INVENTUM ENGINEERING, PC

Remedial Action Work Plan

Riverview Innovation & Technology Campus

Brownfield Cleanup Program Site No. C915353

3875 River Road

Tonawanda, New York 14150

June 29, 2026

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Table of Contents

Executive Summary ix
Engineering Certification xvi
1 Introduction 1
1.1 Remedial Action Work Plan Objectives 1
1.2 Remedial Action Work Plan Organization 1
1.3 Contacts 2
1.4 BCP Site Description and History 3
1.4.1 BCP Site Location and Description 3
1.4.2 Topography 3
1.4.3 Geology 2
1.4.4 Surface Water Hydrology 4
1.4.5 Wetlands and Waterways 5
1.4.6 Groundwater 5
1.5 Nature and Extent of Contamination 6
1.6 Standards Criteria and Guidance 12
2 Design Investigations 13
2.1 Pre-Design Investigation 13
2.2 Ammonia SCO Work Plan 13
2.3 Bench-scale Groundwater Treatment 14
2.4 TENORM Management Plan 14
3 Remedial Design/Remedial Action Scope 15
3.1 Remedial Action Objectives 15
3.1.1 Groundwater 15
3.1.2 Soil 15
3.1.3 Soil Vapor 15
3.2 Remedial Action Work Plan 15
3.3 Remedial Action Scope 16
3.4 Permitting 19
3.4.1 Permits 19
3.4.2 Authorization 20
3.5 Procurement 21
3.6 Materials Management 22

3.7 Treatment 24
3.7.1 Residual Viscous Tar 24
3.7.2 Compressible Purifier Wastes 24
3.7.3 Blue-stained Soils 24
3.7.4 Petroleum Impacted Fill 25
3.7.5 Ammonia Impacted Fill 25
3.7.6 Construction Water 25
3.8 Excavation and Consolidation 26
3.8.1 Excavation 26
3.8.2 Consolidation 29
3.9 Groundwater Collection System Installation 29
3.10 Surface Water Management 31
3.11 Cover Placement 32
3.11.1 Subgrade Preparation 32
3.11.2 Consolidation Cell 33
3.12 Demarcation Layer 34
3.13 Consolidation Cell Capping System 34
3.14 Soil Cover 34
3.14.1 Granular Cover Areas 35
3.14.2 Pavement and Buildings 36
3.15 Groundwater Treatment System Installation and Startup 36
3.16 Treatment System Design 37
3.17 Soil Vapor Assessment and Management 38
3.18 Demolition 39
3.19 Green and Sustainable Remediation 39
3.19.1 Climate Vulnerability Assessment 41
3.20 Monitoring System 41
3.21 Institutional Access Restrictions 41
4 Permits and Other Authorizations 43
4.1 Permits 43
4.2 Authorizations 43
5 Schedule 44
6 Post-construction Plans 45

7 Site Figures 46
8 Bibliography 47
Tables 49
Figures 50
Appendices 51

List of Tables

Table 1-1 - Quantity Summary
Table 3-1 - Material Management Summary
Table 3-2 - GSR Tracking Metrics
Table 3-3 – Monitoring Plan Summary
Table 3-4 - Consolidation Area SCO Analyses
Table 3-5 - Pre-Design Investigation Sampling – Borrow Area
Table 3-6 - Monitoring Well Summary

List of Figures

Figure 1-1 - Site Location
Figure 1-2 - 2024 Aerial Layout
Figure 1-3 - 2024 Topographic Map
Figure 3-1 - Plan, Remedial Alternative
Figure 5-1 - RAWP Schedule
Figure 7-1 – Excavation of Solidified Material
Figure 7-2 – Excavation of VOC Impacted Fill and Soil
Figure 7-3 – Biotreatment
Figure 7-4 – Management of Blue Stained Soil
Figure 7-5 - Insitu Treatment of Blue-stained Soil/Fill
Figure 7-6 - Removal of Soil Piles
Figure 7-7 – Locations of Crushed Concrete
Figure 7-8 - Ammonia Above the Site-specific SCO
Figure 7-9 - Management of Potential TENORM Soils

List of Sheets (Appendix A)

Sheet S-1 - Title Sheet
Sheet S-2 - Selected Plan, Remedial Alternative
Sheet S-3 - Structure and Utility Removal Plan (Sheet 1 of 2)
Sheet S-4 - Structure and Utility Removal Plan (Sheet 2 of 2)
Sheet S-5 - Construction Erosion Control Plan (Sheet 1 of 2)
Sheet S-6 - Construction Erosion Control Plan (Sheet 2 of 2)
Sheet S-7 - Track 1 Areas (Sheet 1 of 2)
Sheet S-8 - Track 1 Areas (Sheet 2 of 2)
Sheet S-9 - Plan and Sections, Consolidation Cell
Sheet S-10 - Consolidation Area Construction
Sheet S-11 - Excavation of Solidified Materials
Sheet S-12 - Excavation of Solidified Materials and Blue-stained Soils
Sheet S-13 - Excavations VOC impacted Fill and Soils (MW-BCP-13 and MW-BCP-16 Areas)
Sheet S-14 - Biotreatment

Sheet S-15 - In situ Solidification of Blue-stained Fill
Sheet S-16 - Removal of Soil Piles
Sheet S-17 - Ammonia Source Soils
Sheet S-18 - Management of TENORM Soils
Sheet S-19 - Site & Utility Plan (Sheet 1 of 2)
Sheet S-20 - Site & Utility Plan (Sheet 2 of 2)
Sheet S-21 - Subgrade Plan (Existing Fill, Demarcation Layer) (Sheet 1 of 2)
Sheet S-22 - Subgrade Plan (Existing Fill, Demarcation Layer) (Sheet 2 of 2)
Sheet S-23 - Subgrade Plan (Unclassified Fill) (Sheet 1 of 2)
Sheet S-24 - Subgrade Plan (Unclassified Fill) (Sheet 2 of 2)
Sheet S-25 - Grading Plan (Finished Grade) (Sheet 1 of 2)
Sheet S-26 - Grading Plan (Finished Grade) (Sheet 2 of 2)
Sheet S-27 - Landscape Plan (Sheet 1 of 2)
Sheet S-28 - Landscape Plan (Sheet 2 of 2)
Sheet S-29 - Perimeter Road Profile (Sheet 1 of 3)
Sheet S-30 - Perimeter Road Profile (Sheet 2 of 3)
Sheet S-31 - Perimeter Road Profile (Sheet 3 of 3)
Sheet S-32 - Details, Retention Pond Secondary Outfall
Sheet S-33 - Plan and Details, Groundwater Control Systems
Sheet S-34 - Process Flow Diagram, Groundwater Treatment System
Sheet S-35 - Monitoring Network (Sheet 1 of 2)
Sheet S-36 - Monitoring Network (Sheet 2 of 2)

List of Appendices

A – Construction Sheets
B - Effluent Standards and Groundwater Treatment System Design Basis
C - CAMP
D – Engineering Report – Stormwater Management
E - Supplemental Test Pits – MW-BCP-13 and MW-BCP-19
F – Remedial Action Monitoring Plan
G - GHG Model Results
H - Health and Safety Plans
I - TENORM Management Plan
J - Site Management Plan Outline
K - Final Engineering Report Outline

List of Acronyms and Abbreviations

AA	Alternatives Analysis
AAR	Alternatives Analysis Report
ACM	Asbestos Containing Material
AMSL	Above Mean Sea Level
AOI	Area of Investigation
AST	Aboveground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	Below Ground Surface
BMP	Best Management Practice
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
cm/s	Centimeters per second
CPP	Community Participation Plan
EDD	Electronic Data Deliverable
EDI	Earth Dimensions, Inc.
EWP	Excavation Work Plan
FER	Final Engineering Report
ft bgs	Feet below ground surface
ft-NAVD88	Elevations as shown on the Sheets are NAVD 1988
FWRIA	Fish and Wildlife Resources Impact Analysis
HASP	Health and Safety Plan
IDW	Investigation Derived Waste
IRM	Interim Remedial Measure
Koc	Organic carbon partition coefficient
Kow	Log octanol-water partition coefficient
MCC	Maximum Concentration of Contaminates
mg/kg	Milligrams per kilogram
mL/min	Milliliters per minute
MS/MSD	Matrix spike/matrix spike duplicate
MW	Monitoring Well
MS4	Municipal Separate Stormwater Sewer System
NA	Natural Attenuation
NAPL	Non-aqueous Phase liquid
ng/L	Nanograms per liter
NWI	National Wetland Inventory
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
OM&M	Operation, Maintenance, and Monitoring
ORP	Oxidation Reduction Potential
OSC	Ontario Specialty Contracting
OU	Operable Unit

OWS	Oil/Water Separator
PAH	Polycyclic aromatic hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated biphenyls
PEM	Palustrine Emergent
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization detector
POTW	Publicly Owned Treatment Works
Powers	Powers Coal and Coke, LLC.
PPE	Personal Protective Equipment
PRAP	Proposed Remedial Action Plan
PRR	Periodic Review Report
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QC	Quality Control
QHHEA	Qualitative Human Health Exposure Assessment
RA	Remedial Action
RAMP	Remedial Action Monitoring Plan
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RD	Remedial Design
RI	Remedial Investigation
RIR	Remedial Investigation Report
RITC	Riverview Innovation & Technology Campus, Inc.
RIWP	Remedial Investigation Work Plan
ROD	Record of Decision
RQD	Rock Quality Designation
SB	Soil Boring
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Values
SMP	Site Management Plan
SMR	Site Management Report
SPDES	State Pollutant Discharge Elimination System
SRIWP	Supplemental Remedial Investigation Work Plan
SS	Surface Sample
SSDS	Sub-Slab Depressurization System
SVOC	Semi-volatile organic compound
SVE	Soil Vapor Extraction
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCC	Tonawanda Coke Corporation
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCWG	Tonawanda Community Work Group
TOGS	Technical and Operational Guidance Series

TENORM	Technically Enhanced Naturally Occurring Radioactive Material
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
ug/Kg	Micrograms per kilogram
ug/L	Micrograms per liter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U. S. Geological Survey
VISL	Vapor Intrusion Screening Levels
VOC	Volatile Organic Compound
W	Water Sample (Not Groundwater)
WOUS	Waters and Wetlands of the United States

Executive Summary

On behalf of Riverview Innovation & Technology Campus, Inc (RITC), Inventum Engineering, P.C. (Inventum) has prepared this Remedial Action Work Plan (RAWP) for the RITC Brownfield Cleanup Program Site (BCP Site). The RAWP has been prepared for implementation of the remedy selected and approved by the New York State Department of Environmental Conservation (NYSDEC). The scope includes activities that are appropriate for successful construction of the remedial alternative in the NYSDEC Decision Document (NYSDEC August 2024) as well as the range of anticipated conditions to be addressed by the remedial action.

RITC is a volunteer under the BCP as it had no ownership or operational history at the operating facility. The BCP Site is listed as NYSDEC Site Number C915353. The approximate 86.5-acre BCP Site represents a portion of the former Tonawanda Coke Corporation (TCC) facility, which was an operating coke making and by-products facility for more than 100-years. A Remedial Investigation (RI) was conducted in accordance with the DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) and a NYSDEC approved Remedial Investigation Work Plan (RIWP). The Remedial Investigation Report (RIR) is available in the Document Repositories. The Alternatives Analysis Report (AAR) was prepared and submitted in May 2024 and the Decision Document selecting the remedial alternative was signed by the NYSDEC in August 2024.

The RI, site management activities, and the Interim Remedial Measures (IRMs) have provided comprehensive understanding of the nature and extent of contaminants of concern, based on the on-site observations, RI testing, and the results of more than 1,100 IRM and site management analytical samples. In addition, prior to and during the RI execution, Inventum and Ontario Specialty Contracting (OSC) identified and implemented numerous IRMs that have been designed and implemented to proactively and systematically eliminate significant potential exposures to human health and the environment at the BCP Site. Construction Completion Reports (CCRs) for completed IRMs have been submitted and CCRs for ongoing IRMs will be submitted for review and approval as the IRMs are completed and will be incorporated into the Final Engineering Report (FER).

Site Description

The BCP property is located at 3875 River Road in the Town of Tonawanda, New York and includes former operating areas of the TCC facility. The TCC had a long history of environmental and safety violations prior to closing and filing for bankruptcy protection in October 2018.

The BCP Site occupies approximately 86.5-acres of the total approximately 140-acres of RITC properties and consisted broadly of the former production area (former battery, powerhouse, oil recovery, and by-products areas) and the former coke and coal yards (described in the RI Report, Inventum 2023). The RITC property (Figure 1-1) is in a heavily industrial area of the Town of Tonawanda, approximately 0.5 mile east of the Niagara River. The BCP Site is bordered to the:

- North by abandoned railroad lines, a former reclamation facility/salvage yard (purchased by the Town of Tonawanda), a solid waste landfill within a quarter mile, and further north (>0.25-mile) by oil storage and refining operations and Interstate 190;
- East by Site 110 (Site No. 915055), high voltage power lines, and a commercial industrial area within a quarter mile and further east (>0.25-mile) by Grand Island Boulevard and Interstate 190;

- South by a high voltage electrical line easement, a major oil storage facility, and commercial/industrial operations within a quarter mile, further south (>0.25-mile) by more commercial/industrial operations, and a small residential community. The nearest residences to the BCP Site are located approximately 0.4-miles from the southern BCP Site boundary; and
- West by Site 109 (Site No. 915055), the former Allied Chemical Special Chemical Division facility (3821 River Road BCP Site #C915003), industrial operations (Vanocur), and Swift River Associates (an aggregate supplier). River Road is within a quarter mile of the BCP Site (contiguous with Site 109). Further southwest and west is Site 108 (Site No. 915055, 3800 River Road), Niagara River World (heavy industrial and logistic operations) and an asphalt terminal, and beyond these industrial properties, the Niagara River.

Site Background

Prior to its closure in 2018, the BCP Site was an operating coke making and by-products facility for more than 100-years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company was merged into Allied Chemical Corporation[1], which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility continuously from 1978 through October 2018. TCC filed for bankruptcy protection in 2018 and all coke manufacturing on the property was permanently discontinued. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the property to RITC was approved by the U.S. Bankruptcy Court. The purchase of the property was completed October 10, 2019. Environmental management of the property was transitioned from the USEPA to RITC between September 2019 and June[2] 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a) as RITC had never conducted coking or by-product production operations on the property, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the property, and has exercised all appropriate care since acquisition. Following approval of the BCP Agreement, RITC has conducted extensive site management, cleanup, and investigation activities in accordance with a series of NYSDEC approved IRM and RI work plans and has characterized the conditions at the BCP Site.

Manufacturing processes used at the plant have included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating a blend of coal in the absence of oxygen. The resulting carbon material “coke” was used, among other things, in foundries and for the production of steel.

The liquids and tars produced on the property were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials was the source of the majority of releases to the ground surface.

[1] Note: Allied-Signal acquired Honeywell in 1999. The combined/merged entity retained the Honeywell name.
[2] The USEPA managed surface water on the property until the NYSDEC approved RITC’s Storm Water Pollution Prevention Plan (SWPPP) in May 2020.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of deterioration. Since the acquisition, RITC has implemented a series of IRMs and is conducting associated maintenance and site management activities to eliminate potential threats and improve the safety and control of the remaining infrastructure, both within and outside the requirements of the BCP Program. Although not all demolition is regulated by the NYSDEC, RITC provided notices and weekly updates on all BCP Site activities. The implemented and ongoing IRMs are eliminating safety hazards on the property and were selected and designed to address potential threats.

It is important to note that this RAWP is for the remedial actions defined in the Decision Document and Record of Decision. There are details of the proposed redevelopment; roadways, stormwater management, building footprint representation, and substation layouts shown for reference. The development detail are to provide reference for the orientation of certain features but will be reviewed and approved by the Town of Tonawanda and other agencies under the Site Plan approval process not by the NYSDEC or NYSDOH with respect to the BCP.

Geology

The geology beneath the Site is relatively straightforward and consistent with regional studies. Fill material overlies native clay and till deposits. The fill is composed primarily of coal, coke, and breeze and to a lesser extent reworked silts, sands, gravels, and miscellaneous fill debris (ex. Wood and brick). The impacts of the TCC operation are contained within the fill. The clay underlying the fill is more than 40- feet thick and the data obtained to date indicates it is less permeable than the clay used in a typical landfill liner.

Nature and Extent

The RI was completed on the BCP Site between October 2020 and September 2021. The RI data is supplemented and confirmed by data collected during the IRMs, site management on the BCP Site, and the RIs on the adjacent Sites 109 and 110; And consisted of an investigation program of test pitting, soil borings, monitoring well installation, surficial soil sampling, surface water sampling, groundwater sampling, and "sediment[3]" sampling. Assessment of subsurface soil contamination was defined based on historical use to establish the RI scope of work and define the nature and extent of impact. The RI data has allowed definition of the nature and extent of contamination on the BCP Site and allowed the NYSDEC to select the appropriate remedial alternative technologies to address contamination and potential exposures (NYSDEC, August 2024).

Qualitative Human Health Exposure Assessment

Inventum completed a qualitative human health exposure assessment (QHHEA) in accordance with NYSDEC DER-10 requirements. The QHHEA was Chapter 5 of the RI Report (Inventum, 2024) determined that there are no current completed pathways for exposure, and therefore no potential exposures, to any offsite receptor with the exception of contact to surface water from the settling ponds and outfalls on the Site. All current and future potential exposures would be associated with contact with fill, shallow groundwater, soil vapor, and remaining process residuals. The onsite potential exposures will be addressed

[3] The term sediment as used herein is fill that is submerged below the flow in stormwater management facilities, there is no sediment as normally defined as loose sand, clay, silt, and other soil particles that settle at the bottom of a body of water, on the BCP Site.

through remedial actions selected by NYSDEC and Institutional Controls/Engineering Controls (IC/ECs), including a Site Management Plan and Environmental Easement.

Conclusions of the Remedial Investigation

The data from the RI and IRMs establish that:

- The potential exposure pathways at the BCP Site have been or are being eliminated;
- The BCP Site surface is entirely covered with fill (average 54-inches thick) underlain by more than 40 feet of low permeability silty clay;
- In its current condition, there are no areas of the BCP Site surface meeting the NYSDEC criteria for unrestricted use;
- The most significant area of impact is in fill and shallow groundwater below the western portion of the former production area (AOI2);
- The fill at the BCP Site does not pose potential exposures to human health or the environment for off-site receptors;
- With very few isolated and near the clay fill interface exceptions, the clay at the BCP Site has not been affected by the TCC operations;
- The impacts to groundwater, with very few isolated exceptions in the upper clay, are limited to shallow perched groundwater in the fill;
- Impacts to shallow groundwater are contained on the property and do not flow off the BCP Site prior to treatment in the onsite surface water controls;
- Naturally occurring background metals are the only compounds detected above Class GA Standards in upper clay groundwater samples in areas not associated with the tar deposition areas;
- Naturally occurring background metals are the only compounds detected above Class GA Standards in lower clay groundwater samples;
- The only compounds detected in bedrock water samples above the Class GA Standards are naturally occurring background metals or metals associated with suspended solids; and
- The removal of waste from containers, buildings, tanks, ponds, and stormwater systems at the BCP Site has accounted for the majority of potentially mobile chemicals left on the property.
- Shallow groundwater, where present, is being, and can be effectively controlled with collection trenches collecting moderate volumes of groundwater.

An overall summary of the nature and extent of impact within the AOIs can be subdivided into three characteristics:

- Low Impacts: AOI 3 (Parking Lot Area) and AOI 6 (Water Treatment Area);
- Materials Management Impacts: AOI 4 (Coke Yard), AOI 5 (Coal Yard), and AOI 7 (Southern Drainage Area); and
- Production Area Impacts: AOI 1 (North Rail Corridor) and AOI 2 (Former Production Area).

Remedial Action Objectives (RAOs)

The generic RAOs address all media encountered and are applicable to the potential for exposure to the compounds identified by the RI. The generic RAOs for Public Health and Environmental Protection are applicable to the following media on the Site (NYSDEC, 2024):

- Groundwater
- Soil
- Soil Vapor

Alternatives Analysis Report (AAR)

The detailed AAR was completed following the procedures required by NYSDEC DER-10 and DER-31. The AAR identified and screened remedial technologies applicable to the nature and extent of contamination identified in the RI and ability to achieve the RAOs. Seven remedial alternatives were assembled, and each provides an array of technologies to comprise a comprehensive remedial program for the BCP Site. The seven assembled remedial alternatives were then screened to identify the single recommended alternative that is most appropriate for the Site. The NYSDEC reviewed the recommendation and through their review and public comments identified the selected remedial alternative (NYSDEC, August 2024).

Selected Remedial Alternative

The Focused RI was designed to address significant threats to human health and the environment and eliminate potential exposure pathways. The RI was executed to characterize the areas known to have the potential to be impacted. The AAR recommended a remedial alternative to address the impacts and potential exposures that remain in fill, limited areas of the upper clay, groundwater, and soil vapor at the BCP Site.

The NYSDEC selected (NYSDEC, August 2024) a remedial alternative that consists of:

- Institutional/Engineering Controls
  - Placing an Environmental Easement on the controlled property (all portions not meeting Track 1 requirements);
  - Placing use restrictions on the property prohibiting the installation of drinking water wells without necessary Town of Tonawanda approvals and water quality treatment as determined by the NYSDOH to render it safe for intended use and prohibiting residential development;
  - Establishing procedures for BCP Site management, including requirements for future onsite excavation in a Site Management Plan (SMP) and Excavation Work Plan(s) (EWPs);
  - Conducting groundwater monitoring in accordance with the SMP;
  - Groundwater compliance monitoring in an SMP;
  - Annual reporting in Periodic Review Reports (PRRs);
- Source Controls
  - Ongoing OM&M;
  - Removal of any remaining above ground tanks, process piping, and process equipment;
  - Removal of all remaining potentially impacted buildings (MG Building and conveyor transfer structure);
  - The existing concrete lined stormwater sedimentation ponds will be used until the new stormwater retention basin is completed. The concrete lined basins will be cleaned and taken out of service thereafter in accordance with the Site 109 remedial actions;
  - Removal of fill along the perimeter of the BCP Site. The removal of the fill around the perimeter is expected to expose the underlying silty clay and allow a portion the perimeter to meet Track 1 criteria and to eliminate the potential for shallow groundwater migration

to or from the BCP Site. This removal will effectively manage the impacted fill at MW-BCP-24A, MW-BCP-27A, and SS-BCP-15 and contain the groundwater at MW-BCP-18;
    - Biotreatment of areas with high TPH concentrations. The treatment protocol will be based on the results of the ST24 Bioremediation Interim Remedial Measures Work Plan proposed April 2023, implemented and ongoing;
    - In situ stabilization of the blue-stained soils in the South Drainage Area AOI;
    - Excavation and treatment of upper clay with impacted groundwater at and around the MW-BCP-13B and MW-BCP-19B areas;
    - Excavation and solidification of the fill and associated shallow groundwater within the footprint of each consolidation area;
    - Solidification and consolidation of the viscous mobile tar and NAPL; and
    - Placement of the solidified tar impacted fill, solidified fill with NAPL, purifier and iron oxide pile materials in a consolidation area(s) constructed in the former production area.
- Elimination of Exposure Pathways
    - Clearing, grubbing, and grading the BCP Site to allow placement of the cover;
    - Consolidation of solidified/stabilized materials in the production area;
    - Continuing monitoring the surface water discharge in accordance with the SWPPP until the completed cover is established and no contact between precipitation and underlying fill is possible;
    - Closure of existing underground utilities that could act as preferential pathways;
    - Construction of a full-scale groundwater collection system;
    - Testing, installation, and startup of a groundwater collection and treatment system;
    - Regrading of fill on the BCP Site to allow placement of a cover system in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). The measured concentrations in the cover materials will be at or lower than the commercial SCOs;
    - Vapor intrusion evaluations shall be conducted for all future occupied structures over areas potentially having residual VOC residuals including provision for implementing actions recommended to address exposures related to soil vapor intrusion; and
    - Maintenance of the cover systems, vegetated areas and groundwater collection and treatment system.

As stated earlier, the following actions have been assumed to be completed prior to implementation of the recommended remedial alternative:

1. Demolition of all above ground structures except the office and former maintenance buildings. The Town of Tonawanda POTW revenue monitoring structure may be replaced with a below grade facility;
2. ASTs have been emptied and removed;
3. Above ground process equipment has been decontaminated and removed;
4. ACM has been abated, except for the office and former maintenance buildings;
5. Groundwater IRM is operational, and the technology required for groundwater treatment is successfully demonstrated, although additional bench-scale testing has been completed to improve the understanding of the technologies available to achieve the discharge criteria for extracted groundwater;
6. The Feasibility Study for Site 109 is completed and the NYSDEC selected remedy is consistent with the selected BCP Site remedial alternative;

7. The Feasibility Study for Site 110 has been completed and the recommended technologies are consistent with the BCP Site recommended alternative.

Remedial Action Work Plan

The RAWP defines the requirements for the completion of the remedial action, including tracking the green and sustainable remediation parameters to be incorporated into the remedial design and monitored in compliance with the green remediation initiative (DER-31) including, but not limited to, incorporation of green remediation principles and a climate change vulnerability assessment.

The remedial design is presented in this RAWP with all tables, design figures, constructions sheets, and calculations attached. The construction drawings have been included in an Appendix and can be provided as a stand-alone set to be used during the implementation of the RAWP and as the basis for the as-built drawings.

Schedule

The RAWP defines the actions through the completion of the remedial actions and the documentation of those actions in the FER. The schedule presented depicts the sequence of ongoing and proposed activities through completion of the FER and includes the preparation and submittal of the Site Management Plan to define the long-term operation, Maintenance and Monitoring (OM&M) activities. The long-term schedule will be presented in the SMP.

Engineering Certification

I, John P. Black certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10), Green Remediation (DER-31).

Respectfully Submitted,

Inventum Engineering, P.C.

John P. Black, P.E.

Date: June 29, 2026

License No: 062818-1

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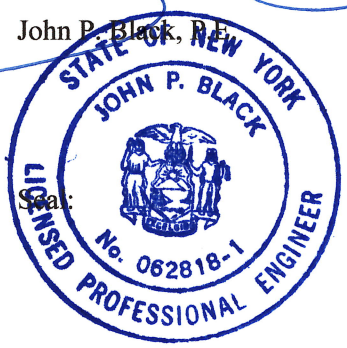

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1 Introduction

On behalf of Riverview Innovation & Technology Campus, Inc (RITC), Inventum Engineering, P.C. (Inventum) has prepared this Remedial Action Work Plan (RAWP) for the RITC Brownfield Cleanup Program Site (BCP Site) located at 3875 River Road in Tonawanda, Erie County, New York (Figure 1-1).

RITC is a volunteer under the BCP as it had no ownership or operational history at the facility until after it was purchased through the U.S. Bankruptcy Court. The coke making and by-products facilities were never operated by RITC. All work conducted for the BCP Site was completed on behalf of RITC, in accordance with NYSDEC approved work plans. The BCP Site is listed as Site Number C915353. The BCP Site represents a portion of the former Tonawanda Coke Corporation (TCC) facility, which was an operating coke making and by-products facility for more than 100-years. TCC filed for bankruptcy protection in 2018 and all manufacturing on the property was permanently suspended in October 2018. On September 23, 2019, the sale of the property to RITC was approved by the U.S. Bankruptcy Court and the purchase was completed October 10, 2019. On February 14, 2020, a Brownfield Cleanup Agreement (BCA) was signed by RITC and the NYSDEC.

The RAWP was prepared to define the tasks required to complete the remedial alternative selected by the NYSDEC (August 2024) in accordance with the BCP Agreement, DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) – Section 5.2(b), and DER-31 Green Remediation (September 2010). The Remedial Investigation Report (RI Report, Inventum, 2023) for the BCP Site was submitted to the NYSDEC July 25, 2022. The Draft Alternatives Analysis for the BCP Site was submitted in April 2024. The Decision Document defining the remedial alternative to be implemented was signed August 28, 2024.

1.1 Remedial Action Work Plan Objectives

The objectives of the RAWP are to define the scopes of the actions required to successfully implement the selected remedial alternative. The ultimate goals for the BCP Site are to create a remediated property that is protective of human health and the environment, complies with State Criteria and Guidance (SCGs), and that can be safely redeveloped for commercial or industrial purposes. The remedial action will be a Track 4 cleanup – restricted use with generic SCOs based on the reasonably anticipated commercial use of the BCP Site. As a result of the recommended remedial action, approximately 7 acres (8 percent) of the BCP Site will meet Track 1 – unrestricted use, cleanup criteria.

1.2 Remedial Action Work Plan Organization

This RAWP Report has been organized into the following sections:

Section 1 - Introduction
Section 2 - Design Investigations
Section 3 - Remedial Design/Remedial Action Scopes
Section 4 – Permits and Other Authorizations
Section 5 – Schedule
Section 6 – Post-Construction Plans
Section 7 – Site Figures
Section 8 – Bibliography
Tables
Figures
Appendices

It is important to note that this RAWP is for the implementation of the remedial actions defined in the Decision Document (NYSDEC August 2024). There are details of the proposed redevelopment; roadways, stormwater management, building footprint representation, and substation layouts shown for reference. The development detail are to provide reference for the orientation of certain features but will be reviewed and approved by the Town of Tonawanda and other agencies under the Site Plan approval process not by the NYSDEC or NYSDOH with respect to the BCP.

1.3 Contacts

A Citizen Participation Plan (CPP, Inventum, 2020[4]) has been followed throughout the management of the BCP Site and is also included as Appendix A to the Remedial Investigation Work Plan (Inventum 2020). The CPP provides information on how information generated on behalf of RITC has been and is being made available and how the owner and NYSDEC inform and involve the public during the remediation of the BCP Site.

Key contact information for NYSDEC, New York State Department of Health (NYSDOH), and Inventum is provided below for reference:

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A website has been established for the projects at the RITC properties and can be accessed through: www.RiverviewTechCampus.com. The website contains numerous documents and photographs that may help the reader envision the locations referenced throughout this work plan.

Copies of approved documents are sent in print and on flash drives to the Buffalo and Erie County Public Libraries, both the Central (Main) and Kenmore Branches:

[4] Appendix B of the CPP has been updated and distributed to the NYSDEC, NYSDOH and posted on the website.

- Buffalo and Erie County Public Library
  Central Library
  One Lafayette Square
  Buffalo, New York 14203
- Buffalo and Erie County Public Library
  Kenmore Branch
  160 Delaware Road
  Kenmore, New York 14217

Approved documents can also be accessed in the NYSDEC DECinfo Locator;

- https://extapps.dec.ny.gov/data/DecDocs/C915353/

1.4 BCP Site Description and History

The BCP Site (Figure 1-2) includes former operating areas of the TCC. The TCC had a long history of environmental and safety violations and closed in October 2018. The closure of the facility eliminated the primary source of those environmental violations. The shutdown and USEPA emergency response actions did not address residuals in buildings, containers, process equipment, or fill at the property. The conditions left on the property by TCC have been the subject of numerous IRMs and completion of the required remedial actions are the focus of this RAWP.

1.4.1 BCP Site Location and Description

The BCP property is located at 3875 River Road in the Town of Tonawanda, Erie County, New York (Figure 1-1). The BCP Site occupies an area of approximately 86.5-acres of the total approximate 140-acres that consist of the RITC properties. The BCP Site broadly consists of the former production area (ex. Battery, powerhouse, oil recovery, and by-products area) and coke and coal yards (described in the RI Report, Inventum 2023).

The property (Figure 1-1) is in a heavily industrial area approximately 0.5 mile east of the Niagara River. The BCP Site is bordered to the:

- north by abandoned railroad lines, a former reclamation facility/salvage yard (purchased by the Town of Tonawanda), a solid waste landfill within a quarter mile, and further north (>0.25-mile) by oil storage and refining operations and Interstate 190;
- east by Site 110 (Site No. 915055), high voltage power lines, and a commercial industrial area within a quarter mile and further east (>0.25-mile) by Grand Island Boulevard and Interstate 190;
- south by a high voltage electrical line easement, a major oil storage facility, and commercial/industrial operations within a quarter mile, further south (>0.25-mile) by more commercial/industrial operations, and a small residential community. The nearest residences to the BCP Site are located approximately 0.4-miles from the southern BCP Site boundary; and
- west by Site 109 (Site No. 915055), the former Allied Chemical Special Chemical Division facility (3821 River Road BCP Site #C915003), industrial operations (Vanocur), and Swift River Associates (an aggregate supplier). River Road is within a quarter mile of the BCP Site (contiguous with Site 109). Further southwest and west is Site 108 (Site No. 915055, 3800 River Road), Niagara River World (heavy industrial and logistic operations) and an asphalt terminal, and beyond these industrial properties, the Niagara River.

1.4.2 Topography

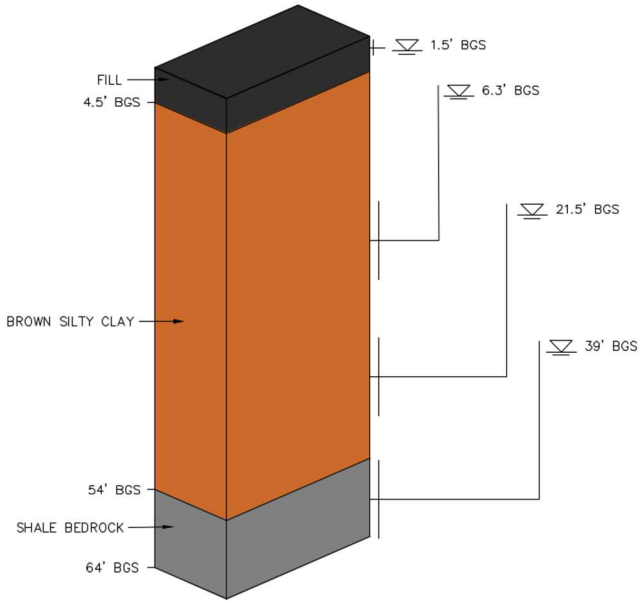
Topographical surveys of the BCP Site were conducted in November 2019, March 2022, and in June 2024 (Figure 1-3) by Niagara Boundary and Mapping Services (now Wendle), a New York State licensed surveyor. Following implementation of numerous IRMs, the elevation of the BCP Site is generally flat with

a slight downslope from east to west and north to south. Surface elevations range from approximately 608feet above mean sea level (ft. NAVD88) on the northeastern boundary to 600 ft NAVD88 on the southwestern boundary, with some remaining piles and local areas above 608 ft. NAVD88. The average elevation of the former production area is approximately 606 ft NAVD88.

The entire surface of the BCP Site has been completely altered from its natural grade. IRMs and ACM activities have continued since the 2022 survey, so the topography continues to evolve. As a result, a new topographic survey was completed for the RAWP in 2024 (Appendix A). The relatively circular piles shown throughout the former production area are piles of crushed concrete to be used to develop a uniform subgrade for the cover systems.

1.4.3 Geology

This description of the geology beneath the BCP Site and the larger regional geology is based on the test pit and drilling programs conducted as part of the RI (Inventum, 2023), regional studies conducted by others, boring/monitoring well log data from adjacent properties, historical knowledge, and local experience. The geology of the BCP Site is remarkably uniform as detailed in the boring logs (Appendix B of the RI Report, Inventum, 2023) and as shown in a generalized schematic typical of BCP Site conditions below.



The schematic is to scale illustrating the relative thickness of clay between the fill and the underlying bedrock. The depths to groundwater shown on the right side of the schematic are typical however there are several locations across the BCP Site there is no saturation of the fill.

Fill material overlies the native clay and till deposits across the BCP Site and is composed primarily of coal, coke, breeze and to a lesser extent silt, sand, and gravel (reworked alluvium and glaciofluvial deposits) and miscellaneous debris (ex. wood and brick). The fill was the near surface material encountered in every test pit and boring. Gravel-sized slag (nodules) fill appear to have been used as a base/ballast for the former rail beds and produce the most water of all materials encountered within the fill. Fill thicknesses (2- to 110-inches, average 54-inches) across the BCP Site were mapped and the mapping was based on ground surface

elevations and depths to top of clay observed within the test pits. This data was used to contour the top of clay across the BCP Site. As anticipated, the fill was thicker within the former operational areas of the BCP Site compared to the BCP Site perimeter.

A glaciolacustrine clay deposit consisting primarily of silt, sand, and clay appear to be the most widespread natural overburden deposits in the area of the BCP Site. Glacial till consisting of a poorly sorted, non-stratified mixture of sand, silt, clay, gravel, and rock fragments lies below the glaciolacustrine deposit. The presence and depth of clay below the BCP Site was verified in all medium and deep boring locations at thicknesses in excess of 45-feet. Permeabilities measured for clay samples from the BCP Site collected during the RI were 3.3×10^{-8} centimeters per second (cm/s) and 2.1×10^{-8} cm/s. For reference this is a lower permeability than required for clay used in landfill bottom layer liner systems.

Inventum made a distinction between the clay and till deposits across the BCP Site based on stiffness, field estimation of moisture content, grain size, and plasticity. The upper clay extends across the BCP Site below the fill to depths of 20 to 30-feet bgs. The upper clay was typically described as a reddish brown to brown, very firm to stiff, dry to moist, low to medium plasticity, silty clay (lean clay [CL]). Several cores retrieved from the upper clay exhibited vertical desiccation cracks. The average permeability of the upper clay material was 3.3×10^{-8} centimeters per second (cm/s) from a thin-walled tube sample collected at MW-BCP-02 (14 to 16 feet bgs). The permeability measured during the RI is consistent with the results of 3.3×10^{-6} cm/s 2.9×10^{-8} cm/s reported in the *Supplementary Site Investigation (SSI) Report* dated July 1990 prepared by Conestoga-Rovers & Associates (CRA, 1990).

Silty clay excavated from the BCP Site is proposed for reuse in the soil cover, consolidation cell areas, and to support electrical service infrastructure to the BCP Site. Samples collected during the Pre-design investigations from the proposed retention pond and consolidation areas were evaluated for material quality and reuse suitability. Analytical results confirm that the silty clay meets commercial-use Soil Cleanup Objectives (SCOs) and is suitable for placement in the unclassified layer of the soil cover. Materials designated for the consolidation cell area also satisfy commercial-use SCOs. The geotechnical characteristics of samples of silty clay produced measured permeability ranging from 1.3×10^{-7}- to 1.5×10^{-8} cm/s, which is appropriate for the intended applications, including the consolidation area base and cover. Samples from the new electrical service pole support backfill met unrestricted-use SCOs.

The lower clay extends below the upper clay to the top of the bedrock between 50 and 54-feet bgs. The lower clay was typically described as reddish brown to brown, soft to very soft, moist to saturated, high to very high plasticity, clay with trace rounded gravels. The average permeability of the sample of the lower clay material was 2.1×10^{-8} cm/s from a thin-walled tube sample collected at MW-BCP-01 (30 to 32-feet bgs). No desiccation cracks were observed in the lower clay.

The BCP Site is located within the Erie-Niagara drainage basin of the Erie-Ontario Lowlands Physiographic Province of New York, which is characterized by a thick sequence of rock formations consisting of sandstones, shales, dolostones, and limestones. The shale bedrock was encountered between 50 and 54-feet below ground surface (bgs) in the borings completed for the four bedrock monitoring wells installed during the RI (MW-BCP-01D, MW-BCP-03D, MW-BCP-05D, and MW-BCP-21D). The bedrock encountered below the BCP Site is consistent with the regional description of the Camillus Shale formation. The upper 10-feet of the bedrock was described as a brownish thinly bedded shale with isolated gypsum lenses. The rock-quality designations (RQDs) of the recovered cores were good to excellent.

1.4.4 Surface Water Hydrology

RITC discharges storm water to the Niagara River under a Storm Water Pollution Prevention Plan (SWPPP) approved by the NYSDEC. Surface water is discharged through three outfalls[5]:

- Outfall #001– Discharge point for stormwater runoff from the former production area after treatment in two concrete-lined settling ponds. Only stormwater runoff and seepage of groundwater into the stormwater conveyance systems has been discharging through this outfall since the acquisition of the BCP Site by RITC.
- Outfall #002– Discharge of runoff from the former coal and coke yards and the southern drainage area. During dry weather periods there is no flow from Outfall #002, there is no sustained base flow.
- Outfall #004 — Represents the combined flow from Outfalls #001, #002, Site 109 (Site #915055, OU2), and a section of the offsite 3821 River Road Site (Site #C915003). Outfall #004 discharges to a drainage ditch on the east side of River Road where the flow combines with flows from the western portion of Site 109 and other industrial properties south of Site 109 including the western portion of the 3821 River Road Site (Site #C915003), the National Grid right of way, the Energy Transfer Terminal, as well as portions of River Road. The combined flow is conveyed through a box culvert under River Road, into a drainage ditch onto National Grid property, then through a corrugated steel culvert onto Site 108, and finally in a constructed ditch to the Niagara River.

1.4.4.1 Existing Stormwater Management Features

RITC assumed responsibility for stormwater management after the approval of the SWPPP. RITC has implemented a series of NYSDEC approved IRMs and Surface Water Action plans to eliminate potential runoff and contributions in and to the stormwater system.

1.4.4.2 Former Production Area

Surface water from the North Rail Corridor and Former Production Area flows to one of two systems; the remaining sections of the box culvert or the ditch that replaced the North Storm Sewer System. The remaining section of the box culvert collects and conveys stormwater from the central production area road (aka "Broadway") between the byproducts area, battery, and coal charging building. The box culvert discharges to a south to north oriented box culvert located west of the primary BCP Site road and discharges into the mansion sump. A portion, and at times 100 percent, of the flow from the box culvert is treated in the groundwater treatment system. The new north storm ditch collects water from the north side of the former production area and conveys flow west to a new inlet immediately east of the mansion sump, after which it conveyed flows west into the mansion sump.

From the mansion sump, surface and stormwater flows through the North-South Storm Sewer to the concrete lined settling ponds on Site 109. The concrete lined settling ponds are primarily a two-chamber design system with overflow v-notched weirs. The water is currently routed to the north pond, then the south pond, and through pumps and filters that discharge to a chase that contains the Outfall #001 monitoring location.

The remaining systems will be removed during the remedial action and replaced with passive stormwater management systems for the RITC property (necessarily including Site 110 and portions of 3821 River

[5] Outfall 003 was not in use at the time of the bankruptcy and there had been no flow from this outfall since 2008 (TCC 2016).

Road (#C915003). The remaining utilities to be removed during the remedial action are shown on the construction sheets in Appendix A.

1.4.4.3 Coal and Coke Yards

RITC improved existing conditions in the coal and coke yards and along the south ditch and implemented temporary flow restrictions (through approved work plans) and engineering control features to maintain the quality of drainage through Outfall #002, the discharge point for the Coal and Coke Yards. Sedimentation Pools 001, 002, and 003, as well as the storm water retention basin, are in the coal and coke yards. The remedial action will eliminate the depressions in these areas and provide alternative passive surface water management and control features (Appendix A).

1.4.5 Wetlands and Waterways

Inventum reviewed the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps for the potential presence of Waters and Wetlands of the United States (WOUS) and the NYSDEC Environmental Resource Mapper for the potential presence of NYS Freshwater Wetlands on the BCP Site. A BCP Site-wide Wetland and waterways assessment was completed by Earth Dimensions, Inc. (EDI, currently LaBella) of Elma, New York for the RI. The wetland investigation area encompassed approximately 103-acres and included the BCP Site, Site 109, and Site 110.

The wetland delineation identified six (6) Palustrine Emergent (PEM) wetlands and three (3) waterways (stormwater ponds) within the investigation area. The identified wetlands on the BCP Site and the adjacent State Superfund Site encompass approximately 1.664 acres and were assessed by EDI as being non-federally jurisdictional under the Navigable Waters Protection Rule due to an apparent lack of connectivity to an intermittent or perennial stream. The NYSDEC notified EDI that these are not state jurisdictional waters. Only two of the wetland areas totaling approximately 0.756 acres are located on the BCP Site. The remainder of the identified wetland acreage is located on the adjacent State Superfund Site. All three of the identified waterways (stormwater ponds) are located on the BCP Site. The wetland area and stormwater ponds will be removed. Aquatic benches, swales, and a retention pond were designed and are detailed in this RAWP (Appendix A). The aquatic benches, swales, and retention pond are larger and were designed to provide the stormwater control under current and anticipated climate change conditions.

No listed species or significant habitats were identified on the BCP Site. A Step 1 Fish and Wildlife Resource Impact Analysis (FWRIA) was conducted in accordance with DER-10 and is provided in Appendix D of the RI Report (Inventum 2023). No additional steps are required based on the findings of the Step 1 FWIA.

1.4.6 Groundwater

Groundwater occurs within the BCP Site in three water bearing units as evidenced by regional groundwater studies (NYSDEC 2007), site investigations on this and adjacent properties, and historical knowledge and experience of the area.

The groundwater in the fill layer at the BCP Site can be characterized as a discontinuous unconfined or perched water bearing unit. The observations made during the remedial investigation identified numerous areas where the fill zone lacked water or contained limited saturated thickness. Subsurface water was discontinuous across the BCP Site in this unit and the presence and flow of water is highly dependent on the presence and thickness of permeable gravel and slag materials, the variation of elevation of the underlying clay, and the presence of the storm sewers, former rail beds, and other anthropogenic BCP Site features. Subsurface water within the fill is likely the primary unit for the potential transport of any BCP

Site related constituents within the BCP Site, but the absence of fill along some areas of the BCP Site perimeter and the absence of flowing water in the test pits around the perimeter of the BCP Site demonstrate the fill water bearing unit is not a complete pathway to any offsite receptor. There is no known offsite transport of groundwater in fill from the BCP Site.

The presence and movement of water In the fill was dominated by the gravel and slag used for rail bed materials. The absence of water in the fill at the BCP Site boundaries showed the shallow groundwater system is contained within the fill layer and is localized to the property. The flow through the monitored outfalls indicates the shallow groundwater is controlled by onsite discharge from the fill to the north and south stormwater ditches, surface water pipes and the box culvert under River Road.

The groundwater IRM collects groundwater from five (5) collection trenches, among other sources, in the western portion of the former production area. Additional collection trenches are being installed and connected to the treatment system in 2025. The groundwater elevation data show that at moderate pumping rates (less than 4 gallons per minute[6]) the groundwater system in the western production area can be controlled. The long-term groundwater collection systems have been designed to address the changes in shallow groundwater associated with excavation and consolidation of materials, the distribution of ammonia in groundwater in the former production area on the BCP Site, and the potential impacts of climate change.

The silty clay below the fill can be characterized as an aquitard, confining groundwater from the underlying bedrock. There is likely a very low east to west gradient of groundwater flow across the BCP Site given the topography and low permeability of the water bearing overburden units.

Samples of the clay material from the BCP Site were tested by Geotechnics of Pittsburgh, PA (Appendix A of the RI Report, Inventum, 2023). Samples from the boring for monitoring well MW-BCP-02 (16 to 18 feet bgs) and MW-BCP-01 (30 to 32 feet bgs) were tested. The samples were classified in the laboratory as a Brown Lean Clay based on the Atterberg Limits. The results of the permeability testing were 3.3×10^{-8} centimeters per second (cm/s) and 2.1×10^{-8} cm/s. Three additional samples of the upper clay materials from the proposed consolidation cell area were tested by 3rd Rock Testing of East Aurora, New York and the permeability of the silty clay samples ranged from 1.3×10^{-7}- to 1.5×10^{-8} cm/s.

Groundwater is not utilized as a source of drinking water in the Town of Tonawanda or in the larger Tonawanda area due to the low productivity of the overburden units (fluvial/lacustrine fill and clay deposits), the naturally occurring high mineral content of groundwater in the bedrock unit, and the proximity of the Niagara River. There are no municipal or known private drinking water wells within a 1-mile radius of the BCP Site (EDR 2019). The Town of Tonawanda water intake from the Niagara River is upstream of the RITC properties and the BCP Site.

1.5 Nature and Extent of Contamination

The RI was completed on the BCP Site between October 2020 and September 2021. The RI data is supplemented and confirmed by data collected during the IRMs, site management on the BCP Site and the RIs on the adjacent Sites 109, 110 and the 3821 River Road BCP Site. The RI and IRM data provided the information required to complete the AA.

[6] The pumping rate is a function of the yield of the fill formation, not the pumping or treatment capacity of the system.

RI activities on the BCP Site were divided into seven specific AOIs based on historical use and anticipated environmental impacts related to the historical use. The AOIs defined for the BCP Site are:

- AOI1 – North Rail Corridor – Approximately 6.7 acres - The North Rail Corridor covers an approximately 100-foot-wide portion of the BCP Site from a gate at the northeast portion of the BCP Site to the former parking area (AOI3). AOI1 is bound to the north by; a closed fly ash landfill (unrelated to TCC or the BCP Site), a closed salvage yard formerly owned by the Erie County Industrial Development Corporation (sold to the Town of Tonawanda), and an abandoned rail corridor; to the east by National Grid high voltage transmission rights of way; to the south by AOI2, and to the west by AOI3.

  The north rail corridor located along the northern boundary of the BCP Site contains the space formerly occupied by abandoned rail spurs, a railroad scale and scale building, a two-story brick house (the "Mansion") that was utilized as office space, a large storm water sump ("mansion sump"), and excavated soil piles placed prior to RITC ownership.

- AOI2 – Former Production Area – Approximately 23.6 acres – The former production area AOI encompasses the area of the BCP Site where coke was produced, the by-products were separated and managed, and the boiler house and other auxiliary equipment was located. This area extends from the western boundary of Site 110 to the former parking area (AOI 3) and included the buildings used for heavy vehicle maintenance and the machine shop.

- AOI3 – Parking Lot – Approximately 5.8 acres - The parking lot AOI is the westernmost AOI between the north rail corridor, the former production area, the coke yard, and the coal yard. This AOI represents the western downgradient (relative to AOIs 1, 2, 4 and 5) BCP Site boundary. The area comprising the Parking Lot AOI was acquired from Wickwire Spencer in the 1960s.

- AOI4 – Coke Yard – Approximately 23.2 acres - The coke yard is in the middle of the BCP Site and included the coke yard, coal crusher building, coke screening building, the breeze crusher building, the coke laboratory trailer, the coke office trailer, the thaw shed, and the former coke rail yard and coke conveyor structure. This AOI is surrounded by other AOIs and Site 110. AOI4 is unpaved apart from the slabs from the former coal crusher and breeze crusher buildings (both demolished in 2021).

- AOI5 – Coal Yard – Approximately 16.2 acres - The coal yard is located south of the coke yard. The coal yard is the area where coal from suppliers (via barge, rail, and truck) was stockpiled prior to blending and use in the production process. There was a stacker/reclaimer/conveyor system that bisected and extended the length of the coal yard from west to east. The coal yard contains an engineered storm water collection ditch (the North Ditch) and sedimentation pool #002 in the northwest corner, which accepts flow from the North Ditch. The North Ditch conveys flow from the northern one-half of the coal yard and the adjacent coke yard. Flow, when present, from sedimentation pool #002 is directed through culverts and below grade conduits to the stormwater retention basin in AOI6 (Water Treatment).

- AOI6 – Water Treatment – Approximately 5.7 acres - The former water treatment area is located on the southwest corner of the BCP Site. There was formerly one metal building and two concrete

block buildings that were associated with four large above ground storage tanks (ASTs, ST21 through ST24) and one former small tank (ST20).

- AOI7 – South Drainage Area - Approximately 10.3 acres - The south drainage area is adjacent to the southern boundary of the BCP Site. No production processes are known to have occurred in this area but there were former rail lines, four abandoned rail cars, and the South Ditch in this AOI. The South Ditch collects runoff from the southern one-half of the coal yard and the south drainage area.

The data from the RI and IRMs establish that:

- Potential exposure routes and sources on the BCP Site have been eliminated by the removal of residuals abandoned by TCC in process equipment, tanks, pipes, and buildings.
- The BCP Site surface is entirely covered with fill (average 54-inches thick) underlain by more than 40 feet of low permeability silty clay.
- There are no areas of the BCP Site surface that meet the criteria for unrestricted use in the current condition.
- The most significant areas of remaining impact is in fill below the western portion of the former production area.
- The fill at the BCP Site does not present any potential exposure to human health or the environment to off-site receptors, potential exposures are limited to the property.
- With very few isolated and near surface exceptions, the clay at the BCP Site has not been affected by the TCC operations.
- The impacts to groundwater, with very few isolated exceptions in the upper clay, are limited to shallow perched ground water in the fill;
- Impacts to shallow groundwater are contained on the BCP Site and do not migrate off the BCP Site prior to the treatment in the onsite surface water controls.
- Naturally occurring background metals are the only constituents detected above Class GA Standards in upper clay groundwater samples and are present in areas not associated with the tar deposition areas.
- Naturally occurring background metals are the only constituents detected above Class GA Standards in lower clay groundwater samples.
- The only constituents detected in bedrock groundwater samples above the Class GA Standards are naturally occurring background metals.
- The removal of waste from the fill, buildings, and process equipment from the BCP Site, has controlled the majority of potentially mobile chemicals left on the BCP Site.

On a site-wide scale the identified impacts are shown in a series of Figures. The figures have been updated with the Solidification IRM data and are included in Section 7:

- Figure 7-1 – Excavation of Solidified Material
- Figure 7-2 – Excavation of VOC Impacted Fill and Soil
- Figure 7-3 – Biotreatment
- Figure 7-4 – Management of Blue Stained Soil
- Figure 7-5 - Insitu Treatment of Blue-stained Soil/Fill
- Figure 7-6 - Removal of Soil Piles

- Figure 7-7 – Locations of Crushed Concrete
- Figure 7-8 - Ammonia Above the Site-specific SCO
- Figure 7-9 - Management of Potential TENORM Soils

The figures show the location and extent of each target material. Volumes are summarized on Table 1.1.

Viscous tar and fill with viscous tar (grossly contaminated soil) which had been identified on the BCP Site and encountered during the remedial investigations and IRMs was generally present in thin layers of 2-inches or less, most often less than 1-inch in thickness. The tar and grossly contaminated fill encountered during the IRMs were stockpiled in the former Thaw Shed area and subsequently solidified in accordance with the Satellite Solidification RAWP.

Significant accumulations of viscous tar were solidified during the Solidification IRM and Satellite Solidification RAWP. The quantity of those materials are the solidified mass as documented after solidification with the onsite GPS. The quantity[7] of solidified tar (~61,000 tons) are tabulated and shown in Table 1-1 and on Figure 7-1. The locations and estimated volume of the solidified viscous tar and associated fill include:

- A Tar filled pipe was encountered in TP-BCP-04. It was confirmed the pipe and residuals were completely removed which consisted of an approximately 200-tons;
- "Grossly impacted" fill stockpiled in the former Thaw Shed area.
- Solidified materials from:
  - Former Production area;
  - Former Light Oil and Phenol Areas;
  - Weak Ammonia Liquor Area;
  - Former Tar Seep No. 2 Area;
  - South Rail Car (RC02, RC02, and RC03) Area (consolidated with Thaw Shed pile);
  - South Water Treatment Area Residuals (consolidated with Thaw Shed pile);
  - Junction Building Area (consolidated with Thaw Shed pile).

Despite indications from Site 110 RI data that significant volumes of tar-impacted materials may be present along the BCP Site boundary with Site 110 (west of the north end of TP-BCP-09 and east of TP-BCP-48, near the perimeter of Tar Seep No. 1), subsequent test pits confirmed that no tar-impacted materials were present in this area of the BCP site. Impacted materials remain on Site 110 and will be addressed under the future RAWP for Site #915055 OU1.

NAPL were observed on the BCP Site. Unlike the Viscous Tar, the lower viscosity of NAPL may have allowed it to move to monitoring wells and test pits as the presence of the wells and effects of purging and sampling create a gradient in the associated fill. The material associated with the NAPL areas was solidified during implementation of the Solidification RAWP[8]. The locations and estimated volume of NAPL solidified fill from the following locations (based on the GPS data collected during solidification) are shown on the RAWP Figure 7-1 (Appendix A) and in Table 1-1:

[7] The quantities listed in this RAWP, but the final quantities will be based on observations and confirmation sampling conducted during implementation of this RAWP.
[8] Recent (November 2025) gauging data at MW-BCP-10A has not detected measurable thicknesses of NAPL.

- Light Oil/Phenol Area;
- Weak Ammonia Liquor Area;
- Former Light Oil Area;
- MW-BCP-05 Area;
- Exhauster Building; and
- Pump House Fill.

The sumps associated with the exhauster building may contain NAPL or grossly contaminated materials The potential volume to be excavated and managed are shown on RAWP Figure 7-3 (Appendix A).

- Exhauster Building Area Sumps – 500 tons.

Volatile Organic Compound (VOC) impacted soils and fill were primarily identified in the production area and are coincident with areas of NAPL and tar-impacted fill. These areas are near locations where historical operations included processing and cooling of VOC containing liquids and gases. The production area volumes include the NAPL impacted fill listed above and the zones around the NAPL that had been impacted by the separate phase materials but did not exhibit signs of the presence of a separate phase. The areas of solidified VOC impacted fill are shown on RAWP Figure 7-1:

- Light Oil Area;
- Former Light Oil Area;
- MW-BCP-5A Area;
- Exhauster Building; and
- Pump House Fill.

The residual VOC impacted soils in the two coal yard areas (MW-BCP-13 and MW-BCP-19) are localized as defined by additional monitoring well data collected downgradient of these locations that were not affected by VOCs. The areas of residual VOC impacted fill and soil are (Figure 7-3):

- Exhauster Building area sumps –500 tons[9];
- MW-BCP-19 Area and MW-BCP-13 Area – 2,200 tons.

The areas where the fill has been impacted by petroleum hydrocarbons require remedial action to address the potential nuisance associated with the hydrocarbons. The largest volume of impact was in the water treatment area located west of where the ST-24 Bioremediation Pilot Test was completed (ST24 Bioremediation Interim Remedial Measures Construction Completion Report, Inventum, June 2023) and where the Full-Scale Bioremediation RAWP (ST-21 through ST-23 areas) has been initiated. The remaining areas of petroleum impacted soils are:

- Former Diesel Tank Area – 1,500 tons (Note: this remediation was started by TCC, but they abandoned the work before completion);
- Heavy Equipment Storage Area – 400 tons the area around the former entrance to the roundhouse and the area where the equipment had been stored (Figure 7-4).

[9] The quantities listed in this RAWP, but the final quantities will be based on observations and confirmation sampling conducted during implementation of this RAWP.

Although significant concentrations of petroleum hydrocarbons were not detected in the test pits near the heavy equipment building, historic spills in this area (NYSDEC Spill Numbers 1207205 and 1311845) were never addressed by TCC.

Given the age of the spills, natural attenuation of spilled materials may have occurred. There is no evidence to suggest that TCC performed unreported remediation in this area. Additionally, the UST shown on historical compressor building drawings had been removed prior to the RI, and no petroleum-impacted soils were encountered during the RI or subsequent demolition of the compressor building.

There are two areas of known Iron Oxide and Purifier wastes on the BCP Site. Based on the investigation of the purifier boxes during demolition and the presence of subgrade purifier box wastes, a contingency has been included for potential Iron Oxide material below the pile. There are three other areas that may have been impacted by purifier materials (Figure 7-5):

- Remaining Purifier Box residuals – 3,600 tons;
- Iron Oxide Pile – 5,000 tons;
- Potentially subgrade Iron Oxide materials – up to 8,000 tons; and
- TP-BCP-46 Area – 1,800 tons.
- Stained Soils in the vicinity of the South Fill Piles – 3,000 tons.

The USEPA accumulated soils from unknown locations on the BCP Site. Some of the materials are known to have been impacted by metals and/or cyanide (not including purifier wastes). The soil piles accumulated, but undocumented, by the USEPA will be managed (Figure 7-7):

- USEPA Soil Piles – 1,000 tons.

RITC conducted a detailed survey and sampling program to identify the locations of potential Technically Enhanced Naturally Occurring Radioactive material (TENORM), Figure 7-10. During the excavation of these areas, the soils will be screened, and the fill will be segregated in accordance with the NYSDEC approved TENORM Management Plan (MJW, 2026). Soils with gamma activity measured by counts per minute (CPM) less than 12,000 can managed in accordance with the site-wide grading plan, soils with counts between 12,000- and 17,000 CPM shall be left in place under no less than 2 feet of cover or placed in the consolidation area, and soils with counts greater than 17,000 CPM that must be excavated will be stockpiled and sampled. The sampled materials shall be placed in the consolidation area if the Radium concentration is greater than the 5.0 picocuries per gram (pCi/g) threshold for TENORM Fill and below the 15 pCi/g threshold for TENORM Waste. Any material classified as TENORM Waste shall be disposed at a licensed facility outside New York.

Residual groundwater impacts center around the former production area; however, there are areas outside AOI1 and AOI2 where excavation and aeration of fill material is proposed to manage shallow groundwater VOCs and cyanide concentrations. Due to the thin nature of the impacted groundwater zone, the volume of impacted groundwater, estimated to be 5,000,000 gallons, is limited.

The areas where impacted fill materials contain ammonia concentrations above the site-specific Ammonia Protection of Ecological Resources SCO are within the Former Production area (Figure 7-9.

1.6 Standards Criteria and Guidance

The SCGs that are applicable and appropriate for the remedial design and development of this RAWP include:

- 6 NYCRR Part 375–- Environmental Remediation Programs (December 2006)
- 6 NYCRR Part 376–- Land Disposal Restrictions
- 6 NYCRR Part 608–- Use and Protection of Waters
- 6 NYCRR Parts 700-706–- Water Quality Standards (June 1998)
- CP-43–- Groundwater Monitoring Well Decommissioning Policy (November 2009)
- Air Guide 1–- Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006, with updates).
- NYSDEC CP-51/Soil Cleanup Guidance, October 21, 2010.
- Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), April 2023.
- NYSDEC DER-10/Technical Guidance for Site Investigation and Remediation, May 3, 2010.
- NYSDEC DER-31/Green Remediation, January 20, 2011.
- NYSDEC DMM-5/Management of Soils Contaminated with Technically Enhanced Naturally Occurring Radioactive Materials (TENORM).
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)

2 Design Investigations

Design investigations have been completed during the preparation for, and implementation of this RAWP:

1. Inventum, 2023, Pre-Design Investigation Work Plan, Riverview Innovation & Technology Campus, Brownfield Cleanup Program Site No. C915353, 3875 River Road, Tonawanda, New York 14150, Revised February 15.
2. Inventum, 2024, Pre-Design Investigation Work Plan, Development of Soil Cleanup Objective for Ammonia, Riverview Innovation & Technology Campus, Brownfield Cleanup Program Site No. C915353, 3875 River Road, Tonawanda, New York 14150, June 12.
3. Groundwater Treatment Technologies, 2025, Treatability Report, October 20.
4. Groundwater Treatment Technologies, 2025, Basis of Design Report.
5. Topographic Mapping – Niagara Boundary July 2024
6. Groundwater Elevation Measurements – Groundwater IRM and periodic site-wide including adjacent Site 3821 River Road and Sites 109 and 110. In process.
7. TENORM Investigation and TENORM Management Plan (MJW, 2026).
8. Full-scale Testing of Bioremediation in the Water Treatment Area (Inventum, 2025).

These activities provided data for the finalization of the remedial design, this RAWP and will subsequently be used as the basis for preparation of the SMP.

2.1 Pre-Design Investigation

The pre-design investigations were designed and implemented to collect data in the Production Area, Parking Lot, Coke Yard, the Coal Yard, and the South Drainage. The purposes of these pre-design investigations were to:

- Evaluate the conditions below the building slabs and secondary containment areas in the Production Area AOI;
- Define the conditions in the Consolidation Cell Location including, but not limited to;
    - Beneath Slabs;
    - Around existing Sump Locations;
    - Below Secondary Containment Locations; and
    - The quality of the silty clay (analytical and geotechnical).
- Further quantify the understanding of the quality of fill available for onsite reuse in the Parking Lot (Note: only pre-design data is included herein, additional testing will be required if borrow operations are implemented);
- Investigate the vicinity of MW-BCP-13B and MW-BCP-19B (Appendix E) to provide an initial basis for the selection of the target depth for the beginning of the excavation near these monitoring wells, final depth will be defined by field confirmation sampling; and
- Define the solidification mix design for the iron oxide pile material.

2.2 Ammonia SCO Work Plan

The Pre-Design Investigation Ammonia SCO Work Plan was prepared and implemented to define a site-specific ammonia Soil Cleanup Objective (SCO) for the fill with ammonia on the RITC BCP Site. The Work Plan was implemented for the development of a SCO for excavations involving materials containing concentrations of ammonia. The SCO was approved by the NYSDEC on October 21, 2025 and the site-specific protection of groundwater soil cleanup objective for ammonia was determined to be 11.05 milligrams per kilogram (mg/kg).

2.3 Bench-scale Groundwater Treatment

The proposed treatment plant has been designed for aggressive collection and groundwater treatment of groundwater with residual impacts. The groundwater quality has improved in response to the removal of sources of contamination from process equipment and residual impacts in the fill and, as a result of the removal of mass in the dissolved system, will accelerate the improvement of groundwater quality at the Site. The groundwater samples used for the design of the IRM Groundwater treatment system were not representative of the quality of the water that will be treated by the management of migration system. A new bench-scale study has been conducted for the design of the final treatment system using only groundwater collected from the treatment system manifold and the battery tunnel sump. The Fact Sheet for the development of the surface water discharge criteria was submitted to, and approved by, the NYSDEC and the effluent criteria for the final groundwater treatment systems have been defined (Appendix B).

The results of the bench-scale testing were used to design the long-term groundwater treatment system and prepare the process flow diagram (Appendix A, Sheet S-34). While the flow and mass loading to the system is expected to drop quickly, thereafter the systems' primary purpose are to collect and treat liquids from the consolidation cell leachate collection systems and to prevent migration of shallow groundwater into the consolidation cell, to prevent migration to the retention basin. Secondarily by designing the groundwater treatment system with the capacity to treat groundwater from Site 110, the 3821 River Road Site, and possibly Site 108, there is an opportunity to reduce the impact of building multiple treatment plants on the environment. If approved by NYSDEC, using a single treatment system, rather than three separate facilities, reduces the impact of manufacturing multiple treatment trains, building separate treatment plants, and of operating three independent systems.

2.4 TENORM Management Plan

During implementation of this RAWP potential TENORM materials will be managed. The management of these materials will be conducted in accordance with the TENORM Management Plan (Appendix I). The TENORM Management Plan (MJW, 2026) includes the required screening, sampling, testing, and materials management (capping, placement in the consolidation area or out-of-state offsite disposal).

3 Remedial Design/Remedial Action Scope

The remedial design scope includes all phases of the remedial action from permitting; procurement; materials management; consolidation area construction, operation, closure; groundwater collection system installation; surface water management; cover placement; groundwater treatment system installation and startup; and monitoring system installation.

3.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) are specific action goals by media and receptor. The RAOs that apply to the remedial design for the BCP Site are listed below.

3.1.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with concentrations exceeding drinking water standards.

Prevent contact with or inhalation of volatiles from contaminated groundwater **RAOs for Environmental Protection**

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

3.1.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure to compounds volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

3.1.3 Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a Site.

3.2 Remedial Action Work Plan

This RAWP has been developed to comply with Section 5.3 of DER-10:

1. Address all requirements of Sections 5.1 and 5.2 in DER-10;
2. Signed and stamped by a professional engineer licensed in New York State;
3. Include the following elements:
    a. A detailed description of the remedial action and remedial technologies;

b. Delineation of the areas targeted for removal, consolidation, engineering controls, and treatment systems;
c. Location and description of all temporary facilities;
d. List of all SCGs (Section 1-6) to be complied with during and following remedial action;
e. Erosion and Sediment Control Plan (E&SCP) and CAMP to be implemented during the remedial action;

4. Health and Safety Plan
5. CAMP;
6. Sampling and Analysis Plan (SAP) to confirm and document the remedial actions (see RAMP);
7. Demolition Work Plan for removal of the remaining structures and utilities;
8. Schedule
9. Description of the Institutional Controls to be placed on the property. RITC is the Site owner.
10. Outline of the SMP;
11. Drawings and Figures required for the construction of the remedial action (see Sheets, Appendix A); and
12. Outline of the FER to include a set of "As-Built" construction Drawings (will be based on the Sheets).

This RAWP includes actions to address the entire selected remedial alternative for the BCP Site. The current conditions of the Site are shown on Figures 7-1 through 7-9. The figures have been developed using the 2024 aerial photographs, The grading sheets (Appendix A) were developed using the new topographic map;

- Ground surface elevations across the BCP Site, and the adjoining Sites 109, 110 and 3821 River Road;
- Ground water elevations across the BCP Site;
- Volume of concrete and fill in above grade piles;
- Define the controlling elevations for surface water drainage at the property boundaries; and
- Define the grades required to maintain the stability of the surrounding offsite ground surfaces.

The ongoing and proposed IRMs provided additional design data including:

- Continuing data collection from the Groundwater Treatment IRM to confirm groundwater collection and treatment effectiveness;
- Continuing data collection and analysis for surface water quality control; and
- Defining the volume and location of the solidified materials.

The TENORM survey and the TENORM Management Plan (Appendix I) provide the locations and volume of the potential TENORM materials that will be encountered and therefore managed during the remedial action.

3.3 Remedial Action Scope

The Remedial Actions (RAs) have been developed to achieve the requirements of the NYSDEC selected remedy, Alternative No. 5 (Sheet S-2). The selected remedial alternative consists of, among other elements, Solidification of NAPL, Containment, Groundwater Control, Institutional Controls, and Engineering Controls. Although the RAWP addresses the required remedial actions the implementation of the remedial design will allow redevelopment in compliance with the General Industrial Zoning of the Site adopted by the Town of Tonawanda on April 9, 2024. The design and execution of the alternative, includes:

- Institutional/Engineering Controls (IC/EC)
    - Place an Environmental Easement on all portions of the BCP Site not meeting Track 1 requirements. To be filed after the final Track 1 areas are completed and defined by data and survey
    - The Environmental Easement will include use restrictions on the BCP Site prohibiting the installation of drinking water wells without necessary Erie County Department of Health approvals and water quality treatment as determined by the NYSDOH to render it safe for intended use and prohibiting residential development. There are no redevelopment plans that would include drinking water supply wells on the BCP Site and there is a potable water supply to the BCP Site;

- Source Controls
    - Ongoing OM&M through completion of the IRMs and remedial actions;
    - Removal of the Former Mixing Pad (Sheets S-3 and S-4) to allow sampling from the underlying fill;
    - The existing concrete lined stormwater sedimentation ponds will be used until the new stormwater retention basin is completed. The concrete lined basins will be cleaned and taken out of service thereafter in accordance with the Site 109 remedial actions;
    - Erosion and Sediment Controls for the earthmoving (Sheets S-5 and S-6);
    - Removal of fill along the perimeter of the BCP Site. The removal of fill around the perimeter is expected to expose the underlying silty clay and allow the placement of silty clay fill to create a perimeter cutoff barrier against shallow groundwater migration to or from the BCP Site (Sheets S-7 and S-8). During this removal impacted fill at MW-BCP-24A, MW-BCP-27A, and SS-BCP-15 locations will be excavated and placed as fill within the areas of the BCP Site to receive a soil cover. The perimeter barrier will contain the groundwater at MW-BCP-18 and prevent it from migrating from the BCP Site (Sheet S-8);
    - Construction of the consolidation area (Sheet S-9 and S-10);
    - Excavation of the solidified fill and associated shallow groundwater within the areas formerly containing viscous tar and NAPL (Sheet S-11). The shallow water being excavated is bound in the matrix; all fill placed in the consolidation area will pass the paint filter test;
    - Excavation and placement of blue-stained soils from the Purifier Box and Iron Oxide Pile areas in the consolidation area (Sheet S-12);
    - Excavation and solidification of upper clay with impacted groundwater at and around the MW-BCP-13B and MW-BCP-19B areas (Sheet S-13);
    - Biotreatment of areas with nuisance conditions associated with TPH concentrations at the former diesel tank area, and the former heavy equipment parking area (Sheet S-14);
    - In situ solidification (ISS) of the thin layer of blue-stained soil/fill (TP-BCP-35 area) in the South Drainage Area AOI (Sheet S-15);
    - Excavation of materials and piles of potential solid waste stockpiled by the USEPA and TCC (Sheet S-16) and placement in the Consolidation Area;
    - Excavation, treatment, and placement of soils with concentrations of ammonia above the site-specific protection of groundwater SCO (Sheet S-17);
    - Excavation and placement of potential TENORM materials in the consolidation cell (Sheet S-18) in accordance with a Division of Materials Management approved TENORM

Management Plan (MJW, 2026, Appendix I), prepared in accordance with DMM-5 (NYSDEC 2023);
    - Capping of the Consolidation Cell (Sheet S-10); and
    - Cover placement over all areas that do not meet Track 1 cleanup criteria (Sheets S-21 through S-26).
- Management of Surface and Groundwater
    - Erosion and Sediment Controls (Sheets S-5 and S-6);
    - Details, Retention Pond Primary and Secondary Outfalls[10] (Sheet S-32);
    - Plan and Details, Groundwater Control Systems (Sheet S-33); and
      ;
    - Process Flow Diagram - Groundwater Treatment System (S-34).

- Elimination of Exposure Pathways
    - Close the remaining underground utilities that could act as preferential pathways (Sheets S-3 and S-4);
    - Clearing, grubbing, and grading the BCP Site to allow placement of the cover. While not necessarily an exposure pathway, this allows placement and compaction of the subgrade and cover;
    - Grading of the subgrade (Sheets S-21 and S-22). The grading is balanced to match the cut and fill and address stormwater management, the proposed redevelopment plan, the relocation, and placement of the perimeter fill and crushed concrete piles, the relocation and consolidation of target materials, and the relocation and placement of potential TENORM material (Sheet S-18);
    - Cover placement to meet the commercial Track 4 requirements, cap the consolidation area, and comply with the Town of Tonawanda Code Part 2, 179-5: Ground Cover Drainage and Erosion requirements (Sheets S-21 to S-26);
    - Construction of a full-scale groundwater collection system to manage residual groundwater impacts, consolidation cell leachate, Site 110 groundwater and potentially recovered groundwater from 3821 River Road BCP Site (Sheets S-33);
    - Testing, installation, and startup of a full-scale groundwater collection and treatment system in accordance with the revised Permit No. 331 and the SPDES equivalent approval (Sheet S-34, Appendix B); and
      During site development[11] soil vapor intrusion evaluations shall be conducted in the groundwater treatment building (Building No. 8) and at the locations of all proposed buildings. Where potential soil vapor management is recommended it shall be installed and operated in accordance with the SMP.
- Long-term Care
    - Establish procedures for BCP Site management, including requirements for future onsite excavation (Excavation Work Plan [EWP] outline in Appendix J) and in accordance with the NYSDEC Template.

[10] The excavation and restoration of the retention basin is required to provide the unclassified fill for the cover systems. The outlet structure details are provided for informational purposes as they are required to convey surface water from the BCP Site to the River Road box culvert not for remedial action.

[11] Although this is a Site Management Plan component it is listed here to acknowledge it is a requirement for construction of occupied buildings on the BCP Site.

3.4 Permitting

The RA will require specific permit applications and approvals in close coordination between RITC, the NYSDEC, the County of Erie, and the Town of Tonawanda. The permits will be associated with storm and groundwater management and will be acquired before any associated actions. The approvals will center on the startup testing, and data required to implement the remedy and grading and erosion and sediment controls for the remedial actions.

A long form Environmental Impact Statement has been submitted but that is directed to the redevelopment and was not required for this, or a component of this RAWP.

3.4.1 Permits

The following permits or permit equivalents are being applied for in conjunction with this RAWP:

1. State Pollutant Discharge Elimination System (SPDES) Permit equivalent limits (NYSDEC) – Received (Appendix B);
2. 1.2. The long-term discharge from the treatment plant will be regulated through the SPDES Equivalent approval based on the effluent standards provided by the NYSDEC;
3. Industrial Waste Discharge Modification (IWD No. 331) (Town of Tonawanda) - Received;
4. Demolition permits (Town of Tonawanda), Received;
5. Grading Plan/Site Control/Erosion & Sediment Control (Town of Tonawanda); and
6. Construction Permits – Groundwater Treatment Building modifications.

The SPDES Permit equivalent discharge limit application (termed a Fact Sheet) was based on data from the Groundwater Treatment IRM, the Pre-final Remedial Design of the long-term groundwater treatment plant bench-scale testing, and the proposed outfall location on the Niagara River. The NYSDEC provided a set of criteria for the discharge from the BCP Site (Appendix B). The proposed long-term treatment plant is expected to have an initial treatment throughput of 50- to 75 GPM but has been designed (Appendix B) with a capacity of 100 GPM for peak flows and to address any changes associated with climate change. Discharge from the BCP Site is expected to drop to less than 10 GPM after the first three to five years of operation, but the conveyance of groundwater from Site 110 and the 3821 River Road BCP Site to the treatment plant may be proposed to NYSDEC. If approved, the flow from Site 110 and 3821 River Road is expected to increase during or immediately following the initial operational period of the BCP Site extraction system. The process flow diagram for the groundwater treatment system is shown on Sheet S-34 and includes the following components:

- Oil/water separator;
- Chemical addition mixing tank and pumps (bleach, acid/caustic as needed);
- LaMella Clarifier to reduce chemically precipitated metals;
- Clarification solids system
- Sludge holding tank
- Plate and frame filter press with collection roll-off and decant tank
- Membrane bioreactor[12], including aeration equipment and permeate and sludge holding tanks;
- Ultra-filtration system;

[12] This equipment is required to meet the ammonia discharge criteria. With time it is expected that it can be by-passed for much of the operating year and the associated costs will decrease.

- Granulated activated carbon vessels;
- Effluent holding tank;
- Pumps with backwash returns;
- Sample ports; and
- Electrical controls and monitoring systems.

An application to modify the Industrial Waste Discharge (IWD) Permit to include the remedial action relocation of the outfall, a new connection to the Town of Tonawanda system at River Road, wash waters, testing and startup waters from the long-term groundwater treatment plant, and decontamination waters has been submitted to the Town of Tonawanda.

The proposed grading plan has been submitted to the Town of Tonawanda as a preliminary review submittal. Following NYSDEC approval of the RAWP, the final grading plan will be submitted for site plan approval.

Curb Cut and Building Plan permit applications will be submitted to the New York State Department of Transportation (NYSDOT) and the Town of Tonawanda for the revision of the utility corridor and expansion of the access road at River Road immediately west of Site 109. More than half of the current road falls on the neighboring property, despite RITC attempts to purchase the road for construction purposes. The property owner declined the offer, citing their potential need for the access to their property.

3.4.2 Authorizations

There are a series of plans, approvals, and modifications to existing approvals needed during and associated with the RA, including:

1. SPDES Equivalent (Appendix B) – The SWPPP will be implemented throughout the remedial action.

2. The long-term discharge from the treatment plant will be regulated through a waiver approval based on the effluent standards provided by the NYSDEC;

3. CAMP – The CAMP has been modified (Appendix C) to address the changing conditions and Site features during the implementation of the remedial actions. The CAMP will be followed until the BCP Site covers and capping systems are completed;

3. Erosion and Sediment Control Plan (E&SCP) – Implementation of the Remedial Design will disturb the entire 86.5-acre surface of the BCP Site. The E&SCP provides the scope of the erosion and dust control measures that will be required to complete the remedy (Sheets S-5 and S-6);

4. Retention Basin(s) Discharge Approval (Appendix D) – the retention/detention basin will be developed in the cavity formed by the borrow pit along the western boundary of the BCP Site. The basin will be used to collect and control surface water from the remediated BCP Site. The basin(s) will be extracted into the silty clay that meet unrestricted use criteria and will be used to collect and contain surface water that has not been in contact with any previous surface materials or groundwater. The discharge from the retention basin will be to the same location that runoff currently discharges through, the box culvert on Site 109 under River Road;

5. Remedial Action Monitoring Plan/Site Grading (Appendix F) – The grading plans will be submitted to the Town of Tonawanda to ensure the proposed grading is consistent with the Town requirements for the River Road corridor.

6. Health and Safety Plan (Appendix H) – All intrusive activities for the completion of the RAWP shall be conducted in accordance with the site- and action-specific HASP.

7. TENORM Management Plan (Appendix I) – The plan to identify and properly manage potential TENORM materials encountered during excavations and grading.

8. Construction Completion Reports – The ongoing Interim Remedial Measures will be completed in conjunction with implementation of this RAWP and the Remedial Action. The CCRs for the ongoing IRMs will be submitted for review and approval prior to being included as appendices to the Final Engineering Report. Previously approved CCRs that are in the public record and document repositories will be cited in the FER but will not be attached.

9. Site Management Plan – The SMP will be submitted with the FER and will include the long-term operational procedures for the active components of the Site, the long-term monitoring program, and the EWP. The SMP will include the requirements to test for, and if appropriate, install soil vapor intrusion mitigation systems (See outline in Appendix J). The EWP will define the procedures for future intrusive work on the BCP Site.

10. Final Engineering Report – The FER will include the As-built construction documents, CCRs for the IRMs, and the data collected during the remedial action (See outline in Appendix K).

Permitting and the remedial design are interrelated and concurrent activities. Not only did the permit/approval requirements drive the remedial design of specific elements of the remedial action, the stormwater management and discharge approvals require coordination of both state and local requirements. Prior to implementation of the RAWP all permits and approvals for those applicable components of the remedy will be in place.

3.5 Procurement

The primary materials to be procured offsite include:

1. Groundwater Treatment Plant Building
    a. Concrete for foundations and slabs – Local
2. Groundwater Treatment Plant – Design and Install – Groundwater Treatment Technologies design, to be competitively bid.
3. Pipe – Local Supply
4. Electrical Services and Materials – O'Connell Electric
5. Demarcation fabric – IWT Cargo-Guard
6. Topsoil – Multiple local sources, Import requests will be submitted as sources are identified.
7. Gravel and Rip Rap – Local virgin quarried stone
8. Seed and Fertilizer – Local sources.

3.6 Materials Management

The remedial action requires management of quantities of on-site and off-site sourced materials (Table 3-1). The CAMP (Appendix C) will be maintained during all intrusive activities and until the entire area of BCP Site surface soils meets commercial SCOs.

The following materials will be used to develop the final grades and surfaces:

1. Breeze, coke, and coal fill – The entire surface of the Site is covered with fill. A primary component of the fill on the Site is coke breeze (fine-grained coke), coke and coal. These materials will, as needed, be graded, and compacted within the limits of the BCP Site. These materials shall only be placed and compacted in areas which are to receive a soil, pavement or building cover. No breeze, coke or coal will remain in Track 1 areas or be within 12-inches of the ground surface at completion of the remedial actions. These materials are not considered import, and therefore no import testing is required;
2. Existing fill (not solely breeze) – There are other materials that were used as fill by the TCC over their period of ownership. While primarily clayey soil, breeze, coal, and coke; sand, gravel and slag were used below roads, tanks, and structures. Sand and gravel that has to be relocated, if free of viscous tar and odors, will be used as general fill below the cover demarcation layer elevations. If the material contains viscous tar or presents a nuisance odor; (1) viscous tar shall be solidified and placed in the consolidation area, or (2) nuisance odors shall be treated with fertilizer in accordance with the biotreatment RAWP prior to use as fill only to be placed and compacted in areas to receive a soil, pavement or building cover;
3. Crushed concrete – All crushed concrete that met the definition of a solid waste was transported from the Site. The remaining crushed concrete has not been discarded and is considered structural fill. These materials shall be placed and compacted within the subgrade (Sheets S-21 and S-22) prior to placement of the demarcation layer. Crushed concrete that exceeds commercial SCOs shall only be placed and compacted in areas to receive a soil, pavement or building cover. Crushed concrete that meets commercial SCOs shall be used as unclassified fill in areas of proposed roads and pavement. The majority of these materials have been tested, those meeting commercial criteria are not considered import;
4. On-site silty clay – On-site silty clay will be excavated from the retention basin, consolidation area and perimeter stormwater control ditches. Stained silty clay will be placed as fill in areas to receive a soil, pavement or building cover. Unstained silty clay will be tested prior to excavation or stockpiled and tested for use as unclassified fill in the soil cover areas. All silty clay to be used as cover materials shall meet the commercial SCOs;
5. Solidified materials – The materials exhibiting characteristics of hazardous waste or that potentially exhibited the characteristics of hazardous waste, or that contained viscous tar were solidified in several areas of the BCP Site; Tar Seep No. 2 area, the former Thaw Shed Area and throughout the former process area. These materials will be excavated and placed in the consolidation cell.
6. Purifier materials – There are two areas of purifier materials that will be excavated and placed in the consolidation cell; the “iron oxide pile” and the materials removed from the purifiers, currently stockpiled in the former thaw shed area. These materials will be excavated and placed and compacted in the consolidation cell. If required, lime kiln dust or Portland cement will be added to allow compaction of the materials;
7. Blue-stained soils – there are areas with thin layers of blue-stained soils along the south boundary of the BCP Site. These soils do not represent a source due to their limited thickness and therefore

limited exposure to water. If excavated during the implementation of this RAWP, these soils will be solidified, placed, and compacted in the consolidation cell. The area of blue-stained soils remaining (Figure 7-6) in place will be solidified in-situ prior to placement of the final cover;

8. EPA soil pile materials – The EPA soil pile materials will be sampled to determine if they exhibit the characteristics of hazardous waste. If the soil in a pile is non-hazardous it will be placed and compacted in the consolidation cell. If a soil pile exhibits any characteristic of a hazardous waste, it will be rendered non-hazardous and placed in the consolidation cell or disposed of offsite;
9. Industrial Debris (Scrap, tires, abandoned pipe) – Industrial debris that is removed during excavation activities will be sorted into two stockpiles; solid waste and recyclable materials. After cumulating enough for transport a five-day notice will be provided to the NYSDEC before any solid waste is transported offsite for disposal or recycled material is transported for reuse.
10. Asphalt – The existing roads and parking areas will not be retained for the post closure redevelopment. Where these surfaces are in areas of excavation, the asphalt surfaces will be removed, prepared, and transported offsite for recycling. If required by the recycling facility, the appropriate testing will be conducted.
11. Offsite sourced granular materials (gravel and well-graded subgrade materials) – Granular materials with less than 10 percent passing the No. 80 sieve from a NYSDEC permitted source will be imported for use as structural fill, building subbase[13], road and parking area subbase following submission of import requests without testing. Granular materials with more than 10 percent passing the No. 80 sieve shall be testing in accordance with Table 5.4(e)10 of DER-10, and only imported after approval of an import notification.

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

12. Topsoil – There are no sources of topsoil on the Site. The limited areas of topsoil available onsite are along the south drainage ditch, the small area south of the offices, and the small test pad near the former locker room building. Any recoverable topsoil will be excavated, stockpiled, and tested in accordance with Table 5.4 (e)10 of NYSDEC DER-10. Topsoil that complies with the commercial SCOs will be used for the final soil cover. Topsoil that does not meet the commercial SCOs shall be placed in an area to receive a soil, pavement, or building cover.

[13] If the final location of buildings, roads or parking areas are known at the time of the remedial action, placement of the subgrade will be conducted in lieu of placing a soil cover that would otherwise be removed.

13. TENORM - Materials that exceed the site-specific criterion of 17,000 γ CPM will be managed in accordance with the TENORM Management Plan, screened, sampled, and will be managed based on the sample data either in the consolidation cell or transported out-of-state for disposal (Appendix I).

Materials that were classified as potential TENORM (Sheet S-18) will be managed in accordance with the DMM approved TENORM Management Plan (Appendix I) and variance(s) as required.

3.7 Treatment

Although the IRMs were intended to treat the fill that could potentially act as a source of ground water contamination, there are several classes of materials that may be encountered or generated during the implementation of this RAWP that may require treatment:

1. Residual viscous tar encountered during excavation;
2. Compressible purifier wastes;
3. Blue-stained soils;
4. Petroleum impacted fill;
5. Ammonia impacted fill; and
6. Construction water.

3.7.1 Residual Viscous Tar

The procedure for excavation and treatment of residual viscous tar was successfully implemented as defined in the approved Solidification IRM Work Plan (Inventum, 2023). All viscous tar encountered during the excavation for the work detailed in this RAWP shall be solidified using either Lime Kiln Dust (LKD) or Portland cement with breeze beneficially used for the BCP Site. Following solidification and successful testing (no materials with free liquids or the characteristics of hazardous waste shall be placed in the cell), the resulting solidified materials will be placed in the consolidation cell.

3.7.2 Compressible Purifier Wastes

The materials in the iron oxide pile and the stockpiles (Sheet S-12) created while demolishing the purifier boxes will be placed and compacted in the consolidation cell(s). The materials will be compacted and used to support the cover. If the materials are saturated or become saturated during compaction, LKD or Portland cement will be introduced to facilitate compaction of the fill. The goal is to eliminate free liquids and create a material that can be placed and compacted to support the cover. The goal is to eliminate free liquids, so the initial mix ratio will be 5% by weight (based on a unit weight of purifier material as 130 pounds per cubic foot) that is 6.5 pounds per cubic foot. Solidified materials will be inspected to confirm there is no free liquid. Paint filters tests will be used (no less than 1/1,000 cubic yards) to confirm there is no free liquid before placing solidified materials in the cell. The placed and compacted materials will be field tested to verify the unconfined compressive strength exceeds 500 pounds per square foot (PSF, 0.25 TSF on the penetrometer).

3.7.3 Blue-stained Soils

Portions of the thin seam of blue-stained soils in the southeast area of the Site (Sheet S-15) will be excavated to allow construction of the perimeter stormwater management system. The materials shall be solidified prior to placement in the Consolidation Cell. The goal is to eliminate free liquids and create a material that can be placed and compacted to support the cover. The goal is to eliminate free liquids, so the initial mix ratio will be 5% by weight (based on a unit weight of purifier material as 130 pounds per cubic foot) that is 6.5 pounds per cubic foot. Solidified materials will be inspected to confirm there is no free liquid. Paint

filters tests will be used (no less than 1/1,000 cubic yards) to confirm there is no free liquid before placing solidified materials in the cell. The placed and compacted materials will be field tested to verify the unconfined compressive strength exceeds 500 PSF/0.25 TSF.

3.7.4 Petroleum Impacted Fill

There are two areas of fill on the Site (Sheet S-14) that are known to have been impacted by petroleum releases; the former diesel tank area and the former heavy equipment staging area. The fill in both areas will be treated to eliminate nuisance conditions following the procedure defined in the Bioremediation RAWP (Inventum, 2024). The materials in the former heavy equipment staging area with visual or olfactory evidence of spill impacts, as defined during the RI test pit program, ranged from 2- to 6-inches below the ground surface.

To ensure all impacted materials are treated, the soils in the heavy equipment maintenance area from the surface to 12-inches bgs will be blended and treated. Any residual fill below 12-inches BGS that produce a nuisance odor detectable within 5 feet while standing shall be excavated and treated.

The materials in the former diesel tank area (Sheet S-14) will be excavated to the top of the underlying silty clay. The materials will be moved within the treatment area and placed in four stockpiles no greater than 250 tons and blended with soils with fertilizer in the ratios in the Bioremediation RAWP (Inventum, 2024), starting at 0.07% by weight (2.5 pounds per cubic yard) and increasing to 5 PCY if the nuisance conditions is not eliminated after the first turn of the bio piles. Moisture content will be maintained at or above 20% during treatment.

Sampling (1/100 tons which is 1/60 CY) will be conducted in accordance with the Bioremediation RAWP after no olfactory nuisance is detected; both VOCs and SVOCs shall be confirmed to meet the commercial SCOs. Following treatment, if the fill does not meet commercial SCOs it will be placed onsite in areas to be covered with a soil, pavement or building cover.

3.7.5 Ammonia Impacted Fill

Fill containing ammonia in excess of the site-specific protection of groundwater SCO (Figure 7-9) that is encountered during excavation will be treated. Treatment will consist of excavation; placement in windrows no greater than 250 cubic yards in volume and turned to aerate twice during a 21-day period. Following the 21-day period each pile will be sampled (1/100 CY). If the ammonia in the fill is less than the ammonia SCO it will be used as fill below the cover system, if the ammonia concentration exceeds the ammonia SCO the material will be retreated or placed in the consolidation cell.

Although not anticipated, materials to be used as fill below the groundwater surface will be tested to verify they meet the protection of groundwater SCO.

3.7.6 Construction Water

Construction water will be treated to allow discharge to the Town of Tonawanda Publicly Owned Treatment Works (POTW). The temporary treatment facilities will be located as necessary to manage water produced during truck washing, equipment decontamination, and from excavations that must be removed prior to backfilling and from pond dewatering by pumping[14] prior to closure.

[14] The water that can discharge in accordance with the SWPPP will be allowed to drain, but water in low lying areas that must be pumped will be pre-treated before discharge to the POTW.

The temporary facilities will include equalization, filtration (bag filters) if necessary, and adsorption through granulated activated carbon (GAC) as required for discharge under Permit No. 331.

3.8 Excavation and Consolidation

Materials to be managed at the Site are distributed throughout the property. Rather than leave solidified materials in isolated areas across the property, especially those materials that may act as sources of groundwater contamination or that require long-term management, a consolidation area (Sheets S-9 and S-10) will be constructed to allow isolation and monitoring of the potential source materials. The consolidation area will include groundwater/leachate collection and management and will be capped with a Part 360 type-multi-layered capping system (Sheet S-10) that is also compliant with the requirements of the TENORM Management Plan (MJW, 2026).

As identified on Table 3-1 and Sheets S-11 to S-18, the following materials from the BCP Site will be placed in the Consolidation Area (Sheets S-9 and S-10):

1. Solidified Fill (Table 1-1, Figure 7-1, and Sheet S-11)
    a. Production Areas – MW-BCP-05 area to Pump House Area
    b. Production Area – Light Oil, Phenol, Weak Ammonia Areas
    c. Satellite Areas – Thaw Shed
    d. Tar Seep No. 2 Area
    e. ST-21-ST-23 Residual Pile moved to Thaw Shed Area
    f. South Rail Materials moved to Thaw Shed Area

2. Purifier Materials (Sheet S-12)
    a. Iron Oxide Pile
    b. Purifier Box Residuals
    c. Solidified, blue-stained soils that require excavation (TP-BCP-46 AND SS-BCP-15 Areas)
3. EPA Soil Pile Materials (Sheet S-16)
4. Soils with Ammonia above the Site-specific protection of groundwater SCO (Sheet S-17)
5. Potential TENORM Materials (Sheet S-18[15])

3.8.1 Excavation

Materials to be placed in the consolidation cell will be excavated and transported to the cell for immediate placement unless free liquids are present in the excavated materials. Excavated materials with free liquids will be stockpiled within the limits of the excavation area and solidified with dry breeze, LKD or Portland cement before transportation and placement in the consolidation cell. The initial limits of each excavation will be marked with grading stakes by OSC using the GPS coordinates collected during the RI and IRMs. The excavation of each area will follow the following sequences.

3.8.1.1 Track 1 Area – Retention Basin Area

The retention basin area will be excavated into the underlying silty clay (Sheet S-23) to provide borrow for the soil cover, to create the required detention and retention volume for stormwater management and to meet Track 1 criteria. The fill over the silty clay will be excavated and used as fill in areas of the BCP Site that are currently below the proposed subgrade elevations (Sheets S-23 and S-24). There are potential

[15] Subject to the determination of the DMM and an in accordance with the approved TENORM Management Plan (MJW, 2026).

TENORM soils in the northern end of the retention basin area that will be excavated in accordance with the TENORM Management Plan.

Outside the Elevated Measurement Limit area, the fill shall be removed to the top of the silty clay, any stained silty clay will be removed from the exposed surface, and the underlying clay will be removed for use in the unclassified layer of the soil cover. The basin will be sampled in accordance with the requirements of DER-10 for import with the exception that only the upper samples will be tested for PFAS. If PFAS compounds are not detected the deeper samples will not be tested for PFAS. Four soil borings have been advanced as part of the pre-design investigations and the data meet both unrestricted and commercial SCOs (Table 3-5).

There will be limited fill placed in the retention basin excavation other than riprap with less than 10 percent passing the No. 80 sieve and limited amounts of soil to support revegetation of areas above the normal pool elevations (Sheet S-27). All soil placed within the Track 1 areas of the retention basin shall be tested to confirm it meets the unrestricted SCOs.

3.8.1.2 Track 1 Area – Perimeter Areas

The perimeter of the BCP Site that border properties other than Site 109, Site 110 and the 3821 River Road BCP Site will be excavated to the silty clay (average depth of 54-inches) to provide a defined barrier against offsite migration of shallow groundwater and to meet Track 1 criteria. The fill will be removed to the top of clay in the limits shown on Sheets S-25 and S-26. Any stained clay will be removed. The fill and stained silty clay will be placed in areas of the BCP Site that are currently below the proposed subgrade elevations (Sheets S-23 and S-24).

The surface of the silty clay will be sampled to confirm it meets the unrestricted SCOs. The samples will be collected at approximately 50-foot intervals or (1/900 SF) whichever is greater. The fill placed in the Track 1 areas will be from the retention basin unclassified fill source, crushed stone with less than 10 percent passing a No. 80 sieve, and/or soil meeting the unrestricted SCOs.

3.8.1.3 Solidified Fill Areas

The solidified fill areas will be excavated to the limits shown on Sheet S-11. The surveyed volumes (by weight, tons) of materials are listed in Table 1-1:

Light Oil Area	3,100
Former Light Oil Area	6,200
Tar Management Area	9,600
Thaw Shed (Includes Junction Building Fill)	3,400
Pump House Area	7,300
Exhauster Building	5,200
MW-BCP-05 Area	7,500
Weak Ammonia Liquor Area	7,800
Former Phenol Area	2,300
Tar Seep No. 2	6,700

The Solidified Fill Areas (Sheet S-11) have been sampled to verify treatment and the limits of solidification. The limits of the solidified materials will be staked and removed in two stages. First, the solidified materials at the north-west end of the production area (aka MW-BCP-05 area) solidified materials will be excavated and stockpiled on other solidified material to allow construction of the first portion of the consolidation

cell. The top six inches of clay under those materials will be removed and stockpiled for sampling of VOCs and SVOCs. If any compound exceeds the rule of 20 for TCLP criterion, a TCLP Test will be completed. Non-hazardous silty clay will be used as fill below areas to be covered. Silty clay exhibiting the characteristics of hazardous waste will be solidified, retested to confirm the characteristic(s) have been eliminated, and placed in the consolidation cell.

As the consolidation cell is available, the removal of the solidified materials will involve excavation to the base of the solidified materials and placement in the consolidation cell. The base of the excavation will be inspected for any grossly contaminated materials (NAPL or viscous tar). Any grossly contaminated materials will be solidified with LKD or Portland cement in accordance with the Satellite Area Solidification RAWP and placed in the consolidation cell. The excavated area will be sampled at a rate of 1 sample per 900 square feet VOCs and SVOCs. If any compound exceeds the rule of 20 for TCLP criterion, a TCLP Test will be completed. Materials exhibiting the characteristics of hazardous waste will be solidified, retested to confirm the characteristic(s) have been eliminated, and placed in the consolidation cell.

3.8.1.4 Iron Oxide Pile, Thaw Shed Area, and EPA Soil Piles

The iron oxide pile was placed/shaped by TCC prior to the 2018 bankruptcy. The pile has been covered and maintained by RITC since they were granted control of the site by the USEPA in 2020. The pile will be excavated to the elevation of the surrounding grade. The materials will be inspected for free liquids, and suspect materials will be tested using the paint filter test. Materials meeting the paint filter test criteria will be placed in the consolidation cell. Materials failing the paint filter test will be solidified with LKD or Portland cement and placed in the consolidation cell.

The area exposed by removal of the pile will be inspected for evidence of purifier waste as blue-tinted or stained soil. Blue-tinted or -stained soil will be excavated and managed like the pile materials. If no evidence of blue staining the area will be sampled for cyanide at a frequency of 1 sample per 900 SF. Any soil with cyanide above the industrial SCO will be excavated and placed in the consolidation cell.

The thaw shed area (Sheet S-11) has been the location used to stockpile excavated materials during the IRMs. Each pile will be excavated to the preexisting surface as delineated by polyethylene sheeting on which the piles were placed. The pile materials will be placed in the consolidation cell. The area under each pile will be sampled for VOCs and SVOCs at a frequency of one sample per 900 SF. If any compound exceeds the rule of 20 for TCLP criterion, a TCLP Test will be completed. Materials exhibiting the characteristics of hazardous waste will be solidified, retested to confirm the characteristic(s) have been eliminated, and placed in the consolidation cell.

The EPA soil piles (Table 1-1, Sheet S-16) were placed by the USEPA between 2018 and 2020. Absent documentation, Inventum sampled the piles in 2026. The piles will be placed in the consolidation cell. The materials will be inspected for free liquids, were suspected the materials will be tested using the paint filter test. Materials meeting the paint filter test criteria will be placed in the consolidation cell. Materials failing the paint filter test will be solidified with LKD or Portland cement and placed in the consolidation cell. The areas exposed by each pile will be inspected for grossly contaminated materials. These areas will be excavated as part of the perimeter fill removal and no further sampling is required.

3.8.1.5 Ammonia Impacted Areas

There is an area of fill that is known to exceed the site-specific Ammonia SCO within the limits of the consolidation cell, Sheet S-17. The materials will be managed in accordance with Section 3.7.5 and placed

in the consolidation cell. The area below any excavated ammonia exceeding the SCO will be sampled for ammonia and excavation will continue if the SCO is exceeded.

3.8.1.6 MW-BCP-13 and MW-BCP-19 Areas

There are two areas of the BCP Site that were impacted by VOCs. the MW-BCP-13 and the MW-BCP-19 locations (Sheet S-13). The fill shall be removed within the limits shown on Sheet S-13. The fill above the silty clay is not impacted by the VOCs and shall be used as fill in the BCP Site. The MW-BCP-13 excavation shall extend to Elevation 578-ft-msl exposing area 30- by 20-feet. All sampling shall be from the bucket of the excavator, no personnel shall enter the excavation. The MW-BCP-19 excavation shall extend to Elevation 586-ft-msl exposing area 30- by 20-feet. The base (1/900 SF) and each sidewall (no less than 1/50LF) will be sampled to confirm the protection of groundwater SCOs are met. The excavated silty clay will be screened with a PiD. Any silty clay with detections of VOCs shall be placed in the consolidation cell. Silty clay with no detections of VOCs using the PiD, shall be used as fill above the groundwater table in an area to receive a soil cover. If any sample location, base, or sidewall, exceeds the protection of groundwater SCO, the areas will be excavated no less than an additional five feet and shall be resampled.

The excavations below the top of silty clay shall be backfilled with silty clay from the retention basin excavation that meet the protection of groundwater SCOs.

Note: potential TENORM soil management will follow the TENORM management Plan (Appendix I).

3.8.2 Consolidation

The target materials (See Table 1-1) will be placed in lifts of no more than 12-inches and will be compacted by no less than three passes of a smooth drum or sheep's foot compactor. Should the surface of any lift deflect after three passes of the roller, lime kiln dust or Portland cement shall be added to solidify the materials. The placed target materials form the subbase for the consolidation cell cap.

The consolidation cell has the capacity to contain VOC and Tar impacted (following treatment and solidification) materials from the contiguous RITC and National Grid NYSDEC Site 110 properties if approved by NYSDEC.

The maintenance and monitoring of the consolidation area(s) will be included in the SMP to define; the location of the limits of the low permeability capping system components, the long-term monitoring requirements (groundwater, cover, collection sumps), groundwater/leachate management, and the contingency actions should the capping system be inadvertently breached.

3.9 Groundwater Collection System Installation

The groundwater collection system has been designed using groundwater data collected during the groundwater IRM, the ongoing groundwater monitoring, the grading plan, and the location and design of the consolidation cell. The data consistently show a thin, discontinuous zone of impacted shallow groundwater lying immediately on top of the silty clay. The most productive zones in the system are the former granular rail bed materials.

The data collected after the completion of the Solidification IRM provides the most representative groundwater elevation and quality data for the future control of the BCP Site. The samples collected for the bench-scale testing for the long-term groundwater treatment system were collected after the majority of the

solidification was completed. The results of the bench-scale testing are included in Appendix B. The satellite areas and the limited area between the former exhauster building and the former tar management area are not expected to alter the findings of the bench-scale testing, and in fact likely introduce a level of conservatism.

The groundwater collection system layout and details are shown in Sheets S-33. The collection systems will manage migration by controlling the groundwater gradient in the areas of impact, control groundwater inflow in the vicinity of the consolidation cell and have the capacity to recover the volume of groundwater anticipated through the cover systems. The collection system along the northeast portion of the former production area was installed with an additional conduit to allow collection of groundwater migrating on Site 110. The systems controlling groundwater migration in the vicinity of the containment cell will serve two purposes; short-term removal of surface water that may seep into the consolidation cell materials during filling and long-term interruption of flow from the fill and as liquids potentially leach from the solidified materials (little to no true leachate is anticipated).

The volume of infiltrating groundwater will reduce as the Site is remediated due to the elimination of low areas that currently contain standing water allowing time for saturation of the underlying fill. The volume of infiltration will be further reduced as the Site is redeveloped and hardscape and buildings will direct precipitation to stormwater management facilities, which have been designed to manage runoff from the Site with 75 percent hardscape. Over time the diminishing flow to the treatment system will allow the system operations to be reduced and provide capacity for flow from other RITC owned property. The following collection systems will be utilized for control of the groundwater at the BCP Site:

1. Existing Systems Modifications/Replacement
    a. Collection System No. 1 (Existing) – Replaced with Southern Perimeter Drain (through PD-4) of the consolidation cell (Sheet S-10).
    b. Collection System No. 2 (Existing) – Removed with Former Light Oil Area Solidified Fill. Replaced with Southern Perimeter Drain around Consolidation Cell (Sheet S-10).
    c. Collection System No. 3 (Existing) – Within Retention Basin Excavation, Replaced along the east side of the Retention Basin as Western Collection Trench (Sheet S-33). Control of gradient near the retention basin.
    d. Collection System No. 4 – Replaced with North Perimeter Drain (through PD-1) of the consolidation cell (Sheet S-10).
    e. Collection System No. 5 - Replaced with Eastern Legs of the North and South Perimeter Drains (through PD-1 and PD-4) of the consolidation cell (Sheet S-10).
2. New Collection Systems (Sheet S-33)
    a. Purifier Area Collection System – Manage groundwater in the vicinity of MW-BCP-12A and the Former Purifier Boxes.
    b. Battery Collection System – Upgrade sump and add pumping system and convenance piping from the former Battery tunnel collection system.
    c. Compressor Area Collection System – Collection of shallow groundwater north of the former compressor building, south of Track 1 barrier area.
    d.
3. Consolidation Cell – Base Drainage/Detection System (Sheet S-10)
    a. Collection Systems BD-2 and BD-3 – Base drainage for water that accumulates during the filling of the consolidation cell. After the water that accumulated during the filling of the

consolidation cell, these systems will be effectively leachate collection systems and will likely collect little to no water after the Site reaches steady state.

The operation and monitoring of the groundwater collection system will be defined in the SMP. The monitoring plan will define the metrics to be gathered to define the criteria when the operation of the system may be reduced or curtailed.

3.10 Surface Water Management

The surface water management systems have been designed to comply with the NYSDEC and Town of Tonawanda General Permits (MS4). They are presented herein for informational purposes and because they affect the grading of the site. It is understood that approval of this RAWP does not constitute approval of the stormwater management systems. The surface water management system design (Appendix D) has been based on collection and management of the surface water from the BCP Site and Site 110 assuming 75 percent hardscape (the maximum allowed under General Industrial zoning in the Town of Tonawanda). Although Site 110 is currently partially in the watershed allowing runoff to the east of the RITC property, following closure, all stormwater from the 3875 River Road property will be managed by RITC. Stormwater management on the National Grid property will remain on that property and continue to follow the current watershed conditions.

The stormwater management system is a combination of the retention basin along the western boundary of the BCP Site supplied by flow from an open ditch system along the east and north boundary and stormwater collection piping systems along the south boundary of the Site (Sheet S-33). The retention basin will be maintained at an elevation of 590-ft-NAVD88 to provide equalization of runoff quality even during dry season low flow events. During design events the pool elevation is designed to rise to elevation 595.96 ft-NAVD88 (Sheet S-25, Appendix A). The peak design discharge from the system is 6.78 cubic feet per second (CFS, Appendix D). The discharge will be conveyed through a 12- or 15-inch diameter pipe to the River Road box culvert that conveys the current flow from the industrial properties east of River Road at and surrounding the BCP Site.

The retention basin design includes three impounding areas to control and direct stormwater within the basin to ensure water is retained with sufficient time to allow equalization and consistent water quality discharging from the BCP Site. The ditch (Sheets S-25 and S-26) from the east and north sides of the Site will collect all flow from the northern 60 percent of the Site and convey the flows to the north end of the retention basin. The underlying silty clay will not allow significant infiltration, under low and normal flow conditions, the eastern and northern ditch will direct runoff to accumulate in the north forebay, then the primary retention basin.

The stormwater from the southern portion of the BCP Site will be intercepted by the perimeter ditch and directed to stormwater piping that will convey flow to the forebay on the east side of the retention basin. The conveyance system eliminates Outfall #002 and the flow from the BCP Site to the south ditch on Site 109 (Note: as a result, the Site 109 RAWP proposes elimination of the south ditch on that Site). Historically the flow from Outfall #002 was uncontrolled to the Niagara River, in the future the flow from the new south ditch will pass through the retention basin allowing time for sedimentation before discharge.

In total the stormwater management system represents more than 10 acres of greenspace that will be allowed to naturally evolve limiting the need for active management. All of the systems are designed to be passive and, while there is sampling and testing required at the outfall, for the most part the systems will function without consumption of fossil fuels.

The management and monitoring of stormwater and the associated systems will be described in the SMP including contingencies for changes required for elimination of obstructions caused by invasive species. The discharge will be managed in accordance with local Municipal Separate Storm Sewer System (MS4) requirements.

3.11 Cover Placement

The cover placement will provide a physical barrier between any residuals that do not meet the commercial SCOs and visitors or employees on the BCP Site. The cover system will eliminate the potential for wind or surface water erosion and associated transport. The cover systems will include; a solid waste equivalent capping system over the consolidation cell (Sheets S-9 and S10), soil covers (Sheets S-25 and S-26) and possibly pavement subgrade. As the BCP Site is redeveloped pavement and building foundation/slab systems will replace portions of the soil cover. Of note is the area over the consolidation cell is designed to maintain the overall grade but can be mounded if additional materials are encountered during grading, which require consolidation. The area will be designated green space, no development is planned over the consolidation cell.

3.11.1 Subgrade Preparation

The earthmoving required to create the stormwater management systems (including the retention basin), to eliminate the areas that retain surface water on the BCP Site and create and fill the consolidation cell includes up to 250,000 cubic yards of material displacement (Sheets S-21 and S-22). Prior to regrading, the Erosion and Sediment Controls (E&SC) will be established (Sheets S-5 and S-6). The E&SC Controls will be inspected and maintained throughout the earthmoving program. The CAMP (Appendix C) will be maintained until BCP Site surface soils meet commercial SCOs or are covered with the demarcation layer. The task specific CAMP station will be moved downwind of the areas of active earthmoving and the two eastern CAMP stations may be relocated as those areas are graded. The top of the prepared subgrade shall be surveyed on a grid[16] spacing of no greater than 50-feet center to center (approximately 1,300 locations) or with aerial photography prior to or immediately following placement of the demarcation layer. Aerial surveys will be used whenever practicable, weather permitting, for documentation of the subgrade surface elevation.

During the subgrade preparation, the sedimentation pools, stormwater retention basin, and the coke yard depressions will be eliminated. In order to fill the depressions, the water in each area will be pumped and discharged through the existing stormwater system. The water will be sampled to confirm it continues to meet the SWPPP criteria. If the water becomes turbid, the water shall be filtered or treated through the temporary treatment facility and subsequently discharged to the existing outfalls or onsite sewer.

The pumping simply accelerates the flow to the outfalls, and the monitoring for the SWPPP will continue throughout the subgrade preparation. The sedimentation pond water will be discharged to the stormwater retention basins using the current ditches and stormwater pipes. As the pool elevations are reduced, the gabion baskets will be removed from the south and coal yard ditches and coke yard to allow the areas to drain. After the extended areas of the stormwater retention basin watershed are dewatered, the stormwater retention basin will be pumped to Outfall #002. As soon as the basin bottom is exposed, the water will be pumped to the sedimentation ponds and ultimately Outfall #001.

[16] The same grid or aerial photographic approach shall be used for the subgrade and final surface to allow confirmation that no less than 12-inches of cover has been placed.

The subgrade preparation will not occur in one step prior to cover placement. There will be areas of prepared subgrade that will be capped or covered while other areas are being prepared for the placement of the demarcation layer. The subgrade preparation earthmoving will:

1. Expose the silty clay in the retention basin, stormwater ditch perimeter, and consolidation cell area;
2. Relocate the stockpiles of materials across the BCP Site including the fill, crushed concrete, and stormwater retention pond berms;
3. Form the initial retention basin bowl;
4. Eliminate the impounding capacity of the current sedimentation pools;
5. Eliminate the impounding capacity of the coke yard;
6. Eliminate the retention capacity of the south and coal yard ditches; and
7. Create the surface for placement of the demarcation layer.

3.11.2 Consolidation Cell

The preparation of the consolidation cell (Sheets S-9 and S-10) will include removal of the overburden fill for the entire area to the top of the silty clay, including the areas for the anchor trenches and perimeter groundwater drains (Sheet S-10). The fill to be excavated will include both solidified materials and general Site fill. The solidified materials (Sheets S-9 and S-11) encountered during the consolidation cell excavation will be placed directly in the prepared sections of the consolidation cell or stockpiled on the solidified materials to the east until a section of the consolidation cell is prepared to allow direct placement of these materials. Fill removed from the limits of the consolidation cell that was not previously solidified and that does not require solidification or treatment will be used as general fill in the BCP Site subgrade outside the limits of the consolidation area, in areas to receive a cover.

Silty clay with no evidence of contamination (Sheets S-9 and S-10) will be removed to create space for placement of the target materials. The depth of the excavation will vary from 10- to 11 feet below the stained silty clay, target elevation 589-ft-msl. The silty clay has been sampled in accordance with Table 5.4 (e)10 of NYSDEC DER-10 and complies with the permeability (Appendix F) and SCOs (Table 3-4) for use as cover (RAMP, Appendix F).

The silty clay that meets the commercial SCO's (Table 3-4) will be used for unclassified fill in the consolidation cell cap and the site-wide cover systems.

The base of the consolidation cell will be inspected and compacted to 90 percent of the standard proctor maximum dry density (ASTM D698-12(2021)). At that density, the silty clay has been tested and has a permeability of less than 1×10^{-7} centimeters per second (cm/s) and provides a low permeability base.

Two Base Drains will be installed below the consolidation cell (Sheets S-9 and S-10). The drains will provide an outlet for precipitation that accumulates in the consolidation area during filling and on/in target materials during placement. The base drains will serve as leachate collection systems, though little to no leachate is anticipated as all target materials are solids and no degradable materials shall be placed in the cell. The base drains will connect to sumps west of the consolidation cell that can be monitored in accordance with the SMP and from which any accumulated ground or surface water can be extracted.

The target materials (See Table 1-1) will be placed in lifts of no more than 12-inches and will be compacted by no less than three passes of a smooth drum or sheep's foot compactor. Should the surface of any lift deflect after three passes of the roller, lime kiln dust or Portland cement shall be added to solidify the materials. The placed target materials form the subbase for the consolidation cell cap.

3.12 Demarcation Layer

A demarcation layer will be placed over all prepared subgrade that does not meet the commercial SCOs. The demarcation layer will be a minimum of 4-ounce orange non-woven geotextile produced by IWT, or approved substitute. The demarcation layer will be placed and pinned or staked in place to avoid shifting during cover placement. A minimum of a 6-inch overlap along the sides and 12-inches at each end of each roll is required to ensure complete coverage.

3.13 Consolidation Cell Capping System

The consolidation cell capping system includes multiple layers of protection for the contained materials (Sheet S-10). The capping system will include a HDPE liner to ensure the cover is less permeable than the base:

1. Consistent with the site-wide cover systems, a layer of 4-ounce non-woven geotextile will be placed over the compacted fill. The demarcation layer will be anchored around the entire perimeter of the consolidation cell outside the limits of the consolidated fill (Sheet S-10);
2. A Geosynthetic Clay Liner (GCL) shall be installed above the non-woven geotextile layer and cover the consolidation area (Sheet S-10);
3. A 60-mil (minimum) HDPE continuously seamed liner system shall be placed over and in direct contact with the GCL layer. The HDPE liner shall extend into the perimeter anchor trench and cover all consolidated materials (Sheet S-10);
4. The HDPE liner shall be covered with a geocomposite drainage layer. The drainage layer shall drain to the perimeter drainage layer and ultimately through the sumps to be recovered and treated in the long-term groundwater treatment system;
5. The anchor trench location shall be surveyed at a minimum of 20-foot center to center and the surface of the liner/geotextile shall be surveyed at a maximum grid spacing of 50-foot center to center;
6. The anchor trench shall be backfilled with compacted silty clay;
7. Perimeter drains shall be constructed outside the perimeter of the liner/anchor trench (Sheets S-10). The perimeter drains will collect shallow groundwater in the vicinity of the consolidation cell for treatment in the groundwater treatment facility;
8. A minimum of 21-inches of compacted unclassified silty clay fill shall be placed and compacted over the upper geosynthetic drainage layer. The silty clay will be placed in no less than two layers. The surface of the unclassified fill will be surveyed at the same interval as the underlying surface (50-foot center to center);
9. Unclassified fill meeting commercial SCOs will be placed to within 6-inches of final grade; and
10. A 6-inch (minimum) topsoil layer will be placed prior to seeding. Due to final grades in the vicinity of the consolidation cell, there will be areas over the outer slopes of the cell where the total thickness of unclassified fill may reach 6 feet.

3.14 Soil Cover

As areas of fill outside the limits of the perimeter road or building areas, reach the associated subgrade elevations (Sheets S-21 and S-22) the soil cover can be placed. The soil cover shall consist of a minimum of 12-inches of cover that meets the commercial SCOs over a demarcation layer:

1. A demarcation layer shall cover all subgrade that does not meet the commercial SCOs. A layer of 4-ounce (minimum) non-woven geotextile, 6-mil polyethylene sheeting, or orange construction

fence fabric will be placed over the compacted fill. The demarcation layer will also cover the consolidation cell (Sheets S-9 and S-10);

2. The surface of the subgrade or demarcation layer shall be surveyed at a maximum spacing of 50-foot center to center or with an aerial survey with 0.1-foot vertical accuracy;
3. The demarcation layer shall be covered with 9-inches of unclassified fill that meets the commercial SCOs recovered from the retention basin, ditch, or consolidation area excavations. The unclassified fill shall be placed without compromising the demarcation layer and shall be compacted to allow placement of the topsoil cover. This is not structural fill, so compaction testing is not required. The surface of the unclassified fill layer shall be surveyed at a maximum spacing of 50-foot center to center or with an aerial survey with 0.1-foot vertical accuracy. The thickness of the unclassified fill will be calculated by comparing the demarcation layer elevation and the top of the unclassified fill. At no measurement point shall the unclassified fill be less than 9-inches thick;
4. A three-inch (minimum) topsoil layer from offsite sources meeting the commercial SCOs shall be placed and compacted over the unclassified fill to bring the soil cover thickness to no less than 12-inches. The topsoil shall be tested in accordance with Table 5.4(e)10 of DER-10, and only imported after approval of an import notification.

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

5. The surface of the topsoil shall be surveyed at a maximum spacing of 50-foot center to center and the data will be used to verify the soil cover is 12-inches or greater in thickness above the demarcation layer; and
6. The soil cover areas will be revegetated in accordance with the Specification (Sheets S27 and S-28).

3.14.1 Granular Cover Areas

As areas of fill within the limits of proposed roads or building areas, reach the associated subgrade elevations (Sheets S-21 and S-22) a granular cover can be placed. The granular fill can be either granular material from a commercial NYSDEC approved source or crushed concrete from the BCP Site that meets the commercial SCOs. The granular cover shall consist of a minimum of 12-inches of cover that meets the commercial SCOs over a demarcation layer:

1. A demarcation layer shall cover all subgrade that does not meet the commercial SCOs. A layer of 4-ounce (minimum) non-woven geotextile, 6-mil polyethylene sheeting, or orange construction fence fabric will be placed over the compacted fill;

2. The surface of the subgrade or demarcation layer shall be surveyed at a maximum spacing of 50-foot center to center or with an aerial survey with 0.1-foot vertical accuracy;
3. The demarcation layer shall be covered with 12-inches of unclassified granular fill that meets the commercial SCOs. The granular unclassified fill shall be placed without compromising the demarcation layer and shall be compacted to allow construction traffic without rutting the cover. This is not structural fill, so compaction testing is not required; and
4. If the granular fill has less than 10 percent passing the No. 80 Sieve and is from a NYSDEC approved commercial source, no testing is required.

3.14.2 Pavement and Buildings

If buildings or pavement are scheduled for construction prior to completion of the gravel cover, the demarcation layer can be placed at the base of the pavement or building slab subgrade. In the areas to be covered with pavement (roads and parking) the pavement design, subbase, base course and wearing courses shall meet the specifications of the Town of Tonawanda, other than the requirement to remove underlying fill.

In areas to be covered by structures, samples will be collected in accordance with an approved work plan, soil vapor intrusion (sub-slab vapor and indoor air) testing will be compared to the NYSDOH Soil Vapor matrices, including any updated or new matrices following the 2024 matrices. The data will be provided to the NYSDEC and NYSDOH for review and concurrence.

Building slabs will be constructed over prepared subbase soils, subbase and slabs designed in accordance with Town and state requirements. Granular subbase, perforated tubing or geovent, and a vapor barrier will be installed prior to slab placement in all buildings to be occupied. Following construction, sub-slab vapor and indoor air testing will be conducted in accordance with a work plan developed for each building. If no mitigation requirement is triggered by the sampling, the piping installed in the subbase will be capped. If testing indicates mitigation is required, a mitigation system will be designed, installed, and operated in conjunction with an approved work plan.

3.15 Groundwater Treatment System Installation and Startup

The groundwater treatment system will be a new system owned or leased by RITC (the current system is a lease arrangement) assembled, tested and operated in the former machine shop/maintenance building. The system will be designed to meet the surface water discharge criteria (Appendix B) although it will have the connections required to discharge to the Town of Tonawanda under Industrial Waste Discharge Permit No. 331 during startup and maintenance.

Groundwater Treatment Technologies has conducted bench-scale studies using groundwater samples collected at the BCP Site to expand their understanding of the treatment system for the remediated property. Based on the data collected to date during the remedial investigation and IRMs, the following scope of work was implemented:

1. Bench-scale Testing.
2. Treatment System Design.
3. Preparation and submittal of the Fact Sheet to allow NYSDEC to define the discharge criteria, and
4. Review of the design based on the NYSDEC effluent criteria (Appendix B).

3.15.1.1 Bench-scale Testing

Prior to final design of the long-term treatment equipment, pumps, and piping a bench-scale test was conducted. The sample for bench scale testing was produced by collecting water from each of the groundwater collection sumps and from the battery sump. Approximately 5-gallons was extracted from each of the sumps (Sumps 1 through 5 and the battery sump). The composite water sample was used to simulate the influent to the treatment train and will produce a sample for testing of anticipated discharge quality. Both the influent and effluent were tested for:

- TCL VOCs, including TICs
- TCL SVOCs
- TAL Metals
- Low Level Mercury
- Cyanide
- Ammonia
- Pesticides and Herbicides
- PCBs
- pH
- TSS

The goal was to define a treatment train that will provide data to the NYSDEC to identify surface water discharge criteria for the remedial action. A "Fact Sheet" including the influent data for the selected treatment train, a process flow diagram, and associated design data was provided to the NYSDEC. NYSDEC provided the required effluent criteria (Appendix B), and the process has been confirmed. The pre-treatment bench-scale data will be provided to the Town of Tonawanda Pre-treatment Coordinator to seek approval for POTW discharge during startup. Following startup testing the discharge will be to the stormwater retention basin.

3.16 Treatment System Design

The system has been designed to meet both the NYSDEC surface water criteria and the POTW IDW Permit criteria. The treatment system design was conducted by Groundwater Treatment & Technology (GWTT) of Wharton, New Jersey under the direction of Inventum Engineering. GWTT designed and leased the existing IRM system to RITC.

The treatment system will be installed in the existing GWTS IRM building which is located immediately east of the proposed retention/detention basin, upstream of the proposed outfall for surface water. The building is located hydraulically downgradient of the majority of the BCP Site reducing the energy demand for conveying collected groundwater.

The system design includes automatic controls for alarm conditions; low level, high level and high-high level conditions as well as manual overall functions for use during testing and maintenance activities. The sump pumps supplying the treatment system influent water will be designed to turnoff if an alarm condition is recognized for the treatment system. This will prevent the sump pumps from continuing to operate if the treatment system has shutdown. The system is intended to automatically operate 24 hours per day/7 days per week. However, daily monitoring of the influent may be required to adjust the pH and balance the flocculant and coagulant metering. Routine daily maintenance will include bag filter changeouts, management of collected solids, and backwashing filter media as needed.

The treatment train will be designed to accommodate the anticipated flow from the remediated BCP Site, 75 GPM with peak discharge of 100 GPM. The system design includes:

1. Oil/water Separator (OWS) – NAPL and passive organic compound treatment including; an oil skimmer to remove light NAPL; and a coalescing media pack and a parallel corrugated plate coalescer to collect dense NAPL.
2. Chemical mixing tank with pH adjustment – to adjust pH if needed in an equalization tank after the OWS. Also includes chemical feed equipment for oxidant injection.
3. Lamella Clarifier to reduce chemically precipitated metals and Total Suspended Solids (TSS). The Lamella Clarifier consist of:
    a. Flash/floc mix tank for the injection of coagulant and flocculant
    b. Lamella clarifier plates to allow solids generated to settle
    c. Chemical feed equipment for clarification
    d. Pump suction tank to hold clarified supernatant.
4. Clarification Solids System for the consolidation and dewatering of sludge generated in the Lamella Clarifier System consisting of pump skids, sludge holding tank, plate and frame filter press for dewatering, solids holding roll-off for disposal, and decant tank and pump conveying filtrate back to the headworks to the treatment system
5. 12,500-gallon Membrane Bioreactor to allow aeration and breakdown of organic compounds including ammonia;
6. Ultra-filtration system containing an automatic strainer and skid mounted ultrafiltration membranes;
7. GAC filtration/absorption – dissolved VOCs, Semi-volatile Organic Compounds (SVOCs) and PFAS treatments;
8. Effluent holding tank for backwash and effluent holding and pump skids;
9. Sample ports; and
10. Integrated electrical controls and monitoring systems.

The final design with a complete set of plans for the groundwater treatment system will be submitted to NYSDEC in January 2026. The plans will include the specifications for the required equipment, plumbing, electrical services, and controls. The startup testing requirements will be provided for review and approval.

An operation, maintenance, and monitoring (OM&M) plan will be provided as an appendix to the SMP but will be in a form that it can be used by the operator as a standalone manual.

3.17 Soil Vapor Assessment and Management

There is residual contamination being covered/capped on the BCP Site. As a result, the remaining building (Building No. 8) and all new buildings must be assessed for potential soil vapor intrusion in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006, with updates).

Preliminary sampling of soil vapor below the Building No. 8 slab detected one constituent, Cyclohexane, in the sub-slab air sample at location SV-BCP-02 (dry storage area near the center of the building) at a concentration above the respective matrix guideline concentrations in the NYSDOH guidance document. Cyclohexane was detected at SV-BCP-02 at a concentrate of 75.4 micrograms per cubic meter (ug/m3) which is above the NYSDOH sub-slab vapor concentration for Matrix D of 60 ug/m3 for Cyclohexane. The

constituents 1,1,1-Trichloroethane, 1,2,4-Trimethylbenzene, Benzene, Carbon tetrachloride, Cyclohexane, Ethylbenzene, Heptane, n-Hexane, Naphthalene, o-Xylene, p/m-Xylene, Toluene were detected in the collected sub-slab samples, but all below their respective guideline concentrations. These detections align with typical constituent found in the RITC BCP site fill. In preparation for the installation of the new groundwater treatment equipment, the floor will be cleaned, and all cracks and wall/slab joints will be filled. All anchor bolt coring will be filled with sealant prior to setting the anchors to prevent soil vapor migration into the building.

There is currently no heat in the section of Building No. 8 to be used for groundwater treatment. Following upgrades for the Groundwater Treatment system installation both sub-slab and indoor air samples will be collected and compared to the NYSDOH matrices. The recommended controls will be installed.

As the site plan for future development is prepared, the locations of buildings to be occupied will be investigated for geotechnical purposes. If residual contamination or potential TENORM remain under the proposed buildings, soil vapor management plans will be incorporated into the construction documents and the building locations shall be assessed for potential soil vapor intrusion in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006, with updates). The sub slab and indoor air of constructed buildings will be tested in accordance with the then current NYSDOH protocols. If required soil vapor mitigation shall be operated and monitored.

3.18 Demolition

There will be limited demolition activity during the remedial action. The demolition conducted during the remedial action will include:

- Pavement – remove and dispose offsite;
- Mixing pad – remove, crush, and use as fill below the cover. After the mixing pad slab is lifted, the area below the slab shall be inspected for staining or signs of grossly contaminated materials. If either are identified that material shall be sampled and tested in accordance with the RAMP. If no staining or grossly contaminated materials are identified, five samples in a five on a die pattern, will be collected and tested in accordance with the RAMP;
- Office Building – demolish and dispose as C&D;
- Box Culvert – Sections of the box culvert that runs along and through the former production area must be removed to allow excavation of the retention basin and solidified soils. The concrete shall be inspected, and any stained concrete shall be stockpiled separately, and samples of the stained concrete shall be tested in accordance with the RAMP before the proper management approach is defined, and
- Out of Service Utilities – Remove as encountered during grading, dispose as solid waste, or recycle. Of particular note is the north south sewer from the mansion Sump to the settling ponds. If this sewer cannot be removed safely, it shall be jet washed and filled with flowable fill.

The security building and settling ponds are on Site 109 and are addressed by the RAWP for Site 109.

The required Town of Tonawanda Building Permit has been obtained.

3.19 Green and Sustainable Remediation

The project incorporated Green and Sustainable Remediation (GSR) best management practices (Table 3-2) since the responsibility for the BCP Site was transferred from U.S. EPA to RITC. The RAWP incorporates GSR throughout the program, including, but not limited to:

1. Reuse of onsite resources:
    a. Onsite borrow is being incorporated into the grading, capping, and cover systems reducing the offsite excavation and transportation of more than 100,000 cubic yards of earth. Onsite sourcing of materials dramatically reduces GHG generation (Appendix G);
    b. Site stormwater is used to moisten the soils in the bioremediation areas; and
    c. The existing maintenance building is being renovated and repurposed for the long-term groundwater treatment system and for the maintenance equipment for the BCP Site.
2. Low-energy management of stormwater (Sheets S-25 and S-26):
    a. The collection and conveyance of surface and stormwater is based on gravity flow, no pumping required;
    b. Runoff from the northern portion of the property will flow by gravity to a surface swale along the east and north property boundaries;
    c. Runoff from the southern portions of the Site will flow by gravity to a swale along the southern portion of the Site and then through a buried conduit to a forebay on the eastern side of the retention pond;
    d. The retention basin is surrounded by aquatic benches that will be vegetated (Sheets S-27 and S-28) with a "wetland" seed mixture[17] that will promote growth, natural filtration, and

	Botanical Name	**Common Name**
31.10%	Carex vulpinoidea, PA Ecotype	Fox Sedge, PA Ecotype
30.30%	Carex lurida, PA Ecotype	Lurid Sedge, PA Ecotype
20.50%	Elymus virginicus, Madison-NY Ecotype	Virginia Wildrye, Madison-NY Ecotype
3.00%	Juncus effusus	Soft Rush
3.00%	Verbena hastata, PA Ecotype	Blue Vervain, PA Ecotype
2.50%	Carex scoparia, PA Ecotype	Blunt Broom Sedge, PA Ecotype
2.20%	Asclepias incarnata, PA Ecotype	Swamp Milkweed, PA Ecotype
1.50%	Zizia aurea, PA Ecotype	Golden Alexanders, PA Ecotype
1.20%	Glyceria striata, PA Ecotype	Fowl Mannagrass, PA Ecotype
1.00%	Verbena urticifolia, PA Ecotype	White Vervain, PA Ecotype
0.70%	Eupatorium perfoliatum, PA Ecotype	Boneset, PA Ecotype
0.50%	Aster umbellatus, PA Ecotype	Flat Topped White Aster, PA Ecotype
0.50%	Carex crinita, PA Ecotype	Fringed Sedge, PA Ecotype
0.50%	Lobelia siphilitica, PA Ecotype	Great Blue Lobelia, PA Ecotype
0.40%	Heliopsis helianthoides, PA Ecotype	Oxeye Sunflower, PA Ecotype
0.40%	Mimulus, ringens, PA Ecotype	Square Stemmed Monkeyflower, PA Ecotype
0.40%	Scirpus cyperinus, PA Ecotype	Woolgrass, PA Ecotype
0.20%	Solidago patula, PA Ecotype	Roughleaf Goldenrod, PA Ecotype
0.10%	Lycopus americanus, PA Ecotype	American Water Horehound, PA Ecotype

    e. evapotranspiration from the retention pond.

3. Idle Management Plan
    a. The use of large amounts of heavy equipment and trucking of topsoil to the BCP Site are the biggest contributors to GHG generation (Appendix G) associated with this RAWP. To the extent practicable, during the morning tailgate meetings the daily work schedule will be assigned to maximize the time the heavy equipment is utilized and minimize the time the equipment is idling between activities.

[17] Wetland Meadow Mix, ERNMX-122, https://www.ernstseed.com/wp-content/uploads/mixsheets/ERNMX-122-MixSheet-20260204080145.pdf

b. Transportation of topsoil to the BCP Site will be scheduled whenever possible to ensure the trucks can arrive onsite, deposit the soil close to its final placement areas and leave with a minimum time spent queuing to unload. Some idling is unavoidable to manage weigh tickets and material manifests, but to the extent practicable that will be minimized.

4. Wetlands and Waterways
    a. There are no state or federal jurisdictional wetlands on the 3875 River Road property.
    b. Aquatic benches, swales, and a retention pond were designed and detailed in this RAWP.

3.19.1 Climate Vulnerability Assessment

The BCP Site is not vulnerable to impacts from climate change. There are no areas of the BCP Site are within a flood plain. The stormwater management systems have all been designed with sufficient capacity for storms equal to the one percent probability events. The system does not require power to operate.

After the covers are in place, the long-term groundwater treatment facility has the capacity to manage the groundwater on the BCP Site. There is sufficient storage capacity to store years of infiltration in the groundwater system should power be interrupted to the groundwater extraction and treatment system.

3.20 Monitoring System

The location, installation specifications and testing of the proposed monitoring locations are proposed on Sheets S-35 and S-36. The existing monitoring well array, and the proposed monitoring well system are listed in Table 3-6. The wells to be abandoned are highlighted in tan with the approximate depths in the final column. The figures show proposed surface and groundwater monitoring points, details of monitoring well construction, details of the surface water monitoring (in accordance with the future Municipal Separate Storm Sewer System [MS4] permit) and sampling location(s), and the required infrastructure to provide access and protect the monitoring locations. It should be noted the locations were selected with the understanding that a RITC site wide monitoring program will provide an integrated set of data to understand conditions across the 140-acre campus.

The monitoring systems includes the metrics for verifying that any required sub slab depressurization systems are properly inspected and recorded.

The sampling and analysis plan for the monitoring network will be included in the SMP.

3.21 Institutional Access Restrictions

The institutional controls that will be implemented include the placement of a NYSDEC approved/required environmental easement on the controlled BCP Site (all portions not meeting Track 1 requirements). The easement will be filed with Erie County at a time when the remedy is substantially complete and will appear any time a party conducts a title search or has a BCP Site survey prepared. The easement will notify the party searching for the deed that the BCP Site containing the BCP Site is in the NYSDEC BCP, registered as Site No. C915353 and that the NYSDEC and NYSDOH have, among other rights, rights of entry and inspection to those portions of the BCP Site that do not meet Track 1 requirements. Identification of the BCP Site number will allow a future potential buyer or occupant to directly access and review the documents in the DEC Info Locator:

(https://www.dec.ny.gov/cfmx/extapps/derexternal/haz/details.cfm?ProgNo=C915353).

Imposition of an institutional control in the form of an environmental easement for the controlled property not included in the Track 1 Area (see remedial element 2) which will:

- require the remedial party or site owner to complete and submit to NYSDEC a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allow the use and development of the controlled property for commercial use or industrial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or Erie County Department of Health; and
- require compliance with the NYSDEC approved Site Management Plan (SMP).

4 Permits and Other Authorizations

The anticipated selected remedial action will require a series of permits and approvals in close coordination between RITC, the NYSDEC, the County of Erie, and the Town of Tonawanda. The permits will largely be associated with storm and groundwater management. The approvals will center on the approval of the work plans required to implement the remedy and grading and controls for the remedial actions.

4.1 Permits

The required permits applied for during the procurement phase of the remedial action:

1. State Pollutant Discharge Elimination System (SPDES) Permit limits (NYSDEC) – Received
2. Industrial Waste Discharge Modification (IWD No. 331) (Town of Tonawanda) – Received (Appendix B)
3. Demolition permits (Town of Tonawanda), Received
4. Stormwater Discharge (MS4) General Permit

4.2 Authorizations

There are a series of approvals and modifications to existing approvals needed during and associated with the remedial design, including:

1. CAMP – The existing CAMP has been modified to address the changing conditions and site features during the implementation of the remedial actions;
2. SWPPP – The SWPPP requirements will be followed until the remedial actions are completed and approved.;
3. Erosion and Sediment Control Plan (E&SCP) – Implementation of the Remedial Design will disturb the entire 86.5-acre surface of the BCP Site. The E&SCP will provide the scope of the erosion and dust control measures that will be required to complete the remedy are shown on Sheets S-5 and S-6;
4. Retention Basin(s) Discharge Approval – A retention basin will be used to collect and control surface water from the remediated BCP Site. The basin(s) will collect surface water that has not been in contact with any previous surface materials or groundwater. The hydraulic design criteria are presented in Appendix D. The retention structures will control the entire watershed, including portions of the water shed outside the BCP Site. Any sediment that has accumulated during the remedial action will be removed from the basin prior to placing the discharge into service. The discharge from the final basin will be monitored in accordance with the MS4;
5. Site Grading – The grading plans (Site Plan) will be submitted to the Town of Tonawanda to ensure the proposed grading is consistent with the vision for the River Road corridor; and
6. Construction Completion Reports – The ongoing Interim Remedial Measures will be completed in conjunction with implementation of this RAWP and the Remedial Action. The CCRs for the ongoing IRMs will be submitted for review and approval prior to completion of the remedial action to be included as appendices to the Final Engineering Report. Completed and approved CCRs will be cited in the FER but will not be appended to the document.

5 Schedule

The proposed baseline schedule for the implementation of the RA is shown as Figure 5-1. Procurement of the groundwater treatment equipment is the longest lead time procurement activity. The recommended alternative largely removes external factors impacting the schedule by limiting the dependance on resources that are not controlled by the State of New York, the Town of Tonawanda, or RITC. The schedule is largely driven by the review and approvals needed from the state and local representatives and the time required to manage the onsite materials and prepare and place the cover system. Highlights of the baseline schedule include:

- The remedial actions are completed in phases, the majority of which overlap. Some activities will be initiated before the remedial design is completed, such as:
    - Environmental Easement Preparation
    - Use Restrictions
    - Permit Applications
    - Buried Utility Management
- From the initiation of action through the completion of the capital phases, the remedial actions are estimated to take 18 months.
- OM&M will begin during the later phases of the remedial action primarily associated with the changeover from the groundwater IRM system to the permanent groundwater collection and treatment system and the migration of the stormwater management system from the TCC controls to construction E&SC controls, to the permanent systems.
- At the completion of the remedial actions, an FER summarizing all of the work completed from the time of the BCP Agreement to the completion of the remedial action will be prepared.
- The final SMP (OM&M) programs will be defined in the SMP that will be prepared during the second and third quarter 2027. Draft SMP by August 1, 2027, Final SMP October 1, 2027.
- The draft FER will be submitted by October 1, 2027 and the final will be submitted November 15, 2027.
- The proposed date for a Certificate of Completion is December 2027.
- The baseline schedule is an evergreen document that will be updated quarterly as the cleanup progresses.

6 Post-construction Plans

The following post-construction plans are anticipated at this time:

1. Construction Completion Reports – The ongoing Interim Remedial Measures will be completed in conjunction with implementation of this RAWP and the Remedial Action. The CCRs for the ongoing IRMs will be submitted for review and approval to be included as appendices to the Final Engineering Report. The completed and approved CCRs will be referenced in the FER but will not be included in the appendices.
2. Site Management Plan – The final SMP will be submitted with the FER and will include the long-term operational procedures for the active components of the BCP Site, the long-term monitoring program, and the EWP. The SMP will include the requirements to test for, and if appropriate, install SSDs under new buildings constructed on the BCP Site (See outline in Appendix J). The EWP will define the procedures for future intrusive work on the BCP Site.
3. Final Engineering Report – The FER will include the As-built construction documents, CCRs for the IRMs, and the data collected during the remedial action (See outline in Appendix K).
4. Environmental Easement – NYSDEC format including the appropriate site-specific references.

7 Site Figures

Site figures have been developed using the 2024 aerial photographs. The RAWP Figures contain the information defined in the Decision Document and have been used as the basis of the construction sheets provided in Appendix A. The Site Figures include:

- Figure 7-1 - Excavation of Solidified Material
- Figure 7-2 – Excavation of VOC Impacted Fill and Soil
- Figure 7-3 – Biotreatment
- Figure 7-4 – Management of Blue Stained Soil
- Figure 7-5 - Insitu Treatment of Blue-stained Soil/Fill
- Figure 7-6 - Removal of Soil Piles
- Figure 7-7 – Locations of Crushed Concrete
- Figure 7-8 - Ammonia Above the Site-specific SCO
- Figure 7-9 - Management of Potential TENORM Soils

8 Bibliography

The bibliography provides a list of documents used in conjunction with numerous BCP Site visits, discussions with USEPA and NYSDEC personnel, IRM data and observations, and expertise at coke making facilities to develop this alternatives analysis report. Some of the documents listed below are not specific to the BCP Site but were referenced to provide regional or other background information.

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2. Inventum Engineering, 2020, Citizen Participation Plan, Riverview Innovation & Technology Campus, BCP Site No. C915353, March.

3. Inventum Engineering, 2020, Storm Water Pollution Prevention Plan, Riverview Innovation & Technology Campus, BCP Site No. C915353, June.

4. Inventum Engineering, 2020, Surface Water System Maintenance Work Plan, June.

5. Inventum Engineering, 2021, Demolition Work Plan, March.

6. Inventum Engineering, 2021, Surface Water System Maintenance, IRM Work Plan, Concrete-lined Settling Ponds, July.

7. Inventum Engineering, 2023, Remedial Investigation Report, Riverview Innovation & Technology Campus, BCP Site No. C915353, August.

8. Inventum Engineering, 2023, Source Area Solidification Interim Remedial Measures Work Plan, Riverview Innovation & Technology Campus, BCP Site No. C915353, October.

9. Inventum Engineering, 2024, Remedial Action Work Plan: Full-Scale Water Treatment Area Bioremediation, Riverview Innovation & Technology Campus, BCP Site No. C915353, October.

10. Inventum Engineering, 2025, Satellite Source Area Solidification Remedial Action Work Plan, Riverview Innovation & Technology Campus, BCP Site No. C915353, February.

11. Inventum Engineering, 2025, Pre-Design Investigation Development of Soil Cleanup Objective for Ammonia, Riverview Innovation & Technology Campus, BCP Site No. C915353, September.

12. MJW, 2026, TENORM Management Plan, Riverview Innovation & Technology Campus, Brownfield Cleanup Program Site No. C915353, 3875 River Road, Tonawanda, New York, April.

13. New York State Department of Environmental Conservation, 2007, Hydrogeologic and Geochemical Investigation of the Southwestern Portion of the Town of Tonawanda, Erie County, New York. April 2007.

14. New York State Department of Environmental Conservation, 2010, DER-10: Technical Guidance for Site Investigation and Remediation, June.

15. New York State Department of Environmental Conservation, 2010, DER-31 Green Remediation, September.

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18. New York State Department of Environmental Conservation, 2015, "Field Investigation Report, Radiological Survey", October.

19. New York State Department of Environmental Conservation, 2015, "Order on Consent, File No. 14-59, R9-20141203-96", June 12.

20. New York State Department of Environmental Conservation, 2016, "Order on Consent, File No. 15-61, R9-20151215-132", Not Signed.

21. New York State Department of Environmental Conservation, 2016, New York State Standards and Specifications for Erosion and Sediment Control, November.

22. New York Statement Department of Environmental Conservation (NYSDEC), 2019, "Oblique Aerial Photographs, DJI_0001 to DJI_0999" December.

23. New York Statement Department of Environmental Conservation (NYSDEC), 2020, BCP Agreement (Index No. C915353-02-20) between the NYSDEC and Riverview dated February 14, 2020.

24. New York State Department of Environmental Conservation (NYSDEC), 2023, DMM-5/Management of Soils Contaminated with Technically Enhanced Naturally Occurring Radioactive Materials (TENORM), October.

25. New York Statement Department of Environmental Conservation (NYSDEC), 2023, Final Permit, SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4), December 13.

26. New York State Department of Environmental Conservation, 2024, Decision Document, Review Innovation & Technology Campus, Brownfield Cleanup Program, Tonawanda, Erie County, Site No. C915353, August 28.

27. Snyder, Abby, 2013, Stipulation to Pursuant to Section 17-0303 of the Environmental Conservation Law and Section 176 of the Navigation Law, June.

28. Town of Tonawanda, n.d., Stormwater Management Plan, SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems, GP-0-15-003.

Tables

Table 1-1
Quantity Summary
RI and IRM Results
Riverview Innovation & Technology Campus
Town of Tonawanda, New York

Media	Location	Estimated Quantity Tons	Cumulative Quantity Tons	Estimated Volume (30% Porosity) Gallons	Cumulative Volume Gallons
Solidified Material (Figure 7-1)					
	Light Oil Area	3,100			
	Former Light Oil Area	6,200			
	Tar Management Area	9,600			
	Thaw Shed (Includes Junction Building Fill)	3,400			
	Pump house	7,300			
	Exhauster Building	5,200			
	MW-BCP-05 Area	7,500			
	Weak Ammonia Liquor Area	7,800			
	Phenol	2,300			
	Tar Seep No. 2	6,700			
	ST21-ST23 Residual Pile	1,400			
	South Rail	30			
	TP-BCP-04 Tar Pipe (Removed)	0			
			60,530		
Residual VOC Impacted Fill and Soil (Figure 7-2)					
	Exhauster Building Sumps	500			
	MW-BCP-13 Area	800			
	MW-BCP-19 Area	1,400			
			2,700		
Petroleum Impacted Fill (Figure 7-3)					
	Former Diesel Tank Area	1,500			
	Compressor Building (Completed)	0			
	Wastewater Treatment Tank Area (Treated)	3,500			
	Heavy Equipment Building	400			
			1,900		
Iron Oxide Materials, Purifier Waste and Blue-Stained Fill/Soil (Figure 7-4)					
	Purifier Box Waste Piles	3,600			
	Iron Oxide Pile	5,000			
	Subgrade Iron Oxide Materials	8,000			
	TP-BCP-46 Area	1,800			
	SS-BCP-15 Area (In Buffer Zone)	1,000			
			19,400		
Blue Stained Soil/Fill to be Solidified In-Situ (Figure 7-5)					
	South Fill Pile Area (TP-BCP-35 Area)	2,000			
			2,000		
Materials to be Consolidated (Figure 7-6)					
	EPA Soil Piles	1,000			
	Shallow Fill MW-BCP-01A Area	150			
	Fill MW-BCP-27A Area	400			
			1,550		
Materials with Ammonia Concentrations above the Site-specific SCO (Figure 7-9)					
	Ammonia Impacted Materials (North of Solidified Materials)	2,400			
			2,400		
Groundwater with Residual Impacts					
	Production Area Along North Rail			500,000	
	MW-BCP-22A			100,000	
	MW-BCP-23A			22,000	
	TP-BCP-46 Area			140,000	
	Production Area			2,800,000	
	Purifier Box Area			600,000	
	MW-BCP-13 Area			20,000	
	MW-BCP-19 Area			20,000	
	TP-BCP-49 Area			300,000	
	MW-BCP-27 Area			200,000	
	MW-BCP-18 Area			20,000	
	TP-BCP-49 Area			30,000	
					4,752,000

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Table 3-1
Materials Managment
Remedial Action Work Plan
Riverview Innovation & Technology Campus
Site No. C915353
Town of Tonawanda, New York

	Onsite Materials											Import Material		
	Breeze, Coke and Coal Fill		Existing Fill			Crushed Concrete	Onsite Silty Clay	Solifdified Fill	Purifier Materials	Blue-stained Soils	EPA Soil Pile Materials	Industrial Debris	Asphalt	Granular Materials	Granular Materials with Fines	Topsoil
Description	Site-wide existing fill within areas of cut (excavation)		Soil Fill - primarily, sand, gravel and slag within areas of cut (excavation)			Former building materials free of stained concrete or brick or non-durable materials	Naturally deposited silty clay	Previously Solidified Fill	Iron Oxide Pile and Purifier Box Fill	Soil with a blue stained appearence within areas of cut (excavation)	Materials placed in northern stockpiles	Industrial debris encountered during excavation activities	Pavement removed to allow site grading	Granular materials from a Commercial Quarry	Granular materials from a Commercial Quarry	Topsoil
Uses	Fill below the demarcation layer of the soil, pavement or building cover systems	Breeze Only - Solidify as needed and place in consolidation cell	Fill below the demarcation layer of the soil, pavement, or building cover systems	Fill below the demarcation layer of the soil, pavement, or building cover systems following bioremediation	Placement in accordance with the TENORM waiver requirements	Fill below the demarcation layer of the soil, pavement, or building cover systems	Unclassified Fill in Soil Cover	Consolidation Cell Fill	Consolidation Cell Fill	Consolidation Cell Fill	Consolidation Cell Fill	Solid waste disposal or recycling	Offsite recycling	Structural Fill - Building subbase, pavement subbase, substation fill, collection trenches.	Structural Fill - Building subbase, pavement subbase, substation fill, collection trenches.	Surface materials for soil covers, consolidation cell cover.
Limitations	No NAPL or Viscous Tar	None	No NAPL or Viscous tar; No nuisance odors; or Radiological Screening actibity exceeding waiver concentrations	Contains nuisance odors, no TENORM	No nuisance odors but radiological activity requiring management in accordance with the DMM waiver	No concrete with tar or biodegradable materials	No staining, meets commercial SCOs	Must be suitable for compaction	Must be suitable for compaction	No NAPL or Viscous Tar; must be suitable for compaction	Must be suitable for compaction	No NAPL or Viscous Tar	No NAPL or Viscous Tar	Commercial source. Less than 10% passing the No. 80 sieve.	Offsite sourced fill, more than 10% passing No. 80 sieve. Meets commercial SCOs.	Offsite sourced materials suitable for support of vegetation growth. Meets commercial SCOs.
Testing	None	Test breeze in accordance with Solidification WP procedures	Radiological screening	Radiological screening	Radiological screening	Characterization of potentially impacted materials	Import Testing	None	None	None	HazCat Testing	As required by disposal facility	As required by offsite recycling facility	Grain-size distribution	Import Testing	Import Testing

Table 3-2
Green Remediation - Best Management Practices
RITC BCP Site #C915353
3875 River Road
Town of Tonawanda, New York

Category	Description	Monitoring Metric	Comment/Exclusion
Buildings	Reuse existing structures for treatment system, storage, sample management, etc.	Reuse Maintenance building for GWTS and for storage of maintenance equipment	Office building and Stormwater Managemnt Ponds and Basin will be used until they must be removed to complete the remedial actions.
Buildings	Use graywater collection systems at on-site buildings for water during cleanup activities, to minimize freshwater use	Reuse stormwater from ponds for bioremediation.	Graywater from IRM GWTS meets POTW criteria but not SWPPP criteria for dust control or other discharge onsite.
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment	Document that no solvents or acids are used to clean equipment.	
Materials	Use materials with recycled content (for example, concrete and/or asphalt from recycled crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled contents)	Track testing and volume of crushed concrete used during site grading.	To the extent practicable, crushed concrete from foundations, slabs and the settling ponds will be used for fill onsite. Concrete will be used for structural fill below roads and future parking areas, when known, but not as granular media in collection systems.
Power and Fuel	Use solar power pack system for low-power system demands (for example, security lighting)	Tried solor power for CAMP stations but the systems power demands exceeded what could be supplied with portable solor panels.	Tried solor power for CAMP stations but the systems power demands exceeded what could be supplied with portable solor panels. Not allowed for system telemetry that must operate 24/7.
Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery	Document sources of major materials; topsoil, gravel/crushed stone, and asphalt.	Topsoil, crushed stone and asphalt will be sourced locally to the extent available.
Project Planning and Team Management	Choose suppliers that will take back scraps or unused materials (if available)		To the extent possible, unused materials will be returned.
Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally	Onsite recycling bins will be provided.	
Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts	Onsite management of materials will be documented.	To the extent practicable, all materials will be managed on the 3875 River Road property.
Project Planning and Team Management	Use a local laboratory to minimize transportation impacts		To the extent practicable, laboratories with local offices or that pick up samples will be used.
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize transportation impacts		With the exception of senior engineering staff, all project personnel are local.
Residual Solid and Liquid Waste	Recycle or reuse un-used, spent or uncontaminated equipment or infrastructure.	Document onsite cut and fill and reuse of crushed concrete.	The fill and onsite prepared concrete will be used to the extent practicable.
Residual Solid and Liquid Waste	Reuse or recycle recovered product (such as resale of captured petroleum products, precipitated metals) and materials (for example, cardboard, plastics, asphalt, concrete)	Document recycling of metal and waste oil.	
Residual Solid and Liquid Waste	Salvage uncontaminated objects/infrastructure with potential to recycle, re-sell, donate, or re-use	Document recycling of metal and waste oil.	It is difficult to track the end use of donated items, donation will not be allowed.
Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make on-site reuse decisions	To the extent practicable, all drill cuttings will be used as onsite fill.	
Residual Solid and Liquid Waste	Use filters (for example, baghouse or cartridge filters) that can be backwashed to avoid frequent disposal of filters	The proposed systems include backflow where applicable.	

Table 3-2
Green Remediation - Best Management Practices
RITC BCP Site #C915353
3875 River Road
Town of Tonawanda, New York

Category	Description	Monitoring Metric	Comment/Exclusion
Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling	None, follow the RAMP.	To the extent practicable. Samples are shipped in reusable coolers, bowls for composite samples are reused. Sample spoons, cord and bailers cannot be reused or would require more detergent and energy to reuse than replace. Sample bottles, zip lock bags cannot be reused.
Site Preparation and Land Restoration	Cover filled excavations with biodegradable fabric to control erosion and serve as a substrate for ecosystems	Document the use of biodegradible fabrics.	Where possible, in the proposed emergent areas, rain gardens and along the new stormwater control systems. Note: the demarcation layer fabrics cannot be biodegradible.
Site Preparation and Land Restoration	For landfill covers, use lower permeability soils than required by regulation when soils are available locally to reduce the amount of leachate generated	Document the volume of silty clay placed in the soil cover.	The RITC Retention basin is the borrow source for the unclassified fill. The unclasified fill is silty clay with low permeability.
Site Preparation and Land Restoration	For restoration use a suitable mix of trees, shrubs, grasses, and herbaceous flowering plants (forbs) to preserve or improve biodiversity and related ecosystem services	Document planting in the FER	Where possible, and where consistent with redevelopment plans, trees and shrubs will be planted. See Sheets S-26 and S-27.
Site Preparation and Land Restoration	If grass is required, use no- or low-mowing species to minimize mowing	Document that the seed mixture includes low-mowing species such as red and white clover.	The tested blend for the cover includes both red and white clover, but some grasses are needed to ensure dense vegetative coverage.
Site Preparation and Land Restoration	Reuse on-site or local clean materials (for example, shredded tires, crushed concrete) rather than importing borrow for fill	Track testing and volume of crushed concrete used during site grading.	To the extent practicable, crushed concrete from foundations, slabs and the mixing pad will be used for fill onsite.
Site Preparation and Land Restoration	Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping	Track testing and volume of crushed concrete used during site grading.	To the extent practicable, crushed concrete from foundations, slabs and the mixing pad will be used for fill onsite.
Site Preparation and Land Restoration	Use excavated areas to serve as retention basins in final storm water control plans	The RITC Retention basin is the borrow source for the unclassified fill.	The RITC Retention basin is the borrow source for the unclassified fill.
Surface and Storm Water	For a landfarm, use a leachate collection and treatment system to fully preserve the quality of downgradient water bodies, soil, and groundwater	Not required, the biotreatment is conducted over 40+ feet of silty clay.	
Vehicles and Equipment	Implement an idle reduction plan		

Table 3-2
Green Remediation - Best Management Practices
RITC BCP Site #C915353
3875 River Road
Town of Tonawanda, New York

Category	Description	Monitoring Metric	Comment/Exclusion

Reference: ASTM BMP Table

List of Acronyms	Definition
BMP	best management practice
GAC	granular activated carbon
GSA	General Services Administration
POTW	publicly owned treatment works
RITC	Riverview Innovation & Technology Campus, Inc.

Table 3-3
Remedial Action Monitoring Plan Samples
Site #C915353
Town of Tonawanda, New York

Location	Rationale	Sample Type	Sample Depth	Soil Sample Analysis												Water Sample Analysis						
				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Surface Water - See SWPPP																						
Procurement																						
Topsoil (Offsite Source)	Import Testing (32,750 CY) - See Cover Placement	Grab	N.A.	See Cover Placement												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/RipRap	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Confirmation Sampling																						
Track 1 - Retention Basin	Confirm excavation meets unrestricted SCOs	Grab	N.A.	See Cover Placement												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Track 1 - Perimeter	Confirm excavation meets unrestricted SCOs (1/900 SF)	Silty Clay - Grab	Base of Excavation	44	44	0	0	44	0	44	9	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Solidified Materials Areas	Confirm no Haz-Mats	Grab	Basse of Excavtion	50	50	0	0	0	0	0	0	0	TBD	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Iron Oxide Pile	Confirm no residule cyanide (1/900 SF)	Grab	Base of Excavation	0	0	5	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Thaw Shed Area	Confirm no impact from piles	Grab	Base of Excavation	10	10	0	0	0	0	0	0	0	TBD	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Ammoia Impacted Areas	Confirm SCO Met (1/900 SF)	Grab	Base of Excavation	0	0	0	0	0	0	0	0	1	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
USEPA Pile Areas	Confirm piles removed	N.A.	N.A.	Inspect to veryify no GCM												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MW-BCP-13 and MW-BCP-19 Areas Confirmation Samples	Confirm clay around excavAtion meet protection of groundwater SCOs.	Silty Clay - Grab	15	16	0	0	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Mixing Pad	Sampling below base of former mixing pad	Grab	Below Base	6	6	6	6	6	0	0	0	0	6	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Exhauster Building Area Sump Excavations	Confirm clay around excavation meet protection of groundwater SCOs.	Grab	15	12	12	12	12	12	0	0	0	12	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Box Culvert	Sample stained concrete	Grab	N.A.	4	4	4	4	4	4	0	0	4	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Table 3-3
Remedial Action Monitoring Plan Samples
Site #C915353
Town of Tonawanda, New York

Location	Rationale	Sample Type	Sample Depth	Soil Sample Analysis												Water Sample Analysis						
				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Treatment																						
Residual Viscous Tar	Residual viscous tar encoutered during excavations will be solidified and the resulting mass will be tested for TCLP.	Solidified Fill	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Compressible Purifier Wastes	Purifier wastes that cannot be compacted to support the cap	Purifier and Iron Oxide Residuals	N.A.	Paint Filter and Field Unconfined Compression Testing												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
In-situ Solidification - Blue-stained Fill	The blue-stained soils along the south property line	Grab	N.A.	Paint Filter and Field Unconfined Compression Testing												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum Impacted Fill	Post-treatment sampling of Former Diesel Tank and Heavy Equipment Storage Area Fill	Composite	N.A.	1/100 Ton	1/100 Ton	1/100 Ton	0	1/100 Ton	0	0	0	1/100 Ton	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Construction Water	Pre-treated water will be pre-treated and discharged to the POTW in accordance with IWD Permit No. 331	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	Monthly Outfall Samples						
Consolidation																						
Iron Oxide Pile	Confirmation that cyanide greater than the protection of groundwater SCO have been removed	Grab	Surface	0	0	1/500 SF	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
EPA Piles (7)	Full TCLP Sampling to determine if treatment is required before placing in cell.	Grab	N.A.	0	0	0	0	0	0	0	0	0	7	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Groundwater Collection System Installation																						
Collection Systems	Grossly Contaminated Materials	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Conveyance/Utility Trench	Visual Confirmation all pile materials have been moved	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/Collection Trench Media	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve. Note: for collection media it must have less than 10% fine material or it will be rejected at the source.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Collection Trench Groundwater	Verify Consistent with GWTS Design	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	N.A.	11
Surface Water Management																						
Surface Water	Confirm Retention Basin Water suitable for discharge	Composite	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3

Table 3-3
Remedial Action Monitoring Plan Samples
Site #C915353
Town of Tonawanda, New York

Location	Rationale	Sample Type	Sample Depth	Soil Sample Analysis												Water Sample Analysis						
				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Cover Placement																						
Erosion and Sediment Controls	Visual Confirmation the controls are in place and notify OSC if any controls are filled or damaged.	N.A.	N.A.	Weekly and following any precitipation event of 1-inch or greater in a 24-hour period.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CAMP	Contiuous during all earth disturbing activities, see CAMP	N.A.	N.A.	See CAMP												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Grossly Contaminated Materials	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Perimeter Shallow Groundwater Barrier Excavation (1/900 SF)	Silty Clay - Grab	N.A.	44	44	44	44	0	0	44	9	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Potential TENORM if counts exceed 17,000 CPM	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	Field Determination	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Unclassified Fill	Confirmation the Commercial SCOs are Met	Grab	N.A.	201	99	99	10	99	0	10	10	10	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Topsoil (Offsite Source)	Import Testing (32,750 CY)	Grab	N.A.	73	34	34	34	34	34	34	34	34	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/RipRap	Import Analysis	Grab	N.A.	Grain-size Analysis, >90% Retained on No. 80 Sieve												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Consolidation Cell																						
Unclassified Fill (within 24-inches of final ground surface)	Confirmation the Commercial SCOs are Met	Grab	N.A.	Included in the Cover System Total												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Topsoil (Offsite Source)	Import Testing	Grab	N.A.	Included in the Cover System Total												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/Base and Perimeter Trench Collection Media	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve. Note: for collection media it must have less than 10% fine material or it will be rejected at the source.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Groundwater Treatment System																						
Influent, process and effluent testing	Initial/Baseline Sampling	Composite and Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8
Long-term Monitoring																						
Monitoring Wells	Initial/Baseline Sampling	Low-flow	TBD	0	0	0	0	0	0	0	0	0	0	0	0	23	23	23	23	23	23	23
	Totals			460	303	204	110	199	38	132	62	61	13	0	0	45	45	45	45	45	34	45

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE	SAMPLE ID:		SB100-11-07292025		SB101-14-07292025		SB99-8-07292025		SBA1-12-07282025		SBA1-6-07282025		SBA1-9-07282025		SBA2-11-07292025	
	LAB ID:		L2547479-20		L2547479-28		L2547479-07		L2547171-03		L2547171-01		L2547171-02		L2547479-03	
	COLLECTION DATE:		7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025	
	SAMPLE DEPTH:		11' BGS		14' BGS		8' BGS		12' BGS		6' BGS		9' NGS		11' BGS	
	SAMPLE MATRIX:		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID	
	Commercial SCO (mg/kg)	Ammonia SCO (mg/kg)	Duplicate Sample of SBG2-11-07292025		Duplicate Sample of SBB3-14-07292025		Duplicate Sample of SBA2-8-07292025									
VOLATILE ORGANICS BY EPA 5035																
1,1,1-Trichloroethane	500	-	<0.00016	U	<0.00016	U	<0.00017	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00014	U
1,1,2,2-Tetrachloroethane	-	-	<0.00015	U	<0.00016	U	<0.00017	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00014	U
1,1,2-Trichloroethane	-	-	<0.00025	U	<0.00026	U	<0.00027	U	<0.00024	U	<0.00023	U	<0.00025	U	<0.00022	U
1,1-Dichloroethane	240	-	<0.00013	U	<0.00014	U	**0.00024**	J	<0.00013	U	<0.00013	U	<0.00013	U	**0.00044**	J
1,1-Dichloroethene	500	-	<0.00022	U	<0.00023	U	<0.00024	U	<0.00021	U	<0.00021	U	<0.00022	U	<0.0002	U
1,2,4-Trichlorobenzene	-	-	<0.00025	U	<0.00026	U	<0.00028	U	<0.00024	U	<0.00024	U	<0.00025	U	<0.00023	U
1,2,4-Trimethylbenzene	190	-	<0.00031	U	<0.00032	U	<0.00034	U	<0.0003	U	<0.00029	U	<0.00031	U	<0.00028	U
1,2-Dibromo-3-chloropropane	-	-	<0.00093	U	<0.00096	U	<0.001	U	<0.00089	U	<0.00087	U	<0.00092	U	<0.00083	U
1,2-Dibromoethane	-	-	<0.00026	U	<0.00027	U	<0.00028	U	<0.00025	U	<0.00024	U	<0.00026	U	<0.00023	U
1,2-Dichlorobenzene	500	-	<0.00013	U	<0.00014	U	<0.00015	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00012	U
1,2-Dichloroethane	30	-	<0.00024	U	<0.00025	U	<0.00026	U	<0.00023	U	<0.00022	U	<0.00024	U	<0.00021	U
1,2-Dichloropropane	-	-	<0.00012	U	<0.00012	U	<0.00013	U	<0.00011	U	<0.00011	U	<0.00012	U	<0.0001	U
1,3,5-Trimethylbenzene	190	-	<0.00018	U	<0.00018	U	<0.0002	U	<0.00017	U	<0.00017	U	<0.00018	U	<0.00016	U
1,3-Dichlorobenzene	280	-	<0.00014	U	<0.00014	U	<0.00015	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U
1,4-Dichlorobenzene	130	-	<0.00016	U	<0.00016	U	<0.00017	U	<0.00015	U	<0.00015	U	<0.00016	U	<0.00014	U
2-Butanone	500	-	<0.0021	U	<0.0021	U	<0.0023	U	<0.002	U	<0.0019	U	<0.002	U	<0.0018	U
2-Hexanone	-	-	<0.0011	U	<0.0011	U	<0.0012	U	<0.001	U	<0.001	U	<0.0011	U	<0.00098	U
4-Methyl-2-pentanone	-	-	<0.0012	U	<0.0012	U	<0.0013	U	<0.0011	U	<0.0011	U	<0.0012	U	<0.0011	U
Acetone	500	-	<0.0045	U	<0.0046	U	**0.014**	U	<0.0043	U	**0.0051**	J	<0.0045	U	**0.0043**	U
Benzene	44	-	<0.00015	U	**0.0085**		<0.00017	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00014	U
Bromodichloromethane	-	-	<0.0001	U	<0.0001	U	<0.00011	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.00009	U
Bromoform	-	-	<0.00023	U	<0.00024	U	<0.00025	U	<0.00022	U	<0.00021	U	<0.00023	U	<0.0002	U
Bromomethane	-	-	<0.00054	U	<0.00056	U	<0.00059	U	<0.00052	U	<0.00051	U	<0.00054	U	<0.00048	U
Carbon disulfide	-	-	<0.0042	U	<0.0044	U	<0.0046	U	<0.0041	U	<0.004	U	<0.0042	U	<0.0038	U
Carbon tetrachloride	22	-	<0.00021	U	<0.00022	U	<0.00023	U	<0.0002	U	<0.0002	U	<0.00021	U	<0.00019	U
Chlorobenzene	500	-	<0.00012	U	<0.00012	U	<0.00013	U	<0.00011	U	<0.00011	U	<0.00012	U	<0.0001	U
Chloroethane	-	-	<0.00042	U	<0.00044	U	<0.00046	U	<0.0004	U	<0.00039	U	<0.00042	U	<0.00038	U
Chloroform	350	-	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.00012	U	<0.00013	U	<0.00012	U
Chloromethane	-	-	<0.00087	U	<0.0009	U	<0.00095	U	<0.00083	U	<0.00081	U	<0.00086	U	<0.00078	U
cis-1,2-Dichloroethene	500	-	<0.00016	U	<0.00017	U	<0.00018	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00014	U
cis-1,3-Dichloropropene	-	-	<0.00015	U	<0.00015	U	<0.00016	U	<0.00014	U	<0.00014	U	<0.00015	U	<0.00013	U
Cyclohexane	-	-	<0.00051	U	<0.00052	U	<0.00055	U	<0.00049	U	<0.00047	U	<0.0005	U	<0.00045	U
Dibromochloromethane	-	-	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.00012	U	<0.00013	U	<0.00012	U
Dichlorodifluoromethane	-	-	<0.00085	U	<0.00088	U	<0.00093	U	<0.00082	U	<0.0008	U	<0.00085	U	<0.00076	U
Ethylbenzene	390	-	<0.00013	U	**0.00034**	J	<0.00014	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00012	U
Freon-113	-	-	<0.00064	U	<0.00067	U	<0.00071	U	<0.00062	U	<0.0006	U	<0.00064	U	<0.00058	U
Isopropylbenzene	-	-	<0.0001	U	<0.0001	U	<0.00011	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.00009	U
Methyl Acetate	-	-	<0.00088	U	<0.00091	U	<0.00097	U	<0.00085	U	<0.00083	U	<0.00088	U	<0.00079	U
Methyl cyclohexane	-	-	<0.00056	U	<0.00058	U	<0.00062	U	<0.00054	U	<0.00053	U	<0.00056	U	<0.0005	U
Methyl tert butyl ether	500	-	<0.00019	U	<0.00019	U	<0.0002	U	<0.00018	U	<0.00018	U	<0.00019	U	<0.00017	U
Methylene chloride	500	-	<0.0021	U	<0.0022	U	<0.0023	U	<0.002	U	<0.002	U	<0.0021	U	<0.0019	U
n-Butylbenzene	500	-	<0.00016	U	<0.00016	U	<0.00017	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00014	U
n-Propylbenzene	500	-	<0.00016	U	<0.00016	U	<0.00017	U	<0.00015	U	<0.00015	U	<0.00016	U	<0.00014	U
Naphthalene	500	-	<0.0006	U	**0.0023**	J	<0.00066	U	<0.00058	U	<0.00057	U	<0.0006	U	<0.00054	U
o-Xylene	-	-	<0.00027	U	<0.00028	U	<0.0003	U	<0.00026	U	<0.00025	U	<0.00027	U	<0.00024	U
p-Isopropyltoluene	-	-	<0.0001	U	<0.0001	U	<0.00011	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.00009	U
p/m-Xylene	-	-	<0.00052	U	<0.00054	U	<0.00057	U	<0.0005	U	<0.00049	U	<0.00052	U	<0.00046	U
sec-Butylbenzene	500	-	<0.00014	U	<0.00014	U	<0.00015	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U
Styrene	-	-	<0.00018	U	<0.00019	U	<0.0002	U	<0.00018	U	<0.00017	U	<0.00018	U	<0.00016	U
tert-Butylbenzene	500	-	<0.00011	U	<0.00011	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.00011	U	<0.0001	U
Tetrachloroethene	150	-	<0.00018	U	<0.00019	U	<0.0002	U	<0.00018	U	<0.00017	U	<0.00018	U	<0.00016	U
Toluene	500	-	<0.0005	U	<0.00052	U	<0.00055	U	<0.00048	U	<0.00047	U	<0.0005	U	<0.00045	U
trans-1,2-Dichloroethene	500	-	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.00012	U	<0.00013	U	<0.00011	U
trans-1,3-Dichloropropene	-	-	<0.00025	U	<0.00026	U	<0.00028	U	<0.00024	U	<0.00024	U	<0.00025	U	<0.00023	U
Trichloroethene	200	-	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.00012	U	<0.00013	U	<0.00011	U
Trichlorofluoromethane	-	-	<0.00065	U	<0.00067	U	<0.00071	U	<0.00062	U	<0.00061	U	<0.00064	U	<0.00058	U
Vinyl chloride	13	-	<0.00031	U	<0.00032	U	<0.00034	U	<0.0003	U	<0.00029	U	<0.00031	U	<0.00028	U
Total VOCs	-	-	-	-	**0.01114**	-	**0.01424**	-	-	-	**0.0051**	-	-	-	**0.00474**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE			SAMPLE ID:	SB100-11-07292025	SB101-14-07292025	SB99-8-07292025	SBA1-12-07282025	SBA1-6-07282025	SBA1-9-07282025	SBA2-11-07292025
			LAB ID:	L2547479-20	L2547479-28	L2547479-07	L2547171-03	L2547171-01	L2547171-02	L2547479-03
			COLLECTION DATE:	7/29/2025	7/29/2025	7/29/2025	7/28/2025	7/28/2025	7/28/2025	7/29/2025
			SAMPLE DEPTH:	11' BGS	14' BGS	8' BGS	12' BGS	6' BGS	9' NGS	11' BGS
			SAMPLE MATRIX:	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL	SOLID
	Commercial SCO (mg/kg)	Ammonia SCO (mg/kg)		Duplicate Sample of SBG2-11-07292025	Duplicate Sample of SBB3-14-07292025	Duplicate Sample of SBA2-8-07292025				
VOLATILE ORGANICS BY EPA 5035 HIGH										
1,1,1-Trichloroethane	500	-		-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-		-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	-		-	-	-	-	-	-	-
1,1-Dichloroethane	240	-		-	-	-	-	-	-	-
1,1-Dichloroethene	500	-		-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-		-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	190	-		-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	-	-		-	-	-	-	-	-	-
1,2-Dibromoethane	-	-		-	-	-	-	-	-	-
1,2-Dichlorobenzene	500	-		-	-	-	-	-	-	-
1,2-Dichloroethane	30	-		-	-	-	-	-	-	-
1,2-Dichloropropane	-	-		-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	190	-		-	-	-	-	-	-	-
1,3-Dichlorobenzene	280	-		-	-	-	-	-	-	-
1,4-Dichlorobenzene	130	-		-	-	-	-	-	-	-
2-Butanone	500	-		-	-	-	-	-	-	-
2-Hexanone	-	-		-	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-		-	-	-	-	-	-	-
Acetone	500	-		-	-	-	-	-	-	-
Benzene	44	-		-	-	-	-	-	-	-
Bromodichloromethane	-	-		-	-	-	-	-	-	-
Bromoform	-	-		-	-	-	-	-	-	-
Bromomethane	-	-		-	-	-	-	-	-	-
Carbon disulfide	-	-		-	-	-	-	-	-	-
Carbon tetrachloride	22	-		-	-	-	-	-	-	-
Chlorobenzene	500	-		-	-	-	-	-	-	-
Chloroethane	-	-		-	-	-	-	-	-	-
Chloroform	350	-		-	-	-	-	-	-	-
Chloromethane	-	-		-	-	-	-	-	-	-
cis-1,2-Dichloroethene	500	-		-	-	-	-	-	-	-
cis-1,3-Dichloropropene	-	-		-	-	-	-	-	-	-
Cyclohexane	-	-		-	-	-	-	-	-	-
Dibromochloromethane	-	-		-	-	-	-	-	-	-
Dichlorodifluoromethane	-	-		-	-	-	-	-	-	-
Ethylbenzene	390	-		-	-	-	-	-	-	-
Freon-113	-	-		-	-	-	-	-	-	-
Isopropylbenzene	-	-		-	-	-	-	-	-	-
Methyl Acetate	-	-		-	-	-	-	-	-	-
Methyl cyclohexane	-	-		-	-	-	-	-	-	-
Methyl tert butyl ether	500	-		-	-	-	-	-	-	-
Methylene chloride	500	-		-	-	-	-	-	-	-
n-Butylbenzene	500	-		-	-	-	-	-	-	-
n-Propylbenzene	500	-		-	-	-	-	-	-	-
Naphthalene	500	-		-	-	-	-	-	-	-
o-Xylene	-	-		-	-	-	-	-	-	-
p-Isopropyltoluene	-	-		-	-	-	-	-	-	-
p/m-Xylene	-	-		-	-	-	-	-	-	-
sec-Butylbenzene	500	-		-	-	-	-	-	-	-
Styrene	-	-		-	-	-	-	-	-	-
tert-Butylbenzene	500	-		-	-	-	-	-	-	-
Tetrachloroethene	150	-		-	-	-	-	-	-	-
Toluene	500	-		-	-	-	-	-	-	-
trans-1,2-Dichloroethene	500	-		-	-	-	-	-	-	-
trans-1,3-Dichloropropene	-	-		-	-	-	-	-	-	-
Trichloroethene	200	-		-	-	-	-	-	-	-
Trichlorofluoromethane	-	-		-	-	-	-	-	-	-
Vinyl chloride	13	-		-	-	-	-	-	-	-
Total VOCs	-	-		-	-	-	-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE			SAMPLE ID:	SB100-11-07292025		SB101-14-07292025		SB99-8-07292025		SBA1-12-07282025		SBA1-6-07282025		SBA1-9-07282025		SBA2-11-07292025	
			LAB ID:	L2547479-20		L2547479-28		L2547479-07		L2547171-03		L2547171-01		L2547171-02		L2547479-03	
			COLLECTION DATE:	7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025	
			SAMPLE DEPTH:	11' BGS		14' BGS		8' BGS		12' BGS		6' BGS		9' NGS		11' BGS	
			SAMPLE MATRIX:	SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID	
	Commercial SCO (mg/kg)	Ammonia SCO (mg/kg)		Duplicate Sample of SBG2-11-07292025		Duplicate Sample of SBB3-14-07292025		Duplicate Sample of SBA2-8-07292025									
PERFLUORINATED ALKYL ACIDS BY EPA 1633																	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		-		-		-		<0.00004	U	-		<0.00004	U	-		-	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		-		-		-		<0.000259	U	-		<0.000258	U	-		-	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		-		-		-		<0.000078	U	-		<0.000077	U	-		-	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		-		-		-		<0.000148	U	-		<0.000147	U	-		-	
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		-		-		-		<0.000236	U	-		<0.000234	U	-		-	
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		-		-		-		<0.000366	U	-		<0.000363	U	-		-	
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		-		-		-		<0.000092	U	-		<0.000091	U	-		-	
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		-		-		-		<0.00003	U	-		<0.000029	U	-		-	
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		-		-		-		<0.00003	U	-		<0.000029	U	-		-	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		-		-		-		<0.000038	U	-		<0.000038	U	-		-	
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		-		-		-		<0.000022	U	-		<0.000022	U	-		-	
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		-		-		-		<0.000082	U	-		<0.000081	U	-		-	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		-		-		-		<0.000044	U	-		<0.000044	U	-		-	
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		-		-		-		<0.000026	U	-		<0.000026	U	-		-	
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		-		-		-		<0.000122	U	-		<0.000121	U	-		-	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		-		-		-		<0.000086	U	-		<0.000085	U	-		-	
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		-		-		-		<0.000083	U	-		<0.000082	U	-		-	
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		-		-		-		<0.000046	U	-		<0.000046	U	-		-	
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		-		-		-		<0.000017	U	-		<0.000017	U	-		-	
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		-		-		-		<0.000024	U	-		<0.000024	U	-		-	
Perfluorobutanesulfonic Acid (PFBS)		-		-		-		<0.00002	U	-		<0.00002	U	-		-	
Perfluorobutanoic Acid (PFBA)		-		-		-		<0.000028	U	-		<0.000028	U	-		-	
Perfluorodecanesulfonic Acid (PFDS)		-		-		-		<0.000014	U	-		<0.000014	U	-		-	
Perfluorodecanoic Acid (PFDA)		-		-		-		<0.000035	U	-		<0.000035	U	-		-	
Perfluorododecanesulfonic Acid (PFDoS)		-		-		-		<0.000022	U	-		<0.000022	U	-		-	
Perfluorododecanoic Acid (PFDoA)		-		-		-		<0.000021	U	-		<0.000021	U	-		-	
Perfluoroheptanesulfonic Acid (PFHpS)		-		-		-		<0.000045	U	-		<0.000045	U	-		-	
Perfluoroheptanoic Acid (PFHpA)		-		-		-		<0.000012	U	-		<0.000012	U	-		-	
Perfluorohexanesulfonic Acid (PFHxS)		-		-		-		<0.00002	U	-		<0.00002	U	-		-	
Perfluorohexanoic Acid (PFHxA)		-		-		-		<0.000015	U	-		<0.000015	U	-		-	
Perfluorononanesulfonic Acid (PFNS)		-		-		-		<0.00003	U	-		<0.000029	U	-		-	
Perfluorononanoic Acid (PFNA)		-		-		-		<0.000013	U	-		<0.000013	U	-		-	
Perfluorooctanesulfonamide (PFOSA)		-		-		-		<0.00001	U	-		<0.00001	U	-		-	
Perfluorooctanesulfonic Acid (PFOS)		-		-		-		**0.000039**	U	-		<0.000031	U	-		-	
Perfluorooctanoic Acid (PFOA)		-		-		-		**0.000032**	J	-		<0.000026	U	-		-	
Perfluoropentanesulfonic Acid (PFPeS)		-		-		-		<0.000026	U	-		<0.000026	U	-		-	
Perfluoropentanoic Acid (PFPeA)		-		-		-		<0.000038	U	-		<0.000038	U	-		-	
Perfluorotetradecanoic Acid (PFTeDA)		-		-		-		<0.000024	U	-		<0.000024	U	-		-	
Perfluorotridecanoic Acid (PFTrDA)		-		-		-		<0.000016	U	-		<0.000016	U	-		-	
Perfluoroundecanoic Acid (PFUnA)		-		-		-		<0.000013	U	-		<0.000013	U	-		-	

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE			SAMPLE ID:	SB100-11-07292025	SB101-14-07292025	SB99-8-07292025	SBA1-12-07282025	SBA1-6-07282025	SBA1-9-07282025	SBA2-11-07292025
			LAB ID:	L2547479-20	L2547479-28	L2547479-07	L2547171-03	L2547171-01	L2547171-02	L2547479-03
			COLLECTION DATE:	7/29/2025	7/29/2025	7/29/2025	7/28/2025	7/28/2025	7/28/2025	7/29/2025
			SAMPLE DEPTH:	11' BGS	14' BGS	8' BGS	12' BGS	6' BGS	9' NGS	11' BGS
			SAMPLE MATRIX:	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL	SOLID
	Commercial SCO (mg/kg)	Ammonia SCO (mg/kg)		Duplicate Sample of SBG2-11-07292025	Duplicate Sample of SBB3-14-07292025	Duplicate Sample of SBA2-8-07292025				
SEMIVOLATILE ORGANICS BY GC/MS										
1,2,4,5-Tetrachlorobenzene	-	-		-	-	<0.02 U	-	<0.019 U	-	-
1,4-Dioxane	130	-		-	-	<0.009 U	-	<0.0086 U	-	-
2,3,4,6-Tetrachlorophenol	-	-		-	-	<0.04 U	-	<0.038 U	-	-
2,4,5-Trichlorophenol	-	-		-	-	<0.037 U	-	<0.036 U	-	-
2,4,6-Trichlorophenol	-	-		-	-	<0.037 U	-	<0.035 U	-	-
2,4-Dichlorophenol	-	-		-	-	<0.031 U	-	<0.03 U	-	-
2,4-Dimethylphenol	-	-		-	-	<0.064 U	-	<0.061 U	-	-
2,4-Dinitrophenol	-	-		-	-	<0.091 U	-	<0.087 U	-	-
2,4-Dinitrotoluene	-	-		-	-	<0.039 U	-	<0.037 U	-	-
2,6-Dinitrotoluene	-	-		-	-	<0.034 U	-	<0.032 U	-	-
2-Chloronaphthalene	-	-		-	-	<0.019 U	-	<0.018 U	-	-
2-Chlorophenol	-	-		-	-	<0.023 U	-	<0.022 U	-	-
2-Methylnaphthalene	-	-		-	-	<0.024 U	-	<0.022 U	-	-
2-Methylphenol	500	-		-	-	<0.03 U	-	<0.029 U	-	-
2-Nitroaniline	-	-		-	-	<0.038 U	-	<0.036 U	-	-
2-Nitrophenol	-	-		-	-	<0.074 U	-	<0.07 U	-	-
3,3'-Dichlorobenzidine	-	-		-	-	<0.052 U	-	<0.05 U	-	-
3-Methylphenol/4-Methylphenol	500	-		-	-	<0.031 U	-	<0.029 U	-	-
3-Nitroaniline	-	-		-	-	<0.037 U	-	<0.035 U	-	-
4,6-Dinitro-o-cresol	-	-		-	-	<0.094 U	-	<0.089 U	-	-
4-Bromophenyl phenyl ether	-	-		-	-	<0.03 U	-	<0.028 U	-	-
4-Chloroaniline	-	-		-	-	<0.036 U	-	<0.034 U	-	-
4-Chlorophenyl phenyl ether	-	-		-	-	<0.021 U	-	<0.02 U	-	-
4-Nitroaniline	-	-		-	-	<0.081 U	-	<0.077 U	-	-
4-Nitrophenol	-	-		-	-	<0.08 U	-	<0.076 U	-	-
Acenaphthene	500	-		-	-	<0.02 U	-	<0.019 U	-	-
Acenaphthylene	500	-		-	-	<0.03 U	-	<0.029 U	-	-
Acetophenone	-	-		-	-	<0.024 U	-	<0.023 U	-	-
Anthracene	500	-		-	-	<0.038 U	-	<0.036 U	-	-
Atrazine	-	-		-	-	<0.068 U	-	<0.065 U	-	-
Benzaldehyde	-	-		-	-	<0.053 U	-	<0.05 U	-	-
Benzo(a)anthracene	5.6	-		-	-	**0.043** J	-	<0.021 U	-	-
Benzo(a)pyrene	1	-		-	-	**0.051** J	-	<0.045 U	-	-
Benzo(b)fluoranthene	5.6	-		-	-	**0.066** J	-	<0.031 U	-	-
Benzo(ghi)perylene	500	-		-	-	**0.047** J	-	<0.022 U	-	-
Benzo(k)fluoranthene	56	-		-	-	<0.031 U	-	<0.03 U	-	-
Biphenyl	-	-		-	-	<0.025 U	-	<0.024 U	-	-
Bis(2-chloroethoxy)methane	-	-		-	-	<0.02 U	-	<0.019 U	-	-
Bis(2-chloroethyl)ether	-	-		-	-	<0.026 U	-	<0.025 U	-	-
Bis(2-chloroisopropyl)ether	-	-		-	-	<0.033 U	-	<0.032 U	-	-
Bis(2-ethylhexyl)phthalate	-	-		-	-	<0.068 U	-	<0.064 U	-	-
Butyl benzyl phthalate	-	-		-	-	<0.049 U	-	<0.047 U	-	-
Caprolactam	-	-		-	-	<0.059 U	-	<0.057 U	-	-
Carbazole	-	-		-	-	<0.019 U	-	<0.018 U	-	-
Chrysene	56	-		-	-	**0.042** J	-	<0.019 U	-	-
Di-n-butylphthalate	-	-		-	-	<0.037 U	-	<0.035 U	-	-
Di-n-octylphthalate	-	-		-	-	<0.066 U	-	<0.063 U	-	-
Dibenzo(a,h)anthracene	0.56	-		-	-	<0.023 U	-	<0.022 U	-	-
Dibenzofuran	350	-		-	-	<0.018 U	-	<0.018 U	-	-
Diethyl phthalate	-	-		-	-	<0.018 U	-	<0.017 U	-	-
Dimethyl phthalate	-	-		-	-	<0.041 U	-	<0.039 U	-	-
Fluoranthene	500	-		-	-	**0.1** J	-	<0.021 U	-	-
Fluorene	500	-		-	-	<0.019 U	-	<0.018 U	-	-
Hexachlorobenzene	6	-		-	-	<0.022 U	-	<0.021 U	-	-
Hexachlorobutadiene	-	-		-	-	<0.029 U	-	<0.027 U	-	-
Hexachlorocyclopentadiene	-	-		-	-	<0.18 U	-	<0.17 U	-	-
Hexachloroethane	-	-		-	-	<0.032 U	-	<0.03 U	-	-
Indeno(1,2,3-cd)pyrene	5.6	-		-	-	**0.041** J	-	<0.026 U	-	-
Isophorone	-	-		-	-	<0.025 U	-	<0.024 U	-	-
n-Nitrosodi-n-propylamine	-	-		-	-	<0.03 U	-	<0.029 U	-	-
Naphthalene	500	-		-	-	**0.024** J	-	**0.023** J	-	-
NDPA/DPA	-	-		-	-	<0.022 U	-	<0.021 U	-	-
Nitrobenzene	-	-		-	-	<0.029 U	-	<0.028 U	-	-
p-Chloro-m-cresol	-	-		-	-	<0.029 U	-	<0.028 U	-	-
Pentachlorophenol	6.7	-		-	-	<0.043 U	-	<0.041 U	-	-
Phenanthrene	500	-		-	-	**0.056** J	-	<0.023 U	-	-
Phenol	500	-		-	-	<0.03 U	-	<0.028 U	-	-
Pyrene	500	-		-	-	**0.079** J	-	**0.02** J	-	-
Total SVOCs	-	-		-	-	**0.549** -	-	**0.043** -	-	-
CHLORINATED HERBICIDES BY GC										
2,4,5-T	-	-		-	-	<0.00603 U	-	<0.00592 U	-	-
2,4,5-TP (Silvex)	500	-		-	-	<0.00517 U	-	<0.00508 U	-	-
2,4-D	-	-		-	-	<0.0122 U	-	<0.012 U	-	-

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ORGANOCHLORINE PESTICIDES BY GC																	
4,4'-DDD	92	-		-		-		<0.00175	U	-		<0.000628	U	-		-	
4,4'-DDE	62	-		-		-		<0.00114	U	-		<0.000407	U	-		-	
4,4'-DDT	47	-		-		-		<0.00395	U	-		<0.00142	U	-		-	
Aldrin	0.68	-		-		-		<0.00173	U	-		<0.00062	U	-		-	
Alpha-BHC	3.4	-		-		-		<0.000581	U	-		<0.000208	U	-		-	
Beta-BHC	3	-		-		-		<0.00186	U	-		<0.000668	U	-		-	
Chlordane	-	-		-		-		<0.0163	U	-		<0.00583	U	-		-	
cis-Chlordane	24	-		-		-		<0.00171	U	-		<0.000614	U	-		-	
Delta-BHC	500	-		-		-		<0.000962	U	-		<0.000345	U	-		-	
Dieldrin	1.4	-		-		-		<0.00154	U	-		<0.00055	U	-		-	
Endosulfan I	200	-		-		-		<0.00116	U	-		<0.000416	U	-		-	
Endosulfan II	200	-		-		-		<0.00164	U	-		<0.000588	U	-		-	
Endosulfan sulfate	200	-		-		-		<0.000974	U	-		<0.000349	U	-		-	
Endrin	89	-		-		-		<0.000839	U	-		<0.000301	U	-		-	
Endrin aldehyde	-	-		-		-		<0.00215	U	-		<0.00077	U	-		-	
Endrin ketone	-	-		-		-		<0.00126	U	-		<0.000454	U	-		-	
Heptachlor	15	-		-		-		<0.0011	U	-		<0.000395	U	-		-	
Heptachlor epoxide		-		-		-		<0.00276	U	-		<0.000991	U	-		-	
Lindane	9.2	-		-		-		<0.000915	U	-		<0.000328	U	-		-	
Methoxychlor	-	-		-		-		<0.00287	U	-		<0.00103	U	-		-	
Toxaphene	-	-		-		-		<0.0258	U	-		<0.00925	U	-		-	
trans-Chlordane	-	-		-		-		<0.00162	U	-		<0.000581	U	-		-	
POLYCHLORINATED BIPHENYLS BY GC																	
Aroclor 1016	1	-		-		-		<0.00938	U	-		<0.0047	U	-		-	
Aroclor 1221	1	-		-		-		<0.0106	U	-		<0.00531	U	-		-	
Aroclor 1232	1	-		-		-		<0.0224	U	-		<0.0112	U	-		-	
Aroclor 1242	1	-		-		-		<0.0142	U	-		<0.00714	U	-		-	
Aroclor 1248	1	-		-		-		<0.0158	U	-		<0.00795	U	-		-	
Aroclor 1254	1	-		-		-		<0.0116	U	-		<0.0058	U	-		-	
Aroclor 1260	1	-		-		-		<0.0195	U	-		<0.00979	U	-		-	
Aroclor 1262	1	-		-		-		<0.0134	U	-		<0.00673	U	-		-	
Aroclor 1268	1	-		-		-		<0.0109	U	-		<0.00549	U	-		-	
PCBs, Total	1	-		-		-		<0.00938	U	-		<0.0047	U	-		-	
TOTAL METALS																	
Aluminum, Total	-	-		-		-		**9510**		-		**11000**	J	-		-	
Antimony, Total	-	-		-		-		<3.5	UJ	-		<3.5	UJ	-		-	
Arsenic, Total	16	-		-		-		**3.97**		-		**3.56**		-		-	
Barium, Total	400	-		-		-		**75.6**	J	-		**96.9**		-		-	
Beryllium, Total	590	-		-		-		**0.507**		-		**0.495**		-		-	
Cadmium, Total	9.3	-		-		-		**0.311**	J	-		<0.05	UJ	-		-	
Calcium, Total	-	-		-		-		**58000**		-		**59500**	J	-		-	
Chromium, Total	-	-		-		-		**13.8**		-		**16.6**	J	-		-	
Cobalt, Total	-	-		-		-		**8.56**		-		**8.21**	J	-		-	
Copper, Total	270	-		-		-		**18.3**	J	-		**19.4**		-		-	
Iron, Total	-	-		-		-		**17200**		-		**19100**	J	-		-	
Lead, Total	1000	-		-		-		**12.4**	J	-		**8.21**		-		-	
Magnesium, Total	-	-		-		-		**17200**	J	-		**15200**	J	-		-	
Manganese, Total	10000	-		-		-		**510**		-		**462**		-		-	
Mercury, Total	2.8	-		-		-		<0.056	U	-		<0.054	U	-		-	
Nickel, Total	310	-		-		-		**20.2**		-		**20.6**	J	-		-	
Potassium, Total	-	-		-		-		**1210**		-		**1390**		-		-	
Selenium, Total	1500	-		-		-		<0.299	U	-		<0.299	U	-		-	
Silver, Total	1500	-		-		-		<0.271	U	-		<0.271	U	-		-	
Sodium, Total	-	-		-		-		**197**		-		**144**	J	-		-	
Thallium, Total	-	-		-		-		<0.821	U	-		<0.82	U	-		-	
Vanadium, Total	-	-		-		-		**18**		-		**20.5**		-		-	
Zinc, Total	10000	-		-		-		**98**	J	-		**52.7**	J	-		-	
GENERAL CHEMISTRY																	
Cyanide, Total	27	-		-		-		<0.24	U	-		<0.22	UJ	-		-	
Nitrogen, Ammonia	-	11.05		-		-		**3.6**	J	-		**9.6**		-		-	
Solids, Total	-	-		**88.2**		**86**		**84.8**		**86.3**		**86.9**		**86.5**		**82.1**	

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBA2-5-07292025		SBA2-8-07292025		SBA3-12-07292025		SBA3-6-07292025		SBA3-9-07292025		SBB1-12-07282025		SBB1-15-07282025		SBB1-9-07282025		SBB2-10-07292025		SBB2-4-07292025		SBB2-7-07292025		SBB3-11-07292025	
		L2547479-01		L2547479-02		L2547479-19		L2547479-17		L2547479-18		L2547171-25		L2547171-24		L2547171-04		L2547479-06		L2547479-04		L2547479-05		L2547479-22	
		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025	
		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12' BGS		15' BGS		9' BGS		10' BGS		4' BGS		7' BGS		11' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																								
VOLATILE ORGANICS BY EPA 5035																									
1,1,1-Trichloroethane	500	<0.00018	U	<0.00017	U	<0.00016	U	<0.00017	U	<0.00019	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U
1,1,2,2-Tetrachloroethane	-	<0.00018	U	<0.00017	UJ	<0.00016	U	<0.00017	U	<0.00019	U	<0.00015	U	<0.00016	U	<0.00015	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U
1,1,2-Trichloroethane	-	<0.00028	U	<0.00027	UJ	<0.00025	U	<0.00028	U	<0.0003	U	<0.00024	U	<0.00025	U	<0.00025	U	<0.00024	U	<0.00026	U	<0.00025	U	<0.00026	U
1,1-Dichloroethane	240	<0.00015	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00016	U	<0.00013	U	<0.00014	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	U
1,1-Dichloroethene	500	<0.00025	U	<0.00024	U	<0.00023	U	<0.00025	U	<0.00027	U	<0.00021	U	<0.00022	U	<0.00022	U	<0.00021	U	<0.00023	U	<0.00022	U	<0.00023	U
1,2,4-Trichlorobenzene	-	<0.00029	U	<0.00028	UJ	<0.00026	U	<0.00028	U	<0.00031	U	<0.00024	U	<0.00026	U	<0.00025	U	<0.00024	U	<0.00026	U	<0.00026	U	<0.00026	U
1,2,4-Trimethylbenzene	190	<0.00035	U	<0.00034	UJ	<0.00032	U	<0.00035	U	<0.00038	U	<0.0003	U	<0.00032	U	<0.00031	U	<0.0003	U	<0.00032	U	<0.00032	U	**0.00097**	J
1,2-Dibromo-3-chloropropane	-	<0.001	U	<0.001	UJ	<0.00095	U	<0.001	U	<0.0011	U	<0.00089	U	<0.00095	U	<0.00093	U	<0.00089	U	<0.00096	U	<0.00094	U	<0.00096	U
1,2-Dibromoethane	-	<0.00029	U	<0.00028	UJ	<0.00026	U	<0.00029	U	<0.00032	U	<0.00025	U	<0.00026	U	<0.00026	U	<0.00025	U	<0.00027	U	<0.00026	U	<0.00027	U
1,2-Dichlorobenzene	500	<0.00015	U	<0.00015	UJ	<0.00014	U	<0.00015	U	<0.00016	U	<0.00013	U	<0.00014	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	U
1,2-Dichloroethane	30	<0.00027	U	<0.00026	U	<0.00024	U	<0.00027	U	<0.00029	U	<0.00023	U	<0.00024	U	<0.00024	U	<0.00023	U	<0.00025	U	<0.00024	U	<0.00025	U
1,2-Dichloropropane	-	<0.00013	U	<0.00013	UJ	<0.00012	U	<0.00013	U	<0.00014	U	<0.00011	U	<0.00012	U	<0.00012	U	<0.00011	U	<0.00012	U	<0.00012	U	<0.00012	U
1,3,5-Trimethylbenzene	190	<0.0002	U	<0.0002	UJ	<0.00018	U	<0.0002	U	<0.00022	U	<0.00017	U	<0.00018	U	<0.00018	U	<0.00017	U	<0.00018	U	<0.00018	U	**0.00022**	J
1,3-Dichlorobenzene	280	<0.00016	U	<0.00015	UJ	<0.00014	U	<0.00015	U	<0.00017	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	U
1,4-Dichlorobenzene	130	<0.00018	U	<0.00017	UJ	<0.00016	U	<0.00018	U	<0.0002	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U
2-Butanone	500	<0.0023	U	<0.0022	UJ	<0.0021	U	<0.0023	U	<0.0025	U	<0.002	U	<0.0021	U	<0.0021	U	<0.002	U	<0.0021	U	<0.0021	U	<0.0021	U
2-Hexanone	-	<0.0012	U	<0.0012	UJ	<0.0011	U	<0.0012	U	<0.0013	U	<0.001	U	<0.0011	U	<0.0011	U	<0.001	U	<0.0011	U	<0.0011	U	<0.0011	U
4-Methyl-2-pentanone	-	<0.0014	U	<0.0013	UJ	<0.0012	U	<0.0013	U	<0.0015	U	<0.0011	U	<0.0012	U	<0.0012	U	<0.0011	U	<0.0012	U	<0.0012	U	<0.0012	U
Acetone	500	**0.015**	U	**0.014**	U	<0.0046	U	**0.013**	U	**0.0058**	U	<0.0043	U	<0.0046	U	<0.0045	U	<0.0043	U	<0.0046	U	<0.0045	U	**0.0097**	
Benzene	44	<0.00018	U	<0.00017	U	<0.00016	U	<0.00017	U	<0.00019	U	<0.00015	U	<0.00016	U	<0.00015	U	**0.0014**		<0.00016	U	<0.00016	U	**0.02**	
Bromodichloromethane	-	<0.00012	U	<0.00011	U	<0.0001	U	<0.00011	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Bromoform	-	<0.00026	U	<0.00025	U	<0.00023	U	<0.00026	U	<0.00028	U	<0.00022	U	<0.00023	U	<0.00023	U	<0.00022	U	<0.00024	U	<0.00023	U	<0.00024	U
Bromomethane	-	<0.00061	U	<0.00059	U	<0.00055	U	<0.00061	U	<0.00066	U	<0.00052	U	<0.00055	U	<0.00054	U	<0.00052	U	<0.00056	U	<0.00055	U	<0.00056	U
Carbon disulfide	-	<0.0048	U	<0.0046	U	<0.0043	U	<0.0048	U	<0.0052	U	<0.004	U	<0.0043	U	<0.0042	U	<0.0041	U	<0.0044	U	<0.0043	U	<0.0044	U
Carbon tetrachloride	22	<0.00024	U	<0.00023	U	<0.00022	U	<0.00024	U	<0.00026	U	<0.0002	U	<0.00022	U	<0.00021	U	<0.00021	U	<0.00022	U	<0.00022	U	<0.00022	U
Chlorobenzene	500	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.00011	U	<0.00012	U	<0.00012	U	<0.00011	U	<0.00012	U	<0.00012	U	<0.00012	U
Chloroethane	-	<0.00048	U	<0.00046	U	<0.00043	U	<0.00047	U	<0.00052	U	<0.0004	U	<0.00043	U	<0.00042	U	<0.0004	U	<0.00044	U	<0.00043	U	<0.00043	U
Chloroform	350	<0.00015	U	<0.00014	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U
Chloromethane	-	<0.00098	U	<0.00095	U	<0.00088	U	<0.00097	U	<0.0011	U	<0.00083	U	<0.00088	U	<0.00087	U	<0.00083	U	<0.0009	U	<0.00088	U	<0.0009	U
cis-1,2-Dichloroethene	500	<0.00018	U	<0.00018	U	<0.00017	U	<0.00018	U	<0.0002	U	<0.00016	U	<0.00017	U	<0.00016	U	<0.00016	U	<0.00017	U	<0.00016	U	<0.00017	U
cis-1,3-Dichloropropene	-	<0.00017	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00018	U	<0.00014	U	<0.00015	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00015	U	<0.00015	U
Cyclohexane	-	<0.00057	U	<0.00055	U	<0.00052	U	<0.00057	U	<0.00062	U	<0.00048	U	<0.00052	U	<0.00051	U	<0.00049	U	<0.00052	U	<0.00051	U	<0.00052	U
Dibromochloromethane	-	<0.00015	U	<0.00014	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U
Dichlorodifluoromethane	-	<0.00097	U	<0.00093	U	<0.00087	U	<0.00096	U	<0.001	U	<0.00081	U	<0.00087	U	<0.00085	U	<0.00082	U	<0.00088	U	<0.00086	U	<0.00088	U
Ethylbenzene	390	<0.00015	U	<0.00014	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00013	U	**0.0021**	
Freon-113	-	<0.00073	U	<0.0007	U	<0.00066	U	<0.00072	U	<0.00079	U	<0.00062	U	<0.00066	U	<0.00064	U	<0.00062	U	<0.00067	U	<0.00065	U	<0.00067	U
Isopropylbenzene	-	<0.00012	U	<0.00011	U	<0.0001	U	<0.00011	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
Methyl Acetate	-	<0.001	U	<0.00097	U	<0.0009	U	<0.00099	U	<0.0011	U	<0.00084	U	<0.0009	U	<0.00088	U	<0.00085	U	<0.00092	U	<0.0009	U	<0.00091	U
Methyl cyclohexane	-	<0.00064	U	<0.00061	U	<0.00057	U	<0.00063	U	<0.00069	U	<0.00054	U	<0.00057	U	<0.00056	U	<0.00054	U	<0.00058	U	<0.00057	U	<0.00058	U
Methyl tert butyl ether	500	<0.00021	U	<0.0002	U	<0.00019	U	<0.00021	U	<0.00023	U	<0.00018	U	<0.00019	U	<0.00019	U	<0.00018	U	<0.00019	U	<0.00019	U	<0.00019	U
Methylene chloride	500	<0.0024	U	<0.0023	U	<0.0022	U	<0.0024	U	<0.0026	U	<0.002	U	<0.0022	U	<0.0021	U	<0.002	U	<0.0022	U	<0.0022	U	<0.0022	U
n-Butylbenzene	500	<0.00018	U	<0.00017	UJ	<0.00016	U	<0.00017	U	<0.00019	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U
n-Propylbenzene	500	<0.00018	U	<0.00017	U	<0.00016	U	<0.00018	U	<0.0002	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U
Naphthalene	500	<0.00069	U	<0.00066	UJ	<0.00062	U	**0.0035**	J	**0.00075**	J	**0.0012**	U	**0.0037**	U	**0.00066**	U	<0.00058	U	<0.00063	U	<0.00061	U	**0.023**	
o-Xylene	-	<0.00031	U	<0.0003	U	<0.00028	U	<0.0003	U	<0.00033	U	<0.00026	U	<0.00028	U	<0.00027	U	<0.00026	U	<0.00028	U	<0.00027	U	**0.00054**	J
p-Isopropyltoluene	-	<0.00012	U	<0.00011	UJ	<0.0001	U	<0.00011	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U
p/m-Xylene	-	<0.00059	U	<0.00057	U	<0.00053	U	<0.00058	U	<0.00064	U	<0.0005	U	<0.00053	U	<0.00052	U	<0.0005	U	<0.00054	U	<0.00053	U	**0.00079**	U
sec-Butylbenzene	500	<0.00015	U	<0.00015	U	<0.00014	U	<0.00015	U	<0.00017	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	U
Styrene	-	<0.00021	U	<0.0002	UJ	<0.00019	U	<0.0002	U	<0.00022	U	<0.00017	U	<0.00018	U	<0.00018	U	<0.00018	U	<0.00019	U	<0.00018	U	<0.00019	U
tert-Butylbenzene	500	<0.00012	U	<0.00012	U	<0.00011	U	<0.00012	U	<0.00013	U	<0.0001	U	<0.00011	U	<0.00011	U	<0.0001	U	<0.00011	U	<0.00011	U	<0.00011	U
Tetrachloroethene	150	<0.00021	U	<0.0002	U	<0.00019	U	<0.0002	U	<0.00022	U	<0.00017	U	<0.00018	U	<0.00018	U	<0.00018	U	<0.00019	U	<0.00018	U	<0.00019	U
Toluene	500	<0.00057	U	<0.00055	U	<0.00052	U	<0.00057	U	<0.00062	U	<0.00048	U	<0.00052	U	<0.0005	U	<0.00049	U	<0.00052	U	<0.00051	U	<0.00052	U
trans-1,2-Dichloroethene	500	<0.00014	U	<0.00014	U	<0.00013	U	<0.00014	U	<0.00016	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U
trans-1,3-Dichloropropene	-	<0.00029	U	<0.00028	U	<0.00026	U	<0.00028	U	<0.00031	U	<0.00024	U	<0.00026	U	<0.00025	U	<0.00024	U	<0.00026	U	<0.00026	U	<0.00026	U
Trichloroethene	200	<0.00014	U	<0.00014	U	<0.00013	U	<0.00014	U	<0.00016	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U
Trichlorofluoromethane	-	<0.00073	U	<0.00071	U	<0.00066	U	<0.00073	U	<0.00079	U	<0.00062	U	<0.00066	U	<0.00065	U	<0.00062	U	<0.00067	U	<0.00066	U	<0.00067	U
Vinyl chloride	13	<0.00035	U	<0.00034	U	<0.00032	U	<0.00035	U	<0.00038	U	<0.0003	U	<0.00032	U	<0.00031	U	<0.0003	U	<0.00032	U	<0.00032	U	<0.00032	U
Total VOCs	-	**0.015**	-	**0.014**	-	-	-	**0.0165**	-	**0.00655**	-	**0.0012**	-	**0.0037**	-	**0.00066**	-	**0.0014**	-	-	-	-	-	**0.05732**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBA2-5-07292025	SBA2-8-07292025	SBA3-12-07292025	SBA3-6-07292025	SBA3-9-07292025	SBB1-12-07282025	SBB1-15-07282025	SBB1-9-07282025	SBB2-10-07292025	SBB2-4-07292025	SBB2-7-07292025	SBB3-11-07292025
		L2547479-01	L2547479-02	L2547479-19	L2547479-17	L2547479-18	L2547171-25	L2547171-24	L2547171-04	L2547479-06	L2547479-04	L2547479-05	L2547479-22
		7/29/2025	7/29/2025	7/29/2025	7/29/2025	7/29/2025	7/28/2025	7/28/2025	7/28/2025	7/29/2025	7/29/2025	7/29/2025	7/29/2025
		5' BGS	8' BGS	12' BGS	6' BGS	9' BGS	12' BGS	15' BGS	9' BGS	10' BGS	4' BGS	7' BGS	11' BGS
		SOLID	SOLID	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL	SOLID	SOLID	SOLID	SOLID
	Commercial SCO (mg/kg)												
VOLATILE ORGANICS BY EPA 5035 HIGH													
1,1,1-Trichloroethane	500	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	240	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	500	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	190	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	30	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	190	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	280	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	130	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	500	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	500	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	44	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	22	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	350	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	500	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyclohexane	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	390	-	-	-	-	-	-	-	-	-	-	-	-
Freon-113	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Acetate	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl cyclohexane	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert butyl ether	500	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	500	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	500	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	150	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	200	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	13	-	-	-	-	-	-	-	-	-	-	-	-
Total VOCs	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBA2-5-07292025		SBA2-8-07292025		SBA3-12-07292025		SBA3-6-07292025		SBA3-9-07292025		SBB1-12-07282025		SBB1-15-07282025		SBB1-9-07282025		SBB2-10-07292025		SBB2-4-07292025		SBB2-7-07292025		SBB3-11-07292025	
		L2547479-01		L2547479-02		L2547479-19		L2547479-17		L2547479-18		L2547171-25		L2547171-24		L2547171-04		L2547479-06		L2547479-04		L2547479-05		L2547479-22	
		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025	
		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12' BGS		15' BGS		9' BGS		10' BGS		4' BGS		7' BGS		11' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																								
PERFLUORINATED ALKYL ACIDS BY EPA 1633																									
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	-		-		<0.00004	U	-		<0.00004	U	-		-	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		<0.000258	U	<0.000259	U	<0.000258	U	<0.000259	U	<0.000258	U	-		-		<0.000258	U	-		<0.000259	U	-		-	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		<0.000077	U	<0.000078	U	<0.000077	U	<0.000078	U	<0.000077	U	-		-		<0.000077	U	-		<0.000078	U	-		-	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		<0.000147	U	<0.000148	U	<0.000147	U	<0.000148	U	<0.000147	U	-		-		<0.000147	U	-		<0.000148	U	-		-	
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		<0.000235	U	<0.000236	U	<0.000235	U	<0.000236	U	<0.000235	U	-		-		<0.000235	U	-		<0.000236	U	-		-	
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		<0.000364	U	<0.000366	U	<0.000364	U	<0.000366	U	<0.000364	U	-		-		<0.000364	U	-		<0.000365	U	-		-	
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		<0.000092	U	<0.000092	U	<0.000092	U	<0.000092	U	<0.000092	U	-		-		<0.000092	U	-		<0.000092	U	-		-	
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U	-		-		<0.000029	U	-		<0.00003	U	-		-	
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U	-		-		<0.000029	U	-		<0.00003	U	-		-	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	-		-		<0.000038	U	-		<0.000038	U	-		-	
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	-		-		<0.000022	U	-		<0.000022	U	-		-	
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		<0.000081	U	<0.000082	U	<0.000081	U	<0.000082	U	<0.000081	U	-		-		<0.000081	U	-		<0.000082	U	-		-	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	-		-		<0.000044	U	-		<0.000044	U	-		-	
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	-		-	
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		<0.000121	U	<0.000122	U	<0.000121	U	<0.000122	U	<0.000121	U	-		-		<0.000121	U	-		<0.000122	U	-		-	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		<0.000085	U	<0.000086	U	<0.000085	U	<0.000086	U	<0.000085	U	-		-		<0.000085	U	-		<0.000086	U	-		-	
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	-		-		<0.000082	U	-		<0.000082	U	-		-	
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	-		-		<0.000046	U	-		<0.000046	U	-		-	
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U	-		-		<0.000017	U	-		<0.000017	U	-		-	
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	-		-		<0.000024	U	-		<0.000024	U	-		-	
Perfluorobutanesulfonic Acid (PFBS)		<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	-		-		<0.00002	U	-		<0.00002	U	-		-	
Perfluorobutanoic Acid (PFBA)		<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U	-		-		<0.000028	U	-		<0.000028	U	-		-	
Perfluorodecanesulfonic Acid (PFDS)		<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	-		-		<0.000014	U	-		<0.000014	U	-		-	
Perfluorodecanoic Acid (PFDA)		<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	-		-		<0.000035	U	-		<0.000035	U	-		-	
Perfluorododecanesulfonic Acid (PFDoS)		<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	-		-		<0.000022	U	-		<0.000022	U	-		-	
Perfluorododecanoic Acid (PFDoA)		<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	-		-		<0.000021	U	-		<0.000021	U	-		-	
Perfluoroheptanesulfonic Acid (PFHpS)		<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	-		-		<0.000045	U	-		<0.000045	U	-		-	
Perfluoroheptanoic Acid (PFHpA)		<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	-		-		<0.000012	U	-		<0.000012	U	-		-	
Perfluorohexanesulfonic Acid (PFHxS)		<0.00002	U	**0.00002**	J	<0.00002	U	<0.00002	U	<0.00002	U	-		-		<0.00002	U	-		<0.00002	U	-		-	
Perfluorohexanoic Acid (PFHxA)		<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	-		-		<0.000015	U	-		<0.000015	U	-		-	
Perfluorononanesulfonic Acid (PFNS)		<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U	-		-		<0.000029	U	-		<0.00003	U	-		-	
Perfluorononanoic Acid (PFNA)		<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	-		-		<0.000013	U	-		<0.000013	U	-		-	
Perfluorooctanesulfonamide (PFOSA)		<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	-		-		<0.00001	U	-		<0.00001	U	-		-	
Perfluorooctanesulfonic Acid (PFOS)		<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	-		-		<0.000031	U	-		<0.000031	U	-		-	
Perfluorooctanoic Acid (PFOA)		<0.000026	U	**0.000031**	J	<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	-		-	
Perfluoropentanesulfonic Acid (PFPeS)		<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	-		-	
Perfluoropentanoic Acid (PFPeA)		<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	-		-		<0.000038	U	-		<0.000038	U	-		-	
Perfluorotetradecanoic Acid (PFTeDA)		<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	-		-		<0.000024	U	-		<0.000024	U	-		-	
Perfluorotridecanoic Acid (PFTrDA)		<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	-		-		<0.000016	U	-		<0.000016	U	-		-	
Perfluoroundecanoic Acid (PFUnA)		<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	-		-		<0.000013	U	-		<0.000013	U	-		-	

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBA2-5-07292025		SBA2-8-07292025		SBA3-12-07292025		SBA3-6-07292025		SBA3-9-07292025		SBB1-12-07282025		SBB1-15-07282025		SBB1-9-07282025		SBB2-10-07292025		SBB2-4-07292025		SBB2-7-07292025		SBB3-11-07292025	
		L2547479-01		L2547479-02		L2547479-19		L2547479-17		L2547479-18		L2547171-25		L2547171-24		L2547171-04		L2547479-06		L2547479-04		L2547479-05		L2547479-22	
		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025	
		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12' BGS		15' BGS		9' BGS		10' BGS		4' BGS		7' BGS		11' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																								
SEMIVOLATILE ORGANICS BY GC/MS																									
1,2,4,5-Tetrachlorobenzene	-	<0.021	U	<0.021	U	<0.02	U	<0.021	U	<0.02	U	-		-		<0.02	U	-		<0.021	U	-		-	
1,4-Dioxane	130	<0.0091	U	<0.0092	U	<0.0087	U	<0.0091	U	<0.0088	U	-		-		<0.0086	U	-		<0.0092	U	-		-	
2,3,4,6-Tetrachlorophenol	-	<0.04	U	<0.04	U	<0.038	U	<0.04	U	<0.039	U	-		-		<0.038	U	-		<0.04	U	-		-	
2,4,5-Trichlorophenol	-	<0.038	U	<0.038	U	<0.036	U	<0.038	U	<0.037	U	-		-		<0.036	U	-		<0.038	U	-		-	
2,4,6-Trichlorophenol	-	<0.038	U	<0.038	U	<0.036	U	<0.038	U	<0.036	U	-		-		<0.035	U	-		<0.038	U	-		-	
2,4-Dichlorophenol	-	<0.032	U	<0.032	U	<0.03	U	<0.032	U	<0.031	U	-		-		<0.03	U	-		<0.032	U	-		-	
2,4-Dimethylphenol	-	<0.066	U	<0.066	U	<0.063	U	<0.065	U	<0.063	U	-		-		<0.062	U	-		<0.066	U	-		-	
2,4-Dinitrophenol	-	<0.092	UJ	<0.093	U	<0.088	U	<0.092	U	<0.09	U	-		-		<0.087	U	-		<0.093	UJ	-		-	
2,4-Dinitrotoluene	-	<0.04	U	<0.04	U	<0.038	U	<0.04	U	<0.038	U	-		-		<0.037	U	-		<0.04	U	-		-	
2,6-Dinitrotoluene	-	<0.034	U	<0.034	U	<0.032	U	<0.034	U	<0.033	U	-		-		<0.032	U	-		<0.034	U	-		-	
2-Chloronaphthalene	-	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	-		-		<0.018	U	-		<0.02	U	-		-	
2-Chlorophenol	-	<0.023	U	<0.024	U	<0.022	U	<0.023	U	<0.023	U	-		-		<0.022	U	-		<0.024	U	-		-	
2-Methylnaphthalene	-	<0.024	U	<0.024	U	<0.023	U	<0.024	U	<0.023	U	-		-		<0.023	U	-		<0.024	U	-		-	
2-Methylphenol	500	<0.031	U	<0.031	U	<0.029	U	<0.031	U	<0.03	U	-		-		<0.029	U	-		<0.031	U	-		-	
2-Nitroaniline	-	<0.038	U	<0.038	U	<0.037	U	<0.038	U	<0.037	U	-		-		<0.036	U	-		<0.038	U	-		-	
2-Nitrophenol	-	<0.075	UJ	<0.075	U	<0.071	U	<0.074	U	<0.072	U	-		-		<0.07	U	-		<0.075	UJ	-		-	
3,3'-Dichlorobenzidine	-	<0.053	U	<0.053	U	<0.05	U	<0.053	U	<0.051	U	-		-		<0.05	U	-		<0.053	U	-		-	
3-Methylphenol/4-Methylphenol	500	<0.031	U	<0.031	U	<0.03	U	<0.031	U	<0.03	U	-		-		<0.029	U	-		<0.031	U	-		-	
3-Nitroaniline	-	<0.037	U	<0.038	U	<0.036	U	<0.037	U	<0.036	U	-		-		<0.035	U	-		<0.038	U	-		-	
4,6-Dinitro-o-cresol	-	<0.095	UJ	<0.096	U	<0.091	U	<0.095	U	<0.092	U	-		-		<0.09	U	-		<0.096	UJ	-		-	
4-Bromophenyl phenyl ether	-	<0.03	U	<0.03	U	<0.029	U	<0.03	U	<0.029	U	-		-		<0.028	U	-		<0.03	U	-		-	
4-Chloroaniline	-	<0.036	U	<0.036	U	<0.034	U	<0.036	U	<0.035	U	-		-		<0.034	U	-		<0.036	U	-		-	
4-Chlorophenyl phenyl ether	-	<0.021	U	<0.021	U	<0.02	U	<0.021	U	<0.02	U	-		-		<0.02	U	-		<0.021	U	-		-	
4-Nitroaniline	-	<0.082	U	<0.082	U	<0.079	U	<0.082	U	<0.08	U	-		-		<0.077	U	-		<0.082	U	-		-	
4-Nitrophenol	-	<0.081	U	<0.081	U	<0.077	U	<0.081	U	<0.078	U	-		-		<0.076	U	-		<0.081	U	-		-	
Acenaphthene	500	<0.02	U	<0.021	U	<0.02	U	<0.02	U	<0.02	U	-		-		<0.019	U	-		<0.021	U	-		-	
Acenaphthylene	500	<0.031	U	<0.031	U	<0.029	U	<0.03	U	<0.03	U	-		-		<0.029	U	-		<0.031	U	-		-	
Acetophenone	-	<0.024	U	<0.025	U	<0.024	U	<0.024	U	<0.024	U	-		-		<0.023	U	-		<0.025	U	-		-	
Anthracene	500	<0.039	U	<0.039	U	<0.037	U	<0.038	U	<0.037	U	-		-		<0.036	U	-		<0.039	U	-		-	
Atrazine	-	<0.07	U	<0.07	U	<0.066	U	<0.069	U	<0.067	U	-		-		<0.065	U	-		<0.07	U	-		-	
Benzaldehyde	-	<0.054	U	<0.054	UJ	<0.051	U	<0.053	U	<0.052	U	-		-		<0.05	U	-		<0.054	U	-		-	
Benzo(a)anthracene	5.6	<0.022	U	<0.022	U	<0.021	U	<0.022	U	<0.022	U	-		-		0.022	J	-		<0.022	U	-		-	
Benzo(a)pyrene	1	<0.048	U	<0.049	U	<0.046	U	<0.048	U	<0.047	U	-		-		<0.046	U	-		<0.049	U	-		-	
Benzo(b)fluoranthene	5.6	<0.033	U	<0.034	U	<0.032	U	<0.033	U	<0.032	U	-		-		<0.032	U	-		<0.034	U	-		-	
Benzo(ghi)perylene	500	<0.023	U	<0.023	U	<0.022	U	<0.023	U	<0.022	U	-		-		<0.022	U	-		<0.023	U	-		-	
Benzo(k)fluoranthene	56	<0.032	U	<0.032	U	<0.03	U	<0.032	U	<0.031	U	-		-		<0.03	U	-		<0.032	U	-		-	
Biphenyl	-	<0.026	U	<0.026	U	<0.025	U	<0.026	U	<0.025	U	-		-		<0.024	U	-		<0.026	U	-		-	
Bis(2-chloroethoxy)methane	-	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	-		-		<0.019	U	-		<0.02	U	-		-	
Bis(2-chloroethyl)ether	-	<0.027	U	<0.027	U	<0.026	U	<0.027	U	<0.026	U	-		-		<0.025	U	-		<0.027	U	-		-	
Bis(2-chloroisopropyl)ether	-	<0.034	U	<0.034	U	<0.032	U	<0.034	U	<0.033	U	-		-		<0.032	U	-		<0.034	U	-		-	
Bis(2-ethylhexyl)phthalate	-	<0.069	U	<0.069	U	<0.066	U	<0.068	U	<0.066	U	-		-		<0.065	U	-		<0.069	U	-		-	
Butyl benzyl phthalate	-	<0.05	U	<0.05	U	<0.048	U	<0.05	U	<0.048	U	-		-		<0.047	U	-		<0.05	U	-		-	
Caprolactam	-	<0.06	U	<0.06	UJ	<0.058	U	<0.06	U	<0.058	U	-		-		<0.057	U	-		<0.06	U	-		-	
Carbazole	-	<0.019	U	<0.019	U	<0.018	U	<0.019	U	<0.019	U	-		-		<0.018	UJ	-		<0.019	U	-		-	
Chrysene	56	<0.021	U	<0.021	U	<0.02	U	<0.02	U	<0.02	U	-		-		**0.019**	J	-		<0.021	U	-		-	
Di-n-butylphthalate	-	<0.038	U	<0.038	U	<0.036	U	<0.038	U	<0.036	U	-		-		<0.035	U	-		<0.038	U	-		-	
Di-n-octylphthalate	-	<0.068	U	<0.068	U	<0.064	U	<0.067	U	<0.065	U	-		-		<0.064	U	-		<0.068	U	-		-	
Dibenzo(a,h)anthracene	0.56	<0.023	U	<0.023	U	<0.022	U	<0.023	U	<0.022	U	-		-		<0.022	U	-		<0.023	U	-		-	
Dibenzofuran	350	<0.019	U	<0.019	U	<0.018	U	<0.019	U	<0.018	U	-		-		<0.018	U	-		<0.019	U	-		-	
Diethyl phthalate	-	<0.018	U	<0.018	U	<0.018	U	<0.018	U	<0.018	U	-		-		<0.017	U	-		<0.018	U	-		-	
Dimethyl phthalate	-	<0.042	U	<0.042	U	<0.04	U	<0.042	U	<0.04	U	-		-		<0.039	U	-		<0.042	U	-		-	
Fluoranthene	500	<0.023	U	<0.023	U	<0.022	U	<0.023	U	<0.022	U	-		-		**0.043**	J	-		<0.023	U	-		-	
Fluorene	500	<0.019	U	<0.019	U	<0.018	U	<0.019	U	<0.019	U	-		-		<0.018	U	-		<0.019	U	-		-	
Hexachlorobenzene	6	<0.022	U	<0.022	U	<0.021	U	<0.022	U	<0.022	U	-		-		<0.021	U	-		<0.022	U	-		-	
Hexachlorobutadiene	-	<0.029	U	<0.029	U	<0.028	U	<0.029	U	<0.028	U	-		-		<0.027	U	-		<0.029	U	-		-	
Hexachlorocyclopentadiene	-	<0.18	U	<0.18	U	<0.17	U	<0.18	U	<0.17	U	-		-		<0.17	U	-		<0.18	U	-		-	
Hexachloroethane	-	<0.032	U	<0.032	U	<0.031	U	<0.032	U	<0.031	U	-		-		<0.03	U	-		<0.032	U	-		-	
Indeno(1,2,3-cd)pyrene	5.6	<0.028	U	<0.028	U	<0.026	U	<0.028	U	<0.027	U	-		-		<0.026	U	-		<0.028	U	-		-	
Isophorone	-	<0.026	U	<0.026	U	<0.025	U	<0.026	U	<0.025	U	-		-		<0.024	U	-		<0.026	U	-		-	
n-Nitrosodi-n-propylamine	-	<0.031	U	<0.031	U	<0.029	U	<0.03	U	<0.03	U	-		-		<0.029	U	-		<0.031	U	-		-	
Naphthalene	500	<0.024	U	<0.024	U	<0.023	U	<0.024	U	<0.023	U	-		-		<0.023	U	-		<0.024	U	-		-	
NDPA/DPA	-	<0.023	U	<0.023	U	<0.022	U	<0.022	U	<0.022	U	-		-		<0.021	U	-		<0.023	U	-		-	
Nitrobenzene	-	<0.029	U	<0.029	U	<0.028	U	<0.029	U	<0.028	U	-		-		<0.028	U	-		<0.03	U	-		-	
p-Chloro-m-cresol	-	<0.03	U	<0.03	U	<0.028	U	<0.029	U	<0.029	U	-		-		<0.028	U	-		<0.03	U	-		-	
Pentachlorophenol	6.7	<0.044	U	<0.044	U	<0.042	U	<0.044	U	<0.042	U	-		-		<0.041	U	-		<0.044	U	-		-	
Phenanthrene	500	<0.024	U	<0.024	U	<0.023	U	<0.024	U	<0.023	U	-		-		**0.032**	J	-		<0.024	U	-		-	
Phenol	500	<0.03	U	<0.03	U	<0.029	U	<0.03	U	<0.029	U	-		-		<0.028	U	-		<0.03	U	-		-	
Pyrene	500	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	-		-		**0.032**	J	-		<0.02	U	-		-	
Total SVOCs	-	-		-		-		-		-		-		-		**0.148**		-		-		-		-	
CHLORINATED HERBICIDES BY GC																									
2,4,5-T	-	<0.00617	U	<0.00613	U	<0.00586	U	<0.00617	U	<0.00592	U	-		-		<0.0058	U	-		<0.00627	U	-		-	
2,4,5-TP (Silvex)	500	<0.00529	U	<0.00526	U	<0.00503	U	<0.00529	U	<0.00508	U	-		-		<0.00498	U	-		<0.00538	U	-		-	
2,4-D	-	<0.0125	U	<0.0124	U	<0.0119	U	<0.0125	U	<0.012	U	-		-		<0.0118	U	-		<0.0127	U	-		-	

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBA2-5-07292025		SBA2-8-07292025		SBA3-12-07292025		SBA3-6-07292025		SBA3-9-07292025		SBB1-12-07282025		SBB1-15-07282025		SBB1-9-07282025		SBB2-10-07292025		SBB2-4-07292025		SBB2-7-07292025		SBB3-11-07292025	
		L2547479-01		L2547479-02		L2547479-19		L2547479-17		L2547479-18		L2547171-25		L2547171-24		L2547171-04		L2547479-06		L2547479-04		L2547479-05		L2547479-22	
		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/29/2025	
		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12' BGS		15' BGS		9' BGS		10' BGS		4' BGS		7' BGS		11' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																								
ORGANOCHLORINE PESTICIDES BY GC																									
4,4'-DDD	92	<0.00196	U	<0.00178	U	<0.00187	U	<0.00186	U	<0.0018	U	-		-		<0.000636	U	-		<0.00182	U	-		-	
4,4'-DDE	62	<0.00127	U	<0.00116	U	<0.00121	U	<0.00121	U	<0.00116	U	-		-		<0.000413	U	-		<0.00118	U	-		-	
4,4'-DDT	47	<0.00441	U	<0.00402	U	<0.00421	U	<0.0042	U	<0.00405	U	-		-		<0.00144	U	-		<0.00411	U	-		-	
Aldrin	0.68	<0.00193	U	<0.00176	U	<0.00184	U	<0.00184	U	<0.00177	U	-		-		<0.000628	U	-		<0.0018	U	-		-	
Alpha-BHC	3.4	<0.000649	U	<0.000592	U	<0.00062	U	<0.000618	U	<0.000596	U	-		-		<0.000211	U	-		<0.000605	U	-		-	
Beta-BHC	3	<0.00208	U	<0.0019	U	<0.00199	U	<0.00198	U	<0.00191	U	-		-		<0.000677	U	-		<0.00194	U	-		-	
Chlordane	-	<0.0182	U	<0.0166	U	<0.0174	U	<0.0173	U	<0.0167	U	-		-		<0.00591	U	-		<0.0169	U	-		-	
cis-Chlordane	24	<0.00191	U	<0.00174	U	<0.00182	U	<0.00182	U	<0.00175	U	-		-		<0.000622	U	-		<0.00178	U	-		-	
Delta-BHC	500	<0.00107	U	<0.000979	U	<0.00103	U	<0.00102	U	<0.000986	U	-		-		<0.000349	U	-		<0.001	U	-		-	
Dieldrin	1.4	<0.00171	U	<0.00156	U	<0.00164	U	<0.00163	U	<0.00157	U	-		-		<0.000558	U	-		<0.0016	U	-		-	
Endosulfan I	200	<0.0013	U	<0.00118	U	<0.00124	U	<0.00123	U	<0.00119	U	-		-		<0.000422	U	-		<0.00121	U	-		-	
Endosulfan II	200	<0.00183	U	<0.00167	U	<0.00175	U	<0.00175	U	<0.00168	U	-		-		<0.000596	U	-		<0.00171	U	-		-	
Endosulfan sulfate	200	<0.00109	U	<0.000992	U	<0.00104	U	<0.00104	U	<0.000998	U	-		-		<0.000354	U	-		<0.00101	U	-		-	
Endrin	89	<0.000937	U	<0.000854	U	<0.000895	U	<0.000893	U	<0.00086	U	-		-		<0.000305	U	-		<0.000874	U	-		-	
Endrin aldehyde	-	<0.0024	U	<0.00219	U	<0.00229	U	<0.00229	U	<0.0022	U	-		-		<0.000781	U	-		<0.00224	U	-		-	
Endrin ketone	-	<0.00141	U	<0.00129	U	<0.00135	U	<0.00134	U	<0.0013	U	-		-		<0.00046	U	-		<0.00132	U	-		-	
Heptachlor	15	<0.00123	U	<0.00112	U	<0.00117	U	<0.00117	U	<0.00113	U	-		-		<0.0004	U	-		<0.00115	U	-		-	
Heptachlor epoxide		<0.00308	U	<0.00281	U	<0.00295	U	<0.00294	U	<0.00283	U	-		-		<0.001	U	-		<0.00288	U	-		-	
Lindane	9.2	<0.00102	U	<0.000931	U	<0.000976	U	<0.000973	U	<0.000938	U	-		-		<0.000332	U	-		<0.000953	U	-		-	
Methoxychlor	-	<0.0032	U	<0.00292	U	<0.00306	U	<0.00305	U	<0.00294	U	-		-		<0.00104	U	-		<0.00298	U	-		-	
Toxaphene	-	<0.0288	U	<0.0262	U	<0.0275	U	<0.0274	U	<0.0264	U	-		-		<0.00937	U	-		<0.0268	U	-		-	
trans-Chlordane	-	<0.00181	U	<0.00165	U	<0.00173	U	<0.00172	U	<0.00166	U	-		-		<0.000589	U	-		<0.00169	U	-		-	
POLYCHLORINATED BIPHENYLS BY GC																									
Aroclor 1016	1	<0.0106	U	<0.0104	U	<0.00973	U	<0.00955	U	<0.00893	U	-		-		<0.00466	U	-		<0.00951	U	-		-	
Aroclor 1221	1	<0.0119	U	<0.0118	U	<0.011	U	<0.0108	U	<0.0101	U	-		-		<0.00526	U	-		<0.0107	U	-		-	
Aroclor 1232	1	<0.0252	U	<0.0249	U	<0.0232	U	<0.0228	U	<0.0213	U	-		-		<0.0111	U	-		<0.0227	U	-		-	
Aroclor 1242	1	<0.016	U	<0.0158	U	<0.0148	U	<0.0145	U	<0.0136	U	-		-		<0.00707	U	-		<0.0144	U	-		-	
Aroclor 1248	1	<0.0178	U	<0.0176	U	<0.0164	U	<0.0161	U	<0.0151	U	-		-		<0.00787	U	-		<0.0161	U	-		-	
Aroclor 1254	1	<0.013	U	<0.0128	U	<0.012	U	<0.0118	U	<0.011	U	-		-		<0.00574	U	-		<0.0117	U	-		-	
Aroclor 1260	1	<0.022	U	<0.0217	U	<0.0202	U	<0.0199	U	<0.0186	U	-		-		<0.0097	U	-		<0.0198	U	-		-	
Aroclor 1262	1	<0.0151	U	<0.0149	U	<0.0139	U	<0.0136	U	<0.0128	U	-		-		<0.00666	U	-		<0.0136	U	-		-	
Aroclor 1268	1	<0.0123	U	<0.0122	U	<0.0114	U	<0.0111	U	<0.0104	U	-		-		<0.00544	U	-		<0.0111	U	-		-	
PCBs, Total	1	<0.0106	U	<0.0104	U	<0.00973	U	<0.00955	U	<0.00893	U	-		-		<0.00466	U	-		<0.00951	U	-		-	
TOTAL METALS																									
Aluminum, Total	-	**11900**		**9970**		**9300**	UJ	**8640**		**10400**		-		-		**9640**	J	-		**10400**		-		-	
Antimony, Total	-	<3.5	UJ	<3.63	UJ	<3.4		<3.69	UJ	<3.55	UJ	-		-		<3.36	UJ	-		<3.71	UJ	-		-	
Arsenic, Total	16	**3.37**		**4**		**3.79**	J	**1.98**		**3.89**		-		-		**3.16**		-		**5.42**		-		-	
Barium, Total	400	**114**	J	**137**	J	**120**		**72.8**	J	**98.8**	J	-		-		**78.3**		-		**86.2**	J	-		-	
Beryllium, Total	590	**0.588**		**0.492**		**0.45**	U	**0.399**	J	**0.495**		-		-		**0.443**		-		**0.523**		-		-	
Cadmium, Total	9.3	<0.05	U	<0.052	U	<0.049		<0.053	U	<0.051	U	-		-		<0.048	UJ	-		<0.053	U	-		-	
Calcium, Total	-	**52700**		**71300**		**65800**		**61600**		**58200**		-		-		**48500**	J	-		**60500**		-		-	
Chromium, Total	-	**16.4**		**14.6**		**14.5**		**12.8**		**16.1**		-		-		**14.5**	J	-		**15.6**		-		-	
Cobalt, Total	-	**9.06**		**8.19**		**9.04**	J	**7.52**		**9.04**		-		-		**8.43**	J	-		**9.56**		-		-	
Copper, Total	270	**20.5**	J	**19.8**	J	**20.9**		**18.1**	J	**21.8**	J	-		-		**18.6**		-		**21**	J	-		-	
Iron, Total	-	**19500**		**18500**		**17000**	J	**14200**		**19100**		-		-		**18000**	J	-		**19500**		-		-	
Lead, Total	1000	**9.1**	J	**14.7**	J	**9.4**	J	**7.33**	J	**10.1**	J	-		-		**7.72**		-		**9.86**	J	-		-	
Magnesium, Total	-	**14400**	J	**16500**	J	**18200**		**14800**	J	**18100**	J	-		-		**14600**	J	-		**17600**	J	-		-	
Manganese, Total	10000	**492**		**495**		**493**		**562**		**488**		-		-		**470**		-		**494**		-		-	
Mercury, Total	2.8	<0.053	U	<0.056	U	<0.05	U	<0.049	U	<0.054	U	-		-		<0.049	U	-		<0.063	U	-		-	
Nickel, Total	310	**21.8**		**20.9**		**21.3**		**17.3**		**22.2**		-		-		**19.6**	J	-		**22.1**		-		-	
Potassium, Total	-	**989**		**1170**		**1200**		**807**		**1220**		-		-		**1420**	J	-		**1220**		-		-	
Selenium, Total	1500	<0.299	U	<0.31	U	<0.291	U	<0.315	U	<0.303	U	-		-		<0.287	U	-		<0.317	U	-		-	
Silver, Total	1500	<0.27	U	<0.281	U	<0.263	U	<0.286	U	<0.275	U	-		-		<0.26	U	-		<0.287	U	-		-	
Sodium, Total	-	**558**		**274**		**147**	J	**135**	J	**150**	J	-		-		**152**	J	-		**263**		-		-	
Thallium, Total	-	<0.819	U	<0.85	U	<0.797	U	<0.865	U	<0.831	U	-		-		<0.788	U	-		<0.868	U	-		-	
Vanadium, Total	-	**21.9**		**19.6**		**18.1**		**17.1**		**19.5**		-		-		**18.8**		-		**19.2**		-		-	
Zinc, Total	10000	**60.8**	J	**59.3**	J	**51.9**	J	**42.5**	J	**60.3**	J	-		-		**48.6**	J	-		**56.3**	J	-		-	
GENERAL CHEMISTRY																									
Cyanide, Total	27	<0.23	U	<0.24	U	<0.24	U	<0.25	U	<0.25	U	-		-		<0.24	UJ	-		0.52	J	-		-	
Nitrogen, Ammonia	-	**15**		**150**	J	<3	UJ	**9.4**	J	<3.2	UJ	-		-		**6.2**	J	-		**13**	J	-		-	
Solids, Total	-	**83.2**		**82.9**		**87.4**		**82.6**		**85.9**		**87.9**		**86.1**		**87.9**		**86**		**81.6**		**85.4**		**85**	

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCF
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 37

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBB3-14-07292025		SBB3-8-07292025		SBC1-11-07282025		SBC1-5-07282025		SBC1-8-07282025		SBC3-12-07312025		SBC3-6-07312025		SBC3-9-07312025		SBD1-12.5-07282025		SBD1-6.5-07282025		SBD1-9.5-07282025		SBD2-12-07292025		SBD2-6-07292025	
		L2547479-23		L2547479-21		L2547171-07		L2547171-05		L2547171-06		L2548047-03		L2548047-01		L2548047-02		L2547171-09		L2547171-08		L2547171-10		L2547479-10		L2547479-08	
		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025	
		14' BGS		8' BGS		11' BGS		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12.5' BGS		6.5' BGS		9.5' BGS		12' BGS		6' BGS	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
VOLATILE ORGANICS BY EPA 5035																											
1,1,1-Trichloroethane	500	<0.00015	U	<0.00016	U	<0.00015	U	<0.00015	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.01	U	<0.00019	U	<0.00016	U	<0.00025	U	<0.00017	U	<0.0002	U
1,1,2,2-Tetrachloroethane	-	<0.00015	U	<0.00016	U	<0.00015	U	<0.00015	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.01	U	<0.00019	U	<0.00016	U	<0.00025	U	<0.00017	U	<0.00019	U
1,1,2-Trichloroethane	-	<0.00024	U	<0.00025	U	<0.00024	U	<0.00025	U	<0.00021	U	<0.00024	U	<0.00026	U	<0.016	U	<0.0003	U	<0.00025	U	<0.00041	U	<0.00028	U	<0.00031	U
1,1-Dichloroethane	240	<0.00013	U	<0.00014	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.009	U	<0.00016	U	<0.00014	U	<0.00022	U	<0.00015	U	<0.00017	U
1,1-Dichloroethene	500	<0.00021	U	<0.00022	U	<0.00022	U	<0.00022	U	<0.00019	U	<0.00021	U	<0.00023	U	<0.015	U	<0.00027	U	<0.00022	U	<0.00036	U	<0.00025	U	<0.00028	U
1,2,4-Trichlorobenzene	-	<0.00024	U	<0.00026	U	<0.00025	U	<0.00025	U	<0.00022	U	<0.00024	U	<0.00026	U	<0.017	U	<0.00031	U	<0.00026	U	<0.00041	U	<0.00028	U	<0.00032	U
1,2,4-Trimethylbenzene	190	**0.0003**	J	<0.00031	U	**0.00038**	U	**0.00047**	J	<0.00027	U	**0.00036**	J	**0.0015**	U	<0.021	U	**0.072**		<0.00032	U	**0.031**	J	**0.0071**		**0.11**	
1,2-Dibromo-3-chloropropane	-	<0.00089	U	<0.00094	U	<0.00092	U	<0.00092	U	<0.0008	U	<0.00088	U	<0.00097	U	<0.062	U	<0.0011	U	<0.00094	U	<0.0015	U	<0.001	U	<0.0012	U
1,2-Dibromoethane	-	<0.00025	U	<0.00026	U	<0.00026	U	<0.00026	U	<0.00022	U	<0.00025	U	<0.00027	U	<0.017	U	<0.00032	U	<0.00026	U	<0.00042	U	<0.00029	U	<0.00033	U
1,2-Dichlorobenzene	500	<0.00013	U	<0.00014	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.0089	U	<0.00016	U	<0.00014	U	<0.00022	U	<0.00015	U	<0.00017	U
1,2-Dichloroethane	30	<0.00023	U	<0.00024	U	<0.00024	U	<0.00024	U	<0.00021	U	<0.00023	U	<0.00025	U	<0.016	U	<0.00029	U	<0.00024	U	<0.00039	U	<0.00027	U	<0.0003	U
1,2-Dichloropropane	-	<0.00011	U	<0.00012	U	<0.00011	U	<0.00012	U	<0.0001	U	<0.00011	U	<0.00012	U	<0.0077	U	<0.00014	U	<0.00012	U	<0.00019	U	<0.00013	U	<0.00015	U
1,3,5-Trimethylbenzene	190	<0.00017	U	<0.00018	U	<0.00018	U	<0.00018	U	<0.00016	U	**0.00021**	J	**0.00084**	J	<0.012	U	**0.021**		<0.00018	U	**0.0081**	J	**0.0024**		**0.03**	
1,3-Dichlorobenzene	280	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.0092	U	<0.00017	U	<0.00014	U	<0.00022	U	<0.00015	U	<0.00017	U
1,4-Dichlorobenzene	130	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U	<0.00014	U	<0.00015	U	<0.00016	U	<0.01	U	<0.00019	U	<0.00016	U	<0.00026	U	<0.00018	U	<0.0002	U
2-Butanone	500	<0.002	U	<0.0021	U	<0.002	U	<0.002	U	<0.0018	U	<0.002	U	<0.0022	U	<0.14	U	<0.0025	U	<0.0021	U	<0.0034	U	<0.0023	U	<0.0026	U
2-Hexanone	-	<0.001	U	<0.0011	U	<0.0011	U	<0.0011	U	<0.00095	U	<0.001	U	<0.0011	U	<0.073	U	<0.0013	U	<0.0011	U	<0.0018	U	<0.0012	U	<0.0014	U
4-Methyl-2-pentanone	-	<0.0011	U	<0.0012	U	<0.0012	U	<0.0012	U	<0.001	U	<0.0011	U	<0.0012	U	<0.079	U	<0.0014	U	<0.0012	U	<0.0019	U	<0.0013	U	<0.0015	U
Acetone	500	<0.0043	U	<0.0045	U	<0.0044	U	<0.0044	U	<0.0039	U	<0.0042	U	**0.0093**	J	<0.3	U	<0.0055	U	<0.0045	U	<0.0073	U	<0.005	U	<0.0056	U
Benzene	44	**0.0054**		**0.00038**	J	<0.00015	U	**0.026**		<0.00013	U	**0.0014**		**0.3**	E	**0.044**		**0.13**		**0.0022**	U	**0.023**	J	**0.091**		**0.12**	
Bromodichloromethane	-	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.00009	U	<0.0001	U	<0.0001	U	<0.0068	U	<0.00012	U	<0.0001	U	<0.00016	U	<0.00011	U	<0.00013	U
Bromoform	-	<0.00022	U	<0.00023	U	<0.00022	U	<0.00023	U	<0.0002	U	<0.00022	U	<0.00024	U	<0.015	U	<0.00028	U	<0.00023	U	<0.00037	U	<0.00026	U	<0.00029	U
Bromomethane	-	<0.00052	U	<0.00055	U	<0.00053	U	<0.00054	U	<0.00047	U	<0.00051	U	<0.00056	U	<0.036	U	<0.00066	U	<0.00055	U	<0.00088	U	<0.00061	U	<0.00068	U
Carbon disulfide	-	<0.0041	U	<0.0043	U	<0.0042	U	<0.0042	U	<0.0037	U	<0.004	U	**0.018**		<0.28	U	<0.0052	U	<0.0043	U	<0.0069	U	<0.0048	U	<0.0053	U
Carbon tetrachloride	22	<0.0002	U	<0.00022	U	<0.00021	U	<0.00021	U	<0.00018	U	<0.0002	U	<0.00022	U	<0.014	U	<0.00026	U	<0.00022	U	<0.00035	U	<0.00024	U	<0.00027	U
Chlorobenzene	500	<0.00011	U	<0.00012	U	<0.00012	U	<0.00012	U	<0.0001	U	<0.00011	U	<0.00012	U	<0.0079	U	<0.00014	U	<0.00012	U	<0.00019	U	<0.00013	U	<0.00015	U
Chloroethane	-	<0.0004	U	<0.00043	U	<0.00041	U	<0.00042	U	<0.00036	U	<0.0004	U	<0.00044	U	<0.028	U	<0.00051	U	<0.00043	U	<0.00069	U	<0.00047	U	<0.00053	U
Chloroform	350	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U	<0.00011	U	<0.00012	U	<0.00014	U	<0.0087	U	<0.00016	U	<0.00013	U	<0.00021	U	<0.00015	U	<0.00016	U
Chloromethane	-	<0.00083	U	<0.00088	U	<0.00085	U	<0.00086	U	<0.00075	U	<0.00082	U	<0.0009	U	<0.058	U	<0.001	U	<0.00088	U	<0.0014	U	<0.00097	U	<0.0011	U
cis-1,2-Dichloroethene	500	<0.00016	U	<0.00016	U	<0.00016	U	<0.00016	U	<0.00014	U	<0.00015	U	<0.00017	U	<0.011	U	<0.0002	U	<0.00016	U	<0.00027	U	<0.00018	U	<0.0002	U
cis-1,3-Dichloropropene	-	<0.00014	U	<0.00015	U	<0.00014	U	<0.00014	U	<0.00013	U	<0.00014	U	<0.00015	U	<0.0098	U	<0.00018	U	<0.00015	U	<0.00024	U	<0.00016	U	<0.00018	U
Cyclohexane	-	<0.00048	U	<0.00051	U	<0.0005	U	<0.0005	U	<0.00044	U	<0.00048	U	<0.00053	U	<0.034	U	<0.00062	U	<0.00051	U	<0.00083	U	<0.00057	U	<0.00064	U
Dibromochloromethane	-	<0.00012	U	<0.00013	U	<0.00013	U	<0.00013	U	<0.00011	U	<0.00012	U	<0.00014	U	<0.0087	U	<0.00016	U	<0.00013	U	<0.00021	U	<0.00015	U	<0.00016	U
Dichlorodifluoromethane	-	<0.00082	U	<0.00086	U	<0.00084	U	<0.00084	U	<0.00074	U	<0.00081	U	<0.00089	U	<0.057	U	<0.001	U	<0.00086	U	<0.0014	U	<0.00096	U	<0.0011	U
Ethylbenzene	390	**0.00058**	J	<0.00013	U	<0.00013	U	**0.0077**		<0.00011	U	<0.00012	U	**0.0025**		<0.0087	U	**0.074**		<0.00013	U	**0.014**	J	**0.047**		**0.22**	
Freon-113	-	<0.00062	U	<0.00065	U	<0.00064	U	<0.00064	U	<0.00056	U	<0.00061	U	<0.00067	U	<0.043	U	<0.00079	U	<0.00065	U	<0.001	U	<0.00072	U	<0.00081	U
Isopropylbenzene	-	<0.0001	U	<0.0001	U	<0.0001	U	**0.0011**		<0.00009	U	<0.0001	U	<0.0001	U	<0.0068	U	**0.0052**		<0.0001	U	**0.0014**	J	**0.00056**	J	**0.0056**	
Methyl Acetate	-	<0.00085	U	<0.0009	U	<0.00087	U	<0.00088	U	<0.00076	U	<0.00084	U	<0.00092	U	<0.059	U	<0.0011	U	<0.0009	U	<0.0014	U	<0.00099	U	<0.0011	U
Methyl cyclohexane	-	<0.00054	U	<0.00057	U	<0.00055	U	<0.00056	U	<0.00048	U	<0.00053	U	<0.00058	U	<0.037	U	<0.00068	U	<0.00057	U	<0.00092	U	<0.00063	U	<0.00071	U
Methyl tert butyl ether	500	<0.00018	U	<0.00019	U	<0.00018	U	<0.00018	U	<0.00016	U	<0.00018	U	<0.00019	U	<0.012	U	<0.00023	U	<0.00019	U	<0.0003	U	<0.00021	U	<0.00024	U
Methylene chloride	500	<0.002	U	<0.0022	U	<0.0021	U	<0.0021	U	<0.0018	U	<0.002	U	<0.0022	U	<0.14	U	<0.0026	U	<0.0022	U	<0.0035	U	<0.0024	U	<0.0027	U
n-Butylbenzene	500	<0.00015	U	<0.00016	U	<0.00015	U	<0.00015	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.01	U	**0.00073**	J	<0.00016	U	**0.00032**	J	<0.00017	U	**0.0006**	J
n-Propylbenzene	500	<0.00015	U	<0.00016	U	<0.00016	U	<0.00016	U	<0.00014	U	<0.00015	U	<0.00016	U	<0.01	U	**0.0039**		<0.00016	U	**0.0014**	J	**0.00043**	J	**0.0067**	
Naphthalene	500	**0.005**		**0.0008**	J	<0.0006	U	**0.098**	U	**0.0035**	UJ	**0.21**		**0.12**		**6**		**2.8**	E	**0.0015**	U	**0.64**		**0.021**		**1400**	E
o-Xylene	-	<0.00026	U	<0.00027	U	<0.00027	U	**0.0053**		<0.00023	U	<0.00026	U	**0.0074**		<0.018	U	**0.082**		<0.00027	U	**0.027**	J	**0.0087**		**0.14**	
p-Isopropyltoluene	-	<0.0001	U	<0.0001	U	<0.0001	U	<0.0001	U	<0.00009	U	<0.0001	U	<0.0001	U	<0.0068	U	**0.0013**		<0.0001	U	**0.00056**	J	**0.00012**	J	**0.00099**	J
p/m-Xylene	-	<0.0005	U	<0.00053	U	<0.00051	U	**0.0048**		<0.00045	U	**0.00083**	J	**0.017**		<0.035	U	**0.12**		<0.00053	U	**0.033**	J	**0.023**	U	**0.11**	U
sec-Butylbenzene	500	<0.00013	U	<0.00014	U	<0.00013	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.009	U	<0.00016	U	<0.00014	U	<0.00022	U	<0.00015	U	<0.00017	U
Styrene	-	<0.00018	U	<0.00018	U	<0.00018	U	<0.00018	U	<0.00016	U	<0.00017	U	**0.00028**	J	<0.012	U	**0.061**		<0.00018	U	**0.028**	J	<0.0002	U	**0.0095**	
tert-Butylbenzene	500	<0.0001	U	<0.00011	U	<0.00011	U	<0.00011	U	<0.0001	U	<0.0001	U	<0.00011	U	<0.0073	U	<0.00013	U	<0.00011	U	<0.00018	U	<0.00012	U	<0.00014	U
Tetrachloroethene	150	<0.00018	U	<0.00018	U	<0.00018	U	<0.00018	U	<0.00016	U	<0.00017	U	<0.00019	U	<0.012	U	<0.00022	U	<0.00018	U	<0.0003	U	<0.0002	U	<0.00023	U
Toluene	500	<0.00048	U	<0.00051	U	<0.0005	U	**0.0083**		<0.00044	U	**0.00072**	J	**0.0099**		**0.044**	U	**0.15**		**0.0012**	U	**0.036**	J	**0.0014**	U	**0.0036**	
trans-1,2-Dichloroethene	500	<0.00012	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00011	U	<0.00012	U	<0.00013	U	<0.0085	U	<0.00016	U	<0.00013	U	<0.00021	U	<0.00014	U	<0.00016	U
trans-1,3-Dichloropropene	-	<0.00024	U	<0.00026	U	<0.00025	U	<0.00025	U	<0.00022	U	<0.00024	U	<0.00026	U	<0.017	U	<0.00031	U	<0.00026	U	<0.00042	U	<0.00028	U	<0.00032	U
Trichloroethene	200	<0.00012	U	<0.00013	U	<0.00012	U	<0.00013	U	<0.00011	U	<0.00012	U	<0.00013	U	<0.0085	U	<0.00016	U	<0.00013	U	<0.00021	U	<0.00014	U	<0.00016	U
Trichlorofluoromethane	-	<0.00062	U	<0.00066	U	<0.00064	U	<0.00064	U	<0.00056	U	<0.00061	U	<0.00067	U	<0.043	U	<0.00079	U	<0.00066	U	<0.001	U	<0.00073	U	<0.00081	U
Vinyl chloride	13	<0.0003	U	<0.00032	U	<0.00031	U	<0.00031	U	<0.00027	U	<0.0003	U	<0.00032	U	<0.021	U	<0.00038	U	<0.00032	U	<0.00051	U	<0.00035	U	<0.00039	U
Total VOCs	-	**0.01128**	-	**0.00118**	-	**0.00038**	-	**0.15167**	-	**0.0035**	-	**0.21352**	-	**0.48672**	-	**6.088**	-	**3.52113**	-	**0.0049**	-	**1.30378**	-	**0.20271**	-	**1.51699**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBB3-14-07292025		SBB3-8-07292025		SBC1-11-07282025		SBC1-5-07282025		SBC1-8-07282025		SBC3-12-07312025		SBC3-6-07312025		SBC3-9-07312025		SBD1-12.5-07282025		SBD1-6.5-07282025		SBD1-9.5-07282025		SBD2-12-07292025		SBD2-6-07292025	
		L2547479-23		L2547479-21		L2547171-07		L2547171-05		L2547171-06		L2548047-03		L2548047-01		L2548047-02		L2547171-09		L2547171-08		L2547171-10		L2547479-10		L2547479-08	
		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025	
		14' BGS		8' BGS		11' BGS		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12.5' BGS		6.5' BGS		9.5' BGS		12' BGS		6' BGS	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
VOLATILE ORGANICS BY EPA 5035 HIGH																											
1,1,1-Trichloroethane	500	-		-		-		-		-		<0.0097	U	<0.01	U	-		<0.012	U	-		<0.01	U	-		<0.0093	U
1,1,2,2-Tetrachloroethane	-	-		-		-		-		-		<0.0097	U	<0.01	U	-		<0.012	U	-		<0.01	U	-		<0.0092	U
1,1,2-Trichloroethane	-	-		-		-		-		-		<0.016	U	<0.016	U	-		<0.019	U	-		<0.016	U	-		<0.015	U
1,1-Dichloroethane	240	-		-		-		-		-		<0.0084	U	<0.0088	U	-		<0.01	U	-		<0.0087	U	-		<0.0081	U
1,1-Dichloroethene	500	-		-		-		-		-		<0.014	U	<0.014	U	-		<0.017	U	-		<0.014	U	-		<0.013	U
1,2,4-Trichlorobenzene	-	-		-		-		-		-		<0.016	U	<0.016	U	-		<0.019	U	-		<0.016	U	-		<0.015	U
1,2,4-Trimethylbenzene	190	-		-		-		-		-		<0.019	U	<0.02	U	-		**0.058**	J	-		<0.02	U	-		**0.16**	
1,2-Dibromo-3-chloropropane	-	-		-		-		-		-		<0.058	U	<0.061	U	-		<0.07	U	-		<0.06	U	-		<0.056	U
1,2-Dibromoethane	-	-		-		-		-		-		<0.016	U	<0.017	U	-		<0.02	U	-		<0.017	U	-		<0.016	U
1,2-Dichlorobenzene	500	-		-		-		-		-		<0.0084	U	<0.0088	U	-		<0.01	U	-		<0.0087	U	-		<0.008	U
1,2-Dichloroethane	30	-		-		-		-		-		<0.015	U	<0.016	U	-		<0.018	U	-		<0.015	U	-		<0.014	U
1,2-Dichloropropane	-	-		-		-		-		-		<0.0073	U	<0.0076	U	-		<0.0088	U	-		<0.0075	U	-		<0.007	U
1,3,5-Trimethylbenzene	190	-		-		-		-		-		<0.011	U	<0.012	U	-		**0.016**	J	-		<0.012	U	-		**0.049**	J
1,3-Dichlorobenzene	280	-		-		-		-		-		<0.0086	U	<0.009	U	-		<0.01	U	-		<0.0089	U	-		<0.0082	U
1,4-Dichlorobenzene	130	-		-		-		-		-		<0.01	U	<0.01	U	-		<0.012	U	-		<0.01	U	-		<0.0095	U
2-Butanone	500	-		-		-		-		-		<0.13	U	<0.14	U	-		<0.16	U	-		<0.13	U	-		<0.12	U
2-Hexanone	-	-		-		-		-		-		<0.069	U	<0.072	U	-		<0.083	U	-		<0.071	U	-		<0.066	U
4-Methyl-2-pentanone	-	-		-		-		-		-		<0.074	U	<0.078	U	-		<0.09	U	-		<0.077	U	-		<0.071	UJ
Acetone	500	-		-		-		-		-		<0.28	U	<0.29	U	-		<0.34	U	-		<0.29	U	-		<0.27	U
Benzene	44	-		-		-		-		-		<0.0097	U	**0.58**		-		**0.1**		-		<0.01	U	-		**0.19**	
Bromodichloromethane	-	-		-		-		-		-		<0.0063	U	<0.0066	U	-		<0.0077	U	-		<0.0066	U	-		<0.0061	U
Bromoform	-	-		-		-		-		-		<0.014	U	<0.015	U	-		<0.017	U	-		<0.015	U	-		<0.014	U
Bromomethane	-	-		-		-		-		-		<0.034	U	<0.035	U	-		<0.041	U	-		<0.035	U	-		<0.032	U
Carbon disulfide	-	-		-		-		-		-		<0.26	U	<0.28	U	-		<0.32	U	-		<0.27	U	-		<0.25	U
Carbon tetrachloride	22	-		-		-		-		-		<0.013	U	<0.014	U	-		<0.016	U	-		<0.014	U	-		<0.013	U
Chlorobenzene	500	-		-		-		-		-		<0.0074	U	<0.0077	U	-		<0.009	U	-		<0.0076	U	-		<0.0071	U
Chloroethane	-	-		-		-		-		-		<0.026	U	<0.028	U	-		<0.032	U	-		<0.027	U	-		<0.025	U
Chloroform	350	-		-		-		-		-		<0.0082	U	<0.0085	U	-		<0.0099	U	-		<0.0084	U	-		<0.0078	U
Chloromethane	-	-		-		-		-		-		<0.054	U	<0.057	U	-		<0.066	U	-		<0.056	U	-		<0.052	U
cis-1,2-Dichloroethene	500	-		-		-		-		-		<0.01	U	<0.011	U	-		<0.012	U	-		<0.01	U	-		<0.0097	U
cis-1,3-Dichloropropene	-	-		-		-		-		-		<0.0092	U	<0.0096	U	-		<0.011	U	-		<0.0095	U	-		<0.0088	U
Cyclohexane	-	-		-		-		-		-		<0.032	U	<0.033	U	-		<0.038	U	-		<0.033	U	-		<0.03	U
Dibromochloromethane	-	-		-		-		-		-		<0.0082	U	<0.0085	U	-		<0.0099	U	-		<0.0084	U	-		<0.0078	U
Dichlorodifluoromethane	-	-		-		-		-		-		<0.053	U	<0.056	U	-		<0.064	U	-		<0.055	U	-		<0.051	U
Ethylbenzene	390	-		-		-		-		-		<0.0082	U	**0.011**	J	-		**0.045**	J	-		<0.0085	U	-		**0.33**	
Freon-113	-	-		-		-		-		-		<0.04	U	<0.042	U	-		<0.049	U	-		<0.042	U	-		<0.038	U
Isopropylbenzene	-	-		-		-		-		-		<0.0063	U	<0.0066	U	-		<0.0077	U	-		<0.0066	U	-		**0.0088**	J
Methyl Acetate	-	-		-		-		-		-		<0.055	U	<0.058	U	-		<0.067	U	-		<0.057	U	-		<0.053	U
Methyl cyclohexane	-	-		-		-		-		-		<0.035	U	<0.037	U	-		<0.042	U	-		<0.036	U	-		<0.034	U
Methyl tert butyl ether	500	-		-		-		-		-		<0.012	U	<0.012	U	-		<0.014	U	-		<0.012	U	-		<0.011	U
Methylene chloride	500	-		-		-		-		-		<0.13	U	<0.14	U	-		<0.16	U	-		<0.14	U	-		<0.13	U
n-Butylbenzene	500	-		-		-		-		-		<0.0097	U	<0.01	U	-		<0.012	U	-		<0.01	U	-		<0.0093	U
n-Propylbenzene	500	-		-		-		-		-		<0.01	U	<0.01	U	-		<0.012	U	-		<0.01	U	-		**0.013**	J
Naphthalene	500	-		-		-		-		-		**0.45**		**1.7**		-		**2.7**		-		**0.1**	J	-		**1.4**	
o-Xylene	-	-		-		-		-		-		<0.017	U	**0.02**	J	-		**0.047**	J	-		<0.018	U	-		**0.16**	
p-Isopropyltoluene	-	-		-		-		-		-		<0.0063	U	<0.0066	U	-		<0.0077	U	-		<0.0066	U	-		<0.0061	U
p/m-Xylene	-	-		-		-		-		-		<0.033	U	**0.076**	U	-		**0.082**	J	-		<0.034	U	-		**0.15**	
sec-Butylbenzene	500	-		-		-		-		-		<0.0085	U	<0.0089	U	-		<0.01	U	-		<0.0088	U	-		<0.0081	U
Styrene	-	-		-		-		-		-		<0.011	U	<0.012	U	-		**0.045**	J	-		<0.012	U	-		**0.016**	J
tert-Butylbenzene	500	-		-		-		-		-		<0.0069	U	<0.0072	U	-		<0.0083	U	-		<0.0071	U	-		<0.0066	U
Tetrachloroethene	150	-		-		-		-		-		<0.011	U	<0.012	U	-		<0.014	U	-		<0.012	U	-		<0.011	U
Toluene	500	-		-		-		-		-		<0.032	U	**0.049**	U	-		**0.11**		-		<0.033	U	-		<0.03	U
trans-1,2-Dichloroethene	500	-		-		-		-		-		<0.008	U	<0.0083	U	-		<0.0097	U	-		<0.0082	U	-		<0.0076	U
trans-1,3-Dichloropropene	-	-		-		-		-		-		<0.016	U	<0.017	U	-		<0.019	U	-		<0.016	U	-		<0.015	U
Trichloroethene	200	-		-		-		-		-		<0.008	U	<0.0083	U	-		<0.0097	U	-		<0.0082	U	-		<0.0076	U
Trichlorofluoromethane	-	-		-		-		-		-		<0.04	U	<0.042	U	-		<0.049	U	-		<0.042	U	-		<0.039	U
Vinyl chloride	13	-		-		-		-		-		<0.02	U	<0.02	U	-		<0.024	U	-		<0.02	U	-		<0.019	U
Total VOCs	-	-	-	-	-	-	-	-	-	-	-	**0.45**	-	**2.436**	-	-	-	**3.203**	-	-	-	**0.1**	-	-	-	**2.4768**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBB3-14-07292025		SBB3-8-07292025		SBC1-11-07282025		SBC1-5-07282025		SBC1-8-07282025		SBC3-12-07312025		SBC3-6-07312025		SBC3-9-07312025		SBD1-12.5-07282025		SBD1-6.5-07282025		SBD1-9.5-07282025		SBD2-12-07292025		SBD2-6-07292025	
		L2547479-23		L2547479-21		L2547171-07		L2547171-05		L2547171-06		L2548047-03		L2548047-01		L2548047-02		L2547171-09		L2547171-08		L2547171-10		L2547479-10		L2547479-08	
		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025	
		14' BGS		8' BGS		11' BGS		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12.5' BGS		6.5' BGS		9.5' BGS		12' BGS		6' BGS	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
PERFLUORINATED ALKYL ACIDS BY EPA 1633																											
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		-	<0.00004	U	-	<0.00004	U	-	-	<0.00004	U	-	-	<0.00004	U	-	-	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		-	<0.000259	U	-	<0.000259	U	-	-	<0.000258	U	-	-	<0.000258	U	-	-	<0.000258	U	<0.000258	U	<0.000259	U	<0.000258	U	<0.000258	U
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		-	<0.000078	U	-	<0.000078	U	-	-	<0.000077	U	-	-	<0.000077	U	-	-	<0.000077	U	<0.000077	U	<0.000078	U	<0.000077	U	<0.000077	U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		-	<0.000148	U	-	<0.000148	U	-	-	<0.000147	U	-	-	<0.000147	U	-	-	<0.000148	U	<0.000148	U	<0.000147	U	<0.000148	U	<0.000148	U
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		-	<0.000236	U	-	<0.000236	U	-	-	<0.000235	U	-	-	<0.000235	U	-	-	<0.000235	U	<0.000235	U	<0.000235	U	<0.000236	U	<0.000235	U
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		-	<0.000366	U	-	<0.000365	U	-	-	<0.000363	U	-	-	<0.000363	U	-	-	<0.000365	U	<0.000365	U	<0.000364	U	<0.000365	U	<0.000364	U
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		-	<0.000092	U	-	<0.000092	U	-	-	<0.000091	U	-	-	<0.000091	U	-	-	<0.000092	U	<0.000092	U	<0.000092	U	<0.000092	U	<0.000092	U
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		-	<0.00003	U	-	<0.00003	U	-	-	<0.000029	U	-	-	<0.000029	U	-	-	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	<0.00003	U
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		-	<0.00003	U	-	<0.00003	U	-	-	<0.000029	U	-	-	<0.000029	U	-	-	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	<0.00003	U
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		-	<0.000038	U	-	<0.000038	U	-	-	<0.000038	U	-	-	<0.000038	U	-	-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		-	<0.000022	U	-	<0.000022	U	-	-	<0.000022	U	-	-	<0.000022	U	-	-	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		-	<0.000082	U	-	<0.000082	U	-	-	<0.000081	U	-	-	<0.000081	U	-	-	<0.000081	U	<0.000081	U	<0.000081	U	<0.000082	U	<0.000081	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		-	<0.000044	U	-	<0.000044	U	-	-	<0.000044	U	-	-	<0.000044	U	-	-	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		-	<0.000026	U	-	<0.000026	U	-	-	<0.000026	U	-	-	<0.000026	U	-	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		-	<0.000122	U	-	<0.000122	U	-	-	<0.000121	U	-	-	<0.000121	U	-	-	<0.000121	U	<0.000121	U	<0.000121	U	<0.000121	U	<0.000121	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		-	<0.000086	U	-	<0.000086	U	-	-	<0.000085	U	-	-	<0.000085	U	-	-	<0.000085	U	<0.000085	U	<0.000086	U	<0.000085	U	<0.000085	U
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		-	<0.000082	U	-	<0.000082	U	-	-	<0.000082	U	-	-	<0.000082	U	-	-	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		-	<0.000046	U	-	<0.000046	U	-	-	<0.000046	U	-	-	<0.000046	U	-	-	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		-	<0.000017	U	-	<0.000017	U	-	-	<0.000017	U	-	-	<0.000017	U	-	-	<0.000017	U	<0.000017	U	<0.000034	U	<0.000017	U	<0.000017	U
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		-	<0.000024	U	-	<0.000024	U	-	-	<0.000024	U	-	-	<0.000024	U	-	-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U
Perfluorobutanesulfonic Acid (PFBS)		-	<0.00002	U	-	<0.00002	U	-	-	<0.00002	U	-	-	<0.00002	U	-	-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U
Perfluorobutanoic Acid (PFBA)		-	<0.000028	U	-	<0.000028	U	-	-	<0.000028	U	-	-	<0.000028	U	-	-	<0.000028	U	<0.000028	U	<0.000056	U	<0.000028	U	<0.000028	U
Perfluorodecanesulfonic Acid (PFDS)		-	<0.000014	U	-	<0.000014	U	-	-	<0.000014	U	-	-	<0.000014	U	-	-	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U
Perfluorodecanoic Acid (PFDA)		-	<0.000035	U	-	<0.000035	U	-	-	<0.000035	U	-	-	<0.000035	U	-	-	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U
Perfluorododecanesulfonic Acid (PFDoS)		-	<0.000022	U	-	<0.000022	U	-	-	<0.000022	U	-	-	<0.000022	U	-	-	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U
Perfluorododecanoic Acid (PFDoA)		-	<0.000021	U	-	<0.000021	U	-	-	<0.000021	U	-	-	<0.000021	U	-	-	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U
Perfluoroheptanesulfonic Acid (PFHpS)		-	<0.000045	U	-	<0.000045	U	-	-	<0.000045	U	-	-	<0.000045	U	-	-	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U
Perfluoroheptanoic Acid (PFHpA)		-	<0.000012	U	-	<0.000012	U	-	-	<0.000012	U	-	-	<0.000012	U	-	-	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U
Perfluorohexanesulfonic Acid (PFHxS)		-	<0.00002	U	-	<0.00002	U	-	-	<0.00002	U	-	-	<0.00002	U	-	-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U
Perfluorohexanoic Acid (PFHxA)		-	<0.000015	U	-	<0.000015	U	-	-	<0.000015	U	-	-	<0.000015	U	-	-	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U
Perfluorononanesulfonic Acid (PFNS)		-	<0.00003	U	-	<0.00003	U	-	-	<0.000029	U	-	-	<0.000029	U	-	-	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	<0.00003	U
Perfluorononanoic Acid (PFNA)		-	<0.000013	U	-	<0.000013	U	-	-	<0.000013	U	-	-	<0.000013	U	-	-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U
Perfluorooctanesulfonamide (PFOSA)		-	<0.00001	U	-	<0.00001	U	-	-	<0.00001	U	-	-	<0.00001	U	-	-	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U
Perfluorooctanesulfonic Acid (PFOS)		-	<0.000031	U	-	<0.000031	U	-	-	<0.000031	U	-	-	<0.000031	U	-	-	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U
Perfluorooctanoic Acid (PFOA)		-	<0.000026	U	-	0.000032	J	-	-	<0.000026	U	-	-	<0.000026	U	-	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
Perfluoropentanesulfonic Acid (PFPeS)		-	<0.000026	U	-	<0.000026	U	-	-	<0.000026	U	-	-	<0.000026	U	-	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
Perfluoropentanoic Acid (PFPeA)		-	<0.000038	U	-	<0.000038	U	-	-	<0.000038	U	-	-	<0.000038	U	-	-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U
Perfluorotetradecanoic Acid (PFTeDA)		-	<0.000024	U	-	<0.000024	U	-	-	<0.000024	U	-	-	<0.000024	U	-	-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U
Perfluorotridecanoic Acid (PFTrDA)		-	<0.000016	U	-	<0.000016	U	-	-	<0.000016	U	-	-	<0.000016	U	-	-	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U
Perfluoroundecanoic Acid (PFUnA)		-	<0.000013	U	-	<0.000013	U	-	-	<0.000013	U	-	-	<0.000013	U	-	-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBB3-14-07292025		SBB3-8-07292025		SBC1-11-07282025		SBC1-5-07282025		SBC1-8-07282025		SBC3-12-07312025		SBC3-6-07312025		SBC3-9-07312025		SBD1-12.5-07282025		SBD1-6.5-07282025		SBD1-9.5-07282025		SBD2-12-07292025		SBD2-6-07292025	
		L2547479-23		L2547479-21		L2547171-07		L2547171-05		L2547171-06		L2548047-03		L2548047-01		L2548047-02		L2547171-09		L2547171-08		L2547171-10		L2547479-10		L2547479-08	
		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025	
		14' BGS		8' BGS		11' BGS		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12.5' BGS		6.5' BGS		9.5' BGS		12' BGS		6' BGS	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
SEMIVOLATILE ORGANICS BY GC/MS																											
1,2,4,5-Tetrachlorobenzene	-	-	<0.02	U	-	<0.019	U	-	-	<0.021	U	-	-	<0.02	U	<0.099	U	<0.02	U	<0.02	U						
1,4-Dioxane	130	-	<0.009	U	-	<0.0086	U	-	-	<0.0092	U	-	-	<0.0088	U	<0.044	U	<0.009	U	<0.0089	U						
2,3,4,6-Tetrachlorophenol	-	-	<0.04	U	-	<0.038	U	-	-	<0.04	U	-	-	<0.038	U	<0.19	U	<0.04	U	<0.039	U						
2,4,5-Trichlorophenol	-	-	<0.038	U	-	<0.036	U	-	-	<0.038	U	-	-	<0.036	U	<0.18	U	<0.038	U	<0.037	U						
2,4,6-Trichlorophenol	-	-	<0.037	U	-	<0.035	U	-	-	<0.038	U	-	-	<0.036	U	<0.18	U	<0.037	U	<0.037	U						
2,4-Dichlorophenol	-	-	<0.032	U	-	<0.03	U	-	-	<0.032	U	-	-	<0.031	U	<0.15	U	<0.032	U	<0.031	U						
2,4-Dimethylphenol	-	-	<0.065	U	-	<0.062	U	-	-	<0.066	U	-	-	<0.063	U	<0.31	U	<0.065	U	<0.064	U						
2,4-Dinitrophenol	-	-	<0.091	U	-	<0.087	U	-	-	<0.093	U	-	-	<0.089	U	<0.44	U	<0.092	U	<0.09	U						
2,4-Dinitrotoluene	-	-	<0.039	U	-	<0.037	U	-	-	<0.04	U	-	-	<0.038	U	<0.19	U	<0.039	U	<0.039	U						
2,6-Dinitrotoluene	-	-	<0.034	U	-	<0.032	U	-	-	<0.034	U	-	-	<0.033	U	<0.16	U	<0.034	U	<0.033	U						
2-Chloronaphthalene	-	-	<0.019	U	-	<0.018	U	-	-	<0.02	U	-	-	<0.019	U	<0.094	U	<0.02	U	<0.019	U						
2-Chlorophenol	-	-	<0.023	U	-	<0.022	U	-	-	<0.024	U	-	-	<0.022	U	<0.11	U	<0.023	U	<0.023	U						
2-Methylnaphthalene	-	-	<0.024	U	-	<0.022	U	-	-	<0.024	U	-	-	<0.023	U	**9.3**		**0.73**		**0.079**	J						
2-Methylphenol	500	-	<0.03	U	-	<0.029	U	-	-	<0.031	U	-	-	<0.03	U	**0.26**	J	<0.03	U	<0.03	U						
2-Nitroaniline	-	-	<0.038	U	-	<0.036	U	-	-	<0.038	U	-	-	<0.037	U	<0.18	U	<0.038	U	<0.037	U						
2-Nitrophenol	-	-	<0.074	U	-	<0.07	U	-	-	<0.075	U	-	-	<0.072	U	<0.36	U	<0.074	U	<0.073	U						
3,3'-Dichlorobenzidine	-	-	<0.052	U	-	<0.05	U	-	-	<0.053	U	-	-	<0.051	U	<0.25	U	<0.052	U	<0.051	U						
3-Methylphenol/4-Methylphenol	500	-	<0.031	U	-	<0.029	U	-	-	<0.031	U	-	-	<0.03	U	**0.74**	J	<0.031	U	<0.03	U						
3-Nitroaniline	-	-	<0.037	U	-	<0.035	U	-	-	<0.038	U	-	-	<0.036	U	<0.18	U	<0.037	U	<0.036	U						
4,6-Dinitro-o-cresol	-	-	<0.094	U	-	<0.09	U	-	-	<0.096	U	-	-	<0.091	U	<0.45	U	<0.094	U	<0.093	U						
4-Bromophenyl phenyl ether	-	-	<0.03	U	-	<0.028	U	-	-	<0.03	U	-	-	<0.029	U	<0.14	U	<0.03	U	<0.03	U						
4-Chloroaniline	-	-	<0.036	U	-	<0.034	U	-	-	<0.036	U	-	-	<0.035	U	<0.17	U	<0.036	U	<0.035	U						
4-Chlorophenyl phenyl ether	-	-	<0.021	U	-	<0.02	U	-	-	<0.021	U	-	-	<0.02	U	<0.1	U	<0.021	U	<0.021	U						
4-Nitroaniline	-	-	<0.081	U	-	<0.077	U	-	-	<0.083	U	-	-	<0.079	U	<0.39	U	<0.081	U	<0.08	U						
4-Nitrophenol	-	-	<0.08	U	-	<0.076	U	-	-	<0.082	U	-	-	<0.078	U	<0.39	U	<0.08	U	<0.079	U						
Acenaphthene	500	-	<0.02	U	-	<0.019	U	-	-	<0.021	U	-	-	<0.02	U	**0.71**	J	**0.046**	J	<0.02	U						
Acenaphthylene	500	-	<0.03	U	-	<0.029	U	-	-	<0.031	U	-	-	<0.029	U	**3.8**		**0.11**	J	<0.03	U						
Acetophenone	-	-	<0.024	U	-	<0.023	U	-	-	<0.025	U	-	-	<0.024	U	<0.12	U	<0.024	U	<0.024	U						
Anthracene	500	-	<0.038	U	-	<0.036	U	-	-	<0.039	U	-	-	<0.037	U	**2.6**		**0.072**	J	<0.038	U						
Atrazine	-	-	<0.069	U	-	<0.065	U	-	-	<0.07	U	-	-	<0.067	U	<0.33	U	<0.069	U	<0.068	U						
Benzaldehyde	-	-	<0.053	U	-	<0.05	U	-	-	<0.054	U	-	-	<0.051	U	<0.26	U	<0.053	U	<0.052	U						
Benzo(a)anthracene	5.6	-	<0.022	U	-	**0.082**	J	-	-	<0.022	U	-	-	**0.021**	J	**3.1**		**0.11**	J	<0.022	U						
Benzo(a)pyrene	1	-	<0.048	U	-	**0.11**	J	-	-	<0.049	U	-	-	<0.046	U	**3.4**		**0.1**	J	<0.047	U						
Benzo(b)fluoranthene	5.6	-	<0.033	U	-	**0.14**		-	-	<0.034	U	-	-	<0.032	U	**3.7**		**0.13**		<0.032	U						
Benzo(ghi)perylene	500	-	<0.023	U	-	**0.085**	J	-	-	<0.024	U	-	-	<0.022	U	**2.1**		**0.066**	J	<0.023	U						
Benzo(k)fluoranthene	56	-	<0.031	U	-	**0.042**	J	-	-	<0.032	U	-	-	<0.03	U	**1.3**		**0.042**	J	<0.031	U						
Biphenyl	-	-	<0.025	U	-	<0.024	U	-	-	<0.026	U	-	-	<0.025	U	**1.3**	J	**0.085**	J	<0.025	U						
Bis(2-chloroethoxy)methane	-	-	<0.02	U	-	<0.019	U	-	-	<0.02	U	-	-	<0.019	U	<0.095	U	<0.02	U	<0.019	U						
Bis(2-chloroethyl)ether	-	-	<0.026	U	-	<0.025	U	-	-	<0.027	U	-	-	<0.026	U	<0.13	U	<0.027	U	<0.026	U						
Bis(2-chloroisopropyl)ether	-	-	<0.034	U	-	<0.032	U	-	-	<0.034	U	-	-	<0.032	U	<0.16	U	<0.034	U	<0.033	U						
Bis(2-ethylhexyl)phthalate	-	-	<0.068	U	-	<0.064	U	-	-	<0.069	U	-	-	<0.066	U	<0.33	U	<0.068	U	<0.067	U						
Butyl benzyl phthalate	-	-	<0.049	U	-	<0.047	U	-	-	<0.05	U	-	-	<0.048	U	<0.24	U	<0.05	U	<0.049	U						
Caprolactam	-	-	<0.06	U	-	<0.057	U	-	-	<0.061	U	-	-	<0.058	U	<0.29	U	<0.06	U	<0.059	U						
Carbazole	-	-	<0.019	U	-	<0.018	U	-	-	<0.019	U	-	-	<0.018	U	**0.96**		**0.019**	U	<0.019	U						
Chrysene	56	-	<0.02	U	-	**0.082**	J	-	-	<0.021	U	-	-	<0.02	U	**3.1**		**0.11**	J	<0.02	U						
Di-n-butylphthalate	-	-	<0.037	U	-	<0.035	U	-	-	<0.038	U	-	-	<0.036	U	<0.18	J	<0.037	U	<0.037	U						
Di-n-octylphthalate	-	-	<0.067	U	-	<0.063	U	-	-	<0.068	U	-	-	<0.065	U	<0.32		<0.067	U	<0.066	U						
Dibenzo(a,h)anthracene	0.56	-	<0.023	U	-	<0.022	U	-	-	<0.023	U	-	-	<0.022	U	**0.44**	U	<0.023	U	<0.022	U						
Dibenzofuran	350	-	<0.018	U	-	<0.018	U	-	-	<0.019	U	-	-	<0.018	U	**1.5**	U	**0.044**	J	<0.018	U						
Diethyl phthalate	-	-	<0.018	U	-	<0.017	U	-	-	<0.018	U	-	-	<0.018	U	<0.088	U	<0.018	U	<0.018	U						
Dimethyl phthalate	-	-	<0.041	U	-	<0.039	U	-	-	<0.042	U	-	-	<0.04	U	<0.2	U	<0.041	U	<0.041	U						
Fluoranthene	500	-	<0.022	U	-	**0.18**		-	-	**0.027**	J	-	-	**0.04**	J	**7.8**		**0.24**		<0.022	U						
Fluorene	500	-	<0.019	U	-	<0.018	U	-	-	<0.019	U	-	-	<0.018	U	**3.4**		**0.13**	J	<0.019	U						
Hexachlorobenzene	6	-	<0.022	U	-	<0.021	U	-	-	<0.022	U	-	-	<0.021	U	<0.1	U	<0.022	U	<0.022	U						
Hexachlorobutadiene	-	-	<0.029	U	-	<0.027	U	-	-	<0.029	U	-	-	<0.028	U	<0.14	U	<0.029	U	<0.028	U						
Hexachlorocyclopentadiene	-	-	<0.18	U	-	<0.17	U	-	-	<0.18	UJ	-	-	<0.17	U	<0.86	U	<0.18	U	<0.18	U						
Hexachloroethane	-	-	<0.032	U	-	<0.03	U	-	-	<0.032	U	-	-	<0.031	U	<0.15	U	<0.032	U	<0.031	U						
Indeno(1,2,3-cd)pyrene	5.6	-	<0.027	U	-	**0.067**	J	-	-	<0.028	U	-	-	<0.026	U	**2**		**0.054**	J	<0.027	U						
Isophorone	-	-	<0.025	U	-	<0.024	U	-	-	<0.026	U	-	-	<0.025	U	<0.12	U	<0.026	U	<0.025	U						
n-Nitrosodi-n-propylamine	-	-	<0.03	U	-	<0.029	U	-	-	<0.031	U	-	-	<0.029	U	<0.15		<0.03	U	<0.03	U						
Naphthalene	500	-	**0.082**	J	-	**0.16**	U	-	-	**0.39**		-	-	**0.03**	U	**20**	U	**1.3**		**1.4**							
NDPA/DPA	-	-	<0.022	U	-	<0.021	U	-	-	<0.023	U	-	-	<0.022	U	<0.11	U	<0.022	U	<0.022	U						
Nitrobenzene	-	-	<0.029	U	-	<0.028	U	-	-	<0.03	U	-	-	<0.028	U	<0.14	U	<0.029	U	<0.029	U						
p-Chloro-m-cresol	-	-	<0.029	U	-	<0.028	U	-	-	<0.03	U	-	-	<0.028	U	<0.14	U	<0.029	U	<0.029	U						
Pentachlorophenol	6.7	-	<0.043	U	-	<0.041	U	-	-	<0.044	U	-	-	<0.042	U	<0.21	U	<0.043	U	<0.042	U						
Phenanthrene	500	-	<0.024	U	-	**0.1**	J	-	-	**0.026**	J	-	-	**0.035**	J	**11**		**0.34**		<0.024	U						
Phenol	500	-	<0.03	U	-	<0.028	U	-	-	<0.03	U	-	-	<0.029	U	**0.67**	J	<0.03	U	<0.029	U						
Pyrene	500	-	<0.019	U	-	**0.15**		-	-	**0.023**	J	-	-	**0.037**	J	**7.1**		**0.25**		<0.019	U						
Total SVOCs	-	-	**0.082**	-	-	**1.198**	-	-	-	**0.466**	-	-	-	**0.163**	-	**90.28**	-	**3.978**	-	**1.479**	-						
CHLORINATED HERBICIDES BY GC																											
2,4,5-T	-	-	<0.00602	U	-	<0.00595	U	-	-	<0.00611	U	-	-	<0.00594	U	<0.00588	U	<0.0061	U	<0.0059	U						
2,4,5-TP (Silvex)	500	-	<0.00516	U	-	<0.0051	U	-	-	<0.00524	U	-	-	<0.0051	U	<0.00504	U	<0.00523	U	<0.00506	U						
2,4-D	-	-	<0.0122	U	-	<0.0121	U	-	-	<0.0124	U	-	-	<0.0121	U	<0.0119	U	<0.0124	U	<0.012	U						

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBB3-14-07292025		SBB3-8-07292025		SBC1-11-07282025		SBC1-5-07282025		SBC1-8-07282025		SBC3-12-07312025		SBC3-6-07312025		SBC3-9-07312025		SBD1-12.5-07282025		SBD1-6.5-07282025		SBD1-9.5-07282025		SBD2-12-07292025		SBD2-6-07292025	
		L2547479-23		L2547479-21		L2547171-07		L2547171-05		L2547171-06		L2548047-03		L2548047-01		L2548047-02		L2547171-09		L2547171-08		L2547171-10		L2547479-10		L2547479-08	
		7/29/2025		7/29/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025	
		14' BGS		8' BGS		11' BGS		5' BGS		8' BGS		12' BGS		6' BGS		9' BGS		12.5' BGS		6.5' BGS		9.5' BGS		12' BGS		6' BGS	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
ORGANOCHLORINE PESTICIDES BY GC																											
4,4'-DDD	92	-	<0.00177	U	-	<0.000651	U	-	-	<0.0018	U	-	-	<0.00064	U	<0.000647	U	<0.0019	U	<0.00195	U						
4,4'-DDE	62	-	<0.00115	U	-	<0.000422	U	-	-	<0.00116	U	-	-	<0.000415	U	<0.000419	U	<0.00123	U	<0.00126	U						
4,4'-DDT	47	-	<0.004	U	-	<0.00147	U	-	-	<0.00405	U	-	-	<0.00144	U	<0.00146	U	<0.00428	U	<0.0044	U						
Aldrin	0.68	-	<0.00175	U	-	<0.000643	U	-	-	<0.00177	U	-	-	<0.000632	U	<0.000638	U	<0.00187	U	<0.00192	U						
Alpha-BHC	3.4	-	<0.000588	U	-	<0.000216	U	-	-	<0.000596	U	-	-	<0.000212	U	<0.000214	U	<0.00063	U	<0.000647	U						
Beta-BHC	3	-	<0.00188	U	-	<0.000692	U	-	-	<0.00191	U	-	-	<0.000681	U	<0.000688	U	<0.00202	U	<0.00207	U						
Chlordane	-	-	<0.0164	U	-	<0.00605	U	-	-	<0.0167	U	-	-	<0.00595	U	<0.00601	U	<0.0176	U	<0.0181	U						
cis-Chlordane	24	-	<0.00173	U	-	<0.000636	U	-	-	<0.00175	U	-	-	<0.000625	U	<0.000632	U	<0.00185	U	<0.0019	U						
Delta-BHC	500	-	<0.000973	U	-	<0.000358	U	-	-	<0.000986	U	-	-	<0.000352	U	<0.000355	U	<0.00104	U	<0.00107	U						
Dieldrin	1.4	-	<0.00155	U	-	<0.000571	U	-	-	<0.00157	U	-	-	<0.000561	U	<0.000567	U	<0.00166	U	<0.00171	U						
Endosulfan I	200	-	<0.00117	U	-	<0.000431	U	-	-	<0.00119	U	-	-	<0.000424	U	<0.000428	U	<0.00126	U	<0.00129	U						
Endosulfan II	200	-	<0.00166	U	-	<0.00061	U	-	-	<0.00168	U	-	-	<0.0006	U	<0.000606	U	<0.00178	U	<0.00183	U						
Endosulfan sulfate	200	-	<0.000985	U	-	<0.000362	U	-	-	<0.000998	U	-	-	<0.000356	U	<0.00036	U	<0.00106	U	<0.00108	U						
Endrin	89	-	<0.000849	U	-	<0.000312	U	-	-	<0.00086	U	-	-	<0.000307	U	<0.00031	U	<0.000909	U	<0.000934	U						
Endrin aldehyde	-	-	<0.00217	U	-	<0.000799	U	-	-	<0.0022	U	-	-	<0.000785	U	<0.000793	U	<0.00233	U	<0.00239	U						
Endrin ketone	-	-	<0.00128	U	-	<0.00047	U	-	-	<0.0013	U	-	-	<0.000462	U	<0.000467	U	<0.00137	U	<0.00141	U						
Heptachlor	15	-	<0.00111	U	-	<0.000409	U	-	-	<0.00113	U	-	-	<0.000402	U	<0.000406	U	<0.00119	U	<0.00122	U						
Heptachlor epoxide		-	<0.00279	U	-	<0.00103	U	-	-	<0.00283	U	-	-	<0.00101	U	<0.00102	U	<0.00299	U	<0.00308	U						
Lindane	9.2	-	<0.000925	U	-	<0.00034	U	-	-	<0.000938	U	-	-	<0.000334	U	<0.000338	U	<0.000991	U	<0.00102	U						
Methoxychlor	-	-	<0.0029	U	-	<0.00106	U	-	-	<0.00294	U	-	-	<0.00105	U	<0.00106	U	<0.0031	U	<0.00319	U						
Toxaphene	-	-	<0.0261	U	-	<0.00959	U	-	-	<0.0264	U	-	-	<0.00942	U	<0.00952	U	<0.0279	U	<0.0287	U						
trans-Chlordane	-	-	<0.00164	U	-	<0.000602	U	-	-	<0.00166	U	-	-	<0.000592	U	<0.000598	U	<0.00176	U	<0.0018	U						
POLYCHLORINATED BIPHENYLS BY GC																											
Aroclor 1016	1	-	<0.00974	U	-	<0.00508	U	-	-	<0.00509	U	-	-	<0.00498	U	<0.00492	U	<0.00972	U	<0.00975	U						
Aroclor 1221	1	-	<0.011	U	-	<0.00573	U	-	-	<0.00575	U	-	-	<0.00562	U	<0.00555	U	<0.011	U	<0.011	U						
Aroclor 1232	1	-	<0.0232	U	-	<0.0121	U	-	-	<0.0122	U	-	-	<0.0119	U	<0.0117	U	<0.0232	U	<0.0233	U						
Aroclor 1242	1	-	<0.0148	U	-	<0.0077	U	-	-	<0.00773	U	-	-	<0.00756	U	<0.00746	U	<0.0147	U	<0.0148	U						
Aroclor 1248	1	-	<0.0164	U	-	<0.00857	U	-	-	<0.0086	U	-	-	<0.00841	U	<0.0083	U	<0.0164	U	<0.0165	U						
Aroclor 1254	1	-	<0.012	U	-	<0.00625	U	-	-	<0.00628	U	-	-	<0.00613	U	<0.00606	U	<0.012	U	<0.012	U						
Aroclor 1260	1	-	<0.0203	U	-	<0.0106	U	-	-	<0.0106	U	-	-	<0.0104	U	<0.0102	U	<0.0202	U	<0.0203	U						
Aroclor 1262	1	-	<0.0139	U	-	<0.00726	U	-	-	<0.00729	U	-	-	<0.00712	U	<0.00703	U	<0.0139	U	<0.0139	U						
Aroclor 1268	1	-	<0.0114	U	-	<0.00592	U	-	-	<0.00594	U	-	-	<0.00581	U	<0.00574	U	<0.0113	U	<0.0114	U						
PCBs, Total	1	-	<0.00974	U	-	<0.00508	U	-	-	<0.00509	U	-	-	<0.00498	U	<0.00492	U	<0.00972	U	<0.00975	U						
TOTAL METALS																											
Aluminum, Total	-	-	**9200**		-	**9440**	J	-	-	**10200**	J	-	-	**11200**	J	**7910**	J	**9380**		**10000**							
Antimony, Total	-	-	<3.59	UJ	-	<3.47	UJ	-	-	<3.63	UJ	-	-	<3.44	UJ	<3.52	UJ	<3.47	UJ	<3.42	UJ						
Arsenic, Total	16	-	**2.57**		-	**2.38**		-	-	**4.41**	J	-	-	**1.71**		**4.41**		**4.25**		**4.4**							
Barium, Total	400	-	**96.4**	J	-	**49**		-	-	**83**		-	-	**104**		**70.5**		**119**	J	**104**	J						
Beryllium, Total	590	-	**0.449**	J	-	**0.449**	J	-	-	**0.5**		-	-	**0.516**		**0.391**	J	**0.455**		**0.492**							
Cadmium, Total	9.3	-	<0.051	U	-	<0.05	UJ	-	-	<0.052	U	-	-	<0.049	UJ	<0.05	UJ	<0.05	U	<0.049	U						
Calcium, Total	-	-	**60900**		-	**52600**	J	-	-	**53200**	J	-	-	**63000**	J	**39800**	J	**50800**		**61600**							
Chromium, Total	-	-	**13.8**		-	**14.6**	J	-	-	**15.7**	J	-	-	**16.6**	J	**14.2**	J	**14.5**		**15.4**							
Cobalt, Total	-	-	**8.85**		-	**8.35**	J	-	-	**9.13**	J	-	-	**6.53**	J	**6.76**	J	**9.03**		**9.8**							
Copper, Total	270	-	**21.3**	J	-	**19.4**		-	-	**16.9**	J	-	-	**18**		**18.7**		**18.3**	J	**20.2**	J						
Iron, Total	-	-	**16200**		-	**17900**	J	-	-	**20300**	J	-	-	**18900**	J	**14900**	J	**17400**		**18200**							
Lead, Total	1000	-	**10.4**	J	-	**8.54**		-	-	**8.78**		-	-	**9.17**	J	**22.6**		**10.4**	J	**10.9**	J						
Magnesium, Total	-	-	**18300**	J	-	**16400**	J	-	-	**15700**		-	-	**14700**	J	**12300**	J	**15900**	J	**17400**	J						
Manganese, Total	10000	-	**545**		-	**460**		-	-	**521**	J	-	-	**369**		**363**		**465**		**540**							
Mercury, Total	2.8	-	<0.057	U	-	<0.057	U	-	-	<0.055	U	-	-	<0.053	U	**0.07**	J	<0.058	U	<0.056	U						
Nickel, Total	310	-	**20.2**		-	**19.7**	J	-	-	**21.4**	J	-	-	**19.9**	J	**18.4**	J	**21.1**		**22.4**							
Potassium, Total	-	-	**1100**		-	**1300**	J	-	-	**1020**		-	-	**1420**	J	**1340**	J	**1110**		**1110**							
Selenium, Total	1500	-	<0.307	U	-	<0.297	U	-	-	<0.31	UJ	-	-	<0.294	U	<0.301	U	<0.296	U	<0.292	U						
Silver, Total	1500	-	<0.278	U	-	<0.269	U	-	-	<0.281	U	-	-	<0.266	U	<0.272	U	<0.268	U	<0.265	U						
Sodium, Total	-	-	**262**		-	**230**		-	-	**588**		-	-	**230**		**253**		**1750**		**1900**							
Thallium, Total	-	-	<0.842	U	-	<0.814	U	-	-	<0.851	U	-	-	<0.805	U	<0.825	U	<0.813	U	<0.802	U						
Vanadium, Total	-	-	**16.8**		-	**18.9**		-	-	**20.3**		-	-	**19.6**		**43.4**		**19**		**19.2**							
Zinc, Total	10000	-	**54**	J	-	**52**	J	-	-	**53.6**	J	-	-	**55.3**	J	**60.5**	J	**54.4**	J	**56.4**	J						
GENERAL CHEMISTRY																											
Cyanide, Total	27	-	<0.24	U	-	<0.23	UJ	-	-	**1.4**		-	-	<0.24	UJ	**0.34**	J	**2.5**		**0.79**	J						
Nitrogen, Ammonia	-	-	<3.3	UJ	-	**8.2**	J	-	-	**3.6**	J	-	-	**11**		**4.4**	J	**77**	J	**200**	J						
Solids, Total	-	**87.2**	**84.3**		**88.2**	**86.7**		**87**		**83.5**		**83**		**84.6**		**80.6**		**85.1**		**86.5**		**84**		**85.9**			

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCF
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 37

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBD2-9-07292025		SBD3-10-07312025		SBD3-13-07312025		SBD3-16-07312025		SBE1-12-07282025		SBE1-6-07282025		SBE1-9-07282025		SBE3-12-07312025		SBE3-6-07312025		SBE3-9-07312025		SBF1-12-07282025		SBF1-6-07282025		SBF1-9-07282025	
		L2547479-09		L2548047-04		L2548047-05		L2548047-06		L2547171-13		L2547171-11		L2547171-12		L2548047-09		L2548047-07		L2548047-08		L2547171-16		L2547171-14		L2547171-15	
		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025	
		9' BGS		10' BGS		13' BGS		16' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS	
		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																										
VOLATILE ORGANICS BY EPA 5035																											
1,1,1-Trichloroethane	500	<0.00016	U	<0.00016	U	<0.00016	U	<0.01	U	<0.011	U	<0.00013	U	<0.00015	U	<0.00013	U	<0.0093	U	<0.0096	U	<0.012	U	<0.0096	U	<1.2	U
1,1,2,2-Tetrachloroethane	-	<0.00016	U	<0.00016	U	<0.00016	U	<0.01	U	<0.011	U	<0.00013	U	<0.00015	U	<0.00013	U	<0.0093	U	<0.0095	U	<0.012	U	<0.0095	U	<1.2	U
1,1,2-Trichloroethane	-	<0.00026	U	<0.00025	U	<0.00025	U	<0.017	U	<0.018	U	<0.00021	U	<0.00024	U	<0.00022	U	<0.015	U	<0.015	U	<0.02	U	<0.015	U	<1.9	U
1,1-Dichloroethane	240	<0.00014	U	<0.00014	U	<0.00014	U	<0.0091	U	<0.01	U	<0.00011	U	<0.00013	U	<0.00012	U	<0.0081	U	<0.0083	U	<0.011	U	<0.0083	U	<1	U
1,1-Dichloroethene	500	<0.00023	U	<0.00022	U	<0.00023	U	<0.015	U	<0.016	U	<0.00019	U	<0.00022	U	<0.00019	U	<0.013	U	<0.014	U	<0.017	U	<0.014	U	<1.7	U
1,2,4-Trichlorobenzene	-	<0.00026	U	<0.00025	U	<0.00026	U	<0.017	U	<0.019	U	<0.00021	U	<0.00025	U	<0.00022	U	<0.015	U	<0.016	U	<0.02	U	<0.016	U	<1.9	U
1,2,4-Trimethylbenzene	190	<0.00032	U	<0.00031	U	**0.0004**	U	**0.031**	J	<0.023	U	**0.00036**	U	**0.0028**	U	**0.0071**		**0.16**		<0.019	U	<0.024	U	**0.056**	J	**5.4**	J
1,2-Dibromo-3-chloropropane	-	<0.00096	U	<0.00093	U	<0.00095	U	<0.063	U	<0.068	U	<0.00078	U	<0.00092	U	<0.0008	U	<0.056	U	<0.057	U	<0.073	U	<0.057	U	<7.1	U
1,2-Dibromoethane	-	<0.00027	U	<0.00026	U	<0.00027	U	<0.018	U	<0.019	U	<0.00022	U	<0.00026	U	<0.00022	U	<0.016	U	<0.016	U	<0.02	U	<0.016	U	<2	U
1,2-Dichlorobenzene	500	<0.00014	U	<0.00013	U	<0.00014	U	<0.009	U	<0.0099	U	<0.00011	U	<0.00013	U	<0.00012	U	<0.008	U	<0.0083	U	<0.01	U	<0.0082	U	<1	U
1,2-Dichloroethane	30	<0.00025	U	<0.00024	U	<0.00024	U	<0.016	U	<0.018	U	<0.0002	U	<0.00024	U	<0.00021	U	<0.014	U	<0.015	U	<0.019	U	<0.015	U	<1.8	U
1,2-Dichloropropane	-	<0.00012	U	<0.00012	U	<0.00012	U	<0.0078	U	<0.0086	U	<0.0001	U	<0.00012	U	<0.0001	U	<0.007	U	<0.0072	U	<0.0092	U	<0.0072	U	<0.89	U
1,3,5-Trimethylbenzene	190	<0.00018	U	<0.00018	U	<0.00018	U	<0.012	U	<0.013	U	**0.0002**	U	**0.0012**	U	**0.004**		**0.084**	J	<0.011	U	<0.014	U	**0.017**	J	**2.6**	J
1,3-Dichlorobenzene	280	<0.00014	U	<0.00014	U	<0.00014	U	<0.0093	U	<0.01	U	<0.00012	U	<0.00014	U	<0.00012	U	<0.0083	U	<0.0085	U	<0.011	U	<0.0085	U	<1	U
1,4-Dichlorobenzene	130	<0.00016	U	<0.00016	U	<0.00016	U	<0.011	U	<0.012	U	<0.00013	U	<0.00016	U	<0.00014	U	<0.0096	U	<0.0098	U	<0.012	U	<0.0098	U	<1.2	U
2-Butanone	500	<0.0021	U	**0.0046**	J	**0.0026**	J	<0.14	U	<0.15	U	**0.0029**	J	<0.002	U	<0.0018	U	<0.12	U	<0.13	U	<0.16	U	<0.13	U	<16	U
2-Hexanone	-	<0.0011	U	<0.0011	UJ	<0.0011	U	<0.074	U	<0.081	U	<0.00093	U	<0.0011	U	<0.00095	U	<0.066	UJ	<0.068	U	<0.086	U	<0.068	U	<8.4	U
4-Methyl-2-pentanone	-	<0.0012	U	<0.0012	U	<0.0012	U	<0.08	U	<0.088	U	<0.001	U	<0.0012	U	<0.001	U	<0.072	U	<0.074	U	<0.094	U	<0.073	U	<9.1	U
Acetone	500	<0.0046	UJ	**0.019**		**0.014**		<0.3	U	<0.33	U	**0.029**	J	<0.0044	U	<0.0039	U	<0.27	U	<0.28	U	<0.35	U	<0.28	U	<34	U
Benzene	44	**0.1**		**0.0028**		**0.0017**		**0.04**		<0.011	U	**0.00042**	J	**0.0021**	U	**0.007**		**0.21**		<0.0095	U	<0.012	U	**0.38**		**5**	
Bromodichloromethane	-	<0.0001	U	<0.0001	U	<0.0001	U	<0.0068	U	<0.0075	U	<0.00009	U	<0.0001	U	<0.00009	U	<0.0061	U	<0.0063	U	<0.008	U	<0.0062	U	<0.78	U
Bromoform	-	<0.00024	U	<0.00023	U	<0.00023	U	<0.015	U	<0.017	U	<0.00019	U	<0.00023	U	<0.0002	U	<0.014	U	<0.014	U	<0.018	U	<0.014	U	<1.8	U
Bromomethane	-	<0.00056	U	<0.00054	U	<0.00055	U	<0.036	U	<0.04	U	<0.00046	U	<0.00053	U	<0.00047	U	<0.032	U	<0.033	U	<0.043	U	<0.033	U	<4.1	U
Carbon disulfide	-	<0.0044	U	<0.0043	U	**0.0051**	J	<0.28	U	<0.31	U	<0.0036	U	<0.0042	U	<0.0037	U	<0.25	U	<0.26	U	<0.33	U	<0.26	U	<32	U
Carbon tetrachloride	22	<0.00022	U	<0.00022	U	<0.00022	U	<0.014	U	<0.016	U	<0.00018	U	<0.00021	U	<0.00018	U	<0.013	U	<0.013	U	<0.017	U	<0.013	U	<1.6	U
Chlorobenzene	500	<0.00012	U	<0.00012	U	<0.00012	U	<0.008	U	<0.0087	U	<0.0001	U	<0.00012	U	<0.0001	U	<0.0071	U	<0.0073	U	<0.0093	U	<0.0073	U	<0.9	U
Chloroethane	-	<0.00043	U	<0.00042	U	<0.00043	U	<0.028	U	<0.031	U	<0.00036	U	<0.00042	U	<0.00036	U	<0.025	U	<0.026	U	<0.033	U	<0.026	U	<3.2	U
Chloroform	350	<0.00013	U	<0.00013	U	<0.00013	U	<0.0088	U	<0.0096	U	<0.00011	U	<0.00013	U	<0.00011	U	<0.0078	U	<0.008	U	<0.01	U	<0.008	U	<1	U
Chloromethane	-	<0.00089	U	<0.00087	U	<0.00089	U	<0.058	U	<0.064	U	<0.00073	U	<0.00086	U	<0.00075	U	<0.052	U	<0.054	U	<0.068	U	<0.053	U	<6.6	U
cis-1,2-Dichloroethene	500	<0.00017	U	<0.00016	U	<0.00017	U	<0.011	U	<0.012	U	<0.00014	U	<0.00016	U	<0.00014	U	<0.0098	U	<0.01	U	<0.013	U	<0.01	U	<1.2	U
cis-1,3-Dichloropropene	-	<0.00015	U	<0.00015	U	<0.00015	U	<0.0099	U	<0.011	U	<0.00012	U	<0.00014	U	<0.00013	U	<0.0088	U	<0.0091	U	<0.012	U	<0.009	U	<1.1	U
Cyclohexane	-	<0.00052	U	<0.00051	U	<0.00052	U	<0.034	U	<0.037	U	<0.00043	U	<0.0005	U	<0.00044	U	<0.03	U	<0.031	U	<0.04	U	<0.031	U	<3.9	U
Dibromochloromethane	-	<0.00013	U	<0.00013	U	<0.00013	U	<0.0088	U	<0.0096	U	<0.00011	U	<0.00013	U	<0.00011	U	<0.0078	U	<0.008	U	<0.01	U	<0.008	U	<1	U
Dichlorodifluoromethane	-	<0.00088	U	<0.00086	U	<0.00087	U	<0.057	U	<0.063	U	<0.00072	U	<0.00084	U	<0.00074	U	<0.051	U	<0.052	U	<0.067	U	<0.052	U	<6.5	U
Ethylbenzene	390	**0.0005**	J	<0.00013	U	**0.0002**	J	**0.0099**	J	<0.0097	U	**0.00015**	U	**0.00039**	U	**0.00081**		**0.11**		<0.0081	U	<0.01	U	**0.15**		**2.7**	J
Freon-113	-	<0.00066	U	<0.00065	U	<0.00066	U	<0.044	U	<0.048	U	<0.00054	U	<0.00064	U	<0.00056	U	<0.039	U	<0.04	U	<0.051	U	<0.04	U	<4.9	U
Isopropylbenzene	-	<0.0001	U	<0.0001	U	<0.0001	U	<0.0068	U	<0.0075	U	**0.00032**	J	<0.0001	U	<0.00009	U	<0.0061	U	<0.0063	U	<0.008	U	<0.0062	U	<0.78	U
Methyl Acetate	-	<0.00091	U	<0.00089	U	<0.00091	U	<0.06	U	<0.065	U	<0.00075	U	<0.00087	U	<0.00077	U	<0.053	U	<0.054	U	<0.07	U	<0.054	U	<6.8	U
Methyl cyclohexane	-	<0.00058	U	<0.00056	U	**0.00068**	J	<0.038	U	<0.041	U	<0.00047	U	<0.00056	U	<0.00049	U	<0.034	U	<0.035	U	<0.044	U	<0.034	U	<4.3	U
Methyl tert butyl ether	500	<0.00019	U	<0.00019	U	<0.00019	U	<0.013	U	<0.014	U	<0.00016	U	<0.00018	U	<0.00016	U	<0.011	U	<0.012	U	<0.015	U	<0.012	U	<1.4	U
Methylene chloride	500	<0.0022	U	<0.0021	U	<0.0022	U	<0.14	U	<0.16	U	<0.0018	U	<0.0021	U	<0.0018	U	<0.13	U	<0.13	U	<0.17	U	<0.13	U	<16	U
n-Butylbenzene	500	<0.00016	U	<0.00016	U	<0.00016	U	<0.01	U	<0.011	U	<0.00013	U	<0.00015	U	<0.00013	U	<0.0093	U	<0.0096	U	<0.012	U	<0.0096	U	<1.2	U
n-Propylbenzene	500	<0.00016	U	<0.00016	U	<0.00016	U	<0.011	U	<0.012	U	<0.00013	U	<0.00016	U	<0.00014	U	<0.0096	U	<0.0098	U	<0.012	U	<0.0098	U	<1.2	U
Naphthalene	500	**0.00089**	J	**0.01**		**0.0067**		**6.9**		**2.8**		**0.12**		**3.9**	E	**2.5**	E	**16**		**3.7**		**40**		**6.9**		**3900**	
o-Xylene	-	<0.00028	U	<0.00027	U	<0.00028	U	<0.018	U	<0.02	U	**0.00041**	U	**0.0014**	U	**0.0038**		**0.063**		<0.017	U	<0.021	U	<0.017	U	**2.9**	J
p-Isopropyltoluene	-	<0.0001	U	<0.0001	U	<0.0001	U	<0.0068	U	<0.0075	U	<0.00009	U	<0.0001	U	**<0.00009**	U	<0.0061	U	<0.0063	U	<0.008	U	<0.0062	U	<0.78	U
p/m-Xylene	-	<0.00054	U	<0.00052	U	**0.00085**	U	**0.054**	U	<0.038	U	**0.00073**	U	**0.0027**	U	**0.012**		<0.031	U	<0.032	U	<0.041	U	**0.052**	J	**7.5**	J
sec-Butylbenzene	500	<0.00014	U	<0.00014	U	<0.00014	U	<0.0092	U	<0.01	U	<0.00011	U	<0.00013	U	<0.00012	U	<0.0082	U	<0.0084	U	<0.011	U	<0.0084	U	<1	U
Styrene	-	<0.00019	U	<0.00018	U	<0.00019	U	<0.012	U	<0.013	U	<0.00015	U	<0.00018	U	<0.00016	U	<0.011	U	<0.011	U	<0.014	U	<0.011	U	**1.5**	J
tert-Butylbenzene	500	<0.00011	U	<0.00011	U	<0.00011	U	<0.0074	U	<0.0081	U	<0.00009	U	<0.00011	U	<0.0001	U	<0.0066	U	<0.0068	U	<0.0086	U	<0.0068	U	<0.84	U
Tetrachloroethene	150	<0.00019	U	<0.00018	U	<0.00019	U	<0.012	U	<0.013	U	<0.00015	U	<0.00018	U	<0.00016	U	<0.011	U	<0.011	U	<0.014	U	<0.011	U	<1.4	U
Toluene	500	<0.00052	U	<0.00051	U	**0.0013**	U	**0.054**	U	<0.037	U	<0.00043	U	**0.002**	U	**0.0067**		<0.03	U	**0.035**	U	<0.04	U	<0.031	U	**5.9**	J
trans-1,2-Dichloroethene	500	<0.00013	U	<0.00013	U	<0.00013	U	<0.0086	U	<0.0094	U	<0.00011	U	<0.00013	U	<0.00011	U	<0.0076	U	<0.0079	U	<0.01	U	<0.0078	U	<0.98	U
trans-1,3-Dichloropropene	-	<0.00026	U	<0.00026	U	<0.00026	U	<0.017	U	<0.019	U	<0.00021	U	<0.00025	U	<0.00022	U	<0.015	U	<0.016	U	<0.02	U	<0.016	U	<1.9	U
Trichloroethene	200	<0.00013	U	<0.00013	U	<0.00013	U	<0.0086	U	<0.0094	U	<0.00011	U	<0.00013	U	<0.00011	U	<0.0076	U	<0.0079	U	<0.01	U	<0.0078	U	<0.98	U
Trichlorofluoromethane	-	<0.00067	U	<0.00065	U	<0.00066	U	<0.044	U	<0.048	U	<0.00055	U	<0.00064	U	<0.00056	U	<0.039	U	<0.04	U	<0.051	U	<0.04	U	<5	U
Vinyl chloride	13	<0.00032	U	<0.00031	U	<0.00032	U	<0.021	U	<0.023	U	<0.00026	U	<0.00031	U	<0.00027	U	<0.019	U	<0.019	U	<0.024	U	<0.019	U	<2.4	U
Total VOCs	-	**0.10139**	-	**0.0364**	-	**0.03353**	-	**7.0889**	-	**2.8**	-	**0.15449**	-	**3.91259**	-	**2.54141**	-	**16.627**	-	**3.735**	-	**40**	-	**7.555**	-	**3533.5**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBD2-9-07292025	SBD3-10-07312025	SBD3-13-07312025	SBD3-16-07312025	SBE1-12-07282025	SBE1-6-07282025	SBE1-9-07282025	SBE3-12-07312025	SBE3-6-07312025	SBE3-9-07312025	SBF1-12-07282025	SBF1-6-07282025	SBF1-9-07282025
		L2547479-09	L2548047-04	L2548047-05	L2548047-06	L2547171-13	L2547171-11	L2547171-12	L2548047-09	L2548047-07	L2548047-08	L2547171-16	L2547171-14	L2547171-15
		7/29/2025	7/31/2025	7/31/2025	7/31/2025	7/28/2025	7/28/2025	7/28/2025	7/31/2025	7/31/2025	7/31/2025	7/28/2025	7/28/2025	7/28/2025
		9' BGS	10' BGS	13' BGS	16' BGS	12' BGS	6' BGS	9' BGS	12' BGS	6' BGS	9' BGS	12' BGS	6' BGS	9' BGS
		SOLID	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL
	Commercial SCO (mg/kg)													
VOLATILE ORGANICS BY EPA 5035 HIGH														
1,1,1-Trichloroethane	500	-	-	-	-	-	<0.0088 U	<0.01 U	<0.01 U	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	<0.0087 U	<0.01 U	<0.01 U	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-	-	<0.014 U	<0.016 U	<0.016 U	-	-	-	-	-
1,1-Dichloroethane	240	-	-	-	-	-	<0.0076 U	<0.009 U	<0.0087 U	-	-	-	-	-
1,1-Dichloroethene	500	-	-	-	-	-	<0.012 U	<0.015 U	<0.014 U	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-	<0.014 U	<0.017 U	<0.016 U	-	-	-	-	-
1,2,4-Trimethylbenzene	190	-	-	-	-	-	<0.018 U	<0.021 U	<0.02 U	-	-	-	-	-
1,2-Dibromo-3-chloropropane	-	-	-	-	-	-	<0.052 U	<0.062 U	<0.06 U	-	-	-	-	-
1,2-Dibromoethane	-	-	-	-	-	-	<0.015 U	<0.017 U	<0.017 U	-	-	-	-	-
1,2-Dichlorobenzene	500	-	-	-	-	-	<0.0076 U	<0.0089 U	<0.0086 U	-	-	-	-	-
1,2-Dichloroethane	30	-	-	-	-	-	<0.013 U	<0.016 U	<0.015 U	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-	-	<0.0066 U	<0.0077 U	<0.0075 U	-	-	-	-	-
1,3,5-Trimethylbenzene	190	-	-	-	-	-	<0.01 U	<0.012 U	<0.012 U	-	-	-	-	-
1,3-Dichlorobenzene	280	-	-	-	-	-	<0.0078 U	<0.0092 U	<0.0089 U	-	-	-	-	-
1,4-Dichlorobenzene	130	-	-	-	-	-	<0.009 U	<0.01 U	<0.01 U	-	-	-	-	-
2-Butanone	500	-	-	-	-	-	**0.13** J	<0.14 U	<0.13 U	-	-	-	-	-
2-Hexanone	-	-	-	-	-	-	<0.062 U	<0.073 U	<0.071 U	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.067 U	<0.079 U	<0.077 U	-	-	-	-	-
Acetone	500	-	-	-	-	-	**0.26** J	<0.3 U	<0.29 U	-	-	-	-	-
Benzene	44	-	-	-	-	-	**0.0089** J	<0.01 U	<0.01 U	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-	-	<0.0057 U	<0.0068 U	<0.0066 U	-	-	-	-	-
Bromoform	-	-	-	-	-	-	<0.013 U	<0.015 U	<0.015 U	-	-	-	-	-
Bromomethane	-	-	-	-	-	-	<0.03 U	<0.036 U	<0.035 U	-	-	-	-	-
Carbon disulfide	-	-	-	-	-	-	<0.24 U	<0.28 U	<0.27 U	-	-	-	-	-
Carbon tetrachloride	22	-	-	-	-	-	<0.012 U	<0.014 U	<0.014 U	-	-	-	-	-
Chlorobenzene	500	-	-	-	-	-	<0.0067 U	<0.0079 U	<0.0076 U	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	<0.024 U	<0.028 U	<0.027 U	-	-	-	-	-
Chloroform	350	-	-	-	-	-	<0.0074 U	<0.0087 U	<0.0084 U	-	-	-	-	-
Chloromethane	-	-	-	-	-	-	<0.049 U	<0.058 U	<0.056 U	-	-	-	-	-
cis-1,2-Dichloroethene	500	-	-	-	-	-	<0.0092 U	<0.011 U	<0.01 U	-	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-	-	-	<0.0083 U	<0.0098 U	<0.0095 U	-	-	-	-	-
Cyclohexane	-	-	-	-	-	-	<0.028 U	<0.034 U	<0.033 U	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	<0.0074 U	<0.0087 U	<0.0084 U	-	-	-	-	-
Dichlorodifluoromethane	-	-	-	-	-	-	<0.048 U	<0.057 U	<0.055 U	-	-	-	-	-
Ethylbenzene	390	-	-	-	-	-	<0.0074 U	<0.0087 U	<0.0085 U	-	-	-	-	-
Freon-113	-	-	-	-	-	-	<0.036 U	<0.043 U	<0.042 U	-	-	-	-	-
Isopropylbenzene	-	-	-	-	-	-	<0.0057 U	<0.0068 U	<0.0066 U	-	-	-	-	-
Methyl Acetate	-	-	-	-	-	-	**0.084** J	<0.059 U	<0.057 U	-	-	-	-	-
Methyl cyclohexane	-	-	-	-	-	-	<0.032 U	<0.037 U	<0.036 U	-	-	-	-	-
Methyl tert butyl ether	500	-	-	-	-	-	<0.01 U	<0.012 U	<0.012 U	-	-	-	-	-
Methylene chloride	500	-	-	-	-	-	<0.12 U	<0.14 U	<0.14 U	-	-	-	-	-
n-Butylbenzene	500	-	-	-	-	-	<0.0088 U	<0.01 U	<0.01 U	-	-	-	-	-
n-Propylbenzene	500	-	-	-	-	-	<0.009 U	<0.01 U	<0.01 U	-	-	-	-	-
Naphthalene	500	-	-	-	-	-	**1.9**	**0.56**	**1.4**	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	<0.015 U	<0.018 U	<0.017 U	-	-	-	-	-
p-Isopropyltoluene	-	-	-	-	-	-	<0.0057 U	<0.0068 U	<0.0066 U	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	<0.029 U	<0.035 U	<0.034 U	-	-	-	-	-
sec-Butylbenzene	500	-	-	-	-	-	<0.0077 U	<0.009 U	<0.0088 U	-	-	-	-	-
Styrene	-	-	-	-	-	-	<0.01 U	<0.012 U	<0.012 U	-	-	-	-	-
tert-Butylbenzene	500	-	-	-	-	-	<0.0062 U	<0.0073 U	<0.0071 U	-	-	-	-	-
Tetrachloroethene	150	-	-	-	-	-	<0.01 U	<0.012 U	<0.012 U	-	-	-	-	-
Toluene	500	-	-	-	-	-	<0.028 U	<0.034 U	<0.033 U	-	-	-	-	-
trans-1,2-Dichloroethene	500	-	-	-	-	-	<0.0072 U	<0.0085 U	<0.0082 U	-	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-	-	-	<0.014 U	<0.017 U	<0.016 U	-	-	-	-	-
Trichloroethene	200	-	-	-	-	-	<0.0072 U	<0.0085 U	<0.0082 U	-	-	-	-	-
Trichlorofluoromethane	-	-	-	-	-	-	<0.036 U	<0.043 U	<0.042 U	-	-	-	-	-
Vinyl chloride	13	-	-	-	-	-	<0.018 U	<0.021 U	<0.02 U	-	-	-	-	-
Total VOCs	-	-	-	-	-	-	**2.3829** -	**0.56** -	**1.4** -	-	-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBD2-9-07292025		SBD3-10-07312025		SBD3-13-07312025		SBD3-16-07312025		SBE1-12-07282025		SBE1-6-07282025		SBE1-9-07282025		SBE3-12-07312025		SBE3-6-07312025		SBE3-9-07312025		SBF1-12-07282025		SBF1-6-07282025		SBF1-9-07282025	
		L2547479-09		L2548047-04		L2548047-05		L2548047-06		L2547171-13		L2547171-11		L2547171-12		L2548047-09		L2548047-07		L2548047-08		L2547171-16		L2547171-14		L2547171-15	
		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025	
		9' BGS		10' BGS		13' BGS		16' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS	
		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																										
PERFLUORINATED ALKYL ACIDS BY EPA 1633																											
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		<0.00004	U	<0.00004	U	<0.00004	U	-		-		<0.00004	U	-		-		<0.00004	U	-		<0.00004	U	<0.00004	U	-	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		<0.000258	U	<0.000258	U	<0.000257	U	-		-		<0.000258	U	-		-		<0.000257	U	-		<0.000259	U	<0.000259	U	-	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		<0.000077	U	<0.000077	U	<0.000077	U	-		-		<0.000077	U	-		-		<0.000077	U	-		<0.000078	U	<0.000078	U	-	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		<0.000148	U	<0.000147	U	<0.000147	U	-		-		<0.000148	U	-		-		<0.000147	U	-		<0.000148	U	<0.000148	U	-	
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		<0.000235	U	<0.000235	U	<0.000234	U	-		-		<0.000235	U	-		-		<0.000234	U	-		<0.000236	U	<0.000236	U	-	
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		<0.000364	U	<0.000364	U	<0.000363	U	-		-		<0.000364	U	-		-		<0.000363	U	-		<0.000366	U	<0.000366	U	-	
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		<0.000092	U	<0.000092	U	<0.000091	U	-		-		<0.000092	U	-		-		<0.000091	U	-		<0.000092	U	<0.000092	U	-	
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		<0.00003	U	<0.00003	U	<0.000029	U	-		-		<0.00003	U	-		-		<0.000029	U	-		<0.00003	U	<0.00003	U	-	
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		<0.00003	U	<0.00003	U	<0.000029	U	-		-		<0.00003	U	-		-		<0.000029	U	-		<0.00003	U	<0.00003	U	-	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		<0.000038	U	<0.000038	U	<0.000038	U	-		-		<0.000038	U	-		-		<0.000038	U	-		<0.000038	U	<0.000038	U	-	
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		<0.000022	U	<0.000022	U	<0.000021	U	-		-		<0.000022	U	-		-		<0.000021	U	-		<0.000022	U	<0.000022	U	-	
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		<0.000081	U	<0.000081	U	<0.000081	U	-		-		<0.000081	U	-		-		<0.000081	U	-		<0.000082	U	<0.000082	U	-	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		<0.000044	U	<0.000044	U	<0.000044	U	-		-		<0.000044	U	-		-		<0.000044	U	-		<0.000044	U	<0.000044	U	-	
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	<0.000026	U	-	
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		<0.000121	U	<0.000121	U	<0.000121	U	-		-		<0.000121	U	-		-		<0.000121	U	-		<0.000122	U	<0.000122	U	-	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		<0.000085	U	<0.000085	U	<0.000085	U	-		-		<0.000085	U	-		-		<0.000085	U	-		<0.000086	U	<0.000086	U	-	
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		<0.000082	U	<0.000082	U	<0.000082	U	-		-		<0.000082	U	-		-		<0.000082	U	-		<0.000082	U	<0.000082	U	-	
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		<0.000046	U	<0.000046	U	<0.000046	U	-		-		<0.000046	U	-		-		<0.000046	U	-		<0.000046	U	<0.000046	U	-	
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		<0.000017	U	<0.000034	U	<0.000033	U	-		-		<0.000017	U	-		-		<0.000017	U	-		<0.000017	U	<0.000017	U	-	
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		<0.000024	U	<0.000024	U	<0.000024	U	-		-		<0.000024	U	-		-		<0.000024	U	-		<0.000024	U	<0.000024	U	-	
Perfluorobutanesulfonic Acid (PFBS)		<0.00002	U	<0.00002	U	<0.00002	U	-		-		<0.00002	U	-		-		<0.00002	U	-		<0.00002	U	<0.00002	U	-	
Perfluorobutanoic Acid (PFBA)		<0.000028	U	<0.000056	U	<0.000056	U	-		-		<0.000028	U	-		-		<0.000028	U	-		<0.000028	U	<0.000028	U	-	
Perfluorodecanesulfonic Acid (PFDS)		<0.000014	U	<0.000014	U	<0.000014	U	-		-		<0.000014	U	-		-		<0.000014	U	-		<0.000014	U	<0.000014	U	-	
Perfluorodecanoic Acid (PFDA)		<0.000035	U	<0.000035	U	<0.000035	U	-		-		<0.000035	U	-		-		<0.000035	U	-		<0.000035	U	<0.000035	U	-	
Perfluorododecanesulfonic Acid (PFDoS)		<0.000022	U	<0.000022	U	<0.000021	U	-		-		<0.000022	U	-		-		<0.000021	U	-		<0.000022	U	<0.000022	U	-	
Perfluorododecanoic Acid (PFDoA)		<0.000021	U	<0.000021	U	<0.000021	U	-		-		<0.000021	U	-		-		<0.000021	U	-		<0.000021	U	<0.000021	U	-	
Perfluoroheptanesulfonic Acid (PFHpS)		<0.000045	U	<0.000045	U	<0.000045	U	-		-		<0.000045	U	-		-		<0.000044	U	-		<0.000045	U	<0.000045	U	-	
Perfluoroheptanoic Acid (PFHpA)		<0.000012	U	<0.000012	U	<0.000012	U	-		-		<0.000012	U	-		-		<0.000012	U	-		<0.000012	U	<0.000012	U	-	
Perfluorohexanesulfonic Acid (PFHxS)		<0.00002	U	<0.00002	U	<0.00002	U	-		-		<0.00002	U	-		-		<0.00002	U	-		<0.00002	U	<0.00002	U	-	
Perfluorohexanoic Acid (PFHxA)		<0.000015	U	<0.000015	U	<0.000015	U	-		-		<0.000015	U	-		-		<0.000015	U	-		<0.000015	U	<0.000015	U	-	
Perfluorononanesulfonic Acid (PFNS)		<0.00003	U	<0.00003	U	<0.000029	U	-		-		<0.00003	U	-		-		<0.000029	U	-		<0.00003	U	<0.00003	U	-	
Perfluorononanoic Acid (PFNA)		<0.000013	U	<0.000013	U	<0.000013	U	-		-		<0.000013	U	-		-		<0.000013	U	-		<0.000013	U	<0.000013	U	-	
Perfluorooctanesulfonamide (PFOSA)		<0.00001	U	<0.00001	U	<0.00001	U	-		-		<0.00001	U	-		-		<0.00001	U	-		<0.00001	U	<0.00001	U	-	
Perfluorooctanesulfonic Acid (PFOS)		<0.000031	U	<0.000031	U	<0.000031	U	-		-		<0.000031	U	-		-		<0.000031	U	-		<0.000031	U	<0.000031	U	-	
Perfluorooctanoic Acid (PFOA)		<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	<0.000026	U	-	
Perfluoropentanesulfonic Acid (PFPeS)		<0.000026	U	<0.000026	U	<0.000026	U	-		-		<0.000026	U	-		-		<0.000026	U	-		<0.000026	U	<0.000026	U	-	
Perfluoropentanoic Acid (PFPeA)		<0.000038	U	<0.000038	U	<0.000038	U	-		-		<0.000038	U	-		-		<0.000038	U	-		<0.000038	U	<0.000038	U	-	
Perfluorotetradecanoic Acid (PFTeDA)		<0.000024	U	<0.000024	U	<0.000024	U	-		-		<0.000024	U	-		-		<0.000024	U	-		<0.000024	U	<0.000024	U	-	
Perfluorotridecanoic Acid (PFTrDA)		<0.000016	U	<0.000016	U	<0.000016	U	-		-		<0.000016	U	-		-		<0.000016	U	-		<0.000016	U	<0.000016	U	-	
Perfluoroundecanoic Acid (PFUnA)		<0.000013	U	<0.000013	U	<0.000013	U	-		-		<0.000013	U	-		-		<0.000013	U	-		<0.000013	U	<0.000013	U	-	

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBD2-9-07292025		SBD3-10-07312025		SBD3-13-07312025		SBD3-16-07312025		SBE1-12-07282025		SBE1-6-07282025		SBE1-9-07282025		SBE3-12-07312025		SBE3-6-07312025		SBE3-9-07312025		SBF1-12-07282025		SBF1-6-07282025		SBF1-9-07282025	
		L2547479-09		L2548047-04		L2548047-05		L2548047-06		L2547171-13		L2547171-11		L2547171-12		L2548047-09		L2548047-07		L2548047-08		L2547171-16		L2547171-14		L2547171-15	
		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025	
		9' BGS		10' BGS		13' BGS		16' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS	
		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																										
SEMIVOLATILE ORGANICS BY GC/MS																											
1,2,4,5-Tetrachlorobenzene	-	<0.02	U	<0.02	U	<0.02	U	-		-		<0.02	U	-		-		<0.02	U	-		<0.19	U	<0.02	U	-	
1,4-Dioxane	130	<0.0087	U	<0.0088	U	<0.0088	U	-		-		<0.0087	U	-		-		<0.0087	U	-		<0.084	U	<0.0088	U	-	
2,3,4,6-Tetrachlorophenol	-	<0.038	U	<0.038	U	<0.039	U	-		-		<0.038	U	-		-		<0.038	U	-		<0.37	U	<0.039	U	-	
2,4,5-Trichlorophenol	-	<0.036	U	<0.036	U	<0.037	U	-		-		<0.036	U	-		-		<0.036	U	-		<0.35	U	<0.037	U	-	
2,4,6-Trichlorophenol	-	<0.036	U	<0.036	U	<0.036	U	-		-		<0.036	U	-		-		<0.036	U	-		<0.34	U	<0.036	U	-	
2,4-Dichlorophenol	-	<0.03	U	<0.031	U	<0.031	U	-		-		<0.03	U	-		-		<0.03	U	-		<0.29	U	<0.031	U	-	
2,4-Dimethylphenol	-	<0.062	U	<0.063	U	<0.063	U	-		-		<0.063	U	-		-		<0.062	U	-		<0.6	U	<0.063	U	-	
2,4-Dinitrophenol	-	<0.088	U	<0.089	U	<0.09	U	-		-		<0.088	U	-		-		<0.088	U	-		<0.85	U	<0.089	U	-	
2,4-Dinitrotoluene	-	<0.038	U	<0.038	U	<0.038	U	-		-		<0.038	U	-		-		<0.038	U	-		<0.36	U	<0.038	U	-	
2,6-Dinitrotoluene	-	<0.032	U	<0.033	U	<0.033	U	-		-		<0.033	U	-		-		<0.032	U	-		<0.31	U	<0.033	U	-	
2-Chloronaphthalene	-	<0.019	U	<0.019	U	<0.019	U	-		-		<0.019	U	-		-		<0.019	U	-		<0.18	U	<0.019	U	-	
2-Chlorophenol	-	<0.022	U	<0.022	U	<0.023	U	-		-		<0.022	U	-		-		<0.022	U	-		<0.21	U	<0.023	U	-	
2-Methylnaphthalene	-	<0.023	U	**0.13**	J	**0.096**	J	-		-		**0.48**		-		-		**0.25**		-		**40**		**0.43**		-	
2-Methylphenol	500	<0.029	U	**0.25**		**0.051**	J	-		-		<0.029	U	-		-		<0.029	U	-		<0.28	U	<0.03	U	-	
2-Nitroaniline	-	<0.036	U	<0.037	U	<0.037	U	-		-		<0.037	U	-		-		<0.036	U	-		<0.35	U	<0.037	U	-	
2-Nitrophenol	-	<0.071	U	<0.072	U	<0.072	U	-		-		<0.071	U	-		-		<0.071	U	-		<0.68	U	<0.072	U	-	
3,3'-Dichlorobenzidine	-	<0.05	U	<0.051	U	<0.051	U	-		-		<0.05	U	-		-		<0.05	U	-		<0.48	U	<0.051	U	-	
3-Methylphenol/4-Methylphenol	500	<0.03	U	**0.79**		**0.15**	J	-		-		<0.03	U	-		-		<0.03	U	-		**0.37**	J	**0.033**	J	-	
3-Nitroaniline	-	<0.036	U	<0.036	U	<0.036	U	-		-		<0.036	U	-		-		<0.036	U	-		<0.34	U	<0.036	U	-	
4,6-Dinitro-o-cresol	-	<0.091	U	<0.092	U	<0.092	U	-		-		<0.091	U	-		-		<0.091	U	-		<0.87	U	<0.092	U	-	
4-Bromophenyl phenyl ether	-	<0.029	U	<0.029	U	<0.029	U	-		-		<0.029	U	-		-		<0.029	U	-		<0.28	U	<0.029	U	-	
4-Chloroaniline	-	<0.034	U	<0.035	U	<0.035	U	-		-		<0.034	U	-		-		<0.034	U	-		<0.33	U	<0.035	U	-	
4-Chlorophenyl phenyl ether	-	<0.02	U	<0.02	U	<0.02	U	-		-		<0.02	U	-		-		<0.02	U	-		<0.19	U	<0.02	U	-	
4-Nitroaniline	-	<0.078	U	<0.079	U	<0.08	U	-		-		<0.079	U	-		-		<0.078	U	-		<0.75	U	<0.079	U	-	
4-Nitrophenol	-	<0.077	U	<0.078	U	<0.078	U	-		-		<0.078	U	-		-		<0.077	U	-		<0.74	U	<0.078	U	-	
Acenaphthene	500	<0.02	U	**0.022**	J	<0.02	U	-		-		**0.17**		-		-		<0.02	U	-		**11**		**0.14**	J	-	
Acenaphthylene	500	<0.029	U	**0.085**	J	**0.045**	J	-		-		**0.35**		-		-		0.083	J	-		**24**		**0.41**		-	
Acetophenone	-	<0.023	U	<0.024	U	<0.024	U	-		-		<0.024	U	-		-		<0.023	U	-		<0.22	U	<0.024	U	-	
Anthracene	500	<0.037	U	**0.067**	J	**0.064**	J	-		-		**0.46**		-		-		**0.065**	J	-		**20**		**0.5**		-	
Atrazine	-	<0.066	U	<0.067	U	<0.067	U	-		-		<0.066	U	-		-		<0.066	U	-		<0.64	U	<0.067	U	-	
Benzaldehyde	-	<0.051	U	<0.052	U	<0.052	U	-		-		<0.051	U	-		-		<0.051	U	-		<0.49	U	<0.052	U	-	
Benzo(a)anthracene	5.6	<0.021	U	**0.11**		**0.15**		-		-		**0.54**		-		-		**0.086**	J	-		**17**		**0.5**		-	
Benzo(a)pyrene	1	<0.046	U	**0.096**	J	**0.08**	J	-		-		**0.5**		-		-		**0.061**	J	-		**15**		**0.49**		-	
Benzo(b)fluoranthene	5.6	<0.032	U	**0.14**		**0.19**		-		-		**0.62**		-		-		**0.093**	J	-		**20**		**0.63**		-	
Benzo(ghi)perylene	500	<0.022	U	**0.064**	J	**0.064**	J	-		-		**0.31**		-		-		**0.037**	J	-		**9.4**		**0.31**		-	
Benzo(k)fluoranthene	56	<0.03	U	**0.043**	J	**0.054**	J	-		-		**0.21**		-		-		<0.03	U	-		**6.2**		**0.16**		-	
Biphenyl	-	<0.025	U	<0.025	U	<0.025	U	-		-		**0.11**	J	-		-		**0.028**	J	-		**6.4**		**0.088**	J	-	
Bis(2-chloroethoxy)methane	-	<0.019	U	<0.019	U	<0.019	U	-		-		<0.019	U	-		-		<0.019	U	-		<0.18	U	<0.019	U	-	
Bis(2-chloroethyl)ether	-	<0.026	U	<0.026	U	<0.026	U	-		-		<0.026	U	-		-		<0.026	U	-		<0.25	U	<0.026	U	-	
Bis(2-chloroisopropyl)ether	-	<0.032	U	<0.032	U	<0.033	U	-		-		<0.032	U	-		-		<0.032	U	-		<0.31	U	<0.033	U	-	
Bis(2-ethylhexyl)phthalate	-	<0.066	U	<0.066	U	<0.066	U	-		-		<0.066	U	-		-		<0.065	U	-		<0.63	U	<0.066	U	-	
Butyl benzyl phthalate	-	<0.048	U	<0.048	U	<0.048	U	-		-		<0.048	U	-		-		<0.048	U	-		<0.46	U	<0.048	U	-	
Caprolactam	-	<0.058	U	<0.058	U	<0.058	U	-		-		<0.058	U	-		-		<0.057	U	-		<0.55	U	<0.058	U	-	
Carbazole	-	<0.018	U	**0.028**	J	<0.019	U	-		-		**0.16**	J	-		-		**0.025**	J	-		**9**		**0.26**		-	
Chrysene	56	<0.02	U	**0.12**		**0.17**		-		-		**0.49**		-		-		**0.088**	J	-		**17**		**0.47**		-	
Di-n-butylphthalate	-	<0.036	U	**0.044**	U	<0.036	U	-		-		<0.036	U	-		-		<0.036	U	-		<0.34	U	<0.036	U	-	
Di-n-octylphthalate	-	<0.064	U	<0.065	U	<0.065	U	-		-		<0.065	U	-		-		<0.064	U	-		<0.62	U	<0.065	U	-	
Dibenzo(a,h)anthracene	0.56	<0.022	U	<0.022	U	**0.022**	J	-		-		**0.076**	J	-		-		<0.022	U	-		**2.2**		**0.069**	J	-	
Dibenzofuran	350	<0.018	U	**0.057**	J	**0.062**	J	-		-		**0.37**		-		-		**0.067**	J	-		**16**		**0.33**		-	
Diethyl phthalate	-	<0.018	U	<0.018	U	<0.018	U	-		-		<0.018	U	-		-		<0.017	U	-		<0.17	U	<0.018	U	-	
Dimethyl phthalate	-	<0.04	U	<0.04	U	<0.04	U	-		-		<0.04	U	-		-		<0.04	U	-		<0.38	U	<0.04	U	-	
Fluoranthene	500	<0.022	U	**0.2**		**0.38**		-		-		**1.7**		-		-		**0.18**		-		**47**		**1.6**		-	
Fluorene	500	<0.018	U	**0.094**	J	**0.13**	J	-		-		**0.49**		-		-		**0.09**	J	-		**21**		**0.46**		-	
Hexachlorobenzene	6	<0.021	U	<0.021	U	<0.022	U	-		-		<0.021	U	-		-		<0.021	U	-		<0.2	U	<0.021	U	-	
Hexachlorobutadiene	-	<0.028	U	<0.028	U	<0.028	U	-		-		<0.028	U	-		-		<0.028	U	-		<0.27	U	<0.028	U	-	
Hexachlorocyclopentadiene	-	<0.17	U	<0.17	U	<0.17	UJ	-		-		<0.17	U	-		-		<0.17	UJ	-		<1.6	U	<0.17	U	-	
Hexachloroethane	-	<0.031	U	<0.031	U	<0.031	U	-		-		<0.031	U	-		-		<0.03	U	-		<0.29	U	<0.031	U	-	
Indeno(1,2,3-cd)pyrene	5.6	<0.026	U	**0.067**	J	**0.071**	J	-		-		**0.26**		-		-		**0.035**	J	-		**9.6**		**0.25**		-	
Isophorone	-	<0.025	U	<0.025	U	<0.025	U	-		-		<0.025	U	-		-		<0.024	U	-		<0.24	U	<0.025	U	-	
n-Nitrosodi-n-propylamine	-	<0.029	U	<0.029	U	<0.03	U	-		-		<0.029	U	-		-		<0.029	U	-		<0.28	U	<0.03	U	-	
Naphthalene	500	**0.067**	J	**1.3**		**0.75**		-		-		**2.3**	U	-		-		**3.3**		-		**6700**		**14**		-	
NDPA/DPA	-	<0.022	U	<0.022	U	<0.022	U	-		-		<0.022	U	-		-		<0.021	U	-		<0.21	U	<0.022	U	-	
Nitrobenzene	-	<0.028	U	<0.028	U	<0.028	U	-		-		<0.028	U	-		-		<0.028	U	-		<0.27	U	<0.028	U	-	
p-Chloro-m-cresol	-	<0.028	U	<0.028	U	<0.029	U	-		-		<0.028	U	-		-		<0.028	U	-		<0.27	U	<0.028	U	-	
Pentachlorophenol	6.7	<0.042	U	<0.042	U	<0.042	U	-		-		<0.042	U	-		-		<0.042	U	-		<0.4	U	<0.042	U	-	
Phenanthrene	500	<0.023	U	**0.24**		**0.4**		-		-		**1.9**		-		-		**0.24**		-		**69**		**1.8**		-	
Phenol	500	<0.029	U	**1.4**		**0.9**		-		-		<0.029	U	-		-		<0.028	U	-		<0.27	U	<0.029	U	-	
Pyrene	500	<0.019	U	**0.15**		**0.24**		-		-		**1.2**		-		-		**0.13**		-		**34**		**1.2**		-	
Total SVOCs	-	**0.067**	-	**5.497**	-	**4.069**	-	-	-	-	-	**12.696**	-	-	-	-	-	**4.858**	-	-	-	**7094.17**	-	**24.13**	-	-	-
CHLORINATED HERBICIDES BY GC																											
2,4,5-T	-	<0.00587	U	<0.00587	U	<0.00606	U	-		-		<0.00592	U	-		-		<0.00584	U	-		<0.00572	U	<0.00593	U	-	
2,4,5-TP (Silvex)	500	<0.00504	U	<0.00504	U	<0.0052	U	-		-		<0.00508	U	-		-		<0.00501	U	-		<0.00491	U	<0.00509	U	-	
2,4-D	-	<0.0119	U	<0.0119	U	<0.0123	U	-		-		<0.012	U	-		-		<0.0119	U	-		<0.0116	U	<0.0121	U	-	

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBD2-9-07292025		SBD3-10-07312025		SBD3-13-07312025		SBD3-16-07312025		SBE1-12-07282025		SBE1-6-07282025		SBE1-9-07282025		SBE3-12-07312025		SBE3-6-07312025		SBE3-9-07312025		SBF1-12-07282025		SBF1-6-07282025		SBF1-9-07282025	
		L2547479-09		L2548047-04		L2548047-05		L2548047-06		L2547171-13		L2547171-11		L2547171-12		L2548047-09		L2548047-07		L2548047-08		L2547171-16		L2547171-14		L2547171-15	
		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025	
		9' BGS		10' BGS		13' BGS		16' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS		12' BGS		6' BGS		9' BGS	
		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																										
ORGANOCHLORINE PESTICIDES BY GC																											
4,4'-DDD	92	<0.00194	U	<0.00175	U	<0.00191	U	-		-		<0.000651	U	-		-		<0.0019	U	-		<0.000599	U	<0.000633	U	-	
4,4'-DDE	62	<0.00126	U	<0.00113	U	<0.00124	U	-		-		<0.000422	U	-		-		<0.00123	U	-		<0.000389	U	<0.00041	U	-	
4,4'-DDT	47	<0.00437	U	<0.00394	U	<0.00431	U	-		-		<0.00147	U	-		-		<0.00428	U	-		<0.00135	U	<0.00143	U	-	
Aldrin	0.68	<0.00191	U	<0.00172	U	<0.00189	U	-		-		<0.000643	U	-		-		<0.00188	U	-		<0.000592	U	<0.000625	U	-	
Alpha-BHC	3.4	<0.000642	U	<0.00058	U	<0.000634	U	-		-		<0.000216	U	-		-		<0.00063	U	-		<0.000199	U	<0.00021	U	-	
Beta-BHC	3	<0.00206	U	<0.00186	U	<0.00203	U	-		-		<0.000692	U	-		-		<0.00202	U	-		<0.000637	U	<0.000673	U	-	
Chlordane	-	<0.018	U	<0.0162	U	<0.0178	U	-		-		<0.00605	U	-		-		<0.0176	U	-		<0.00557	U	<0.00588	U	-	
cis-Chlordane	24	<0.00189	U	<0.00171	U	<0.00187	U	-		-		<0.000636	U	-		-		<0.00186	U	-		<0.000585	U	<0.000618	U	-	
Delta-BHC	500	<0.00106	U	<0.000959	U	<0.00105	U	-		-		<0.000358	U	-		-		<0.00104	U	-		<0.000329	U	<0.000347	U	-	
Dieldrin	1.4	<0.0017	U	<0.00153	U	<0.00168	U	-		-		<0.000571	U	-		-		<0.00166	U	-		<0.000525	U	<0.000554	U	-	
Endosulfan I	200	<0.00128	U	<0.00116	U	<0.00127	U	-		-		<0.000431	U	-		-		<0.00126	U	-		<0.000397	U	<0.000419	U	-	
Endosulfan II	200	<0.00181	U	<0.00164	U	<0.00179	U	-		-		<0.00061	U	-		-		<0.00178	U	-		<0.000562	U	<0.000593	U	-	
Endosulfan sulfate	200	<0.00108	U	<0.000972	U	<0.00106	U	-		-		<0.000362	U	-		-		<0.00106	U	-		<0.000333	U	<0.000352	U	-	
Endrin	89	<0.000928	U	<0.000837	U	<0.000916	U	-		-		<0.000312	U	-		-		<0.00091	U	-		<0.000287	U	<0.000303	U	-	
Endrin aldehyde	-	<0.00238	U	<0.00214	U	<0.00235	U	-		-		<0.000799	U	-		-		<0.00233	U	-		<0.000735	U	<0.000776	U	-	
Endrin ketone	-	<0.0014	U	<0.00126	U	<0.00138	U	-		-		<0.0047	U	-		-		<0.00137	U	-		<0.000433	U	<0.000457	U	-	
Heptachlor	15	<0.00122	U	<0.0011	U	<0.0012	U	-		-		<0.000409	U	-		-		<0.00119	U	-		<0.000377	U	<0.000398	U	-	
Heptachlor epoxide		<0.00305	U	<0.00276	U	<0.00302	U	-		-		<0.00103	U	-		-		<0.003	U	-		<0.000945	U	<0.000998	U	-	
Lindane	9.2	<0.00101	U	<0.000912	U	<0.000999	U	-		-		<0.00034	U	-		-		<0.000992	U	-		<0.000313	U	<0.00033	U	-	
Methoxychlor	-	<0.00317	U	<0.00286	U	<0.00313	U	-		-		<0.00106	U	-		-		<0.00311	U	-		<0.00098	U	<0.00103	U	-	
Toxaphene	-	<0.0285	U	<0.0257	U	<0.0282	U	-		-		<0.00959	U	-		-		<0.028	U	-		<0.00882	U	<0.00931	U	-	
trans-Chlordane	-	<0.00179	U	<0.00162	U	<0.00177	U	-		-		<0.000602	U	-		-		<0.00176	U	-		<0.000554	U	<0.000585	U	-	
POLYCHLORINATED BIPHENYLS BY GC																											
Aroclor 1016	1	<0.00987	U	<0.00484	U	<0.00503	U	-		-		<0.00499	U	-		-		<0.00505	U	-		<0.00481	U	<0.00496	U	-	
Aroclor 1221	1	<0.0111	U	<0.00546	U	<0.00567	U	-		-		<0.00564	U	-		-		<0.00569	U	-		<0.00543	U	<0.00559	U	-	
Aroclor 1232	1	<0.0236	U	<0.0116	U	<0.012	U	-		-		<0.0119	U	-		-		<0.012	U	-		<0.0115	U	<0.0118	U	-	
Aroclor 1242	1	<0.015	U	<0.00735	U	<0.00763	U	-		-		<0.00758	U	-		-		<0.00766	U	-		<0.0073	U	<0.00752	U	-	
Aroclor 1248	1	<0.0167	U	**0.0331**	J	**0.076**		-		-		<0.00844	U	-		-		<0.00852	U	-		<0.00813	U	<0.00837	U	-	
Aroclor 1254	1	<0.0122	U	<0.00596	U	<0.00619	U	-		-		<0.00615	U	-		-		<0.00622	U	-		0.00713	J	<0.00611	U	-	
Aroclor 1260	1	<0.0205	U	**0.0113**	J	**0.0367**	J	-		-		<0.0104	U	-		-		<0.0105	U	-		<0.01	U	<0.0103	U	-	
Aroclor 1262	1	<0.0141	U	<0.00692	U	<0.00719	U	-		-		<0.00714	U	-		-		<0.00722	U	-		<0.00688	U	<0.00709	U	-	
Aroclor 1268	1	<0.0115	U	<0.00565	U	<0.00586	U	-		-		<0.00583	U	-		-		<0.00589	U	-		<0.00561	U	<0.00578	U	-	
PCBs, Total	1	<0.00987	U	**0.0444**	J	**0.113**	J	-		-		<0.00499	U	-		-		<0.00505	U	-		0.00713	J	<0.00496	U	-	
TOTAL METALS																											
Aluminum, Total	-	**10200**		**9260**	J	**8530**	J	-		-		**10700**	J	-		-		**8450**	J	-		**9460**	J	**11000**	J	-	
Antimony, Total	-	<3.43	UJ	<3.46	UJ	<3.57	UJ	-		-		<3.37	UJ	-		-		<3.45	UJ	-		<3.22	UJ	<3.55	UJ	-	
Arsenic, Total	16	**3.53**		**3.82**	J	**2.79**	J	-		-		**4.15**		-		-		**4.43**	J	-		**4.48**		**2.85**		-	
Barium, Total	400	**79.3**	J	**80.2**		**28.4**		-		-		**90.1**		-		-		**52.4**		-		**94**		**95**		-	
Beryllium, Total	590	**0.488**		**0.457**		**0.404**	J	-		-		**0.492**		-		-		**0.428**	J	-		**0.434**		**0.53**		-	
Cadmium, Total	9.3	<0.049	U	<0.049	U	<0.051	U	-		-		<0.048	UJ	-		-		<0.049	U	-		<0.046	UJ	<0.051	UJ	-	
Calcium, Total	-	**53700**		**50300**	J	**46100**	J	-		-		**54600**	J	-		-		**49300**	J	-		**57200**	J	**50900**	J	-	
Chromium, Total	-	**14.6**		**14**	J	**13**	J	-		-		**15.6**	J	-		-		**13.1**	J	-		**14.4**	J	**16.4**	J	-	
Cobalt, Total	-	**8.88**		**8.74**	J	**8.05**	J	-		-		**8.85**	J	-		-		**7.93**	J	-		**8.61**	J	**7.38**	J	-	
Copper, Total	270	**19.6**	J	**13.6**	J	**11.4**	J	-		-		**20.2**		-		-		**11.3**	J	-		**18**		**17.9**		-	
Iron, Total	-	**18600**		**18000**	J	**16100**	J	-		-		**19000**	J	-		-		**17600**	J	-		**17700**	J	**17700**	J	-	
Lead, Total	1000	**9.31**	J	**10.6**		**8.84**		-		-		**9.06**		-		-		**7.9**		-		**9.97**		**9.14**		-	
Magnesium, Total	-	**16600**	J	**15100**		**14400**		-		-		**15300**	J	-		-		**14100**		-		**16900**	J	**14300**	J	-	
Manganese, Total	10000	**525**		**475**	J	**459**	J	-		-		**466**		-		-		**438**	J	-		**480**		**398**		-	
Mercury, Total	2.8	<0.049	U	<0.058	U	**0.163**		-		-		<0.053	U	-		-		<0.06	U	-		**0.206**		<0.054	U	-	
Nickel, Total	310	**21.4**		**20.3**	J	**18.7**	J	-		-		**21.4**	J	-		-		**18.6**	J	-		**19**	J	**20.2**	J	-	
Potassium, Total	-	**1390**		**1220**		**1180**		-		-		**1350**	J	-		-		**887**		-		**1440**	J	**1190**	J	-	
Selenium, Total	1500	<0.293	U	<0.296	UJ	<0.305	UJ	-		-		<0.288	U	-		-		<0.294	UJ	-		<0.275	U	<0.304	U	-	
Silver, Total	1500	<0.265	U	<0.268	U	<0.276	U	-		-		<0.261	U	-		-		<0.267	U	-		<0.249	U	<0.275	U	-	
Sodium, Total	-	**1420**		**3670**		**2120**		-		-		**135**	J	-		-		**998**		-		**164**	J	**141**	J	-	
Thallium, Total	-	<0.803	U	<0.811	U	<0.837	U	-		-		<0.789	U	-		-		<0.807	U	-		<0.753	U	<0.833	U	-	
Vanadium, Total	-	**18.9**		**17.8**		**15.7**		-		-		**20**		-		-		**17.2**		-		**19.6**		**20.3**		-	
Zinc, Total	10000	**58.9**	J	**56.4**	J	**50.1**	J	-		-		**54.6**	J	-		-		**47.8**	J	-		**52.2**	J	**61.2**	J	-	
GENERAL CHEMISTRY																											
Cyanide, Total	27	**4.8**		**6.1**		**7.3**		-		-		<0.23	UJ	-		-		**0.32**	J	-		**0.49**	J	<0.24	U	-	
Nitrogen, Ammonia	-	**13**	J	**4**	J	**18**		-		-		<3.1	UJ	-		-		**11**		-		**4.6**	J	**4.5**	J	-	
Solids, Total	-	**86**		**86.1**		**84.6**		83.6		**86.1**		**86.3**		**88.9**		**86.4**		**86**		**85.9**		**90.1**		**85.3**		**78**	

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCF
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 37

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBF2-12-07292025		SBF2-6-07292025		SBF2-9-07292025		SBF3-10-07312025		SBF3-13-07312025		SBF3-16-07312025		SBG1-10-07282025		SBG1-13-07282025		SBG1-7-07282025		SBG2-11-07292025		SBG2-5-07292025		SBG2-8-07292025		SBG3-12-07312025	
		L2547479-16		L2547479-14		L2547479-15		L2548047-10		L2548047-11		L2548047-12		L2547171-18		L2547171-19		L2547171-17		L2547479-13		L2547479-11		L2547479-12		L2548047-13	
		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025	
		12' BGS		6' BGS		9' BGS		10' BGS		13' BGS		16' BGS		1-' BGS		13' BGS		7' BGS		11' BGS		5' BGS		8' BGS		12' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
VOLATILE ORGANICS BY EPA 5035																											
1,1,1-Trichloroethane	500	<0.00016	U	<0.00016	U	<0.00022	U	<0.01	U	<0.00014	U	<0.0099	U	<0.00018	U	<0.00015	U	<0.00015	U	<0.00017	U	<0.00013	U	<0.00016	U	<0.00016	U
1,1,2,2-Tetrachloroethane	-	<0.00016	U	<0.00016	U	<0.00022	U	<0.01	U	<0.00013	U	<0.0099	U	<0.00018	U	<0.00015	U	<0.00015	U	<0.00016	UJ	<0.00013	U	<0.00016	U	<0.00016	U
1,1,2-Trichloroethane	-	<0.00026	U	<0.00026	U	<0.00036	U	<0.016	U	<0.00022	U	<0.016	U	<0.00029	U	<0.00024	U	<0.00025	U	<0.00027	UJ	<0.00021	U	<0.00026	U	<0.00025	U
1,1-Dichloroethane	240	<0.00014	U	<0.00014	U	<0.00019	U	<0.0089	U	<0.00012	U	<0.0086	U	<0.00016	U	<0.00013	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.00014	U	<0.00014	U
1,1-Dichloroethene	500	<0.00024	U	<0.00023	U	<0.00032	U	<0.015	U	<0.00019	U	<0.014	U	<0.00026	U	<0.00022	U	<0.00022	U	<0.00024	U	<0.00019	U	<0.00023	U	<0.00023	U
1,2,4-Trichlorobenzene	-	<0.00027	U	<0.00026	U	<0.00036	U	<0.017	U	<0.00022	U	<0.016	U	<0.00029	U	<0.00025	U	<0.00025	U	<0.00027	UJ	<0.00022	U	<0.00027	U	<0.00026	U
1,2,4-Trimethylbenzene	190	<0.00033	U	**0.0018**	J	<0.00044	U	**0.033**	J	**0.0049**		**0.028**	J	<0.00036	U	<0.0003	U	**0.0007**	U	<0.00033	UJ	<0.00026	U	<0.00033	U	**0.0024**	
1,2-Dibromo-3-chloropropane	-	<0.00099	U	<0.00096	U	<0.0013	U	<0.061	U	<0.00081	U	<0.059	U	<0.0011	U	<0.00091	U	<0.00092	U	<0.001	UJ	<0.00079	U	<0.00098	U	<0.00095	U
1,2-Dibromoethane	-	<0.00028	U	<0.00027	U	<0.00037	U	<0.017	U	<0.00022	U	<0.016	U	<0.0003	U	<0.00026	U	<0.00026	U	<0.00028	UJ	<0.00022	U	<0.00027	U	<0.00026	U
1,2-Dichlorobenzene	500	<0.00014	U	<0.00014	U	<0.00019	U	<0.0088	U	<0.00012	U	<0.0086	U	<0.00015	U	<0.00013	U	<0.00013	U	<0.00014	UJ	<0.00011	U	<0.00014	U	<0.00014	U
1,2-Dichloroethane	30	<0.00025	U	<0.00025	U	<0.00034	U	<0.016	U	<0.00021	U	<0.015	U	<0.00028	U	<0.00024	U	<0.00024	U	<0.00026	UJ	<0.0002	U	<0.00025	U	<0.00024	U
1,2-Dichloropropane	-	<0.00012	U	<0.00012	U	<0.00017	U	<0.0077	U	<0.0001	U	<0.0074	U	<0.00013	U	<0.00011	U	<0.00012	U	<0.00012	UJ	<0.0001	U	<0.00012	U	<0.00012	U
1,3,5-Trimethylbenzene	190	<0.00019	U	**0.00041**	J	<0.00026	U	**0.014**	J	**0.0024**		**0.013**	J	<0.00021	U	<0.00018	U	**0.00026**	U	<0.00019	UJ	<0.00015	U	<0.00019	U	**0.00038**	J
1,3-Dichlorobenzene	280	<0.00015	U	<0.00014	U	<0.0002	U	<0.0091	U	<0.00012	U	<0.0088	U	<0.00016	U	<0.00014	U	<0.00014	U	<0.00015	UJ	<0.00012	U	<0.00014	U	<0.00014	U
1,4-Dichlorobenzene	130	<0.00017	U	<0.00016	U	<0.00023	U	<0.01	U	<0.00014	U	<0.01	U	<0.00018	U	<0.00016	U	<0.00016	U	<0.00017	UJ	<0.00014	U	<0.00017	U	<0.00016	U
2-Butanone	500	<0.0022	U	<0.0021	U	<0.003	U	<0.14	U	<0.0018	U	<0.13	U	<0.0024	U	<0.002	U	<0.002	U	<0.0022	UJ	<0.0018	U	<0.0022	U	<0.0021	U
2-Hexanone	-	<0.0012	U	<0.0011	U	<0.0016	U	<0.072	U	<0.00096	U	<0.07	U	<0.0013	U	<0.0011	U	<0.0011	U	<0.0012	UJ	<0.00094	U	<0.0012	U	<0.0011	U
4-Methyl-2-pentanone	-	<0.0013	U	<0.0012	U	<0.0017	U	<0.078	U	<0.001	U	<0.076	U	<0.0014	U	<0.0012	U	<0.0012	U	<0.0013	UJ	<0.001	U	<0.0012	U	<0.0012	U
Acetone	500	<0.0048	U	**0.0059**	J	<0.0064	U	<0.3	U	<0.0039	U	<0.28	U	<0.0052	U	<0.0044	U	**0.01**	U	<0.0048	U	<0.0038	U	<0.0047	U	<0.0046	U
Benzene	44	**0.00034**	J	**0.079**		**0.00025**	J	**0.027**	U	**0.0034**		<0.0099	U	<0.00018	U	**0.0011**	U	**0.0018**	U	<0.00016	UJ	<0.00013	U	<0.00016	U	**0.011**	
Bromodichloromethane	-	<0.00011	U	<0.0001	U	<0.00014	U	<0.0067	U	<0.00009	U	<0.0065	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.00011	UJ	<0.00009	U	<0.00011	U	<0.0001	U
Bromoform	-	<0.00024	U	<0.00024	U	<0.00033	U	<0.015	U	<0.0002	U	<0.015	U	<0.00026	U	<0.00022	U	<0.00023	U	<0.00024	UJ	<0.0002	U	<0.00024	U	<0.00023	U
Bromomethane	-	<0.00058	U	<0.00056	U	<0.00077	U	<0.036	U	<0.00047	U	<0.034	U	<0.00062	U	<0.00053	U	<0.00054	U	<0.00058	U	<0.00046	U	<0.00057	U	<0.00055	U
Carbon disulfide	-	<0.0045	U	<0.0044	U	<0.0061	U	<0.28	U	<0.0037	U	<0.27	U	<0.0049	U	<0.0042	U	<0.0042	U	<0.0045	U	<0.0036	U	<0.0045	U	<0.0043	U
Carbon tetrachloride	22	<0.00023	U	<0.00022	U	<0.00031	U	<0.014	U	<0.00019	U	<0.014	U	<0.00025	U	<0.00021	U	<0.00021	U	<0.00023	U	<0.00018	U	<0.00022	U	<0.00022	U
Chlorobenzene	500	<0.00012	U	<0.00012	U	<0.00017	U	<0.0078	U	<0.0001	U	<0.0075	U	<0.00014	U	<0.00012	U	<0.00012	U	<0.00013	UJ	<0.0001	U	<0.00012	U	<0.00012	U
Chloroethane	-	<0.00045	U	<0.00043	U	<0.0006	U	<0.028	U	<0.00037	U	<0.027	U	<0.00048	U	<0.00041	U	<0.00042	U	<0.00045	U	<0.00036	U	<0.00044	U	<0.00043	U
Chloroform	350	<0.00014	U	<0.00013	U	<0.00019	U	<0.0086	U	<0.00011	U	<0.0083	U	<0.00015	U	<0.00013	U	<0.00013	U	<0.00014	UJ	<0.00011	U	<0.00014	U	<0.00013	U
Chloromethane	-	<0.00092	U	<0.0009	U	<0.0012	U	<0.057	U	<0.00075	U	<0.055	U	<0.001	U	<0.00085	U	<0.00086	U	<0.00093	U	<0.00074	U	<0.00091	U	<0.00089	U
cis-1,2-Dichloroethene	500	<0.00017	U	<0.00017	U	<0.00023	U	<0.011	U	<0.00014	U	<0.01	U	<0.00019	U	<0.00016	U	<0.00016	U	<0.00017	UJ	<0.00014	U	<0.00017	U	<0.00017	U
cis-1,3-Dichloropropene	-	<0.00016	U	<0.00015	U	<0.00021	U	<0.0097	U	<0.00013	U	<0.0094	U	<0.00017	U	<0.00014	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00015	UJ	<0.00015	U
Cyclohexane	-	<0.00054	U	<0.00052	U	<0.00072	U	<0.033	U	<0.00044	U	<0.032	U	<0.00058	U	<0.0005	U	<0.0005	U	<0.00054	U	<0.00043	U	<0.00053	U	<0.00052	U
Dibromochloromethane	-	<0.00014	U	<0.00013	U	<0.00019	U	<0.0086	U	<0.00011	U	<0.0083	U	<0.00015	U	<0.00013	U	<0.00013	U	<0.00014	UJ	<0.00011	U	<0.00014	U	<0.00013	U
Dichlorodifluoromethane	-	<0.00091	U	<0.00088	U	<0.0012	U	<0.056	U	<0.00074	U	<0.054	U	<0.00098	U	<0.00084	U	<0.00084	U	<0.00091	U	<0.00073	U	<0.0009	U	<0.00087	U
Ethylbenzene	390	<0.00014	U	**0.014**		<0.00019	U	<0.0086	U	**0.00076**	J	<0.0084	U	<0.00015	U	**0.00048**	U	**0.00045**	U	<0.00014	UJ	<0.00011	U	<0.00014	U	**0.0019**	
Freon-113	-	<0.00069	U	<0.00067	U	<0.00092	U	<0.042	U	<0.00056	U	<0.041	U	<0.00074	U	<0.00063	U	<0.00064	U	<0.00069	U	<0.00055	U	<0.00068	U	<0.00066	U
Isopropylbenzene	-	<0.00011	U	**0.0011**		<0.00014	U	<0.0067	U	<0.00009	U	<0.0065	U	<0.00012	U	<0.0001	U	**0.0018**		<0.00011	UJ	<0.00009	U	<0.00011	U	**0.00031**	J
Methyl Acetate	-	<0.00094	U	<0.00091	U	<0.0013	U	<0.058	U	<0.00077	U	<0.056	U	<0.001	U	<0.00087	U	<0.00088	U	<0.00095	U	<0.00075	U	<0.00093	U	<0.0009	U
Methyl cyclohexane	-	<0.0006	U	<0.00058	U	<0.0008	U	<0.037	U	<0.00049	U	<0.036	U	<0.00065	U	<0.00055	U	<0.00056	U	<0.0006	U	<0.00048	U	<0.00059	U	<0.00057	U
Methyl tert butyl ether	500	<0.0002	U	<0.00019	U	<0.00027	U	<0.012	U	<0.00016	U	<0.012	U	<0.00022	U	<0.00018	U	<0.00018	U	<0.0002	UJ	<0.00016	U	<0.0002	U	<0.00019	U
Methylene chloride	500	<0.0023	U	<0.0022	U	<0.003	U	<0.14	U	<0.0018	U	<0.14	U	<0.0024	U	<0.0021	U	<0.0021	U	<0.0023	UJ	<0.0018	U	<0.0022	U	<0.0022	U
n-Butylbenzene	500	<0.00016	U	<0.00016	U	<0.00022	U	<0.01	U	<0.00014	U	<0.0099	U	<0.00018	U	<0.00015	U	<0.00015	U	<0.00017	UJ	<0.00013	U	<0.00016	U	<0.00016	U
n-Propylbenzene	500	<0.00017	U	**0.00023**	J	<0.00023	U	<0.01	U	<0.00014	U	<0.01	U	<0.00018	U	<0.00016		**0.0008**	J	<0.00017	UJ	<0.00014	U	<0.00017	U	<0.00016	U
Naphthalene	500	**0.094**		**0.063**		**0.0079**		**5.4**		**1.2**	E	**8.7**		**0.0042**	U	**0.0066**	U	**0.18**		<0.00065	UJ	**0.0014**	J	<0.00064	U	**0.39**	
o-Xylene	-	<0.00029	U	**0.0048**		<0.00039	U	<0.018	U	**0.0027**		<0.017	U	<0.00031	U	**0.00033**	U	**0.0012**	U	<0.00029	UJ	<0.00023	U	<0.00028	U	**0.0021**	
p-Isopropyltoluene	-	<0.00011	U	<0.0001	U	<0.00014	U	<0.0067	U	<0.00009	U	<0.0065	U	<0.00012	U	<0.0001	U	<0.0001	U	<0.00011	UJ	<0.00009	U	<0.00011	U	**0.00015**	J
p/m-Xylene	-	<0.00055	U	**0.0027**		<0.00074	U	**0.057**	U	**0.0079**		**0.037**	U	<0.0006	U	<0.00051	U	**0.00062**	U	<0.00056	UJ	<0.00044	U	<0.00055	U	**0.0037**	
sec-Butylbenzene	500	<0.00014	U	<0.00014	U	<0.00019	U	<0.009	U	<0.00012	U	<0.0087	U	<0.00016	U	<0.00013	U	<0.00013	U	<0.00014	UJ	<0.00012	U	<0.00014	U	<0.00014	U
Styrene	-	<0.00019	U	<0.00019	U	<0.00026	U	<0.012	U	<0.00016	U	<0.012	U	<0.00021	U	<0.00018	U	<0.00018	U	<0.0002	UJ	<0.00016	U	<0.00019	U	<0.00019	U
tert-Butylbenzene	500	<0.00012	U	<0.00011	U	<0.00016	U	<0.0072	U	<0.0001	U	<0.007	U	<0.00013	U	<0.00011	U	<0.00011	U	<0.00012	UJ	<0.00009	U	<0.00012	U	<0.00011	U
Tetrachloroethene	150	<0.00019	U	<0.00019	U	<0.00026	U	<0.012	U	<0.00016	U	<0.012	U	<0.00021	U	<0.00018	U	<0.00018	U	<0.0002	U	<0.00016	U	<0.00019	U	<0.00019	U
Toluene	500	<0.00054	U	**0.0029**		<0.00072	U	**0.062**		**0.0045**		**0.039**	U	<0.00058	U	<0.0005	U	<0.0005	U	<0.00054	UJ	<0.00043	U	<0.00053	U	**0.0016**	
trans-1,2-Dichloroethene	500	<0.00014	U	<0.00013	U	<0.00018	U	<0.0084	U	<0.00011	U	<0.0081	U	<0.00015	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.00011	U	<0.00013	U	<0.00013	U
trans-1,3-Dichloropropene	-	<0.00027	U	<0.00026	U	<0.00036	U	<0.017	U	<0.00022	U	<0.016	U	<0.00029	U	<0.00025	U	<0.00025	U	<0.00027	U	<0.00022	U	<0.00027	UJ	<0.00026	U
Trichloroethene	200	<0.00014	U	<0.00013	U	<0.00018	U	<0.0084	U	<0.00011	U	<0.0081	U	<0.00015	U	<0.00012	U	<0.00013	U	<0.00014	U	<0.00011	U	<0.00013	U	<0.00013	U
Trichlorofluoromethane	-	<0.00069	U	<0.00067	U	<0.00092	U	<0.043	U	<0.00056	U	<0.041	U	<0.00074	U	<0.00064	U	<0.00064	U	<0.00069	U	<0.00055	U	<0.00068	U	<0.00066	U
Vinyl chloride	13	<0.00033	U	<0.00032	U	<0.00045	U	<0.02	U	<0.00027	U	<0.02	U	<0.00036	U	<0.00031	U	<0.00031	U	<0.00033	U	<0.00026	U	<0.00033	U	<0.00032	U
Total VOCs	-	**0.09434**	-	**0.17584**	-	**0.00815**	-	**5.593**	-	**1.22656**	-	**8.817**	-	**0.0042**	-	**0.00851**	-	**0.19763**	-	-	-	**0.0014**	-	-	-	**0.41354**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBF2-12-07292025	SBF2-6-07292025	SBF2-9-07292025	SBF3-10-07312025	SBF3-13-07312025	SBF3-16-07312025	SBG1-10-07282025	SBG1-13-07282025	SBG1-7-07282025	SBG2-11-07292025	SBG2-5-07292025	SBG2-8-07292025	SBG3-12-07312025
		L2547479-16	L2547479-14	L2547479-15	L2548047-10	L2548047-11	L2548047-12	L2547171-18	L2547171-19	L2547171-17	L2547479-13	L2547479-11	L2547479-12	L2548047-13
		7/29/2025	7/29/2025	7/29/2025	7/31/2025	7/31/2025	7/31/2025	7/28/2025	7/28/2025	7/28/2025	7/29/2025	7/29/2025	7/29/2025	7/31/2025
		12' BGS	6' BGS	9' BGS	10' BGS	13' BGS	16' BGS	1-' BGS	13' BGS	7' BGS	11' BGS	5' BGS	8' BGS	12' BGS
		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOIL	SOIL	SOIL	SOLID	SOLID	SOLID	SOLID
	Commercial SCO (mg/kg)													
VOLATILE ORGANICS BY EPA 5035 HIGH														
1,1,1-Trichloroethane	500	-	-	-	-	<0.0092 U	-	-	-	-	-	-	<0.0095 U	
1,1,2,2-Tetrachloroethane	-	-	-	-	-	<0.0092 U	-	-	-	-	-	-	<0.0094 U	
1,1,2-Trichloroethane	-	-	-	-	-	<0.015 U	-	-	-	-	-	-	<0.015 U	
1,1-Dichloroethane	240	-	-	-	-	<0.008 U	-	-	-	-	-	-	<0.0082 U	
1,1-Dichloroethene	500	-	-	-	-	<0.013 U	-	-	-	-	-	-	<0.014 U	
1,2,4-Trichlorobenzene	-	-	-	-	-	<0.015 U	-	-	-	-	-	-	<0.015 U	
1,2,4-Trimethylbenzene	190	-	-	-	-	<0.018 U	-	-	-	-	-	-	<0.019 U	
1,2-Dibromo-3-chloropropane	-	-	-	-	-	<0.055 U	-	-	-	-	-	-	<0.057 U	
1,2-Dibromoethane	-	-	-	-	-	<0.015 U	-	-	-	-	-	-	<0.016 U	
1,2-Dichlorobenzene	500	-	-	-	-	<0.008 U	-	-	-	-	-	-	<0.0082 U	
1,2-Dichloroethane	30	-	-	-	-	<0.014 U	-	-	-	-	-	-	<0.014 U	
1,2-Dichloropropane	-	-	-	-	-	<0.0069 U	-	-	-	-	-	-	<0.0071 U	
1,3,5-Trimethylbenzene	190	-	-	-	-	<0.011 U	-	-	-	-	-	-	<0.011 U	
1,3-Dichlorobenzene	280	-	-	-	-	<0.0082 U	-	-	-	-	-	-	<0.0084 U	
1,4-Dichlorobenzene	130	-	-	-	-	<0.0094 U	-	-	-	-	-	-	<0.0097 U	
2-Butanone	500	-	-	-	-	<0.12 U	-	-	-	-	-	-	<0.13 U	
2-Hexanone	-	-	-	-	-	<0.065 U	-	-	-	-	-	-	<0.067 U	
4-Methyl-2-pentanone	-	-	-	-	-	<0.071 U	-	-	-	-	-	-	<0.073 U	
Acetone	500	-	-	-	-	<0.26 U	-	-	-	-	-	-	<0.27 U	
Benzene	44	-	-	-	-	**0.012** J	-	-	-	-	-	-	<0.0094 U	
Bromodichloromethane	-	-	-	-	-	<0.006 U	-	-	-	-	-	-	<0.0062 U	
Bromoform	-	-	-	-	-	<0.014 U	-	-	-	-	-	-	<0.014 U	
Bromomethane	-	-	-	-	-	<0.032 U	-	-	-	-	-	-	<0.033 U	
Carbon disulfide	-	-	-	-	-	<0.25 U	-	-	-	-	-	-	<0.26 U	
Carbon tetrachloride	22	-	-	-	-	<0.013 U	-	-	-	-	-	-	<0.013 U	
Chlorobenzene	500	-	-	-	-	<0.007 U	-	-	-	-	-	-	<0.0072 U	
Chloroethane	-	-	-	-	-	<0.025 U	-	-	-	-	-	-	<0.026 U	
Chloroform	350	-	-	-	-	<0.0077 U	-	-	-	-	-	-	<0.008 U	
Chloromethane	-	-	-	-	-	<0.052 U	-	-	-	-	-	-	<0.053 U	
cis-1,2-Dichloroethene	500	-	-	-	-	<0.0097 U	-	-	-	-	-	-	<0.0099 U	
cis-1,3-Dichloropropene	-	-	-	-	-	<0.0087 U	-	-	-	-	-	-	<0.009 U	
Cyclohexane	-	-	-	-	-	<0.03 U	-	-	-	-	-	-	<0.031 U	
Dibromochloromethane	-	-	-	-	-	<0.0077 U	-	-	-	-	-	-	<0.008 U	
Dichlorodifluoromethane	-	-	-	-	-	<0.05 U	-	-	-	-	-	-	<0.052 U	
Ethylbenzene	390	-	-	-	-	<0.0078 U	-	-	-	-	-	-	<0.008 U	
Freon-113	-	-	-	-	-	<0.038 U	-	-	-	-	-	-	<0.039 U	
Isopropylbenzene	-	-	-	-	-	<0.006 U	-	-	-	-	-	-	<0.0062 U	
Methyl Acetate	-	-	-	-	-	<0.052 U	-	-	-	-	-	-	<0.054 U	
Methyl cyclohexane	-	-	-	-	-	<0.033 U	-	-	-	-	-	-	<0.034 U	
Methyl tert butyl ether	500	-	-	-	-	<0.011 U	-	-	-	-	-	-	<0.011 U	
Methylene chloride	500	-	-	-	-	<0.13 U	-	-	-	-	-	-	<0.13 U	
n-Butylbenzene	500	-	-	-	-	<0.0092 U	-	-	-	-	-	-	<0.0095 U	
n-Propylbenzene	500	-	-	-	-	<0.0094 U	-	-	-	-	-	-	<0.0097 U	
Naphthalene	500	-	-	-	-	**2**	-	-	-	-	-	-	**1.5**	
o-Xylene	-	-	-	-	-	<0.016 U	-	-	-	-	-	-	<0.016 U	
p-Isopropyltoluene	-	-	-	-	-	<0.006 U	-	-	-	-	-	-	<0.0062 U	
p/m-Xylene	-	-	-	-	-	<0.031 U	-	-	-	-	-	-	<0.032 U	
sec-Butylbenzene	500	-	-	-	-	<0.0081 U	-	-	-	-	-	-	<0.0083 U	
Styrene	-	-	-	-	-	<0.011 U	-	-	-	-	-	-	<0.011 U	
tert-Butylbenzene	500	-	-	-	-	<0.0065 U	-	-	-	-	-	-	<0.0067 U	
Tetrachloroethene	150	-	-	-	-	<0.011 U	-	-	-	-	-	-	<0.011 U	
Toluene	500	-	-	-	-	**0.033** U	-	-	-	-	-	-	<0.031 U	
trans-1,2-Dichloroethene	500	-	-	-	-	<0.0076 U	-	-	-	-	-	-	<0.0078 U	
trans-1,3-Dichloropropene	-	-	-	-	-	<0.015 U	-	-	-	-	-	-	<0.016 U	
Trichloroethene	200	-	-	-	-	<0.0076 U	-	-	-	-	-	-	<0.0078 U	
Trichlorofluoromethane	-	-	-	-	-	<0.038 U	-	-	-	-	-	-	<0.039 U	
Vinyl chloride	13	-	-	-	-	<0.018 U	-	-	-	-	-	-	<0.019 U	
Total VOCs	-	-	-	-	-	**2.045**	-	-	-	-	-	-	**1.5**	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBF2-12-07292025		SBF2-6-07292025		SBF2-9-07292025		SBF3-10-07312025		SBF3-13-07312025		SBF3-16-07312025		SBG1-10-07282025		SBG1-13-07282025		SBG1-7-07282025		SBG2-11-07292025		SBG2-5-07292025		SBG2-8-07292025		SBG3-12-07312025	
		L2547479-16		L2547479-14		L2547479-15		L2548047-10		L2548047-11		L2548047-12		L2547171-18		L2547171-19		L2547171-17		L2547479-13		L2547479-11		L2547479-12		L2548047-13	
		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025	
		12' BGS		6' BGS		9' BGS		10' BGS		13' BGS		16' BGS		1-' BGS		13' BGS		7' BGS		11' BGS		5' BGS		8' BGS		12' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
PERFLUORINATED ALKYL ACIDS BY EPA 1633																											
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		-	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	-	-	<0.00004	U	-	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U	<0.00004	U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		-	<0.000258	U	<0.000259	U	<0.000258	U	<0.000259	U	<0.000258	U	-	-	<0.000257	U	-	<0.000258	U	<0.000259	U	<0.000256	U	<0.000259	U	<0.000256	U
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		-	<0.000077	U	<0.000077	U	<0.000077	U	<0.000078	U	<0.000077	U	-	-	<0.000077	U	-	<0.000077	U	<0.000078	U	<0.000077	U	<0.000078	U	<0.000077	U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		-	<0.000148	U	<0.000148	U	<0.000147	U	<0.000148	U	<0.000148	U	-	-	<0.000147	U	-	<0.000147	U	<0.000148	U	<0.000146	U	<0.000148	U	<0.000146	U
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		-	<0.000235	U	<0.000235	U	<0.000234	U	<0.000236	U	<0.000235	U	-	-	<0.000234	U	-	<0.000235	U	<0.000236	U	<0.000233	U	<0.000236	U	<0.000233	U
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		-	<0.000364	U	<0.000365	U	<0.000363	U	<0.000365	U	<0.000364	U	-	-	<0.000363	U	-	<0.000364	U	<0.000365	U	<0.000361	U	<0.000365	U	<0.000361	U
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		-	<0.000092	U	<0.000092	U	<0.000091	U	<0.000092	U	<0.000092	U	-	-	<0.000091	U	-	<0.000092	U	<0.000092	U	<0.000091	U	<0.000092	U	<0.000091	U
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		-	<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	-	-	<0.000029	U	-	<0.000029	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		-	<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	-	-	<0.000029	U	-	<0.000029	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	-	-	<0.000038	U	-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		-	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	-	-	<0.000021	U	-	<0.000022	U	<0.000022	U	<0.000021	U	<0.000022	U	<0.000021	U
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		-	<0.000081	U	<0.000081	U	<0.000081	U	<0.000082	U	<0.000081	U	-	-	<0.000081	U	-	<0.000081	U	<0.000082	U	<0.000081	U	<0.000082	U	<0.000081	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		-	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	-	-	<0.000044	U	-	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U	<0.000044	U
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	-	-	<0.000026	U	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		-	<0.000121	U	<0.000121	U	<0.000121	U	<0.000122	U	<0.000121	U	-	-	<0.000121	U	-	<0.000121	U	<0.000121	U	<0.00012	U	<0.000121	U	<0.00012	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		-	<0.000085	U	<0.000085	U	<0.000085	U	<0.000086	U	<0.000085	U	-	-	<0.000085	U	-	<0.000085	U	<0.000086	U	<0.000085	U	<0.000086	U	<0.000085	U
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		-	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	-	-	<0.000082	U	-	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U	<0.000082	U
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		-	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	-	-	<0.000046	U	-	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U	<0.000046	U
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		-	<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U	-	-	<0.000017	U	-	<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U	<0.000017	U
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	-	-	<0.000024	U	-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U
Perfluorobutanesulfonic Acid (PFBS)		-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	-	-	<0.00002	U	-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U
Perfluorobutanoic Acid (PFBA)		-	<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U	-	-	<0.000028	U	-	<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U	<0.000028	U
Perfluorodecanesulfonic Acid (PFDS)		-	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	-	-	<0.000014	U	-	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U	<0.000014	U
Perfluorodecanoic Acid (PFDA)		-	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	-	-	<0.000035	U	-	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U	<0.000035	U
Perfluorododecanesulfonic Acid (PFDoS)		-	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	<0.000022	U	-	-	<0.000021	U	-	<0.000022	U	<0.000022	U	<0.000021	U	<0.000022	U	<0.000021	U
Perfluorododecanoic Acid (PFDoA)		-	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	-	-	<0.000021	U	-	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U	<0.000021	U
Perfluoroheptanesulfonic Acid (PFHpS)		-	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	-	-	<0.000045	U	-	<0.000045	U	<0.000045	U	<0.000045	U	<0.000045	U	<0.000044	U
Perfluoroheptanoic Acid (PFHpA)		-	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	-	-	<0.000012	U	-	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U	<0.000012	U
Perfluorohexanesulfonic Acid (PFHxS)		-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	-	-	<0.00002	U	-	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U	<0.00002	U
Perfluorohexanoic Acid (PFHxA)		-	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	-	-	<0.000015	U	-	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U	<0.000015	U
Perfluorononanesulfonic Acid (PFNS)		-	<0.00003	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.00003	U	-	-	<0.000029	U	-	<0.000029	U	<0.00003	U	<0.000029	U	<0.00003	U	<0.000029	U
Perfluorononanoic Acid (PFNA)		-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	-	-	<0.000013	U	-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U
Perfluorooctanesulfonamide (PFOSA)		-	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	-	-	<0.00001	U	-	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U	<0.00001	U
Perfluorooctanesulfonic Acid (PFOS)		-	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	-	-	<0.000031	U	-	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U	<0.000031	U
Perfluorooctanoic Acid (PFOA)		-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	-	-	<0.000026	U	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
Perfluoropentanesulfonic Acid (PFPeS)		-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	-	-	<0.000026	U	-	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U	<0.000026	U
Perfluoropentanoic Acid (PFPeA)		-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	-	-	<0.000038	U	-	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U	<0.000038	U
Perfluorotetradecanoic Acid (PFTeDA)		-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	-	-	<0.000024	U	-	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U	<0.000024	U
Perfluorotridecanoic Acid (PFTrDA)		-	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	-	-	<0.000016	U	-	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U	<0.000016	U
Perfluoroundecanoic Acid (PFUnA)		-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	-	-	<0.000013	U	-	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U	<0.000013	U

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBF2-12-07292025		SBF2-6-07292025		SBF2-9-07292025		SBF3-10-07312025		SBF3-13-07312025		SBF3-16-07312025		SBG1-10-07282025		SBG1-13-07282025		SBG1-7-07282025		SBG2-11-07292025		SBG2-5-07292025		SBG2-8-07292025		SBG3-12-07312025	
		L2547479-16		L2547479-14		L2547479-15		L2548047-10		L2548047-11		L2548047-12		L2547171-18		L2547171-19		L2547171-17		L2547479-13		L2547479-11		L2547479-12		L2548047-13	
		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025	
		12' BGS		6' BGS		9' BGS		10' BGS		13' BGS		16' BGS		1-' BGS		13' BGS		7' BGS		11' BGS		5' BGS		8' BGS		12' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
SEMIVOLATILE ORGANICS BY GC/MS																											
1,2,4,5-Tetrachlorobenzene	-	-	<0.02	U	<0.02	U	<0.11	U	<0.4	U	<0.1	U	-	-	<0.02	U	-	<0.02	U	<0.02	U	<0.097	U
1,4-Dioxane	130	-	<0.0088	U	<0.0088	U	<0.048	U	<0.18	U	<0.044	U	-	-	<0.0088	U	-	<0.0087	U	<0.0087	U	<0.043	U
2,3,4,6-Tetrachlorophenol	-	-	<0.038	U	<0.038	U	<0.21	U	<0.77	U	<0.19	U	-	-	<0.039	U	-	<0.038	U	<0.038	U	<0.19	U
2,4,5-Trichlorophenol	-	-	<0.037	U	<0.036	U	<0.2	U	<0.73	U	<0.18	U	-	-	<0.037	U	-	<0.036	U	<0.036	U	<0.18	U
2,4,6-Trichlorophenol	-	-	<0.036	U	<0.036	U	<0.2	U	<0.72	U	<0.18	U	-	-	<0.036	U	-	<0.036	U	<0.036	U	<0.18	U
2,4-Dichlorophenol	-	-	<0.031	U	<0.031	U	<0.17	U	<0.61	U	<0.15	U	-	-	<0.031	U	-	<0.03	U	<0.03	U	<0.15	U
2,4-Dimethylphenol	-	-	<0.063	U	<0.063	U	<0.34	U	<1.3	U	<0.32	U	-	-	<0.063	U	-	<0.062	U	<0.062	U	<0.31	U
2,4-Dinitrophenol	-	-	<0.089	U	<0.089	U	<0.48	U	<1.8	U	<0.45	U	-	-	<0.09	U	-	<0.088	U	<0.088	U	<0.44	U
2,4-Dinitrotoluene	-	-	<0.038	U	<0.038	U	<0.21	U	<0.76	U	<0.19	U	-	-	<0.038	U	-	<0.038	U	<0.038	U	<0.19	U
2,6-Dinitrotoluene	-	-	<0.033	U	<0.033	U	<0.18	U	<0.66	U	<0.16	U	-	-	<0.033	U	-	<0.032	U	<0.032	U	<0.16	U
2-Chloronaphthalene	-	-	<0.019	U	<0.019	U	<0.1	U	<0.38	U	<0.095	U	-	-	<0.019	U	-	<0.019	U	<0.019	U	<0.093	U
2-Chlorophenol	-	-	<0.022	U	<0.022	U	<0.12	U	<0.45	U	<0.11	U	-	-	<0.023	U	-	<0.022	U	<0.022	U	<0.11	U
2-Methylnaphthalene	-	-	<0.023	U	<0.023	U	**2.3**		**11**		**0.76**	J	-	-	**0.11**	J	-	<0.023	U	<0.023	U	**3**	
2-Methylphenol	500	-	<0.03	U	<0.03	U	<0.16	U	<0.59	U	<0.15	U	-	-	<0.03	U	-	<0.029	U	<0.029	U	<0.14	U
2-Nitroaniline	-	-	<0.037	U	<0.037	U	<0.2	U	<0.74	U	<0.18	U	-	-	<0.037	U	-	<0.036	U	<0.036	U	<0.18	U
2-Nitrophenol	-	-	<0.072	U	<0.072	U	<0.39	U	<1.4	U	<0.36	U	-	-	<0.072	U	-	<0.071	U	<0.071	U	<0.35	U
3,3'-Dichlorobenzidine	-	-	<0.051	U	<0.051	U	<0.27	U	<1	U	<0.26	U	-	-	<0.051	U	-	<0.05	U	<0.05	U	<0.25	U
3-Methylphenol/4-Methylphenol	500	-	<0.03	U	<0.03	U	<0.16	U	<0.6	U	<0.15	U	-	-	<0.03	U	-	<0.03	U	<0.03	U	<0.15	U
3-Nitroaniline	-	-	<0.036	U	<0.036	U	<0.19	U	<0.72	U	<0.18	U	-	-	<0.036	U	-	<0.036	U	<0.036	U	<0.18	U
4,6-Dinitro-o-cresol	-	-	<0.092	U	<0.092	U	<0.5	U	<1.8	U	<0.46	U	-	-	<0.092	U	-	<0.091	U	<0.091	U	<0.45	U
4-Bromophenyl phenyl ether	-	-	<0.029	U	<0.029	U	<0.16	U	<0.58	U	<0.15	U	-	-	<0.029	U	-	<0.029	U	<0.029	U	<0.14	U
4-Chloroaniline	-	-	<0.035	U	<0.035	U	<0.19	U	<0.69	U	<0.17	U	-	-	<0.035	U	-	<0.034	U	<0.034	U	<0.17	U
4-Chlorophenyl phenyl ether	-	-	<0.02	U	<0.02	U	<0.11	U	<0.41	U	<0.1	U	-	-	<0.02	U	-	<0.02	U	<0.02	U	<0.1	U
4-Nitroaniline	-	-	<0.079	U	<0.079	U	<0.43	U	<1.6	U	<0.4	U	-	-	<0.08	U	-	<0.078	U	<0.078	U	<0.39	U
4-Nitrophenol	-	-	<0.078	U	<0.078	U	<0.42	U	<1.6	U	<0.39	U	-	-	<0.078	U	-	<0.077	U	<0.077	U	<0.38	U
Acenaphthene	500	-	**0.5**		<0.02	U	**0.57**	J	**3.5**		**0.14**	J	-	-	**0.078**	J	-	<0.02	U	<0.02	U	**1.5**	
Acenaphthylene	500	-	<0.029	U	<0.029	U	**1.7**		**8**		**0.48**	J	-	-	**0.13**	J	-	<0.029	U	<0.029	U	**1.3**	
Acetophenone	-	-	<0.024	U	<0.024	U	<0.13	U	<0.47	U	<0.12	U	-	-	<0.024	U	-	<0.023	U	<0.023	U	<0.12	U
Anthracene	500	-	<0.037	U	<0.037	U	**1.4**		**6.7**		**0.48**	J	-	-	**0.2**		-	<0.037	U	<0.037	U	**1.5**	
Atrazine	-	-	<0.067	U	<0.067	U	<0.36	U	<1.3	U	<0.34	U	-	-	<0.067	U	-	<0.066	U	<0.066	U	<0.33	U
Benzaldehyde	-	-	<0.052	U	<0.052	U	<0.28	U	<1	U	<0.26	U	-	-	<0.052	U	-	<0.051	U	<0.051	U	<0.25	U
Benzo(a)anthracene	5.6	-	<0.022	U	<0.021	U	**1.9**		**7.9**		**0.56**	J	-	-	**0.27**		-	**0.042**	J	**0.06**	J	**1.4**	
Benzo(a)pyrene	1	-	<0.047	U	<0.046	U	**1.8**		**7.5**		**0.49**	J	-	-	**0.28**		-	<0.046	U	**0.06**	J	**1.2**	
Benzo(b)fluoranthene	5.6	-	<0.032	U	<0.032	U	**2.5**		**10**		**0.64**		-	-	**0.33**		-	**0.065**	J	**0.087**	J	**1.6**	
Benzo(ghi)perylene	500	-	<0.022	U	<0.022	U	**1.2**		**5.2**		**0.29**	J	-	-	**0.17**		-	**0.034**	J	**0.048**	J	**0.62**	J
Benzo(k)fluoranthene	56	-	<0.03	U	<0.03	U	**0.58**	J	**2.6**		**0.21**	J	-	-	**0.08**	J	-	<0.03	U	**0.03**	J	**0.43**	J
Biphenyl	-	-	<0.025	U	<0.025	U	**0.4**	J	**1.8**	J	**0.13**	J	-	-	**0.027**	J	-	<0.024	U	<0.024	U	**0.5**	J
Bis(2-chloroethoxy)methane	-	-	<0.019	U	<0.019	U	<0.1	U	<0.38	U	<0.096	U	-	-	<0.019	U	-	<0.019	U	<0.019	U	<0.094	U
Bis(2-chloroethyl)ether	-	-	<0.026	U	<0.026	U	<0.14	U	<0.52	U	<0.13	U	-	-	<0.026	U	-	<0.026	U	<0.026	U	<0.13	U
Bis(2-chloroisopropyl)ether	-	-	<0.033	U	<0.033	U	<0.18	U	<0.65	U	<0.16	U	-	-	<0.033	U	-	<0.032	U	<0.032	U	**<0.16**	U
Bis(2-ethylhexyl)phthalate	-	-	<0.066	U	<0.066	U	<0.36	U	<1.3	U	<0.33	U	-	-	<0.066	U	-	<0.065	U	<0.065	U	<0.32	U
Butyl benzyl phthalate	-	-	<0.048	U	<0.048	U	<0.26	U	<0.96	U	<0.24	U	-	-	<0.048	U	-	<0.048	U	<0.048	U	<0.24	U
Caprolactam	-	-	<0.058	U	<0.058	U	<0.31	U	<1.2	U	<0.29	U	-	-	<0.058	U	-	<0.058	U	<0.057	U	<0.28	U
Carbazole	-	-	<0.018	U	<0.018	U	**0.86**	J	**3.5**	J	**0.26**	J	-	-	**0.058**	J	-	<0.018	U	<0.018	U	**0.71**	J
Chrysene	56	-	<0.02	U	<0.02	U	**2**		**8.6**		**0.59**		-	-	**0.27**		-	**0.04**	J	**0.06**	J	**1.2**	
Di-n-butylphthalate	-	-	<0.036	U	<0.036	U	<0.2	U	<0.72	U	<0.18	U	-	-	<0.036	U	-	<0.036	U	<0.036	U	<0.18	U
Di-n-octylphthalate	-	-	<0.065	U	<0.065	U	<0.35	U	<1.3	U	<0.33	U	-	-	<0.065	U	-	<0.064	U	<0.064	U	<0.32	U
Dibenzo(a,h)anthracene	0.56	-	<0.022	U	<0.022	U	**0.28**	J	**1.2**	J	<0.11	U	-	-	**0.035**	J	-	<0.022	U	<0.022	U	**0.17**	J
Dibenzofuran	350	-	**0.027**	U	<0.018	U	**1.3**		**5.4**		**0.46**	J	-	-	**0.086**	J	-	<0.018	U	<0.018	U	**1.5**	
Diethyl phthalate	-	-	<0.018	U	<0.018	U	<0.096	U	<0.35	U	<0.089	U	-	-	<0.018	U	-	<0.018	U	<0.017	U	<0.086	U
Dimethyl phthalate	-	-	<0.04	U	<0.04	U	<0.22	U	<0.8	U	<0.2	U	-	-	<0.04	U	-	<0.04	U	<0.04	U	<0.2	U
Fluoranthene	500	-	<0.022	U	**0.038**	J	**5.4**		**20**		**1.6**		-	-	**0.74**		-	**0.078**	J	**0.12**		**4.5**	
Fluorene	500	-	<0.018	U	<0.018	U	**2.4**		**9.2**		**0.7**	J	-	-	**0.16**	J	-	<0.018	U	<0.018	U	**2**	
Hexachlorobenzene	6	-	<0.021	U	<0.021	U	<0.12	U	<0.43	U	<0.11	U	-	-	<0.022	U	-	<0.021	U	<0.021	U	<0.1	U
Hexachlorobutadiene	-	-	<0.028	U	<0.028	U	<0.15	U	<0.56	U	<0.14	U	-	-	<0.028	U	-	<0.028	U	<0.028	U	<0.14	U
Hexachlorocyclopentadiene	-	-	<0.17	U	<0.17	U	<0.94	UJ	<3.4	UJ	<0.87	UJ	-	-	<0.17	U	-	<0.17	U	<0.17	U	<0.84	U
Hexachloroethane	-	-	<0.031	U	<0.031	U	<0.17	U	<0.62	U	<0.16	U	-	-	<0.031	U	-	<0.031	U	<0.03	U	<0.15	U
Indeno(1,2,3-cd)pyrene	5.6	-	<0.027	U	<0.027	U	**1.3**		**5.3**		**0.31**	J	-	-	**0.13**	J	-	**0.037**	J	**0.04**	J	**0.71**	J
Isophorone	-	-	<0.025	U	<0.025	U	<0.13	U	<0.5	U	<0.12	U	-	-	<0.025	U	-	<0.024	U	<0.024	U	<0.12	U
n-Nitrosodi-n-propylamine	-	-	<0.029	U	<0.029	U	<0.16	U	<0.59	U	<0.15	U	-	-	<0.03	U	-	<0.029	U	<0.029	U	<0.14	U
Naphthalene	500	-	**0.11**	J	**0.26**		**16**		**92**		**7.9**		-	-	**0.82**	U	-	**0.26**		**0.11**	J	**14**	
NDPA/DPA	-	-	<0.022	U	<0.022	U	<0.12	U	<0.43	U	<0.11	U	-	-	<0.022	U	-	<0.022	U	<0.021	U	<0.11	U
Nitrobenzene	-	-	<0.028	U	<0.028	U	<0.15	U	<0.56	U	<0.14	U	-	-	<0.028	U	-	<0.028	U	<0.028	U	<0.14	U
p-Chloro-m-cresol	-	-	<0.028	U	<0.028	U	<0.15	U	<0.57	U	<0.14	U	-	-	<0.029	U	-	<0.028	U	<0.028	U	<0.14	U
Pentachlorophenol	6.7	-	<0.042	U	<0.042	U	<0.23	U	<0.84	U	<0.21	U	-	-	<0.042	U	-	<0.042	U	<0.042	U	<0.2	U
Phenanthrene	500	-	<0.023	U	<0.023	U	**6.4**		**26**		**2.1**		-	-	**0.75**		-	**0.05**	J	**0.063**	J	**6.2**	
Phenol	500	-	<0.029	U	<0.029	U	<0.16	U	<0.58	U	<0.14	U	-	-	<0.029	U	-	<0.028	U	<0.028	U	<0.14	U
Pyrene	500	-	<0.019	U	<0.019	U	**3.8**		**14**		**1.1**		-	-	**0.67**		-	**0.061**	J	**0.09**	J	**3.1**	
Total SVOCs	-	-	**0.637**	-	**0.298**	-	**54.09**	-	**249.4**	-	**19.2**	-	-	-	**5.394**	-	-	**0.667**	-	**0.768**	-	**47.14**	-
CHLORINATED HERBICIDES BY GC																							
2,4,5-T	-	-	<0.0059	U	<0.00586	U	<0.00635	U	<0.00595	U	<0.00605	U	-	-	<0.00599	U	-	<0.00589	U	<0.00592	U	<0.00577	U
2,4,5-TP (Silvex)	500	-	<0.00506	U	<0.00503	U	<0.00544	U	<0.0051	U	<0.00519	U	-	-	<0.00514	U	-	<0.00506	U	<0.00508	U	<0.00495	U
2,4-D	-	-	<0.012	U	<0.0119	U	<0.0129	U	<0.0121	U	<0.0123	U	-	-	<0.0122	U	-	<0.012	U	<0.012	U	<0.0117	U

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBF2-12-07292025		SBF2-6-07292025		SBF2-9-07292025		SBF3-10-07312025		SBF3-13-07312025		SBF3-16-07312025		SBG1-10-07282025		SBG1-13-07282025		SBG1-7-07282025		SBG2-11-07292025		SBG2-5-07292025		SBG2-8-07292025		SBG3-12-07312025	
		L2547479-16		L2547479-14		L2547479-15		L2548047-10		L2548047-11		L2548047-12		L2547171-18		L2547171-19		L2547171-17		L2547479-13		L2547479-11		L2547479-12		L2548047-13	
		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025	
		12' BGS		6' BGS		9' BGS		10' BGS		13' BGS		16' BGS		1-' BGS		13' BGS		7' BGS		11' BGS		5' BGS		8' BGS		12' BGS	
		SOLID		SOLID		SOLID		SOLID		SOLID		SOLID		SOIL		SOIL		SOIL		SOLID		SOLID		SOLID		SOLID	
	Commercial SCO (mg/kg)																										
ORGANOCHLORINE PESTICIDES BY GC																											
4,4'-DDD	92	-	<0.00179	U	<0.00185	U	<0.00203	U	<0.00178	U	<0.00179	U	-	-	<0.000646	U	-	<0.00171	U	<0.0017	U	<0.00186	U				
4,4'-DDE	62	-	<0.00116	U	<0.0012	U	<0.00131	U	<0.00115	U	<0.00116	U	-	-	<0.000419	U	-	<0.00111	U	<0.0011	U	<0.00121	U				
4,4'-DDT	47	-	<0.00403	U	<0.00418	U	<0.00457	U	<0.00401	U	<0.00403	U	-	-	<0.00146	U	-	<0.00386	U	<0.00384	U	<0.0042	U				
Aldrin	0.68	-	<0.00177	U	<0.00183	U	<0.002	U	<0.00176	U	<0.00176	U	-	-	<0.000638	U	-	<0.00169	U	<0.00168	U	<0.00184	U				
Alpha-BHC	3.4	-	<0.000594	U	<0.000614	U	<0.000672	U	<0.00059	U	<0.000593	U	-	-	<0.000214	U	-	<0.000568	U	<0.000566	U	<0.000618	U				
Beta-BHC	3	-	<0.0019	U	<0.00197	U	<0.00215	U	<0.00189	U	<0.0019	U	-	-	<0.000687	U	-	<0.00182	U	<0.00181	U	<0.00198	U				
Chlordane	-	-	<0.0166	U	<0.0172	U	<0.0188	U	<0.0165	U	<0.0166	U	-	-	<0.006	U	-	<0.0159	U	<0.0158	U	<0.0173	U				
cis-Chlordane	24	-	<0.00175	U	<0.00181	U	<0.00198	U	<0.00174	U	<0.00175	U	-	-	<0.000631	U	-	<0.00167	U	<0.00166	U	<0.00182	U				
Delta-BHC	500	-	<0.000982	U	<0.00102	U	<0.00111	U	<0.000976	U	<0.000982	U	-	-	<0.000355	U	-	<0.00094	U	<0.000936	U	<0.00102	U				
Dieldrin	1.4	-	<0.00157	U	<0.00162	U	<0.00178	U	<0.00156	U	<0.00157	U	-	-	<0.000566	U	-	<0.0015	U	<0.00149	U	<0.00163	U				
Endosulfan I	200	-	<0.00118	U	<0.00123	U	<0.00134	U	<0.00118	U	<0.00118	U	-	-	<0.000428	U	-	<0.00113	U	<0.00113	U	<0.00123	U				
Endosulfan II	200	-	<0.00168	U	<0.00174	U	<0.0019	U	<0.00167	U	<0.00168	U	-	-	<0.000605	U	-	<0.0016	U	<0.0016	U	<0.00174	U				
Endosulfan sulfate	200	-	<0.000995	U	<0.00103	U	<0.00113	U	<0.000989	U	<0.000995	U	-	-	<0.000359	U	-	<0.000952	U	<0.000948	U	<0.00104	U				
Endrin	89	-	<0.000857	U	<0.000887	U	<0.000971	U	<0.000852	U	<0.000857	U	-	-	<0.000309	U	-	<0.00082	U	<0.000816	U	<0.000892	U				
Endrin aldehyde	-	-	<0.00219	U	<0.00227	U	<0.00248	U	<0.00218	U	<0.00219	U	-	-	<0.000792	U	-	<0.0021	U	<0.00209	U	<0.00228	U				
Endrin ketone	-	-	<0.00129	U	<0.00134	U	<0.00146	U	<0.00128	U	<0.00129	U	-	-	<0.000466	U	-	<0.00124	U	<0.00123	U	<0.00134	U				
Heptachlor	15	-	<0.00112	U	<0.00116	U	<0.00127	U	<0.00112	U	<0.00112	U	-	-	<0.000406	U	-	<0.00108	U	<0.00107	U	<0.00117	U				
Heptachlor epoxide		-	<0.00282	U	<0.00292	U	<0.0032	U	<0.0028	U	<0.00282	U	-	-	<0.00102	U	-	<0.0027	U	<0.00269	U	<0.00294	U				
Lindane	9.2	-	<0.000934	U	<0.000967	U	<0.00106	U	<0.000929	U	<0.000934	U	-	-	<0.000337	U	-	<0.000894	U	<0.00089	U	<0.000972	U				
Methoxychlor	-	-	<0.00293	U	<0.00303	U	<0.00331	U	<0.00291	U	<0.00292	U	-	-	<0.00106	U	-	<0.0028	U	<0.00279	U	<0.00304	U				
Toxaphene	-	-	<0.0263	U	<0.0273	U	<0.0298	U	<0.0262	U	<0.0263	U	-	-	<0.00951	U	-	<0.0252	U	<0.0251	U	<0.0274	U				
trans-Chlordane	-	-	<0.00166	U	<0.00171	U	<0.00188	U	<0.00164	U	<0.00166	U	-	-	<0.000598	U	-	<0.00158	U	<0.00158	U	<0.00172	U				
POLYCHLORINATED BIPHENYLS BY GC																											
Aroclor 1016	1	-	<0.00952	U	<0.00926	U	<0.00518	U	<0.00497	U	<0.00478	U	-	-	<0.00482	U	-	<0.00936	U	<0.00886	U	<0.00499	U				
Aroclor 1221	1	-	<0.0107	U	<0.0104	U	<0.00585	U	<0.00561	U	<0.0054	U	-	-	<0.00543	U	-	<0.0106	U	<0.00999	U	<0.00564	U				
Aroclor 1232	1	-	<0.0227	U	<0.0221	U	<0.0124	U	<0.0119	U	<0.0114	U	-	-	<0.0115	U	-	<0.0224	U	<0.0211	U	<0.0119	U				
Aroclor 1242	1	-	<0.0144	U	<0.014	U	<0.00787	U	<0.00755	U	<0.00726	U	-	-	<0.00731	U	-	<0.0142	U	<0.0134	U	<0.00758	U				
Aroclor 1248	1	-	<0.0161	U	<0.0156	U	**0.0103**	J	**0.0108**	J	<0.00808	U	-	-	<0.00814	U	-	<0.0158	U	<0.015	U	<0.00844	U				
Aroclor 1254	1	-	<0.0117	U	<0.0114	U	<0.00638	U	<0.00613	U	<0.00589	U	-	-	<0.00593	U	-	<0.0115	U	<0.0109	U	<0.00615	U				
Aroclor 1260	1	-	<0.0198	U	<0.0193	U	<0.0108	U	<0.0104	U	<0.00996	U	-	-	<0.01	U	-	<0.0195	U	<0.0184	U	<0.0104	U				
Aroclor 1262	1	-	<0.0136	U	<0.0132	U	<0.00741	U	<0.00711	U	<0.00684	U	-	-	<0.00689	U	-	<0.0134	U	<0.0127	U	<0.00714	U				
Aroclor 1268	1	-	<0.0111	U	<0.0108	U	<0.00604	U	<0.0058	U	<0.00558	U	-	-	<0.00562	U	-	<0.0109	U	<0.0103	U	<0.00583	U				
PCBs, Total	1	-	<0.00952	U	<0.00926	U	**0.0103**	J	**0.0108**	J	<0.00478	U	-	-	<0.00482	U	-	<0.00936	U	<0.00886	U	<0.00499	U				
TOTAL METALS																											
Aluminum, Total	-	-	**9650**		**10300**		**9500**	J	**9300**	J	**6320**	J	-	-	**10800**	J	-	**10600**		**9900**		**7160**	J				
Antimony, Total	-	-	<3.46	UJ	<3.41	UJ	<3.75	UJ	<3.43	UJ	<3.39	UJ	-	-	<3.5	UJ	-	<3.55	UJ	<3.43	UJ	<3.52	UJ				
Arsenic, Total	16	-	**6.33**		**2**		**4.22**	J	**4.17**	J	**2.74**	J	-	-	**3.24**		-	**4.08**		**5.06**		**2.8**	J				
Barium, Total	400	-	**86.9**	J	**89.2**	J	**83.1**		**82.9**		**125**		-	-	**83.4**		-	**90.8**	J	**103**	J	**59.3**					
Beryllium, Total	590	-	**0.494**		**0.484**		**0.489**		**0.483**		**0.31**	J	-	-	**0.499**		-	**0.524**		**0.507**		**0.338**	J				
Cadmium, Total	9.3	-	<0.049	U	<0.049	U	<0.054	U	<0.049	U	<0.049	U	-	-	<0.05	UJ	-	<0.051	U	<0.049	U	<0.05	U				
Calcium, Total	-	-	**54900**		**50600**		**51400**	J	**48600**	J	**43700**	J	-	-	**53500**	J	-	**52900**		**53900**		**42200**	J				
Chromium, Total	-	-	**14.8**		**16.4**		**15.2**	J	**15**	J	**10.2**	J	-	-	**15.4**	J	-	**16**		**15.7**		**12.1**	J				
Cobalt, Total	-	-	**9.4**		**8.34**		**7.87**	J	**9.78**	J	**5.83**	J	-	-	**9.53**	J	-	**9.85**		**11.8**		**6.22**	J				
Copper, Total	270	-	**22.2**	J	**15.1**	J	**17.8**	J	**17.8**	J	**10.4**	J	-	-	**18.2**		-	**22**	J	**39**	J	**11.9**	J				
Iron, Total	-	-	**19200**		**16200**		**19600**	J	**18300**	J	**13300**	J	-	-	**18700**	J	-	**18400**		**18800**		**14800**	J				
Lead, Total	1000	-	**10.9**	J	**9.64**	J	**10.6**		**11.6**		**5.52**		-	-	**8.19**		-	**9.91**	J	**12.5**	J	**6.98**					
Magnesium, Total	-	-	**15500**	J	**17200**	J	**16600**		**16200**		**13600**		-	-	**13400**	J	-	**16000**	J	**17500**	J	**12200**					
Manganese, Total	10000	-	**457**		**453**		**437**	J	**462**	J	**337**	J	-	-	**472**		-	**541**		**507**		**374**	J				
Mercury, Total	2.8	-	<0.05	U	<0.052	U	<0.055	U	**0.086**		<0.054	U	-	-	**0.12**		-	<0.053	U	**0.064**	J	<0.057	U				
Nickel, Total	310	-	**22.4**		**21.1**		**20.8**	J	**21.1**	J	**13.8**	J	-	-	**21.2**	J	-	**22.5**		**23**		**16.1**	J				
Potassium, Total	-	-	**957**		**1240**		**1240**		**1290**		**888**		-	-	**1700**	J	-	**984**		**1250**		**922**					
Selenium, Total	1500	-	<0.296	U	<0.291	U	<0.32	UJ	<0.293	UJ	<0.29	UJ	-	-	<0.3	U	-	<0.303	U	<0.293	U	<0.301	UJ				
Silver, Total	1500	-	<0.268	U	<0.264	U	<0.29	U	<0.265	U	<0.263	U	-	-	<0.271	U	-	<0.274	U	<0.265	U	<0.272	U				
Sodium, Total	-	-	**293**		**216**		**181**	J	**175**	J	**116**	J	-	-	**197**		-	**169**	J	**180**		**136**	J				
Thallium, Total	-	-	<0.811	U	<0.798	U	<0.878	U	<0.803	U	<0.795	U	-	-	<0.821	U	-	<0.831	U	<0.803	U	<0.825	U				
Vanadium, Total	-	-	**20.3**		**16.9**		**20**		**18**		**12.4**		-	-	**20**		-	**19.7**		**20.6**		**14.4**					
Zinc, Total	10000	-	**52.1**	J	**64.8**	J	**55**	J	**56.7**	J	**35.6**	J	-	-	**49.6**	J	-	**57.1**	J	**58**	J	**40.2**	J				
GENERAL CHEMISTRY																											
Cyanide, Total	27	-	<0.22	U	<0.22	U	**0.76**	J	**1.2**		**0.5**	J	-	-	<0.24	UJ	-	<0.24	U	<0.25	U	<0.23	U				
Nitrogen, Ammonia	-	-	**28**	J	**15**	J	**14**		**4.9**	J	<3.3	U	-	-	**5.6**	J	-	**7.8**	J	<3.1	UJ	**110**					
Solids, Total	-	**86.9**		**85.9**		**86.7**		**80**		**85.5**		**85.3**		**86.2**		**87**		**85.2**		**86.1**		**86.2**		**85.7**		**86.9**	

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCF
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 37

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBG3-15-07312025		SBG3-18-07312025		TRIP BLANK-1-07282025		TRIP BLANK-2-07282025		TRIP BLANK-1-07292025		TRIP BLANK-2-07292025		TRIP BLANK-3-07292025		TRIPBLANK-1-07312025		TRIPBLANK-2-07312025	
		L2548047-14		L2548047-15		L2547171-22		L2547171-23		L2547479-29		L2547479-30		L2547479-31		L2548047-16		L2548047-17	
		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025	
		15' BGS		18' BGS		-		-		-		-		-		-		-	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																		
VOLATILE ORGANICS BY EPA 5035																			
1,1,1-Trichloroethane	500	<0.00015	U	<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
1,1,2,2-Tetrachloroethane	-	<0.00015	U	<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
1,1,2-Trichloroethane	-	<0.00024	U	<0.00024	U	<0.00027	U	<0.00027	U	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ
1,1-Dichloroethane	240	<0.00013	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
1,1-Dichloroethene	500	<0.00021	U	<0.00021	U	<0.00024	U	<0.00024	U	<0.00024	UJ	<0.00024	UJ	<0.00024	UJ	<0.00024	UJ	<0.00024	UJ
1,2,4-Trichlorobenzene	-	<0.00024	U	<0.00024	U	<0.00027	U	<0.00027	U	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ	**0.00027**	J	<0.00027	UJ
1,2,4-Trimethylbenzene	190	**0.0029**		<0.0003	U	<0.00033	U	<0.00033	U	<0.00033	UJ	<0.00033	UJ	<0.00033	UJ	<0.00033	UJ	<0.00033	UJ
1,2-Dibromo-3-chloropropane	-	<0.00088	U	<0.00089	U	<0.001	U	<0.001	U	<0.001	UJ	<0.001	UJ	<0.001	UJ	<0.001	UJ	<0.001	UJ
1,2-Dibromoethane	-	<0.00025	U	<0.00025	U	<0.00028	U	<0.00028	U	<0.00028	UJ	<0.00028	UJ	<0.00028	UJ	<0.00028	UJ	<0.00028	UJ
1,2-Dichlorobenzene	500	<0.00013	U	<0.00013	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
1,2-Dichloroethane	30	<0.00023	U	<0.00023	U	<0.00026	U	<0.00026	U	<0.00026	UJ	<0.00026	UJ	<0.00026	UJ	<0.00026	UJ	<0.00026	UJ
1,2-Dichloropropane	-	<0.00011	U	<0.00011	U	<0.00012	U	<0.00012	U	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ
1,3,5-Trimethylbenzene	190	**0.0015**	J	<0.00017	U	<0.00019	U	<0.00019	U	<0.00019	UJ	<0.00019	UJ	<0.00019	UJ	<0.00019	UJ	<0.00019	UJ
1,3-Dichlorobenzene	280	<0.00013	U	<0.00013	U	<0.00015	U	<0.00015	U	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ
1,4-Dichlorobenzene	130	<0.00015	U	<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
2-Butanone	500	<0.002	U	<0.002	U	<0.0022	U	<0.0022	U	<0.0022	UJ	<0.0022	UJ	<0.0022	UJ	<0.0022	UJ	<0.0022	UJ
2-Hexanone	-	<0.001	UJ	<0.001	U	<0.0012	U	<0.0012	U	<0.0012	UJ	<0.0012	UJ	<0.0012	UJ	<0.0012	UJ	<0.0012	UJ
4-Methyl-2-pentanone	-	<0.0011	U	<0.0011	U	<0.0013	U	<0.0013	U	<0.0013	UJ	<0.0013	UJ	<0.0013	UJ	<0.0013	UJ	<0.0013	UJ
Acetone	500	<0.0042	U	<0.0043	U	<0.0048	U	<0.0048	U	<0.0048	UJ	**0.0098**	J	<0.0048	UJ	<0.0048	UJ	<0.0048	UJ
Benzene	44	**0.0011**		<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
Bromodichloromethane	-	<0.0001	U	<0.0001	U	<0.00011	U	<0.00011	U	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ
Bromoform	-	<0.00022	U	<0.00022	U	<0.00025	U	<0.00025	U	<0.00025	UJ	<0.00025	UJ	<0.00025	UJ	<0.00025	UJ	<0.00025	UJ
Bromomethane	-	<0.00051	U	<0.00052	U	<0.00058	U	<0.00058	U	<0.00058	UJ	<0.00058	UJ	<0.00058	UJ	<0.00058	UJ	<0.00058	UJ
Carbon disulfide	-	<0.004	U	<0.004	U	<0.0046	U	<0.0046	U	<0.0046	UJ	<0.0046	UJ	<0.0046	UJ	<0.0046	UJ	<0.0046	UJ
Carbon tetrachloride	22	<0.0002	U	<0.0002	U	<0.00023	U	<0.00023	U	<0.00023	UJ	<0.00023	UJ	<0.00023	UJ	<0.00023	UJ	<0.00023	UJ
Chlorobenzene	500	<0.00011	U	<0.00011	U	<0.00013	U	<0.00013	U	<0.00013	UJ	<0.00013	UJ	<0.00013	UJ	<0.00013	UJ	<0.00013	UJ
Chloroethane	-	<0.0004	U	<0.0004	U	<0.00045	U	<0.00045	U	<0.00045	UJ	<0.00045	UJ	<0.00045	UJ	<0.00045	UJ	<0.00045	UJ
Chloroform	350	<0.00012	U	<0.00012	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
Chloromethane	-	<0.00082	U	<0.00083	U	<0.00093	U	<0.00093	U	<0.00093	UJ	<0.00093	UJ	<0.00093	UJ	<0.00093	UJ	<0.00093	UJ
cis-1,2-Dichloroethene	500	<0.00015	U	<0.00016	U	<0.00018	U	<0.00018	U	<0.00018	UJ	<0.00018	UJ	<0.00018	UJ	<0.00018	UJ	<0.00018	UJ
cis-1,3-Dichloropropene	-	<0.00014	U	<0.00014	U	<0.00016	U	<0.00016	U	<0.00016	UJ	<0.00016	UJ	<0.00016	UJ	<0.00016	UJ	<0.00016	UJ
Cyclohexane	-	<0.00048	U	<0.00048	U	<0.00054	U	<0.00054	U	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ
Dibromochloromethane	-	<0.00012	U	<0.00012	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
Dichlorodifluoromethane	-	<0.00081	U	<0.00081	U	<0.00092	U	<0.00092	U	<0.00092	UJ	<0.00092	UJ	<0.00092	UJ	<0.00092	UJ	<0.00092	UJ
Ethylbenzene	390	**0.00059**	J	<0.00012	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
Freon-113	-	<0.00061	U	<0.00062	U	<0.00069	U	<0.00069	U	<0.00069	UJ	<0.00069	UJ	<0.00069	UJ	<0.00069	UJ	<0.00069	UJ
Isopropylbenzene	-	<0.0001	U	<0.0001	U	<0.00011	U	<0.00011	U	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ
Methyl Acetate	-	<0.00084	U	<0.00084	U	<0.00095	U	<0.00095	U	<0.00095	UJ	<0.00095	UJ	<0.00095	UJ	<0.00095	UJ	<0.00095	UJ
Methyl cyclohexane	-	<0.00053	U	<0.00054	U	<0.0006	U	<0.0006	U	<0.0006	UJ	<0.0006	UJ	<0.0006	UJ	<0.0006	UJ	<0.0006	UJ
Methyl tert butyl ether	500	<0.00018	U	<0.00018	U	<0.0002	U	<0.0002	U	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ
Methylene chloride	500	<0.002	U	<0.002	U	<0.0023	U	<0.0023	U	<0.0023	UJ	<0.0023	UJ	<0.0023	UJ	<0.0023	UJ	<0.0023	UJ
n-Butylbenzene	500	<0.00015	U	<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
n-Propylbenzene	500	<0.00015	U	<0.00015	U	<0.00017	U	<0.00017	U	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ	<0.00017	UJ
Naphthalene	500	**0.61**		<0.00058	U	<0.00065	U	<0.00065	U	<0.00065	UJ	<0.00065	UJ	<0.00065	UJ	<0.00065	UJ	<0.00065	UJ
o-Xylene	-	**0.0012**		<0.00026	U	<0.00029	U	<0.00029	U	<0.00029	UJ	<0.00029	UJ	<0.00029	UJ	<0.00029	UJ	<0.00029	UJ
p-Isopropyltoluene	-	**0.00095**		<0.0001	U	<0.00011	U	<0.00011	U	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ	<0.00011	UJ
p/m-Xylene	-	**0.003**		<0.0005	U	<0.00056	U	<0.00056	U	<0.00056	UJ	<0.00056	UJ	<0.00056	UJ	<0.00056	UJ	<0.00056	UJ
sec-Butylbenzene	500	<0.00013	U	<0.00013	U	<0.00015	U	<0.00015	U	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ	<0.00015	UJ
Styrene	-	<0.00017	U	<0.00017	U	<0.0002	U	<0.0002	U	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ
tert-Butylbenzene	500	<0.0001	U	<0.0001	U	<0.00012	U	<0.00012	U	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ	<0.00012	UJ
Tetrachloroethene	150	<0.00017	U	<0.00017	U	<0.0002	U	<0.0002	U	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ	<0.0002	UJ
Toluene	500	**0.0012**		<0.00048	U	<0.00054	U	<0.00054	U	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ	<0.00054	UJ
trans-1,2-Dichloroethene	500	<0.00012	U	<0.00012	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
trans-1,3-Dichloropropene	-	<0.00024	U	<0.00024	U	<0.00027	U	<0.00027	U	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ	<0.00027	UJ
Trichloroethene	200	<0.00012	U	<0.00012	U	<0.00014	U	<0.00014	U	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ	<0.00014	UJ
Trichlorofluoromethane	-	<0.00061	U	<0.00062	U	<0.0007	U	<0.0007	U	<0.0007	UJ	<0.0007	UJ	<0.0007	UJ	<0.0007	UJ	<0.0007	UJ
Vinyl chloride	13	<0.0003	U	<0.0003	U	<0.00034	U	<0.00034	U	<0.00034	UJ	<0.00034	UJ	<0.00034	UJ	<0.00034	UJ	<0.00034	UJ
Total VOCs	-	**0.62244**	-	-	-	-	-	-	-	-	-	**0.0098**	-	-	-	**0.00027**	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBG3-15-07312025		SBG3-18-07312025		TRIP BLANK-1-07282025		TRIP BLANK-2-07282025		TRIP BLANK-1-07292025		TRIP BLANK-2-07292025		TRIP BLANK-3-07292025		TRIPBLANK-1-07312025		TRIPBLANK-2-07312025	
		L2548047-14		L2548047-15		L2547171-22		L2547171-23		L2547479-29		L2547479-30		L2547479-31		L2548047-16		L2548047-17	
		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025	
		15' BGS		18' BGS		-		-		-		-		-		-		-	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																		
VOLATILE ORGANICS BY EPA 5035 HIGH																			
1,1,1-Trichloroethane	500	<0.0089	U	-		<0.0084	U	<0.0084	U	<0.0084	U	<0.0084	UJ	<0.0084	UJ	<0.0084	U	<0.0084	U
1,1,2,2-Tetrachloroethane	-	<0.0088	U	-		<0.0083	U	<0.0083	U	<0.0083	U	<0.0083	UJ	<0.0083	UJ	<0.0083	U	<0.0083	U
1,1,2-Trichloroethane	-	<0.014	U	-		<0.013	U	<0.013	U	<0.013	U	<0.013	UJ	<0.013	UJ	<0.013	U	<0.013	U
1,1-Dichloroethane	240	<0.0077	U	-		<0.0072	U	<0.0072	U	<0.0072	U	<0.0072	UJ	<0.0072	UJ	<0.0072	U	<0.0072	U
1,1-Dichloroethene	500	<0.013	U	-		<0.012	U	<0.012	U	<0.012	U	<0.012	UJ	<0.012	UJ	<0.012	U	<0.012	U
1,2,4-Trichlorobenzene	-	<0.014	U	-		<0.014	U	<0.014	U	<0.014	U	<0.014	UJ	<0.014	UJ	<0.014	U	<0.014	U
1,2,4-Trimethylbenzene	190	<0.018	U	-		<0.017	U	<0.017	U	<0.017	U	<0.017	UJ	<0.017	UJ	<0.017	U	<0.017	U
1,2-Dibromo-3-chloropropane	-	<0.053	U	-		<0.05	U	<0.05	U	<0.05	U	<0.05	UJ	<0.05	UJ	<0.05	U	<0.05	U
1,2-Dibromoethane	-	<0.015	U	-		<0.014	U	<0.014	U	<0.014	U	<0.014	UJ	<0.014	UJ	<0.014	U	<0.014	U
1,2-Dichlorobenzene	500	<0.0076	U	-		<0.0072	U	<0.0072	U	<0.0072	U	<0.0072	UJ	<0.0072	UJ	<0.0072	U	<0.0072	U
1,2-Dichloroethane	30	<0.014	U	-		<0.013	U	<0.013	U	<0.013	U	<0.013	UJ	<0.013	UJ	<0.013	U	<0.013	U
1,2-Dichloropropane	-	<0.0066	U	-		<0.0062	U	<0.0062	U	<0.0062	U	<0.0062	UJ	<0.0062	UJ	<0.0062	U	<0.0062	U
1,3,5-Trimethylbenzene	190	<0.01	U	-		<0.0096	U	<0.0096	U	<0.0096	U	<0.0096	UJ	<0.0096	UJ	<0.0096	U	<0.0096	U
1,3-Dichlorobenzene	280	<0.0078	U	-		<0.0074	U	<0.0074	U	<0.0074	U	<0.0074	UJ	<0.0074	UJ	<0.0074	U	<0.0074	U
1,4-Dichlorobenzene	130	<0.0091	U	-		<0.0086	U	<0.0086	U	<0.0086	U	<0.0086	UJ	<0.0086	UJ	<0.0086	U	<0.0086	U
2-Butanone	500	<0.12	U	-		<0.11	U	<0.11	U	<0.11	U	<0.11	UJ	<0.11	UJ	<0.11	U	<0.11	U
2-Hexanone	-	<0.063	U	-		<0.059	U	<0.059	U	<0.059	U	<0.059	UJ	<0.059	UJ	<0.059	U	<0.059	U
4-Methyl-2-pentanone	-	<0.068	U	-		<0.064	U	<0.064	U	<0.064	U	<0.064	UJ	<0.064	UJ	<0.064	U	<0.064	U
Acetone	500	<0.26	U	-		<0.24	U	<0.24	U	<0.24	U	<0.24	UJ	<0.24	UJ	<0.24	U	<0.24	U
Benzene	44	<0.0088	U	-		<0.0083	U	<0.0083	U	<0.0083	U	<0.0083	UJ	<0.0083	UJ	<0.0083	U	<0.0083	U
Bromodichloromethane	-	<0.0058	U	-		<0.0054	U	<0.0054	U	<0.0054	U	<0.0054	UJ	<0.0054	UJ	<0.0054	U	<0.0054	U
Bromoform	-	<0.013	U	-		<0.012	U	<0.012	U	<0.012	U	<0.012	UJ	<0.012	UJ	<0.012	U	<0.012	U
Bromomethane	-	<0.031	U	-		<0.029	U	<0.029	U	<0.029	U	<0.029	UJ	<0.029	UJ	<0.029	U	<0.029	U
Carbon disulfide	-	<0.24	U	-		<0.23	U	<0.23	U	<0.23	U	<0.23	UJ	<0.23	UJ	<0.23	U	<0.23	U
Carbon tetrachloride	22	<0.012	U	-		<0.012	U	<0.012	U	<0.012	U	<0.012	UJ	<0.012	UJ	<0.012	U	<0.012	U
Chlorobenzene	500	<0.0067	U	-		<0.0064	U	<0.0064	U	<0.0064	U	<0.0064	UJ	<0.0064	UJ	<0.0064	U	<0.0064	U
Chloroethane	-	<0.024	U	-		<0.023	U	<0.023	U	<0.023	U	<0.023	UJ	<0.023	UJ	<0.023	U	<0.023	U
Chloroform	350	<0.0074	U	-		<0.007	U	<0.007	U	<0.007	U	<0.007	UJ	<0.007	UJ	<0.007	U	<0.007	U
Chloromethane	-	<0.049	U	-		<0.047	U	<0.047	U	<0.047	U	<0.047	UJ	<0.047	UJ	<0.047	U	<0.047	U
cis-1,2-Dichloroethene	500	<0.0093	U	-		<0.0088	U	<0.0088	U	<0.0088	U	<0.0088	UJ	<0.0088	UJ	<0.0088	U	<0.0088	U
cis-1,3-Dichloropropene	-	<0.0084	U	-		<0.0079	U	<0.0079	U	<0.0079	U	<0.0079	UJ	<0.0079	UJ	<0.0079	U	<0.0079	U
Cyclohexane	-	<0.029	U	-		<0.027	U	<0.027	U	<0.027	U	<0.027	UJ	<0.027	UJ	<0.027	U	<0.027	U
Dibromochloromethane	-	<0.0074	U	-		<0.007	U	<0.007	U	<0.007	U	<0.007	UJ	<0.007	UJ	<0.007	U	<0.007	U
Dichlorodifluoromethane	-	<0.048	U	-		<0.046	U	<0.046	U	<0.046	U	<0.046	UJ	<0.046	UJ	<0.046	U	<0.046	U
Ethylbenzene	390	<0.0075	U	-		<0.007	U	<0.007	U	<0.007	U	<0.007	UJ	<0.007	UJ	<0.007	U	<0.007	U
Freon-113	-	<0.037	U	-		<0.035	U	<0.035	U	<0.035	U	<0.035	UJ	<0.035	UJ	<0.035	U	<0.035	U
Isopropylbenzene	-	<0.0058	U	-		<0.0054	U	<0.0054	U	<0.0054	U	<0.0054	UJ	<0.0054	UJ	<0.0054	U	<0.0054	U
Methyl Acetate	-	<0.05	U	-		<0.048	U	<0.048	U	<0.048	U	<0.048	UJ	<0.048	UJ	<0.048	U	<0.048	U
Methyl cyclohexane	-	<0.032	U	-		<0.03	U	<0.03	U	<0.03	U	<0.03	UJ	<0.03	UJ	<0.03	U	<0.03	U
Methyl tert butyl ether	500	<0.011	U	-		<0.01	U	<0.01	U	<0.01	U	<0.01	UJ	<0.01	UJ	<0.01	U	<0.01	U
Methylene chloride	500	<0.12	U	-		<0.11	U	<0.11	U	<0.11	U	<0.11	UJ	<0.11	UJ	<0.11	U	<0.11	U
n-Butylbenzene	500	<0.0089	U	-		<0.0084	U	<0.0084	U	<0.0084	U	<0.0084	UJ	<0.0084	UJ	<0.0084	U	<0.0084	U
n-Propylbenzene	500	<0.0091	U	-		<0.0086	U	<0.0086	U	<0.0086	U	<0.0086	UJ	<0.0086	UJ	<0.0086	U	<0.0086	U
Naphthalene	500	**1.3**		-		<0.032	U	<0.032	U	<0.032	U	<0.032	UJ	<0.032	UJ	<0.032	U	<0.032	U
o-Xylene	-	<0.015	U	-		<0.014	U	<0.014	U	<0.014	U	<0.014	UJ	<0.014	UJ	<0.014	U	<0.014	U
p-Isopropyltoluene	-	<0.0058	U	-		<0.0054	U	<0.0054	U	<0.0054	U	<0.0054	UJ	<0.0054	UJ	<0.0054	U	<0.0054	U
p/m-Xylene	-	<0.03	U	-		<0.028	U	<0.028	U	**0.032**	J	<0.028	UJ	<0.028	UJ	<0.028	U	<0.028	U
sec-Butylbenzene	500	<0.0077	U	-		<0.0073	U	<0.0073	U	<0.0073	U	<0.0073	UJ	<0.0073	UJ	<0.0073	U	<0.0073	U
Styrene	-	<0.01	U	-		<0.0098	U	<0.0098	U	<0.0098	U	<0.0098	UJ	<0.0098	UJ	<0.0098	U	<0.0098	U
tert-Butylbenzene	500	<0.0063	U	-		<0.0059	U	<0.0059	U	<0.0059	U	<0.0059	UJ	<0.0059	UJ	<0.0059	U	<0.0059	U
Tetrachloroethene	150	<0.01	U	-		<0.0098	U	<0.0098	U	<0.0098	U	<0.0098	UJ	<0.0098	UJ	<0.0098	U	<0.0098	U
Toluene	500	<0.029	U	-		<0.027	U	<0.027	U	**0.032**	J	<0.027	UJ	<0.027	UJ	<0.027	U	<0.027	U
trans-1,2-Dichloroethene	500	<0.0073	U	-		<0.0068	U	<0.0068	U	<0.0068	U	<0.0068	UJ	<0.0068	UJ	<0.0068	U	<0.0068	U
trans-1,3-Dichloropropene	-	<0.014	U	-		<0.014	U	<0.014	U	<0.014	U	<0.014	UJ	<0.014	UJ	<0.014	U	<0.014	U
Trichloroethene	200	<0.0073	U	-		<0.0068	U	<0.0068	U	<0.0068	U	<0.0068	UJ	<0.0068	UJ	<0.0068	U	<0.0068	U
Trichlorofluoromethane	-	<0.037	U	-		<0.035	U	<0.035	U	<0.035	U	<0.035	UJ	<0.035	UJ	<0.035	U	<0.035	U
Vinyl chloride	13	<0.018	U	-		<0.017	U	<0.017	U	<0.017	U	<0.017	UJ	<0.017	UJ	<0.017	U	<0.017	U
Total VOCs	-	**1.3**	-	-	-	-	-	-	-	**0.064**	-	-	-	-	-	-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBG3-15-07312025		SBG3-18-07312025		TRIP BLANK-1-07282025		TRIP BLANK-2-07282025		TRIP BLANK-1-07292025		TRIP BLANK-2-07292025		TRIP BLANK-3-07292025		TRIPBLANK-1-07312025		TRIPBLANK-2-07312025	
		L2548047-14		L2548047-15		L2547171-22		L2547171-23		L2547479-29		L2547479-30		L2547479-31		L2548047-16		L2548047-17	
		7/31/2025		7/31/2025		7/28/2025		7/28/2025		7/29/2025		7/29/2025		7/29/2025		7/31/2025		7/31/2025	
		15' BGS		18' BGS		-		-		-		-		-		-		-	
		SOLID		SOLID		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Commercial SCO (mg/kg)																		
PERFLUORINATED ALKYL ACIDS BY EPA 1633																			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)		<0.00004	U	<0.00004	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		<0.000258	U	<0.000258	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)		<0.000077	U	<0.000077	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		<0.000148	U	<0.000147	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)		<0.000235	U	<0.000235	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)		<0.000364	U	<0.000364	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Perfluoropropyl Propanoic Acid (3:3FTCA)		<0.000092	U	<0.000092	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)		<0.00003	U	<0.000029	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)		<0.00003	U	<0.000029	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)		<0.000038	U	<0.000038	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)		<0.000022	U	<0.000022	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)		<0.000081	U	<0.000081	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		<0.000044	U	<0.000044	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)		<0.000026	U	<0.000026	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)		<0.000121	U	<0.000121	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		<0.000085	U	<0.000085	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)		<0.000082	U	<0.000082	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)		<0.000046	U	<0.000046	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoro-3-Methoxypropanoic Acid (PFMPA)		<0.000017	U	<0.000017	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoro-4-Methoxybutanoic Acid (PFMBA)		<0.000024	U	<0.000024	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutanesulfonic Acid (PFBS)		<0.00002	U	<0.00002	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutanoic Acid (PFBA)		<0.000028	U	<0.000028	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanesulfonic Acid (PFDS)		<0.000014	U	<0.000014	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic Acid (PFDA)		<0.000035	U	<0.000035	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorododecanesulfonic Acid (PFDoS)		<0.000022	U	<0.000022	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorododecanoic Acid (PFDoA)		<0.000021	U	<0.000021	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptanesulfonic Acid (PFHpS)		<0.000045	U	<0.000045	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptanoic Acid (PFHpA)		<0.000012	U	<0.000012	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexanesulfonic Acid (PFHxS)		<0.00002	U	<0.00002	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexanoic Acid (PFHxA)		<0.000015	U	<0.000015	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorononanesulfonic Acid (PFNS)		<0.00003	U	<0.000029	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorononanoic Acid (PFNA)		<0.000013	U	<0.000013	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctanesulfonamide (PFOSA)		<0.00001	U	<0.00001	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctanesulfonic Acid (PFOS)		<0.000031	U	<0.000031	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctanoic Acid (PFOA)		<0.000026	U	<0.000026	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoropentanesulfonic Acid (PFPeS)		<0.000026	U	<0.000026	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoropentanoic Acid (PFPeA)		<0.000038	U	<0.000038	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic Acid (PFTeDA)		<0.000024	U	<0.000024	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotridecanoic Acid (PFTrDA)		<0.000016	U	<0.000016	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroundecanoic Acid (PFUnA)		<0.000013	U	<0.000013	U	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBG3-15-07312025		SBG3-18-07312025		TRIP BLANK-1-07282025	TRIP BLANK-2-07282025	TRIP BLANK-1-07292025	TRIP BLANK-2-07292025	TRIP BLANK-3-07292025	TRIPBLANK-1-07312025		TRIPBLANK-2-07312025	
		L2548047-14		L2548047-15		L2547171-22	L2547171-23	L2547479-29	L2547479-30	L2547479-31	L2548047-16		L2548047-17	
		7/31/2025		7/31/2025		7/28/2025	7/28/2025	7/29/2025	7/29/2025	7/29/2025	7/31/2025		7/31/2025	
		15' BGS		18' BGS		-	-	-	-	-	-		-	
		SOLID		SOLID		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		SOIL	
	Commercial SCO (mg/kg)													
SEMIVOLATILE ORGANICS BY GC/MS														
1,2,4,5-Tetrachlorobenzene	-	<0.098	U	<0.02	U						-	-	-	-
1,4-Dioxane	130	<0.043	U	<0.0089	U						-	-	-	-
2,3,4,6-Tetrachlorophenol	-	<0.19	U	<0.039	U						-	-	-	-
2,4,5-Trichlorophenol	-	<0.18	U	<0.037	U						-	-	-	-
2,4,6-Trichlorophenol	-	<0.18	U	<0.036	U						-	-	-	-
2,4-Dichlorophenol	-	<0.15	U	<0.031	U						-	-	-	-
2,4-Dimethylphenol	-	<0.31	U	<0.064	U						-	-	-	-
2,4-Dinitrophenol	-	<0.44	U	<0.09	U						-	-	-	-
2,4-Dinitrotoluene	-	<0.19	U	<0.039	U						-	-	-	-
2,6-Dinitrotoluene	-	<0.16	U	<0.033	U						-	-	-	-
2-Chloronaphthalene	-	<0.094	U	<0.019	U						-	-	-	-
2-Chlorophenol	-	<0.11	U	<0.023	U						-	-	-	-
2-Methylnaphthalene	-	**2.5**		<0.023	U						-	-	-	-
2-Methylphenol	500	<0.15	U	<0.03	U						-	-	-	-
2-Nitroaniline	-	<0.18	U	<0.037	U						-	-	-	-
2-Nitrophenol	-	<0.35	U	<0.072	U						-	-	-	-
3,3'-Dichlorobenzidine	-	<0.25	U	<0.051	U						-	-	-	-
3-Methylphenol/4-Methylphenol	500	<0.15	U	<0.03	U						-	-	-	-
3-Nitroaniline	-	<0.18	U	<0.036	U						-	-	-	-
4,6-Dinitro-o-cresol	-	<0.45	U	<0.093	U						-	-	-	-
4-Bromophenyl phenyl ether	-	<0.14	U	<0.029	U						-	-	-	-
4-Chloroaniline	-	<0.17	U	<0.035	U						-	-	-	-
4-Chlorophenyl phenyl ether	-	<0.1	U	<0.021	U						-	-	-	-
4-Nitroaniline	-	<0.39	U	<0.08	U						-	-	-	-
4-Nitrophenol	-	<0.38	U	<0.079	U						-	-	-	-
Acenaphthene	500	**1.5**		<0.02	U						-	-	-	-
Acenaphthylene	500	**0.88**		<0.03	U						-	-	-	-
Acetophenone	-	<0.12	U	<0.024	U						-	-	-	-
Anthracene	500	**1.5**		<0.038	U						-	-	-	-
Atrazine	-	<0.33	U	<0.068	U						-	-	-	-
Benzaldehyde	-	<0.25	U	<0.052	U						-	-	-	-
Benzo(a)anthracene	5.6	**1.3**		<0.022	U						-	-	-	-
Benzo(a)pyrene	1	**1.1**		<0.047	U						-	-	-	-
Benzo(b)fluoranthene	5.6	**1.3**		<0.032	U						-	-	-	-
Benzo(ghi)perylene	500	**0.55**	J	<0.023	U						-	-	-	-
Benzo(k)fluoranthene	56	**0.5**	J	<0.031	U						-	-	-	-
Biphenyl	-	**0.46**	J	<0.025	U						-	-	-	-
Bis(2-chloroethoxy)methane	-	<0.094	U	<0.019	U						-	-	-	-
Bis(2-chloroethyl)ether	-	<0.13	U	<0.026	U						-	-	-	-
Bis(2-chloroisopropyl)ether	-	<0.16	U	<0.033	U						-	-	-	-
Bis(2-ethylhexyl)phthalate	-	<0.33	U	<0.067	U						-	-	-	-
Butyl benzyl phthalate	-	<0.24	U	<0.049	U						-	-	-	-
Caprolactam	-	<0.29	U	<0.059	U						-	-	-	-
Carbazole	-	**0.57**	J	<0.019	U						-	-	-	-
Chrysene	56	**1.2**		<0.02	U						-	-	-	-
Di-n-butylphthalate	-	<0.18	U	<0.036	U						-	-	-	-
Di-n-octylphthalate	-	<0.32	U	<0.066	U						-	-	-	-
Dibenzo(a,h)anthracene	0.56	**0.15**	J	<0.022	U						-	-	-	-
Dibenzofuran	350	**1.4**		<0.018	U						-	-	-	-
Diethyl phthalate	-	<0.087	U	<0.018	U						-	-	-	-
Dimethyl phthalate	-	<0.2	U	<0.04	U						-	-	-	-
Fluoranthene	500	**4.1**		<0.022	U						-	-	-	-
Fluorene	500	**1.9**		<0.019	U						-	-	-	-
Hexachlorobenzene	6	<0.1	U	<0.022	U						-	-	-	-
Hexachlorobutadiene	-	<0.14	U	<0.028	U						-	-	-	-
Hexachlorocyclopentadiene	-	<0.85	U	<0.17	U						-	-	-	-
Hexachloroethane	-	<0.15	U	<0.031	U						-	-	-	-
Indeno(1,2,3-cd)pyrene	5.6	**0.63**	J	<0.027	U						-	-	-	-
Isophorone	-	<0.12	U	<0.025	U						-	-	-	-
n-Nitrosodi-n-propylamine	-	<0.14	U	<0.03	U						-	-	-	-
Naphthalene	500	**11**		**0.11**	J						-	-	-	-
NDPA/DPA	-	<0.11	U	<0.022	U						-	-	-	-
Nitrobenzene	-	<0.14	U	<0.028	U						-	-	-	-
p-Chloro-m-cresol	-	<0.14	U	<0.029	U						-	-	-	-
Pentachlorophenol	6.7	<0.21	U	<0.042	U						-	-	-	-
Phenanthrene	500	**5.8**		<0.023	U						-	-	-	-
Phenol	500	<0.14	U	<0.029	U						-	-	-	-
Pyrene	500	**2.8**		<0.019	U						-	-	-	-
Total SVOCs	-	**41.14**	-	**0.11**	-	-	-	-	-	-	-	-	-	-
CHLORINATED HERBICIDES BY GC														
2,4,5-T	-	<0.00586	U	<0.00598	U						-	-	-	-
2,4,5-TP (Silvex)	500	<0.00503	U	<0.00513	U						-	-	-	-
2,4-D	-	<0.0119	U	<0.0121	U						-	-	-	-

Table 3-4
Consolidation Area Sampling
Silty Clay - Import Sampling
Riverview Innovation & Technolgy Campus, Inc.
Site No. C915353
Town of Tonawanda, New York

ANALYTE		SBG3-15-07312025		SBG3-18-07312025		TRIP BLANK-1-07282025	TRIP BLANK-2-07282025	TRIP BLANK-1-07292025	TRIP BLANK-2-07292025	TRIP BLANK-3-07292025	TRIPBLANK-1-07312025	TRIPBLANK-2-07312025
		L2548047-14		L2548047-15		L2547171-22	L2547171-23	L2547479-29	L2547479-30	L2547479-31	L2548047-16	L2548047-17
		7/31/2025		7/31/2025		7/28/2025	7/28/2025	7/29/2025	7/29/2025	7/29/2025	7/31/2025	7/31/2025
		15' BGS		18' BGS		-	-	-	-	-	-	-
		SOLID		SOLID		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Commercial SCO (mg/kg)											
ORGANOCHLORINE PESTICIDES BY GC												
4,4'-DDD	92	<0.00192	U	<0.00176	U						- -	- -
4,4'-DDE	62	<0.00124	U	<0.00114	U						- -	- -
4,4'-DDT	47	<0.00433	U	<0.00397	U						- -	- -
Aldrin	0.68	<0.0019	U	<0.00174	U						- -	- -
Alpha-BHC	3.4	<0.000637	U	<0.000585	U						- -	- -
Beta-BHC	3	<0.00204	U	<0.00187	U						- -	- -
Chlordane	-	<0.0178	U	<0.0164	U						- -	- -
cis-Chlordane	24	<0.00188	U	<0.00172	U						- -	- -
Delta-BHC	500	<0.00105	U	<0.000968	U						- -	- -
Dieldrin	1.4	<0.00168	U	<0.00154	U						- -	- -
Endosulfan I	200	<0.00127	U	<0.00117	U						- -	- -
Endosulfan II	200	<0.0018	U	<0.00165	U						- -	- -
Endosulfan sulfate	200	<0.00107	U	<0.00098	U						- -	- -
Endrin	89	<0.00092	U	<0.000844	U						- -	- -
Endrin aldehyde	-	<0.00236	U	<0.00216	U						- -	- -
Endrin ketone	-	<0.00139	U	<0.00127	U						- -	- -
Heptachlor	15	<0.00121	U	<0.00111	U						- -	- -
Heptachlor epoxide		<0.00303	U	<0.00278	U						- -	- -
Lindane	9.2	<0.001	U	<0.00092	U						- -	- -
Methoxychlor	-	<0.00314	U	<0.00288	U						- -	- -
Toxaphene	-	<0.0283	U	<0.0259	U						- -	- -
trans-Chlordane	-	<0.00178	U	<0.00163	U						- -	- -
POLYCHLORINATED BIPHENYLS BY GC												
Aroclor 1016	1	<0.0048	U	<0.00515	U						- -	- -
Aroclor 1221	1	<0.00541	U	<0.00581	U						- -	- -
Aroclor 1232	1	<0.0114	U	<0.0123	U						- -	- -
Aroclor 1242	1	<0.00728	U	<0.00782	U						- -	- -
Aroclor 1248	1	<0.00811	U	<0.0087	U						- -	- -
Aroclor 1254	1	<0.00591	U	<0.00635	U						- -	- -
Aroclor 1260	1	<0.00999	U	<0.0107	U						- -	- -
Aroclor 1262	1	<0.00686	U	<0.00737	U						- -	- -
Aroclor 1268	1	<0.0056	U	<0.00601	U						- -	- -
PCBs, Total	1	<0.0048	U	<0.00515	U						- -	- -
TOTAL METALS												
Aluminum, Total	-	**7380**	J	**9130**	J						- -	- -
Antimony, Total	-	<3.51	UJ	<3.58	UJ						- -	- -
Arsenic, Total	16	**3.06**	J	**2.69**	J						- -	- -
Barium, Total	400	**69**		**55.1**							- -	- -
Beryllium, Total	590	**0.364**	J	**0.436**	J						- -	- -
Cadmium, Total	9.3	<0.05	U	<0.051	U						- -	- -
Calcium, Total	-	**42800**	J	**46400**	J						- -	- -
Chromium, Total	-	**11.6**	J	**14.3**	J						- -	- -
Cobalt, Total	-	**8.75**	J	**7.7**	J						- -	- -
Copper, Total	270	**13**	J	**23**	J						- -	- -
Iron, Total	-	**15100**	J	**17900**	J						- -	- -
Lead, Total	1000	**8.36**		**9.63**							- -	- -
Magnesium, Total	-	**14200**		**14300**							- -	- -
Manganese, Total	10000	**426**	J	**443**	J						- -	- -
Mercury, Total	2.8	<0.055	U	<0.053	U						- -	- -
Nickel, Total	310	**17.4**	J	**18.9**	J						- -	- -
Potassium, Total	-	**1020**		**1290**							- -	- -
Selenium, Total	1500	<0.3	UJ	<0.306	UJ						- -	- -
Silver, Total	1500	<0.271	U	<0.277	U						- -	- -
Sodium, Total	-	**134**	J	**134**	J						- -	- -
Thallium, Total	-	<0.821	U	<0.839	U						- -	- -
Vanadium, Total	-	**14.9**		**18**							- -	- -
Zinc, Total	10000	**44.4**	J	**52.1**	J						- -	- -
GENERAL CHEMISTRY												
Cyanide, Total	27	<0.24	U	<0.23	U						- -	- -
Nitrogen, Ammonia	-	**8.4**		<3.1	U						- -	- -
Solids, Total	-	**87.7**		**84.9**							- -	- -

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCF
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 37

Table 3-5
PreDesign Investigation Borrow Area Sampling
3875 River Road
Tonawanda, New York

ANALYTE					SAMPLE ID:		SB-BCP-01-12TO14-05152023		SB-BCP-01-18TO20-05152023		SB-BCP-01-22TO24-05152023		SB-BCP-01-8TO10-05152023		SB-BCP-02-10TO12-05152023		SB-BCP-02-14TO16-05152023		SB-BCP-02-20TO22-05152023		SB-BCP-02-4TO6-05152023		SB-BCP-03-12TO14-05162023		SB-BCP-03-20TO22-05162023		SB-BCP-03-24TO26-05162023		SB-BCP-03-8TO10-05162023		SB-BCP-04-14TO16-05162023		SB-BCP-04-20TO22-05162023		SB-BCP-04-2TO4-05162023		SB-BCP-04-8TO10-05162023	
					LAB ID:		L2327220-02		L2327220-03		L2327220-04		L2327220-01		L2327220-06		L2327220-07		L2327220-08		L2327220-05		L2327169-02		L2327169-03		L2327169-04		L2327169-01		L2327169-07		L2327169-08		L2327169-05		L2327169-06	
					COLLECTION DATE:		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/15/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023		5/16/2023	
					SAMPLE DEPTH:		12-14'		18-20'		22-24'		8-10'		10-12'		14-16'		20-22'		4-6'		12-14'		20-22'		24-26'		8-10'		14-16'		20-22'		2-4'		8-10'	
					SAMPLE MATRIX:		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	CAS	Unrestricted SCOs (mg/kg)	Commerical SCOs (mg/kg)	Industrial SCOs (mg/kg)																																		
VOLATILE ORGANICS BY GC/MS																																						
1,1,1-Trichloroethane	71-55-6	0.68	500	1000	<0.00019	U	<0.00016	U	<0.00021	U	<0.00016	U	<0.00019	U	<0.0002	U	<0.00015	U	<0.00018	U	<0.00019	U	<0.00016	U	<0.00027	U	<0.00019	U	<0.0002	U	<0.00026	U	<0.00019	U	<0.00022	U
1,1,2,2-Tetrachloroethane	79-34-5				<0.00019	U	<0.00016	U	<0.00021	U	<0.00016	U	<0.00019	U	<0.0002	U	<0.00015	U	<0.00018	U	<0.00019	U	<0.00016	U	<0.00027	U	<0.00019	U	<0.0002	U	<0.00026	U	<0.00019	U	<0.00022	U
1,1,2-Trichloroethane	79-00-5				<0.00031	U	<0.00026	U	<0.00034	U	<0.00025	U	<0.0003	U	<0.00032	U	<0.00024	U	<0.00028	U	<0.00031	U	<0.00026	U	<0.00043	U	<0.0003	U	<0.00032	U	<0.00042	U	<0.0003	U	<0.00035	U
1,1-Dichloroethane	75-34-3	0.27	240	480	<0.00017	U	<0.00014	U	<0.00018	U	<0.00014	U	<0.00016	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00017	U	<0.00014	U	<0.00023	U	<0.00016	U	<0.00017	U	<0.00023	U	<0.00017	U	<0.00019	U
1,1-Dichloroethene	75-35-4	0.33	500	1000	<0.00027	U	<0.00023	U	<0.0003	U	<0.00022	U	<0.00027	U	<0.00028	U	<0.00022	U	<0.00025	U	<0.00028	U	<0.00023	U	<0.00038	U	<0.00027	U	<0.00029	U	<0.00038	U	<0.00027	U	<0.00031	U
1,2,3-Trichlorobenzene	87-61-6				<0.00037	U	<0.00031	U	<0.00041	U	<0.0003	U	<0.00036	U	<0.00038	U	<0.00029	U	<0.00034	U	<0.00037	U	<0.00031	U	<0.00052	U	<0.00037	U	<0.00039	U	<0.00051	U	<0.00037	U	<0.00042	U
1,2,4-Trichlorobenzene	120-82-1				<0.00031	U	<0.00026	U	<0.00034	U	<0.00026	U	<0.00031	U	<0.00032	U	<0.00025	U	<0.00029	U	<0.00034	U	<0.00032	U	<0.00026	U	<0.00044	U	<0.00031	U	<0.00033	U	<0.00043	U	<0.00031	U	<0.00036	U
1,2,4-Trimethylbenzene	95-63-6	3.6	190	380																																		
1,2-Dibromo-3-chloropropane	96-12-8				<0.0012	U	<0.00097	U	<0.0013	U	<0.00094	U	<0.0011	U	<0.0012	U	<0.00091	U	<0.001	U	<0.0012	U	<0.00096	U	<0.0016	U	<0.0011	U	<0.0012	U	<0.0016	U	<0.0011	U	<0.0013	U
1,2-Dibromoethane	106-93-4				<0.00032	U	<0.00027	U	<0.00035	U	<0.00026	U	<0.00031	U	<0.00033	U	<0.00025	U	<0.0003	U	<0.00032	U	<0.00027	U	<0.00045	U	<0.00032	U	<0.00034	U	<0.00044	U	<0.00032	U	<0.00037	U
1,2-Dichlorobenzene	95-50-1	1.1	500	1000	<0.00017	U	<0.00014	U	<0.00018	U	<0.00014	U	<0.00016	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00017	U	<0.00014	U	<0.00023	U	<0.00016	U	<0.00017	U	<0.00023	U	<0.00016	U	<0.00019	U
1,2-Dichloroethane	107-06-2	0.02	30	60	<0.0003	U	<0.00025	U	<0.00032	U	<0.00024	U	<0.00029	U	<0.0003	U	<0.00023	U	<0.00027	U	<0.0003	U	<0.00025	U	<0.00041	U	<0.00029	U	<0.00031	U	<0.00041	U	<0.00029	U	<0.00034	U
1,2-Dichloropropane	78-87-5				<0.00014	U	<0.00012	U	<0.00016	U	<0.00012	U	<0.00014	U	<0.00015	U	<0.00011	U	<0.00013	U	<0.00014	U	<0.00012	U	<0.0002	U	<0.00014	U	<0.00015	U	<0.0002	U	<0.00014	U	<0.00016	U
1,3-Dichlorobenzene	541-73-1	2.4	280	560	<0.00017	U	<0.00014	U	<0.00019	U	<0.00014	U	<0.00017	U	<0.00018	U	<0.00013	U	<0.00016	U	<0.00017	U	<0.00014	U	<0.00024	U	<0.00017	U	<0.00018	U	<0.00024	U	<0.00017	U	<0.00019	U
1,4-Dichlorobenzene	106-46-7	1.8	130	250	<0.0002	U	<0.00017	U	<0.00022	U	<0.00016	U	<0.00019	U	<0.0002	U	<0.00016	U	<0.00018	U	<0.0002	U	<0.00016	U	<0.00027	U	<0.0002	U	<0.00021	U	<0.00027	U	<0.0002	U	<0.00022	U
1,4-Dioxane	123-91-1	0.1	130	250	<0.04	U	<0.034	U	<0.044	U	<0.033	U	<0.04	U	<0.042	U	<0.032	U	<0.037	U	<0.041	U	<0.034	U	<0.056	U	<0.04	U	<0.042	U	<0.056	U	<0.04	U	<0.046	U
1,3,5-Trimethylbenzene	108-67-8	8.4	190	380																																		
1,3-Dichlorobenzene	541-73-1	2.4	280	560	<0.00017	U							<0.00014	U																								
1,4-Dichlorobenzene	106-46-7	1.8	130	250	<0.00020	U							<0.00016	U																								
2-Butanone	78-93-3	0.12	500	1000	<0.0026	U	<0.0022	U	<0.0028	U	<0.0021	U	<0.0025	U	<0.0026	U	<0.002	U	<0.0023	U	<0.0026	U	<0.0021	U	<0.0036	U	<0.0025	U	<0.0027	U	<0.0035	U	<0.0025	U	<0.0029	U
2-Hexanone	591-78-6				<0.0014	U	<0.0011	U	<0.0015	U	<0.0011	U	<0.0013	U	<0.0014	U	<0.0012	U	<0.0013	U	<0.0014	U	<0.0011	U	<0.0019	U	<0.0013	U	<0.0014	U	<0.0018	U	<0.0014	U	<0.0016	U
4-Methyl-2-pentanone	108-10-1				<0.0015	U	<0.0012	U	<0.0016	U	<0.0012	U	<0.0014	U	<0.0015	U	<0.0012	U	<0.0014	U	<0.0015	U	<0.0012	U	<0.002	U	<0.0015	U	<0.0015	U	<0.002	U	<0.0015	U	<0.0017	U
Acetone	67-64-1	0.05	500	1000	<0.0056	U	**0.011**		<0.0061	U	<0.0045	U	<0.0054	U	<0.0057	U	**0.0096**		<0.0051	U	<0.0056	U	<0.0046	U	<0.0077	U	<0.0055	U	<0.0058	U	**0.012**	J	<0.0055	U	<0.0063	U
Aniline	62-53-3	0.05	36	36																																		
Benzene	71-43-2	0.06	44	89	<0.00019	U	<0.00016	U	<0.00021	U	<0.00016	U	<0.00019	U	<0.0002	U	<0.00015	U	<0.00018	U	<0.00019	U	<0.00016	U	<0.00027	U	<0.00019	U	<0.0002	U	<0.00026	U	<0.00019	U	<0.00022	U
Bromochloromethane	74-97-5				<0.00024	U	<0.0002	U	<0.00026	U	<0.00019	U	<0.00023	U	<0.00024	U	<0.00019	U	<0.00022	U	<0.00024	U	<0.0002	U	<0.00033	U	<0.00023	U	<0.00025	U	<0.00032	U	<0.00023	U	<0.00027	U
Bromodichloromethane	75-27-4				<0.00012	U	<0.00011	U	<0.00014	U	<0.0001	U	<0.00012	U	<0.00013	U	<0.0001	U	<0.00012	U	<0.00013	U	<0.0001	U	<0.00017	U	<0.00012	U	<0.00013	U	<0.00017	U	<0.00012	U	<0.00014	U
Bromoform	75-25-2				<0.00028	U	<0.00024	U	<0.00031	U	<0.00023	U	<0.00028	U	<0.00029	U	<0.00022	U	<0.00026	U	<0.00028	U	<0.00024	U	<0.00039	U	<0.00028	U	<0.0003	U	<0.00039	U	<0.00028	U	<0.00032	U
Bromomethane	74-83-9				<0.00067	U	<0.00056	U	<0.00074	U	<0.00054	U	<0.00066	U	<0.00069	U	<0.00053	U	<0.00061	U	<0.00067	U	<0.00056	U	<0.00093	U	<0.00066	U	<0.0007	U	<0.00092	U	<0.00066	U	<0.00076	U
Carbon disulfide	75-15-0				<0.0052	U	<0.0044	U	<0.0058	U	<0.0043	U	<0.0051	U	<0.0054	U	<0.0041	U	<0.0048	U	<0.0053	U	<0.0044	U	<0.0073	U	<0.0052	U	<0.0055	U	<0.0072	U	<0.0052	U	<0.006	U
Carbon tetrachloride	56-23-5	0.76	22	44	<0.00026	U	<0.00022	U	<0.00029	U	<0.00022	U	<0.00026	U	<0.00027	U	<0.00021	U	<0.00024	U	<0.00027	U	<0.00022	U	<0.00037	U	<0.00026	U	<0.00028	U	<0.00036	U	<0.00026	U	<0.0003	U
Chlorobenzene	108-90-7	1.1	500	1000	<0.00015	U	<0.00012	U	<0.00016	U	<0.00012	U	<0.00014	U	<0.00015	U	<0.00012	U	<0.00013	U	<0.00015	U	<0.00012	U	<0.0002	U	<0.00014	U	<0.00015	U	<0.0002	U	<0.00014	U	<0.00017	U
Chloroethane	75-00-3				<0.00052	U	<0.00044	U	<0.00057	U	<0.00042	U	<0.00051	U	<0.00054	U	<0.00041	U	<0.00048	U	<0.00052	U	<0.00044	U	<0.00072	U	<0.00052	U	<0.00054	U	<0.00072	U	<0.00052	U	<0.00059	U
Chloroform	67-66-3	0.37	350	700	<0.00016	U	<0.00014	U	<0.00018	U	<0.00013	U	<0.00016	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00014	U	<0.00022	U	<0.00016	U	<0.00017	U	<0.00022	U	<0.00016	U	<0.00018	U
Chloromethane	74-87-3				<0.0011	U	<0.00091	U	<0.0012	U	<0.00087	U	<0.001	U	<0.0011	U	<0.00085	U	<0.00098	U	<0.0011	U	<0.0009	U	<0.0015	U	<0.0011	U	<0.0011	U	<0.0015	U	<0.0011	U	<0.0012	U
cis-1,2-Dichloroethene	156-59-2	0.25	500	1000	<0.0002	U	<0.00017	U	<0.00022	U	<0.00016	U	<0.0002	U	<0.00021	U	<0.00016	U	<0.00018	U	<0.0002	U	<0.00017	U	<0.00028	U	<0.0002	U	<0.00021	U	<0.00028	U	<0.0002	U	<0.00023	U
cis-1,3-Dichloropropene	10061-01-5				<0.00018	U	<0.00015	U	<0.0002	U	<0.00015	U	<0.00018	U	<0.00019	U	<0.00014	U	<0.00017	U	<0.00018	U	<0.00015	U	<0.00025	U	<0.00018	U	<0.00019	U	<0.00025	U	<0.00018	U	<0.00021	U
Cyclohexane	110-82-7				<0.00063	U	<0.00053	U	<0.00069	U	<0.00051	U	<0.00061	U	<0.00065	U	<0.0005	U	<0.00058	U	<0.00063	U	<0.00052	U	<0.00087	U	<0.00062	U	<0.00066	U	<0.00086	U	<0.00062	U	<0.00072	U
Dibromochloromethane	124-48-1				<0.00016	U	<0.00014	U	<0.00018	U	<0.00013	U	<0.00016	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00014	U	<0.00022	U	<0.00016	U	<0.00017	U	<0.00022	U	<0.00016	U	<0.00018	U
Dichlorodifluoromethane	75-71-8				<0.001	U	<0.00089	U	<0.0012	U	<0.00086	U	<0.001	U	<0.0011	U	<0.00083	U	<0.00097	U	<0.0011	U	<0.00088	U	<0.0015	U	<0.001	U	<0.0011	U	<0.0014	U	<0.001	U	<0.0012	U
Ethylbenzene	100-41-4	1	390	780	<0.00016	U	<0.00014	U	<0.00018	U	<0.00013	U	<0.00016	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00014	U	<0.00023	U	<0.00016	U	<0.00017	U	<0.00022	U	<0.00016	U	<0.00018	U
Freon-113	76-13-1				<0.0008	U	<0.00067	U	<0.00088	U	<0.00065	U	<0.00078	U	<0.00082	U	<0.00063	U	<0.00073	U	<0.0008	U	<0.00067	U	<0.0011	U	<0.00079	U	<0.00084	U	<0.0011	U	<0.00079	U	<0.00091	U
Hexachlorobenzene	118-74-1																																					
Isopropylbenzene	98-82-8				<0.00012	U	<0.00011	U	<0.00014	U	<0.0001	U	<0.00012	U	<0.00013	U	<0.0001	U	<0.00012	U	<0.00013	U	<0.0001	U	<0.00017	U	<0.00012	U	<0.00013	U	<0.00017	U	<0.00012	U	<0.00014	U
Methyl Acetate	79-20-9				<0.0011	U	<0.00092	U	<0.0012	U	<0.00089	U	<0.0011	U	<0.0011	U	<0.00086	U	<0.001	U	<0.0011	U	<0.00092	U	<0.0015	U	<0.0011	U	<0.0011	U	<0.0015	U	<0.0011	U	<0.0012	U
Methyl cyclohexane	108-87-2				<0.0007	U	<0.00059	U	<0.00076	U	<0.00056	U	<0.00068	U	<0.00072	U	<0.00055	U	<0.00064	U	<0.0007	U	<0.00058	U	<0.0009	U	<0.00069	U	<0.00073	U	<0.0009	U	<0.00069	U	<0.00079	U
Methyl tert butyl ether	1634-04-4	0.93	500	1000	<0.00023	U	<0.0002	U	<0.00025	U	<0.00019	U	<0.00023	U	<0.00024	U	<0.00018	U	<0.00021	U	<0.00023	U	<0.00019	U	<0.00032	U	<0.00023	U	<0.00024	U	<0.00032	U	<0.00023	U	<0.00026	U
Methylene chloride	75-09-2	0.05	500	1000	<0.0026	U	<0.0022	U	<0.0029	U	<0.0021	U	<0.0026	U	<0.0027	U	<0.0021	U	<0.0024	U	<0.0026	U	<0.0022	U	<0.0037	U	<0.0026	U	<0.0028	U	<0.0036	U	<0.0026	U	<0.003	U
n-Butylbenzene	104-51-8	12	500	1000																																		
n-Propylbenzene	103-65-1	3.9	500	1000																																		
Naphthalene	91-20-3	12	500	1000																																		
Nitrobenzene	98-95-3	0.08	8.9	8.9																																		
o-Xylene	95-47-6				<0.00034	U	<0.00028	U	<0.00037	U	<0.00027	U	<0.00033	U	<0.00034	U	<0.00026	U	<0.00031	U	<0.00034	U	<0.00028	U	<0.00047	U	<0.00033	U	<0.00035	U	<0.00046	U	<0.00033	U	<0.00038	U
p-Isopropyltoluene	99-87-6																																					
p/m-Xylene	179601-23-1	0.26	500	1000	<0.00065	U	<0.00054	U	<0.00071	U	<0.00052	U	<0.00063	U	<0.00066	U	<0.00051	U	<0.00059	U	<0.00065	U	<0.00054	U	<0.0009	U	<0.00064	U	<0.00068	U	<0.00089	U	<0.00064	U	<0.00074	U
sec-Butylbenzene	135-98-8	11	500	1000																																		
Styrene	100-42-5				<0.00023	U	<0.00019	U	<0.00025	U	<0.00018	U	<0.00022	U	<0.00023	U	<0.00018	U	<0.00021	U	<0.00023	U	<0.00019	U	<0.00031	U	<0.00022	U	<0.00024	U	<0.00031	U	<0.00022	U	<0.00026	U
tert-Butylbenzene	98-06-6	5.9	500	1000																																		
Tetrachloroethene	127-18-4	1.3	150	300	<0.00023	U	<0.00019	U	<0.00025	U	<0.00018	U	<0.00022	U	<0.00023	U	<0.00018	U	<0.00021	U	<0.00023	U	<0.00019	U	<0.00031	U	<0.00022	U	<0.00024	U	<0.00031	U	<0.00022	U	<0.00026	U
Toluene	108-88-3	100	500	1000	<0.00063	U	<0.00053	U	<0.00069	U	<0.00051	U	<0.00061	U	<0.00064	U	<0.00049	U	<0.00057	U	<0.00063	U	<0.00052	U	<0.00087	U	<0.00062	U	<0.00066	U	<0.00086	U	<0.00062	U	<0.00071	U
trans-1,2-Dichloroethene	156-60-5	0.19	500	1000	<0.00016	U	<0.00013	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00014	U	<0.00016	U	<0.00013	U	<0.00022	U	<0.00016	U	<0.00016	U	<0.00022	U	<0.00016	U	<0.00018	U
trans-1,3-Dichloropropene	10061-02-6				<0.00032	U	<0.00026	U	<0.00034	U	<0.00026	U	<0.00031	U	<0.00032	U	<0.00025	U	<0.00029	U	<0.00032	U	<0.00026	U	<0.00044	U	<0.00031	U	<0.00033	U	<0.00043	U	<0.00031	U	<0.00036	U
Trichloroethene	79-01-6	0.47	200	400	<0.00016	U	<0.00013	U	<0.00017	U	<0.00013	U	<0.00015	U	<0.00016	U	<0.00012	U	<0.00014	U	<0.00016	U	<0.00013	U	<0.00022	U	<0.00016	U	<0.00016	U	<0.00022	U	<0.00016	U	<0.00018	U
Trichlorofluoromethane	75-69-4				<0.0008	U	<0.00068	U	<0.00088	U	<0.00065	U	<0.00078	U	<0.00083	U	<0.00063	U	<0.00074	U	<0.0008	U	<0.00067	U	<0.0011	U	<0.00079	U	<0.00084	U	<0.0011	U	<0.0008	U	<0.00091	U
Vinyl chloride	75-01-4	0.02	13	27	<0.00039	U	<0.00032	U	<0.00042	U	<0.00031	U	<0.00038	U	<0.0004	U	<0.0003	U	<0.00035	U	<0.00039	U	<0.00032	U	<0.00054	U	<0.00038	U	<0.0004	U	<0.00053	U	<0.00038	U	<0.00044	U
Total VOCs					-	-	**0.011**	-	-	-	-	-	-	-	-	-	**0.0096**	-	-	-	-	-	-	-	-	-	-	-	-	**0.012**	-	-	-	-	-	-

Table 3-5
PreDesign Investigation Borrow Area Sampling
3875 River Road
Tonawanda, New York

| | | |

Table 3-5
PreDesign Investigation Borrow Area Sampling
3875 River Road
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ORGANOCHLORINE PESTICIDES BY GC																																				
4,4'-DDD	72-54-8	0.0033		92	180	<0.000665	U	<0.000655	U	<0.000756	U	<0.000651	U	<0.000647	U	<0.000667	U	<0.000711	U	<0.000648	U	<0.000634	U	<0.000672	U	<0.000717	U	<0.000648	U	<0.000664	U	<0.000758	U	<0.000679	U	<0.000643	U
4,4'-DDE	72-55-9	0.0033		62	120	<0.000431	U	<0.000424	U	<0.00049	U	<0.000422	U	<0.000419	U	<0.000432	U	<0.000461	U	<0.00042	U	<0.000411	U	<0.000436	U	<0.000465	U	<0.00042	U	<0.00043	U	<0.000492	U	<0.00044	U	<0.000417	U
4,4'-DDT	50-29-3	0.0033		47	94	<0.0015	U	<0.00148	U	<0.0017	U	<0.00147	U	<0.00146	U	<0.0015	U	<0.0016	U	<0.00146	U	<0.00143	U	<0.00152	U	<0.00162	U	<0.00146	U	<0.0015	U	<0.00171	U	<0.00153	U	<0.00145	U
Aldrin	309-00-2	0.005		0.68	1.4	<0.000657	U	<0.000646	U	<0.000747	U	<0.000642	U	<0.000638	U	<0.000658	U	<0.000702	U	<0.00064	U	<0.000626	U	<0.000664	U	<0.000708	U	<0.00064	U	<0.000655	U	<0.000749	U	<0.000671	U	<0.000635	U
Alpha-BHC	319-84-6	0.02		3.4	6.8	<0.000221	U	<0.000217	U	<0.000251	U	<0.000216	U	<0.000215	U	<0.000221	U	<0.000236	U	<0.000215	U	<0.00021	U	<0.000223	U	<0.000238	U	<0.000215	U	<0.00022	U	<0.000252	U	<0.000225	U	<0.000213	U
Beta-BHC	319-85-7	0.036		3	14	<0.000707	U	<0.000696	U	<0.000804	U	<0.000692	U	<0.000688	U	<0.000709	U	<0.000756	U	<0.000689	U	<0.000674	U	<0.000715	U	<0.000762	U	<0.00069	U	<0.000706	U	<0.000806	U	<0.000722	U	<0.000683	U
Chlordane	57-74-9					<0.00618	U	<0.00608	U	<0.00702	U	<0.00604	U	<0.00601	U	<0.00619	U	<0.00661	U	<0.00602	U	<0.00589	U	<0.00624	U	<0.00666	U	<0.00602	U	<0.00616	U	<0.00704	U	<0.00631	U	<0.00597	U
cis-Chlordane	5103-71-9	0.094		24	47	<0.00065	U	<0.000639	U	<0.000739	U	<0.000636	U	<0.000632	U	<0.000651	U	<0.000695	U	<0.000633	U	<0.000619	U	<0.000657	U	<0.0007	U	<0.000633	U	<0.000648	U	<0.000741	U	<0.000664	U	<0.000628	U
Delta-BHC	319-86-8	0.04		500	1000	<0.000365	U	<0.000359	U	<0.000415	U	<0.000357	U	<0.000355	U	<0.000366	U	<0.00039	U	<0.000356	U	<0.000348	U	<0.000369	U	<0.000394	U	<0.000356	U	<0.000364	U	<0.000416	U	<0.000373	U	<0.000353	U
Dieldrin	60-57-1	0.005		1.4	2.8	<0.000583	U	<0.000574	U	<0.000663	U	<0.00057	U	<0.000567	U	<0.000584	U	<0.000623	U	<0.000568	U	<0.000556	U	<0.000589	U	<0.000628	U	<0.000568	U	<0.000582	U	<0.000664	U	<0.000595	U	<0.000563	U
Endosulfan I	959-98-8	2.4		200	920	<0.000441	U	<0.000434	U	<0.000501	U	<0.000431	U	<0.000428	U	<0.000442	U	<0.000471	U	<0.000429	U	<0.00042	U	<0.000445	U	<0.000475	U	<0.00043	U	<0.00044	U	<0.000502	U	<0.00045	U	<0.000426	U
Endosulfan II	33213-65-9	2.4		200	920	<0.000624	U	<0.000613	U	<0.000709	U	<0.00061	U	<0.000606	U	<0.000625	U	<0.000666	U	<0.000607	U	<0.000594	U	<0.00063	U	<0.000672	U	<0.000608	U	<0.000622	U	<0.000711	U	<0.000636	U	<0.000602	U
Endosulfan sulfate	1031-07-8	2.4		200	920	<0.00037	U	<0.000364	U	<0.000421	U	<0.000362	U	<0.00036	U	<0.000371	U	<0.000396	U	<0.00036	U	<0.000352	U	<0.000374	U	<0.000399	U	<0.000361	U	<0.000369	U	<0.000422	U	<0.000378	U	<0.000357	U
Endrin	72-20-8	0.014		89	410	<0.000319	U	<0.000314	U	<0.000362	U	<0.000312	U	<0.00031	U	<0.000319	U	<0.000341	U	<0.00031	U	<0.000304	U	<0.000322	U	<0.000343	U	<0.000311	U	<0.000318	U	<0.000363	U	<0.000325	U	<0.000308	U
Endrin aldehyde	7421-93-4					<0.000816	U	<0.000803	U	<0.000928	U	<0.000798	U	<0.000794	U	<0.000818	U	<0.000872	U	<0.000795	U	<0.000778	U	<0.000825	U	<0.00088	U	<0.000796	U	<0.000814	U	<0.00093	U	<0.000833	U	<0.000788	U
Endrin ketone	53494-70-5					<0.00048	U	<0.000473	U	<0.000546	U	<0.00047	U	<0.000467	U	<0.000482	U	<0.000514	U	<0.000468	U	<0.000458	U	<0.000485	U	<0.000518	U	<0.000468	U	<0.000479	U	<0.000548	U	<0.00049	U	<0.000464	U
Heptachlor	76-44-8	0.042		15	29	<0.00418	U	<0.00411	U	<0.00475	U	<0.00409	U	<0.00406	U	<0.00419	U	<0.00447	U	<0.00407	U	<0.00398	U	<0.00422	U	<0.00451	U	<0.00408	U	<0.00417	U	<0.00427	U	<0.00404	U		
Heptachlor epoxide	1024-57-3					<0.00105	U	<0.00103	U	<0.00119	U	<0.00103	U	<0.00102	U	<0.00105	U	<0.00112	U	<0.00102	U	<0.001	U	<0.00106	U	<0.00113	U	<0.00102	U	<0.00105	U	<0.0012	U	<0.00107	U	<0.00101	U
Lindane	58-89-9	0.1		9.2	23	<0.000348	U	<0.000342	U	<0.000395	U	<0.00034	U	<0.000338	U	<0.000348	U	<0.000371	U	<0.000338	U	<0.000331	U	<0.000351	U	<0.000374	U	<0.000339	U	<0.000347	U	<0.000396	U	<0.000355	U	<0.000336	U
Methoxychlor	72-43-5					<0.00109	U	<0.00107	U	<0.00124	U	<0.00106	U	<0.00106	U	<0.00109	U	<0.00116	U	<0.00106	U	<0.00104	U	<0.0011	U	<0.00117	U	<0.00106	U	<0.00108	U	<0.00124	U	<0.00111	U	<0.00105	U
Toxaphene	8001-35-2					<0.0098	U	<0.00964	U	<0.0111	U	<0.00958	U	<0.00952	U	<0.00982	U	<0.0105	U	<0.00954	U	<0.00933	U	<0.0099	U	<0.0106	U	<0.00955	U	<0.00977	U	<0.0112	U	<0.01	U	<0.00946	U
trans-Chlordane	5103-74-2					<0.000616	U	<0.000606	U	<0.0007	U	<0.000602	U	<0.000598	U	<0.000617	U	<0.000658	U	<0.000599	U	<0.000587	U	<0.000622	U	<0.000663	U	<0.0006	U	<0.000614	U	<0.000702	U	<0.000629	U	<0.000595	U
CHLORINATED HERBICIDES BY GC																																				
2,4,5-T	93-76-5					<0.00596	U	<0.00615	U	<0.00681	U	<0.00591	U	<0.00592	U	<0.00612	U	<0.00642	U	<0.00595	U	<0.00583	U	<0.00626	U	<0.00666	U	<0.00593	U	<0.00601	U	<0.00699	U	<0.00613	U	<0.00581	U
2,4,5-TP (Silvex)	93-72-1	3.8		500	1000	<0.00512	U	<0.00528	U	<0.00585	U	<0.00507	U	<0.00508	U	<0.00525	U	<0.00551	U	<0.0051	U	<0.005	U	<0.00538	U	<0.00571	U	<0.00508	U	<0.00516	U	<0.006	U	<0.00526	U	<0.00499	U
2,4-D	94-75-7					<0.0121	U	<0.0125	U	<0.0138	U	<0.012	U	<0.012	U	<0.0124	U	<0.013	U	<0.0121	U	<0.0118	U	<0.0127	U	<0.0135	U	<0.012	U	<0.0122	U	<0.0142	U	<0.0124	U	<0.0118	U
2,4-DB	94-82-6					<0.00989	U	<0.0102	U	<0.0113	U	<0.0098	U	<0.00982	U	<0.0101	U	<0.0106	U	<0.00987	U	<0.00966	U	<0.0104	U	<0.011	U	<0.00983	U	<0.00996	U	<0.0116	U	<0.0102	U	<0.00963	U
Dalapon	75-99-0					<0.0126	U	<0.013	U	<0.0144	U	<0.0125	U	<0.0125	U	<0.0129	U	<0.0136	U	<0.0126	U	<0.0123	U	<0.0132	U	<0.014	U	<0.0125	U	<0.0127	U	<0.0147	U	<0.0129	U	<0.0122	U
Dicamba	1918-00-9					<0.00646	U	<0.00666	U	<0.00738	U	<0.0064	U	<0.00642	U	<0.00664	U	<0.00696	U	<0.00645	U	<0.00632	U	<0.00679	U	<0.00721	U	<0.00642	U	<0.00651	U	<0.00758	U	<0.00664	U	<0.0063	U
Dichloroprop	120-36-5					<0.011	U	<0.0114	U	<0.0126	U	<0.0109	U	<0.011	U	<0.0113	U	<0.0119	U	<0.011	U	<0.0108	U	<0.0116	U	<0.0123	U	<0.011	U	<0.0111	U	<0.0129	U	<0.0113	U	<0.0108	U
MCPA	94-74-6					<1.09	U	<1.12	U	<1.24	U	<1.08	U	<1.08	U	<1.12	U	<1.17	U	<1.09	U	<1.06	U	<1.14	U	<1.22	U	<1.08	U	<1.1	U	<1.28	U	<1.12	U	<1.06	U
MCPP	93-65-2					<1.21	U	<1.25	U	<1.38	U	<1.2	U	<1.2	U	<1.24	U	<1.3	U	<1.21	U	<1.18	U	<1.27	U	<1.35	U	<1.2	U	<1.22	U	<1.42	U	<1.24	U	<1.18	U
GENERAL CHEMISTRY																																				
Cyanide, Total	57-12-5	27		27	10000	-		-		-		-		-		-		-		-		-		-		-		-		-		-		-	
Nitrogen, Ammonia	7664-41-7					-		-		-		-		-		-		-		-		-		-		-		-		-		-		-	
Solids, Total	NONE					**84.4**		**83.6**		**74.2**		**86.4**		**86.6**		**82.8**		**78.7**		**85.8**		**87.1**		**81.3**		**75.8**		**86.6**		**83.9**		**72.3**		**81.6**		**86.8**	
PERFLUORINATED ALKYL ACIDS BY EPA 1633																																				
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (1	763051-92-9					-	-	-		<0.000165	U	-	-	-		<0.000166	U	-	-	-		<0.000167	U	-	-	-		<0.000166	U	-	-						
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4					-	-	-		<0.000382	U	-	-	-		<0.000384	U	-	-	-		<0.000387	U	-	-	-		<0.000384	U	-	-						
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4					-	-	-		<0.00008	U	-	-	-		<0.00008	U	-	-	-		<0.00008	U	-	-	-		<0.00008	U	-	-						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2					-	-	-		<0.000276	U	-	-	-		<0.000278	U	-	-	-		<0.00028	U	-	-	-		<0.000278	U	-	-						
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3					-	-	-		<0.000498	U	-	-	-		<0.0005	U	-	-	-		<0.000504	U	-	-	-		<0.000501	U	-	-						
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4					-	-	-		<0.00174	U	-	-	-		<0.00174	U	-	-	-		<0.00176	U	-	-	-		<0.00175	U	-	-						
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5					-	-	-		<0.000142	U	-	-	-		<0.000143	U	-	-	-		<0.000144	U	-	-	-		<0.000143	U	-	-						
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4					-	-	-		<0.000144	U	-	-	-		<0.000145	U	-	-	-		<0.000146	U	-	-	-		<0.000145	U	-	-						
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-	756426-58-1					-	-	-		<0.000194	U	-	-	-		<0.000194	U	-	-	-		<0.000196	U	-	-	-		<0.000195	U	-	-						
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	13252-13-6					-	-	-		<0.000097	U	-	-	-		<0.000098	U	-	-	-		<0.000098	U	-	-	-		<0.000098	U	-	-						
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2					-	-	-		<0.000111	U	-	-	-		<0.000111	U	-	-	-		<0.000112	U	-	-	-		<0.000111	U	-	-						
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2					-	-	-		<0.000504	U	-	-	-		<0.000506	U	-	-	-		<0.00051	U	-	-	-		<0.000507	U	-	-						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSA	2991-50-6					-	-	-		<0.000081	U	-	-	-		<0.000082	U	-	-	-		<0.000082	U	-	-	-		<0.000082	U	-	-						
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8					-	-	-		<0.000099	U	-	-	-		<0.000099	U	-	-	-		<0.0001	U	-	-	-		<0.000099	U	-	-						
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE	24448-09-7					-	-	-		<0.000247	U	-	-	-		<0.000248	U	-	-	-		<0.00025	U	-	-	-		<0.000249	U	-	-						
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFO	2355-31-9					-	-	-		<0.000099	U	-	-	-		<0.000099	U	-	-	-		<0.0001	U	-	-	-		<0.000099	U	-	-						
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6					-	-	-		<0.000094	U	-	-	-		<0.000094	U	-	-	-		<0.000095	U	-	-	-		<0.000095	U	-	-						
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7					-	-	-		<0.000082	U	-	-	-		<0.000082	U	-	-	-		<0.000083	U	-	-	-		<0.000083	U	-	-						
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1					-	-	-		<0.00004	U	-	-	-		<0.00004	U	-	-	-		<0.00004	U	-	-	-		<0.00004	U	-	-						
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5					-	-	-		<0.000031	U	-	-	-		<0.000031	U	-	-	-		<0.000031	U	-	-	-		<0.000031	U	-	-						
Perfluorobutanesulfonic Acid (PFBS)	375-73-5					-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-						
Perfluorobutanoic Acid (PFBA)	375-22-4					-	-	-		0.000126	J	-	-	-		**0.000166**	J	-	-	-		<0.00005	U	-	-	-		**0.000222**	J	-	-						
Perfluorodecanesulfonic Acid (PFDS)	335-77-3					-	-	-		<0.000032	U	-	-	-		<0.000032	U	-	-	-		<0.000032	U	-	-	-		<0.000032	U	-	-						
Perfluorodecanoic Acid (PFDA)	335-76-2					-	-	-		<0.000074	U	-	-	-		<0.000075	U	-	-	-		<0.000075	U	-	-	-		<0.000075	U	-	-						
Perfluorododecanesulfonic Acid (PFDoS)	79780-39-5					-	-	-		<0.000038	U	-	-	-		<0.000038	U	-	-	-		<0.000038	U	-	-	-		<0.000038	U	-	-						
Perfluorododecanoic Acid (PFDoA)	307-55-1					-	-	-		<0.00004	U	-	-	-		<0.00004	U	-	-	-		<0.00004	U	-	-	-		<0.000041	U	-	-						
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8					-	-	-		<0.000036	U	-	-	-		<0.000037	U	-	-	-		<0.000037	U	-	-	-		<0.000037	U	-	-						
Perfluoroheptanoic Acid (PFHpA)	375-85-9					-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-						
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4					-	-	-		<0.000059	U	-	-	-		<0.000059	U	-	-	-		<0.000059	U	-	-	-		<0.000059	U	-	-						
Perfluorohexanoic Acid (PFHxA)	307-24-4					-	-	-		<0.000046	U	-	-	-		<0.000046	U	-	-	-		<0.000046	U	-	-	-		<0.000046	U	-	-						
Perfluorononanesulfonic Acid (PFNS)	68259-12-1					-	-	-		<0.000042	U	-	-	-		<0.000042	U	-	-	-		<0.000042	U	-	-	-		<0.000042	U	-	-						
Perfluorononanoic Acid (PFNA)	375-95-1					-	-	-		<0.000077	U	-	-	-		<0.000078	U	-	-	-		<0.000078	U	-	-	-		<0.000078	U	-	-						
Perfluorooctanesulfonamide (PFOSA)	754-91-6					-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-	-		<0.000043	U	-	-						
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.00088		0.44	0.44	-	-	-		<0.000078	U	-	-	-		<0.000079	U	-	-	-		<0.000079	U	-	-	-		<0.000079	U	-	-						
Perfluorooctanoic Acid (PFOA)	335-67-1	0.00066		0.5	0.6	-	-	-		0.000055	J	-	-	-		<0.000052	U	-	-	-		<0.000052	U	-	-	-		<0.000052	U	-	-						
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4					-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-	-		<0.000023	U	-	-						
Perfluoropentanoic Acid (PFPeA)	2706-90-3					-	-	-		<0.000055	U	-	-	-		<0.000056	U	-	-	-		<0.000056	U	-	-	-		<0.000056	U	-	-						
Perfluorotetradecanoic Acid (PFTeDA)	376-06-7					-	-	-		<0.000105	U	-	-	-		<0.000105	U	-	-	-		<0.000106	U	-	-	-		<0.000106	U	-	-						
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8					-	-	-		<0.000052	U	-	-	-		<0.000052	U	-	-	-		<0.000053	U	-	-	-		<0.000052	U	-	-						
Perfluoroundecanoic Acid (PFUnA)	2058-94-8					-	-	-		<0.000051	U	-	-	-		<0.000051	U	-	-	-		<0.000051	U	-	-	-		<0.000051	U	-	-						

* Comparison is not performed on parameters with non-numeric criteria.

NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-UNRES: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 3-6
Riverview Innovation Technology Campus BCP Site
Monitoring Well Locations

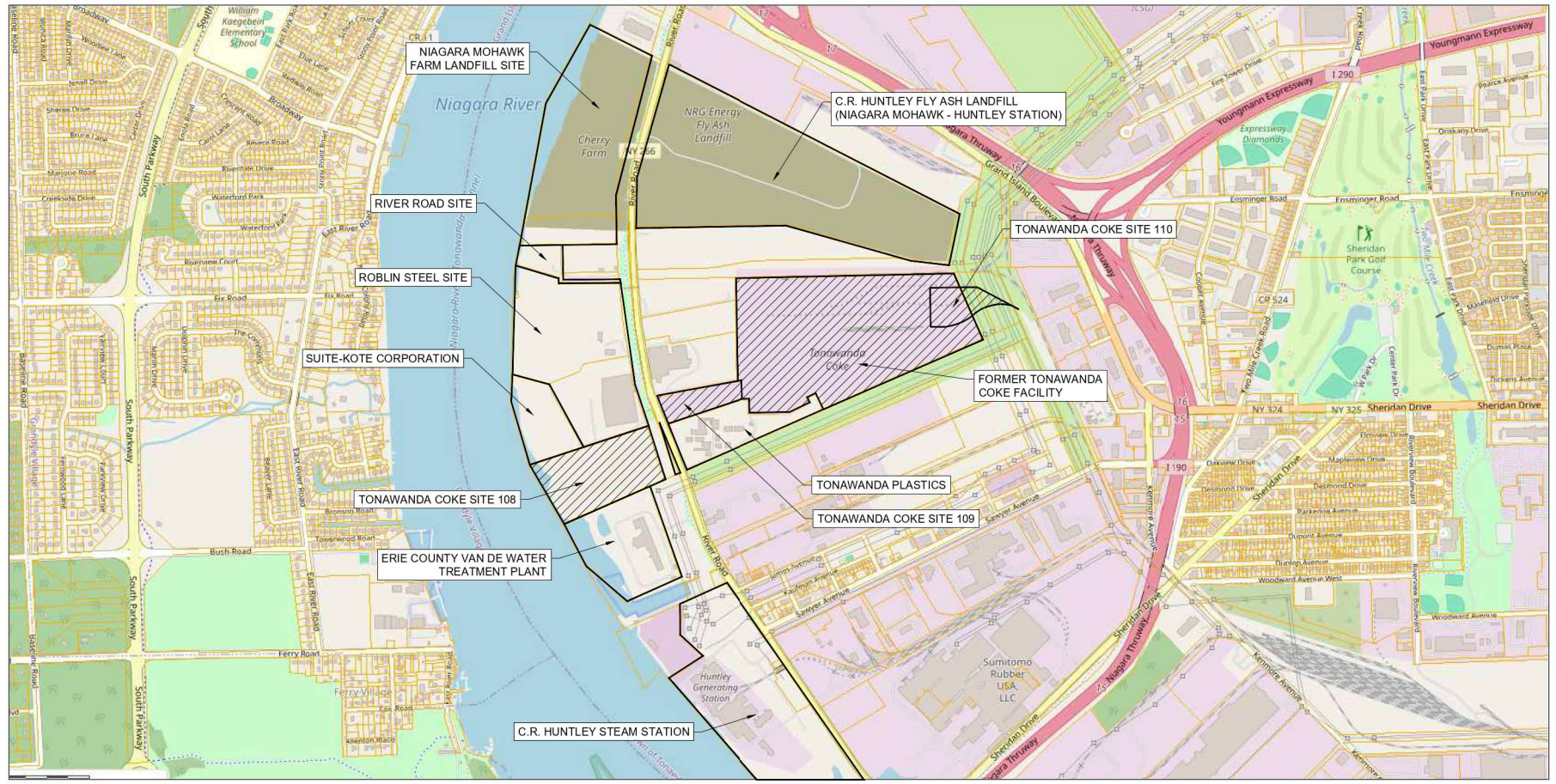
Soil Boring/Monitoring Well Location	Latitude	Longitude	NY State Plane (West Zone) Survey Feet		Ground Surface Elevation (ft.AMSL)	Top of Casing Elevation (ft.AMSL)	Total Depth
			Easting (x)	Northing (y)			
MW-BCP-01A	42.98503496	-78.93060577	1055371.76	1087813.27	603.08	606.17	
MW-BCP-01B	42.98503356	-78.93062202	1055367.41	1087812.78	603.07	606.01	
MW-BCP-01C	42.98503231	-78.93063809	1055363.11	1087812.34	602.71	606.26	
MW-BCP-01D	42.98504183	-78.93058003	1055378.657	1087815.746	602.62	602.62	
MW-BCP-02A	42.98408482	-78.93022718	1055471.63	1087466.57	605.57	608.66	6
MW-BCP-02B	42.98407383	-78.93022275	1055472.8	1087462.56	605.83	608.7	26
MW-BCP-03A	42.98317496	-78.93077944	1055322.49	1087135.58	601.96	604.8	
MW-BCP-03B	42.98317518	-78.93079779	1055317.58	1087135.68	602.11	604.89	
MW-BCP-03C	42.98317526	-78.93081528	1055312.9	1087135.73	602.1	604.83	
MW-BCP-03D	42.98317841	-78.93074856	1055330.758	1087136.803	601.7	601.7	
MW-BCP-04A	42.9837205	-78.92988045	1055563.86	1087333.41	605.48	608.71	
MW-BCP-04B	42.9837062	-78.9298733	1055565.75	1087328.19	605.34	608.67	
MW-BCP-05A	42.98443282	-78.92842003	1055955.7	1087591.41	605.73	608.73	6
MW-BCP-05C	42.98443237	-78.92844039	1055950.25	1087591.27	605.64	608.6	40
MW-BCP-05D	42.98443181	-78.92846252	1055944.33	1087591.09	605.74	608.1	66
MW-BCP-06A	42.98508511	-78.92683232	1056381.5	1087827.4	604.99	607.79	6
MW-BCP-06C	42.98508439	-78.92680847	1056387.88	1087827.11	604.98	607.45	41
MW-BCP-07C	42.98374178	-78.92848407	1055937.53	1087339.63	604.96	607.53	41
MW-BCP-08A	42.98352473	-78.92826965	1055994.58	1087260.29	607.9	610.39	8
MW-BCP-08B	42.98352391	-78.92828919	1055989.35	1087260.01	607.92	610.84	26
MW-BCP-09A	42.98400209	-78.92802857	1056059.8	1087434	607.02	609.88	5.5
MW-BCP-09B	42.98400199	-78.9280088	1056065.09	1087433.94	606.98	609.84	21
MW-BCP-10A	42.98442153	-78.92772266	1056142.28	1087586.53	605.83	608.74	6
MW-BCP-10C	42.98442175	-78.92770458	1056147.12	1087586.59	605.86	608.56	40
MW-BCP-11A	42.98363241	-78.92653385	1056459.2	1087297.63	609.27	612.37	8
MW-BCP-11B	42.98363229	-78.92650989	1056465.61	1087297.56	609.34	612.5	26
MW-BCP-12A	42.98411401	-78.92536837	1056771.77	1087471.88	605.64	608.75	6
MW-BCP-12B	42.98411827	-78.92534758	1056777.34	1087473.41	605.73	608.67	26
MW-BCP-13A	42.98320996	-78.9230788	1057383.07	1087139.91	608.95	611.67	8.5
MW-BCP-13B	42.98321178	-78.92306479	1057386.82	1087140.56	608.9	611.28	31
MW-BCP-15A	42.98213067	-78.93082905	1055307.64	1086755.04	601.47	604.49	
MW-BCP-15C	42.98211739	-78.93082812	1055307.87	1086750.2	601.6	604.51	
MW-BCP-16A	42.9806213	-78.93028178	1055451.81	1086204.34	597.51	597.17	
MW-BCP-16B	42.98060975	-78.9302822	1055451.68	1086200.13	597.48	597.13	
MW-BCP-16C	42.98059795	-78.93028139	1055451.88	1086195.83	597.42	597.14	
MW-BCP-17A	42.98095837	-78.92763203	1056161.36	1086324.27	600.4	603.08	6
MW-BCP-17B	42.98094439	-78.92762829	1056162.34	1086319.17	600.32	603.13	21
MW-BCP-18A	42.98120559	-78.92512219	1056833.33	1086411.63	602.31	605.34	5
MW-BCP-18B	42.98119888	-78.92514701	1056826.68	1086409.21	602.31	604.98	21
MW-BCP-19A	42.98214263	-78.92352269	1057262.72	1086751.4	606.42	609.51	7
MW-BCP-19B	42.98222639	-78.92357999	1057247.51	1086781.99	607.53	610.2	21
MW-BCP-20A	42.98194626	-78.92586816	1056634.82	1086682.38	604.44	607.53	6
MW-BCP-20B	42.98193214	-78.92586206	1056636.43	1086677.23	604.27	607.16	21
MW-BCP-21A	42.98505941	-78.92840888	1055959.621	1087819.761	604.52	604.518	
MW-BCP-21C	42.98506046	-78.92842822	1055954.449	1087820.164	604.5	604.497	
MW-BCP-21D	42.98505798	-78.92838689	1055965.502	1087819.214	604.5	604.501	
MW-BCP-22A	42.98492985	-78.92465337	1056964.293	1087768.44	601.96	601.96	6
MW-BCP-23A	42.98504087	-78.92080491	1057994.195	1087804.741	608.85	606.157	
MW-BCP-24A	42.98314511	-78.92384312	1057178.458	1087117.106	608.79	608.793	9.5
MW-BCP-24B	42.98313351	-78.92384838	1057177.034	1087112.883	608.53	608.53	25
MW-BCP-25A	42.98211149	-78.92412808	1057100.68	1086740.707	606.86	606.857	7
MW-BCP-25B	42.98210189	-78.92414415	1057096.367	1086737.225	606.93	606.928	25
MW-BCP-26B	42.98166971	-78.92329944	1057321.76	1086578.8	605.8	603	20
MW-BCP-27A	42.98345736	-78.91981978	1058255.476	1087226.567	608.57	611.28	

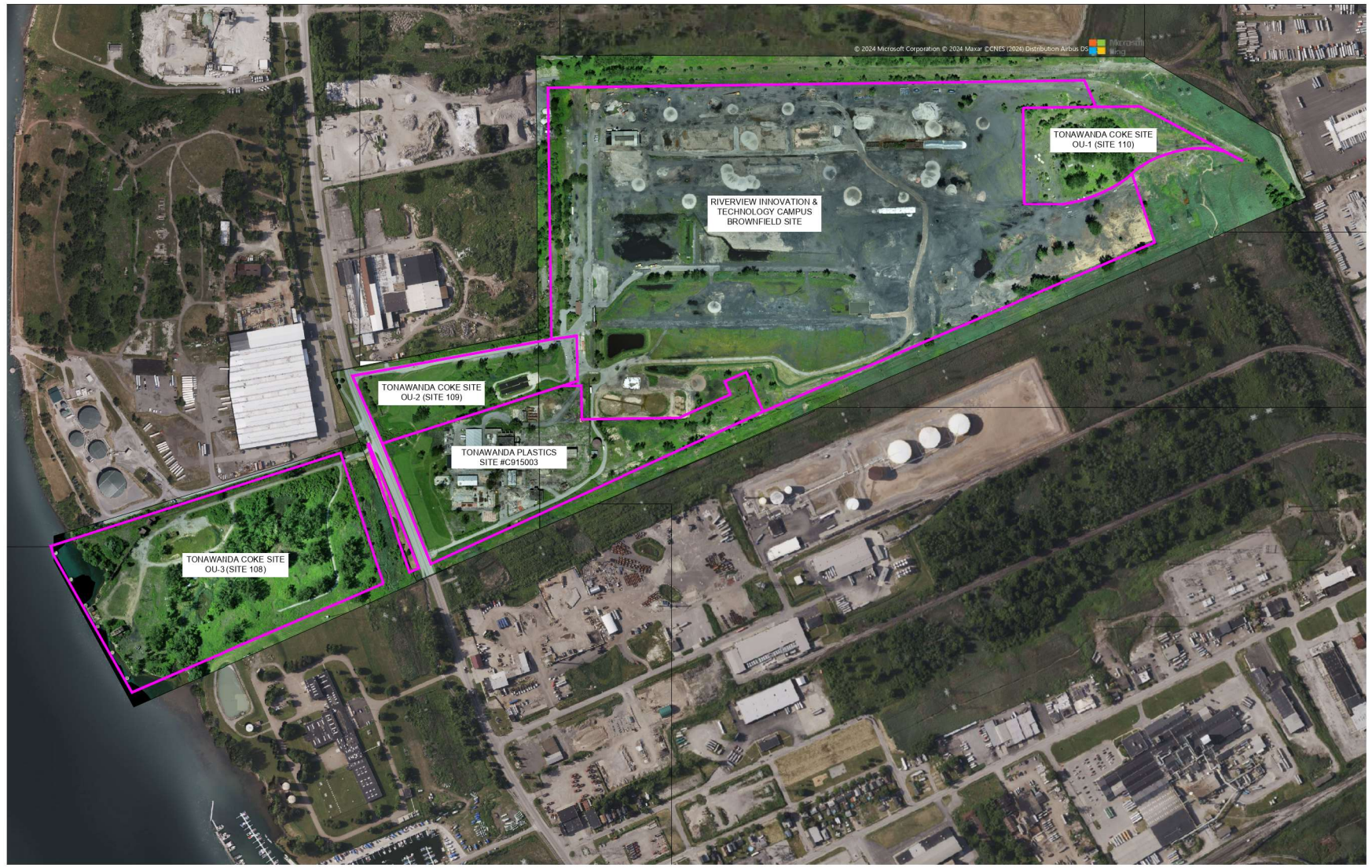
Table 3-6
Riverview Innovation Technology Campus BCP Site
Monitoring Well Locations

Replacement Monitoring Wells	Bottom of Boring Elevation (Feet)
MW-BCP-26A	600.42
MW-BCP-26B	586.53
MW-BCP-28A	599
MW-BCP-28B	584
MW-BCP-29A	523.95
MW-BCP-29B	577.9

Note:
MW-BCP-25A - Monitoring Wells to be abandoned. Less than 10 feet bgs shall be fully excavated. Over 10 feet shall be abandoned by a NYS Licensed Driller.

Figures


NIAGARA MOHAWK FARM LANDFILL SITE
C.R. HUNTLEY FLY ASH LANDFILL (NIAGARA MOHAWK - HUNTLEY STATION)
RIVER ROAD SITE
TONAWANDA COKE SITE 110
ROBLIN STEEL SITE
SUITE-KOTE CORPORATION
FORMER TONAWANDA COKE FACILITY
TONAWANDA PLASTICS
TONAWANDA COKE SITE 108
TONAWANDA COKE SITE 109
ERIE COUNTY VAN DE WATER TREATMENT PLANT
C.R. HUNTLEY STEAM STATION
Niagara River
Cherry Farm
NRG Energy Fly Ash Landfill
Tonawanda Coke
Huntley Generating Station
Sumitomo Rubber USA LLC
Sheridan Park Golf Course
William Kaegebein Elementary School
Youngmann Expressway
Sheridan Drive
Ferry Road
Busch Road
South Parkway
River Road
Niagara Thruway
Grand Island Boulevard
Ensminger Road
Pearce Avenue
Driskany Drive
Two Mile Creek Road
East Park Drive
Woodward Avenue West
Kenmore Avenue
Lawyer Avenue
Sheridan Drive
Dupont Avenue
Dunlop Avenue
Woodward Avenue
Broadway
Elmwood Avenue
Delaware Avenue
Maryland Avenue
Dumbar Road
Torrent Avenue
Oakview Drive
Maplewood Drive
Delaware Drive
Beechwood Drive
Redwood Drive
Parkside Avenue
Parkwood Avenue
Ferry Village Road
Ferry Road
East River Road
Bronson Road
Townsend Road
Waterfront Park
Riverview Boulevard
Ellicott Creek
Erie Canal
NY 266
NY 324
NY 325
CR 524
I 290
I 190
CR 11
Erie Tower Drive
Expressway Diamond
Two Mile Creek Road
Cooper Avenue
Kenmore Avenue
Woodward Avenue
Sheridan Drive
Niagara Thruway
Grand Island Boulevard
Youngmann Expressway
Ensminger Road
Pearce Avenue
Driskany Drive
East Park Drive
Maryland Drive
Dumbar Road
Torrent Avenue
Oakview Drive
Maplewood Drive
Delaware Drive
Beechwood Drive
Redwood Drive
Parkside Avenue
Parkwood Avenue
Dupont Avenue
Dunlop Avenue
Woodward Avenue West
Woodward Avenue
Kenmore Avenue
Lawyer Avenue
Sheridan Drive
Niagara Thruway
Sumitomo Rubber USA LLC
Huntley Generating Station
Ferry Village Road
Ferry Road
East River Road
Bronson Road
Townsend Road
Busch Road
South Parkway



N

E

1" = 250'
250' 125' 0 250'

REFERENCES:
1. SITE AERIAL IMAGES PROVIDED BY NIAGARA BOUNDARY AND MAPPING, JULY 2024
2. GENERAL AERIAL IMAGERY UTILIZED FROM GOOGLE MAPS

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APPROVED		XXX

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2024 AERIAL LAYOUT
RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK

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FIGURE 1-2

DRAWING NUMBER
RAWP

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GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
100 0 50 100 200

2024 Topographic Map
Figure 1-3
XX

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Figure 5-1 - RAWP Schedule
BCP Site #C915353
3875 River Road
Town of Tonawanda, New York

	Task Name	Duration	Start
1	**2026 / 2027 Schedule**	**394 days**	**Fri Jun 26**
2	**Site Management**	**393 days**	**Mon Jun 29**
3	Site Management and Security	78.6 wks	Mon Jun 29
4	Water Treatment and Monitoring	78.6 wks	Mon Jun 29
5	Community Air Monitoring	78.6 wks	Mon Jun 29
6	Erosion and Sediment Control Maintenance	78.6 wks	Mon Jun 29
7	**Remedial Action Work Plan**	**1 day**	**Fri Jun 26**
8	Final NYSDEC Approval	1 day	Fri Jun 26
9	**Remedial Action**	**392 days**	**Mon Jun 29**
10	Groundwater IRM Operations	250 days	Mon Jun 29
11	**Retention Pond Excavation**	**202 days**	**Mon Jul 20**
12	Fill Removal	80 days	Mon Jul 20
13	Clay Sampling	120 days	Mon Aug 3
14	Clay Borrow Recovery	140 days	Wed Oct 14
15	TENORM Management	80 days	Mon Jul 20
16	**Consolidation Area Construction**	**170 days**	**Mon Jul 13**
17	Fill Removal	80 days	Mon Jul 13
18	Clay Removal	100 days	Wed Sep 2
19	Base Drain Construction (Note: will be in phases)	40 days	Wed Sep 30
20	Capping	40 days	Mon Jan 11
21	**Solidified Materials Management**	**120 days**	**Mon Jul 27**
22	Exhauster Building to MW-BCP-05 Area	20 days	Mon Jul 27
23	Tar Management Area	10 days	Mon Aug 24
24	Light Oil Area and Pump House Soils	40 days	Mon Aug 24
25	Light Oil, Phenol and Weak Ammonia Area	40 days	Mon Oct 19
26	Tar Seep No. 2	20 days	Mon Dec 14
27	**Consolidation of Other Materials**	**60 days**	**Mon Aug 24**
28	Iron Oxide Pile	30 days	Mon Aug 24
29	Thaw Shed Materials	20 days	Mon Oct 5
30	Soil Piles	10 days	Mon Nov 2
31	**Sump, MW-BCP-13 and MW-BCP-19 Excavations**	**15 days**	**Mon Aug 31**
32	Exhauster Area Sumps	5 days	Mon Aug 31
33	MW-BCP-13 and MW-BCP-19 Areas	10 days	Mon Sep 7
34	**Blue-stained Soil Management**	**32 days**	**Mon Nov 2**
35	TP-BCP-35 Area	20 days	Mon Nov 2
36	SS-BCP-15 Area	10 days	Mon Nov 30
37	TP-BCP-46 Area	2 days	Mon Dec 14
38	**Site-Wide Cover**	**237 days**	**Mon Jul 13**
39	Track 1 Area Excavations	80 days	Mon Jul 13
40	Sub-grade Preparation	150 days	Mon Jul 20
41	Demarcation Layer	90 days	Mon Sep 14
42	Unclassified Fill Placement	180 days	Wed Sep 16
43	Topsoil Placement	180 days	Wed Sep 30
44	**Groundwater Treatment System Installation**	**130 days**	**Mon Jan 11**
45	Equipment Installation	80 days	Mon Jan 11
46	Startup and Testing	30 days	Mon May 3
47	Decontamination of Existing System	20 days	Mon Jun 14
48	**Final Engineering Report**	**140 days**	**Mon Jun 14**
49	Draft Report	80 days	Mon Jun 14
50	Review and Comments	20 days	Mon Oct 4
51	Final FER	40 days	Mon Nov 1
52	CoC	0 days	Wed Dec 29

N

LOCATION MAP
NOT TO SCALE

LOCATION	CUBIC YARDS	TONS
PUMP HOUSE	4,000	7,300
EXHAUSTER	2,800	5,100
MW-05	4,000	7,300
WAL	4,300	7,800
PHENOL	1,300	2,400
LOA	1,700	3,100
TW	5,300	9,600
TAR SEEP NO. 2	3,700	6,700
THAW SHED	1,800	3,300
FLOA	3,400	6,200
SWT PILE	750	1,400
RWL AREA	15	30
TOTAL	33,065	60,230

LEGEND

SOLIDIFIED MATERIAL

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

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RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS

BCP SITE (NYSDEC #C915353)
3875 RIVER ROAD
TOWN OF TONAWANDA, NEW YORK

FIGURE 7-1

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EXCAVATION OF SOLIDIFIED MATERIALS

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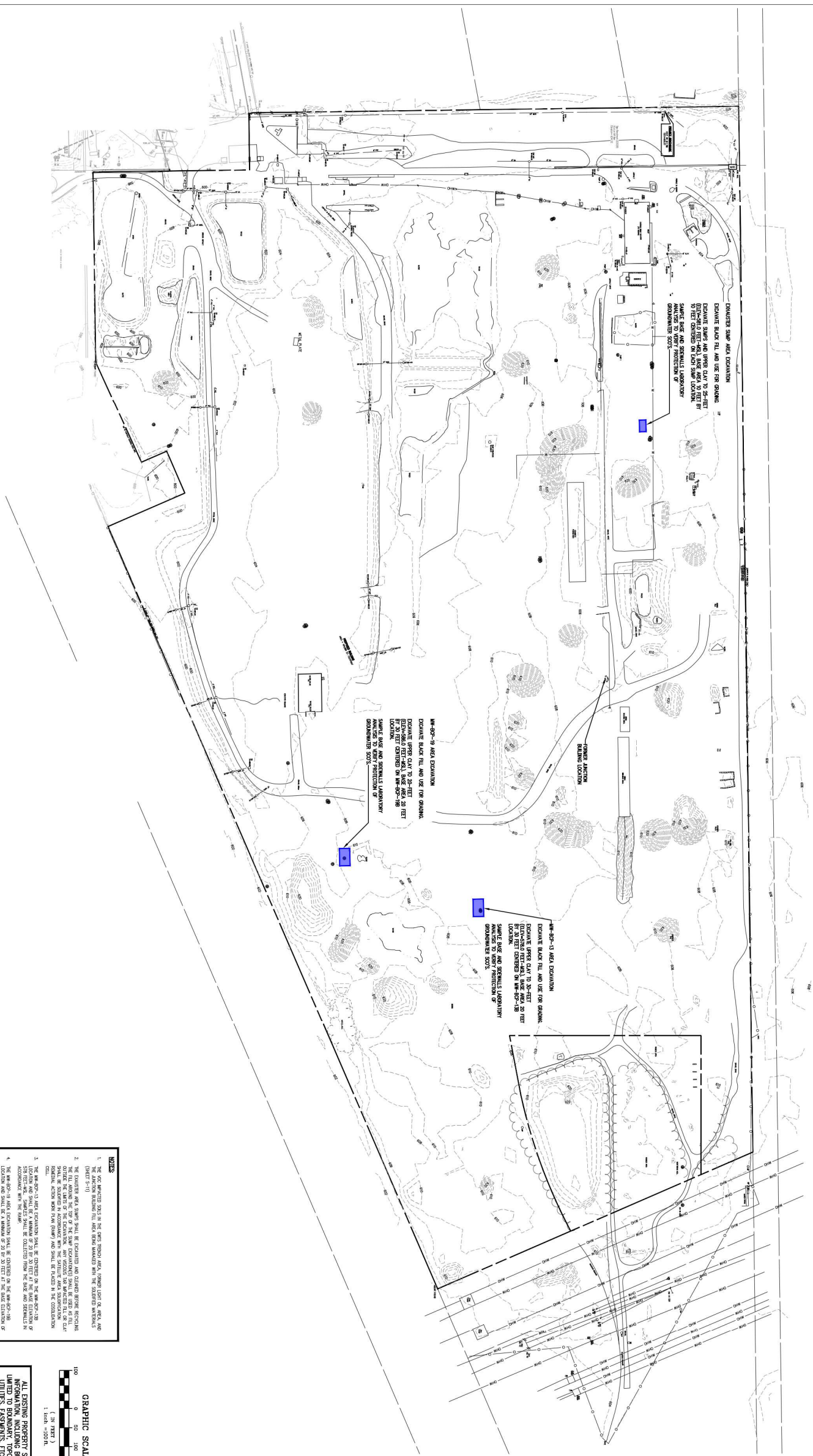
S-11



NOTES:

1. THE VOC IMPACTED SOILS IN THE ONE'S TRENCH AREA, FORMER LIGHT OIL AREA AND THE JUNCTION BUILDING FILL AREA BERM MANAGED WITH THE SOLIDIFIED MATERIALS (SHEET S-11)
2. THE EXCAVATED AREA SUMPS SHALL BE EXCAVATED AND CLEANED BEFORE RECYCLING THE FILL AROUND THE TOP OF THE SUMP EXCAVATION(S) SHALL BE USED AS FILL. SOILS SHALL BE SOLIDIFIED IN ACCORDANCE WITH THE SOLIDITE AREA SOLIDIFICATION REMEDIAL ACTION WORK PLAN (RAWP) AND SHALL BE PLACED IN THE COSOLIDATION CELL.
3. THE MW-BCP-13 AREA EXCAVATION SHALL BE CENTERED ON THE MW-BCP-13B LOCATION AND SHALL BE A MINIMUM OF 20 BY 30 FEET AT THE BASE ELEVATION OF 578 FEET-MSL. SAMPLES SHALL BE COLLECTED FROM THE BASE AND SIDEWALLS IN ACCORDANCE WITH THE RAWP.
4. THE MW-BCP-19 AREA EXCAVATION SHALL BE CENTERED ON THE MW-BCP-19B LOCATION AND SHALL BE A MINIMUM OF 20 BY 20 FEET AT THE BASE ELEVATION OF 580 FEET-MSL. SAMPLES SHALL BE COLLECTED FROM THE BASE AND SIDEWALLS IN ACCORDANCE WITH THE RAWP.
5. ALL EXCAVATIONS INTO THE SILTY CLAY SHALL BE BACKFILLED WITH UNCLASSIFIED CLAY FILL THAT MEETS THE COMMERCIAL SCO'S.
6. THE EXCAVATION BOUNDARIES WERE BASED ON ADDITIONAL TEST PITS CONDUCTED IN 2025. THESE ARE THE BASE OF THE EXCAVATIONS. THE EXCAVATION SIDES WILL BE SLOPED TO MAINTAIN STABILITY DURING SHORING.

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FIGURE 7-2

EXCAVATION OF VOC IMPACTED FILL & SOIL

DRAWING NUMBER S-13

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NOTES:

1. THE BIOTREATMENT OF THE NUISANCE MATERIALS IN THE WATER TREATMENT AREA IS BEING COMPLETED IN ACCORDANCE WITH THE FULL-SCALE BIOTREATMENT REMEDIAL ACTION WORK PLAN.
2. THE BIOTREATMENT OF THE SOILS IN THE FORMER HEAVY EQUIPMENT STAGING AREA SHALL BE COMPLETED TO REMEDIATE SOILS TO NUISANCE CONDITIONS IN THE NON-BIOTREATMENT IMPACTED SOILS ARE AT THE GROUND SURFACE. THOSE AREAS OF THE BIOTREATMENT AREA SHALL BE EXCAVATED TO REMEDIATE SOILS TO NUISANCE CONDITIONS IN THE NON-BIOTREATMENT AREA SHALL BE BACKFILLED WITH CLEAN SOIL MEETING THE REQUIREMENTS OF 6 NYCRR PART 375-6.7(d) THAT LIE WITHIN THE TRACK 1 AREAS SHALL BE EXCAVATED AND USED AS FILL TO MEET SUBGRADE BELOW THE COVER SYSTEMS.
3. THE BIOTREATMENT IN THE FORMER DIESEL TANK AREA SHALL BE COMPLETED TO REMEDIATE THE SOILS TO NUISANCE CONDITIONS IN THE NON-BIOTREATMENT AREA AND ELIMINATE THE POTENTIAL FOR NUISANCE CONDITIONS TO GROUNDWATER AND ELIMINATE THE POTENTIAL FOR NUISANCE CONDITIONS. THE BIOTREATMENT SHALL BE COMPLETED TO A DEPTH OF 2 FEET BELOW GRADE IN IMPACTED TILL IS FROM THE GROUND SURFACE TO THE TOP OF THE SILTY CLAY.

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FIGURE 7-3

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BIOTREATMENT

DRAWING NUMBER
S-14

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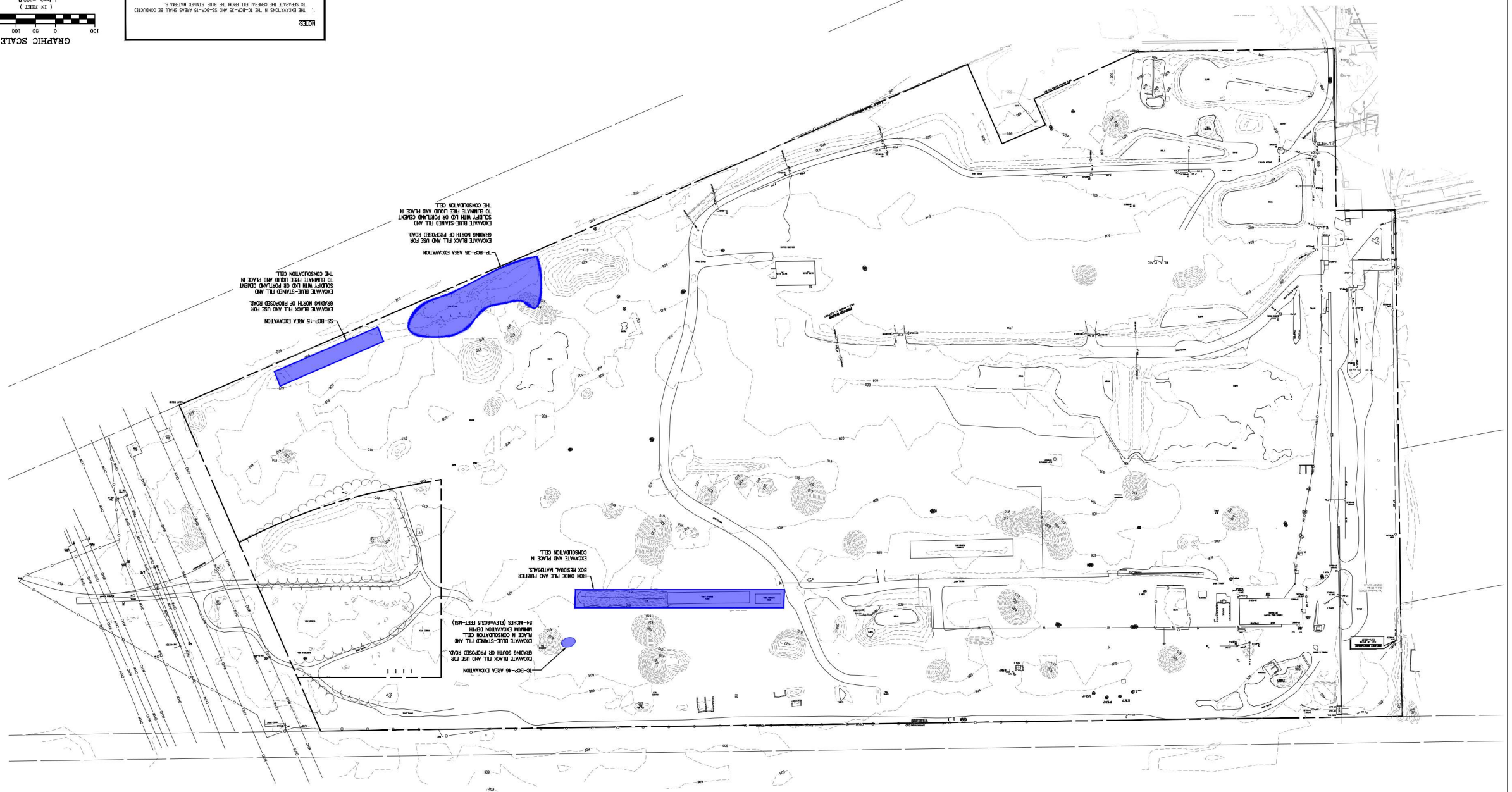

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
100 0 50 100 200

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NOTES:
1. THE EXCAVATIONS IN THE TO-BCP-35 AND SS-BCP-15 AREAS SHALL BE CONDUCTED TO SEPARATE THE CHEMICAL FILL FROM THE BLUE-STAINED MATERIALS.
2. CHEMICAL FILL SHALL BE USED FOR GRADING WITHIN PROPOSED PERIMETER ROAD
3. BLUE-STAINED SOIL FROM THE TO-BCP-35 AND SS-BCP-15 AREAS WILL BE SOLIDIFIED AND SOLIDIFY WITH LIME OR PORTLAND CEMENT TO ELIMINATE FREE LIQUID AND PLACE IN THE CONSOLIDATION CELL.
4. THE IRON OXIDE PLT AND FABRIC BOX RESIDUALS SHALL BE EXCAVATED AND PLACED AND COMPACTED IN THE CONSOLIDATION CELL. PORTLAND CEMENT MAY BE ADDED TO FACILITATE COMPACTION IN THE CELL.
5. BLUE-STAINED SOIL FROM THE P-BCP-46 AREA WILL BE PLACED ABOVE THE SILTY CLAY ELEVATION IN THE EXCAVATION PER SECTION 2 OF THE SOLIDIFIED MATERIALS FROM TAR SEEP NO. 2. PORTLAND CEMENT MAY BE ADDED TO FACILITATE COMPACTION.

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MANAGEMENT OF BLUE-STAINED FILL

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S-12

FIGURE 7-4

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NOTES

1. THE EXCAVATIONS IN THE BP-BCP-35 AND SS-BCP-15 AREAS SHALL BE CONDUCTED AS SHOWN ON SHEET S-12.
2. GENERAL FILL FROM THE EXISTING BREZE PILES AND THE LAYER OVER THE BLUE-STAINED SOILS FOR GRADING WITHIN THE PROPOSED PERIMETER ROAD.
3. BLUE-STAINED SOIL EXPOSED IN THE AREA SHOWN SHALL BE SOLIDIFIED WITH 5.0% PORTLAND CEMENT AND COMPACTED IN PLACE OR PLACED IN THE CONSOLIDATION CELL.

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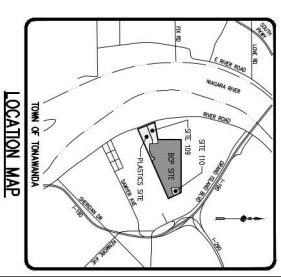
GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

N

LOCATION MAP
NOT TO SCALE


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IN-SITU TREATMENT OF BLUE-STAINED FILL

DRAWING NUMBER
S-15

FIGURE 7-5

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS

BCP SITE (NYSDEC #C915353)
3875 RIVER ROAD
TOWN OF TONAWANDA, NEW YORK

STATE OF NEW YORK — JOHN A. ROCK — LICENSED PROFESSIONAL ENGINEER

DRAWING BY	BME CAD OPERATOR
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NOTES:
1. THE USEPA SOIL PILES SHALL BE EXCAVATED, PLACED AND COMPACTED IN THE CONSOLIDATION CELL
2. SAMPLING IS NOT REQUIRED FOR THE REMOVAL OF THE SOIL PILES.

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
100 0 50 100 200

FREEZE PILES USE AS FILL BELOW THE EXCAVATION LAYER

CONCRETE PILES (TYP.) USE FOR FILL BELOW EXCAVATION LAYER ELEVATIONS

CONCRETE PILES (TYP.) USE FOR FILL BELOW EXCAVATION LAYER ELEVATIONS

USEPA SOIL PILE NO. 1
USEPA SOIL PILE NO. 2
USEPA SOIL PILE NO. 3
USEPA SOIL PILE NO. 4
USEPA SOIL PILE NO. 5
USEPA SOIL PILE NO. 6
USEPA SOIL PILE NO. 7

LOCATION MAP
NOT TO SCALE

TOWN OF TONAWANDA
PLASTICS SITE
BCP SITE
SITE 109
SITE 110
RIVER ROAD
NIAGARA FALLS BLVD
SHERIDAN DR
NIAGARA FALLS BLVD
LIVE OAK
N

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
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TOWN OF TONAWANDA, NEW YORK

REMOVAL OF SOIL PILES

DRAWING NUMBER
S-16

FIGURE 7-6

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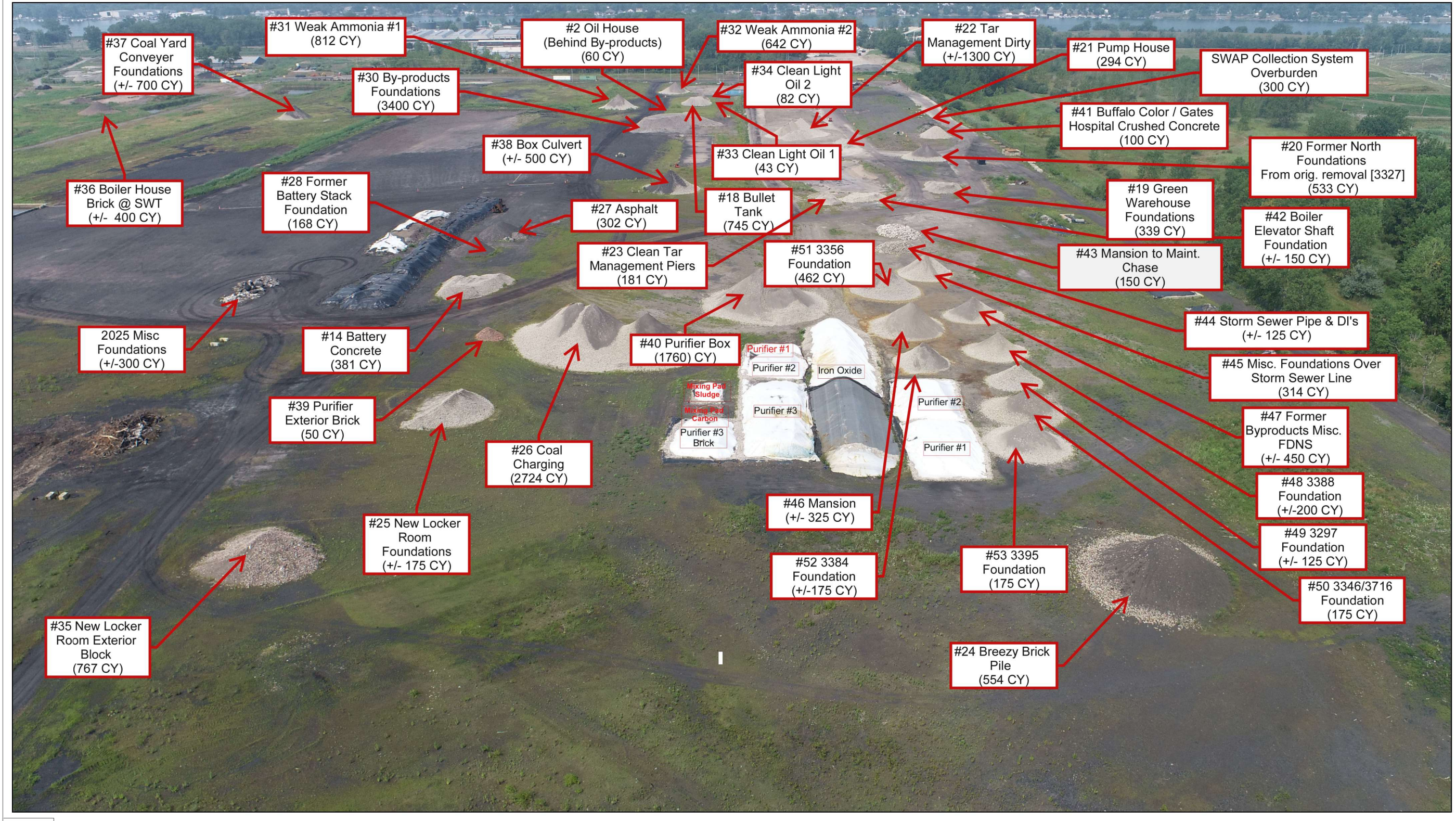

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LOCATIONS OF CRUSHED CONCRETE TO BE USED AS FILL BELOW THE SOIL COVER

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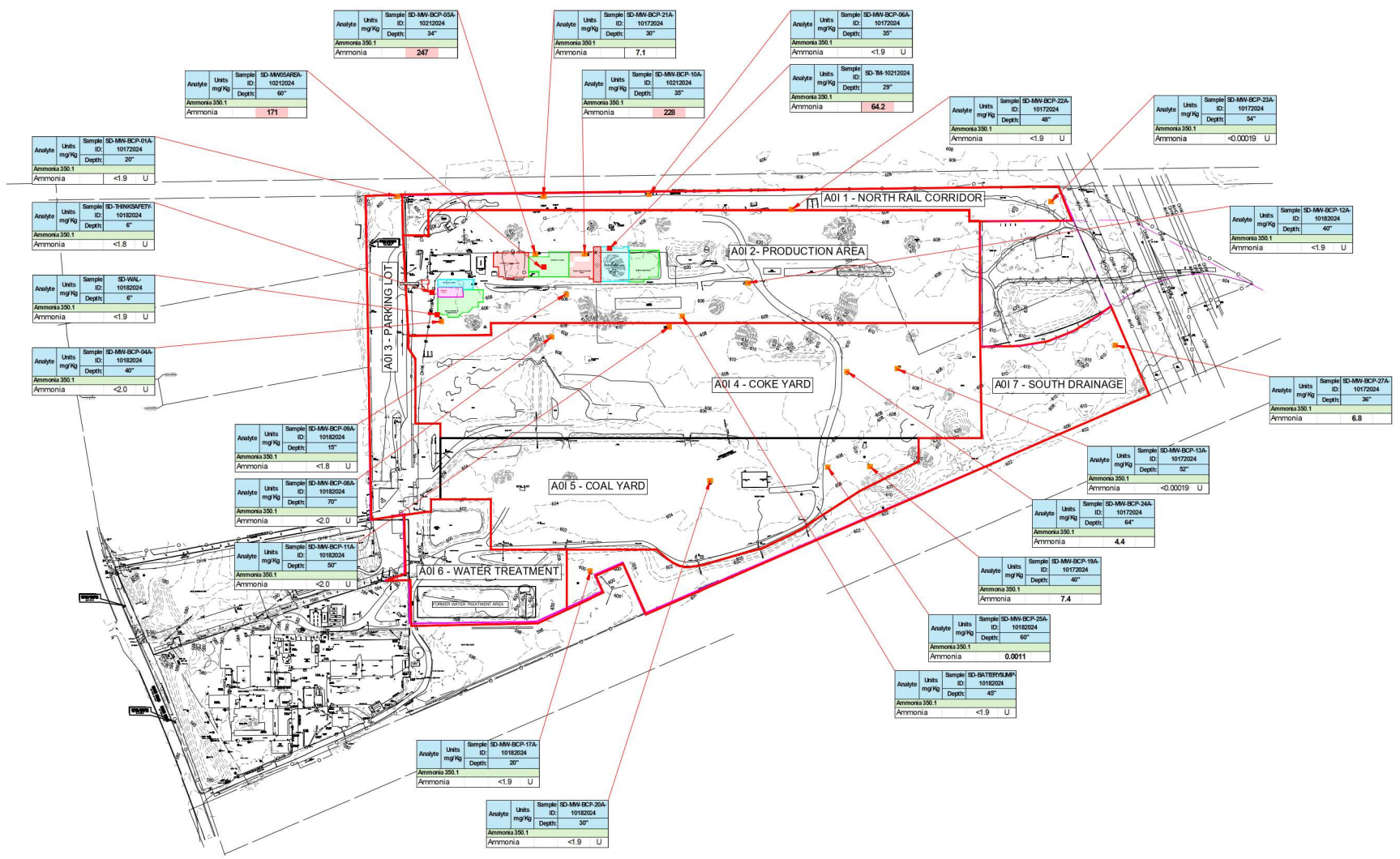
FIGURE 7 - 7

DRAWING NUMBER
RITC RDWP



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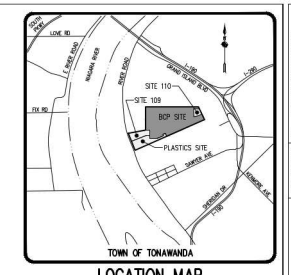

LOCATION MAP
NOT TO SCALE

Notes:
1. Former Water Treatment Area has been excavated to native clay.
2. Soil samples were collected from test pits advanced within 5-feet of the associated monitoring wells.
3. Ammonia results highlighted in red represent values above the site-specific Ammonia SCO of 11.05 mg/Kg.

E

Reference: Niagara Boundary, Map Showing Topographic Survey of Property Owned by Riverview Innovation & Technology Campus Inc., April 2022

LEGEND:
- BCP SITE BOUNDARY
- AOI BOUNDARY
- SSF SITE BOUNDARY
- MONITORING WELL LOCATION
- MONITORING WELL LOCATION SOIL SAMPLES
- SUPPLEMENTAL SOIL SAMPLE

DRAWING BY: RB | BME CAD OPERATOR
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APPROVED:

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AMMONIA SOURCE AREA
RITC BCP SITE #C915353
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FIGURE 7-8

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FIGURE 7-9

DRAWING NUMBER
S–17

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DAL 1
DAL 2
DAL 3
DAL 4
AHO
OHW
METAL PLATE
SHED
SHED
SHED

Appendices

Appendix A – Construction Sheets

Title Sheet
Remedial Action Work Plan

Riverview Innovation & Technology
Campus Site C915353
3875 River Road
Town of Tonawanda, New York

List of Sheets

Sheet S-1	-	Title Sheet
Sheet S-2	-	Selected Plan, Remedial Alternative
Sheet S-3	-	Structure and Utility Removal Plan (Sheet 1 of 2)
Sheet S-4	-	Structure and Utility Removal Plan (Sheet 2 of 2)
Sheet S-5	-	Construction Erosion Control Plan (Sheet 1 of 2)
Sheet S-6	-	Construction Erosion Control Plan (Sheet 2 of 2)
Sheet S-7	-	Track 1 Areas (Sheet 1 of 2)
Sheet S-8	-	Track 1 Areas (Sheet 2 of 2)
Sheet S-9	-	Plan and Sections, Consolidation Cell
Sheet S-10	-	Consolidation Area Construction
Sheet S-11	-	Excavation of Solidified Materials
Sheet S-12	-	Excavation of Solidified Materials and Blue-stained Soils
Sheet S-13	-	Excavations VOC impacted Fill and Soils (MW-BCP-13 and MW-BCP-16 Areas)
Sheet S-14	-	Biotreatment
Sheet S-15	-	In situ Solidification of Blue-stained fill
Sheet S-16	-	Removal of Soil Piles
Sheet S-17	-	Ammonia Source Area Soils
Sheet S-18	-	Management of TENORM Soils
Sheet S-19	-	Site & Utility Plan (Sheet 1 of 2)
Sheet S-20	-	Site & Utility Plan (Sheet 2 of 2)
Sheet S-21	-	Subgrade Plan (Existing Fill, Demarcation Layer) (Sheet 1 of 2)
Sheet S-22	-	Subgrade Plan (Existing Fill, Demarcation Layer) (Sheet 2 of 2)
Sheet S-23	-	Subgrade Plan (Unclassified Fill) (Sheet 1 of 2)
Sheet S-24	-	Subgrade Plan (Unclassified Fill) (Sheet 2 of 2)
Sheet S-25	-	Grading Plan (Finished Grade) (Sheet 1 of 2)
Sheet S-26	-	Grading Plan (Finished Grade) (Sheet 2 of 2)
Sheet S-27	-	Landscape Plan (Sheet 1 of 2)
Sheet S-28	-	Landscape Plan (Sheet 2 of 2)
Sheet S-29	-	Perimeter Road Profile (Sheet 1 of 3)
Sheet S-30	-	Perimeter Road Profile (Sheet 2 of 3)
Sheet S-31	-	Perimeter Road Profile (Sheet 3 of 3)
Sheet S-32	-	Details, Retention Pond Secondary Outfall
Sheet S-33	-	Groundwater Collection Systems
Sheet S-34	-	Process Flow Diagram, Groundwater Treatment System
Sheet S-35	-	Monitoring Network (Sheet 1 of 2)
Sheet S-36	-	Monitoring Network (Sheet 2 of 2)

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TITLE SHEET
REMEDIAL ACTION WORK PLAN

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S–1

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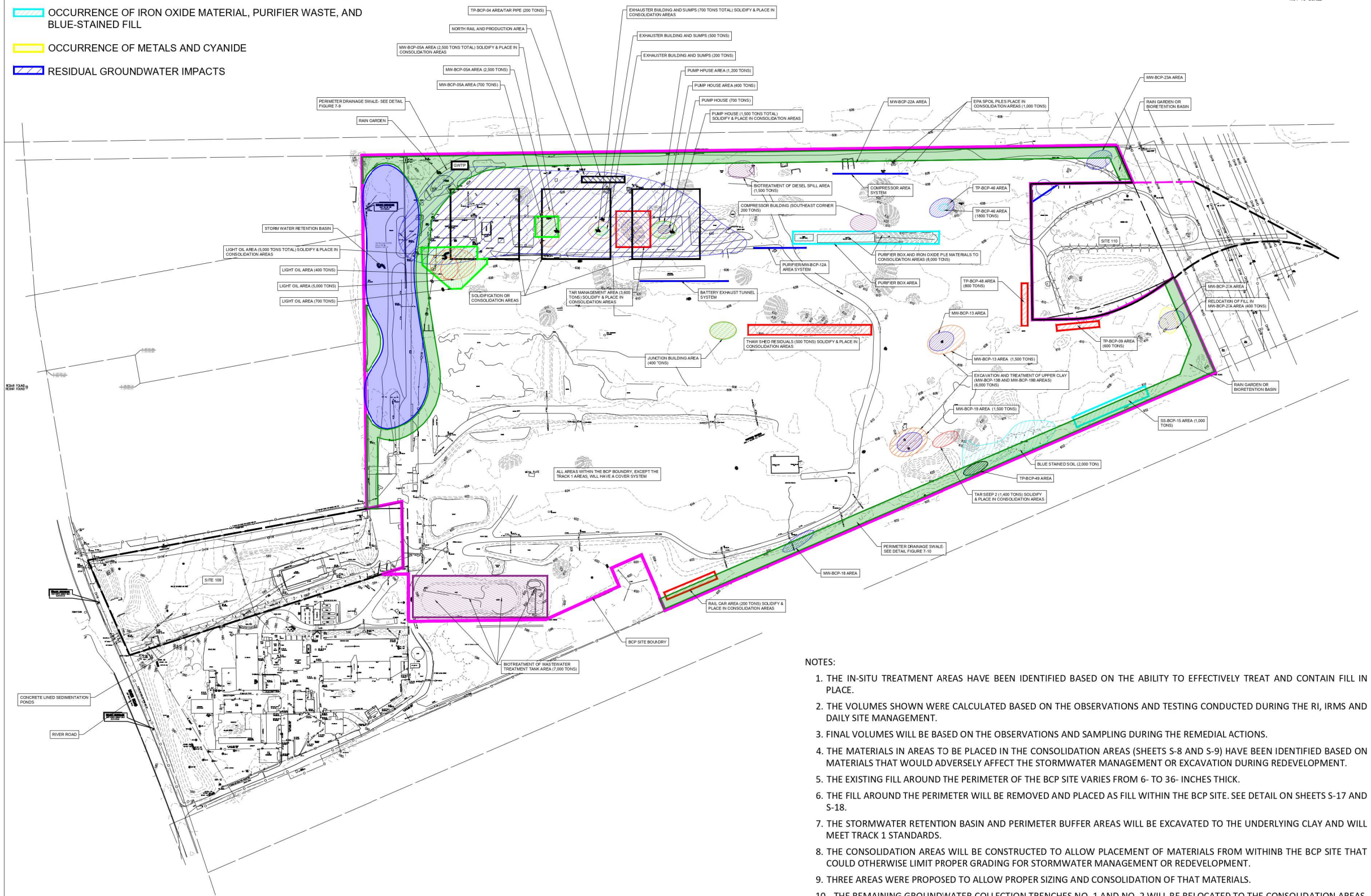
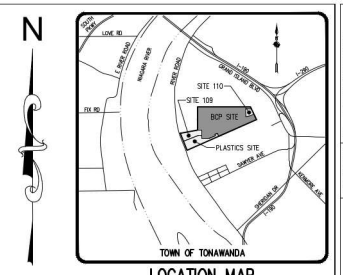
LEGEND

- PERIMETER FILL REMOVAL AREA (TRACK 1)
- STORM WATER RETENTION BASIN (TRACK 1)
- OCCURRENCE OF VISCOUS TAR
- OCCURRENCE OF NAPL
- OCCURRENCE OF VOC IMPACTED FILL
- OCCURRENCE OF PETROLEUM IMPACTED FILL
- OCCURRENCE OF IRON OXIDE MATERIAL, PURIFIER WASTE, AND BLUE-STAINED FILL
- OCCURRENCE OF METALS AND CYANIDE
- RESIDUAL GROUNDWATER IMPACTS





LOCATION MAP
NOT TO SCALE

NOTES:

1. THE IN-SITU TREATMENT AREAS HAVE BEEN IDENTIFIED BASED ON THE ABILITY TO EFFECTIVELY TREAT AND CONTAIN FILL IN PLACE.
2. THE VOLUMES SHOWN WERE CALCULATED BASED ON THE OBSERVATIONS AND TESTING CONDUCTED DURING THE RI, IRMS AND DAILY SITE MANAGEMENT.
3. FINAL VOLUMES WILL BE BASED ON THE OBSERVATIONS AND SAMPLING DURING THE REMEDIAL ACTIONS.
4. THE MATERIALS IN AREAS TO BE PLACED IN THE CONSOLIDATION AREAS (SHEETS S-8 AND S-9) HAVE BEEN IDENTIFIED BASED ON MATERIALS THAT WOULD ADVERSELY AFFECT THE STORMWATER MANAGEMENT OR EXCAVATION DURING REDEVELOPMENT.
5. THE EXISTING FILL AROUND THE PERIMETER OF THE BCP SITE VARIES FROM 6- TO 36- INCHES THICK.
6. THE FILL AROUND THE PERIMETER WILL BE REMOVED AND PLACED AS FILL WITHIN THE BCP SITE. SEE DETAIL ON SHEETS S-17 AND S-18.
7. THE STORMWATER RETENTION BASIN AND PERIMETER BUFFER AREAS WILL BE EXCAVATED TO THE UNDERLYING CLAY AND WILL MEET TRACK 1 STANDARDS.
8. THE CONSOLIDATION AREAS WILL BE CONSTRUCTED TO ALLOW PLACEMENT OF MATERIALS FROM WITHINB THE BCP SITE THAT COULD OTHERWISE LIMIT PROPER GRADING FOR STORMWATER MANAGEMENT OR REDEVELOPMENT.
9. THREE AREAS WERE PROPOSED TO ALLOW PROPER SIZING AND CONSOLIDATION OF THAT MATERIALS.
10. THE REMAINING GROUNDWATER COLLECTION TRENCHES NO. 1 AND NO. 2 WILL BE RELOCATED TO THE CONSOLIDATION AREAS. ALL SHALLOW GROUNDWATER AT THE EXISTING COLLECTION TRENCH NO. 1 AND NO. 2 LOCATIONS WILL BE ELIMINATED.
11. THE PROPOSED LONG-TERM GROUNDWATER TREATMENT PLANT (GWTT) WILL BE LOCATED NORTH OF THE CONSOLIDATION AREAS AND WILL BE CONSTRUCTED AND STARTUP TESTING WILL BE COMPLETE BEFORE THE EXISTING FACILITY IN THE MAINTENANCE BUILDING IS REMOVED.

E

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SELECTED PLAN, REMEDIAL ALTERNATIVE
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TONAWANDA, NY 14150

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FIGURE 3-1

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S–2

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EXISTING UTILITIES TO BE REMOVED AS NECESSARY (TYP). REMOVAL TO BE COORDINATED WITH RESPONSIBLE PARTY AND SHALL OCCUR AFTER COMPLETION OF NEW STORMWATER MANAGEMENT FACILITY AND DOWNSTREAM CONVEYANCE STRUCTURES. PIPING & SWALES HAVE BEEN INSTALLED (TYP)

EXISTING SANITARY SEWER AND MANHOLE PREVIOUSLY REMOVED IN 2024

PROJECT BENCHMARK
XCUT ON MH RIM
ELEV=603.37

THE MANSION SUMP AND THE NORTH-SOUTH SEWER SHALL BE MAINTAINED TO BY-PASS THE RETENTION POND CONSTRUCTION. THE MANSION SUMP AND NORTH-SOUTH SEWER WILL BE REMOVED OR CLOSED IN PLACE WHEN THE SETTLING PONDS ARE REMOVED. THE SECTION OF THE NORTH-SOUTH SEWER ALONG THE RETENTION WILL BE CLOSED IN PLACE IF IT CANNOT BE SAFELY REMOVED.

Site Benchmark (20039)
XCut on Mh Rim
Elevation= 604.32

THE REMAINING OPEN SECTION OF BOX CULVERT SHALL BE REMOVED, INSPECTED FOR STAINING OR VISUAL INDICATIONS OF CONTAMINATION, AND IF FREE OF STAINING, CRUSHED AND USED AS STRUCTURAL FILL. THE SECTIONS FILLED WITH FLOWABLE FILL SHALL REMAIN IN PLACE BELOW THE DEMARCATION LAYER.

EXISTING SANITARY SEWER TO BE REMOVED AND REPLACED WITH NEW SEWER ALONG PROPOSED ACCESS ROAD (SEE SHEET S-33)

EXISTING POLES AND OVERHEAD ELECTRICAL LINES SHALL BE REMOVED PRIOR TO SUBGRADE EXCAVATION AND PREPARATION (TYP)

SEDIMENTATION POOL #3 TO BE REMOVED PRIOR TO GRADING OF SITE. TEMPORARY DIVERSION SWALES MAY BE NECESSARY TO MANAGE STORMWATER RUNOFF DURING CONSTRUCTION ACTIVITIES AND SHOULD BE COORDINATED WITH RESPONSIBLE PARTY (TYP).

EXISTING DRAINAGE SWALES AND PONDING/LOW AREAS TO BE FILLED IN WITH RE-GRADING ACTIVITIES (TYP). TEMPORARY DIVERSION SWALES MAY BE NECESSARY TO MANAGE STORMWATER RUNOFF DURING CONSTRUCTION ACTIVITIES AND SHOULD BE COORDINATED WITH RESPONSIBLE PARTY (TYP).

REMAINING EXISTING PAVEMENT AREAS SHALL BE REMOVED AND TRANSPORTED TO SWIFT RIVER FOR RECYCLING (TYP)

REMAINING STRUCTURES (OFFICE, MG BUILDING, TRANSFER STATION, AND POTW OUTFALL METER BUILDING) SHALL BE DEMOLISHED AND DISPOSED OFFSITE (TYP)

EXISTING STORMWATER PIPING SHALL BE REMOVED DURING SUBGRADE PREPARATION (TYP)

EXISTING UTILITIES TO BE REMOVED AS NECESSARY (TYP). REMOVAL TO BE COORDINATED WITH RESPONSIBLE PARTY AND SHALL OCCUR AFTER COMPLETION OF NEW STORMWATER MANAGEMENT FACILITY AND DOWNSTREAM CONVEYANCE STRUCTURES. PIPING & SWALES HAVE BEEN INSTALLED (TYP)

EXISTING BUILDINGS AND UTILITIES WITHIN BCP SITE TO BE REMOVED IN ACCORDANCE WITH RAWP (TYP)

EXISTING FORMER MIXING PAD SHALL BE REMOVED, CRUSHED AND USED AS STRUCTURAL FILL. SAMPLE AND ANALYSIS BELOW FORMER MIXING PAD IN ACCORDANCE WITH THE RAWP TO VERIFY NO TAR LIKE MATERIALS OR FILL WITH CHARACTERISTICS OF HAZARDOUS WASTE.

EXISTING GRAVEL DRIVE CATCH BASINS AND PIPING SHALL BE REMOVED DURING SUBGRADE PREPARATION (TYP)

MATCHLINE (SEE SHEET 2 OF 2)

MATCHLINE (SEE SHEET 1 OF 2)

SITE 109 - OU2
NYSDEC SITE #915055
AREA=±7.39 ACRES

METAL PLATE

REBAR FOUND

LEGEND

- BOUNDARY LINE
- PROPOSED ART ROAD CORRIDOR
- CENTERLINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- ± L.P. PROPOSED LOW POINT OF ROAD
- ± H.P. PROPOSED HIGH POINT OF ROAD

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GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.
50 0 25 50 100

N

LOCATION MAP
NOT TO SCALE
TOWN OF TONAWANDA
SITE 109
BCP SITE
PLASTICS SITE
RIVER ROAD
MAGARA RIVER
SAWYER AVE
OVERHOLSER DR
LOCKPORT RD

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STRUCTURE AND UTILITY REMOVAL PLAN (SHEET 1 OF 2)
DRAWING NUMBER
S-3

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NOTES:

1. THE REMAINING STRUCTURES AND OUTDATED, OR REDUNDANT, ABOVE GRADE UTILITIES SHALL BE REMOVED AS REQUIRED TO ALLOW IMPLEMENTATION OF THE RAMP.
2. PRIOR TO REMOVAL ALL STRUCTURES SHALL BE INSPECTED TO ABATE ASBESTOS CONTAINING MATERIALS, REMOVE UNIVERSAL WASTES, AND DISCONNECT/DE-ENERGIZE UTILITIES.
3. THE CURRENT OFFICE BUILDING WILL BE UTILIZED UNTIL THE GRADING REACHES THAT LOCATION.
4. THE MG BUILDING AND ASSOCIATED ELECTRICAL INFRASTRUCTURE WILL BE REMOVED AFTER THE ALTERNATIVE ELECTRICAL SUPPLY IS OPERABLE.
5. THE DEMOLITION DEBRIS FROM THE MG BUILDING SHALL BE STOCKPILED, SAMPLED AND ANALYZED. SHOULD POLYCHLORINATED BIPHENYL BE DETECTED ABOVE COMMERCIAL SOIL CLEANUP OBJECTIVES, THE MATERIALS SHALL BE DISPOSED OFFSITE.
6. THE OVERHEAD PIPING AND FORMER CONVEYOR TRANSFER STRUCTURE WILL BE REMOVED AT THE SAME TIME AS THE MG BUILDING. THE METAL SHALL BE INSPECTED AND RECYCLED OR DISPOSED OFFSITE.
7. FOLLOWING THE INSTALLATION AND TESTING OF THE NEW SANITARY SEWER, THE FORMER METER HOUSE AND METER PIT SHALL BE REMOVED. THE METER HOUSE STRUCTURE SHALL BE REMOVED AND DISPOSED OFFSITE; THE METER PIT SHALL BE BACKFILLED WITH CLEAN FILL AFTER THE FORMER SEWER IS SCALED.

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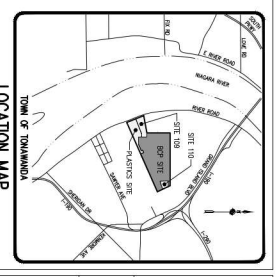
GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

LEGEND
- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTER LINE
- PROPERTY MARKER (FOUND)
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x L.P. PROPOSED LOW POINT OF ROAD
- x H.P. PROPOSED HIGH POINT OF ROAD

LOCATION MAP
NOT TO SCALE


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STRUCTURE AND UTILITY REMOVAL PLAN (SHEET 2 OF 2)
DRAWING NUMBER
S-4

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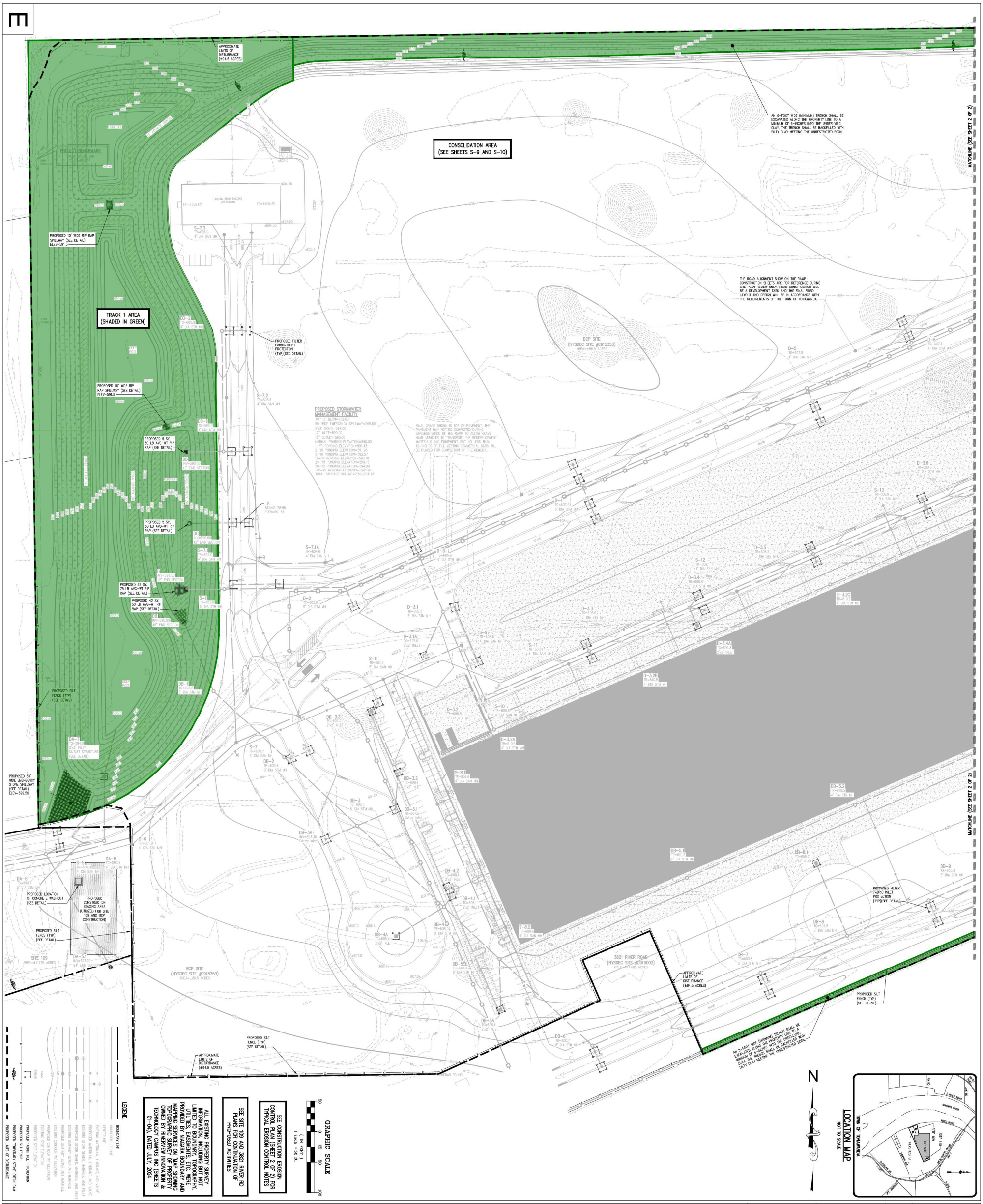

CONSTRUCTION EROSION CONTROL PLAN (SHEET 1 OF 2)

DRAWING NUMBER
S-5

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CONSTRUCTION EROSION CONTROL NOTES:

1. THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) CONSISTS OF THE STORMWATER MANAGEMENT REPORT, THE PROJECT PLANS, INCLUDING THE GRADING, CONSTRUCTION, EROSION CONTROL PLAN AND DETAIL SHEET. THE SWPPP FOR THIS PROJECT IS INTENDED TO CONFORM WITH THE NYSDEC GENERAL PERMIT GP-0-20-001 AND THE REQUIREMENTS OF LOCAL AND NYSDEC AUTHORITIES REGARDING THE CONTROL OF STORMWATER QUANTITY AND QUALITY. A SWPPP MAY ALREADY BE IN PLACE FOR THIS PROJECT AS PART OF THE ONGOING REMEDIATION ACTIVITIES.
2. THE RESPONSIBLE PARTY SHALL IMPLEMENT THE REQUIRED SWPPP. THE OWNER'S CONTRACTOR, SUB-CONTRACTOR AND ALL OTHERS ASSOCIATED WITH THE IMPLEMENTATION OF THE PLAN SHALL BE FAMILIAR WITH THE PLAN AND THE CONDITIONS OF THE NYSDEC GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
3. ANY MODIFICATIONS OR DEVIATIONS FROM THE SWPPP, INCLUDING EROSION CONTROL MEASURES AND STORMWATER MANAGEMENT FACILITIES, SHALL BE DOCUMENTED IN THE INSPECTION REPORT AND CONSIDERED PART OF THE SWPPP FOR THE PROJECT.
4. THE RESPONSIBLE PARTY SHALL FILE THE NOTICE OF INTENT (NOI) FOR CONSTRUCTION ACTIVITY WITH NYSDEC PRIOR TO COMMENCING ANY CONSTRUCTION. A COPY OF THE NOI SHALL BE KEPT ON-SITE AND PROVIDED TO THE MUNICIPALITY.
5. THE RESPONSIBLE PARTY SHALL PROVIDE ON SITE INSPECTIONS BY A LICENSED PROFESSIONAL REGARDING EROSION CONTROL DURING CONSTRUCTION. INSPECTIONS ARE TO BE PROVIDED AT A MINIMUM OF TWICE A WEEK FOR DISTURBANCES OF 5 ACRES AND GREATER, AND ONCE A WEEK FOR DISTURBANCES LESS THAN 5 ACRES. AN INSPECTION REPORT LOG AND THE SWPPP ARE TO BE KEPT ON-SITE BY THE RESPONSIBLE PARTY.
6. FOR SITES WHERE SOIL DISTURBANCE ACTIVITIES HAVE BEEN TEMPORARILY SUSPENDED (E.G. WINTER SHUTDOWN) AND TEMPORARY STABILIZATION MEASURES HAVE BEEN APPLIED TO ALL DISTURBED AREAS, THE RESPONSIBLE PARTY/OPERATOR MAY REDUCE THE SELF-INSPECTION FREQUENCY, BUT SHALL MAINTAIN A MINIMUM OF MONTHLY INSPECTIONS. (30 CALENDAR DAYS)
7. THE RESPONSIBLE PARTY'S CONTRACTOR/REPRESENTATIVE SHALL IDENTIFY AT LEAST ONE INDIVIDUAL TO BE TRAINED FROM THEIR COMPANY THAT WILL BE RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP. THE INDIVIDUAL MUST RECEIVE (4) HOURS OF NYSDEC TRAINING EVERY (3) YEARS. THE OWNER/OPERATOR SHALL INSURE THAT AT LEAST ONE OF THE TRAINED INDIVIDUALS IS ON SITE ON A DAILY BASS WHEN SOIL DISTURBANCE ACTIVITIES ARE BEING PERFORMED.
8. FOR DISTURBANCES OF 5 ACRES AND GREATER, IN AREAS WHERE SOIL DISTURBANCE ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED, THE APPLICATION OF SOIL STABILIZATION MEASURES MUST BE INITIATED BY THE END OF THE NEXT BUSINESS DAY AND COMPLETED WITHIN 14 DAYS. FROM THE DATE THE CURRENT SOIL DISTURBANCE ACTIVITY CEASED. IF THE SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY GROUNDCOVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW OR EQUIVALENT MATERIAL. ADDITIONAL TIME FRAMES FOR STABILIZATION ARE SUBJECT TO THE REQUIREMENTS OF A REGULATED TRADITIONAL LAND USE MS4.
9. FOR DISTURBANCES LESS THAN 5 ACRES, IN AREAS WHERE SOIL DISTURBANCE ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED, THE APPLICATION OF SOIL STABILIZATION MEASURES MUST BE INITIATED BY THE END OF THE NEXT BUSINESS DAY AND COMPLETED WITHIN 7 DAYS. FROM THE DATE THE CURRENT SOIL DISTURBANCE ACTIVITY CEASED. IF THE SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY GROUNDCOVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW OR EQUIVALENT MATERIAL. ADDITIONAL TIME FRAMES FOR STABILIZATION ARE SUBJECT TO THE REQUIREMENTS OF A REGULATED TRADITIONAL LAND USE MS4.
10. ALL GROUND DISTURBANCE ACTIVITIES AND UTILITY EXCAVATIONS SHALL COMPLY WITH THE CURRENT REMEDIAL ACTION WORK PLAN (RAWP).
11. THE RESPONSIBLE PARTY'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE ESTABLISHMENT, MAINTENANCE, CLEANING, REPAIR AND REPLACEMENT OF EROSION CONTROL MEASURES DURING SITE CONSTRUCTION.
12. ALL DISTURBED AREAS TO BE RECLAIMED PER THE REMEDIAL ACTION WORK PLAN (RAWP).
13. AREAS OR EMBANKMENTS REQUIRING AN EROSION CONTROL BLANKET SHALL UTILIZE ECS-1B (EASTCOAST) OR AN APPROVED EQUIVALENT.
14. TEMPORARY SEEDING OF DISTURBED AREAS SHALL BE PROVIDED AS FOLLOWS:

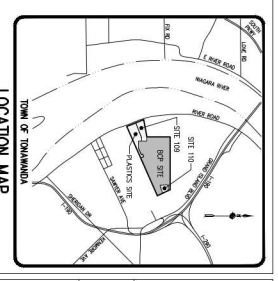
    THE SURFACE TWO INCHES OF SOIL SHOULD BE LOOSENED BY DISKING, RAKING, OR BACK-BLADING WITH A BULLDOZER. IMMEDIATELY FERTILIZE WITH 300 LBS PER ACRE (OR 7 LBS. PER 1000 SQ. F') OF 10-10-10 FERTILIZER. IMMEDIATELY SEED WITH THE FOLLOWING MIX:

	LBS/ACRE	LBS/1000 SQ. FT.
ANNUAL RYEGRASS	40	1
PERENNIAL RYEGRASS	40	1
OATS	40	1
WHITE CLOVER (+ INOCULANT)	4	0.1

    SEED SHOULD HAVE A GERMINATION RATE OF AT LEAST 85 PERCENT AND MINIMAL INERT MATERIAL.
15. DISTURBED AREAS WITH A SOIL COVER SYSTEM SHALL BE STABILIZED USING PERMANENT LAWN SEEDING MIX UPON COMPLETION OF GRADING AND CONSTRUCTION:

	LBS/ACRE
CREEPING RED FESCUE	36
CHEWINGS FESCUE	36
PERENNIAL RYEGRASS	9
RED CLOVER	14
WHITE CLOVER	18

    SEEDING RATE: 6.0 LBS PER 1,000 SQ. FT.
    MULCH: STRAW OR WOOD FIBER MULCH USED WITH HYDROSEEDING METHOD, AT TWO TONS PER ACRE WITH TACKIFIER STARTING FERTILIZER: 5-10-10 AT 20 LBS PER 1,000 SQ. FT
16. ALL SEEDED AREAS ARE TO BE MONITORED FOR GERMINATION AND EROSION. ERODED AREAS ARE TO BE BACKFILLED, FINE GRADED AND RE-SEEDED. AREAS THAT FAIL TO GERMINATE A MINIMUM OF 80% SHALL BE RE-SEEDED.
17. ANY EXCAVATIONS THAT MUST BE DEWATERED SHALL BE HANDLED IN ACCORDANCE WITH THE REMEDIAL ACTION WORK PLAN.
18. THE RESPONSIBLE PARTY SHALL BE RESPONSIBLE FOR REMOVING EXISTING EROSION CONTROL MEASURES THAT ARE LOCATED WITHIN ESTABLISHED AREAS. MATERIALS ARE TO BE DISPOSED OF PROPERLY.
19. UPON COMPLETION OF CONSTRUCTION AND FINAL STABILIZATION THE RESPONSIBLE PARTY MAY FILE A NOTICE OF TERMINATION (NOT) WITH NYSDEC PER THE REQUIREMENTS OF THE GENERAL PERMIT GP-0-25-001.



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GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.
50 0 25 50 100

LEGEND
BOUNDARY LINE
CENTERLINE
PROPOSED LOT LINE
EXISTING WATERMAIN, HYDRANT, AND VALVE
PROPOSED WATERMAIN, HYDRANT, AND VALVE
EXISTING STORM SEWER, MANHOLE, AND INLET
PROPOSED STORM SEWER, MANHOLE, AND INLET
EXISTING SANITARY SEWER AND MANHOLE
PROPOSED SANITARY SEWER AND MANHOLE
EXISTING CONTOUR W/ ELEVATION
PROPOSED CONTOUR W/ ELEVATION
EXISTING SPOT ELEVATION
PROPOSED SPOT ELEVATION
PROPOSED FABRIC INLET PROTECTION
PROPOSED SILT FENCE
PROPOSED TEMPORARY STONE CHECK DAM
PROPOSED LIMITS OF DISTURBANCE
PROPOSED TEMPORARY DIVERSION SWALE

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CONSTRUCTION EROSION CONTROL PLAN (SHEET 2 OF 2)
DRAWING NUMBER
S-6

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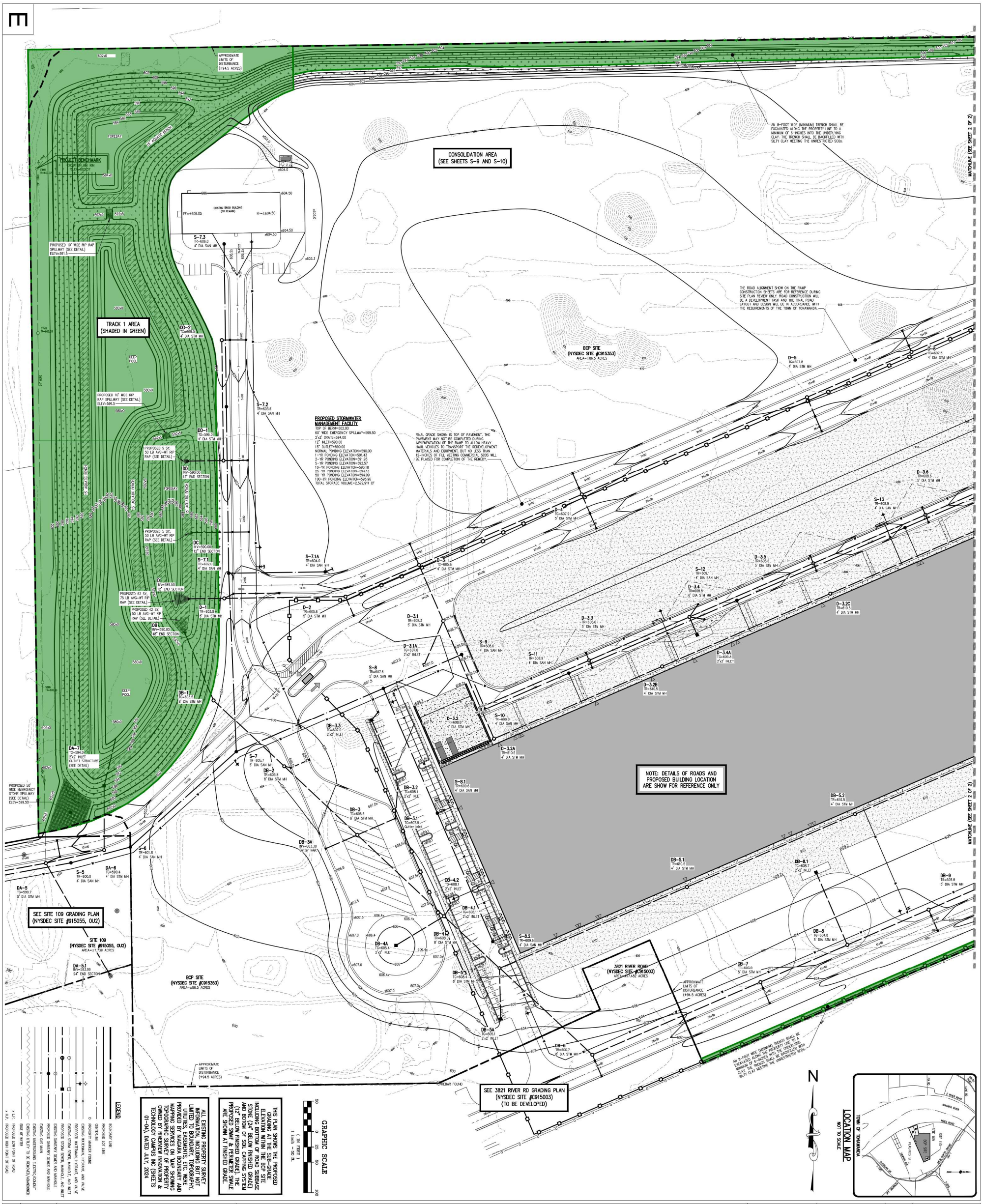

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DRAWING NUMBER S-7

TRACK 1 AREAS (SHEET 1 OF 2)

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NOTES:

1. ALL FILL SHALL BE REMOVED FROM THE SILTY CLAY IN THE AREAS HIGHLIGHTED IN GREEN.
2. THE EXPOSED SILTY CLAY SURFACE WILL BE SAMPLED (SEE RAMP) AND TESTED TO DETERMINE IF THE EXPOSED SOILS MEET THE UNRESTRICTED SOIL CLEANUP OBJECTIVES (SCOS). AREAS THAT MEET UNRESTRICTED SCOS WILL BE DESIGNATED AS TRACK 1 AREA AND ALL FILL USED TO ALLOW REVEGETATION OR SURFACE WATER MANAGEMENT SHALL MEET UNRESTRICTED SCOS.
3. THE LIMITS OF THE CONFIRMED TRACK 1 AREA(S) SHALL BE SURVEYED BY A LICENSED NEW YORK STATE SURVEYOR. THE TRACK 1 AREA(S) SHALL NOT BE INCLUDED IN THE SITE MANAGEMENT PLAN (SMP).

THIS PLAN SHOWS THE PROPOSED ELEVATION WITH THE BCP SITE INCLUDING BOTTOM OF ROAD SUBBASE STONE (24" BELOW FINISHED GRADE) AND BOTTOM OF SOIL CAPPING SYSTEM (12" BELOW FINISHED GRADE). THE PROPOSED SMMF & PERIMETER SWALE ARE SHOWN AT FINISHED GRADE.

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GRAPHIC SCALE

50 0 25 50 100

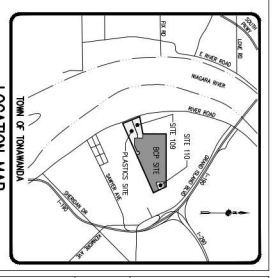
(IN FEET)

1 inch = 50 ft.

LEGEND

- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTERLINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING OVERHEAD ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- X L.P. PROPOSED LOW POINT OF ROAD
- X H.P. PROPOSED HIGH POINT OF ROAD

LOCATION MAP
NOT TO SCALE
TOWN OF TONAWANDA



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TRACK 1 AREAS
(SHEET 2 OF 2)

DRAWING NUMBER
S-8

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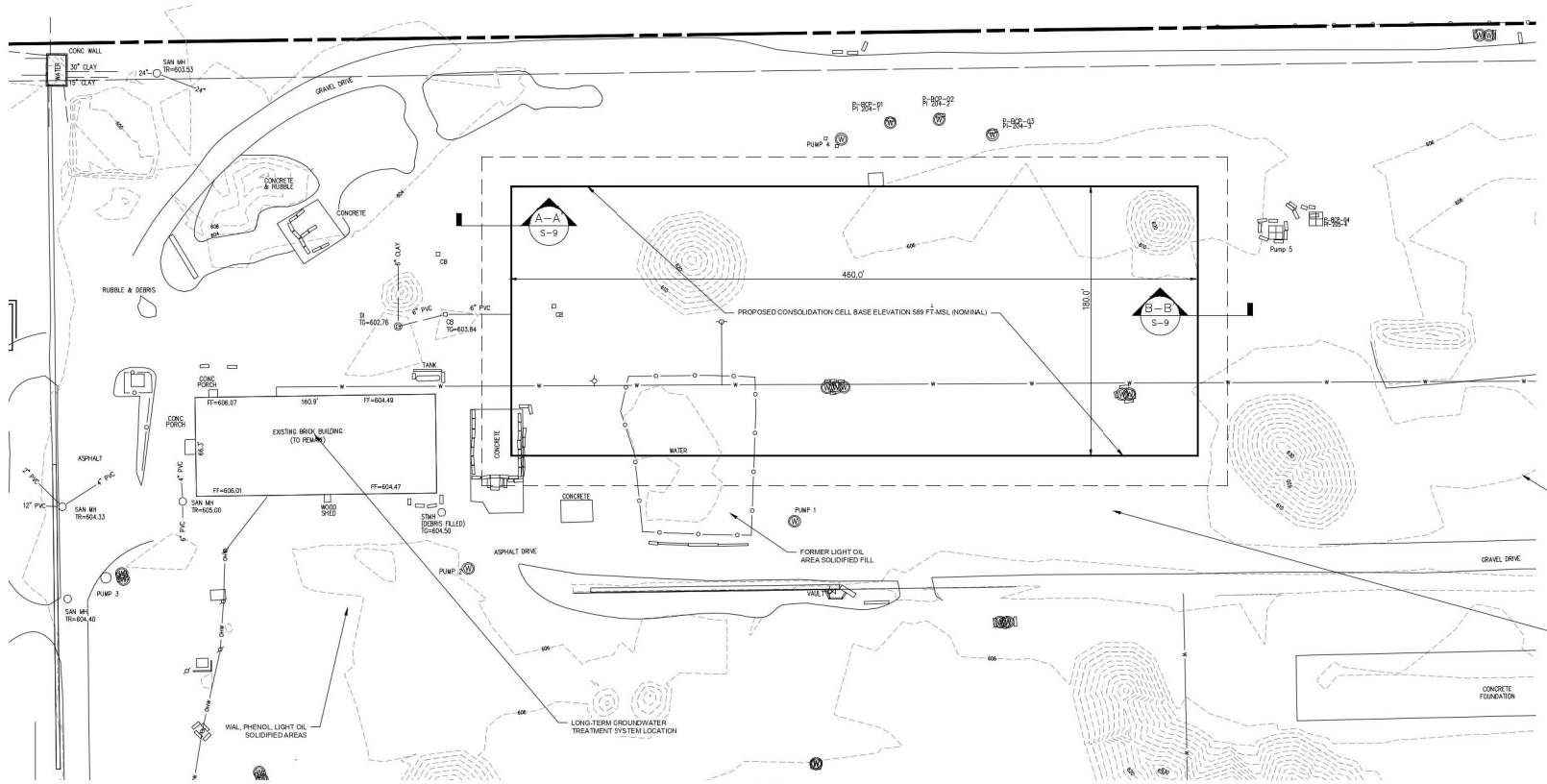
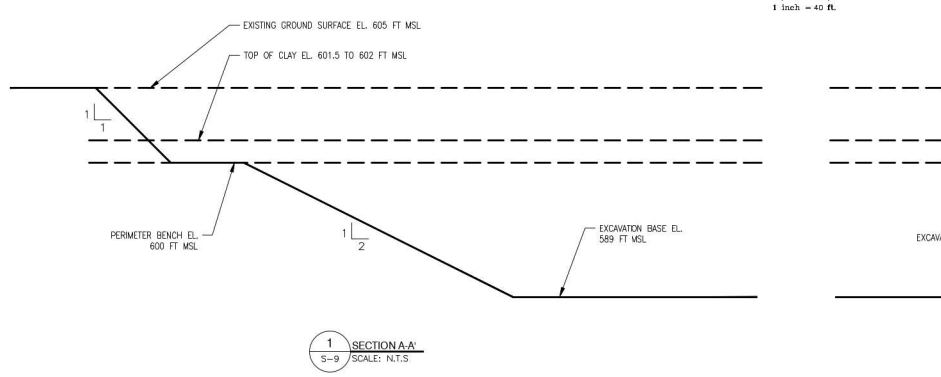
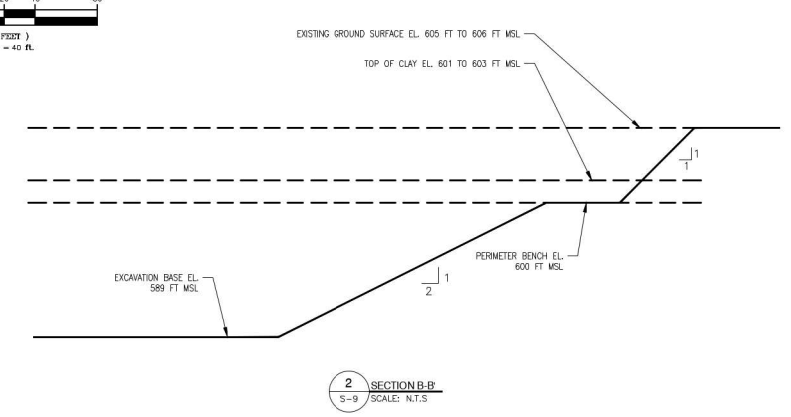


S-9 PLAN
SCALE: 1"=40'

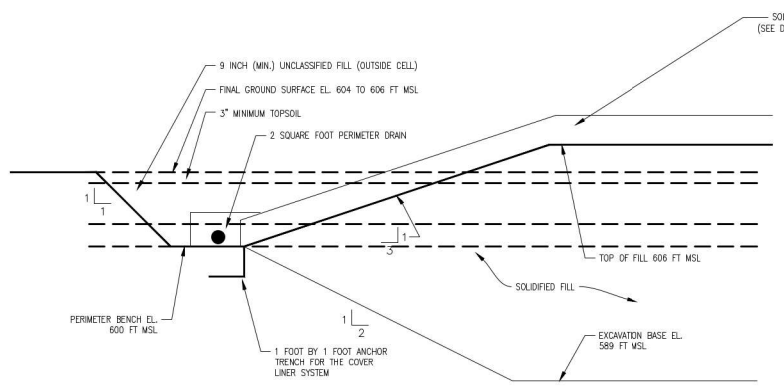
GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.



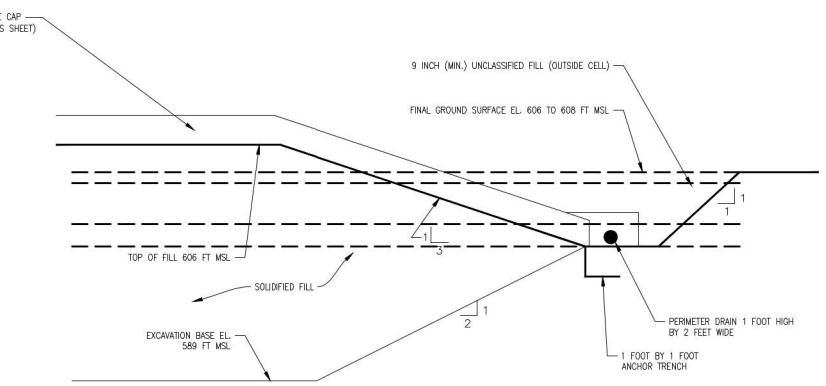
1 S-9 SECTION A-A'
SCALE: N.T.S



2 S-9 SECTION B-B'
SCALE: N.T.S



3 S-9 SECTION A-A' DETAIL
SCALE: N.T.S



4 S-9 SECTION B-B' DETAIL
SCALE: N.T.S

NOTES:

1. THE CONCRETE STOCKPILES SHALL BE REMOVED AND PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-21 AND S-22).
2. THE CONSOLIDATION AREA SHALL BE CONSTRUCTED IN THE NORTHWEST AREA OF THE BCP SITE. BECAUSE THE VOLUMES OF TARGET MATERIALS ARE KNOWN, A SINGLE CONSOLIDATION CELL WILL BE BUILT, MINIMIZING THE QUANTITY OF CONSTRUCTION MATERIALS REQUIRED CONSISTENT WITH THE GREEN REMEDIATION INITIATIVE.
3. THE SHALLOW FILL WITHIN THE LIMITS OF THE LINER FOR THE CONSOLIDATION AREA SHALL BE REMOVED IN INCREMENTS FROM THE WEST TO THE EAST. GENERAL SHALLOW FILL SHALL BE PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-17 AND S-18).
4. SOLIDIFED FILL IN THE INITIAL CONSOLIDATION CELL FOOTPRINT SHALL BE STOCKPILED ON THE SOLIDIFIED MATERIALS EAST OF THE EXCAVATION.
5. FOLLOWING REMOVAL OF THE FILL, ALL STAINED SILTY CLAY SHALL BE REMOVED FROM THE FILL/SILTY CLAY INTERFACE. THE STAINED SILTY CLAY SHALL BE PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-21 AND S-22).
6. THE CLAY SHALL BE EXCAVATED TO THE EXCAVATION BASE AND STOCKPILED FOR USE IN THE SOLID WASTE CAP AND SOIL COVER. THE SILTY CLAY HAS BEEN SAMPLED FOR IMPORT PARAMETERS. AND HAS BEEN SHOWN TO MEET COMMERCIAL SCOS.
7. FOLLOWING EXCAVATION TO GRADE, THE SIDE SLOPES AND BASE SHALL BE COMPACTED TO 90-PERCENT OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
8. THE CONSOLIDATION CELL WILL BE EXCAVATED IN SECTIONS TO MORE EFFICIENTLY MANAGE THE FILL.

LEGEND

BOUNDARY LINE
EXISTING WATERMAIN, HYDRANT, AND VALVE
EXISTING STORM SEWER, MANHOLE, AND INLET
EXISTING SANITARY SEWER AND MANHOLE
EXISTING TREE LINE
PROPERTY MARKER FOUND
EXISTING CONTOUR W/ ELEVATION
EXISTING SPOT ELEVATION
EXISTING GAS MAIN
EXISTING UNDERGROUND ELECTRIC/CONDUIT
EDGE OF WATER

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CHECKED: | J. BLACK
APPROVED: | XXX

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FIGURE 3-1

DRAWING NUMBER
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E

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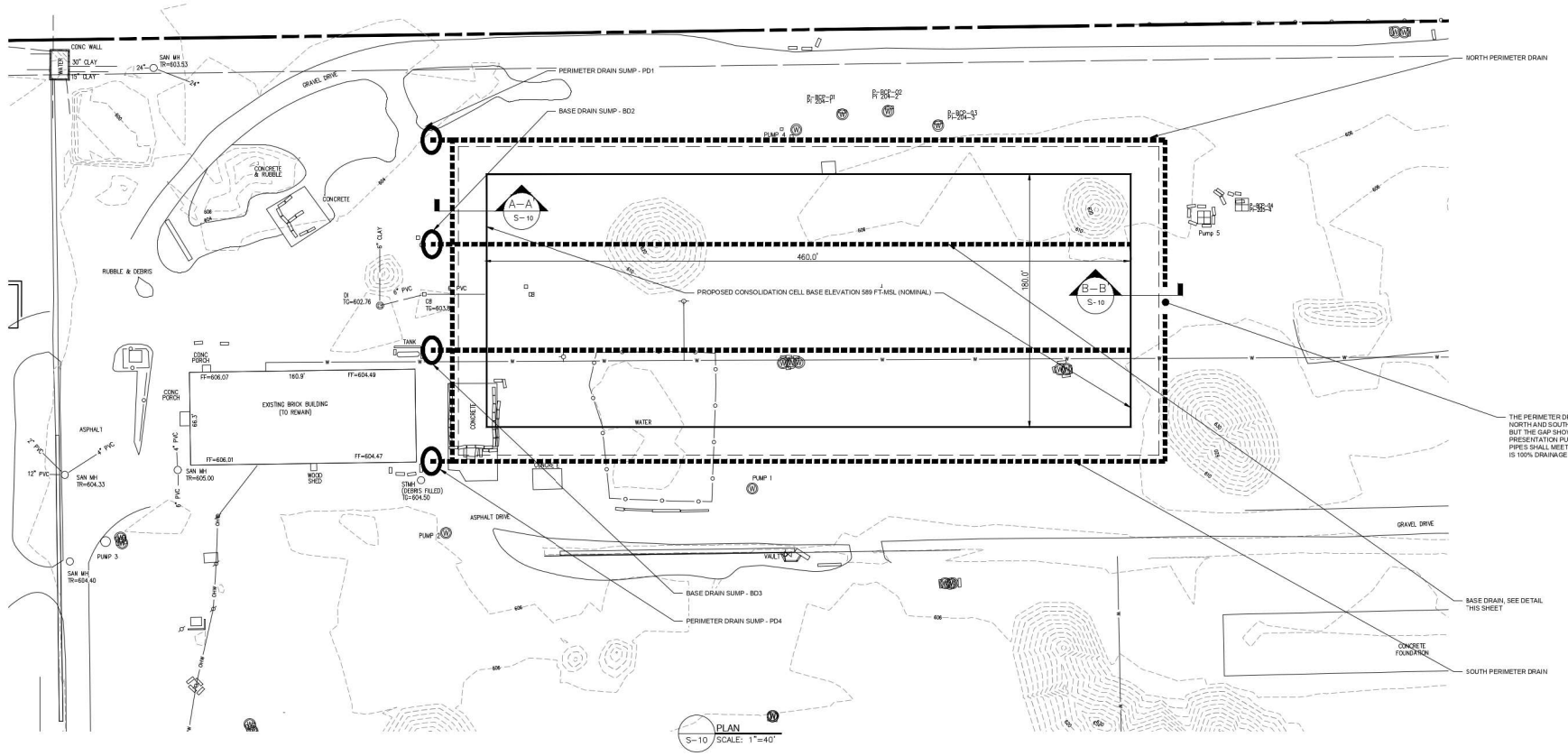
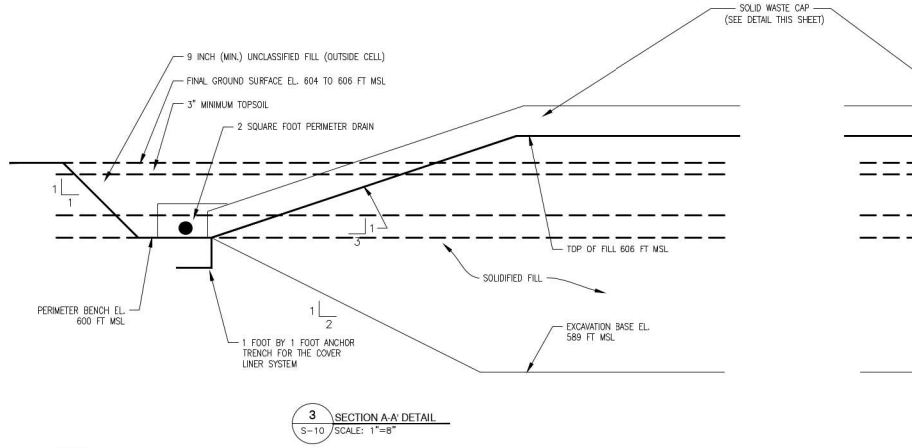
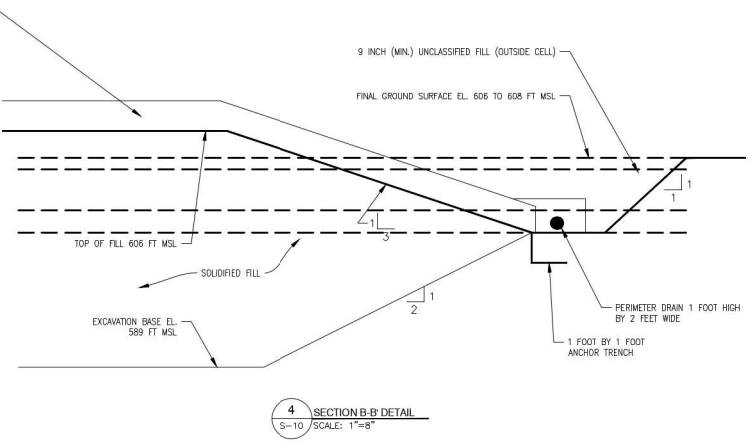


PLAN
S-10 SCALE: 1"=40'

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.



3 SECTION A-A' DETAIL
S-10 SCALE: 1"=8'



4 SECTION B-B' DETAIL
S-10 SCALE: 1"=8'

NOTES:

1. FOLLOWING PREPARATION OF THE BASE, TWO BASE DRAINS WILL BE INSTALLED. THE BASE DRAINS WILL COLLECT ANY WATER THAT MIGRATES THROUGH THE CONSOLIDATION CELL DUE TO MOISTURE THAT COLLECTS DURING PLACEMENT.
2. THE TARGET MATERIALS SHALL BE PLACED AND COMPACTED IN LIFTS OF NO MORE THAN 12-INCH LOOSE/INITIAL THICKNESS. THE MATERIALS PLACED IN THE CONSOLIDATION CELL SHALL BE COMPACTED BY NO LESS THAN 3-PASSES OF A 20,000 (MIN) POUND SMOOTH DRUM ROLLER.
3. THE TOP/TOE OF THE COMPACTED FILL IN THE CONSOLIDATION CELL SHALL NOT EXCEED TO TOP OF CLAY ELEVATION AT THE PERIMETER.
4. AFTER ALL TARGET MATERIALS ARE IN THE CONSOLIDATION CELL, THE FINAL SURFACE SHALL BE COMPACTED WITH NO LESS THAN THREE PASSES OF THE SMOOTH DRUM ROLLER.
5. THE FINAL SURFACE SHALL BE SURVEYED AND THE SOLID WASTE CAP SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS.
6. THE CAPPING SYSTEM WILL CONSIST OF THE FOLLOWING LAYERS FROM BOTTOM TO TOP; (A) ONE LAYER OF GEOSYNTHETIC CLAY LINEAR (GCL), (B) ONE LAYER OF WELDED 60-MIL HIGH DENSITY POLYETHYLENE (HDPE) LINER, (C) ONE LAYER OF GEOCOMPOSITE DRAINAGE LAYER, (D) 18-INCHES (MIN.) OF UNCLASSIFIED FILL MEETING THE NYSDEC COMMERCIAL SCOS, (E) ONE LAYER OF ORANGE NON-WOVEN GEOTEXTILE TO DELINEATE THE LIMITS OF THE CONSOLIDATION CELL, (F) 6-INCHES OF TOPSOIL MEETING THE NYSDEC COMMERCIAL SCOS, AND (G) VEGETATION TO CONTROL EROSION OF THE SURFACE.
7. THE GCL AND HDPE LINERS SHALL BE ANCHORED AROUND THE PERIMETER IN A 1-FOOT BY 1-FOOT (MIN.) ANCHORED TRENCH BACKFILLED WITH UNCLASSIFIED FILL MEETING THE NYSDEC COMMERCIAL SCOS.
8. THE GEOCOMPOSITE DRAINAGE LAYER SHALL BE ANCHORED AND ULTIMATELY DRAIN INTO A PERIMETER DRAINAGE COLLECTION SYSTEM CONSISTING OF A 3-INCH DIAMETER HDPE PERFORATED TUBING SURROUNDED BY NYSDOT #3 CLEAN GRAVEL.
9. THE CONSOLIDATION AREA CAPPING SYSTEM SHALL BE ANCHORED INTO THE SILT CLAY. AS A RESULT, THE OUTER SLOPES OF THE UNCLASSIFIED FILL WILL BE LOWER THAN THE SURROUNDING FINAL GRADES FOR THE SITE. THE SUBGRADE OVER THE SLOPES WILL BE FILLED WITH COMPACTED UNCLASSIFIED FILL TO 6-INCHES BELOW THE FINAL GRADE WITHIN THE LIMITS OF THE PERIMETER DRAINS. A LAYER OF ORANGE NON-WOVEN GEOTEXTILE WILL BE PLACES AND COVERED WITH 6-INCHES OF TOPSOIL. OUTSIDE THE LIMITS OF THE PERIMETER DRAIN, THE SITE FILL WILL REMAIN AND THE STANDARD 12-INCH COVER WILL BE INSTALLED.
10. THE FINAL GRADE OF THE CONSOLIDATED MATERIALS, THE UNCLASSIFIED FILL COMPONENT OF THE CAP, AND THE FINAL SURFACE SHALL BE SURVEYED BY A PROFESSIONAL LAND SURVEYOR LICENSED IN NEW YORK.

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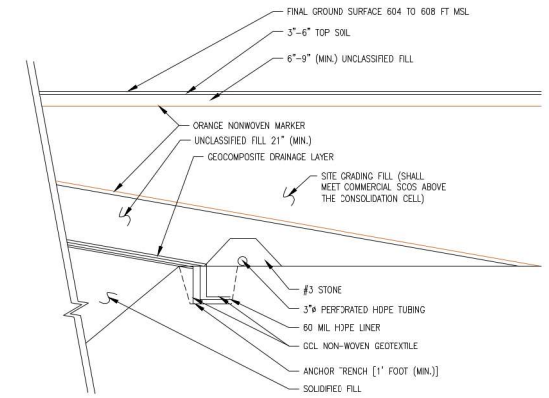
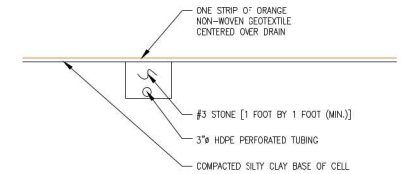
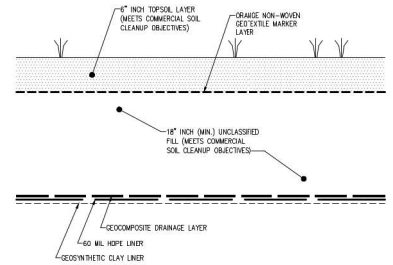


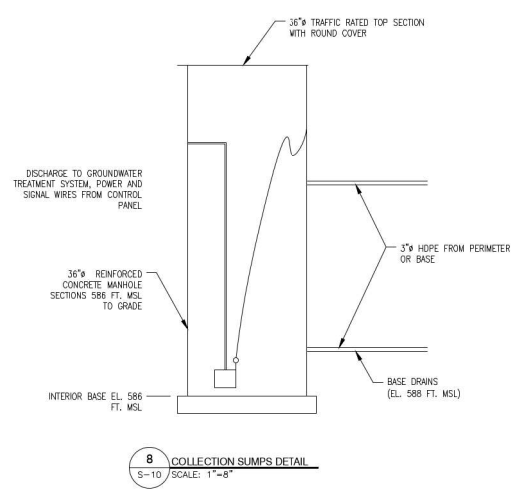
5 ANCHOR TRENCH & PERIMETER DRAIN DETAIL
S-10 SCALE: 1"=8'



6 BASE DRAIN DETAIL
S-10 SCALE: 1"=8'

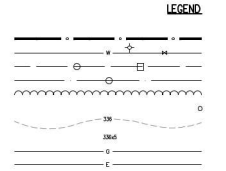


7 CONSOLIDATION CELL CAPPING SYSTEM DETAIL
S-10 SCALE: 1"=8'



8 COLLECTION SUMPS DETAIL
S-10 SCALE: 1"=8'

LEGEND



BOUNDARY LINE
EXISTING WATERMAIN, HYDRANT, AND VALVE
EXISTING STORM SEWER, MANHOLE, AND INLET
EXISTING SANITARY SEWER AND MANHOLE
EXISTING TREE LINE
PROPERTY MARKER FOUND
EXISTING CONTOUR W/ ELEVATION
EXISTING SPOT ELEVATION
EXISTING GAS MAIN
EXISTING UNDERGROUND ELECTRIC/CONDUIT
EDGE OF WATER

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FIGURE

DRAWING NUMBER
S-10

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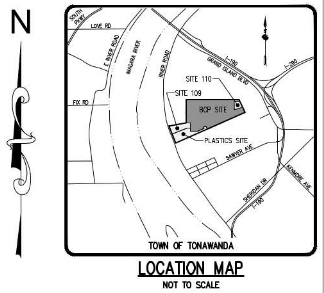

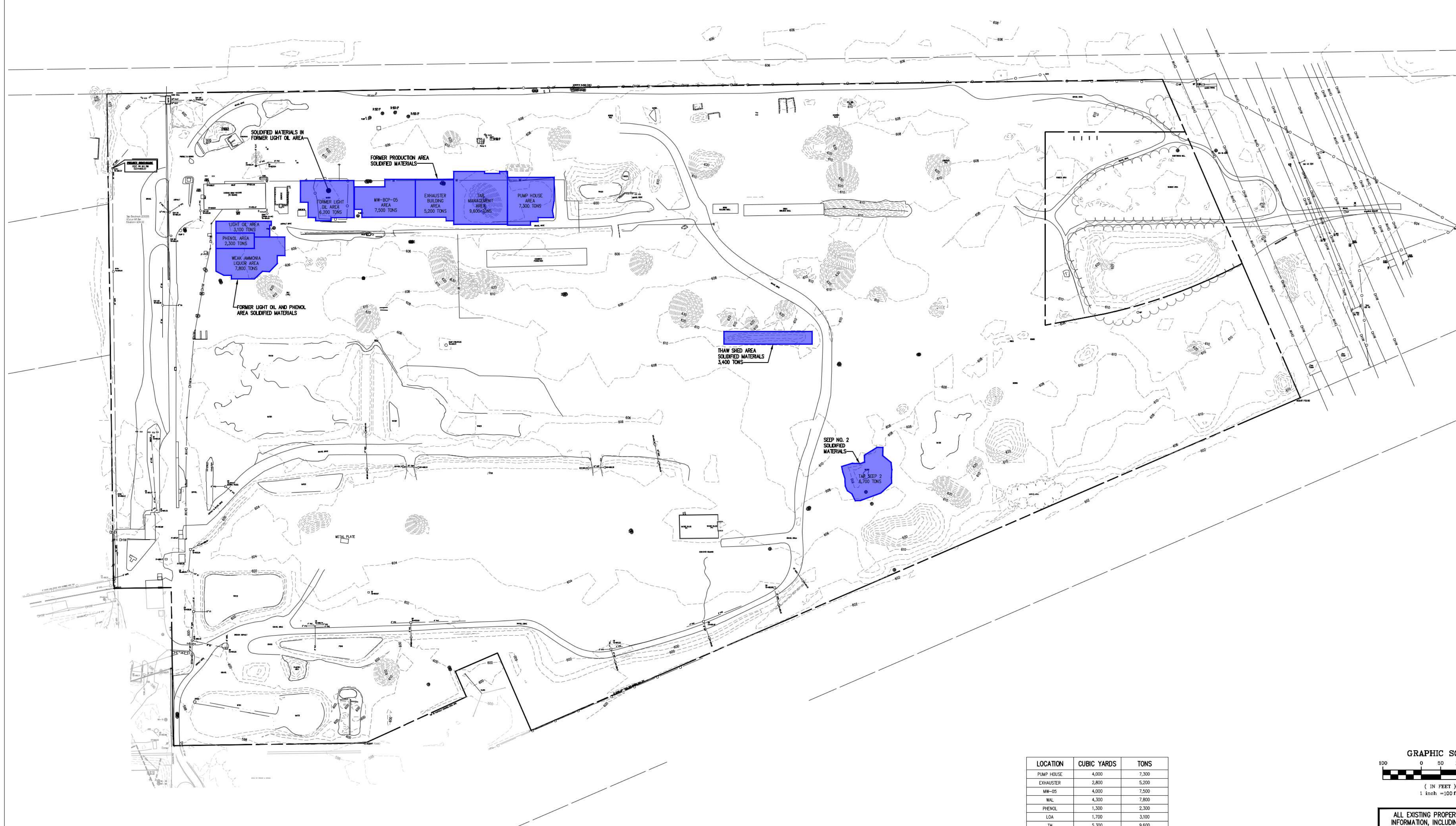

LOCATION	CUBIC YARDS	TONS
PUMP HOUSE	4,000	7,300
EXHAUSTER	2,800	5,200
MW-05	4,000	7,500
WAL	4,300	7,800
PHENOL	1,300	2,300
LOA	1,700	3,100
TM	5,300	9,600
TAR SEEP NO. 2	3,700	6,700
THAW SHED	1,800	3,400
FLOA	3,400	6,200
SWT PILE	750	1,400
RAIL AREA	15	30
TOTAL	33,065	60,530

LEGEND

SOLIDIFIED MATERIAL

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 ft.

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EXCAVATION OF SOLIDIFIED MATERIALS

DRAWING NUMBER
S-11

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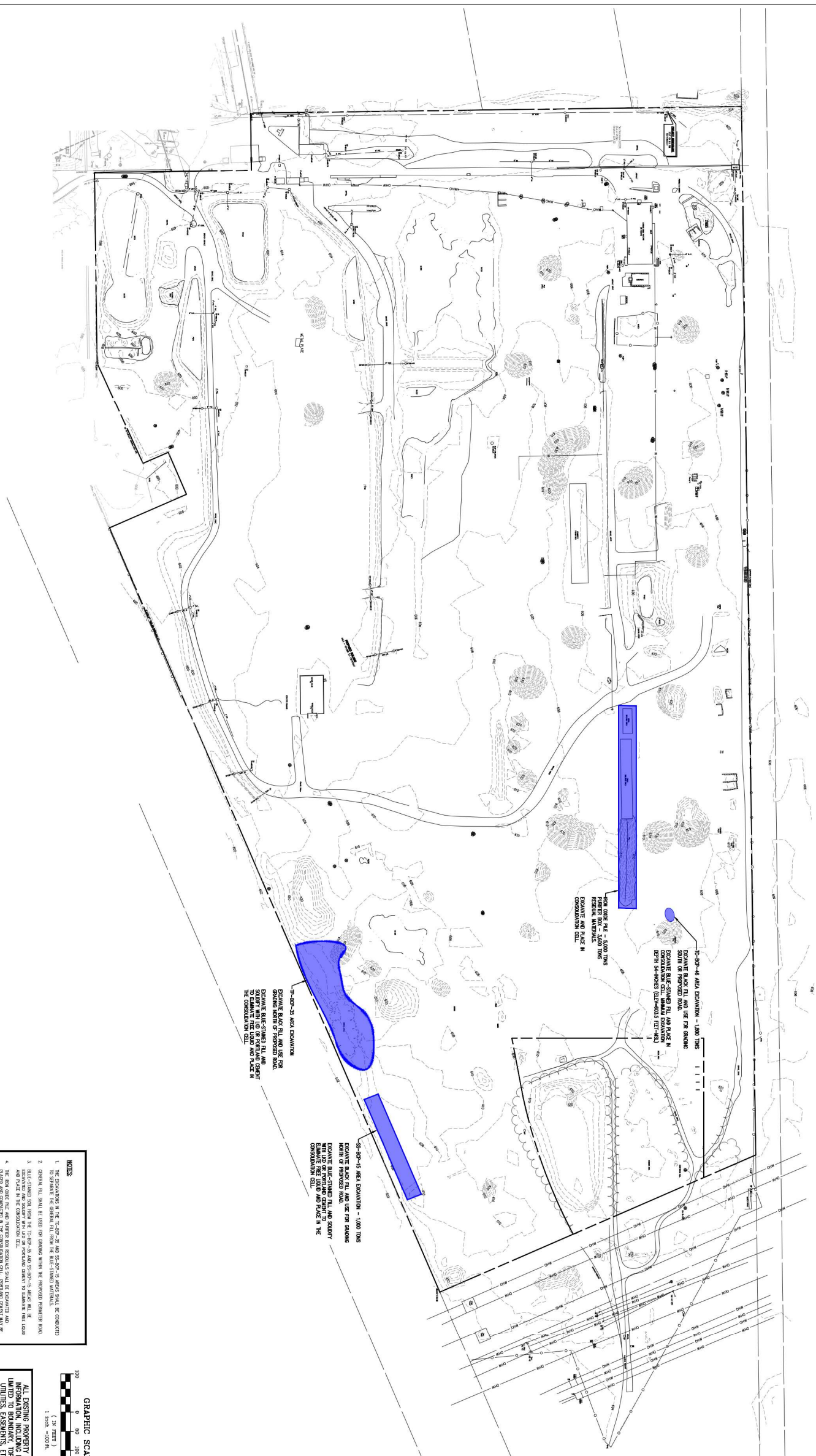

NOTES:

1. THE EXCAVATING IN THE TC-BCP-35 AND SS-BCP-15 AREAS SHALL BE CONDUCTED TO SEPARATE THE GENERAL FILL FROM THE BLUE-STAINED MATERIALS.
2. GENERAL FILL SHALL BE USED FOR GRADING WITHIN THE PROPOSED PERIMETER ROAD.
3. BLUE-STAINED SOIL FROM THE TC-BCP-35 AND SS-BCP-15 AREAS WILL BE EXCAVATED AND SOUPDY WITH LIQ OR PORTLAND CEMENT TO ELIMINATE FREE LIQUID AND PLACE IN THE CONSOLIDATION CELL.
4. THE IRON OXIDE PAC AND PURIFIED BOX RESIDUALS SHALL BE EXCAVATED AND PLACED AND COMPACTED IN THE CONSOLIDATION CELL. PORTLAND CEMENT MAY BE ADDED TO FACILITATE COMPACTION IN THE CELL.
5. BLUE-STAINED SOIL FROM THE TP-BCP-46 AREA WILL BE PLACED ABOVE THE SILTY CLAY LAYER AND BELOW THE GENERAL FILL. SOUPDY WITH LIQ OR PORTLAND CEMENT MAY BE ADDED TO THE EXCAVATED MATERIALS FROM THE DEEP NO. 4 PORTLAND CEMENT MAY BE ADDED TO FACILITATE COMPACTION.

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MANAGEMENT OF BLUE-STAINED FILL

DRAWING NUMBER
S-12

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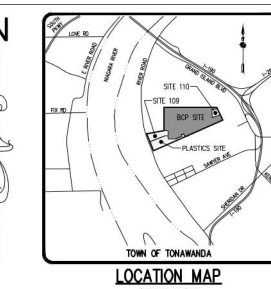
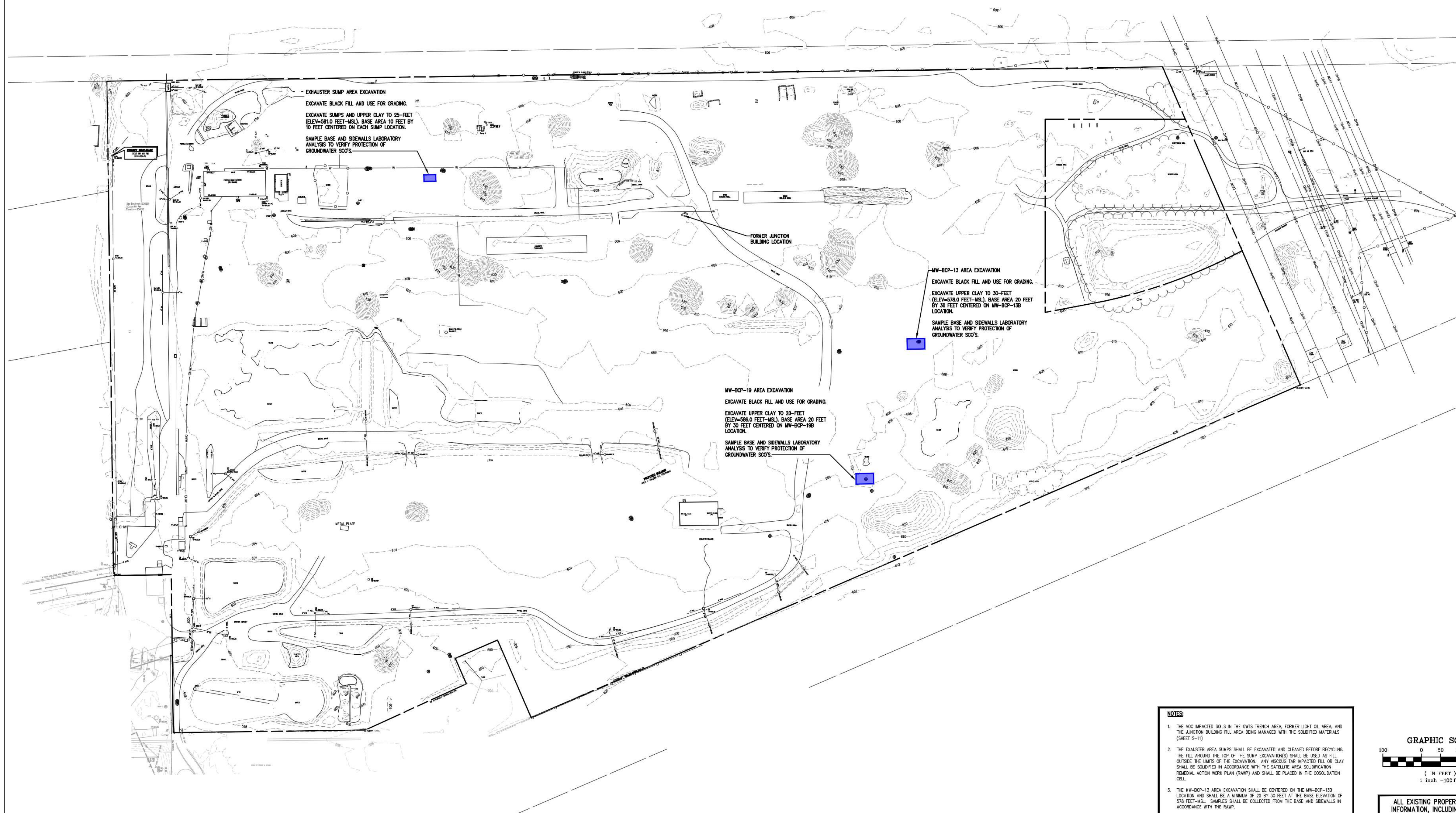


LOCATION MAP
NOT TO SCALE



NOTES:

1. THE VOC IMPACTED SOILS IN THE GWTS TRENCH AREA, FORMER LIGHT OIL AREA, AND THE JUNCTION BUILDING FILL AREA BEING MANAGED WITH THE SOLIDIFIED MATERIALS (SHEET S-11)
2. THE EXHAUSTER AREA SUMPS SHALL BE EXCAVATED AND CLEANED BEFORE RECYCLING. THE FILL AROUND THE TOP OF THE SUMP EXCAVATION(S) SHALL BE USED AS FILL OUTSIDE THE LIMITS OF THE EXCAVATION. ANY VISCOUS TAR IMPACTED FILL OR CLAY SHALL BE SOLIDIFIED IN ACCORDANCE WITH THE SATELLITE AREA SOLIDIFICATION REMEDIAL ACTION WORK PLAN (RAMP) AND SHALL BE PLACED IN THE COSOLIDATION CELL.
3. THE MW-BCP-13 AREA EXCAVATION SHALL BE CENTERED ON THE MW-BCP-13B LOCATION AND SHALL BE A MINIMUM OF 20 BY 30 FEET AT THE BASE ELEVATION OF 578 FEET-MSL. SAMPLES SHALL BE COLLECTED FROM THE BASE AND SIDEWALLS IN ACCORDANCE WITH THE RAMP.
4. THE MW-BCP-19 AREA EXCAVATION SHALL BE CENTERED ON THE MW-BCP-19B LOCATION AND SHALL BE A MINIMUM OF 20 BY 30 FEET AT THE BASE ELEVATION OF 586 FEET-MSL. SAMPLES SHALL BE COLLECTED FROM THE BASE AND SIDEWALLS IN ACCORDANCE WITH THE RAMP.
5. ALL EXCAVATIONS INTO THE SILTY CLAY SHALL BE BACKFILLED WITH UNCLASSIFIED CLAY FILL THAT MEETS THE COMMERCIAL SCO'S.
6. THE EXCAVATION BOUNDARIES WERE BASED ON ADDITIONAL TEST PITS CONDUCTED IN 2025. THESE ARE THE BASE OF THE EXCAVATIONS, THE EXCAVATION SIDES WILL BE SLOPED TO MAINTAIN STABILITY DURING SAMPLING.

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 ft.

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EXCAVATION OF VOC IMPACTED FILL & SOIL

DRAWING NUMBER
S-13

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E

NOTES:

1. THE BIOTREATMENT OF THE NUISANCE MATERIALS IN THE WATER TREATMENT AREA IS BEING COMPLETED IN ACCORDANCE WITH THE FULL-SCALE BIOTREATMENT REMEDIAL ACTION WORK PLAN.
2. THE BIOTREATMENT OF THE SOILS IN THE FORMER HEAVY EQUIPMENT STAGING AREA SHALL BE COMPLETED TO REMEDIATE SOILS TO REMOVE CONCENTRATIONS OF THE NUISANCE IMPACTED SOILS ABV AT THE GROUND SURFACE. THOSE AREAS OF THE BIOTREATMENT SHALL BE COMPLETED TO REMEDIATE SOILS TO REMOVE CONCENTRATIONS OF THE NUISANCE IMPACTED SOILS ABV THAT LIE WITHIN THE TRACK 1 AREAS SHALL BE EXCAVATED AND USED AS FILL TO MEET SUBGRADE BELOW THE COVER SYSTEMS.
3. THE BIOTREATMENT IN THE FORMER WEST TANK AREA SHALL BE COMPLETED TO REMEDIATE SOILS TO REMOVE CONCENTRATIONS OF THE NUISANCE IMPACTED SOILS ABV AT THE GROUNDWATER AND ELIMINATE THE POTENTIAL FOR NUISANCE CONDITIONS. THE IMPACTED TILL IS FROM THE GROUND SURFACE TO THE TOP OF THE SILTY CLAY.

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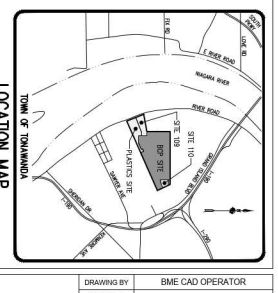
N

LOCATION MAP
NOT TO SCALE



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BIOTREATMENT

DRAWING NUMBER
S-14

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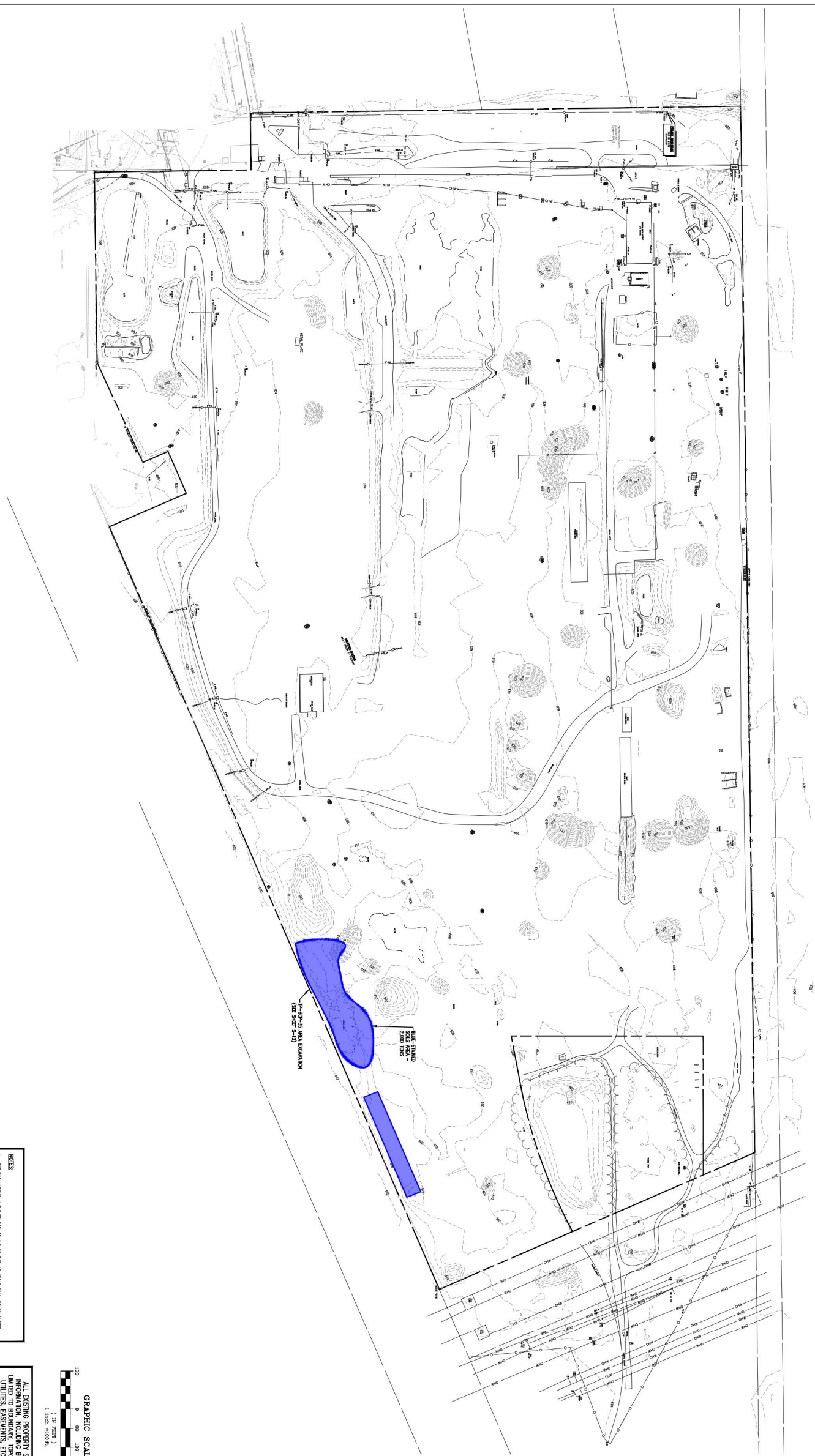

NOTES

1. THE EXCAVATIONS IN THE BP-BCP-35 AND SS-BCP-15 AREAS SHALL BE CONDUCTED AS SHOWN ON SHEET S-12.
2. GENERAL FILL FROM THE EXISTING BREZE PILES AND THE LAYER OVER THE BLUE-STAINED SOILS FOR GRADING WITHIN THE PROPOSED PERIMETER ROAD.
3. BLUE-STAINED SOIL EXPOSED IN THE AREA SHOWN SHALL BE SOLIDIFIED WITH 5.0% PORTLAND CEMENT AND COMPACTED IN PLACE OR PLACED IN THE CONSOLIDATION CELL.

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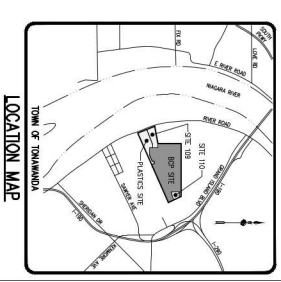
GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

N

LOCATION MAP
NOT TO SCALE



IN-SITU TREATMENT OF BLUE-STAINED FILL

DRAWING NUMBER
S-15

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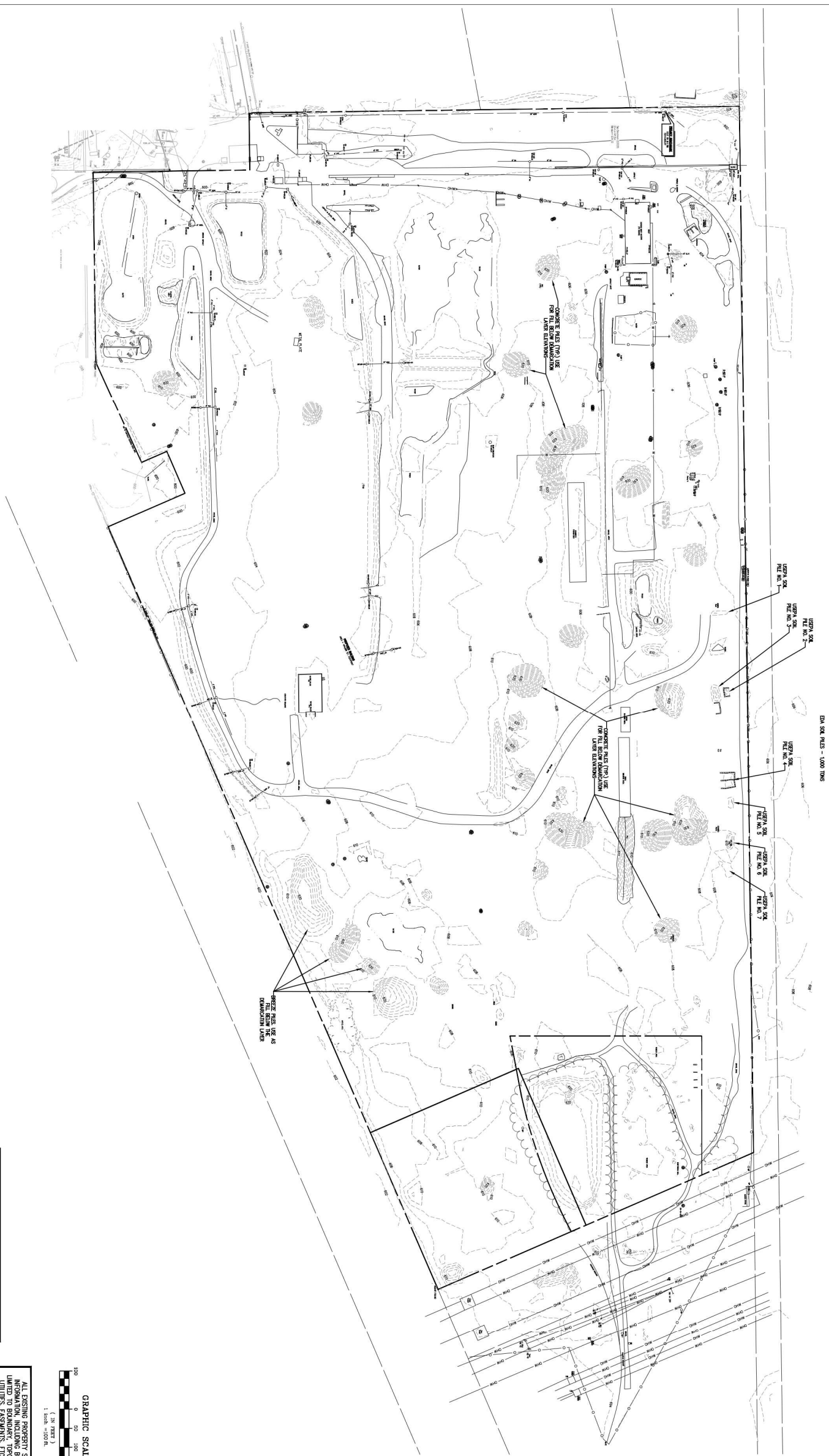


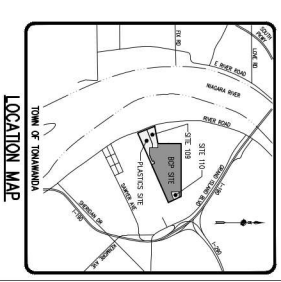
NOTES

1. THE USEPA SOIL PILES SHALL BE EXCAVATED, PLACED AND COMPACTED IN THE CONSOLIDATION CELL.
2. SAMPLING IS NOT REQUIRED FOR THE REMOVAL OF THE SOIL PILES.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY KNOWN AS RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC. SHEETS 01-04, DATED JULY, 2024

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
100 0 50 100 200

N

LOCATION MAP
NOT TO SCALE


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RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS

BCP SITE (NYSDEC #C915353)
3875 RIVER ROAD
TOWN OF TONAWANDA, NEW YORK

JOHN A. ROCK — STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER — No. 092618

DRAWING BY	BME CAD OPERATOR
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REMOVAL OF SOIL PILES

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S-16

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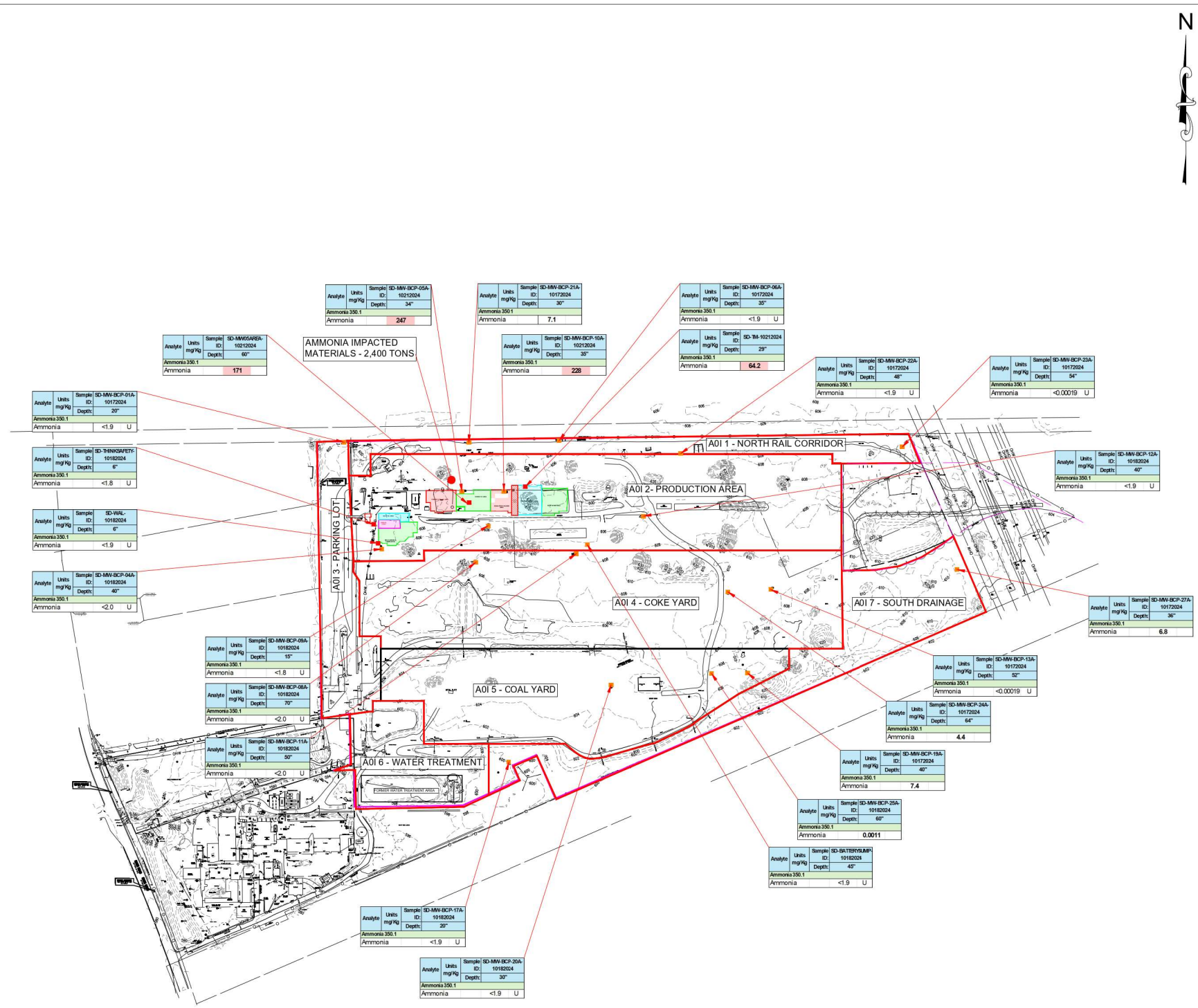

Notes:
1. Former Water Treatment Area has been excavated to native clay.
2. Soil samples were collected from test pits advanced within 5-feet of the associated monitoring wells.
3. Ammonia results highlighted in red represent values above the site-specific Ammonia SCO of 11.05 mg/Kg.

E

Reference: Niagara Boundary, Map Showing Topographic Survey of Property Owned by Riverview Innovation & Technology Campus Inc., April 2022

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APPROVED:

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AMMONIA SOURCE AREA
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TONAWANDA, NY 14150

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FIGURE 7-9

DRAWING NUMBER
S–17

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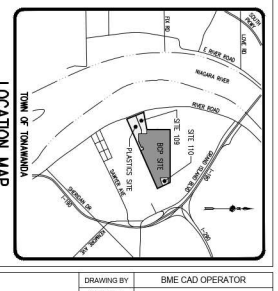
NOTES

1. THE EXCAVATIONS IN THE POTENTIAL TENORM SOIL EXCAVATION AREAS SHALL BE MONITORED BY A CERTIFIED NUM SPECIALIST, IN ACCORDANCE WITH THE RAWP AND THE TENORM MANAGEMENT PLAN.
2. THE FINAL EXTENT OF THE EXCAVATION OF THE POTENTIAL TENORM SOILS IDENTIFIED IN THE FIELD MAY BE REDUCED BASED ON RESULTS OF CONFIRMATORY SAMPLING IN ACCORDANCE WITH THE RAWP AND THE TENORM MANAGEMENT PLAN.
3. ONLY THE SOILS IDENTIFIED AS POTENTIAL TENORM BY NUM DURING EXCAVATION REQUIRE PLACEMENT IN THE CONSOLIDATION CELL. SOME SOILS WITHIN THE LIMITS SHOWN MAY NOT BE POTENTIAL TENORM.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY LOCATED IN TONAWANDA & TONAWANDA, NY (SHEETS 01-04), DATED JULY, 2024

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
100 0 50 100 200

N

LOCATION MAP
NOT TO SCALE


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MANAGEMENT OF POTENTIAL TENORM SOILS
DRAWING NUMBER
S-18

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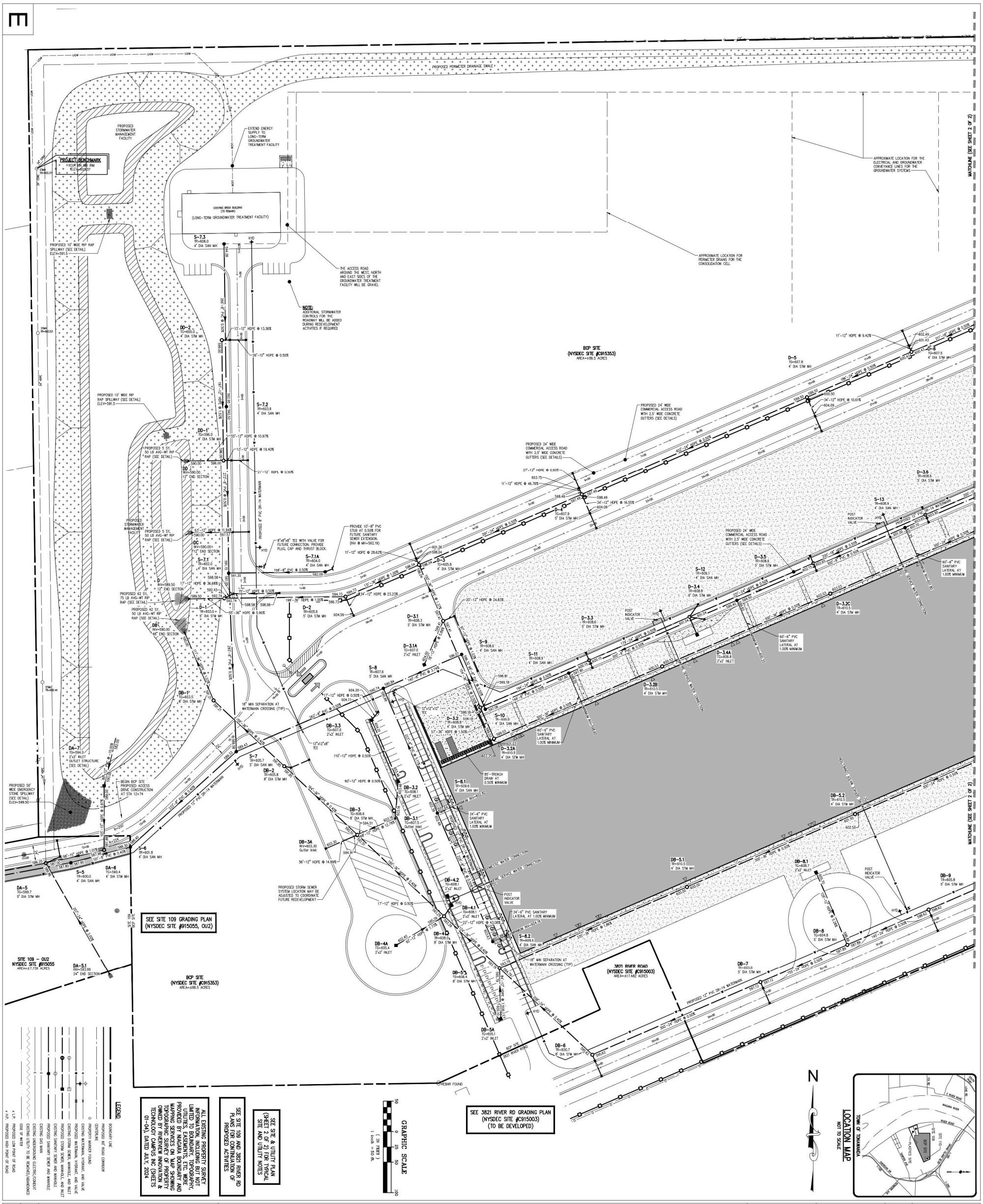

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SITE & UTILITY PLAN (SHEET 1 OF 2)

DRAWING NUMBER S-19

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RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS

BCP SITE (NYSDEC #C915353) & SITE 110 (OU1, NYSDEC #915055)

3875 RIVER ROAD

TOWN OF TONAWANDA, NEW YORK

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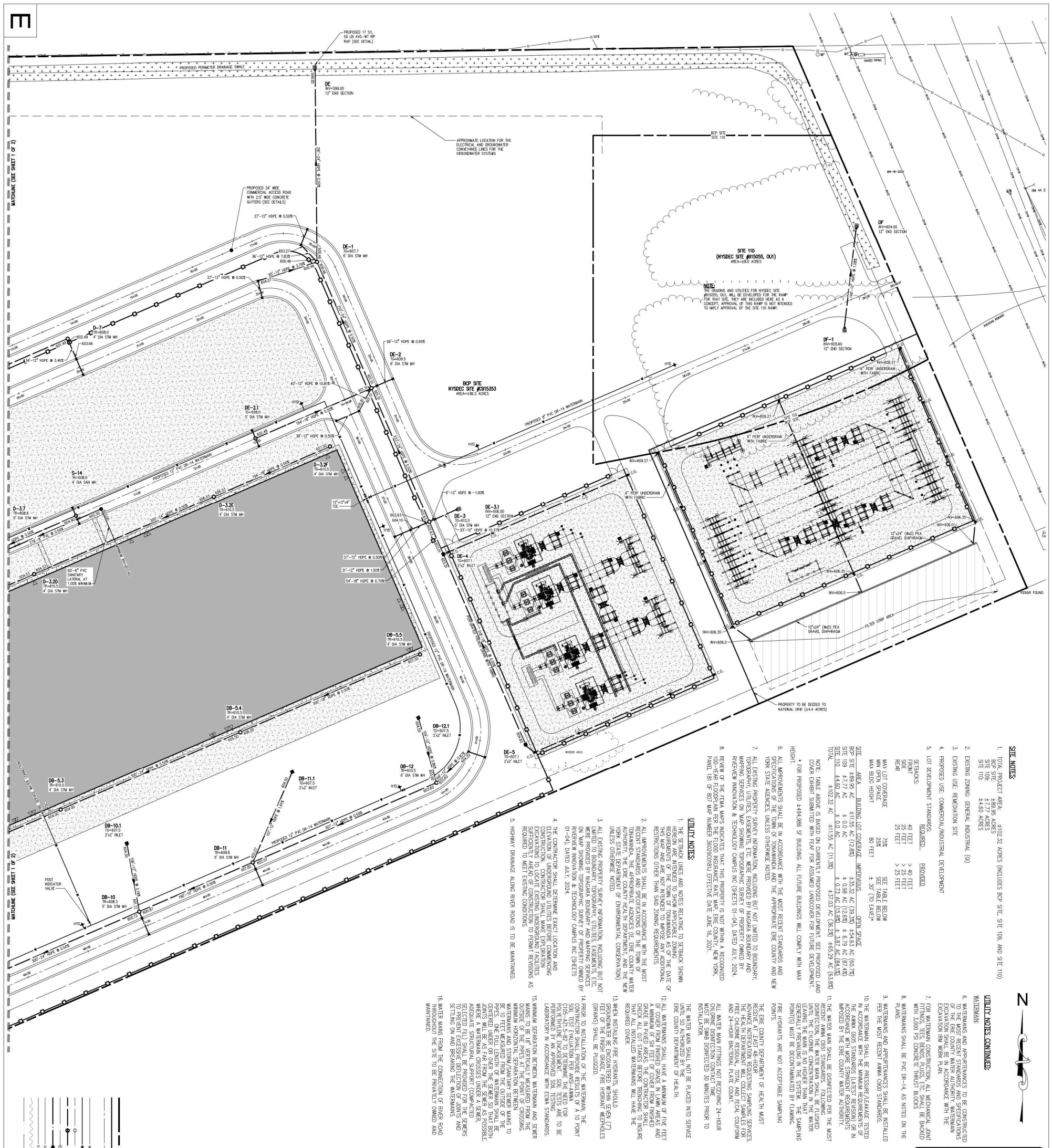


SITE NOTES:

1. TOTAL PROJECT AREA: ±102.32 ACRES (INCLUDES BCP SITE, SITE 109, AND SITE 110)
   BCP SITE: ±89.95 ACRES
   SITE 109: ±7.77 ACRES
   SITE 110: ±4.60 ACRES
2. EXISTING ZONING: GENERAL INDUSTRIAL (GI)
3. EXISTING USE: REMEDIATION SITE
4. PROPOSED USE: COMMERCIAL/INDUSTRIAL DEVELOPMENT
5. LOT DEVELOPMENT STANDARDS:

SETBACKS:	REQUIRED:	PROVIDED
FRONT	40 FEET	> 40 FEET
SIDE	25 FEET	> 25 FEET
REAR	25 FEET	> 25 FEET
MAX LOT COVERAGE	75%	SEE TABLE BELOW
MIN OPEN SPACE	25%	SEE TABLE BELOW
MAX BLDG HEIGHT	80 FEET	± 30' (TO EAVE)*

SITE	AREA	BUILDING LOT COVERAGE	IMPERVIOUS	OPEN SPACE
BCP SITE	±89.95 AC	±11.55 AC (12.8%)	±35.32 AC (39.3%)	±54.63 AC (60.7%)
SITE 109	±7.77 AC	± 0.0 AC	± 0.98 AC (12.6%)	± 6.79 AC (87.4%)
SITE 110	±4.60 AC	± 0.0 AC	± 0.73 AC (15.9%)	± 3.87 AC (84.1%)
TOTAL	±102.32 AC	±11.55 AC (11.3%)	±37.03 AC (36.2%)	±65.29 AC (63.8%)

NOTE: TABLE ABOVE IS BASED ON CURRENTLY PROPOSED DEVELOPMENT. SEE PROPOSED LAND COVER EXHIBIT SUBMITTED WITH FEAF FOR ASSUMED LANDCOVER FOR FUTURE DEVELOPMENT.

* FOR PROPOSED ±494,986 SF BUILDING. ALL FUTURE BUILDINGS WILL COMPLY WITH MAX HEIGHT.

6. ALL IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE MOST RECENT STANDARDS AND SPECIFICATIONS OF THE TOWN OF TONAWANDA AND THE APPROPRIATE ERIE COUNTY AND NEW YORK STATE AGENCIES, UNLESS OTHERWISE NOTED.
7. ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024.
8. REVIEW OF THE FEMA MAPS INDICATES THAT THIS PROPERTY IS NOT WITHIN A RECOGNIZED 100-YEAR FLOODPLAIN PER THE FLOOD INSURANCE RATE MAP, ERIE COUNTY, NEW YORK, PANEL 181 OF 807 MAP NUMBER 36029C0181J EFFECTIVE DATE JUNE 16, 2021.

UTILITY NOTES:

1. THE SETBACK LINES AND NOTES RELATING TO SETBACK SHOWN HEREON ARE INTENDED TO SHOW APPLICABLE ZONING REQUIREMENTS OF THE TOWN OF TONAWANDA AS OF THE DATE OF THIS MAP. THIS MAP DOES NOT PURPORT TO REFLECT ANY ADDITIONAL RESTRICTIONS OTHER THAN SAID ZONING REQUIREMENTS.
2. ALL IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE MOST RECENT STANDARDS AND SPECIFICATIONS OF THE TOWN OF TONAWANDA, THE APPROPRIATE AGENCIES (IE, ERIE COUNTY WATER AUTHORITY, THE ERIE COUNTY HEALTH DEPARTMENT, AND THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) UNLESS OTHERWISE NOTED.
3. ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024.
4. THE CONTRACTOR SHALL DETERMINE EXACT LOCATION AND ELEVATION OF UNDERGROUND UTILITIES BEFORE COMMENCING CONSTRUCTION. CONTRACTOR SHALL MAKE EXPLORATION EXCAVATIONS AS REQUIRE EXISTING UNDERGROUND FACILITIES REQUIRED TO MEET EXISTING CONDITIONS AS REQUIRED TO PERMIT REVISIONS AS
5. HIGHWAY DRAINAGE ALONG RIVER ROAD IS TO BE MAINTAINED.

UTILITY NOTES CONTINUED:

WATERMAIN:

6. WATERMAINS AND APPURTENANCES TO BE CONSTRUCTED TO THE MOST RECENT STANDARDS AND SPECIFICATIONS OF THE ERIE COUNTY WATER AUTHORITY. WATERMAIN EXCAVATION SHALL BE IN ACCORDANCE WITH THE EXCAVATION IRM WORK PLAN.
7. FOR WATERMAIN CONSTRUCTION, ALL MECHANICAL JOINT FITTINGS, TEES, BENDS, PLUGS, ETC. SHALL BE BACKED WITH 3,000 PSI CONCRETE THRUST BLOCKS
8. WATERMAINS SHALL BE PVC DR-14, AS NOTED ON THE PLANS.
9. WATERMAINS AND APPURTENANCES SHALL BE INSTALLED PER THE MOST RECENT AWWA C900 STANDARDS.
10. THE WATERMAIN SHALL BE PRESSURE/LEAKAGE TESTED IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS OF AWWA C600 STANDARDS. ALL TESTING SHALL BE DONE IN ACCORDANCE WITH THE MORE STRINGENT REQUIREMENTS IMPOSED BY THE ERIE COUNTY WATER AUTHORITY.
11. THE WATER MAIN SHALL BE DISINFECTED PER THE MOST RECENT AWWA C651 STANDARDS. FOLLOWING SUCCESSFUL HYDROSTATIC TESTING, THE FINISHED LINE SHALL BE FILLED WITH WATER CONTAINING CHLORINE CONCENTRATION IN THE WATER LEAVING THE MAIN IS NO HIGHER THAN THAT GENERALLY PREVAILING IN THE SYSTEM. THE SAMPLING POINT(S) MUST BE DECONTAMINATED BY FLAMING.
12. ALL WATERMAINS SHALL HAVE A MINIMUM OF FIVE FEET OF COVER FROM FINISHED GRADE IN LAWN AREAS AND A MINIMUM OF SIX FEET OF COVER FROM FINISHED GRADE IN PAVED AREAS. THE CONTRACTOR SHALL CHECK ALL CUT SHEETS BEFORE TRENCHING TO INSURE THAT THE INSTALLED WATERMAINS WILL HAVE THE REQUIRED COVER.
13. WHEN INSTALLING FIRE HYDRANTS, SHOULD GROUNDWATER BE ENCOUNTERED WITHIN SEVEN (7) FEET OF THE FINISH GRADE, FIRE HYDRANT WEEPHOLES (DRAINS) SHALL BE PLUGGED.
14. PRIOR TO INSTALLATION OF THE WATERMAIN, THE CONTRACTOR SHALL PROVIDE RESULTS OF A 10 POINT C105-AZ1.5-82 TO DETERMINE THE NEED FOR POLYETHYLENE ENCASEMENT. SOIL TESTS ARE TO BE PERFORMED BY AN APPROVED SOIL TESTING LABORATORY IN ACCORDANCE WITH ECWA STANDARDS.
15. MINIMUM SEPARATION BETWEEN WATERMAIN AND SEWER MAINS TO BE 18" VERTICALLY MEASURED FROM OUTSIDE OF THE PIPES AT THE POINT OF CROSSING. WATERMAINS AND STORM/SANITARY SEWER MAINS TO BE 10 FEET MEASURED FROM THE OUTSIDE OF THE PIPES. ONE FULL LENGTH OF WATERMAIN SHALL BE CENTERED UNDER OR OVER THE SEWER SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE. WHERE A WATERMAIN CROSSES OVER A SEWER, ADEQUATE VERTICAL SUPPORT SHALL BE PROVIDED FOR SELECTED FILL SHALL BE PROVIDED FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING ON AND BREAKING THE WATERMAINS.
16. WATER MAINS FROM THE CONNECTION OF RIVER ROAD THROUGHOUT THE SITE TO BE PRIVATELY OWNED AND MAINTAINED.

SANITARY SEWER:

17. ALL SANITARY SEWERS ARE IN COMPLIANCE WITH THE SPECIFICATIONS AND STANDARDS POLICY OF THE TOWN OF TONAWANDA.
18. SANITARY SEWERS, LATERALS AND APPURTENANCES SHALL BE CONSTRUCTED ACCORDING TO THE SPECIFICATIONS OF THE TOWN OF TONAWANDA. SANITARY SEWER EXCAVATION SHALL BE IN ACCORDANCE WITH THE EXCAVATION IRM WORK PLAN.
19. SANITARY SEWER PIPE SHALL BE 8" PVC SDR-35 OR AS NOTED ON THE PLAN.
20. INFILTRATION AND EXFILTRATION SHALL BE LIMITED TO 100 GALLONS PER MILE PER INCH DIAMETER OF PIPE PER 24 HOURS FOR SANITARY SEWERS. IF AN AIR TEST IS USED, THE TEST AS A MINIMUM SHALL CONFORM TO THE PROCEDURE DESCRIBED IN ASTM STANDARD SPECIFICATION AND PRACTICE FOR INSTALLATION ACCEPTANCE OF PLASTIC NON-PRESSURE SEWER LINES USING LOW-PRESSURE AIR."
21. THE FOLLOWING TESTS SHALL BE PERFORMED ON PVC SANITARY SEWER PIPE:
    A) DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACK FILL HAS BEEN IN PLACE AT LEAST 30 DAYS.
    B) NO PIPE SHALL EXCEED A 5% DEFLECTION.
    C) IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID BALL OR MANDREL IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES.
22. NEW SEWERS ARE TO BE PLUGGED WHEN CONNECTED TO EXISTING MANHOLES UNTIL THE NEW SEWERS ARE FLUSHED, TESTED, AND READY FOR SERVICE.

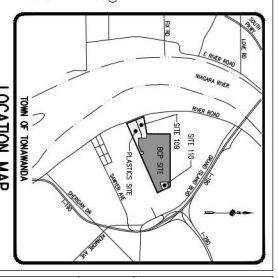
STORM SEWER:

23. STORM SEWERS, LATERALS AND APPURTENANCES SHALL BE CONSTRUCTED ACCORDING TO THE SPECIFICATIONS OF THE TOWN OF TONAWANDA. STORM SEWER EXCAVATION SHALL BE IN ACCORDANCE WITH THE EXCAVATION IRM WORK PLAN.
24. STORM SEWER PIPE SHALL BE HIGH-DENSITY POLYETHYLENE (HDPE) SMOOTH INTERIOR, AS NOTED ON THE PLAN.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON "MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

LEGEND
- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTER LINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x U.P. EXISTING UTILITY POLE
- x U.P. PROPOSED LOW POINT OF ROAD
- x H.P. PROPOSED HIGH POINT OF ROAD

LOCATION MAP
NOT TO SCALE


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SITE & UTILITY PLAN
(SHEET 2 OF 2)
DRAWING NUMBER
S-20

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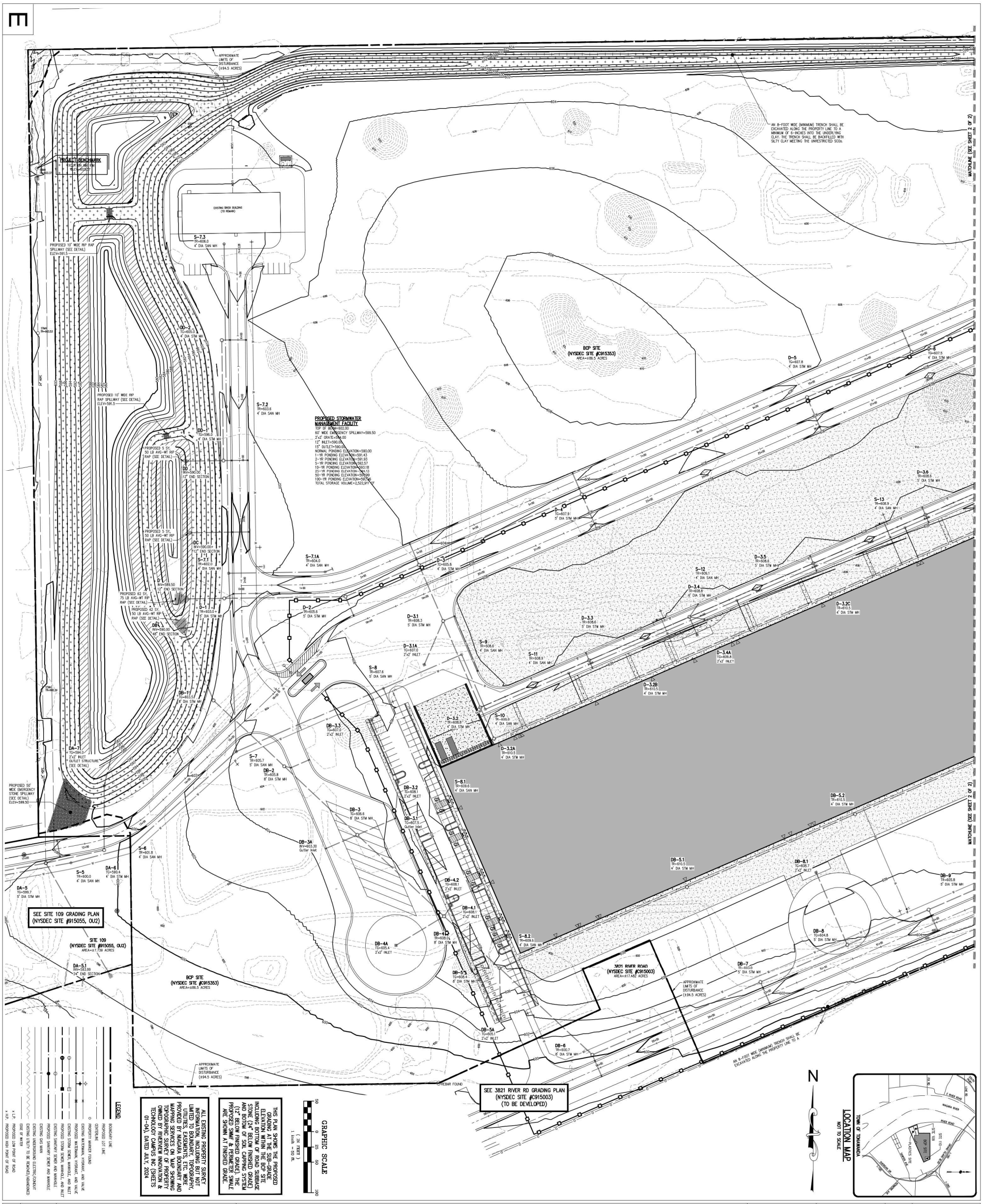

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SUB-GRADE PLAN (SHEET 1 OF 2)

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NOTES:

1. THE CAMP STATIONS SHALL BE IN PLACE AND MONITORED DURING ALL SUBGRADE PREPARATION ACTIVITIES.
2. THE SUBGRADE SHALL BE PREPARED USING FILL FROM THE BCP SITE. THE CUT AND FILL BALANCES AND THE FILL REQUIRED TO MEET THE GRADE SHALL BE EXCAVATED FROM THE TRACK 1 AREAS. THE AREAS THAT ARE CURRENTLY ABOVE THE PROPOSED GRADES, AND THE CONCRETE PILES.
3. PRIOR TO PLACEMENT OF THE FILL THE SURFACE OF THE EXISTING SUBGRADE SHALL BE PROOF ROLLED BY NO LESS THAN 3 PASSED OF A 20 TON SMOOTH WHEEL COMPACTOR.
4. FILL PLACED IN THE TRACK 1 AREAS SHALL MEET THE UNRESTRICTED SCOS.
5. FILL SHALL BE PLACED IN LIFTS OF NO MORE THAN 8-INCHES LOOSE THICKNESS AND SHALL BE COMPACTED WITH NO LESS THAN THREE PASSES OF A 20 TON (MIN) SMOOTH DRUM COMPACTOR, TO CREATE A COMPLETE COVER OF 9-INCHES (NOMINAL)
6. THE SURFACE OF THE FINISHED SUBGRADE SHALL BE SURVEYED TO PROVIDE A BASIS FOR DOCUMENTATION OF COVER THICKNESS AND FOR DEFINITION OF THE MINIMUM THICKNESS OF TOPSOIL REQUIRED.
7. IN AREAS OF PAVEMENT OR PROPOSED STRUCTURES, THE SUBGRADE MAY BE BELOW THE ELEVATIONS SHOWN TO ALLOW PLACEMENT OF GRAVEL PAVEMENT OR FOUNDATIONS TO ACT AS THE COVER.

THIS PLAN SHOWS THE PROPOSED SUBGRADE ELEVATIONS AT THE BCP SITE INCLUDING BOTTOM OF ROAD SUBBASE STONE (24" BELOW FINISHED GRADE) AND BOTTOM OF SOIL CAPPING SYSTEM (12" BELOW FINISHED GRADE). THE PROPOSED SWMF & PERIMETER SWALE ARE SHOWN AT FINISHED GRADE.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC., WERE PROVIDED BY MACKENZIE RAVEIS AND IS SHOWN ON THE MAPPING SET AS "BASE MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

GRAPHIC SCALE

50 0 25 50 100

(IN FEET)

1 inch = 50 ft.

LEGEND

- BOUNDARY LINE
- PROPOSED LOT LINE
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- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
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- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
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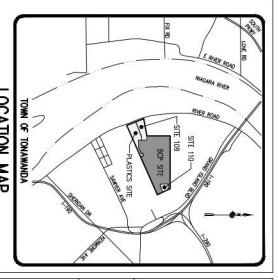
- x H.P. PROPOSED HIGH POINT OF ROAD
- x L.P. PROPOSED LOW POINT OF ROAD

LOCATION MAP
NOT TO SCALE



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TOWN OF TONAWANDA, NEW YORK

STATE OF NEW YORK — JOHN R. BOCK — 093918 — LICENSED PROFESSIONAL ENGINEER

SUB-GRADE PLAN (SHEET 2 OF 2)

DRAWING NUMBER
S-22

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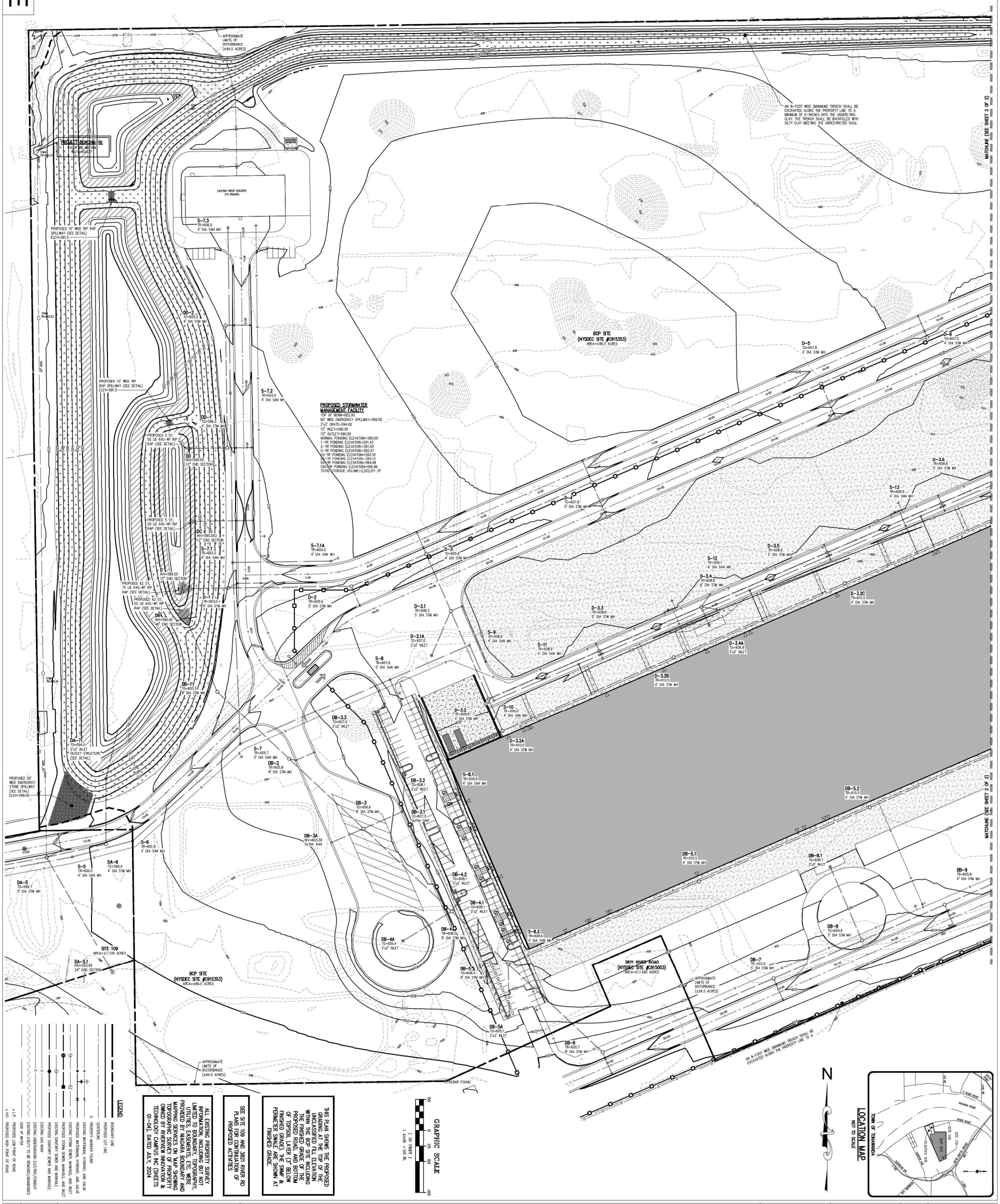

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SUB-GRADE PLAN (UNCLASSIFIED FILL) (SHEET 1 OF 2)

DRAWING NUMBER
S-23

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NOTES

1. A MINIMUM 12-INCH THICK SOIL COVER IS REQUIRED IN AREAS THAT DO NOT MEET THE UNRESTRICTED SCOS AS TRACK 1 AREA.
2. PRIOR TO PLACEMENT OF THE UNCLASSIFIED FILL THE SURFACE OF THE SUBGRADE SHALL BE SURVEYED TO PROVIDE A BASIS FOR DOCUMENTATION OF THE COVER THICKNESS.
3. THE SUBGRADE THAT DOES NOT MEET UNRESTRICTED SCOS (TRACK 1 AREAS) SHALL BE COVERED WITH A LAYER OF ORANGE 4 OUNCE NON-WOVEN GEOTEXTILE OR APPROVED SUBSTITUTE.
4. THE UNCLASSIFIED FILL SHALL BE PLACED IN ONE OR MORE LIFT TO CREATE A COMPLETE COVER OF 9-INCHES (NOMINAL). THE SURFACE OF THE UNCLASSIFIED FILL SHALL BE SURVEYED TO PROVIDE A BASIS FOR DOCUMENTATION OF COVER THICKNESS AND FOR DEFINITION OF THE MINIMUM THICKNESS OF TOP SOIL REQUIRED.
5. IN AREAS OF PAVEMENT OR PROPOSED STRUCTURES, 12-INCHES OF GRAVEL MAY BE PLACED AS THE COVER.

N

LEGEND

- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTER LINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x L.P. PROPOSED LOW POINT OF ROAD
- x H.P. PROPOSED HIGH POINT OF ROAD

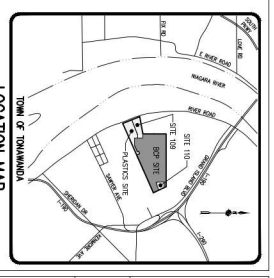
GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.
50 0 25 50 100

THIS PLAN SHOWS THE PROPOSED GRADING AT THE TOP OF THE UNCLASSIFIED FILL ELEVATION WITHIN THE BCP SITE INCLUDING THE FINISHED GRADE OF THE PROPOSED ROAD, AND BOTTOM OF TOPSOIL LAYER (3' BELOW FINISHED GRADE). THE SWMF & PERIMETER SWALE ARE SHOWN AT FINISHED GRADE.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPH, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY RAMAY LAND SURVEYING AND MAPPING SERVICES ON MAP ENTITLED TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

LOCATION MAP
NOT TO SCALE



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SUB-GRADE PLAN
(UNCLASSIFIED FILL)
(SHEET 2 OF 2)

DRAWING NUMBER
S-24

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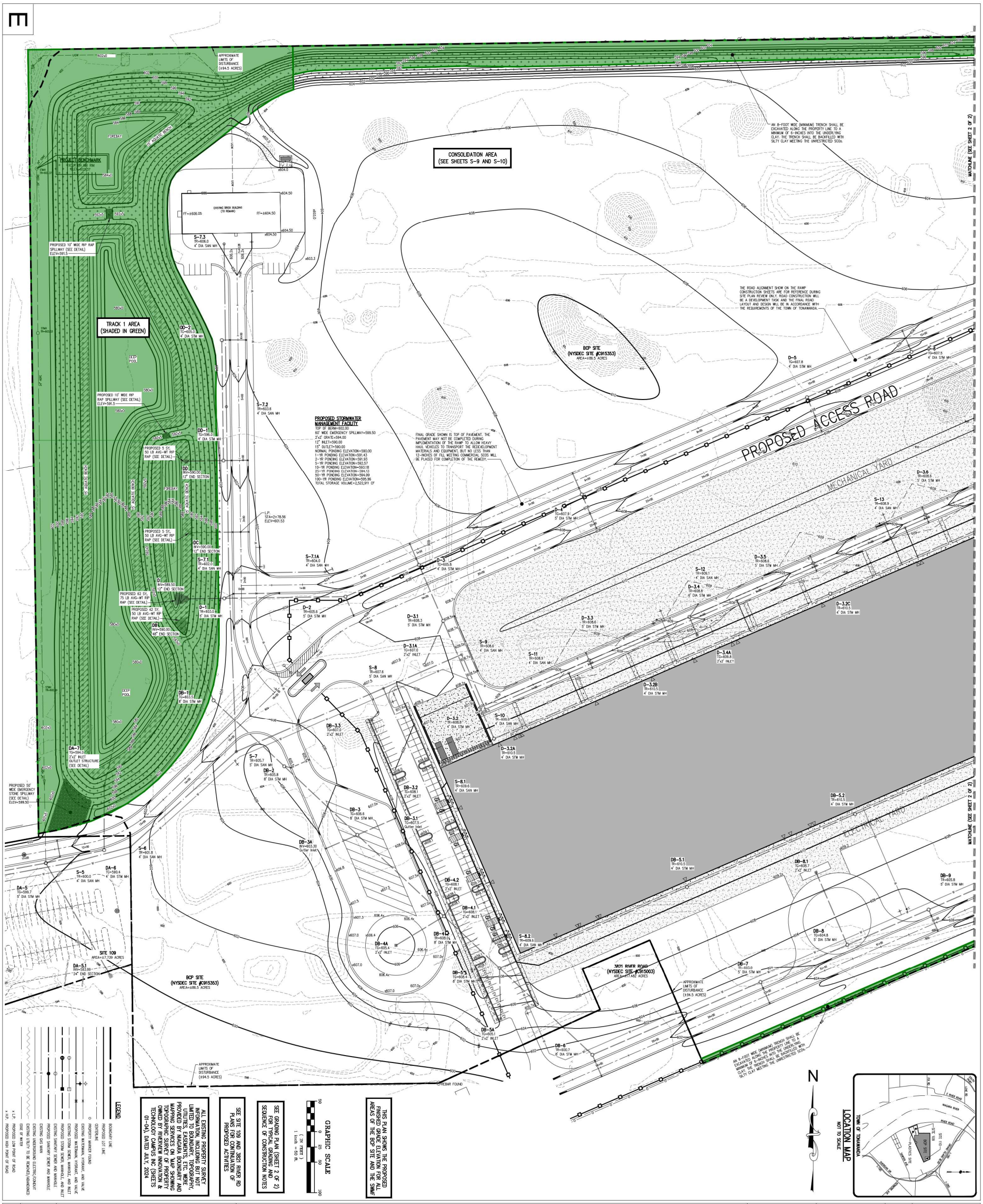

GRADING PLAN (FINISHED GRADE) (SHEET 1 OF 2)

DRAWING NUMBER
S-25

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GRADING NOTES:

1. ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024.
2. EXISTING UTILITIES WHETHER FUNCTIONAL OR ABANDONED WITHIN THE PROJECT AREA MAY NOT BE SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL CALL THE UFPO HOTLINE AT 1(800)962-7962 OR 811 FOR STAKE-OUT OF EXISTING UTILITIES
3. ALL EXCAVATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH THE EXCAVATION REMEDIAL ACTION WORK PLAN (RAWP).
4. DUST SHALL BE CONTROLLED DURING CONSTRUCTION BY THE CONTRACTOR TO MINIMIZE EFFECT ON THE ADJACENT PROPERTIES.
5. NO BLASTING IS ALLOWED OR REQUIRED FOR THE REDEVELOPMENT ACTIVITIES.
6. HIGHWAY DRAINAGE ALONG RIVER ROAD TO BE MAINTAINED AS DIRECTED BY COUNTY SUPERINTENDENT OF HIGHWAYS.
7. FILL MATERIAL PLACED IN THE PAVEMENT AND BUILDING AREA SHALL BE SELECT MATERIAL AND COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS MEASURED BY THE MODIFIED PROCTOR TEST (ASTM D1557) AND/OR THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER. ALL IMPORTED MATERIAL SHALL MEET THE COMMERCIAL SOIL CLEANUP OBJECTIVES AND BE TESTED IN ACCORDANCE WITH THE REMEDIAL ACTION WORK PLAN.
8. REVIEW OF THE FEMA MAPS INDICATES THAT THIS PROPERTY IS NOT WITHIN A RECOGNIZED 100-YEAR FLOODPLAIN PER THE FLOOD INSURANCE RATE MAP, ERIE COUNTY, NEW YORK, PANEL 181 OF 807 MAP NUMBER 36029C0181J EFFECTIVE DATE JUNE 16, 2021.

SEQUENCE OF CONSTRUCTION STEPS:

TOTAL DISTURBED ACREAGE = ±94.5 ACRES

THE PROJECT SITE IS CURRENTLY UNDERGOING REMEDIATION ACTIVITIES. CONSTRUCTION SEQUENCE NOTES, PLANS AND DETAILS ARE ONLY TO BE USED AS A GUIDE AND SHOULD BE REVIEWED WITH THE REMEDIAL ACTION WORK PLAN (RAWP) AND ANY OTHER REMEDIATION REQUIREMENTS. THE CONTRACTOR SHALL IMPLEMENT EROSION MEASURES AS NECESSARY AND SHALL COORDINATE CONSTRUCTION SEQUENCE WITH ON SITE FIELD ENGINEERS, AND THE RESPONSIBLE PARTY AS NECESSARY.

STEP 1: (SITE PREPARATION)

- INSTALL AND MAINTAIN STABILIZED CONSTRUCTION ENTRANCE(S), CONSTRUCTION STAGING AREAS, AND CONSTRUCTION FENCING.
- CLEAR AND GRUB DESIGNATED AREAS AS REQUIRED FOR SILT FENCE INSTALLATION.
- COMPLETE CLEARING AND GRUBBING OPERATIONS.

STEP 2: (CONSTRUCTION ACTIVITY)

- COMMENCE MASS GRADING OPERATIONS, COMPLETE REQUIRED CUTS AND FILLS, INSTALL UTILITIES, AND INSTALL EROSION CONTROL MEASURES AS NECESSARY (SUBJECT TO FINAL EROSION CONTROL MEASURES INCLUDING STONE CHECK DAMS, INTERCEPTOR SWALES, AND TEMPORARY SEDIMENT TRAPS. SWALES TO BE STABILIZED WITHIN 2 DAYS OF COMPLETION AND SEDIMENT TRAPS TO BE STABILIZED IMMEDIATELY. MEASURES ARE TO BE MAINTAINED BY THE CONTRACTOR UNTIL GROUND COVER HAS BEEN ESTABLISHED.
- CONTRACTOR MAY BEGIN TO INSTALL UTILITIES DURING GRADING OPERATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO STABILIZE THE SITE AND VERIFY GRADING ELEVATIONS PRIOR TO UTILITY CONSTRUCTION. ADDITIONAL EROSION CONTROL MEASURES, INCLUDING STONE CHECK DAMS, INTERCEPTOR SWALES AND TEMPORARY SEDIMENT TRAPS SHALL BE PROVIDED AS SHOWN IN THE PLANS, OR AS DIRECTED.
- THE PROPOSED STORM SEWERS FROM DA (WITHIN SITE 109) TO PROPOSED SWMF SHALL BE INSTALLED PRIOR TO REMOVAL OF THE EXISTING WATER TREATMENT FACILITY IN SITE 109 AND THE EXISTING 24" PIPE AT PROPOSED MANHOLE DA-5 TO BE TEMPORARILY DIRECTED DOWNSTREAM UNTIL THE PROPOSED SWMF IS BUILT.
- COMPLETE EARTHWORK, INCLUDING FINE GRADING OF STORMWATER MANAGEMENT AREA AND SLOPES. THE SOIL COVER SYSTEM IN DESIGNATED AREAS MAY BE INSTALLED AND STABILIZED WITH IDENTIFIED SEED MIXTURE.
- COMPLETE INSTALLATION OF UNDERGROUND UTILITIES AND PAVEMENT BOXOUTS.
- INSTALL ASPHALT ACCESS DRIVE.

STEP 3: (STABILIZATION & MONITORING)

- SEED AND MULCH ALL DISTURBED AREAS AS REQUIRED BY GP-0-20-001. SEED WITH A SEED MIX AS INDICATED IN CONSTRUCTION EROSION CONTROL NOTES, AND MULCH.
- FROM NOVEMBER 15TH TO APRIL 1ST, IF STRAW MULCH ALONE IS USED FOR TEMPORARY STABILIZATION, IT SHALL BE APPLIED AT DOUBLE THE STANDARD RATE OF 2 TONS PER ACRE, MAKING THE APPLICATION RATE 4 TONS PER ACRE.
- MONITOR STORMWATER MANAGEMENT FACILITY, SEDIMENT BASINS, AND SEDIMENT TRAPS DURING CONSTRUCTION OPERATIONS FOR SILT ACCUMULATION. CONTRACTOR TO CLEAN AS NECESSARY.
- MAINTAIN PERIMETER SILT FENCE AND INLET PROTECTION UNTIL THE ADJACENT SOILS HAVE ACHIEVED 80% STABILIZATION.
- SEE CONSTRUCTION EROSION CONTROL NOTES FOR REQUIRED SEED MIXES AND TEMPORARY/WINTER STABILIZATION METHODOLOGY.
- DUST SHALL BE CONTROLLED DURING CONSTRUCTION BY THE CONTRACTOR TO MINIMIZE EFFECT ON THE ADJACENT PROPERTIES.
- THE CAMP SHALL BE IN PLACE UNTIL IN ACCORDANCE WITH THE RAWP AND CAMP.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE EXISTING ROADWAYS, PAVED AREAS, AND CHANNELS FREE OF MUD, DIRT, AND DEBRIS. THE CONTRACTOR WILL CLEAN THESE AREAS AS NECESSARY OR AS REQUIRED BY THE OWNER OR TOWN OF TONAWANDA.

THIS PLAN SHOWS THE PROPOSED FINISHED GRADE ELEVATION FOR ALL AREAS OF THE BCP SITE AND THE SWMF

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GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

LEGEND

- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTER LINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT, AND VALVE
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- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x LP PROPOSED LOW POINT OF ROAD
- x HP PROPOSED HIGH POINT OF ROAD

N

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GRADING PLAN
(FINISHED GRADE)
(SHEET 2 OF 2)

DRAWING NUMBER
S-26

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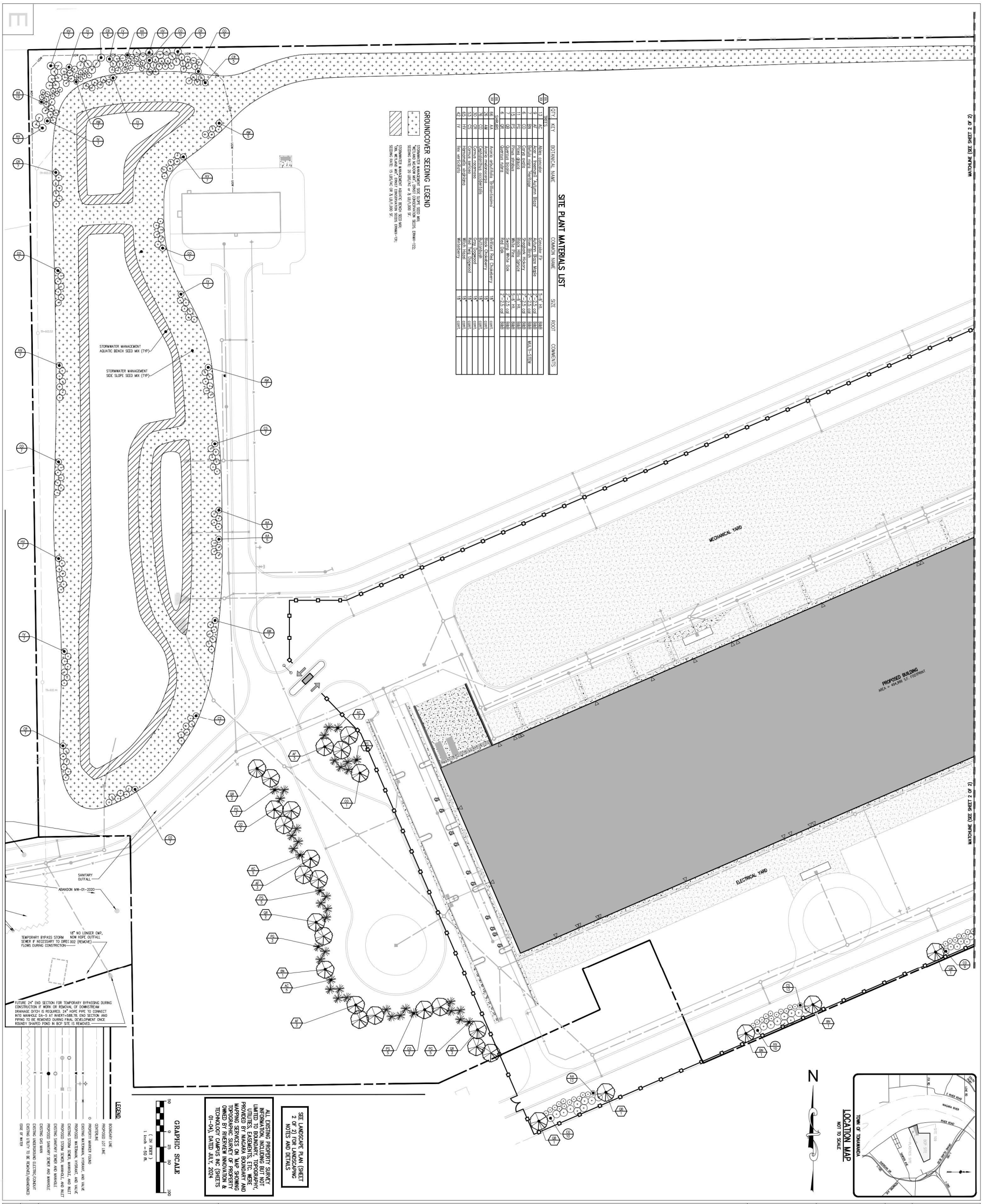

SITE PLANT MATERIALS LIST

QTY.	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENTS
TREES (XA / XF)						
13	AC	Abies concolor	Concolor Fir	5'-6' Ht.	B&B	
9	AF	Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	2"-2.5" cal	B&B	
7	AM	Amelanchier laevis 'Cumulus'	Cumulus Serviceberry	2"-2.5" cal	B&B	MULTI-STEM
6	CO	Cornus kousa 'Heritage'	Scarlet Kousa Dogwood	2"-2.5" cal	B&B	
11	PG	Picea glauca	Black Hills Spruce	5'-6' Ht.	B&B	
14	PS	Pinus strobus	White Pine	5'-6' Ht.	B&B	
7	QB	Quercus bicolor	Swamp White Oak	2"-2.5" cal	B&B	
9	QR	Quercus rubra	Red Oak	2"-2.5" cal	B&B	
SHRUBS (XA / XF)						
66	AA	Aronia arbutifolia 'Brilliantissima'	Brilliant Red Chokeberry	18"*	cont.	
26	AM	Aronia melanocarpa	Black Chokeberry	18"	cont.	
30	CO	Cephalanthus occidentalis	Buttonbush	18"	cont.	
53	CS	Cornus sericea	Red Twig Dogwood	18"	cont.	
65	HV	Hamamelis virginiana	Witch Hazel	18"	cont.	
42	IV	Ilex verticillata	Winterberry	18"	cont.	

GROUNDCOVER SEEDING LEGEND

"WETLAND MEADOW MIX", ERNST CONSERVATION SEEDS, ERNMX-112; SEEDING RATE: 20 LBS/AC or ½ LB/1,000 SF.

STORMWATER MANAGEMENT AQUATIC BENCH SEED MIX: "DRL WETLAND MIX", ERNST CONSERVATION SEEDS ERNMX-131; SEEDING RATE 15 LBS/AC OR ½ LB/1,000 SF.

LEGEND

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- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER

GRAPHIC SCALE
1 inch = 50 ft.
50 0 25 50 100

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SEE LANDSCAPE PLAN (SHEET 2 OF 2) FOR LANDSCAPING NOTES AND DETAILS

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LANDSCAPE PLAN (SHEET 1 OF 2)

S-27

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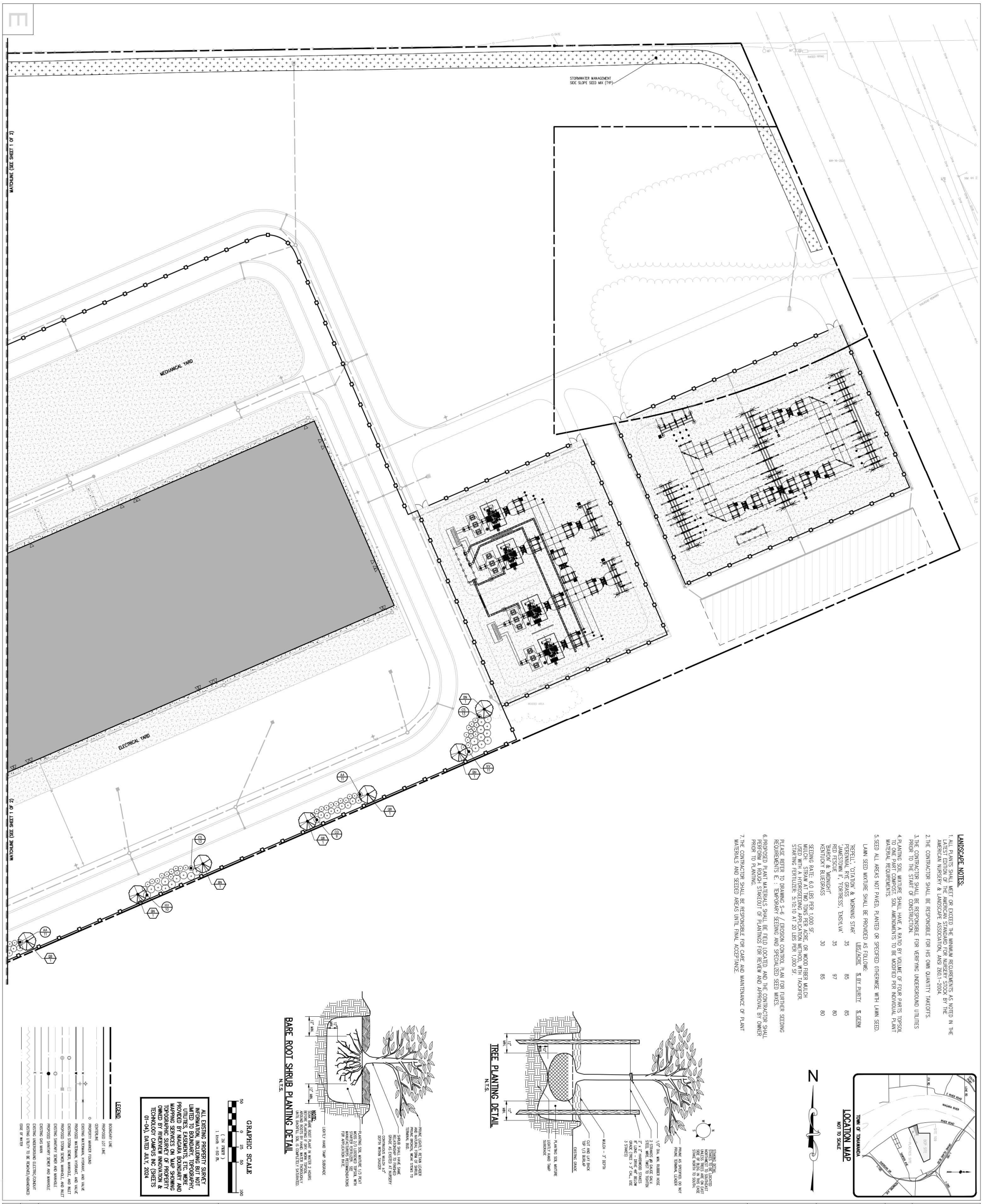

LANDSCAPE NOTES:

1. ALL PLANTS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS AS NOTED IN THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK BY THE AMERICAN NURSERY & LANDSCAPE ASSOCIATION, ANSI Z60.1-2004.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN QUANTITY TAKEOFFS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING UNDERGROUND UTILITIES PRIOR TO THE START OF CONSTRUCTION.
4. PLANTING SOIL MIXTURE SHALL HAVE A RATIO BY VOLUME OF FOUR PARTS TOPSOIL TO ONE PART COMPOST. SOIL AMENDMENTS TO BE MODIFIED PER INDIVIDUAL PLANT MATERIAL REQUIREMENTS.
5. SEED ALL AREAS NOT PAVED, PLANTED OR SPECIFIED OTHERWISE WITH LAWN SEED.

LAWN SEED MIXTURE SHALL BE PROVIDED AS FOLLOWS:

	LBS/ACRE	% BY PURITY	% GERM
'REBEL', 'CITATION' & 'MORNING STAR' PERENNIAL RYE GRASS	35	85	85
'JAMESTOWN II', 'FORTRESS', 'ENSYLVA' RED FESCUE	35	97	80
'BARON' & 'MIDNIGHT' KENTUCKY BLUEGRASS	30	85	80

SEEDING RATE: 6.0 LBS PER 1,000 SF.
MULCH: STRAW AT TWO TONS PER ACRE OR WOOD FIBER MULCH USED WITH A HYDROSEEDING APPLICATION METHOD, WITH TACKIFIER.
STARTING FERTILIZER: 5:10:10 AT 20 LBS PER 1,000 SF.

PLEASE REFER TO DRAWING S-6 / EROSION CONTROL PLAN FOR FURTHER SEEDING REQUIREMENTS IE : TEMPORARY SEEDING AND SPECIALIZED SEED MIXES.

6. PROPOSED PLANT MATERIALS SHALL BE FIELD LOCATED AND THE CONTRACTOR SHALL PERFORM A ROUGH STAKEOUT OF PLANTINGS FOR REVIEW AND APPROVAL BY OWNER PRIOR TO PLANTING.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARE AND MAINTENANCE OF PLANT MATERIALS AND SEEDED AREAS UNTIL FINAL ACCEPTANCE.

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, WETLANDS, ETC. WERE PROVIDED BY NIAGARA SURVEYING, PLLC AND MAPPING SHOWN ON "MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

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LANDSCAPE PLAN (SHEET 2 OF 2)

S-28

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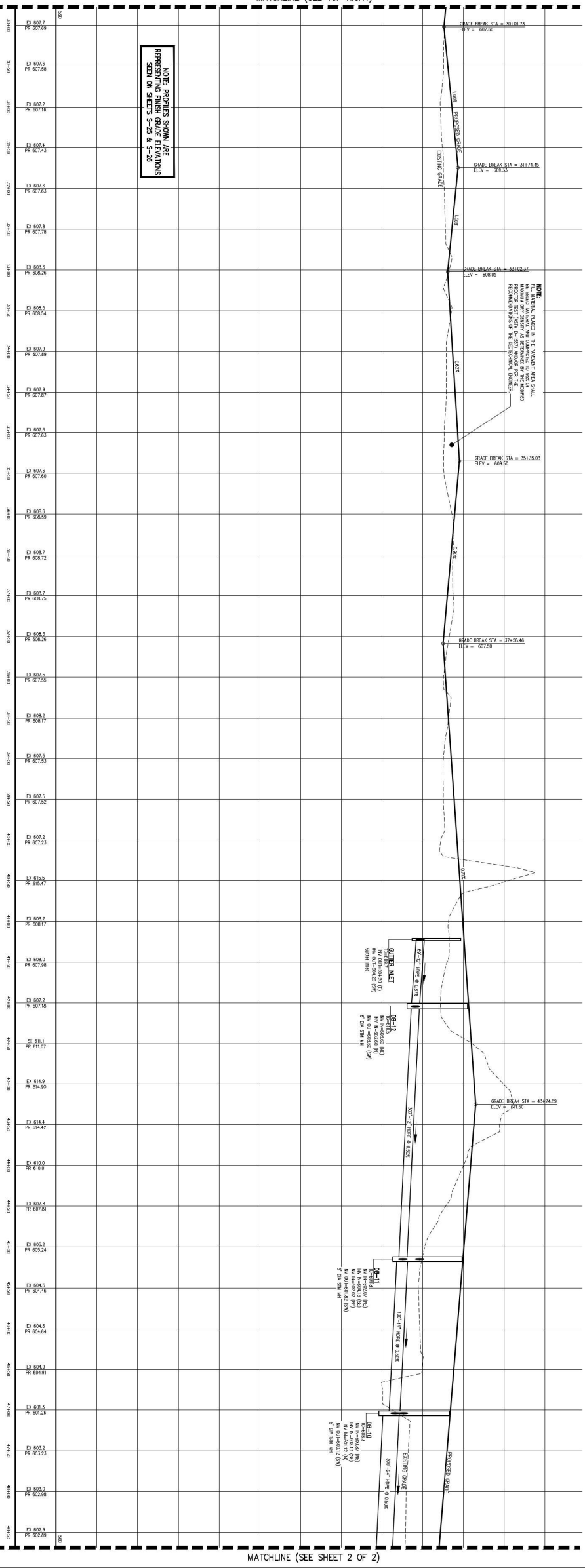
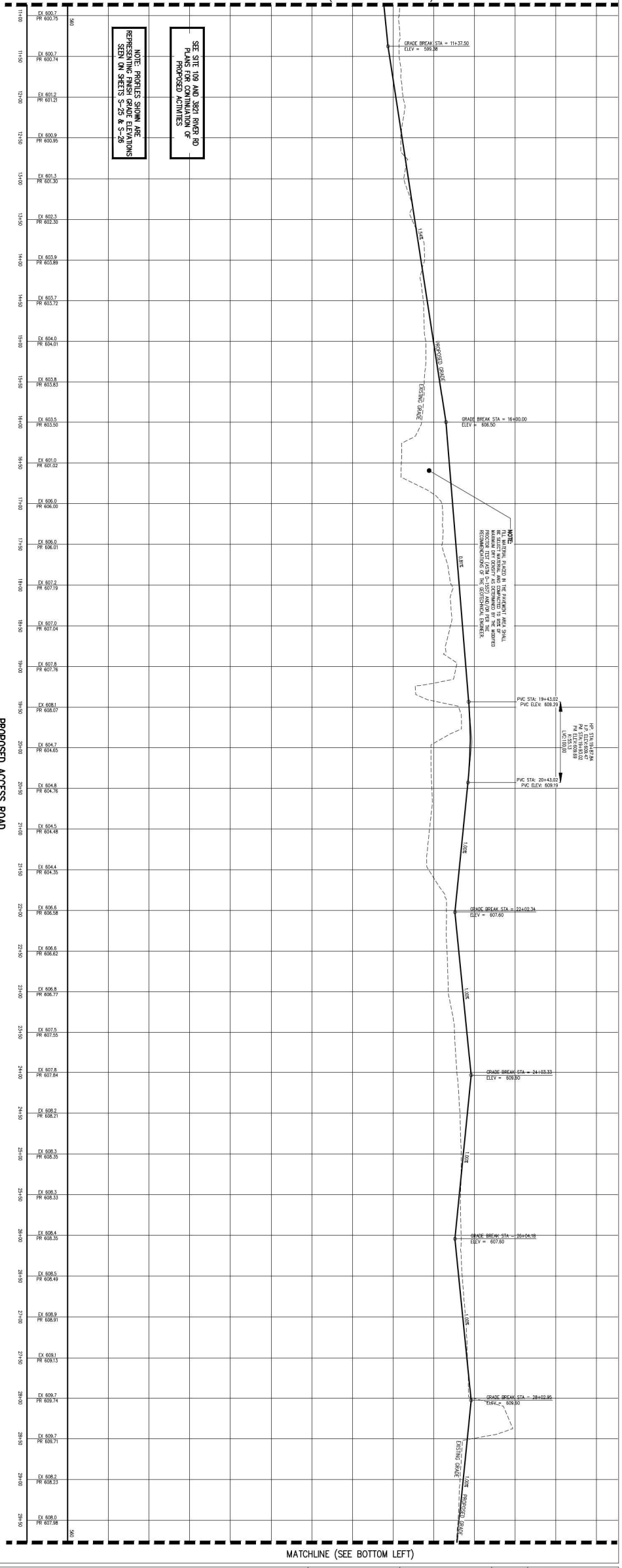
MATCHLINE (SEE TOP RIGHT)



MATCHLINE (SEE SITE 109 PLAN SET)



PROPOSED ACCESS ROAD

SCALE: HOR 1"=50'
VER 1"=5'

MATCHLINE (SEE SHEET 2 OF 2)

PROPOSED ACCESS ROAD

SCALE: HOR 1"=50'
VER 1"=5'

MATCHLINE (SEE BOTTOM LEFT)

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PROFILE
(SHEET 1 OF 3)

DRAWING NUMBER
S-29

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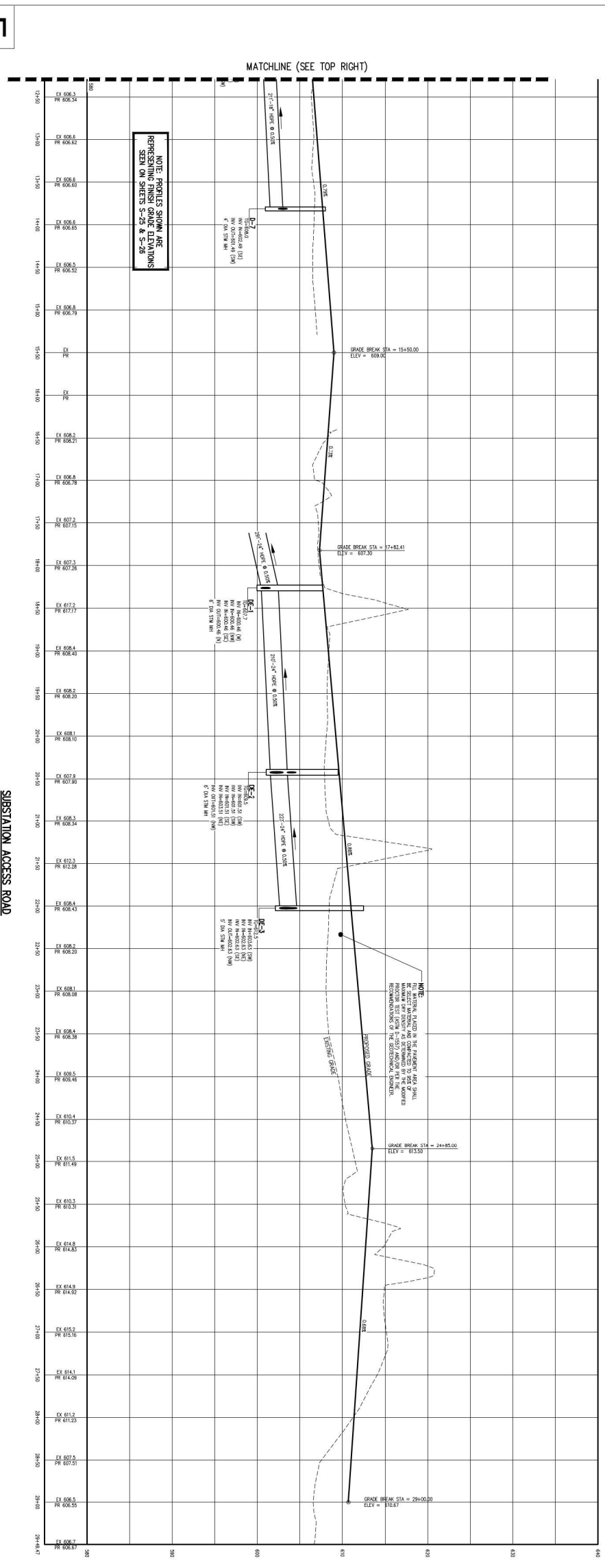

SUBSTATION ACCESS ROAD

SCALE: HOR 1"=50'
VER 1"=5'

PROFILE
(SHEET 2 OF 3)

DRAWING NUMBER
S-30

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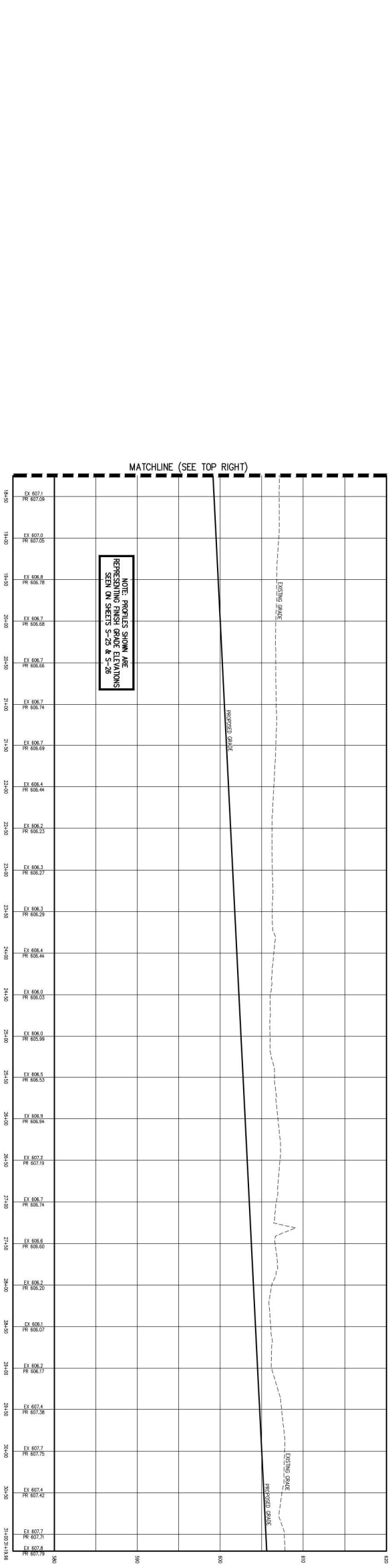

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DRAWING NUMBER
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PROFILE
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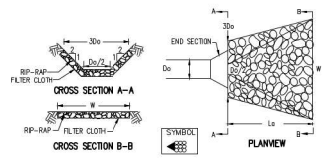
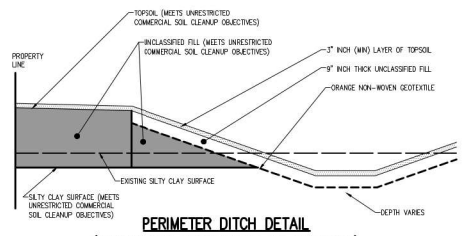


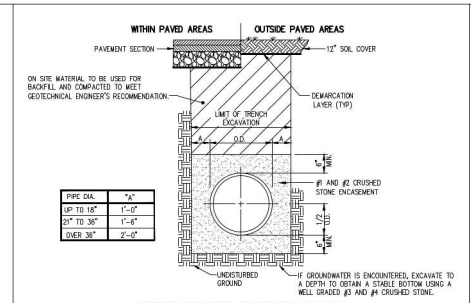
RIP-RAP OUTLET DIMENSIONS

DESIGNATION	DIA. OF PIPE Do	3Do	Lo	W
DB	6"	1'-0"	2'-0"	2'-0"
DC	12"	3'	5'-0"	5'
DD	15"	3'-9"	6'-0"	6'
DE	18"	4'-6"	7'-0"	6'
DF	21"	5'-3"	8'-0"	6'
DG	24"	6'	9'-0"	6'
DH	27"	6'-9"	10'-0"	6'
DI	30"	7'-6"	11'-0"	6'
DJ	12"	3'	5'-0"	11'

RIP-RAP OUTLET PROTECTION DETAIL
N.T.S.

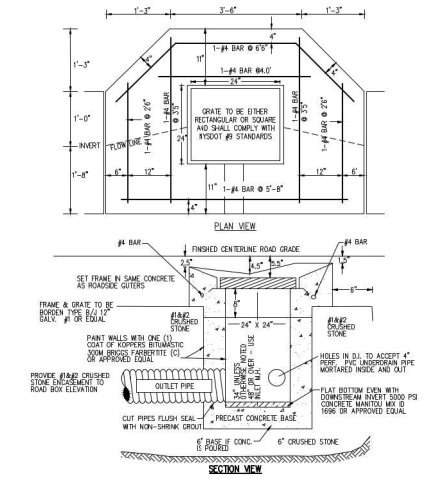


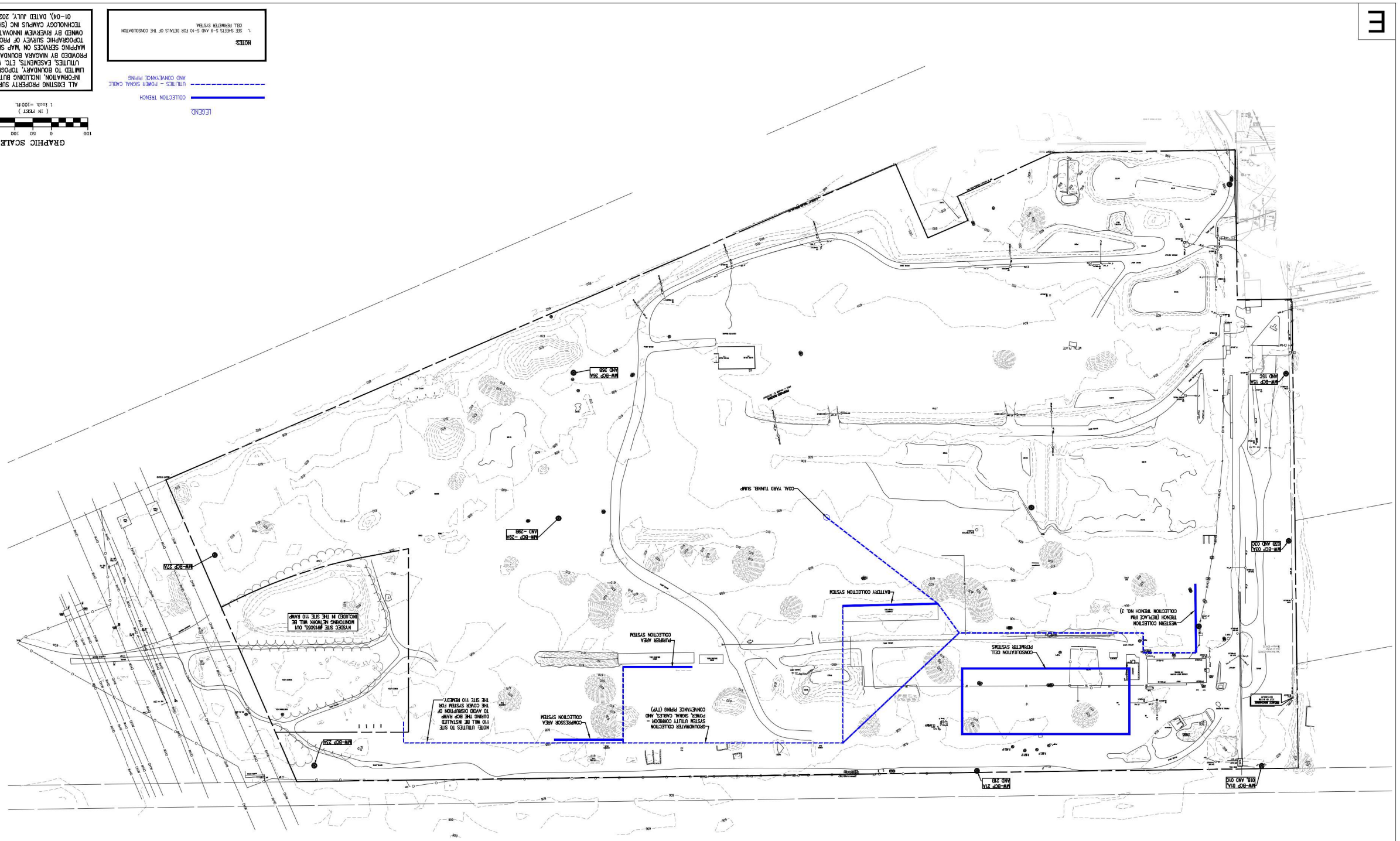
PERIMETER DITCH DETAIL
(NORTH AND EAST SIDES OF BPC SITE)
N.T.S.

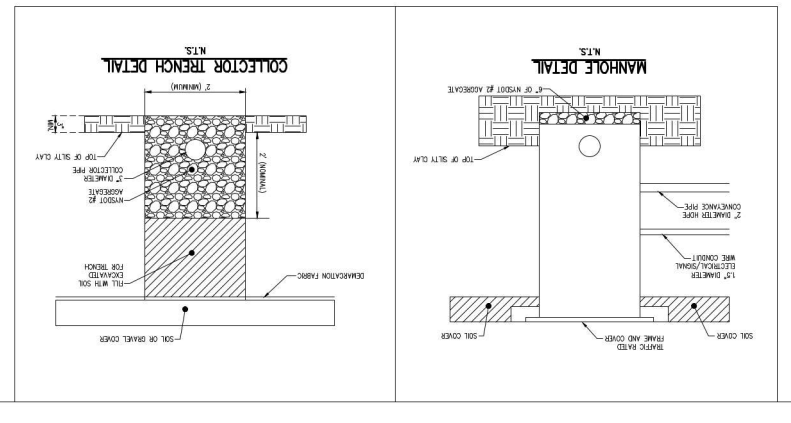


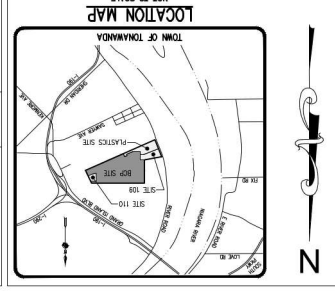
PIPE DIA.	"A"
UP TO 18"	1'-0"
21" TO 36"	1'-4"
OVER 36"	2'-0"

STORM SEWER BEDDING DETAIL
N.T.S.









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GROUNDWATER COLLECTION SYSTEMS

DRAWING NUMBER

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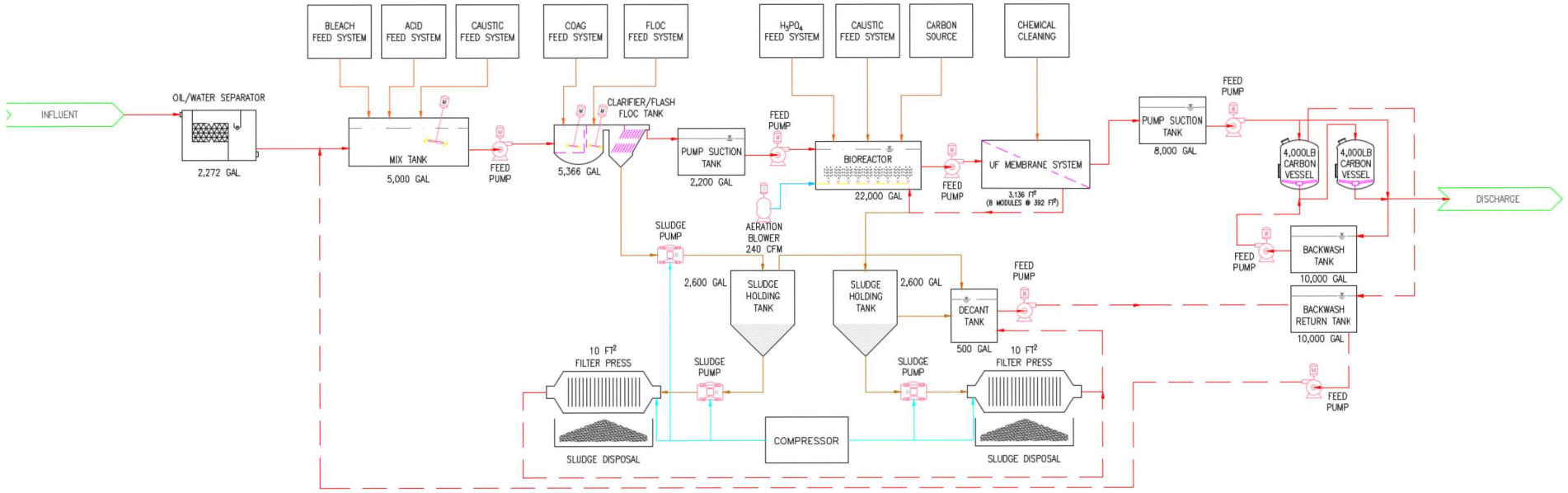


PROCESS FLOW DIAGRAM

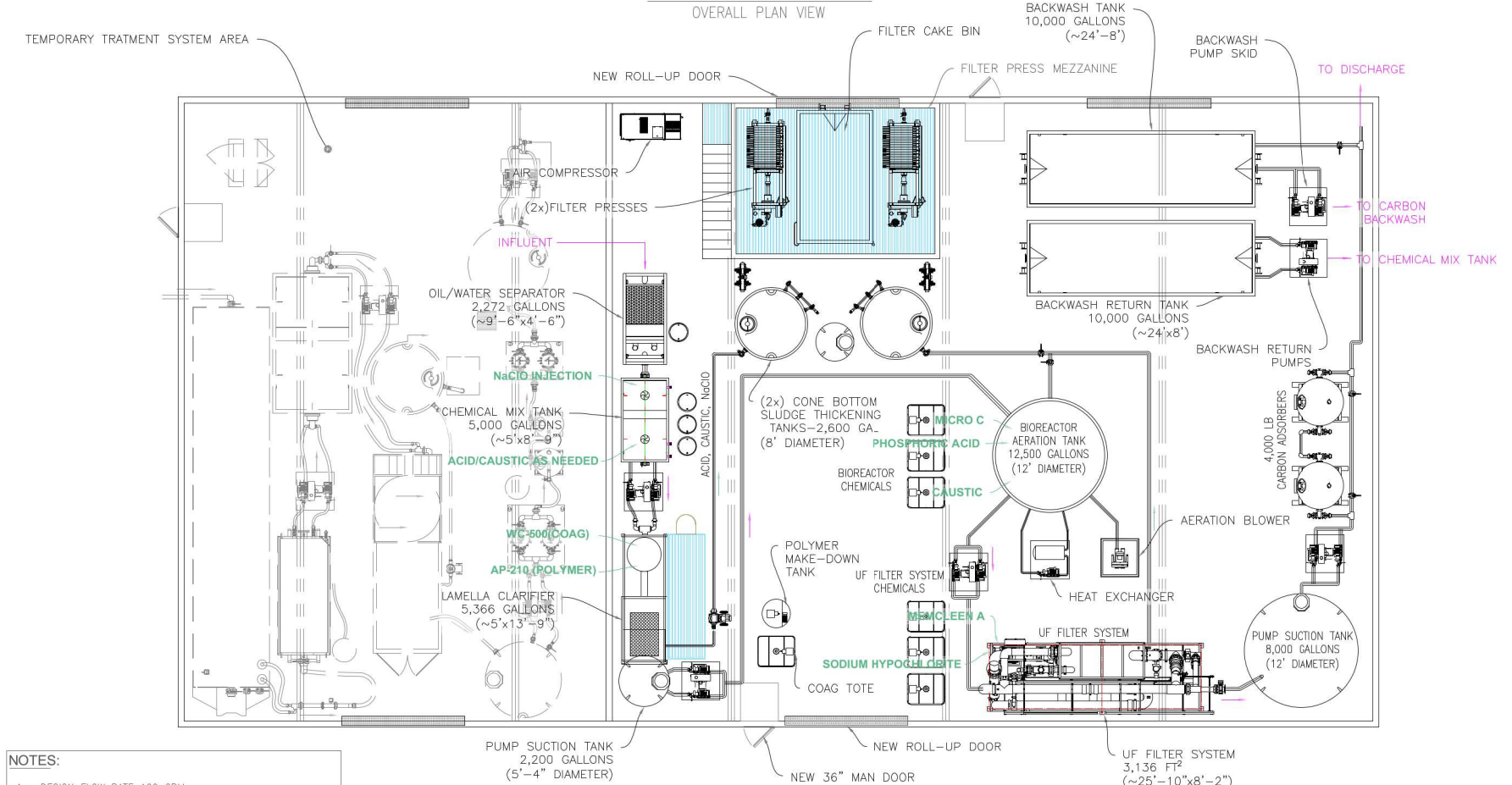
NOT TO SCALE

LOCATION MAP

NOT TO SCALE

TREATMENT SYSTEM

OVERALL PLAN VIEW



NOTES:

1. DESIGN FLOW RATE 100 GPM
2. SYSTEM FOOTPRINT APPROXIMATELY 65'X80'
3. NOT ALL VALVES, CONNECTIONS, ETC SHOWN FOR CLARITY
4. ELECTRICAL POWER PROVIDED BY OTHERS.
5. FINAL EQUIPMENT LAYOUT SUBJECT TO CHANGE PRIOR TO FINAL APPROVAL.

PRELIMINARY LAYOUT

NOT TO SCALE

E

REV	DRAWING BY	CHECKED	APPROVED

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PROCESS FLOW DIAGRAM

DRAWING NUMBER

S-34

C:\Users\roxan\Inventum Engineering\Inventum - Inventum\CAD\Projects\Tonawanda\RAMP\June 2026 Revision\S-34 GWTS Layout.dwg

MW-BCP 01A, 01B, AND 01C

MW-BCP 21A AND 21B

APPROXIMATE LIMITS OF DISTURBANCE (±94.5 ACRES)

AN 8-FOOT WIDE (MINIMUM) TRENCH SHALL BE EXCAVATED ALONG THE PROPERTY LINE TO A MINIMUM OF 6-INCHES INTO THE UNDERLYING CLAY. THE TRENCH SHALL BE BACKFILLED WITH SILTY CLAY MEETING THE UNRESTRICTED SCOs.

MATCHLINE (SEE SHEET 2 OF 2)

PROJECT BENCHMARK
XCUT ON MH RIM
ELEV=603.37

EXISTING BRICK BUILDING (TO REMAIN)

MW-BCP 04A AND 04B

BCP SITE
(NYSDEC SITE #C915353)
AREA=±86.5 ACRES

MW-BCP 03A, 03B AND 03C

PROPOSED STORMWATER MANAGEMENT FACILITY
TOP OF BERM=602.00
60' WIDE EMERGENCY SPILLWAY=599.50
2'x2' GRATE=594.00
12" INLET=590.00
15" OUTLET=590.00
NORMAL PONDING ELEVATION=590.00
1-YR PONDING ELEVATION=591.43
2-YR PONDING ELEVATION=591.93
5-YR PONDING ELEVATION=592.57
10-YR PONDING ELEVATION=593.18
25-YR PONDING ELEVATION=594.13
50-YR PONDING ELEVATION=594.99
100-YR PONDING ELEVATION=595.96
TOTAL STORAGE VOLUME=2,522,911 CF

MW-BCP 28A AND 28B

MW-BCP 15A AND 15C

PROPOSED BUILDING
AREA = 464,999 S.F. FOOTPRINT

SITE 109
AREA=±7.739 ACRES

BCP SITE
(NYSDEC SITE #C915353)
AREA=±86.5 ACRES

MW-BCP 16A, 16B, AND 16C

3821 RIVER ROAD
(NYSDEC SITE #C915003)
AREA=±17.482 ACRES

APPROXIMATE LIMITS OF DISTURBANCE (±94.5 ACRES)

AN 8-FOOT WIDE (MINIMUM) TRENCH SHALL BE EXCAVATED ALONG THE PROPERTY LINE TO A MINIMUM OF 6-INCHES INTO THE UNDERLYING CLAY. THE TRENCH SHALL BE BACKFILLED WITH SILTY CLAY MEETING THE UNRESTRICTED SCOs.

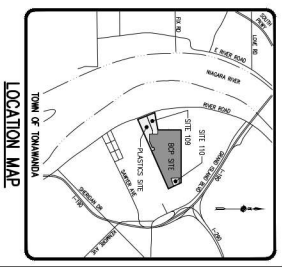
MATCHLINE (SEE SHEET 2 OF 2)

APPROXIMATE LIMITS OF DISTURBANCE (±94.5 ACRES)

REBAR FOUND

N

LOCATION MAP
NOT TO SCALE



LEGEND
- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTER LINE
- PROPERTY MARKER FOUND
- EXISTING WATERMAIN, HYDRANT AND VALVE
- PROPOSED WATERMAIN, HYDRANT AND VALVE
- EXISTING STORM SEWER, MANHOLE AND INLET
- PROPOSED STORM SEWER, MANHOLE AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x L.P. PROPOSED HIGH POINT OF ROAD
- x H.P. PROPOSED LOW POINT OF ROAD

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.
50 0 25 50 100

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, AND ROADWAY, PROVIDED BY MASHAW SURVEYING AND MAPPING SERVICES ON MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

SEE SITE 109 AND 3821 RIVER RD PLANS FOR CONTINUATION OF PROPOSED ACTIVITIES

SEE GRADING PLAN (SHEET 2 OF 2) FOR TYPICAL GRADING AND SEQUENCE OF CONSTRUCTION NOTES

THIS PLAN SHOWS THE PROPOSED FINISHED ELEVATION OF ALL AREAS OF THE BCP SITE AND THE SMMF

P:\2968\Drawings\Final\2968 Design Base.dwg

DRAWING NUMBER
S-35

MONITORING NETWORK (SHEET 1 OF 2)

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NOTES:

1. THE CAMP STATIONS SHALL BE IN-PLACE AND MONITORED DURING ALL DRILLING ACTIVITIES.
2. THE DESIGNATED MONITORING WELLS SHALL BE PROTECTED DURING IMPLEMENTATION OF THE RAWP.
3. MONITORING WELLS THAT ARE NOT PART OF THE LONG-TERM MONITORING PLAN SHALL BE ABANDONED IN ACCORDANCE WITH CP-43: GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY PRIOR TO PLACEMENT OF THE DEMARCATION LAYER.
4. FOLLOWING PLACEMENT OF THE COVER SYSTEMS THE NEW MONITORING WELLS SHALL BE INSTALLED IN THE LOCATIONS SHOWN IN ACCORDANCE WITH THE RAWP.
5. EXISTING MONITORING WELL CASINGS SHALL BE ADJUSTED AS REQUIRED.
6. FOLLOWING ADJUSTMENT OF MONITORING WELL CASINGS AND THE INSTALLATION OF NEW MONITORING WELLS, THE GROUND SURFACE AND THE MEASURING POINT LOCATIONS AND ELEVATIONS SHALL BE MEASURED BY A NEW YORK STATE LICENSED SURVEYOR IN ACCORDANCE WITH THE RAWP.

GRAPHIC SCALE

50 0 25 50 100

(IN FEET)

1 inch = 50 ft.

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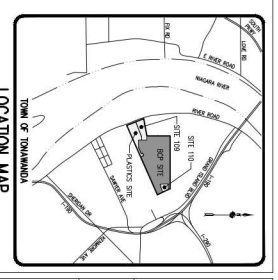
THIS PLAN SHOWS THE PROPOSED FINISHED GRADE ELEVATION FOR ALL AREAS OF THE BCP SITE AND THE SMMP

LEGEND

- BOUNDARY LINE
- PROPOSED LOT LINE
- CENTERLINE
- PROPERTY MARKER (FOUND)
- EXISTING WATERMAIN, HYDRANT, AND VALVE
- PROPOSED WATERMAIN, HYDRANT, AND VALVE
- EXISTING STORM SEWER, MANHOLE, AND INLET
- PROPOSED STORM SEWER, MANHOLE, AND INLET
- EXISTING SANITARY SEWER AND MANHOLE
- PROPOSED SANITARY SEWER AND MANHOLE
- EXISTING GAS MAIN
- EXISTING UNDERGROUND ELECTRIC/CONDUIT
- EXISTING UTILITY TO BE REMOVED/ABANDONED
- EDGE OF WATER
- x L.P. PROPOSED LOW POINT OF ROAD
- x H.P. PROPOSED HIGH POINT OF ROAD

LOCATION MAP
NOT TO SCALE



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STATE OF NEW YORK — JOHN P. BLOCK — LICENSED PROFESSIONAL ENGINEER — No. 092815

MONITORING NETWORK (SHEET 2 OF 2)

DRAWING NUMBER
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Appendix B – Fact Sheet and Treatment System Design Basis

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Wharton, New Jersey 07885
Tel: (800) 770-0901
(973) 983-0901
Fax: (973) 983-0903

Basis of Design

This Basis of Design was prepared by Groundwater Treatment and Technology (GWTT) for the design and operation of the shallow groundwater treatment system to be installed to manage groundwater migration at the Riverview Innovation & Technology Campus (RITC) Brownfield Cleanup Program (BCP) site in Tonawanda, NY.

The proposed treatment system is designed to treat extracted groundwater at maximum flow rate of 100-gallons per minute (GPM), which will be generated at the properties that compose the RITC, through multiple shallow groundwater collection trenches with sumps, extraction wells or other extraction technologies. Influent characterization of source water generated from the existing shallow groundwater collection trenches at RTIC site has served as the Basis of Design (BoD) for the treatment system design. Influent samples were collected in August 2024 for treatability testing, and a composited sample was analyzed for parameters which were at the time assumed to be a monitoring requirement of the State Pollutant Discharge Elimination System (SPDES) discharge permit equivalent. Since the influent water quality characterization was performed, site-specific SPDES permit equivalent effluent water quality was developed and is shown below in **Table 1**.

Sample ID		INF	*Qualifier (Q)*	Units	Discharge Criteria	
Sample Date		8/9/2024				
Sample Time		12:20			Monthly	Daily Maximum
Flow		NS		MGD	Monitor	100
pH				SU	Monitor	9
Oil and Grease		4.8		mg/L	Monitor	15
Biochemical Oxygen Demand 5-day (BOD5)		32		mg/L	Monitor	Monitor
Total Dissolved Solids (TDS)		NS		mg/L	Monitor	1,000
Total Suspended Solids (TSS)		NS		mg/L	20	40
Benzene		27		µg/L	40	5
Ethlybenzene		ND	***0.70***	µg/L	40	25
Methylene Chloride		NS		µg/L	Monitor	25
Toluene		1.7	*J*	µg/L	Monitor	25
2,4-Dimethylphenol		6.6		µg/L	Monitor	5
Phenol		58		µg/L	Monitor	5
Naphthalene		2.3		µg/L	40	5
Cadmium, Total		NS		mg/L	Monitor	4
Mercury, Total		14.39		µg/L	Monitor	3.5
Ammonia/ammonium		48.9		mg/L	Monitor	10
Cyanide, Total		1.01		mg/L	Monitor	1
Phenols, Total		NS		µg/L	Monitor	8
1,2,4,5-Tetrachlorobenzene*		NS		µg/L	Monitor	50
Solids, Settleable		NS		-	Monitor	Monitor
Aluminum, Total		NS		µg/L	Monitor	500
Iron, Total		24.5		µg/L	Monitor	1,500
Magnesium, Total		34.0		µg/L	Monitor	175,000
Manganese, Total		1.749		µg/L	Monitor	1,500
Xylene, Ortho- (1,2-)		ND	***0.70***	µg/L	Monitor	25
Xylene, Meta- (1,3-)/Para- (1,4-)		ND	***0.70***	µg/L	Monitor	25
Perfluorooctanoic Acid (PFOA)		8.96	J	ng/L	Monitor	21
Perfluorooctanesulfonic Acid (PFOS)		6.38	J	ng/L	Monitor	7.9

Table 1 Notes: Not Sampled (NS), Not Detected (ND), ug/L (micrograms per liter), mg/L (milligrams per liter), J (reported result is estimated)

Treatment System Equipment

The proposed groundwater treatment system for the RITC project site was designed to ensure compliance with the above Table 1 discharge parameters defined in the permit equivalent provided by the New York State Department of Environmental Conservation (NYSDEC) SPDES for Outfall 001. The system is designed for an average flow rate of 75 gallons per minute (GPM) and a peak flow rate of 100 GPM. The system is composed of the following unit operations:

- One (1) Oil-Water Separator rated for 100 GPM, designed to reduce any free phase Non-Aqueous Phase Liquid (NAPL) that may enter the treatment system
    - NAPL separated from the combined influent will be collected and stored in a collection vessel for off-site disposal

- One (1) Chemical Mix Tank to begin the chemical precipitation process
    - Chemical feed equipment for pH adjustment (acid and caustic), including feed pumps, tubing, injection quills, and controllers
    - Chemical feed equipment for oxidant injection (sodium hypochlorite), including feed pumps, tubing, injection quills, and controllers
- One (1) duplex electric centrifugal pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 100 GPM, supplied with 480 V, 3 phase motors
- One (1) Lamella Clarifier System designed to reduce chemically precipitated metals, including mercury and cyanide, generated in the mix tank and any Total Suspended Solids (TSS) contained in the influent source water. The Lamella Clarifier System consists of:
    - One (1) Flash/Flocculation Mix Tank for the Injection of coagulant and flocculant
    - One (1) Lamella Clarifier equipped with Lamella plates to allow solids generated to settle
    - Chemical feed equipment for clarification (coagulant and flocculant), including feed pumps, tubing, injection quills, and controllers
    - One (1) Pump Suction Tank to hold clarified supernatant
    - One (1) duplex electric centrifugal pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 100 GPM, supplied with 480 V, 3 phase motors
- One (1) Clarification Solids System for the consolidating and dewatering of sludge generated in the Lamella Clarifier System, consisting of:
    - One (1) duplex air-operated diaphragm pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of conveying daily sludge generated to the Clarification Solids System
    - One (1) Sludge Holding Tank to consolidate solids from the Clarification System for dewatering
    - One (1) Plate and Frame Filter Press for Dewatering
    - One (1) Solids Holding Roll-off for disposal
    - One (1) Decant Tank and Pump for conveying filtrate back to the headworks of the treatment system
- One Membrane Bioreactor system designed to reduce Ammonia, Biochemical Oxygen Demand and any organic loading (Volatile Organic Compounds [VOCs]/Semi-violate Organic Compounds [SVOCs]), consisting of:
    - One (1) Bioreactor tank with associated aeration blowers, diffusion equipment and controls for pH
        - Chemical feed equipment for pH adjustment (caustic), including feed pumps, tubing, injection quills, and controllers
        - Chemical feed equipment for nutrient addition (Carbon, Phosphorous), including feed pumps, tubing, injection quills, and controllers

    - One (1) Ultrafiltration System, containing an automatic strainer, skid-mounted ultrafiltration membranes, associated valves and appurtenances and instrumentational controls
        - Chemical feed equipment for periodic membrane cleanings, including feed pumps, tubing, injection quills, and controllers
    - One (1) Permeate Holding tank for collection of ultrafiltered effluent
    - One (1) Sludge Holding Tank to consolidate biosolids periodically wasted
- One (1) duplex electric centrifugal pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 100 GPM, supplied with 480 V, 3 phase motors
- Two (2) liquid phase Granular Activated Carbon (GAC) vessels designed to reduce PFAS and polish any remaining organic compounds. Each vessel will be loaded with up to 6,000 lbs. of Granular Activated Carbon (GAC)
- One (1) Effluent Holding/Backwash Holding Tank
    - One (1) Backwash pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 300 GPM, supplied with 480 V, 3 phase motors
- One (1) Backwash Return Tank
    - One (1) Backwash Return pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 50 GPM, supplied with 480 V, 3 phase motors
- One (1) Effluent pump skid containing two (2) full capacity pumps – one (1) operating, one (1) installed standby - each capable of 100 GPM, supplied with 480 V, 3 phase motors

Process Design Narrative

Influent source water will be conveyed and comingled prior to entering the treatment system. The influent will flow by gravity through a manifold into the oil/water separator (OWS). The OWS is an open top, gravity flow tank, designed for the removal of free-floating oil, grease, and settleable oily coated solids from oil-water mixtures. The unit is equipped with a series of weir plates as well as removable coalescing media. The OWS is also equipped with a manual drain valve plumbed to a double-walled oil storage tank to collect any recoverable oil floating on the top surface of the OWS. Oil collected in the oil storage tank will need to be periodically pumped out and disposed of in accordance with RITCs requirements and Federal and NYS regulations. Water will flow by gravity into the effluent chamber of the OWS. The OWS will be elevated so that the effluent chamber can flow by gravity to the chemical mix tank.

Solids and/or sludge that have settled to the bottom of the oil/water separator will need to be periodically removed to prevent accumulated material from clogging the coalescing media thus reducing the efficiency of the unit. All waste material from the oil/water separator must be disposed of in accordance with federal and NYS regulations. The waste products from cleaning the oil/water separator will need to be containerized and segregated from other waste streams for characterization and disposal. Recovered oil

will also need to be periodically drained from the unit and disposed of in accordance with site and local regulations

The chemical mix tank shall be a closed-top, 6,000-gallon tank; equipped with two (2) mixers to adequately agitate the water. These tanks will allow for pH adjustment (as required) and the introduction of an oxidant (as required) to enhance the precipitation of metals. Separate pH and Oxidation-Reduction Potential (ORP) probes will be submerged in the tank. and wired to controllers that will communicate with the chemical feed pumps and inject pH adjustment chemicals and oxidant, if necessary, to adjust the pH and ORP of the incoming water depending on influent water quality. The chemical mix tank will be provided with a control system with high-level alarms. The chemical mix tank will have high-level alarms to alert the operator of an abnormal operating condition and notify the operator to discontinue the forward flow to the treatment system. A high-level alarm would also trigger other influent sources to shut off until the alarm is cleared. Chemically precipitated water will be pumped via electrical centrifugal transfer pumps to the Lamella clarifier.

Prior to entering the flash/flocculation (floc) tank, water will flow through an in-line static mixer where a coagulant will be injected via a chemical metering pump. The coagulant is used to change the electrical charge of the fine particles and to cause a destabilization of the particles. Water will then enter the flash/floc tanks. Flocculent will be added to the tanks using a chemical metering pump. Flocculent is used to bring the charged particles together and make them heavier, which will allow for better settling in the downstream Lamella clarifier. Electric mixers will be installed in the flash/floc tank to ensure proper mixing of the water and clarification chemicals. Flow pacing for the chemical feed pumps feeding the coagulant and flocculent will be achieved using a magnetic flow meter installed upstream of the clarifier. The flash/floc tank's discharge will be elevated to allow the water to flow by gravity from the flash/floc tank to the Lamella clarifier to minimize the shearing of any floc particles prior to entering the clarifiers.

The flash/flocculant tanks will be equipped with liquid level alarms. The high-level alarm will activate an indicator light on the alarm panel and a strobe light to alert the operator of a high-level condition. The high-high-level alarm will activate an indicator light on the alarm panel and activate a strobe light to alert the operator of a high-high-level condition, and it will also send a signal to shut down the transfer pumps pumping water to the chemical mix tank.

Water will flow by gravity from the flash/flocculant tanks to the clarifier. The clarifier is equipped with several features that will facilitate both the settling of solids and routine maintenance of the units. Water to the clarifiers is directed to an influent chamber. Slanted plates extending from the top of the unit force the water underneath them and then upward through the plates to allow for settling of the suspended solids. Treated water flows upward through the plates while solids collect and fall to the bottom of the clarifier. The channels between the Lamella plates collect solids into a compact mass that allows the solids to slide down to the solids collection area at the bottom of the Lamella clarifier.

Solids and/or sludge that have settled to the bottom of the clarifier will need to be periodically removed and pumped to two sludge holding tanks plumbed in parallel. The sludge holding tanks are cone bottom poly tanks with a nominal capacity of 3,000- gallons. Sludge should be removed from the clarifier before solids begin passing through the clarification zone and into the effluent portion of the clarifier. Sludge is removed from the clarifier and pumped to the sludge holding tank where sludge can be condensed, and free water can be decanted to the backwash return tank via a decant tank and an electric decant pump. The remaining solids in the sludge holding tank will then be pumped via a second sludge pump skid to a plate and frame filter press. Filter cake from the filter press will be dropped into a lined roll-off container

for disposal at a permitted disposal facility selected to receive the waste. The filtrate generated from dewatering will feed into the decant tank.

The sludge holding tanks will each be equipped with a level transmitter capable of signaling a high-level alarm. The high-level alarm will alert the operator of a high-level condition in the sludge holding tank while also sending a signal to shut down the electric sludge pump feeding the sludge holding tank.

Clarified water will rise above the launders and flow by gravity to a pump suction tank, where the clarified water can be pumped to the membrane bioreactor (MBR) through a duplex pump skid. The pump suction tank will be equipped with liquid level alarms. The high-level alarm will alert the operator of a high-level condition in the pump suction tank while also sending a signal to shut down the clarifier transfer pumps.

Wastewater will be transferred to the aerated bioreactor which is the first step in the MBR process. The bioreactor is a 12,500 -gallon high-density polyethylene (HDPE) tank. A level transmitter is included in the tank to monitor the tank level, control wastewater transfer and provide alarms for high level. The dissolved oxygen (DO) level within the tank will be monitored and the oxygen concentration in the bioreactor will be controlled using a controller connected to the aeration system. Two blowers provide air to the bioreactor. Blower speed is controlled using a VFD based on the DO reading within the bioreactor. Aeration is through fine bubble diffusers.

Water will be transferred from the bioreactor to the Ultrafiltration (UF) membrane system. The UF membrane system is connected to the bioreactor and contains wide channel tubular membranes, 8" diameter by four meter long each one containing 395 square feet of membrane area. Each membrane housing contains eight millimeters diameter membrane tubes. The unit has eight (8) modules installed. A permeate recycling valve is installed which will automatically return permeate to the process (feed) tank when there is a low influent flow volume. This is done to prevent the system from shutting down "dirty" and allowing the waste fluid to sit in the membranes. The system includes an integrated cleaning tank. Waste activated sludge from the bioreactor can be wasted from the concentrate return piping of the Ultrafilter (UF) for discharge to a cone bottom HDPE gravity thickening tank for reduction of the solids that require off-site disposal. The water phase will be decanted to a decant tank for return to the bioreactor.

A shell and tube heat exchanger will be provided to add heat to the process fluid to allow the nitrifying biomass to be at an optimal temperature for ammonia reduction. The exchanger will be installed in the concentrate return piping between the ultrafilter and the bioreactor. The heat exchanger is a single pass unit with stainless steel tubes. Hot water at 150°F will be supplied to the exchanger to heat the process fluid. Mill duty stainless steel circulation pumps will be provided. The circulation pump is designed to provide the correct velocity and pressure within the membrane tube to maximize permeate reduction and minimize fouling potential. The pump is provided with a dynamic seal configuration to provide long seal life.

Permeate generated from the UF system will flow by gravity to a pump suction tank prior to being conveyed through the Granular Activated Carbon (GAC) vessels using a duplex electrical centrifugal transfer pump.

Two (2) high-pressure liquid phase carbon adsorption vessels shall be provided (designed for a maximum pressure of 75 psi) for the reduction of per- and polyfluoroalkyl (PFAS) compounds as well as further polishing of organic compounds and mercury. Each carbon unit shall contain 4,000-pounds (lbs.) of granular F400 PFAS liquid-phase carbon media but can hold up to 6,000 lbs. of GAC media. The adsorptive

media vessels will be installed and configured in series (lead/lag operation). Each carbon unit is designed for a flow rate of 100 GPM to allow for an empty bed contact time (EBCT) of 10 minutes adsorption per vessel.

If breakthrough occurs on the lead unit, the water will be treated through the lag unit temporarily. The spent media will be removed and replaced from the lead unit. The spent media will be sampled to determine Resource Conservation and Recovery Act (RCRA) waste characteristics and will be regenerated or disposed of accordingly. Periodic sampling of the effluent of the lead unit (midpoint sampling) will determine if breakthrough is occurring and will alert the operator as to when to replace the media in the lead vessel. In addition, the operator will maintain a regular schedule for replacement of media units based on the expected life of the media to prevent any breakthrough.

The inlet and outlet of each adsorptive media vessel will be equipped with a pressure gauge to monitor the differential pressure across the media. The differential pressure across each adsorptive media vessel will be recorded in a logbook. If the differential pressure across a particular vessel rises to the point that water flow is restricted (as measured by the effluent flow meter), that vessel will be taken off-line, and the media will either be replaced or backwashed (to the backwash holding tank) to reduce the pressure in the unit due to excessive pressure drop. The affected vessel will then be put back on-line and forward flow is resumed.

Treated water will be conveyed to the retention basin above the permitted discharge Outfall. Periodically, treated effluent will fill a backwash holding tank to allow for a clean water source to backwash the media vessels (as required). A duplex electric centrifugal pump skid will be installed on the backwash holding tank to convey treated water through one or more GAC vessels in an up-flow configuration. Backwash water will be conveyed to the backwash return tank to be reprocessed through the headworks of the treatment system during lower flow operations.

The proposed treatment system layout figure is provided in **Appendix A**.

Treatment System Chemicals

The following **Table 2** depicts the proposed water treatment chemicals which may be used (as required) in the treatment system. These chemicals are described in the process narrative; their location is included in the table:

Water Treatment Chemical	Percent Solution	Usage	Treatment System Location(s)
Sodium Hydroxide	25%	pH Adjustment	Chemical Mix Tank, Bioreactor
Sulfuric Acid	93%	pH Adjustment	Chemical Mix Tank
Sodium Hypochlorite	12.5%	Oxidation	Chemical Mix Tank
WC-500 (Coagulant)	50%	Coagulation	Lamella Clarifier
AP-210 (Polymer)	0.2 – 0.5% (made down from solid)	Flocculation	Lamella Clarifier

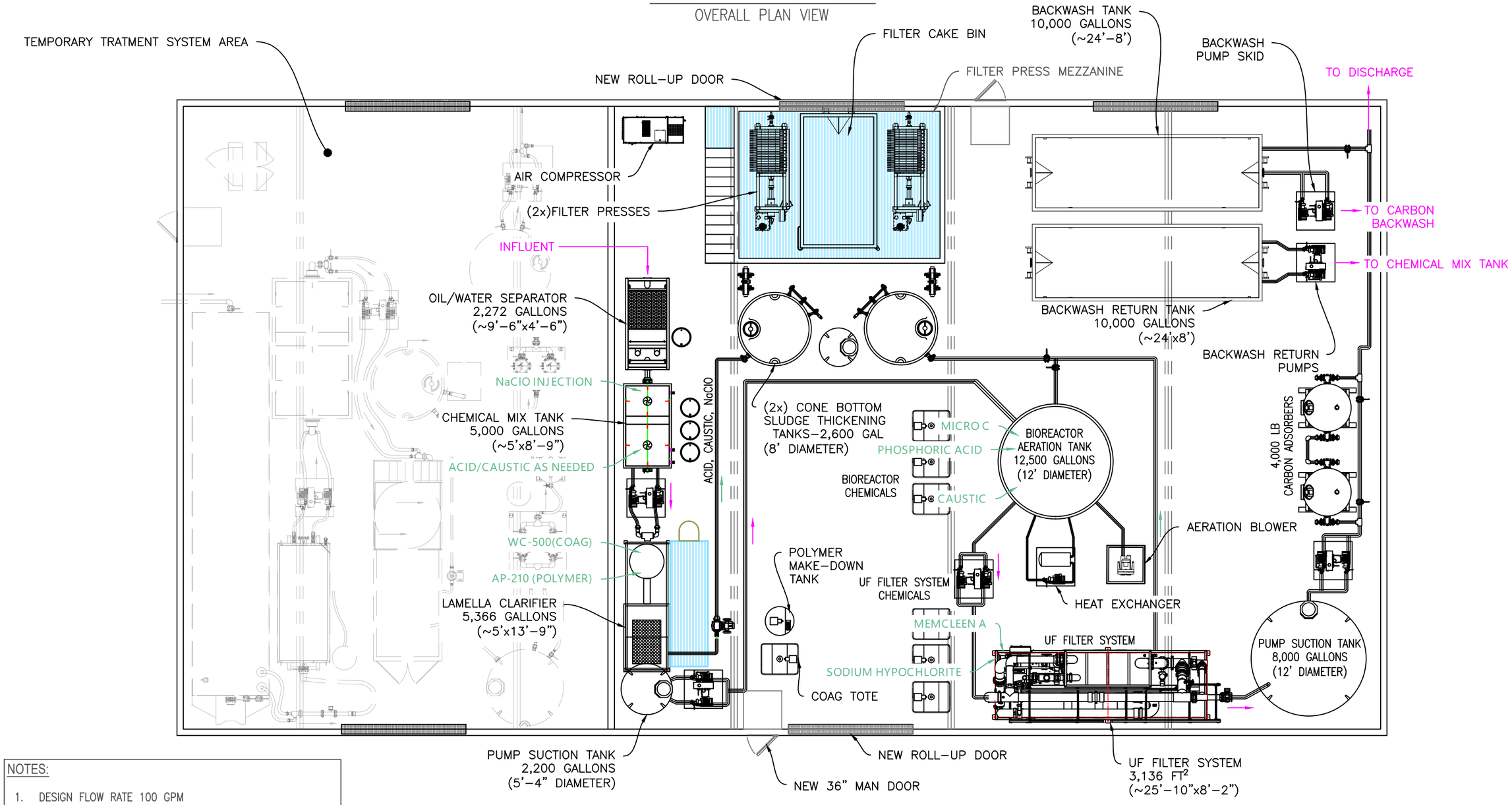
Micro C	70-74%	Carbon Source	Bioreactor
Phosphoric Acid	75%	Phosphorous Source	Bioreactor
Memcleen A	40 – 50 %	Membrane Cleaning	Ultrafiltration
Sodium Hypochlorite	12.5%	Membrane Cleaning	Ultrafiltration

Note: The Safety Data Sheets (SDS) the Water Treatment Chemicals included in Table 2 are provided in the attached Appendix B.

Appendix A –Treatment System Layout Figure

TREATMENT SYSTEM

OVERALL PLAN VIEW



NOTES:

1. DESIGN FLOW RATE 100 GPM
2. SYSTEM FOOTPRINT APPROXIMATELY 65'X80'
3. NOT ALL VALVES, CONNECTIONS, ETC SHOWN FOR CLARITY
4. ELECTRICAL POWER PROVIDED BY OTHERS.
5. FINAL EQUIPMENT LAYOUT SUBJECT TO CHANGE PRIOR TO FINAL APPROVAL.

REV.	DATE	BY	REMARKS
D	9/19/25	KoL	UPDATE LAYOUT
C	2/28/25	JpE	UPDATE LAYOUT
B	2/26/25	JpE	UPDATE LAYOUT
A	9/30/25	JpE	INITIAL ISSUE.
G	10/27/25	JpE	ADD CHEMICAL INJECTION, HEAT EXCHANGER
F	9/29/25	LJ	UPDATED BIOREACTOR & CARBON UNIT CAPACITIES
E	9/25/25	LJ	ADDED EQUIPMENT CAPACITIES & DIMENSIONS

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CUSTOMER: INVENTUM ENGINEERING

SITE: TONAWANDA, NY

TITLE: TREATMENT SYSTEM EQUIPMENT LAYOUT

SCALE: NTS

	BY	DATE
DRAWN	JpE	8/21/24
APPROVALS		
MECH.	KL	2/26/25
I&C		
PROCESS	RO	2/26/25

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Appendix B – Water Treatment System Chemicals SDSs

ADEGA Chemical Company

SAFETY DATA SHEET

AP-210 Anionic Polymer

According to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: **AP-210 anionic polymer**

Type of product: Mixture

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Processing aid for industrial applications.

Uses advised against: None.

1.3. Details of the supplier of the safety data sheet

Company:
ADEGA Chemical
25411 NE 53rd Street
Vancouver, Wa 98682
United States

Telephone: 949-275-7208

Telefax: 360-883-4471

E-mail address: nick@lagosandassociates.com

1.4. Emergency telephone number

800-424-9300 CHEMTREC (CCN 20412), Outside U.S. 703-527-3887

24-hour emergency number:

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

Classification according to paragraph (d) of 29 CFR 1910.1200:

Not classified.

2.2. Label elements

Labelling according to paragraph (f) of 29 CFR 1910.1200:

Hazard symbol(s):	None.
Signal word:	None.
Hazard statement(s):	None.
Precautionary statement(s):	None.

2.3. Other hazards

Aqueous solutions or powders that become wet render surfaces extremely slippery.

SECTION 3. Composition/information on ingredients

3.1 Substances

Not applicable, this product is a mixture.

3.2 Mixtures

Hazardous components
Contains no reportable hazardous substances.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Move to fresh air. No hazards which require special first aid measures.

Skin contact:
Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.

Eye contact:
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of persistent eye irritation, consult a physician.

Ingestion:
Rinse mouth with water. Do NOT induce vomiting. Get medical attention if symptoms occur.

4.2. Most important symptoms and effects, both acute and delayed

Powder can cause localized skin irritation in folds of skin or under tight clothing. Moderate eye irritation due to typical effects all powders have on conjunctivae.

4.3. Indication of any immediate medical attention and special treatment needed.

None reasonably foreseeable.

Other information:
Aqueous solutions or powders that become wet render surfaces extremely slippery.

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Water; Water spray; Foam; Carbon Dioxide (CO_2); Dry powder.
Warning! Aqueous solutions or powders that become wet render surfaces extremely slippery.

Unsuitable extinguishing media:
None known.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products:
Thermal decomposition may produce: nitrogen oxides (NOx), carbon oxides (COx), Ammonia (NH3). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

5.3. Advice for fire-fighters

Protective measures:
In the event of fire, wear self-contained breathing apparatus.

Other information:
Warning; aqueous solutions or powders that become wet render surfaces extremely slippery.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions:
Aqueous solutions or powders that become wet render surfaces extremely slippery.

Protective equipment:
Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection).

Emergency procedures:
Keep people away from spill/leak. Prevent further leakage or spillage if safe to do

6.2. Environmental precautions

As with all chemical products, do not flush into surface water.

6.3. Methods and material for containment and cleaning up

Small spills:
Do not flush with water. Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal. After cleaning, flush away traces with water.

Large spills:
Do not flush with water. Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal.

Residues:
After dry cleaning up of residues; flush away remaining trace substance with large quantities of water.

6.4. Reference to other sections

SECTION 7: Handling and storage; SECTION 8: Exposure controls/personal protection; SECTION 13: Disposal considerations;

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Aqueous solutions or powders that become wet render surfaces extremely slippery. Use personal protective equipment.

7.2. Conditions for safe storage, including any incompatibilities.

Keep in a dry place. Keep container closed when not in use. Incompatible with strong bases, and oxidizing agents.

7.3. Specific end use(s)

None specified. Information is not available

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits: None known

8.2. Exposure controls

Appropriate engineering controls:

Use local exhaust if dusting occurs. Natural ventilation is adequate in absence of dusts.

Individual protection measures, such as personal protective equipment:

a) Eye/face protection: Safety glasses with side-shields. Use equipment for eye protection tested and approved under appropriate government standards (e.g., NIOSH, EN 166 (EU).

b) Skin protection: Workclothes protecting arms, legs and body.

c) Hand protection: PVC or other plastic material gloves; the selected protective gloves must satisfy EU Directive 89/689/EEC and Standard EN 374 derived from it, and NIOSH (US)

d) Respiratory protection: No personal respiratory protective equipment normally required. Dust safety masks recommended where working powder concentration is more than 10 mg/m^3. Use respirators and components tested and approved under appropriate govt standards such as NIOSH (US), CEN (EU).

d) Additional advice: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product and at the end of the work day.

Environmental exposure controls:

Do not allow uncontrolled discharge of product into the environment. Do not flush into surface water.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

a) Appearance:	Granular solid, White.
b) Odour:	None.
c) Odour Threshold:	Not applicable.
d) pH:	5 - 9 @ 5 g/L
e) Melting point/freezing point:	> 150°C
f) Initial boiling point and boiling range:	Not applicable.
g) Flash point:	Not applicable.
h) Evaporation rate:	Not applicable.
i) Flammability (solid, gas):	No data available.
j) Upper/lower flammability or explosive limits:	Not expected to create explosive atmospheres.
k) Vapour pressure:	Not applicable.
l) Vapour density:	Not applicable.
m) Relative density:	0.6 - 0.9
n) Solubility(ies):	Soluble in water.
o) Partition coefficient:	-2
p) Autoignition temperature:	Does not self-ignite (based on the chemical structure).
q) Decomposition temperature:	> 150°C
r) Viscosity:	See Technical Bulletin.
s) Explosive properties:	Kst = 0 (Not explosive according to ASTM E1226-19 and EN 14034)
t) Oxidizing properties:	Not expected to be oxidizing based on the chemical structure.
v) Particle characteristics:	No data available.

9.2. Other information

None.

SECTION 10. Stability and reactivity

10.1. Reactivity None known.

10.2. Chemical stability Stable under normal conditions.

10.3. Possibility of hazardous reactions Oxidizing agents may cause exothermic reactions. Contact with strong bases liberates ammonia.

10.4. Conditions to avoid None known.

10.5. Incompatible materials Incompatible with oxidizing agents.

10.6. Hazardous decomposition products Thermal decomposition may produce: nitrogen oxides (NOx), carbon oxides (COx), Ammonia (NH_3). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient environment.

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Information on the product as supplied:

Acute oral toxicity: LD50/oral/rat > 5000 mg/kg

Acute dermal toxicity: LD50/dermal/rat > 5000 mg/kg

Acute inhalation toxicity: The product is not expected to be toxic by inhalation.

Skin corrosion/irritation: Not irritating.

Serious eye damage/eye irritation: Not irritating.

Respiratory/skin sensitisation: Not sensitizing.

Mutagenicity: Not mutagenic.

Carcinogenicity: Not carcinogenic.

Reproductive toxicity: Not toxic for reproduction.

STOT - single exposure: No known effects.

STOT - repeated exposure: No known effects.

Aspiration hazard: No hazards resulting from the material as supplied.

SECTION 12. Ecological information

12.1. Toxicity

Information on the product as supplied:

Acute toxicity to fish:	LC50/Danio rerio/96 hours > 100 mg/L (OECD 203) LC50/Fathead minnow/96 hours > 100 mg/L (OECD 203)
Acute toxicity to invertebrates:	EC50/Daphnia magna/48 hours > 100 mg/L (OECD 202)
Acute toxicity to algae:	IC50/Scenedesmus subspicatus/72 hours > 100 mg/L (OECD 201)
Chronic toxicity to fish:	No data available.
Chronic toxicity to invertebrates:	No data available.
Toxicity to microorganisms:	No data available.
Effects on terrestrial organisms:	No known effects.
Sediment toxicity:	No data available.

12.2. Persistence and degradability

Information on the product as supplied:

Degradation:	Not readily biodegradable.
Hydrolysis:	Does not hydrolyze.
Photolysis:	No data available.

12.3. Bioaccumulative potential

Information on the product as supplied:

Not bioaccumulating.

Partition co-efficient (Log Pow):	-2
Bioconcentration factor (BCF):	~0

12.4. Mobility in soil

Information on the product as supplied: None.

12.5. Other adverse effects None known.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Waste from residues / unused products:

Dispose in accordance with local and national regulations. Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated packaging:

Rinse empty containers with water and use the rinse-water to prepare the working solution. Dispose in accordance with local and national regulations. Can be landfilled or incinerated, when in compliance with local regulations.

Recycling:

In accordance with local and national regulations.

SECTION 14. Transport information

Land transport (DOT) Not classified.

Sea transport (IMDG) Not classified.

Air transport (IATA) Not classified.

SECTION 15. Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Information on the product as supplied:

TSCA Chemical Substances Inventory: All components of this product are either listed on the inventory or are exempt from listing.

US SARA Reporting Requirements:

SARA (Section 311/312) hazard class: Not concerned.

SARA Title III Sections:

Section 302(TPQ) – Reportable Quantity – Not concerned
Section 304 – Reportable Quantity – Not concerned
Section 313 – (De minimis concentration) – Not concerned

Clean Water Act
Section 311 Hazardous Substances (40 CFR 117.3) – Reportable Quantity: Not concerned

Clean Air Act
Section 112(r) Accidental release prevention requirements (40 CFR 68) – Reportable Quantity: Not concerned

CERCLA
Hazardous Substances List (40 CFR 302.4) – Reportable Quantity: Not concerned

RCRA status: Not RCRA hazardous.

California Proposition 65 Information:

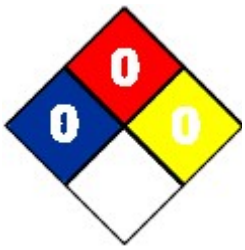
WARNING! This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm, Acrylamide.

SECTION 16. Other information

NFPA and HMIS Ratings:

NFPA:

Health:	0
Flammability:	0
Instability:	0



HMIS:

Health:	0
Flammability:	0
Physical Hazard:	0
PPE Code:	B

This data sheet contains changes from the previous version in section(s):

Section 8. Exposure controls/personal protection; Section 16. Other Information

Key or legend to abbreviations and acronyms used in the safety data sheet:

STOT = Specific target organ toxicity

Training Advice:

Do not handle until all safety precautions have been read and understood.

This SDS was prepared in accordance with the following:

U.S. Code of Federal Regulations 29 CFR 1910.1200

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Safety Data Sheet
SULFURIC ACID 66Be°

Version 1.9 Revision Date: 08/21/2025

SECTION 1. IDENTIFICATION

Product name : SULFURIC ACID 66Be°

Synonyms : NC SULFURIC ACID 66Be

Recommended use of the chemical and restrictions on use

Recommended use : Acid.
Fertilizers.
Water treatment chemical

Restricted Uses : No data available

Manufacturer or supplier's details

Company : Univar Solutions Canada Ltd.
Address 64 Arrow Road
North York, ON, M9M 2L9
Canada

Emergency telephone number:
Local Emergency Contact : During Office hours Monday-Friday, 8.00 am - 4.30 pm (Pacific Standard Time) : 1-866-686-4827

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARD IDENTIFICATION

Hazardous Classification of the substance or mixture

Corrosive to metals : Category 1

Skin corrosion : Category 1A

Serious eye damage : Category 1

Carcinogenicity : Category 1A

Specific target organ toxicity - single exposure : Category 3 (Respiratory system)

Label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H350 May cause cancer.

Precautionary statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P234 Keep only in original packaging.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

CAS-No.	Chemical name	% by Weight	Synonyms
7664-93-9	Sulfuric acid	80 - 100	Sulfuric acid

The exact ranges of this mixture are being withheld due to a Trade Secret.

Molecular formula : H2-O4-S

SECTION 4. FIRST-AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.

Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled	:	If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of skin contact	:	Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist. Take victim immediately to hospital.
If swallowed	:	Clean mouth with water and drink afterwards plenty of water. Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2)
Unsuitable extinguishing media	:	High volume water jet Water
Hazardous combustion products	:	sulfur oxides Gases hazardous to health may be formed. Sulphuric acid
Specific extinguishing methods	:	Use a water spray to cool fully closed containers.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains.

Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Do not breathe vapours/dust.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
To avoid spills during handling keep bottle on a metal tray.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

Materials to avoid : Do not store near acids.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
7664-93-9	Sulfuric acid	TWA	1 mg/m3	CA AB OEL
		STEL	3 mg/m3	CA AB OEL
		TWA (Thoracic)	0.2 mg/m3	CA BC OEL
		TWAEV (thoracic dust)	0.2 mg/m3	CA QC OEL

Personal protective equipment

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing

problems.

Skin and body protection	:	Impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	Clear, colorless, amber
Odour	:	pungent
Odour Threshold	:	No data available
pH	:	0.3 @ 25 °C (77 °F)
Freezing Point (Melting point/range)	:	-31 - 10.56 °C (-24 - 51.01 °F)
Boiling Point (Boiling point/boiling range)	:	217 - 330 °C (423 - 626 °F)
Flash point	:	does not flash
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	< 0.3 mmHg @ 25 °C (77 °F)
Relative vapour density	:	3.4 @ 20 °C (68 °F) (Air = 1.0)
Relative density	:	1.8347 - 1.8437 @ 25 °C (77 °F) Reference substance: (water = 1)
Density	:	Estimated 1.837 g/cm3 @ 20 °C (68 °F)
Solubility(ies)		
Water solubility	:	completely miscible
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	340 °C

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable under normal conditions.

Possibility of hazardous reactions	:	Acid reacts with most metals to release hydrogen gas which can form explosive mixtures with air. Reacts with organic materials and may cause ignition of finely divided materials on contact.
Conditions to avoid	:	Avoid contact with combustible material (paper, wool, oil).
Incompatible materials	:	acetylenes Acids Ammonia Combustible material Flammable materials Metals nitrates Nitriles nitrites Organic materials Oxidizing agents phosphorus Powdered metals Reducing agents water Peroxides
Hazardous decomposition products	:	corrosive vapors Sulphur oxides toxic fumes

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Components:

7664-93-9:

Acute oral toxicity	:	LC50 (Rat, male and female): 2,140 mg/kg
Acute inhalation toxicity	:	LC50 (Rat, male and female): mg/m3 375 Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	Remarks: No data available

Skin corrosion/irritation

Product:

Remarks: Extremely corrosive and destructive to tissue.

Components:

7664-93-9:

Species: Rabbit
Result: Causes severe burns.

Serious eye damage/eye irritation

Product:

Remarks: May cause irreversible eye damage.

Components:

7664-93-9:

Remarks: No data available

Respiratory or skin sensitisation

Components:

7664-93-9:

Remarks: No data available

Germ cell mutagenicity

Components:

7664-93-9:

Genotoxicity in vitro	:	Test Type: Ames test Species: Salmonella typhimurium Metabolic activation: with and without metabolic activation Result: negative
Germ cell mutagenicity - Assessment	:	Not mutagenic in Ames Test

Carcinogenicity

Product:

Carcinogenicity - Assessment	:	Human carcinogen.

Components:

7664-93-9:

Species: Mouse, (male and female)
Application Route: Oral
Exposure time: lifetime
Dose: 0.2 mL of 0.2% aq solution
Frequency of Treatment: 1 days/week
Symptoms: Local irritation, Tumors

Carcinogenicity - Assessment	:	Weight of evidence does not support classification as a carcinogen

ACGIH	Suspected human carcinogen	
	7664-93-9	Sulfuric acid

Reproductive toxicity

Components:

7664-93-9:

Reproductive toxicity - Assessment		Fertility classification not possible from current data.
Teratogenicity - Assessment	:	Did not show teratogenic effects in animal experiments.

STOT - single exposure

Product:

Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922
Contaminated packaging	:	Empty remaining contents.

Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

TDG (Transportation of Dangerous Goods):
UN1830, SULFURIC ACID, 8, II

IATA (International Air Transport Association):
UN1830, SULPHURIC ACID, 8, II

IMDG (International Maritime Dangerous Goods):
UN1830, SULPHURIC ACID, 8, II

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all of the information required by the HPR.

NPRI Components : 7664-93-9

The components of this product are reported in the following inventories:

TSCA	:	All substances listed as active on the TSCA inventory
AIIC	:	On the inventory, or in compliance with the inventory
DSL	:	All components of this product are on the Canadian DSL
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
NZIoC	:	Not in compliance with the inventory

SECTION 16. OTHER INFORMATION

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Univar Solutions EHS Product Compliance Department (1-855-429-2661) SDSNA@univarsolutions.com.

Revision Date : 08/21/2025

Legacy SDS: : R0001174

Material number:
16186267, 16174712, 16175807, 16178772, 16181534, 16174800, 16177108, 16175890, 16175344, 16175320, 16174913, 16174890, 16174602, 16168596, 16168315, 55254, 104393, 153270, 136507, 170942, 20261, 747387, 746673, 572695, 549278, 554154, 105608, 55212, 74712, 55684, 56633, 72048, 152711, 88318, 89725, 87701, 592090, 52439, 89466, 107474, 56705, 88445, 108413, 106107

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AIIC	Australia Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50		Lethal Concentration 50%	

Safety Data Sheet
PHOSPHORIC ACID 75%

Version 1.5 Revision Date: 06/19/2025

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PHOSPHORIC ACID 75%

Recommended use of the chemical and restrictions on use

Recommended use : Industrial chemical

Manufacturer or supplier's details

Company : Univar Solutions USA
Address 3075 Highland Pkwy Suite 200
Downers Grove, IL 60515
United States of America (USA)

Emergency telephone number:
Transport North America: CHEMTREC (1-800-424-9300)
CHEMTREC INTERNATIONAL Tel # 703-527-3887

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Acute toxicity (Oral) : Category 4

Skin corrosion : Category 1B

Serious eye damage : Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements : **Prevention:**
P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT

induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

CAS-No.	Chemical name	Weight percent
7664-38-2	Phosphoric acid	70 - 90

Actual concentration is withheld as a trade secret
Any Concentration shown as a range is due to batch variation.

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
Take victim immediately to hospital.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

		Continue rinsing eyes during transport to hospital. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist. Take victim immediately to hospital.
If swallowed	:	Clean mouth with water and drink afterwards plenty of water. Keep respiratory tract clear. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry powder Water may be ineffective. Water mist
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire-fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Phosphorous oxides toxic fumes
Specific extinguishing methods	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Use water spray to cool unopened containers.
Further information	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Neutralize with chalk, alkali solution or ammonia. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.

Advice on safe handling	:	Do not breathe vapours/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. To avoid spills during handling keep bottle on a metal tray. Dispose of rinse water in accordance with local and national regulations.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.
Materials to avoid	:	Do not store near acids.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
7664-38-2	Phosphoric acid	TWA	1 mg/m3	ACGIH
		STEL	3 mg/m3	ACGIH
		TWA	1 mg/m3	NIOSH REL
		ST	3 mg/m3	NIOSH REL
		TWA	1 mg/m3	OSHA Z-1
		TWA	1 mg/m3	OSHA P0
		STEL	3 mg/m3	OSHA P0
		PEL	1 mg/m3	CAL PEL
		STEL	3 mg/m3	CAL PEL

Personal protective equipment

Respiratory protection	:	No personal respiratory protective equipment normally required.

Hand protection

Remarks	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	viscous
Colour	:	clear, colourless
Odour	:	odourless
Odour Threshold	:	No data available
pH	:	1 @ 75 - 85 %
Freezing Point (Melting point/freezing point)	:	-20 - 42.35 °C (-4 - 108.23 °F)
Boiling Point (Boiling point/boiling range)	:	135 - 158 °C (275 - 316 °F)
Flash point	:	Not applicable
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	0.0285 mmHg @ 20 °C (68 °F)
Relative vapour density	:	0.670AIR=1
Relative density	:	1.57 @ 25 °C (77 °F)
Density	:	No data available
Solubility(ies)		
Water solubility	:	soluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	Not applicable
Thermal decomposition	:	No data available
Viscosity		
Viscosity, dynamic	:	23 mPa.s @ 40 °C (104 °F)
Viscosity, kinematic	:	23 mm2/s @ 25 °C (77 °F)

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Acid reacts with most metals to release hydrogen gas which can form explosive mixtures with air.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Metals Bases Alcohols Aldehydes Ketones

		phenols Esters halogenated hydrocarbons Amines Cyanides sulfides fluorides Alkalis
Hazardous decomposition products	:	phosphine Oxides of phosphorus

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity	:	Assessment: The component/mixture is moderately toxic after single ingestion.
Acute dermal toxicity	:	Assessment: The component/mixture is minimally toxic after single contact with skin.

Components:

7664-38-2:

Acute oral toxicity	:	Assessment: The component/mixture is moderately toxic after single ingestion.

Skin corrosion/irritation

Product:

Result: Corrosive to skin

Components:

7664-38-2:
Species: Rabbit
Result: Causes burns.

Serious eye damage/eye irritation

Product:

Remarks: May cause irreversible eye damage.

Components:

7664-38-2:
Result: Risk of serious damage to eyes.
Remarks: No data available

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Aspiration toxicity

Product:

Corrosive to the respiratory tract.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

7664-38-2:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): 3 - 3.25 Exposure time: 96 h Test Type: static test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test Type: static test
Toxicity to algae	:	EC50 (Desmodesmus subspicatus): > 100 mg/l End point: Growth rate Exposure time: 72 h Test Type: static test

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

DOT (Department of Transportation):
UN1805, Phosphoric acid solution, 8, III

IATA (International Air Transport Association):
UN1805, Phosphoric acid, solution, 8, III

IMDG (International Maritime Dangerous Goods):
UN1805, PHOSPHORIC ACID SOLUTION, 8, III

SECTION 15. REGULATORY INFORMATION

WHMIS Classification	:	D1A: Very Toxic Material Causing Immediate and Serious Toxic Effects E: Corrosive Material

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Phosphoric acid	7664-38-2	5000	*

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Corrosive to metals
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

7664-38-2 Phosphoric acid

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

7664-38-2 Phosphoric acid

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

Massachusetts Right To Know

7664-38-2 Phosphoric acid

Pennsylvania Right To Know

7664-38-2 Phosphoric acid
7732-18-5 Water

California Prop 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

AIIC : On the inventory, or in compliance with the inventory

DSL : All components of this product are on the Canadian DSL

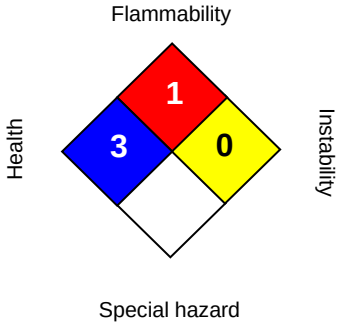
ENCS : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
NZIoC	:	not determined

SECTION16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	3/
FLAMMABILITY	1
PHYSICAL HAZARD	4

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Univar Solutions Product Compliance Department (1-855-429-2661) SDSNA@univarsolutions.com.

Revision Date : 06/19/2025

Legacy SDS: : 100000061391

Material number:
16226452, 16141981, 16174990, 16174986, 16176413, 16171457, 16148053, 16141248, 16140178, 16140102, 16144656

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AIIC	Australian Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program

CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

360 Connecticut Drive
Burlington, NJ 08016
Telephone: (609) 387-0330
Fax: (609) 239-2061
www.dynatecsystems.com

SAFETY DATA SHEET

SECTION 01: IDENTIFICATION

Product Name:	MEMCLEEN A	
Product Type :	Cleaner for membrane systems	
Telephone Numbers:	Customer Service:	609.387.0330
	CHEMTREC (U.S.A.)	800.424.9300 (24 hours)

SECTION 02: HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Mild Skid Irritation	Category 3
Serious Eye Irritation	Category 2

WARNING!

GHL LABEL

Hazard Statements

H316	Causes mild skin irritation
H319	Causes serious eye irritation

Precautionary Statements

P280	Wear protective gloves / protective clothing / eye protection / face protection
P264	Wash hand thoroughly after handling
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+313	IF SKIN irritation occurs: Get medical advice / attention
P337+313	IF EYE irritation occurs: Get medical advice / attention

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SAFETY DATA SHEET – MEMCLEEN A

SECTION 03: COMPOSITION / INFORMATION ON INGREDIENTS

Component Name	CAS #	%
Water	7732-18-5	50 - 60
2-Hydroxy 1,2,3-Propanetricarboxylic Acid	77-92-9	30 - 40
Monopotassium 2-Hydroxy 1,2,3-PropanetricarboxylateCitrate	866-83-1	10 - 20

SECTION 04: FIRST AID MEASURES

Contact with Eyes: Flush with water for 15 minutes. Seek immediate medical attention.

Skin Contact: Wash exposed areas with water and mild soap. Remove contaminated clothing immediately and launder before reuse. If irritation persists, seek immediate medical attention.

Inhalation: Remove victim to fresh air. Administer oxygen or artificial respiration if breathing is affected or stopped. Seek immediate medical attention.

Ingestion: Give large quantities of water. Never give anything by mouth to an unconscious person. Seek immediate medical attention.

SECTION 05: FIREFIGHTING MEASURES

Suitable Extinguishing Media: Water fog, foam, CO2, dry chemical

Special Fire Fighting Procedures: Use self-contained breathing apparatus and full bunker gear in fire areas. Evacuate all unprotected personnel from area. Exercise caution when fighting any chemical fire.

Unusual Fire Fighting Hazards: Material will not burn unless preheated.

SECTION 06: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Evacuate all unprotected personnel from the area.

Environmental Precautions: Contain spill if it can be done with minimal risk.

Methods for Cleaning Up: Surfaces will be slippery. Dilute with water and mop up, or absorb with an inert material and place in an appropriate waste disposal container. Dispose of according to local and regional authority requirements.

SECTION 07: HANDLING AND STORAGE

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.

Handling and Storage: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required.

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SAFETY DATA SHEET – MEMCLEEN A

SECTION 08: PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

Exposure Limits:

Name	CAS No.	OSHA PEL	ACGIH TLV
2-Hydroxy -1,2,3-Propanetricarboxylic Acid	77-92-9	Not Established	Not Established
Monopotassium 2-Hydroxy-1,2,3 Propanetricarboxylate	866-83-1	Not Established	Not Established

Engineering Controls: Where possible, provide general mechanical and/or local exhaust ventilation to prevent release of airborne dust into the work environment and to reduce vapor or mist to below the PEL or TLV. Eye wash facility should be provided in storage and general work area.

Personal Protection Equipment (PPE)

Eye Protection: Approved OSHA safety glasses or goggles.

Skin Protection: Wear protective gloves.

Respiratory Protection: In case of inadequate ventilation wear respiratory protection.

Personal Hygiene: Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Property	Description
Appearance	Clear Liquid
Odor	Mild Odor
pH @ 25 C	2.0+/-0.5
Melting/Freezing Point	32° F
Boiling Point	
Flash Point	>212°F
Specific Gravity	1.2
Solubility	100% in Water
VOC Content	Negligible

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable under normal conditions of storage and handling

Conditions to Avoid: Strong Oxidizing agents

Hazardous Decomposition / Byproducts: CO, CO2 and unidentified organic compounds may form during combustion

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SAFETY DATA SHEET – MEMCLEEN A

Hazardous Polymerization: Will not occur

Polymerization Conditions to Avoid: None

SECTION 11: TOXICOLOGICAL INFORMATION

Likely Route of Exposure	Contact and inhalation; ingestion possible.
Eye Contact	Slight to moderate irritant effect on the eyes
Skin Contact	Contact may cause mild skin irritation including redness, burning and drying/cracking of the skin. No harmful effects from skin adsorption are expected
Inhalation	Low to moderate degree of toxicity by inhalation
Reproductive Effects	Not classified
Embryotoxcity	Not classified
Carcinogenicity	Not classified
Teratogenicity	Not classified
Mutagenicity	Not classified
Synergistic Products	Not classified

SECTION 12: ECOLOGICAL INFORMATION

EcoToxicity:	$EC_{50\ Mix:}$ Daphina Magna (24 Hr) 5033 mg/L
	$EC_{50\ Mix:}$ Leuciscus idus (48 Hr) 1443 mg/L
Persistence and Degradability:	Not established
Bioaccumulative Potential:	Not established
Mobility in soil:	Not established
Other information:	Avoid release to the environment

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations:	Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.
Ecology – Waste Materials:	Avoid release to the environment.

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SAFETY DATA SHEET – MEMCLEEN A

SECTION 14: TRANSPORT INFORMATION

DOT SHIPPING INFORMATION

Not Regulated DOT (HM-181) (Domestic Surface)

Overland Transport: No additional information available

Transport by Sea: IMDG Not regulated

Air Transport: ICAO/IATA Not dangerous according to the specifications

SECTION 15: REGULATORY INFORMATION

TSCA STATUS: Components of this product are listed on the United States TSCA (Toxic Substances Control Act) inventory.

SARA Title III Section 302/304 Hazard Categorization:

No Chemicals in the Material are subject to the reporting requirements.

SARA Title III Section 311/312 Hazard Categorization:

Acute	Chronic	Fire	Pressure	Reactivity
X				

CERCLA Section 102 (a) Hazardous Substance:

No chemicals in this material are subject to the reporting requirement.

SECTION 16: OTHER INFORMATION

HMIS Rating

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

FOR COMPANY USE

The information and recommendations set forth herein are taken from sources believed to be accurate as of the date hereof; however, Dynatec Systems, Inc., makes no warranty with respect to the accuracy of the information of the suitability of the recommendations and assumes no liability to any user thereof.

G William Fisher

Prepared by: G. William Fisher
Revision: A

Created: 5 October, 2015
Revised: 30 June, 2023

SAFETY DATA SHEET

MicroC® 2000A

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	MicroC® 2000A	**Publication Date:**	May 17, 2024
Product Code:	NA	**Replaces:**	February 26, 2024
Product Use:	A reducing agent for biological processes		

Supplier Information:
Environmental Operating Solutions, Inc
53 Portside Drive
Pocasset, MA 02559

Phone: 508-743-8440
Fax: 844-308-5537
Website: www.microc.com

EMERGENCY TELEPHONE NUMBER: **CHEMTREC** **800-424-9300**

2. HAZARDS IDENTIFICATION

OSHA Regulatory Status:
This product when used as intended is not hazardous according to 29 CFR 1910.1200
This product when used as intended is not hazardous according to GHS categories

GHS Pictograms:	None Applicable
Signal Word:	None Applicable
GHS Hazard Classification:	None Applicable
Hazard Statements:	None Applicable

Note: When vaporized, glycerin mist may cause irritation of the respiratory tract.

Potential Health Effects

Routes of Exposure	Ingestion, inhalation, skin contact, eye contact
Eyes	May cause slight irritation
Skin	May cause slight irritation
Inhalation	High mist concentrations may cause irritation of respiratory tract.
Ingestion	May be harmful if swallowed in large quantities

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS #	% by Weight
Glycerin; glycerol	56-81-5	70-74%
Water	7732-18-5	22-26%
Sodium Chloride	7647-14-5	4-6%
Methanol	67-56-1	< 1%

4. FIRST AID MEASURES

Eye Contact	Immediately flush eyes thoroughly with plenty of water for 15 minutes and consult a physician immediately.
Skin Contact	Remove contaminated clothing and wash affected area with water and soap. Consult physician if irritation develops
Inhalation	Remove individual to fresh air. Seek medical attention if breathing problems persist
Ingestion	Do not induce vomiting. Rinse mouth thoroughly. Seek medical attention.
General Advice	If individual feels unwell following the exposure to the product consult a physician immediately. Present this Safety Data Sheet to the doctor in attendance
Note to physician	Treat patient symptomatically

5. FIRE FIGHTING MEASURES

Flammability Summary (OSHA and NFPA)	Non-flammable Material
Protection of Firefighters:	Wear suitable protective equipment. Wear self contained breathing apparatus if necessary
Extinguishing Media	Use equipment appropriate to the main source of the fire. Water spray, alcohol foam, dry chemical or CO2. Water or alcohol foam may cause frothing
Specific hazards arising from the chemical	Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal Protection for Spills	Keep unnecessary personnel away from spill. Use personal protective equipment. Ventilate area of leak or spill. Avoid breathing vapors and mist.
Methods for Containment	Eliminate all sources of ignition. Stop flow of material if safe to do so. Dike spilled material. Absorb spill with inert absorbent material. Sand, earth and vermiculite are suitable absorbent materials.
Environmental Precautions	Prevent further leakage. Contain spill if safe to do so. Do not let product enter storm drains if possible.

7. HANDLING AND STORAGE

Precautions for Safe Handling	See other relevant sections of this SDS. Avoid contact with skin and eyes. Avoid breathing mist. Use with adequate ventilation. Do not handle and store near open flames, high heat or sources of ignition.
Storage	Keep containers closed when not in use. Minimize evaporative losses. Keep away from ignition sources.
Incompatible Materials for Storage	None known

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

INSUFFICIENT DATA ON MIXTURE. DATA ON INDIVIDUAL COMPONENTS PROVIDED BELOW

Component	Concentration in Product	ACGIH TLV	OSHA TABLE Z-1 Limits for Air Contaminants	NIOSH
Glycerin CAS No: 56-81-5	70-74% w/w	Form: Glycerin Mist TWA: 10 mg/m3	Form: Total Dust PEL: 15 mg/m3 Form: Respirable Fraction PEL: 5 mg/m3	Insufficient Data on Glycerin Mist
Methanol CAS No: 67-56-1	< 1 % w/w	TWA: 260 mg/m3	PEL: 260 mg/m3	TWA: 260 mg/m3

Engineering Controls — Use proper equipment and storage conditions to control airborne levels below recommended exposure limits.

Personal Protective Equipment

Eye Protection: — Use normal eye protection practices such as safety glasses with side shields. Use chemical goggles if risk of splashing is high.

Skin Protection — Handle with chemical resistant gloves. Dispose of contaminated gloves after use. Nitrile gloves recommended.

Respiratory Protection — If workers could be exposed to concentrations above the exposure limits in Section 8, use a full face respirator with multipurpose combination cartridges.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid	**Flash Point**	None to Boil (ASTM D93)
Color	Light brown	**Boiling Point**	Not determined
Odor	Musty – Sweet Odor	**Evaporation Rate**	Not determined
Odor Threshold	Not determined	**UEL/LEL**	Not determined
		Flammability (solid, gas)	Not determined
pH	7.00-11.00	**Vapor Pressure**	Not determined
Solubility in Water	Highly soluble in water	**Vapor Density**	Not determined
		Relative Density	Not Determined
Bulk Density	10.2 lbs/gal	**Partition Coefficient**	Not determined
Specific gravity	1.22@ 20°C	**Autoignition Temperatures**	
Viscosity	50 cPs @ 20C	**Decomposition Temperature**	Not determined

Environmental Operating Solutions, Inc.
53 Portside Drive, Pocasset, MA 02559

10. STABILITY AND REACTIVITY

Reactivity	Avoid contact with oxidizing agents (e.g. nitric acid, peroxides, chromates)
Chemical Stability	Stable under normal storage conditions
Possibility of hazardous reactions	None known
Conditions to Avoid	Heat, flames, sparks. Contact with oxidizing agents
Incompatible Materials	None known
Hazardous Decomposition Products	Oxides of carbon under high heat

11. TOXICOLOGY

INSUFFICIENT DATA ON MIXTURE. DATA ON INDIVIDUAL COMPONENTS PROVIDED BELOW

Eye Contact	The components in this product may result in mild eye irritation from contact with liquid or vapors. Symptoms include redness, swelling, watering.
Skin Contact	The components in this product may result in mild skin irritation. Symptoms include redness, itching, burning, dermatitis.
Inhalation	Breathing high mist concentrations may be harmful. Inhalation can cause irritation of the throat and lungs.
Ingestion	Ingestion of this product may result in nausea, vomiting and diarrhea. Aspiration into the lungs can cause damage and inflammation to the lungs.
Target Organs	Lungs, Kidneys
Prolonged Exposure	Symptoms include nausea, headache, vomiting

Glycerin; Glycerol CAS No. 56-81-5

Acute Toxicity	Dermal LD50 = > 10,000 mg/kg (Rabbit) Inhalation LC50 = > 570 mg/m^3 1 hr (Rat) Oral LD50 = 12,600 mg/kg (Rat)
Carcinogenicity	Not listed by ACGIH, IARC, NIOSH, NTP or OSHA
Mutagenicity	No data available
Reproductive Toxicity	No data available

Methanol 67-56-1

Acute Toxicity	Dermal LD50 = 15,800 mg/kg (Rabbit) Inhalation LC50 = 64,000 mg/m^3 4 hr (Rat) Oral LD50 = 5,600 mg/kg (Rat)
Carcinogenicity	Not listed by ACGIH, IARC, NIOSH, NTP or OSHA
Mutagenicity	No data available
Reproductive Toxicity	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity
MicroC 2000:

Acute Toxicity:	Ceriodaphnia dubia, LC50 @48 hr > 400 mg/L. Pimephales promelas, LC50 @ 96 hr > 400 mg/l.
Chronic Toxicity:	Ceriodaphnia dubia, NOEC 400 mg/L, LOEC > 400 mg/L and IC25 > 400 mg/L. Pimephales promelas, NOEC 200 mg/L, LOEC > 400 mg/L and IC25 284.3 mg/L.
Persistence and degradability	No data available
Bioaccumulative potential	No data available
Mobility in soil	No data available
Other adverse effects	No data available

13. DISPOSAL CONSIDERATIONS

This product as supplied is not classified as a RCRA hazardous waste according to 40 CFR 261. However it should be fully characterized prior to disposal as contamination with other materials may subject it to hazardous waste regulations. RCRA requires the user of the product to determine whether the product meets RCRA criteria for hazardous waste. Always consult with local, state and federal regulations prior to disposal.

14. TRANSPORTATION INFORMATION

US Domestic DOT	Not Regulated
Shipping Name	Glycerin; Glycerol
IMDG	Not dangerous goods
IATA	Not dangerous goods
Marine pollutant	No

15. REGULATORY INFORMATION

United States

Toxic Substances Control Act

The components of this product are listed on the TSCA Inventory of Existing Chemical Substances

Section 302 (EHS) TPQ	Not applicable
Section 304 (EHS) TPQ	Not applicable

SARA Section 311/312 Hazard Categories

Acute - NO
Chronic – NO
Physical - None
Pressure Hazard - NO
Fire Hazard - NO

SARA Section 313

This product may contain trace amounts of a chemical that is subject to reporting requirements of SARA

Methanol CAS # 67-56-1 Typical % Weight in Product 0.0-0.10%

CERCLA

This product may contain trace amounts of a chemical that is subject to reporting requirements of CERCLA

Methanol RQ # 5,000. Typical % Weight in Product 0.0-0.10%

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): None

State Right to Know Regulations

California – Proposition 65	WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm: CAS# 67-56-1 - Methanol
Massachusetts Right to Know	Glycerin, Methanol
Minnesota Hazardous Substances List	Glycerin mist, Methanol
New Jersey Right to Know	Methanol
Pennsylvania Right to Know	Glycerin, Methanol
Rhode Island Right to Know	Glycerin, Methanol

16. ADDITIONAL INFORMATION

SDS REVISION STATUS: May 17, 2024 | Replaces: February 26, 2024

THIS SAFETY DATA SHEET (SDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS SDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. WE BELIEVE THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF ITS PUBLICATION DATE, BUT MAKE NO WARRANTY THAT IT IS. IF THIS SDS IS MORE THAN THREE YEARS OLD YOU SHOULD CONTACT THE SUPPLIER TO MAKE CERTAIN THAT THE INFORMATION IS CURRENT.

Safety Data Sheet
SODIUM HYPOCHLORITE 12.5%

Version 1.20 Revision Date: 11/11/2023

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : SODIUM HYPOCHLORITE 12.5%

Recommended use of the chemical and restrictions on use

Recommended use : Industrial Chemical

Manufacturer or supplier's details

Company : Univar Solutions USA
Address 3075 Highland Pkwy Suite 200
Downers Grove, IL 60515
United States of America (USA)

Emergency telephone number:
Transport North America: CHEMTREC (1-800-424-9300)
CHEMTREC INTERNATIONAL Tel # 703-527-3887

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Skin corrosion : Category 1

Serious eye damage : Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statements : **Prevention:**
P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

CAS-No.	Chemical name	Weight percent
7681-52-9	Sodium hypochlorite	12.5
1310-73-2	Sodium hydroxide	0 - 5

Actual concentration is withheld as a trade secret
Any Concentration shown as a range is due to batch variation.

Synonyms : Bleach**,**

SECTION 4. FIRST AID MEASURES

General advice : Show this safety data sheet to the doctor in attendance.
Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : Take victim immediately to hospital.
Move to fresh air.
If breathing has stopped, apply artificial respiration.
If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Remove contaminated clothing. If irritation develops, get medical attention.
Burns must be treated by a physician.

In case of eye contact : In case of eye contact
Immediately flush eye(s) with plenty of water.
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

		If easy to do, remove contact lens, if worn. If eye irritation persists, consult a specialist. Take victim immediately to hospital.
If swallowed	:	Take victim immediately to hospital. Do NOT induce vomiting. Rinse mouth with water. If victim is fully conscious, give a cupful of water. If a person vomits when lying on his back, place him in the recovery position.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Carbon dioxide (CO2) Foam Dry powder
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire-fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	No hazardous combustion products are known
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Neutralise with acid. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	Do not breathe vapours/dust.

Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
To avoid spills during handling keep bottle on a metal tray.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
7681-52-9	Sodium hypochlorite	STEL	2 mg/m3	US WEEL
1310-73-2	Sodium hydroxide	C	2 mg/m3	ACGIH
		C	2 mg/m3	NIOSH REL
		TWA	2 mg/m3	OSHA Z-1
		C	2 mg/m3	OSHA P0
		C	2 mg/m3	CAL PEL

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures : When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	clear yellow
Odour	:	Chlorine
Odour Threshold	:	No data available
pH	:	11.5 - 13
Freezing Point (Melting point/freezing point)	:	-20 - -15 °C (-4 - 5 °F)
Boiling Point ()	:	230 °F (230 °F) Decomposition: Decomposition temperature
Flash point	:	Not Flammable
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	12 - 17.5 mmHg @ 20 °C (68 °F)
Relative vapour density	:	No data available
Relative density	:	1.17 @ 20 °C (68 °F) Reference substance: (water = 1)
Density	:	1.17 g/cm3
Solubility(ies)		
Water solubility	:	completely soluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable
Possibility of hazardous reactions	:	No hazards to be specially mentioned.
Conditions to avoid	:	Keep away from heat, flame, sparks and other ignition sources.
Incompatible materials	:	Acids Combustible material Halogenated compounds Metals metal salts Organic materials

organic nitro compounds
Zinc

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Components:

7681-52-9:
Acute oral toxicity : LD50 (Rat, male): > 2,000 mg/kg

Skin corrosion/irritation

Components:

7681-52-9:
Species: Rabbit
Result: Causes burns.

1310-73-2:
Species: Rabbit
Result: Causes severe burns.

Serious eye damage/eye irritation

Components:

7681-52-9:
Species: Rabbit
Result: Risk of serious damage to eyes.

1310-73-2:
Species: Rabbit
Result: Risk of serious damage to eyes.

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

STOT - single exposure

Components:

7681-52-9:
Assessment: The substance or mixture is classified as specific target organ toxicant, single ex-

posure, category 3 with respiratory tract irritation.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

7681-52-9:

Toxicity to fish	:	LC50 (Salmo gairdneri (Rainbow Fish)): 0.06 mg/l Exposure time: 96 h Test Type: flow-through test LC50 (Pimephales promelas (fathead minnow)): 5.9 mg/l Exposure time: 96 h Test Type: static test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 0.141 mg/l Exposure time: 48 h Test Type: flow-through test EC50 (Ceriodaphnia dubia): 0.035 mg/l Exposure time: 48 h Test Type: flow-through test
Toxicity to algae	:	IC50: 0.023 mg/l Exposure time: 7 d Test Type: flow-through test
M-Factor (Acute aquatic toxicity)	:	10
Acute aquatic toxicity- Assessment	:	Very toxic to aquatic life.
Chronic aquatic toxicity- Assessment	:	Toxic to aquatic life with long lasting effects.

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. Harmful to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

DOT (Department of Transportation):
UN1791, Hypochlorite solutions, 8, III , Marine Pollutant (SODIUM HYPOCHLORITE) (SODIUM HYPOCHLORITE)

IATA (International Air Transport Association):
UN1791, Hypochlorite solution, 8, III

IMDG (International Maritime Dangerous Goods):
UN1791, HYPOCHLORITE SOLUTION, 8, III, Marine Pollutant (SODIUM HYPOCHLORITE) (SODIUM HYPOCHLORITE)

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Sodium hypochlorite	7681-52-9	100	800
Sodium hydroxide	1310-73-2	1000	20000

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Corrosive to metals
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 302 : This material does not contain any components with a section 302 EHS TPQ.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

7681-52-9	Sodium hypochlorite
1310-73-2	Sodium hydroxide

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

7681-52-9	Sodium hypochlorite
1310-73-2	Sodium hydroxide

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

Massachusetts Right To Know

7681-52-9	Sodium hypochlorite
1310-73-2	Sodium hydroxide

Pennsylvania Right To Know

7732-18-5	Water
7681-52-9	Sodium hypochlorite
1310-73-2	Sodium hydroxide

California Prop 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

DSL : All components of this product are on the Canadian DSL

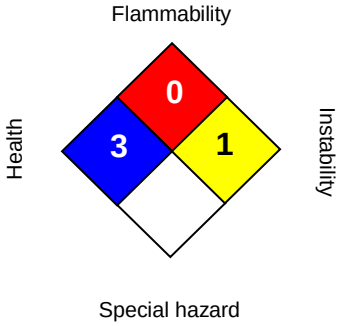
AICS : On the inventory, or in compliance with the inventory

NZIoC : Not in compliance with the inventory

ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory

SECTION16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	3/
FLAMMABILITY	0
PHYSICAL HAZARD	1

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Univar Solutions Product Compliance Department (1-855-429-2661) SDSNA@univarsolutions.com.

Revision Date : 11/11/2023

Legacy SDS: : R0004191

Material number:
16056658, 691814, 65964, 132750, 707559, 161023, 160052, 16185565, 16182803, 16182803, 16182146, 16151747, 16144335, 16164762, 16164766, 16164347, 16164686, 16164337, 16147922, 16160423, 16160441, 16147117, 16145833, 16148433, 16148162, 16161401, 16142035, 16112157, 746448, 653645, 16023856, 16023855, 560182, 161166, 146774, 132681, 167734, 20464, 20461, 573786, 554377, 160127, 160809, 115370, 98722, 674528, 116864, 501223

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Govern-ment Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical	LOAEL	Lowest Observed Adverse Effect

	Substances		Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

Safety Data Sheet
CAUSTIC SODA 25%

Version 1.12 Revision Date: 03/27/2025

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : CAUSTIC SODA 25%

Recommended use of the chemical and restrictions on use

Recommended use : Reserved for industrial and professional use.
Restrictions on use : None known.

Manufacturer or supplier's details

Company : Univar Solutions USA
Address 3075 Highland Pkwy Suite 200
Downers Grove, IL 60515
United States of America (USA)

Emergency telephone number:
Transport North America: CHEMTREC (1-800-424-9300)
CHEMTREC INTERNATIONAL Tel # 703-527-3887

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Acute toxicity (Oral) : Category 4

Skin corrosion : Category 1A

Serious eye damage : Category 1

Specific target organ toxicity - single exposure : Category 3 (Respiratory system)

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statements : **Prevention:**
P234 Keep only in original container.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

CAS-No.	Chemical name	Weight percent
1310-73-2	Sodium hydroxide	20 - 30

Actual concentration is withheld as a trade secret
Any Concentration shown as a range is due to batch variation.

Synonyms : Sodium Hydroxide**,**

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact	:	Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist. Take victim immediately to hospital.
If swallowed	:	Keep respiratory tract clear. Do not induce vomiting without medical advice. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	No hazardous combustion products are known
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for	:	Neutralise with acid.

containment and cleaning up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	Do not breathe vapours/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. To avoid spills during handling keep bottle on a metal tray. Dispose of rinse water in accordance with local and national regulations.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.
Recommended storage temperature	:	> 10 °C

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1310-73-2	Sodium hydroxide	C	2 mg/m3	ACGIH
		C	2 mg/m3	NIOSH REL
		TWA	2 mg/m3	OSHA Z-1
		C	2 mg/m3	OSHA P0
		C	2 mg/m3	CAL PEL

Personal protective equipment

Respiratory protection	:	General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Remarks	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	colourless
Odour	:	odourless
Odour Threshold	:	No data available
pH	:	14 @ 20 - 25 °C (68 - 77 °F)
Freezing Point (Freezing Point)	:	-18 °C (-0.40 °F)
Boiling Point	:	No data available
Flash point	:	94 °C (201 °F) No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	1.27 - 1.28 @ 20 - 25 °C (68 - 77 °F) Reference substance: (water = 1)
Density	:	No data available
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No decomposition if stored and applied as directed.
Conditions to avoid	:	Keep away from heat, flame, sparks and other ignition sources.
Incompatible materials	:	Acids Halogenated compounds Metals organic nitro compounds Zinc

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : Acute toxicity estimate: 1,961 mg/kg

Skin corrosion/irritation

Product:

Result: Causes burns.

Components:

1310-73-2:
Species: Rabbit
Result: Causes severe burns.

Serious eye damage/eye irritation

Components:

1310-73-2:
Species: Rabbit
Result: Risk of serious damage to eyes.

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

STOT - single exposure

Product:

Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

1310-73-2:

Toxicity to fish	:	LC50 (Gambusia affinis (Mosquito fish)): 125 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Ceriodaphnia dubia): 40.38 mg/l Exposure time: 48 h Test Type: Immobilization

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with all applicable local, state and federal regulations.
For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-637-7922

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

DOT (Department of Transportation):
UN1824, Sodium hydroxide solution, 8, II

IATA (International Air Transport Association):
UN1824, Sodium hydroxide solution, 8, II

IMDG (International Maritime Dangerous Goods):
UN1824, SODIUM HYDROXIDE SOLUTION, 8, II, Flash Point:94 °C(201 °F)

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Sodium hydroxide	1310-73-2	1000	3921

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Corrosive to metals
Skin corrosion or irritation
Serious eye damage or eye irritation
Acute toxicity (any route of exposure)
Specific target organ toxicity (single or repeated exposure)

SARA 302 : This material does not contain any components with a section 302 EHS TPQ.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

1310-73-2 Sodium hydroxide

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

1310-73-2 Sodium hydroxide

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

Massachusetts Right To Know

1310-73-2 Sodium hydroxide

Pennsylvania Right To Know

7732-18-5 Water

1310-73-2 Sodium hydroxide

California Prop 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

DSL : All components of this product are on the Canadian DSL

AICS : Not in compliance with the inventory

NZIoC : Not in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

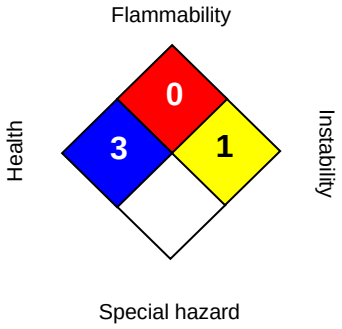
PICCS : On the inventory, or in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

None known.

SECTION16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	3
FLAMMABILITY	0
PHYSICAL HAZARD	4

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

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Revision Date : 03/27/2025

Material number:
16224415, 16221451, 16221450, 16221449, 16221448, 16221447, 16221446, 16217001, 16214886, 16214622, 16214617, 16214616, 16214613, 16215333, 16212546, 16212036, 16209256, 16197210, 16206616, 16206171, 16181533, 16192173, 16192016, 16132255, 16158399, 16146684, 16182270, 16148128, 16162026, 16188797, 16145004, 16188640, 16163721, 16162553, 16147855, 16151729, 16147016, 16002081, 16002153, 16163814, 16181444, 16185708, 16185366, 16178437, 16176600, 16176259, 16175654, 16175444, 16175415, 16174721, 16176744, 16170086, 16169860, 16169683, 16146335, 16146334, 16143884, 16145401, 16145323, 16145278, 16145243, 16145242, 16125921, 16116103, 16113730, 755848, 650799, 546389, 70561, 53072, 574261, 53570, 16150734, 16149350, 16149457, 16144981, 16145777, 16147137, 16163653, 102698, 16160832, 16137556, 16137474, 16137324, 16152197, 16152426, 16144481, 16147885, 16159715, 16143521, 16160487, 16160771, 16160572, 16160486, 16147888, 16147884, 16147854, 16147799, 16148872, 16144724

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AIIC	Australian Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health

CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

SECTION 1 – Identification of the Substance

1.1 Substance Identification

Substance:	Dialuminum Chloride Pentahydroxide
Trade Name:	WC 500
Synonyms:	Aluminum Chlorohydrate
CAS No:	12042-91-0
EC number:	234-933-1

1.2 Uses of the Substance
This material is used as a water treatment coagulant.

1.3 Details of the Supplier
Supplier: ADEGA Chemical
Address: 25411 NE 53rd Street, Vancouver, Washington 98682; USA
Telephone: 1 949-275-7208 Fax: 1 360-883-4471

1.4 Emergency Telephone Number - 1 800 824 9300

PRODUCT AND TECHNICAL INFORMATION NUMBER: (949) 275-7208

Proper Shipping Name	(49CFR 172.101):	None
D.O.T. Hazard Name	(49CFR 172.101):	None
D.O.T. ID Number	(49CFR 172.101):	None
D.O.T. Hazard Class	(49CFR 172.101):	None
RCRA Hazard Class	(40CFR 261) (IF DISCARDED):	None
E.P.A. Priority Pollutants	(40 CFR 122.53):	None

U.S. NFPA: Health: 2; Flammability: 0; Reactivity: 0
US HMIS: Health Hazard: 2; Fire Hazard: 0; Physical Hazard: 0; Personal Protection: B

Generic Description: contains water soluble Dialuminum Chloride Pentahydroxide (Aluminum Chlorohydrate) in a 50 % w/w solution in water

SECTION 2 – HAZARDS IDENTIFACATION HAZARDOUS INGREDIENTS AS DEFINED IN 29 CFR 1910 1200

2.1 Classification: Not Regulated, No Hazard

2.3 Label Elements: Not Regulated, No Hazard

2.1 Other Hazards: Not Regulated, No Hazard

SECTION 3 – Composition/Information of Ingredients

3.1 Substances

Main Constituent:	Dialuminum Chloride Pentahydroxide
CAS No:	12042-91-0
EC number:	234-933-1
Purity	50% w/w
Synonyms:	Aluminum Chlorohydrate
Other Constituent:	Water (CAS no 7732-18-5, EC no 231-791-2) ~50% w/w
Impurities:	None
Additives:	None

3.2 Hazard Ingredients None

3.3 Additional Information None

SECTION 4 – First Aid Measures

4.1 General Information: Immediate medical attention is not necessary.

4.2 In Case Of Inhalation: Supply fresh air. Rinse mouth and nose with water. Contact a physician.

4.3 In Case Of Skin Contact: Rinse with water. If symptoms persist, call a physician.

4.4 In Case Of Eye Contact: Rinse with plenty of lukewarm water, also under the eyelids. If symptoms persist, call a physician.

4.5 In Case Of Ingestion: Do NOT induce vomiting. Rinse mouth with water. Drink 1 or 2 glasses of water or milk. If symptoms persist, call a physician. Never give anything by mouth to an unconscious person.

4.6 Self Protect of First Aider: Direct contact with the product should be prevented or minimized. Wear gloves in a suitable material such as PVC, Neoprene or Natural rubber.

4.7 Information to Physician:

Symptoms:

If Inhaled:	May cause mucous membrane irritation with cough and rhinitis.
If On Skin:	May cause mild irritation dryness and dermatitis.
If In Eyes:	May cause redness, conjunctivitis and short term mild irritation.
If Swallowed:	May cause burning pain in mouth and throat.

Hazards: See Section 4.6

Treatment: See Sections 4.2 – 4.5

SECTION 5 – Fire Fighting Measures

5.1 Suitable extinguishing media:

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Extinguishing Media Which Must Not Be Used for Safety Reasons:

None.

5.3 Special Exposure Hazards Arising from the Substance Itself, Combustion Products, Resulting Gases:

Hydrogen chloride may be released when heating above the decomposition temperature.

5.4 Special Protective Equipment for Fire Fighters:

In the event of fire, wear self-contained breathing apparatus. Fire fighters must wear fire resistant personnel protective equipment

5.5 Additional Information

None

SECTION 6 – Accidental Release Measures

6.1 Personal Precautions: Refer to protective measures listed in section "Section 7. Handling and Storage". Wear protective suit and boots. If aerosols or mist are formed, use half mask with combination filter B/P2.

6.2 Environmental Precautions: Cover the drains to prevent the product from entering the environment. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods for Cleaning Up: Contain spills in dyke or use absorptive barriers. Remove larger spills using a vacuum truck. Must be disposed of in accordance with local and national regulations.

6.4 Additional Information: Product is water-soluble and compatible with water treatment plants. Product reacts with soaps forming a hydroxide gel.

SECTION 7 – Handling and Storage

7.1 Handling: The work place and work methods shall be organized in such a way that direct contact with the product is prevented or minimized.

Protective Measures: Wear gloves in a suitable material such as PVC, Neoprene or Natural rubber. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also consider the specific local conditions under which the product is used, such as the danger of cuts, abrasion and the contact time. Tightly fitted safety goggles must be worn. Skin should be covered by clothing at a minimum; avoid excessive skin contact.

Prevention of Aerosol and Dust Generation:
Material should be transferred in ways that do not create mists or aerosols.

7.2 Storage: Product should be stored in dry conditions above freezing and below high temperatures (not >60°C).

Technical Measures to Prevent Exposure: Avoid incompatible materials including non acid-proof metals such as aluminum, copper and iron, bases, unalloyed steel and galvanized surfaces.

Packaging Materials: Plastic (PE, PP, PVC), fiberglass-reinforced polyester, epoxy-coated concrete and titanium. High density PE is recommended.

7.3 Specific End Use: This product is intended to be used as a water treatment coagulant. When used in this application, the product should be handled as described above to minimize worker exposure to lungs, eyes, and skin.

SECTION 8 – Exposure Controls/Personal Protection

8.1 Exposure Limit Values: Occupational exposure limit is 2mg/m3 as Aluminum for soluble Aluminum compounds (OSHA TLV-TLW, ACGIH TLV-TLW, EH40, EU OEL, AGW).

8.2 Exposure Controls:

8.2.1 Occupational Exposure Controls

Technical Measures to Prevent Exposure: Material transfer should be done under conditions of local exhaust ventilation to avoid breathing mist.

Personal Protective Equipment

Respiratory Protection:	Dust mask. In absence of local exhaust ventilation, approved respirators are recommended.
Hand Protection:	Wear gloves in a suitable material such as PVC, Neoprene or Natural rubber.
Eye Protection:	Tightly fitting safety goggles must be worn.
Skin Protection:	Skin should be covered by clothing at a minimum. Avoid excessive skin contact.

SECTION 9 – Physical and Chemical Properties

9.1 Appearance

Physical State: Solution Color: white to light yellow Odor: slight, characteristic

9.2 Safety Relevant Basic Data

pH (20 °C):	Approximately 4 in a 15% aqueous solution.
Melting point/range (°C):	Not applicable.
Boiling point/range (°C):	110 – 115°C.
Flash point (°C):	None, product is not flammable.
Ignition temperature (°C):	None, product is not flammable.
Vapor Pressure (kPa):	2.3 kPa
Density (g/cm3):	1.33 – 1.35 g/cm3
Water Solubility (20 °C in g/l):	Fully soluble
Viscosity, dynamic (mPa s):	10 mPa s

SECTION 10 – Stability and Reactivity

10.1 Conditions to Avoid: Excessive heating after water evaporation for long periods of time can result in the evolution of HCl.

10.2 Materials to Avoid: Will react with caustics to form aluminum hydroxides. Can corrode ordinary grades of steel.

10.3 Hazardous Decomposition Products: HCl can be evolved during high temperature heating for extended periods of time.

SECTION 11 – Toxicological Information

Product is not classified under either the Dangerous Substance Directive or GHS/CLP Regulation.

11.1 Acute toxicity

Oral: Not classified. Rat ingestion study, OECD 401, LD_{50} (rat) indicates > 2000 mg/kg.
Dermal: Not classified. Rat dermal toxicity test, OECD 402, LD_{50} (rat) >2000 mg/kg body weight.
Inhalative:

Irritant or Corrosive Effects

Primary Irritation to Skin: Not classified. Negative results rabbit skin, OECD 404.
Irritation to Eyes: Not classified. Negative results rabbit eye, OECD 405.

Sensitization

Not classified. Negative result for Aluminum Hydroxy Chloride, CAS 1327-41-9, read across.

Specific Target Organ Toxicity (STOT)

Not classified. No STOT identified in animal studies. Human effects related to systemic toxicity.

Repeated Dose Toxicity

Not classified. Read across from chronic (1 year) toxicity study (oral, rat) with Al Citrate, OECD 426 and OECD 452. Read across from short term repeat dose toxicity study (rat) with Aluminum Hydroxy Chloride, CAS 1327-41-9.

Carcinogenicity - Not classified. No studies; none expected.

Mutagenicity/Genotoxicity - Not classified. Negative results for in-vitro mutagenicity testing.

Toxicity for Reproduction

Not classified. Read across from Aluminum Hydroxy Chloride reproductive / developmental toxicity screening test. NOAEL 1000 mg/kg/day (equivalent to 90 mg/kg bw/day Al^{3+}) and Aluminum Citrate one year developmental and chronic neurotoxicity study (oral, rat).

SECTION 12 – Ecological Information

12.1 Ecotoxicity

Not classified. Zebra fish LC_{50} (96h) 100 – 500 mg/l (OECD 203),
Daphnia Magna EC_{50} (48h) 397mg/l, EC_{50} (bactéria) > 1000 mg/l Fermentation tube test.

12.2 Mobility - Not classified based on rapid hydrolysis and precipitation.

12.3 Persistence and Degradability- Inorganic product, not degradable. Cannot be eliminated from water by biological purification processes.

12.4 Results of PBT Assessment - Substance is not toxic.

SECTION 13 – Disposal Considerations

13.1 Appropriate Disposal / Product: Must be disposed of in accordance with local and national regulations.

13.2 Waste Codes / Waste Designations According to EWC/AVV/U.S. EPA:

Not applicable; material is not a hazardous waste.

13.3 Appropriate Packaging:

Follow recommendations according to method of disposal and specific disposal facility.

13.4 Additional Information:

None.

SECTION 14 – Transport Information

14.1 Land transport (ADR/RID and GGVS/GGVE) Not restricted.
This is not a hazardous material for transportation as defined by USA Dept. of Transportation.
14.2 Maritime transport (IMDG-Code/GGVSea) Not restricted. Not a marine pollutant.
14.3 Air transport (ICAO-TI and IATA/DGR) Not restricted.

SECTION 15 – Regulatory Information

15.1 EU Regulations Not classified.
Restrictions on Use: Maximum use in drinking water 250 mg/L.
15.2 National Regulations
Germany: Wassergefahrdungsklasse (water hazard class): not a hazard.

United States Maximum use in drinking water 250 mg/L
U.S.A. HMIS: Health Hazard: 2 Fire Hazard: 0 Physical Hazard: 0 Personal Protection: B
U.S.A. NFPA: Health: 2 Fire: 0 Reactivity: 0

Other Countries
This product is regulated in Japan and Korea.

SECTION 16 – Other Information

NSF – Certified to NSF/ANSI Standard 60 - Maximum use in drinking water 250 mg/L
New SDS edition: October 10, 2022
Previous edition: September 10, 2021
Changes from previous issue date are due to: the only changes were to update the Edition Date.

Abbreviation	Definition
<	less than
>	greater than
%	percent
°C	degree Centigrade
ACGIH	American Conference of Governmental Industrial Hygienists,
Al:	Aluminum
Al^{3+}	aluminum trivalent cation
AVV	Abfallverzeichnis-Verordnung
B/P2	breathing, non-toxic particle filter
BOD:	Biochemical Oxygen Demand
bw	body weight
CAS:	Chemical Abstracts Service
CLP:	Classification, labeling and packaging
cm^3	cubic centimeter
DGR	Dangerous Goods Regulations

Abbreviation	Definition
DSL	Dangerous Substances List
EC Number or (ECN)	European Community Number
EC_{50}	Concentration causing 50% of the maximum response
EH40:	UK Environmental Health occupational exposure limits
e-mail	electronic mail address
EmS	Emergency Schedule
ERG	Emergency Response Guidebook
EST/EDT	Eastern Standard Time/Eastern Daylight Savings Time
EWC	European Waste Council
FAX	facsimile number
FDA	Food and Drug Administration (USA)
g	gram
GGVS	Regulation of hazardous transportation for Germany
GHS:	Globally Harmonized System
h	hour
HCl	hydrogen chloride
HMIS	hazardous material information system
IATA	International Air Transport Association
ICAO-TI	International Civil Aviation Organization Technical Instructions
IMDG	International Maritime Dangerous Goods
kg	kilogram
l	liter
LC_{50}	50% lethal concentration
LD_{50}	50% lethal dose
m_3	cubic meter
mg	milligram
mPa	millipascal
No.	number
N.O.S:	Not otherwise specified
NFPA	National Fire Protection Association
NOAEL	no observable adverse effect level
OECD	Organization for Economic Co-Operation and Development
OSHA:	Occupational Safety and Health Administration
OTC	Over the Counter
PBT:	Persistent, Bioaccumulative and Toxic
PE	polyethylene
pH	log hydrogen ion concentration (acid-base scale)
PO	Post Office
PP	polypropylene
PPE	Personal Protective Equipment
PVC	polyvinyl chloride
RCRA	Resource Conservation & Recovery Act
REACH	**R**egistration, **E**valuation, **A**uthorization and Restriction of **Ch**emical substances
(M)SDS:	(Material) Safety Data Sheet
s	second
STOT	Specific target organ toxicity
TLV-TWA:	Threshold Limit Value – Time-Weighted Average
w/w:	weight by weight

GWTT
Ground / Water Treatment & Technology

627 Mt. Hope Road
Wharton, New Jersey 07885
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October 20, 2025

Inventum Engineering
Site Location: 3875 River Road, Tonawanda, NY
Riverview Innovation and Technology Campus, Inc (RITC)
Treatability Report

Attention: James Edwards
GWTT Ref: Job #4208

Dear Mr. Edwards:

Ground/Water Treatment & Technology, LLC (GWTT) conducted a bench scale test on representative groundwater from the Riverview Innovation & Technology Campus, Inc. (RITC) in Tonawanda, NY (Project Site) to determine unit operations required to meet effluent discharge requirements for the proposed groundwater treatment system. Various unit operations were tested to confirm sampling results for the reduction of Total Metals, Oil and Grease, Volatile and Semi-Volatile Organic Compounds (VOCs/SVOCs) and other contaminants of concern identified during sample characterization.

Sample Collection and Compositing

Samples were received by GWTT from the site on August 6, 2024. These samples were from the five groundwater collections sumps on-site which will closely resemble representative source waters to the treatment system. An additional sample of the Battery Sump source was collected to represent a location a groundwater treatment sump to be installed in the future. Each of the individual sources were sampled in separate 1-gallon cubitainers.

Photo 1: Individual Subsamples of Source Water Sumps

Two gallons of each sample location were collected, and GWTT created a composited 1-gallon representative influent sample for analytical analyses. This representative sample was analyzed by Alpha Analytical (now Pace) for the following analytes:

- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Pesticides
- Target Analyte List (TAL) Metals

- Cyanide - (Total Cyanide, Free Cyanide, Cyanide Amenable to Chlorination)
- Nitrogen, Ammonia

Influent sample characterization results can be found in Appendix A. The influent characterization was based upon the current site SWPP conditions for discharge and the data has since been reviewed against the Permit Equivalent values. Specific organic compounds were analyzed during influent characterization in order to understand organic loading in the system. Sample results were compared to the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Permit Equivalent effluent criteria. The following contaminants of concern were above the discharge criteria as shown in Table 1.

Sample ID	INF	*Qualifier (Q)*	Units	Discharge Criteria	
Sample Date	8/9/2024				
Sample Time	12:20			Monthly	Daily Maximum
Benzene	27		µg/L	40	5
2,4-Dimethylphenol	6.6		µg/L	Monitor	5
Phenol	58		µg/L	Monitor	5
Mercury, Total	14.39		µg/L	Monitor	3.5
Ammonia/ammonium	48.9		mg/L	Monitor	10
Cyanide, Total	1.01		mg/L	Monitor	1
Iron, Total	24,500		µg/L	Monitor	1,500
Manganese, Total	1,749		µg/L	Monitor	1,500

Table 1: Influent Source Water Characterization Discharge Exceedances

Preliminary Process Design

GWTT developed a preliminary process design for the proposed treatment system based upon the SPDES Permit Equivalent surface water discharge criteria provide by the NYSDEC and the influent and effluent data from the temporary treatment system which has been operating at the project site since March of 2022. The intent of the proposed process design is to address the treatment of various contaminants of concern, which were to be confirmed during treatability testing. The initial treatability testing was performed using site specific SWPPP Targets which were revised following the treatability study with the introduction of the NYSDEC Permit Equivalent values.

The treatment system process was developed with the specific unit operations below, each targeting a specific contaminant(s) of concern for treatment:

a. Oil Water Separator (OWS) – Light Non-Aqueous Phase Liquid (LNAPL) and Dense Non-Aqueous Phase Liquid (DNAPL)

b. Chemical Mix Tank (Acid, Caustic and Sodium Hypochlorite) – Metals Precipitation, Cyanide and Ammonia Reduction

c. Chemical Precipitation – Total Suspended Solids, Total Metals, Total Cyanide

d. Membrane Bioreactor – Ammonia, VOCs and SVOCs

e. Granular Activated Carbon (GAC) – Dissolved Hydrocarbons, SVOCs and VOCs

Treatability Testing Sequence of Operations

Oil Water Separator (OWS)

The first unit operation used to treat the representative bulk influent sample was to simulate an OWS. The bulk sample was composited and then the water was decanted from the middle of the composite to produce a treated sample of approximately 5-gallons (of the 6-gallons total) to ensure there was no free phase Light Non-aqueous Phase Liquid (LNAPL (sheen) or Dense Non-aqueous Phase Liquid (DNAPL) remaining in the sample for subsequent unit operations. The OWS treated sample was collected and set aside to perform other unit operations testing. A slight sheen was observed during influent compositing which resulted in an Oil and Grease number of 4.8 mg/L, which is below the Permit Equivalent discharge concentration of 15 mg/L Daily Maximum.

Chemical Oxidation and Precipitation

The next unit operation to be tested was for the reduction of metals, suspended solids, cyanide and ammonia in the waste stream, through the process of pH adjustment and oxidation. One-liter (1L) subsamples of the OWS treated water were collected and then placed in the standard jar testing apparatus, to simulate proper mixing. Various subsamples were generated and tested at varying chemical setpoints and the following subsamples were further analyzed for contaminants of concern identified in the effluent discharge requirements. The subsamples selected were a selection of the lowest turbidity samples that were generated from different dosing rates and chemical selection, as shown below in Table 2:

Sample ID	INF		JAR 2		JAR 6		JAR 7		JAR 10		JAR 11
Sample Date	8/9/2024	Q	8/23/2024	Q	8/23/2024	Q	8/23/2024	Q	8/23/2024	Q	8/23/2024
Sample Time	12:20		14:00		14:05		14:10		14:15		14:20
pH (Initial)	9.26		--		8.81		--		8.81		--
pH (adjusted)	--		7.4		--		10.00		--		10.00
NaOCl (12.5%) mL			--		--		--		--		--
WC-500 (50%) mL			--		--		--		0.1		0.1
FeCl3 (38%) mL			0.05		0.1		0.1		--		--
AP-210 (0.2%) mL			1		0.5		0.5		0.5		0.5
pH (Final)			7.63		7.92		9.43		8.62		9.85

Table 2: Jar Testing Chemical Selection and Dosing

These samples were precipitated, settled and the supernatant was run through 5-micron filtration to simulate mechanical filtration required as pretreatment prior to subsequent unit operations. The results, shown in Table 3, show a reduction of Total Metals below discharge criteria for all samples tested.

Sample ID	INF	Qualifier	JAR 2	Qualifier	JAR 6	Qualifier	JAR 7	Qualifier	JAR 10	Qualifier	JAR 11	Qualifier	Units	Discharge Criteria	
Sample Date	8/9/2024	(Q)	8/23/2024	(Q)	8/23/2024	(Q)	8/23/2024	(Q)	8/23/2024	(Q)	8/23/2024	(Q)			
Sample Time	12:20		14:00		14:05		14:10		14:15		14:20			Monthly Average	Daily Maximum
Iron, Total	24.5		0.366		0.312		0.291		0.143		0.23		mg/L	Monitor	1.500
Magnesium, Total	34.0		18.6		17.2		16.7		17.1		15.2		mg/L	Monitor	175
Manganese, Total	1.749		0.1708		0.06404		0.00748		0.01267		0.00745		mg/L	Monitor	1.500
Mercury, Total	0.01439		ND	*0.00009*	ND	*0.00009*	ND	*0.00009*	ND	*0.00009*	ND	*0.00009*	mg/L	Monitor	0.0035
Cyanide, Total	1.01		0.534		0.453		0.436		0.271		0.353		mg/L	Monitor	1
Nitrogen, Ammonia	48.9		44.5				38.8		42		42.0		mg/L	Monitor	10

Table 3: Jar Testing Results for Various Contaminants of Concern

Based on the results of the jar testing sampling the most effective subsample collected and analyzed from the precipitation unit operation came from the Jar #10 supernatant. The supernatant sample was generated using the following parameters:

- Chemical Pretreatment
    - Adjust pH to ~8.8 s.u. using Sulfuric Acid (as required)
- Chemical Precipitation
    - Coagulant – 0.1 mL/L of WC-500 (Aluminum Chlorohydrate @ 50%)
    - Flocculent – 0.5 mL/L of AP-210 (0.2% solution strength)

Supplemental Testing

Oxidation for Ammonia

Treatability testing of representative source waters from the temporary system installed at the project site which was performed in 2021 using similar methodologies for reducing Ammonia. The elevated concentrations were not reduced using the oxidation pretreatment step; however, the concentrations were much higher in the initial testing performed in 2021 than that of the water collected for this study. As such, further oxidation testing was performed during this study to determine if this change in water quality would allow for oxidation of Ammonia.

Effluent supernatant results from Jar #10 showed that while all metals were below discharge criteria, Total Ammonia (~14% reduction) was still above the Permit Equivalent discharge criteria. Further testing of pretreatment of the chemical precipitation/clarification unit operation was performed on the composited OWS effluent to determine if using sodium hypochlorite as an oxidizing agent would increase the reduction of Ammonia in the supernatant of the individual jar test samples.

Sample ID	INF-2		OXY-1		OXY-2		OXY-3		OXY-4
Sample Date	11/7/2024	Q	11/7/2024	Q	11/7/2024	Q	11/7/2024	Q	11/7/2024
Sample Time	12:30		13:30		13:45		14:45		15:00
pH (Initial)	9.3		9.3		9.3		9.3		9.3
pH (adjusted)	8.8		8.82		8.85		8.82		8.88
NaOCl (12.5%) mL			0.1		0.25		0.1		0.25
WC-500 (50%) mL			0.1		0.1		--		--
FeCl3 (38%) mL			--		--		0.1		0.1
AP-210 (0.2%) mL			0.6		0.6		0.6		0.6
pH (Final)			8.42		8.44		7.87		7.95

Table 4: Oxidation Jar Testing Chemical Dosing Volumes

Total Ammonia was the only contaminant of concern that was elevated above Permit Equivalent discharge criteria in the jar testing supernatant for this round of supplemental testing. New representative source water was generated from the sump samples collected during the initial treatability testing source water collection; however, the battery sump was not included in this influent sample (labelled INF-2 in the below Table 5)

Sample ID	INF-2		OXY-1		OXY-2		OXY-3		OXY-4		Units	Discharge Criteria	
Sample Date	11/7/2024	Q	11/7/2024	Q	11/7/2024	Q	11/7/2024	Q	11/7/2024	Q			
mple Time	12:30		13:30		13:45		14:45		15:00			Monthly Average	Daily Maximum
Cyanide, Total	0.759		0.459		0.400		0.385		0.530		mg/L	Monitor	1
Nitrogen, Ammonia	31.6		31.5		30.1		30.4		32.2		mg/L	Monitor	10

Table 5: Total Cyanide and Ammonia Concentrations from Oxidation Testing

Sample results shown in Table 5 showed that the influent concentration of Ammonia was approximately 25% less than the initial influent characterization composite including the Battery Sump. The oxidation testing results did not show an increase in the reduction of Ammonia from the influent concentration. Based upon the sample results of the supplemental testing, using oxidation as a pretreatment step for the reduction of Total Ammonia is not effective. In the permanent system, however, an oxidant can be dosed (as needed) if needed to oxidize Iron or other dissolved metals prior to coagulation/flocculation.

Membrane Bioreactor Characterization for Ammonia Reduction

Further research on the best available technologies to treat Ammonia in groundwater streams provided additional unit operations which can be utilized to reduce Ammonia. Of the available technologies, the following unit operations were studied:

1. Breakpoint Chlorination – dosing enough oxidant (Sodium Hypochlorite) to convert Ammonia into Chloramines, followed by an additional oxidant dosage to reduce any Chloramines formed and convert them to Nitrogen gas, which would create a Free Chlorine (FC) residual.

$$NH_4^+ + 1.5HOCl = 0.5N_2 + 1.5H_2O + 2.5H^+ + 1.5Cl^-$$

Based upon the influent concentration of ammonia (~42 mg/L) and other background chemistry which consumes hypochlorite as it is being dosed (as evident in previous treatability of the temporary treatment system), the use of breakpoint chlorination would consume an excessive amount of 12.5% sodium hypochlorite and would not make economic sense to implement full-scale. Additionally, health and safety considerations would need to be developed for storing and consuming the theoretical amount of oxidant required to oxidize the ammonia.

2. Air Stripping – Air stripping using a packed column tower is another way to reduce low levels of ammonia in source waters containing Ammonia. An oversized blower will increase the air to water (A:W) ratio of the source water at an elevated pH (~11.5 s.u.) and strip out the Ammonia in the basic source water. Again, economically this would be cost prohibitive based upon the influent concentration of Ammonia and the size of the blower required to meet the A:W ratio. Additionally, the pack tower height plays an important role in the design criteria for an air stripper for ammonia reduction, which also would preclude using air stripping as an effective unit operation for Ammonia reduction. In addition to this, using air stripping to reduce ammonia would also trigger the need for air permitting if the VOC concentration of the source waters exceed certain criteria.

3. Membrane Bioreactor (MBR) – using biological methods to reduce Ammonia and other organics in the clarified supernatant is another method for reducing Ammonia in the impacted source waters. Based upon conversations with our technology partner who designs MBR systems for the reduction of organics and Ammonia, further influent characterization would be required to determine what pretreatment (if any) is required to ensure optimization of the MBR unit operation for Ammonia reduction. The results in the below Table 6 were parameters selected by the MBR vendor to identify any gaps in the impacted source water and to determine if the MBR unit operation would be successful in meeting the Ammonia effluent discharge requirements.

Sample ID	INFLUENT	*Qualifier (Q)*	Units	EFFLUENT
Sample Date	10/23/2024			DISCHARGE
Sample Time	14:00			REQUIREMENTS
Phosphorus, Orthophosphate	0.002	J	mg/L	
Chemical Oxygen Demand	480		mg/L	
COD, Soluble	93		mg/L	
BOD, 5 day	32		mg/L	
Total Organic Carbon	21		mg/L	
Dissolved Organic Carbon	21		mg/L	

Table 6: MBR Specific Influent Characterization for Preliminary Design

Table 6 shows that in addition to the ~42 mg/L of Ammonia identified in the characterization sample from August 2024, virtually no Phosphorus is present in the influent sample. The Biochemical Oxygen Demand

(BOD) concentration at 32 mg/L is too low to maintain nitrification of Ammonia and reduction of other organic compounds so a carbon source would need to be included in the final design of the MBR system to ensure the biomass will be viable and grow/reduce the contaminants of concern. Due to the nitrification process creating a drop in the alkalinity of the source water, caustic will need to be added to ensure bioreactor pH is maintained at a near neutral level (~7.5) to optimize the reduction of Ammonia. After further discussion with the MBR vendor and inquiring if MBR biological systems could be replicated on a smaller scale, it was determined that the biomass would not be representative of what will be present in the full-scale system using representative source water influent from the project site.

Influent Characterization of PFAS Compounds

Further influent sampling was performed during the initial influent characterization to achieve the following:

1. Characterize the influent concentration of PFOS and PFOA to determine if the Permit Equivalent effluent discharge requirements would be met without treatment.
    a. Perfluorooctanoic Acid (PFOA) has a effluent limit of 21 ng/L.
    b. Perfluorooctanesulfonic Acid (PFOS) has an effluent limit of 7.9 ng/L

2. Collect background chemistry data to assist in developing usage rates for PFAS media.

3. Determine if further treatment of background chemistry (specifically Total Organic Carbon or TOC) is needed to prolong the lifespan of the Granular Activated Carbon (GAC) proposed to polish residual PFAS concentrations.

Table 7 shows the concentrations of various anionic constituents which may consume some of the capacity of PFAS specific media as well as TOC concentrations to see if premature organic fouling might occur in the GAC vessels

Sample ID		INF	*Qualifier (Q)*	Units	Discharge Criteria	
Sample Date		8/9/2024				
Sample Time		12:15			Monthly Average	Daily Maximum
Perfluorooctanoic Acid (PFOA)		8.96	J	***ng/L***	Monitor	21
Perfluorooctanesulfonic Acid (PFOS)		6.38	J	***ng/L***	Monitor	7.9
Alkalinity, Total		1010		mg CaCO3/L		
Chloride		240		mg/L		
Nitrogen, Nitrate		2.20		mg/L		
Sulfate		360		mg/L		
Total Organic Carbon		36		mg/L		

Table 7: Influent Characterization of PFAS and Other General Chemistry Contaminants of Concern

Based upon the results in Table 7, adsorptive capacity will be diminished in any PFAS specific Ion Exchange (IX) resins due to high Sulfate values, however the PFAS compounds in question are low part per trillion (ppt) level. Therefore GAC treatment would be sufficient as the sole PFAS treatment unit operation. The TOC concentrations were collected in the Raw Influent characterization, therefore systemic reduction of the TOC through chemical precipitation and biological reduction was not studied but would be presumed based upon both methods of treatment. Due to the low concentrations of BOD/COD in the influent, the TOC would be assumed to be reduced during biological treatment, the unit operation prior to the GAC adsorption.

System Design

Based on treatability studies performed to date and data provided to GWTT, the raw water is expected to contain low levels of Non-Aqueous Phase Liquid (NAPL), Total Suspended Solids (TSS), Volatile and Semi-Volatile Organic Compounds (VOC /SVOC), as well as elevated concentrations of Total Cyanide, Ammonia and Total Metals which may require discharge prior to treatment based upon concentrations observed in the treatability testing. Additionally, there were other design conditions based upon treatability testing and vendor discussion of specific unit operations which were considered during the preliminary process design:

1. Ammonia reduction using the Membrane Bioreactor will also reduce organic compounds associated with the Chemical Oxygen Demand (COD) of the source waters. If there are exceedances of specific organic compounds through the MBR unit operation, the Granular Activated Carbon (GAC) will polish any remaining VOC or SVOC compound prior to discharge.
2. The ppt effluent requirement for PFAS compounds will require the ability of the system to polish low level concentrations of both PFOS and PFOA if the concentrations increase from the influent characterization performed during the treatability testing. Currently the treatability testing shows influent PFOA and PFOS concentrations to be below the Permit Equivalent discharge criteria as seen in Table 7
3. The chemical oxidation unit operation has been included in the final design and can be utilized to oxidize water for either cyanide oxidation or metals oxidation, depending on the real-time measurement of Oxidation Reduction Potential (ORP) in the chemical mix tank. Oxidation of free cyanide will not occur since influent characterization determined a minimal amount is characterized as free cyanide.

GWTT's final system design for discharge incorporates multiple unit operations for reducing the contaminants of concern in the impacted source waters. The following unit operations are included to meet or exceed permitted discharge limitations:

1. Influent Equalization *(by others) – bulk settling of TSS*
2. Oil/Water Separator – NAPL and organics (passive treatment)

3. Chemical Mix Tank – based upon influent conditions, *(mix tank to be provided, but chemical dosing pumps and chemicals/storage to be mobilized only if required)*
    a. *The pH of the impacted source waters can be adjusted to an optimal precipitation setpoint using either acid or caustic, based upon pH setpoint in the chemical mix tank*
    b. *Oxidation of dissolved metals, cyanide can be achieved (if necessary) using an oxidant based upon the ORP of the influent source water*
4. Chemical precipitation and clarification – TSS and Precipitated Metals
5. The addition of a coagulant and flocculant (polymer) will reduce the TSS and metals associated in the particulate fraction, as well as the dissolved metals that were precipitated in the chemical mix tank.
6. Solids Thickening and Dewatering – Disposal by others
7. Ultrafiltration Membrane Bioreactor – reduction of Ammonia, Biochemical/Chemical Oxygen Demand (BOD/COD) and organic compounds (VOC/SVOCs)
8. Granular Activated Carbon (GAC) – dissolved NAPL, dissolved mercury, VOC/SVOCs, PFOA and PFOS (as necessary)
9. Effluent Equalization and Discharge – Holding tank for backwash
10. Backwash Return – Holding tank for backwash waters and decant from the Solids Thickening and Dewatering System

Based on the raw water provided for treatability testing, GWTT's design assumes that most of the metals present in the raw water stream are associated with the TSS and can be removed by gravity settling, coagulation/flocculation/clarification. Effluent polishing of the MBR effluent for any dissolved organics and PFAs compounds will be installed if there is elevated concentrations of these compounds that may enter the system during treatment plant operations.

Please feel free to contact me at **973-983-0901** or at rorlando@gwttllc.com if you have any questions or if you require any additional information.

Regards,

Rob Orlando, P.E.

Principal Engineer

Ground/Water Treatment & Technology, LLC

Appendix A: Influent Characterization Summary Table and Results

Sample ID Sample Date Sample Time	INF 8/9/2024 12:20	*Qualifier (Q)*	Units	Discharge Criteria Monthly Average	 Daily Maximum
Flow	NS		MGD	Monitor	100
pH	8.81		SU	Monitor	9
Oil and Grease	4.8		mg/L	Monitor	15
Biochemical Oxygen Demand 5-day (BOD5)	32		mg/L	Monitor	Monitor
Total Dissolved Solids (TDS)	NS		mg/L	Monitor	1,000
Total Suspended Solids (TSS)	NS		mg/L	20	40
Benzene	27		µg/L	40	5
Ethlybenzene	ND	***0.70***	µg/L	40	25
Methylene Chloride	NS		µg/L	Monitor	25
Toluene	1.7	*J*	µg/L	Monitor	25
2,4-Dimethylphenol	6.6		µg/L	Monitor	5
Phenol	58		µg/L	Monitor	5
Naphthalene	2.3		µg/L	40	5
Cadmium, Total	NS		mg/L	Monitor	4
Mercury, Total	14.39		µg/L	Monitor	3.5
Ammonia/ammonium	48.9		mg/L	Monitor	10
Cyanide, Total	1.01		mg/L	Monitor	1
Phenols, Total	NS		µg/L	Monitor	8
1,2,4,5-Tetrachlorobenzene*	NS		µg/L	Monitor	50
Solids, Settleable	NS		-	Monitor	Monitor
Aluminum, Total	NS		µg/L	Monitor	500
Iron, Total	24,500		µg/L	Monitor	1,500
Magnesium, Total	34,000		µg/L	Monitor	175,000
Manganese, Total	1,749		µg/L	Monitor	1,500
Xylene, Ortho- (1,2-)	ND	***0.70***	µg/L	Monitor	25
Xylene, Meta- (1,3-)/Para- (1,4-)	ND	***0.70***	µg/L	Monitor	25
2-Methylphenol; o-Cresol	NS		µg/L	Monitor	Monitor
Perfluorooctanoic Acid (PFOA)	8.96	J	ng/L	Monitor	21
Perfluorooctanesulfonic Acid (PFOS)	6.38	J	ng/L	Monitor	7.9
Perfluorobutanoic Acid (PFBA)	NS		ng/L	Monitor	Monitor
Perfluoropentanoic Acid (PFPeA)	NS		ng/L	Monitor	Monitor
Perfluorohexanoic Acid (PFHxA)	NS		ng/L	Monitor	Monitor
Perfluoroheptanoic Acid (PFHpA)	NS		ng/L	Monitor	Monitor
Perfluoro-nonanoic Acid (PFNA)	NS		ng/L	Monitor	Monitor
Perfluoro-decanoic Acid (PFDA)	NS		ng/L	Monitor	Monitor
Perfluoroundecanoic Acid (PFUnA)	NS		ng/L	Monitor	Monitor
Perfluorododecanoic Acid (PFDoA)	NS		ng/L	Monitor	Monitor
Perfluorotridecanoic Acid (PFTriA)	NS		ng/L	Monitor	Monitor
Perfluorotetradecanoic Acid (PFTeA)	NS		ng/L	Monitor	Monitor
Perfluorobutanesulfonic Acid (PFBS)	NS		ng/L	Monitor	Monitor
Perfluoropentanesulfonic Acid (PFPeS)	NS		ng/L	Monitor	Monitor
Perfluorohexanesulfonic Acid (PFHxS)	NS		ng/L	Monitor	Monitor
Perfluoroheptanesulfonic Acid (PFHpS)	NS		ng/L	Monitor	Monitor
Perfluorononanesulfonic Acid (PFNS)	NS		ng/L	Monitor	Monitor
Perfluorodecanesulfonic Acid (PFDS)	NS		ng/L	Monitor	Monitor

Sample ID Sample Date Sample Time	INF 8/9/2024 12:20	*Qualifier (Q)*	Units	Discharge Criteria Monthly Average	 Daily Maximum
Perfluorododecanesulfonic Acid (PFDoS)	NS		ng/L	Monitor	Monitor
Perfluorooctanesulfonamide (FOSA)	NS		ng/L	Monitor	Monitor
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	NS		ng/L	Monitor	Monitor
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	NS		ng/L	Monitor	Monitor
1H,1H,2H,2H-Fluorotelomer Sulfonic Acid (4:2 FTS)	NS		ng/L	Monitor	Monitor
1H,1H,2H,2H- Fluorotelomer Sulfonic Acid (6:2 FTS)	NS		ng/L	Monitor	Monitor
1H,1H,2H,2H- Fluorotelomer Sulfonic Acid (8:2 FTS)	NS		ng/L	Monitor	Monitor
N-ethyl Perfluoro-octanesulfon-amide (NEtFOSA)	NS		ng/L	Monitor	Monitor
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	NS		ng/L	Monitor	Monitor
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	NS		ng/L	Monitor	Monitor
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	NS		ng/L	Monitor	Monitor
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	NS		ng/L	Monitor	Monitor
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA or GenX)	NS		ng/L	Monitor	Monitor
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	NS		ng/L	Monitor	Monitor
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	NS		ng/L	Monitor	Monitor
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	NS		ng/L	Monitor	Monitor
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	NS		ng/L	Monitor	Monitor
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	NS		ng/L	Monitor	Monitor
Nonafluoro-3,6-dioxaheptanoic Acid (NFDHA)	NS		ng/L	Monitor	Monitor
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	NS		ng/L	Monitor	Monitor
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	NS		ng/L	Monitor	Monitor
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	NS		ng/L	Monitor	Monitor

NOTES

1. Discharge limit is set at the Practical Quantitation Limit (PQL). The actual standard or guidance value concentration is below this limit. Analysis of this parameter shall be conducted using the most stringent USEPA approved method in accordance with 40 CFR 136.

2. Mercury shall be analyzed using USEPA Method 1631.

3. PFOA/PFOS:
    a. Sampling for PFOA shall use EPA method 1633 or other method specified by DER.
    b. Sampling for PFOS shall use EPA method 1633 or other method specified by DER.

4. Xylenes - 25 ug/L applies to each isomer individually. 50 ug/L applies to the sum of these substances.

INVENTUM ENGINEERING PC

March 4, 2025

To: NYSDEC Division of Water (DOW)

From: John Black, P.E. and James Edwards (Inventum)

CC: Benjamin McPherson (NYSDEC), John Yensan (RITC); Dan Flanigan (OSC)

RE: State Pollutant Discharge Elimination System Permit Equivalents
Factsheet Submittal
Riverview Innovation & Technology Campus, Inc. (RITC)
Brownfield Cleanup Program Site No. C915353
3875 River Road
Town of Tonawanda, New York

Inventum Engineering, P.C. (Inventum), on behalf of Riverview Innovation & Technology Campus, Inc. (Riverview), is submitting State Pollutant Discharge Elimination System (SPDES) Permit Equivalents (PEQ) Factsheet for the Riverview Brownfield Cleanup Program (BCP) Site No. C915353, BCP Site No. C915003, and the TCC State Superfund Site No. 915055 (Operable Units [OUs] 3, 2 and 1; Sites 108, 109 and 110). Collectively these sites are the former Tonawanda Coke and Allied Plastics facility.

Inventum, and our consultant Groundwater Treatment Technologies (GWTT) are in the process of preparing a Remedial Action Work Plans (RAWPs), including groundwater collection and treatment, for the Riverview BCP Site and Site 109. The RAWPs for the 3821 River Road BCP and Sites 108 and 100 are expected by 2027. The SPDES PEQ Factsheet is the spreadsheet to provide the basis to request discharge criteria for the former Tonawanda Coke and Allied Plastics facilities flowing the completion of the ongoing and proposed remediation programs. The data presented was collected by Inventum on behalf of Riverview during the ongoing BCP investigation and cleanup program since June 2020. Over that time period the former process equipment, contaminated buildings and sources in the subsurface have been remediated.

The descriptions and data in the attached Fact Sheet is intended to provide an understanding of the water quality being managed on the sites and assist permit writers in the development of permit limits for a SPDES PEQ for the future discharge of treated groundwater and stormwater to be generated after implementation of the approved remedial action, that will include:

- Solidification of residual viscous tar materials and placement of the solidified materials in a consolidation cell;
- Placement of the piles of residual purifier wastes, believed to be the primary source of cyanide, in the consolidation cell;
- Biotreatment of petroleum impacted soils;
- Placement of a soil cover, pavement and buildings over all materials not meeting commercial soil cleanup objectives (SCOs);

441Carlisle Drive
Suite C
Herndon, Virginia 20170

- Construction of a surface water retention basin to manage surface runoff; and
- Construction of a groundwater collection and treatment system capable of controlling the groundwater in the former production area and meeting the PEQ standards set on the basis of this Fact Sheet.

The discharge from the groundwater treatment plant will be initially to the detention basin, but the discharge from the basin will then flow through a pipe and ditch system to the Niagara River.

Background

The Riverview BCP Site, 3821 River Road BCP Site and the associated State Superfund Site located at 3800. 3821, and 3875 River Road were once the former Tonawanda Coke Corporation (TCC) coke making and by-products facilities. The former coke plant has been remediated and removed under multiple approved Interim Remedial Measures (IRMs). An IRM to collect and treat the groundwater within the vicinity of the former TCC plant has been in place since March 2022 and is currently ongoing. This IRM consists of series of groundwater collection trench that conveys the groundwater to temporary groundwater treatment system with treatment capacity of 75-gallons per minute (GPM) treats and discharges the treated effluent to the Town of Tonawanda publicly owned treatment works (POTW) under Permit No. 331 with a specific approval for discharge from the treatment system received from the Pre-treatment Coordinator. The buildings and process equipment on the 3821 River Road BCP Site are undergoing remediation. The process equipment on the state superfund site has been removed.

The remedial action for the Riverview BCP Site and OU2 (Site 109) site will include covering the entire site with slab-on-grade building foundations, pavement, or soil cover. Residual impacted groundwater will be on the Riverview BCP Site will be collected and treated in a new groundwater treatment facility and discharged to a new onsite stormwater detention basin. The discharge from the detention basin will flow through a series of pipes and surface drainage ditches and under River Road to the Niagara River on the 3800 River Road, Site 108, in the Town of Tonawanda, New York.

Although the first day of discharge is scheduled in 2026, the Remedial Action Work Plan for the project is to be submitted in March 2025 for review and approval by the New York State Department of Conservation (NYSDEC) Division of Environmental Remediation (DER). It is anticipated that the Division of Environmental Remediation (DER) will require an indication of the proposed PEQ standards before approving the Remedial Action Work Plan (RAWP) for the Riverview BCP Site.

The current SWPP discharge criteria were adopted from the criteria when the plant was operating and discharging far greater volumes of process water and far greater mass of the target compounds. The proposed groundwater treatment plant discharge will be limited by the annual fluctuation of infiltration through a much smaller area of the former plant.

During the operating period of discharge the process water received limited primary treatment. Under the proposed RAWP, the groundwater will be treated through a series of processes, each more effective than was conducted by TCC (please see the attached Process Flow Diagram [PFD]). In addition, under the proposed RAWP, Riverview is proposing to move Outfall #001 to the discharge of the treatment plant into the stormwater basin and relocate Outfall #004 to the entrance to the box culvert under River Road, immediately upstream of the point the stormwater basin discharge comingles with the discharges from National Grid and Energy Transfer.

SPDES PEQ Factsheet Submittal

As outlined in the DER Instruction worksheet of the SPDES Factsheet, Inventum has completed the following worksheets and provided PDF copies in Appendix A:

- Background Information
- Flow Diagram
- Location
- Factsheet

An electronic version of the SPDES PEQ Factsheet is also being provided as part of this submittal.

Background Information Worksheet

The Background Information Worksheet has been updated with the request information for the Sites.

Flow Diagram Worksheet

The plan view for the permanent groundwater treatment system designed treat up to 100-GPM and to operate for 30-years has been included within this worksheet. The main groundwater treatment components consist of:

- Oil Water Separator (OWS) which is a non-aqueous phase liquid (NAPL) and passive organic compound treatment vessel in the event any NAPL is recovered. There is no expectation any NAPL will remain on the sites after remediation.
- Mixing tank with chemical feeds for sodium hypochlorite (e.g. bleach), acid, and caustic to injected as needed to assist with adjustment of pH and injection of sodium hypochlorite for metal reduction in Clariifer.
- Clarifier/Flash Flocculation Tank for coagulant and flocculant are introduced to reduce solids in the groundwater and initiate the metals reduction process. The groundwater will be pretreated for pH and oxidation using Sodium Hypochlorite (as required) to enhance metals reduction. The influent water will then flow by gravity from the Flash/Flocculant Tank to the Clarifier which will allow the solids in the groundwater and the flocs created to settle at the bottom of the Clarifier for solids consolidation, dewatering, and offsite disposal.
- Membrane and Bioreactor (MBR) system is designed to reduce the organic content (Biological Oxygen Demand [BOD] and Chemical Oxygen Demand [COD]) as well as the solids content (Total Suspend Solids [TSS]), ammonia nitrogen (NH_3-N) and Volatile Organic Compounds (VOCs) and Semi volatile Organic Compounds (SVOCs) of the incoming groundwater. The ultrafiltration membranes following the bioreactor will reduce TSS concentrations and contain the biomass in the bioreactor. The membranes will protect the Granular Activated Carbon (GAC) media from excessive filling of the pore spaces required for treated groundwater carbon contact.
- Two GAC vessels are in place for reduction of cyanide (CN), polishing of SVOCs and VOCs and are oversized for Poly fluorinated Substances (PFAS) reduction with no less that 10-minutes of empty bed contact time (EBCT) per vessel. Under normal flow conditions the EBCT will exceed 20 minutes.

Location Worksheet

A United State Geological (USGS) map has been included to show locations of the sites, discharge location and the Niagara River which is the receive body of water.

Factsheet Worksheet

The green shaded columns #3 through #7 have been updated with available analytical data collected from temporary groundwater treatment system data and the corresponding analytical reports are provided in Appendix B. Since March of 2022 Inventum has been collected treatment system influent and effluent samples for the operating Interim Remedial Measures (temporary) groundwater treatment system for the following parameters in accordance with the IRM Work Plan:

- TCL VOCs, including TICs
- TCL SVOCs, including TICs
- TAL Metals
- Low Level Mercury
- Cyanide
- Ammonia
- Pesticides and Herbicides
- PCBs
- pH
- PFAS

Additional samples for Oil and Grease and BOD were collected in August 2024 to support in the design of the permanent treatment system and the results are reported in the Factsheet Worksheet.

The data provide in the Factsheet Worksheet is from December 2024 treatment system influent sample which is representative of groundwater conditions over the past 6-months and the December influent is only from groundwater from the collection trenches and does not include any additional sources such as decontamination water or excavation dewatering.

The existing permit limits column has been updated to include the concentration limit for each constituent that is included in the RITCs Stormwater Pollution Prevention Plan (SWPPP) Targets. Constituents present in the treatment system's December 2024 influent sample that exceeded the RITC Site SWPPP Target values include;

- Benzene,
- Total Cyanide, and
- Ammonia.

Summary

As described, Riverview has been aggressively eliminating the sources of surface water and groundwater contamination resulting from the operation of coke making and by products production on the former TCC and associated properties. The attached Fact Sheet has been prepared to request the discharge criteria to be used as the final design basis for the RAWP, which will allow final design and remediation of

the properties. Inventum and Riverview would be available, at your convenience, for a meeting to discuss the proposed remediation and outfall locations.

If you have any questions, please contact me at 571-217-6761 or at john.black@inventumeng.com.

Sincerely,

John Black, P.E.
President
Inventum Engineering, P.C

Attachments

Appendix A - SPDES PEQ Factsheet

Background Worksheet

Flow Diagram Worksheet

Location Worksheet

Factsheet Worksheet

SPDES Permit Equivalent Background Information

DER Site Engineer	John Black (Inventum Engineering)
BWP Permit Engineer	
Location of Saved Files	
Date Requested	4-Mar-25
Date of Review	

Contact Information	john.black@inventumeng.com, 571-752-6559
Contact Information	

DER Site No.	C915353
Site Name	Riverview Innovation & Technology Campus
Site Discharger Name	Riverview Innovation & Technology Campus
ATTN: Contact Name	Daniel Flanigan
Site Address	3875 River Rd Tonawanda, NY 14150
Effluent Flow Rate	100 GPM
Receiving Waterbody	Niagara River
WIN	
Proposed First Day of Discharge	1-Sep-26
Proposed Duration of Discharge	30 Years
Is this site a Brownfield?	Y

Contact Phone #	716-856-3333
Contact Email	dflanigan@oscinc.com
Contact Address	140 Lee St, Buffalo, NY 14210

0.144 MGD (Peak Discharge, will vary from 0 to 100 GPM)

Outfall Latitude	42°58'43"N
Outfall Longitude	78°56'24"W

Source of Contamination	Industrial properties along River Road, Town of Tonawanda, New York. The primary source of contamination will be treated groundwater from the remediated RITC BCP Site.

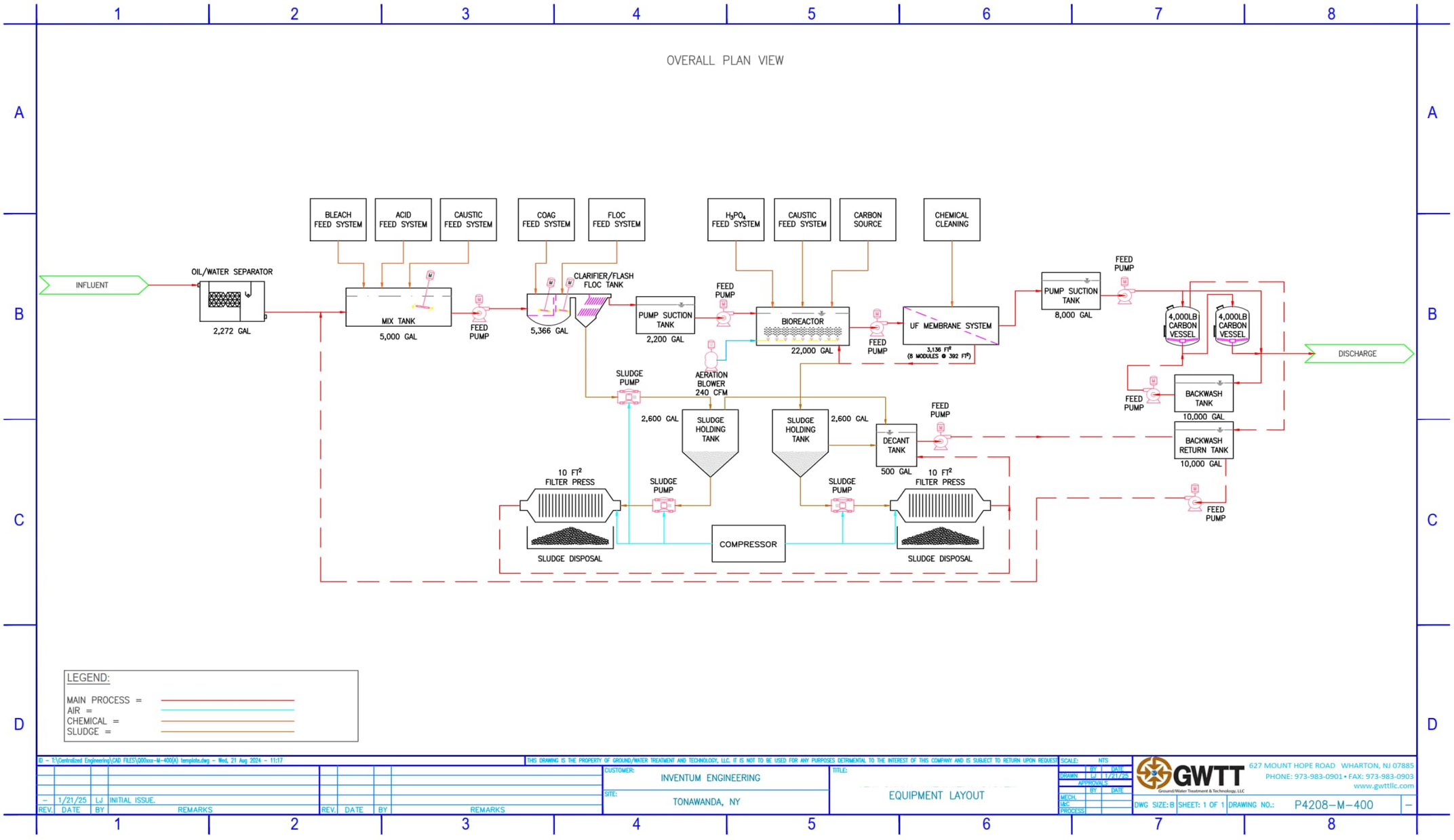
Pollutants of Concern	Constituents present in the treatment system influent samples that exceed Riverview's SWPPP target values include Benzene, Total Cyanide, and Ammonia.

Treatment System	The flow diagram design drawing for the treatment system is shown on the Flow Diagram Tab. The treatment system

	is designed to treat up to 100-GPM. The main treatment system components consist of, in order, a oil/water separator, mixing tank, clarifier / flash flocculation tank, membrane bioreactor (MBR), two 4,000-pound granular activated carbon vessels.
Description of Project	The Brownfield Cleanup Project and associated State Superfund Sites were the former Tonawanda Coke Corporation Site. The former coke plant has been remediated and removed. The remedial action will cover the entire site with pavement or soil cover. Residual impacted groundwater will be collected and treated in a new groundwater treatment facility and discharged to a new onsite stormwater detention basin. The discharge from the detention basin will flow through a series of pipes and surface drainage ditches to the Niagara River on 3800 River Road, Town of Tonawanda. Although the First Day of Discharge is 2026, the RAWP for the project is to be submitted in March 2025 for review and approval by the NYSDEC DER.

SPDES Permit Equivalent - Treatment System Flow Diagram

Process Flow Diagarm (PFD)



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REV.	DATE	BY	REMARKS
–	1/21/25	LJ	INITIAL ISSUE.

CUSTOMER: INVENTUM ENGINEERING
SITE: TONAWANDA, NY
TITLE: EQUIPMENT LAYOUT

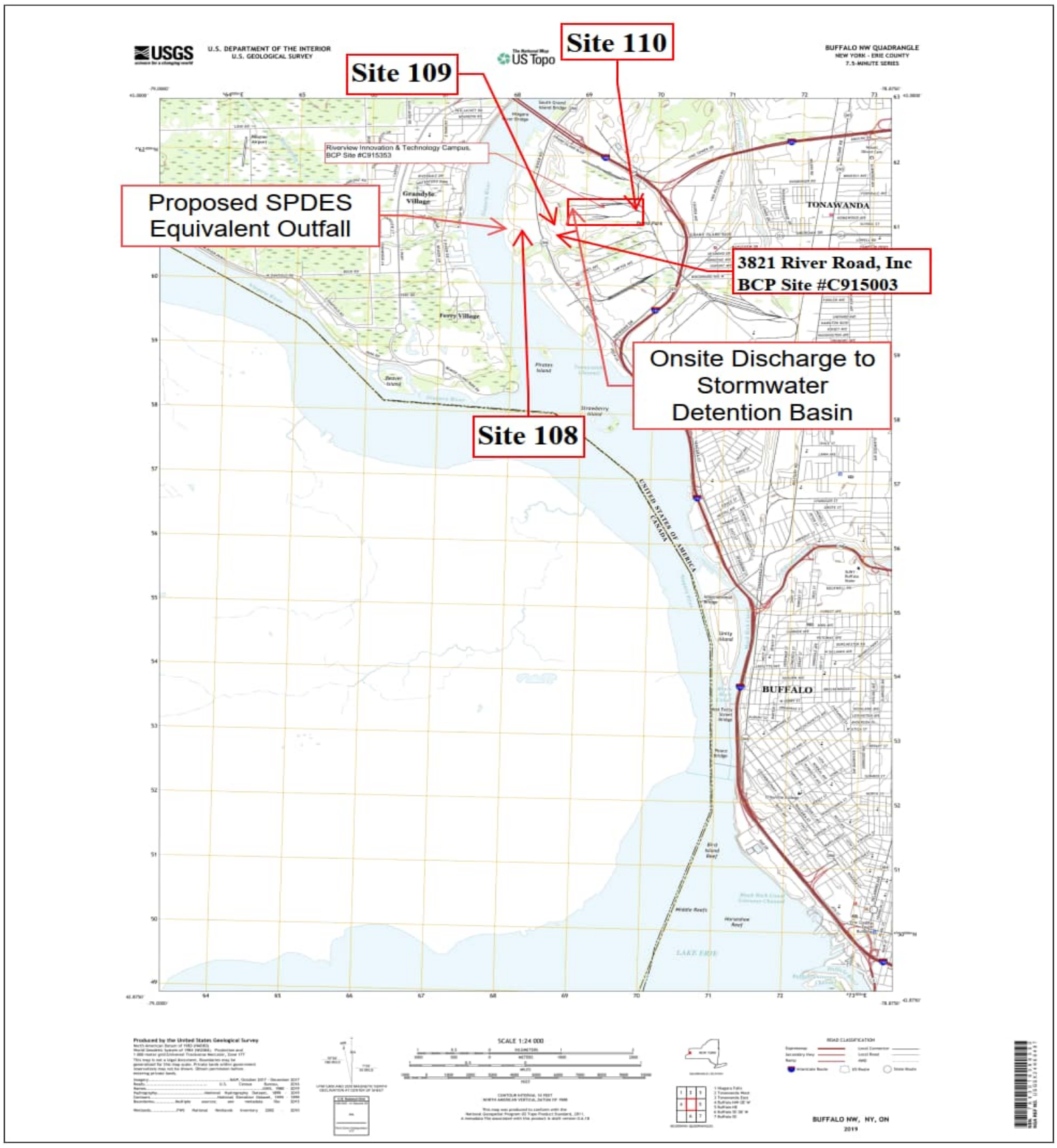
SCALE: NTS
DRAWN: BY LJ DATE 1/21/25
APPROVALS: BY DATE
MECH.
C&C
PROCESS

GWTT Ground/Water Treatment & Technology, LLC
627 MOUNT HOPE ROAD WHARTON, NJ 07885
PHONE: 973-983-0901 • FAX: 973-983-0903
www.gwttllc.com

DWG SIZE: B | SHEET: 1 OF 1 | DRAWING NO.: P4208–M–400 | –

SPDES Permit Equivalent - Site Location

A



INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
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SITE LOCATION MAP

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

DRAWING BY	RB
CHECKED	
APPROVED	

FIGURE 1 - 1

SPDES Permit Equivalent Factsheet Pollutant Summary Table

DER Site No.	C915353
Site Name	Riverview Innovation & Technology Campus
Receiving Waterbody	Niagara River
Class/Standard	0
Hardness (mg/L)	0
Chronic Dilution Ratio	5

Instructions: Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Parameter	CAS No.	Present/Absent	Units	Existing Permit Limit	Influent Concentration	Qualifier	TBEL Daily Max	TBEL Daily Avg	Source of TBEL	WQS	WQS Type	Translator (see references)	Source of WQS	Calculated WQBEL	ML	Monthly Avg Limits in Permit Table	Daily Max Limits in Permit Table	Basis of Selected Limits	Notes
	pH	NA	Y	SU	6.0-9.0	6.91		6.0-9.0	-	TOGS 1.2.1 Att.C (J. pH; neutralization, standard practice)	6.5-8.5	-	-	6 NYCRR 703.3	6.5-8.5		Monitor	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Oil and Grease	NA		mg/L		4.8		15	-	TOGS 1.2.1 Att.C (J. oil & grease; oil separation, division guidance 8/1/87)	No residue or visible oil	Narrative	-	6 NYCRR 703.2	-		Monitor	15		Lab Number: L2461774 Sampled on 10/23/2024
	Biochemical Oxygen Demand 5-day (BOD_5)	NA		mg/L		32		10	-		5	ISEL	-	TOGS 1.3.1	25		Monitor	10		Lab Number: L2461774 Sampled on 10/23/2024
	Total Dissolved Solids	NA		mg/L							500	Narrative	-	6 NYCRR 703.3	2500		0	0		
	Total Suspended Solids	NA	Y	mg/L		17		50	20	TOGS 1.2.1 Att.C (J. TSS & settleable solids; sedimentation)	None from sewage, industrial wastes, or	Narrative	-	6 NYCRR 703.2	-		20	50		Permit limit is for a 24-hour composite sample, the reported results is a grap sample Lab Project ID: 245791 Sampled on 12/11/2024
	Cadmium, Total	07440-43-9	N	mg/L							#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791
	Chromium, Total	07440-47-3	N	mg/L							#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791
	Copper, Total	07440-50-8	Y	mg/L	200	0.0299					#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791
	Fluoride	16984-48-8	N	mg/L	1.5						#NUM!	A(C)	-		#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Permit limit is for a 24-hour composite sample
	Lead, Total	07439-92-1	N	mg/L							#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791 Permit Requires to Monitor
	Nickel, Total	07440-02-0	N	mg/L	500						#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791
	Zinc, Total	07440-66-6	N	mg/L	500						#NUM!	A(C)			#NUM!		0	#NUM!		WQS is currently calculating the chronic standard of Class A, B, & C waters. Be sure to modify the WQS as needed for the appropriate class waterbody. Lab Project ID: 245791
	Perfluorooctanoic acid (PFOA)	335-67-1	Y	ng/L		10		21	-	40 CFR 125.3 TOGS 1.2.1					0			0		DOW developed TBELs in accordance with 40 CFR 125.3 and TOGS 1.2.1. Please reach out to Evan Walters (evan.walters@dec.ny.gov) and Gwendolyn Temple (gwendolyn.temple@dec.ny.gov) with questions. Lab Project ID: 245791
	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Y	ng/L		2.85		7.9	-	40 CFR 125.3 TOGS 1.2.1					0			0		DOW developed TBELs in accordance with 40 CFR 125.3 and TOGS 1.2.1. Please reach out to Evan Walters (evan.walters@dec.ny.gov) and Gwendolyn Temple (gwendolyn.temple@dec.ny.gov) with questions. Lab Project ID: 245791
	PRIORITY POLLUTANTS (From: 40 CFR Part 122, Appendix D): Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.																			
GC/MS Volatile Fraction Compounds	Acrolein*	00107-02-8	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Acrylonitrile*	00107-13-1	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.

Benzene	00071-43-2	Y	µg/L	1.5	4.29								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Bromoform	00075-25-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Carbon Tetrachloride	00056-23-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Chlorobenzene	00108-90-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Chlorodibromomethane	00124-48-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Chloroethane	00075-00-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2-Chloroethylvinyl ether	00110-75-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Chloroform	00067-66-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Dichlorobromomethane	00075-27-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,1-Dichloroethane	00075-34-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,2-Dichloroethane	00107-06-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,1-Dichloroethylene	00075-35-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,2-Dichloropropane	00078-87-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,3-Dichloropropylene	00542-75-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Ethylbenzene	00100-41-4	Y	µg/L		5.77								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methyl Bromide*	00074-83-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methyl Chloride	00074-87-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methylene Chloride	00065-09-2	Y	µg/L		14.2	BL							0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,1,2,2-Tetrachloroethane	00079-34-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Tetrachloroethylene	00127-18-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Toluene	00108-88-3	Y	µg/L	3	2.08								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

	1,2-trans-Dichloroethylene	00156-60-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	1,1,1-Trichloroethane	00071-55-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	1,1,2-Trichloroethane	00079-00-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Trichloroethene	00079-01-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Vinyl chloride	00075-01-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
GC/MS Acid Fraction Compounds	2-Chlorophenol	00095-57-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	2,4-Dichlorophenol	00120-83-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	2,4-Dimethylphenol	00105-69-7	Y	µg/L		12.8								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	4,6-Dinitro-o-cresol*	00534-52-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	2,4-Dinitrophenol	00051-28-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	2-Nitrophenol	00088-75-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	4-Nitrophenol	00100-02-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	p-Chloro-m-crsol	00059-50-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Pentachlorophenol*	00087-86-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Phenol	00108-95-2	Y	µg/L		12.3								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	2,4,6-Trichlorophenol	00088-06-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
GC/MS Base/Neutral Fraction Compounds	Acenaphthene	00083-32-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Acenaphthylene	00208-96-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
	Anthracene	00120-12-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

Benzidine	00092-87-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Benz(a)anthracene*	00056-55-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Benzo(a)pyrene*	00050-32-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
3,4-Benzofluoranthene*	00205-99-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Benzo(ghi)perylene	00191-24-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Benzo(k)fluoranthene	00207-08-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Bis(2-chloroethoxy)methane	00111-91-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Bis(2-chloroethyl)ether	00111-44-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Bis(2-chloroisopropyl)ether	00102-60-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Bis(2-ethylhexyl)phthalate	00117-81-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
4-Bromophenyl phenyl ether*	00101-55-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Butylbenzyl phthalate	00085-68-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2-Chloronaphthalene	00091-58-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
4-Chlrophenyl phenyl ether*	07005-72-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Chrysene*	00218-01-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Dibenz(a,h)anthracene*	00053-70-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
1,2-Dichlorobenzene	00095-50-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,3-Dichlorobenzene	00541-73-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,4-Dichlorobenzene	00106-46-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
3,3'-Dichlorobenzidine	00091-94-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Diethyl phthalate	00084-66-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

Dimethyl phthalate	00131-11-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Di-n-butyl phthalate	00084-74-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2,6-Dinitrotoluene	00606-20-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Di-n-octyl phthalate	00117-84-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,2-Diphenylhydrazine	00122-66-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Fluroanthene*	00206-44-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Fluorene	00086-73-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Hexachlorobenzene*	00118-74-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Hexachlorobutadiene*	00087-68-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Hexachlorocyclopentadiene	00077-47-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Hexachloroethane*	00067-72-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Indeno(1,2,3-cd)pyrene*	00193-39-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Isophorone	00078-59-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Naphthalene	00091-20-3	Y	µg/L	30	11.7								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Nitrobenzene	00098-95-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
N-nitrosodimethylamine	00062-75-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
N-nitrosodi-n-propylamine	00621-64-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
N-nitrosodiphenylamine	00086-30-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Phenanthrene*	00085-01-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Pyrene*	00129-00-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,2,4-Trichlorobenzene*	00120-82-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.

GC/MS Pesticides Fraction Compounds	Aldrin*	00309-00-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	alpha-BHC*	00319-84-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	beta-BHC*	00319-85-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	gamma-BHC (Lindane)*	00058-89-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	delta-BHC*	00319-86-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Chlordane*	00057-74-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	4,4'-DDT*	00050-29-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	4,4'-DDE*	00072-55-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	4,4'-DDD*	00072-54-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Dieldrin*	00060-57-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	alpha-Endosulfan*	00959-98-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	beta-Endosulfan	33213-65-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Endosulfan sulfate	01031-07-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Endrin*	00072-20-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Endrin aldehyde	07421-93-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Heptachlor*	00076-44-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Heptachlor epoxide*	01024-57-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1242*	53469-21-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1254*	11097-69-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1221*	11104-28-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

	PCB-1232*	11141-16-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1248*	12672-29-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1260*	11096-82-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	PCB-1016*	12674-11-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Toxaphene*	08001-35-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Dioxin: 2,3,7,8-Tetrachlorodibenzo-p-dioxin**	01764-01-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Metals and Other Toxic Pollutants	Antimony, Total	07440-36-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Arsenic, Total	07440-38-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
	Berylium, Total	07440-41-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Cadmium, Total	07440-43-9	Y	µg/L		187								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Chromium, Total	07440-47-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Copper, Total	07440-50-8	Y	µg/L		0.0299								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Lead, Total	07439-92-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
	Mercury, Total*	07439-97-6	Y	µg/L		0.0704		0.05						0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Nickel, Total	07440-02-0	N	µg/L	500									0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Selenium, Total	07782-49-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Silver, Total	07440-22-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Thallium, Total*	07440-28-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Zinc, Total	07440-66-6	N	µg/L	500									0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Cyanide, Total	00057-12-5	Y	mg/L	0.03	0.79	L							0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

	Phenols, Total***			mg/L	0.08										0		0	0		Total Phenols are not in our sample suite. We sampled for Phenol and have a result of 12.3 ug/L
	Asbestos	01332-21-4	N												0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
	*These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides. **Dioxin is not listed in Part 122, Appendix D, but is a priority pollutant. ***Phenols, Total is not a Priority Pollutant but is considered a Toxic Substance for permit classification purposes.																		
	Other Significant Pollutants with NYSDEC Standards/Guidance Values and USEPA/NYSDEC Promulgated Analytical Methods: Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.																		
Base/Neutral/Acid Compounds	4-Aminobiphenyl	00092-67-1	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Aniline	00062-53-3	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Aramite	00140-57-8	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	4-Chloroaniline	00106-47-8		µg/L											0		0	0		
	3,3'-Dimethylbenzidine	00119-93-7	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	a,a-Dimethyphenethylamine	00122-09-8	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	1,3-Dinitrobenzene	00099-65-0	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Diphenylamine	00122-39-4	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Hexachlorophene	00070-30-4	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Hexachloropropene	01888-71-7	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	5-Nitro-o-toluidine	00099-55-8	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	2-Nitroaniline	00088-74-4		µg/L											0		0	0		
	3-Nitroaniline	00099-09-2		µg/L	5										0		0	0		
	4-Nitroaniline	00100-01-6		µg/L	5										0		0	0		
	Pentachlorobenzene*	00608-93-5	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	1,4-Phenylenediamine	00106-50-3	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.
	Phorate	00298-02-2	N	µg/L											0		0	0		No knowledge of being present in the groundwater influent.

	1,2,4,5-Tetrachlorobenzene*	00095-94-3		µg/L										0		0	0		
	o-Toluidine	00095-53-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	1,3,5-Trinitrobenzene, sym-	00099-35-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Conventional Compounds and Metals	Ammonia/ammonium	07664-41-7	Y	mg/L	1.5	4								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Bromide	24959-67-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
	Color		N											0		0	0		No knowledge of being present in the groundwater influent.
	Coliform, Fecal		N											0		0	0		No knowledge of being present in the groundwater influent.
	Coliform, Total		N											0		0	0		No knowledge of being present in the groundwater influent.
	Fluoride	16984-48-8	N	mg/L	1.5									0		0	0		No knowledge of being present in the groundwater influent.
	Nitrogen, Nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
	Nitrogen, Nitrite		N											0		0	0		No knowledge of being present in the groundwater influent.
	Methylene Blue Active Substances		N											0		0	0		No knowledge of being present in the groundwater influent.
	Phosphorus (as P), Total	07723-14-0	N	mg/L										0		0	0		Lab Number: L2461774 Sampled on 10/23/2024
	Radioactivity: Alpha, Total		N											0		0	0		
	Radioactivity: Beta, Total		N											0		0	0		
	Radioactivity: Radium, Total		N											0		0	0		
	Radioactivity: Radium 226, Total		N											0		0	0		
	Solids, Settleable													0		0	0		
	Sulfate (as SO4)	14808-79-8		mg/L										0		0	0		

Sulfide (as S)		N	mg/L										0		0	0		No knowledge of being present in the groundwater influent.
Sulfite (as SO3)	14265-45-3	N	mg/L										0		0	0		No knowledge of being present in the groundwater influent.
Cyanide, Amenable to Chlorination		N	mg/L										0		0	0		No knowledge of being present in the groundwater influent.
Chromium, Hexavalent	07440-47-3	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Aluminum, Total	07439-90-5	Y	µg/L	1000	288								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Barium, Total	07440-39-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Boron, Total	07440-42-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Cobalt, Total	07440-48-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Iron, Total	07439-89-6	Y	µg/L	4000	2860								0		0	0		Permit limit is for a 24-hour composite sample, the reported results is a grap sample, Lab Project ID: 245791 Sampled on 12/11/2024
Magnesium, Total	07439-95-4	Y	µg/L		22700								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Molybdenum, Total	07439-98-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Manganese, Total	07439-96-5	Y	µg/L	1000	352								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Sodium, Total	07440-23-5	Y	µg/L		81800								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Tin, Total	07440-31-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Titanium, Total	07440-32-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Vanadium, Total	07440-62-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Volatile Organic Compounds	Acetone	00067-64-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Allyl chloride	00107-05-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Chloroprene	00126-99-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Dibromomethane	00074-95-3	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.

trans-1,4-Dichloro-2-butene	00110-57-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Dichlorodifluoromethane	00075-71-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
cis-1,2-Dichloroethylene	00156-59-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
cis-1,3-Dichloropropene	10061-01-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
trans-1,3-Dichloropropene	10061-02-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Ethylene dibromide (EDB)	00106-93-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Ethylene glycol	00107-21-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
2-Hexanone	00591-78-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methacrylonitrile	00126-98-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Methyl ethyl ketone	00078-93-3	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methyl iodide (Iodomethane)	00074-88-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Methyl methacrylate	00080-62-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Pentachloroethane	00076-01-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Pyridine	00110-86-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Styrene	00100-42-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,1,1,2-Tetrachloroethane	00630-20-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Trichlorofluoromethane	00075-69-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
1,2,3-Trichloropropane	00096-18-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Xylene, Ortho- (1,2-)	00095-47-6	Y	µg/L		4.02								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Xylene, Meta- (1,3-)	00108-38-3		µg/L		2.84								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor. The lab reflects Meta- and Para Xylene together as m,p-Xylenes. This combined total is 2.84 ug/L.
Xylene, Para- (1,4-)	00106-42-3		µg/L		2.84								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor. The lab reflects Meta- and Para- Xylene together as m,p-Xylenes. This combined total is 2.84 ug/L.

Pesticides	Alachlor	15972-60-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Aldicarb	00116-06-3	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Ametryn	00834-12-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Aminocarb (Metacil)	02032-59-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Atraton	01610-17-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Atrazine	01912-24-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Azinphosmethyl	00086-50-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Barban	00101-27-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Benefin	01861-40-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Bromacil	00314-40-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Butachlor	23184-66-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Captan	00133-06-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Carbaryl	00063-25-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Carbofuran*	01563-66-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Dalapon	00075-99-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Demeton (-o)	00298-03-3	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Demeton (-S)*	00126-75-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	Diazinon	00333-41-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
	1,2-Dibromo-3-chloropropane	00096-12-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
	Dicamba	01918-00-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.

2,4-Dichlorophenoxyacetic acid (2,4-D)	00094-75-7	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Dinoseb*	00088-85-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Disulfoton	00298-04-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Ferbam	14484-64-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Fluometuron	02164-17-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Glyphosate (Roundup)*	01071-83-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Hexachlorocyclohexanes	00608-73-1	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Hexazinone	51235-04-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Isodrin	00465-73-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Isopropalin	33820-53-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Kepone*	00143-50-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Malathion	00121-75-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Mancozeb	08018-01-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Maneb	12427-38-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Methomyl*	16752-77-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Methoxychlor*	00072-43-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methyl parathion*	00298-00-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
2-Methyl-4-chloro-phenoxyacetic acid; MCPA	00094-74-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Metribuzin	21087-64-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Mirex (Hexachloropentadiene)*	02385-85-5	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Nabam	00142-59-6	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.

Oxamyl*	23135-22-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Parathion*	00056-38-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Pentachloronitrobenzene	00082-68-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Prometon	01610-18-0	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Propachlor	01918-16-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Propazine	00139-40-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Propham	00122-42-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Simazine*	00122-34-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Terbacil	05902-51-2	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Terbufos*	13071-79-9	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorophenoxyacetic acid*	00093-76-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Trifluralin	01582-09-8	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Zineb	12122-67-7	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
Ziram	00137-30-4	N	µg/L										0		0	0		No knowledge of being present in the groundwater influent.
*These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides.																		
Other Significant Pollutants with USEPA/NYSDEC Promulgated Analytical Methods: Include monitoring results for any of the pollutants listed below that are believed present in the discharge from any outfall at your facility.																		
AOP (Ambam oxidation product)		N											0		0	0		No knowledge of being present in the groundwater influent.
Acetonitrile	00075-05-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Acetophenone	00098-86-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Benomyl	17804-35-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Bentazon	25057-89-0	N											0		0	0		No knowledge of being present in the groundwater influent.

Benzyl alcohol	00100-51-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Benzyl chloride	00100-44-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Bolstar (Sulprofos)	35400-43-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Busan 40	51026-28-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Busan 85	00128-03-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium, Total	07440-70-2	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Carbam S	00128-04-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Carbendazim	10605-21-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Carbon disulfide*	00075-15-0	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Carbophenothion (Trithion)*	00786-19-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlordene	03734-48-3	N											0		0	0		No knowledge of being present in the groundwater influent.
2-(4-Chloro-2-methylphenoxy)propionic acid; MCPP	00093-65-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorobenzilate	00510-15-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Chloropropham	00101-21-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Chloropropylate	05836-10-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorpyrifos*	02921-88-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorpyrifos methyl	05598-13-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Coumaphos	00056-72-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Cyanazine	21725-46-2	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-DB	00094-82-6	N											0		0	0		No knowledge of being present in the groundwater influent.
DEET	00134-62-3	N											0		0	0		No knowledge of being present in the groundwater influent.

Diallate	02303-16-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenzofuran	00132-64-9	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Dichlofenthion	00097-17-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Dichloran	00099-30-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2,6-Dichlorophenol	00087-65-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlorvos*	00062-73-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Dicofol	00115-32-2	N											0		0	0		No knowledge of being present in the groundwater influent.
o,o-Diethyl-o-2-pyrazinyl phosphorothioate (Thionazin)	00297-97-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethoate	00060-51-5	N											0		0	0		No knowledge of being present in the groundwater influent.
7,12-Dimethylbenz(a)anthracene	00057-97-6	N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Dioxane; diethylene dioxide	00123-91-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Dioxathion*	00078-34-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Diuron	00330-54-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethalfluralin	55283-68-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethion*	00563-12-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl methacrylate	00097-63-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl methane sulfonate	00062-50-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Etridiazole	02593-15-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Famphur*	00052-85-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Fecal Streptococci	68876-78-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Fensulfothion	00115-90-2	N											0		0	0		No knowledge of being present in the groundwater influent.

Fenthion (Baytex)*	00055-38-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Fenuron	00101-42-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Fenuron-TCA	04482-55-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Formaldehyde	00050-00-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Gold, Total	07440-57-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Hexachlorobicycloheptadiene	03389-71-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Iridium, Total	07439-88-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Isobutyl alcohol	00078-83-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Isosafrole	00120-58-1	N											0		0	0		No knowledge of being present in the groundwater influent.
KN Methyl	00128-03-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Linuron	00330-55-2	N											0		0	0		No knowledge of being present in the groundwater influent.
MCPA isooctyl ester	26544-20-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Mephosfolan	00950-10-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Metham	00137-42-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl carbamate; methiocarb*	02032-65-7	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Methyl methanesulfonate	00066-27-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl trithion	00953-17-3	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methyl-2-pentanone; Methyl isobutyl ketone	00108-10-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
3-Methylcholanthrene	00056-49-5	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylnaphthalene	00091-57-6	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2-Methylphenol; o-Cresol	00095-48-7	Y	µg/L		14.3								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.

3-Methylphenol; m-Cresol	00108-39-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
4-Methylphenol; p-Cresol	00106-44-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024 Permit requires to monitor.
Mevinphos	07786-34-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Mexacarbate*	00315-18-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Monuron	00150-68-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Monuron-TCA	00140-41-0	N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosomethylethylamine	10595-95-6	N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosomorpholine	00059-89-2	N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosopiperidine	00100-75-4	N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosopyrrolidine	00930-55-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Naled	00300-76-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1-Naphthylamine	00134-32-7	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Naphthylamine	00091-59-8	N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Napthoquinone	00130-15-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Neburon	00555-37-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Niacaide	15339-36-3	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Nitroquinoline-1-oxide	00056-57-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Osmium, Total	07440-04-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Palladium, Total	07440-05-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Perthane	00072-56-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Phenacetin	00062-44-2	N											0		0	0		No knowledge of being present in the groundwater influent.

Phosphorus, Orthophosphate		N											0		0	0		No knowledge of being present in the groundwater influent.
Picoline, alpha-	00109-06-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Platinum, Total	07440-06-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium, Total	07440-09-7	Y	µg/L		29400								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Profluralin	26399-36-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Prometryn	07287-19-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Pronamide	23950-58-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Propionitrile	00107-12-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Propoxur	00114-26-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Rhenium	07440-15-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Rhodium, Total	07440-16-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Ronnel	00299-84-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Ruthenium, Total	07440-18-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Safrole	00094-59-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Secbumeton	26259-45-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Siduron	01982-49-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Silica, Dissolved	07631-86-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Simetrin	01014-70-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Stirofos	00961-11-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Strobane*	08001-50-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Swep	01918-18-9	N											0		0	0		No knowledge of being present in the groundwater influent.

Terbuthylazine	05915-41-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Terbutryn	00886-50-0	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,4,6-Tetrachlorophenol	00058-90-2	N											0		0	0		No existing permit.
Tetraethyl dithiopyrophosphate	03689-24-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Triadimefon	43121-43-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Trichloronate	00327-98-0	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorophenol	00095-95-4	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2,4,5-Trichlorophenoxyacetic acid, isooctyl ester	32534-95-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Tricyclazole	41814-78-2	N											0		0	0		No knowledge of being present in the groundwater influent.
o,o,o-Triethylphosphorothioate	00126-68-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Vinyl acetate	00108-05-4	N											0		0	0		No knowledge of being present in the groundwater influent.
ZAC (Zinc ammonium carbonates, etc)	38714-47-5	N											0		0	0		No knowledge of being present in the groundwater influent.
*These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concern (BCCs), or are restricted pesticides.																		
Other Significant Pollutants with NYSDEC Standards/Guidance Values: Identify any of the pollutants listed below that are believed present in the discharge from any outfall at your facility on the Industrial Chemical Survey form. No USEPA/NYSDEC analytical methods have been promulgated for pollutants listed in this section. Provide analytical results, if available, as direrected in Section III Items 2.A.i. and ii. of the instructions or as an attachment to this application.																		
Acrylamide	00079-06-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Acrylic acid	00079-10-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Aldicarb sulfone	01646-88-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Aldicarb sulfoxide	01646-87-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Alkyl dimethyl benzyl ammonium chloride	68391-01-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Alkyl diphenyl oxide sulfonates		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Amino-para-cresol	00095-84-1	N											0		0	0		No knowledge of being present in the groundwater influent.

4-Amino-meta-cresol	02835-99-6	N											0		0	0		No knowledge of being present in the groundwater influent.
5-Amino-ortho-creso	02835-95-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Aminomethylene phosphonic acid salts		N											0		0	0		No knowledge of being present in the groundwater influent.
Aminopyridine	26445-05-6	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Aminopyridines	00504-29-0	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Aminopyridines	00462-08-8	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Aminopyridines	00504-24-5	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Aminotoluene	00108-44-1	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Aminotoluene	00106-49-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Anisole	00100-66-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Aryltriazoles		N											0		0	0		No knowledge of being present in the groundwater influent.
Azobenzene	00103-33-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Benzal chloride	00098-87-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Benzisothiazole	00271-61-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoic trichloride	00098-07-7	N											0		0	0		No knowledge of being present in the groundwater influent.
2-(2-hydroxy-3,5-di-tert-pentylphenyl)Benzotriazole	25973-55-1	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1'-Biphenyl	00092-52-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Bis(chloromethyl)ether	00542-88-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Boric acid, Borates and Metaborates		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromobenzene	00108-86-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Bromochloromethane	00074-97-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024

4-(1-methylethoxy)-1-Butanol	31600-69-8	N											0		0	0		No knowledge of being present in the groundwater influent.
cis-2-Butenal	15798-64-8	N											0		0	0		No knowledge of being present in the groundwater influent.
trans-2-Butenal	00123-73-9	N											0		0	0		No knowledge of being present in the groundwater influent.
cis-2-Butenenitrile	01190-76-7	N											0		0	0		No knowledge of being present in the groundwater influent.
trans-2-Butenenitrile	00627-26-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Butoxyethoxyethanol	00112-34-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Butoxypropanol	05131-66-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Butyl isopropyl phthalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Butylate	02008-41-5	N											0		0	0		No knowledge of being present in the groundwater influent.
n-Butylbenzene	00104-51-8	N											0		0	0		No knowledge of being present in the groundwater influent.
sec-Butylbenzene	00135-98-8	N											0		0	0		No knowledge of being present in the groundwater influent.
tert-Butylbenzene	00098-06-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Carboxin	05234-68-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Chloramben	00133-90-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Chloranil	00118-75-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorinated dibenzofurans		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chloro-1,1,1-trifluoropropane	00460-35-5	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Chloro-o-toluidine	00095-69-2	N											0		0	0		No knowledge of being present in the groundwater influent.
5-Chloro-o-toluidine	00095-79-4	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Chloroaniline	00095-51-2	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chloroaniline	00108-42-9	N											0		0	0		No knowledge of being present in the groundwater influent.

4-Chlorobenzotrifluoride	00098-56-6	N											0		0	0		No knowledge of being present in the groundwater influent.
1-Chlorobutane	00109-69-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Chloromethyl methyl ether	00107-30-2	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Chloronitrobenzene	00088-73-3	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chloronitrobenzene	00121-73-3	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Chloronitrobenzene	00100-00-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorothalonil	01897-45-6	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Chlorotoluene	00095-49-8	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chlorotoluene	00108-41-8	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Chlorotoluene	00106-43-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Cyanogen bromide	00506-68-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Cyanogen chloride	00506-77-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Dechlorane Plus	13560-89-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Demeton (Systox)*	08065-48-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Di(2-ethylhexyl)adipate	00103-23-1	N											0		0	0		No knowledge of being present in the groundwater influent.
2,2-Dibromo-3-nitrilopropionamide	10222-01-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Dibromoacetonitrile	03252-43-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Dibromobenzene	00583-53-9	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Dibromobenzene	00108-36-1	N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Dibromobenzene	00106-37-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Dibromodichloromethane	00594-18-3	N											0		0	0		No knowledge of being present in the groundwater influent.

cis-1,4-Dichloro-2-butene	01476-11-5	N											0		0	0		No knowledge of being present in the groundwater influent.
3,4-Dichlorobenzotrifluoride	00328-84-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlorodifluoromethane	00075-71-8	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Dichlorofluoromethane	00075-43-4	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1-Dichloropropanes	00078-99-9	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Dichloropropanes	00142-28-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2,2-Dichloropropanes	00594-20-7	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1-Dichloropropene	00563-58-6	N											0		0	0		No knowledge of being present in the groundwater influent.
α,α-Dichlorotoluene	00098-87-3	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dichlorotoluenes	32768-54-0	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorotoluenes	00095-73-8	N											0		0	0		No knowledge of being present in the groundwater influent.
2,5-Dichlorotoluenes	19398-61-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2,6-Dichlorotoluenes	00118-69-4	N											0		0	0		No knowledge of being present in the groundwater influent.
3,4-Dichlorotoluenes	00095-75-0	N											0		0	0		No knowledge of being present in the groundwater influent.
3,5-Dichlorotoluenes	25186-47-4	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Difluoro-1,1,2,2-tetrachloroethane	00076-12-0	N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Diisopropyl benzene	00100-18-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Diisopropylbenzene	00577-55-9	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Diisopropylbenzene	00099-62-7	N											0		0	0		No knowledge of being present in the groundwater influent.
N,N-Dimethyl aniline	00121-69-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyl tetrachloroterephthalate	01861-32-1	N											0		0	0		No knowledge of being present in the groundwater influent.

2,3-Dimethylaniline	00087-59-2	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dimethylaniline	00095-68-1	N											0		0	0		No knowledge of being present in the groundwater influent.
2,5-Dimethylaniline	00095-78-3	N											0		0	0		No knowledge of being present in the groundwater influent.
2,6-Dimethylaniline	00087-62-7	N											0		0	0		No knowledge of being present in the groundwater influent.
3,4-Dimethylaniline	00095-64-7	N											0		0	0		No knowledge of being present in the groundwater influent.
3,5-Dimethylaniline	00108-69-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylbenzylammonium chloride	01875-92-9	N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Dimethylbibenzyl	00538-39-6	N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Dimethyldiphenylmethane	04957-14-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylethylbenzylammonium chloride	05197-80-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylformamide	00068-12-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Dinitrotoluene (mixed isomers)	25321-14-6	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dinitrotoluene	00602-01-7	N											0		0	0		No knowledge of being present in the groundwater influent.
2,5-Dinitrotoluene	00619-15-8	N											0		0	0		No knowledge of being present in the groundwater influent.
3,4-Dinitrotoluene	00610-39-9	N											0		0	0		No knowledge of being present in the groundwater influent.
3,5-Dinitrotoluene	00618-85-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Diphenamid	00957-51-7	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1-Diphenylhydrazines	00530-50-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Diquat dibromide	00085-00-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Dodecylguanidine acetate	02439-10-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Dodecylguanidine hydrochloride	13590-97-1	N											0		0	0		No knowledge of being present in the groundwater influent.

Dyphilline	0479-18-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Endothall	00145-73-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Endrin ketone	53494-70-5	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Ethylene chlorohydrin	00107-07-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylene oxide	00075-21-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylenethiourea	00096-45-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Folpet	00133-07-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Guaifenesin	00093-14-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Hexachlorocyclohexanes (epsilon)	06108-10-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrazine	00302-01-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrogen sulfide	07783-06-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Hydroquinone	00123-31-9	N											0		0	0		No knowledge of being present in the groundwater influent.
1-Hydroxyethylidene-1,1-diphosphonic acid	02809-21-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Isodecyl diphenyl phosphate	29761-21-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Isopropylbenzene	00098-82-8	N	µg/L										0		0	0		
2-Isopropyltoluene	00527-84-4	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Isopropyltoluene	00535-77-3	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Isopropyltoluene	00099-87-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Isothiazolones, total		N											0		0	0		No knowledge of being present in the groundwater influent.
Linear alkylbenzene sulfonates		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercaptobenzothiazole	00149-30-4	N											0		0	0		No knowledge of being present in the groundwater influent.

Methacrylic acid	00079-41-4	N											0		0	0		No knowledge of being present in the groundwater influent.
[1-Methoxyethyl]benzene	04013-34-7	N											0		0	0		No knowledge of being present in the groundwater influent.
[2-Methoxyethyl]benzene	03558-60-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Methylbenz(a)anthracenes		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylene bisthiocyanate	06217-18-6	N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Methylene-bis-(2-chloroaniline)	00101-14-4	N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Methylene-bis-(N,N'-dimethyl)aniline	00101-61-1	N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Methylene-bis-(N-methyl)aniline	01807-55-2	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylethyl-1,3-dioxolane	00126-39-6	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylstyrene	00611-15-4	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Methylstyrene	00100-80-1	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methylstyrene	00622-97-9	N											0		0	0		No knowledge of being present in the groundwater influent.
α-Methylstyrene	00098-83-9	N											0		0	0		No knowledge of being present in the groundwater influent.
N-Methylaniline	00100-61-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Niacinamide	00098-92-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Nitralin	04726-14-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrilotriacetic acid	00139-13-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2-Nitrotoluene	00088-72-2	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Nitrotoluene	00099-08-1	N											0		0	0		No knowledge of being present in the groundwater influent.
4-Nitrotoluene	00099-99-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Paraquat	04685-14-7	N											0		0	0		No knowledge of being present in the groundwater influent.

Pendimethalin	40487-42-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Phenyl ether	00101-84-8	N											0		0	0		No knowledge of being present in the groundwater influent.
3-Phenyl-1-propene	00637-50-3	N											0		0	0		No knowledge of being present in the groundwater influent.
cis-1-Phenyl-1-propene	00766-90-5	N											0		0	0		No knowledge of being present in the groundwater influent.
trans-1-Phenyl-1-propene	00873-66-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Phenylenediamine	00095-54-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Phenylenediamine	00108-45-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Phenylhydrazine	00100-63-0	N											0		0	0		No knowledge of being present in the groundwater influent.
Phenylpropanolamine	14838-15-4	N											0		0	0		No knowledge of being present in the groundwater influent.
Picloram	01918-02-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Polybrominated biphenyls (PBBs)	59536-65-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Propanil	00709-98-8	N											0		0	0		No knowledge of being present in the groundwater influent.
n-Propylbenzene	00103-65-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Quaternary ammonium compounds		N											0		0	0		No knowledge of being present in the groundwater influent.
Strontium 90	07440-24-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Tebuthiuron	34014-18-1	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,3,4-Tetrachlorobenzenes*	00634-66-2	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,3,5-Tetrachlorobenzenes	00634-90-2	N											0		0	0		No knowledge of being present in the groundwater influent.
Tetrachloroterephthalic acid	02136-79-0	N											0		0	0		No knowledge of being present in the groundwater influent.
α,α,α,4-Tetrachlorotoluene	05216-25-1	N											0		0	0		No knowledge of being present in the groundwater influent.
Tetrahydrofuran	00109-99-9	N											0		0	0		No knowledge of being present in the groundwater influent.

Theophylline	00058-55-9	N											0		0	0		No knowledge of being present in the groundwater influent.
Thiram	00137-26-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Toluene-2,4-diamine	00095-80-7	N											0		0	0		No knowledge of being present in the groundwater influent.
Toluene-2,5-diamine	00095-70-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Toluene-2,6-diamine	00823-40-5	N											0		0	0		No knowledge of being present in the groundwater influent.
Tolyltriazole	29385-43-1	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,4-Tribromobenzene	00615-54-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Tributyltin oxide	00056-35-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,6-Trichloroaniline	00634-93-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,3-Trichlorobenzenes	00087-61-6	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3,5-Trichlorobenzenes	00108-70-3	N											0		0	0		No knowledge of being present in the groundwater influent.
Trichlorofluoromethane	00075-69-4	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorophenoxypropionic acid (Silvex)*	00093-72-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,1,2-Trichloropropane	00598-77-6	N											0		0	0		No knowledge of being present in the groundwater influent.
cis-1,2,3-Trichloropropene	13116-57-9	N											0		0	0		No knowledge of being present in the groundwater influent.
trans-1,2,3-Trichloropropene	13116-58-0	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,4-Trichlorotoluene	07359-72-0	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,5-Trichlorotoluene	56961-86-5	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,6-Trichlorotoluene	02077-46-5	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorotoluene	06639-30-1	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,6-Trichlorotoluene	23749-65-7	N											0		0	0		No knowledge of being present in the groundwater influent.

α,α,α-Trichlorotoluene	00098-07-7	N											0		0	0		No knowledge of being present in the groundwater influent.
α,α,2-Trichlorotoluene	00088-66-4	N											0		0	0		No knowledge of being present in the groundwater influent.
α,2,4-Trichlorotoluene	00094-99-5	N											0		0	0		No knowledge of being present in the groundwater influent.
α,α,4-Trichlorotoluene	13940-94-8	N											0		0	0		No knowledge of being present in the groundwater influent.
α-2,6-Trichlorotoluene	02014-83-7	N											0		0	0		No knowledge of being present in the groundwater influent.
α-3,4-Trichlorotoluene	00102-47-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Trichlorotrifluoroethanes	26523-64-8	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1,1-Trichloro-2,2,2-trifluoroethane	00354-58-5	N											0		0	0		No knowledge of being present in the groundwater influent.
1,1,2-Trichloro-1,2,2-trifluoroethane	00076-13-1	N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Trimethylbenzenes	00108-67-8	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,3-Trimethylbenzenes	00526-73-8	N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,4-Trimethylbenzenes	00095-63-6	N											0		0	0		No knowledge of being present in the groundwater influent.
1,3,5-Trimethylbenzenes	00108-67-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Trimethylbenzenes (mixed isomers)	25551-13-7	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,6-Trimethylpyridines	01463-84-6	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,6-Trimethylpyridines	00108-75-8	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,4-Trinitrotoluene	00602-29-9	N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,6-Trinitrotoluene	18292-97-2	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trinitrotoluene	00610-25-3	N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,6-Trinitrotoluene	00118-96-7	N											0		0	0		No knowledge of being present in the groundwater influent.
3,4,5-Trinitrotoluene	00603-15-6	N											0		0	0		No knowledge of being present in the groundwater influent.

Triphenyl phosphate	00115-86-6	N											0		0	0		No knowledge of being present in the groundwater influent.
Tritium	10028-17-8	N											0		0	0		No knowledge of being present in the groundwater influent.
Uranyl Ion		N											0		0	0		No knowledge of being present in the groundwater influent.
For discharges to groundwater, also include any substances to which the Principal Organic Contaminant (POC) groundwater applies. The POC groundwater standard includes the following classes of compounds: (1) Halogenated alkanes (including those compounds identified by Freon, Genatron, Halon, CFC- and HCFC- prefizes in their product names); (2) Halogenated ethers; (2) Halobenzenes and substituted halobenzenes; (4) Benzene and alkyl- or nitrogen-substituted benzenes; (5) Substituted unsaturated hydrocarbons (i.e. straight or branched chain unsaturated hydrocarbon containing one of the following: halogen, aldehyde, nitrile, amide); (6) Halogenated non-aromatic cyclic hydrocarbons. See 6NYCRR Section 700.1 for additional information.																	
Notes: *These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concerns (BCCs), or are restricted pesticides.																	
Other Pollutants and Hazardous Substances Required to be Identified in ICS by Applicants if Present at Facility in Signficant Levels																	
Abamectin [Avermectin B1]		N											0		0	0		No knowledge of being present in the groundwater influent.
Acephate		N											0		0	0		No knowledge of being present in the groundwater influent.
Acetic Acid		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Acetic anhydride		N											0		0	0		No knowledge of being present in the groundwater influent.
Acetone cyanohydrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Acetyl bromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Acetyl chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Acid Compounds		N											0		0	0		No knowledge of being present in the groundwater influent.
Acifluorfen, sodium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
Adipic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Alkalinity, Carbonate, as CaCO3		N											0		0	0		No knowledge of being present in the groundwater influent.
d-trans-Allethrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Allyl alcohol		N											0		0	0		No knowledge of being present in the groundwater influent.
Allylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Aluminum oxide (fibrous form)		N											0		0	0		No knowledge of being present in the groundwater influent.
Aluminum phosphide*		N											0		0	0		No knowledge of being present in the groundwater influent.

Aluminum sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Amino-2-methylanthraquinone		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Aminoanthraquinone		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Aminoazobenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Amitraz		N											0		0	0		No knowledge of being present in the groundwater influent.
Amitrole		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium benzoate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium bicarbonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium bichromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium bifluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium bisulfite		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium carbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium carbonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium citrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium fluoroborate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium hydroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium nitrate (solution)		N											0		0	0		No knowledge of being present in the groundwater influent.

Ammonium oxalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium silicofluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium sulfamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium sulfate (solution)		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium sulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium sulfite		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium tartrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium thiocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ammonium thiosulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Amyl acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Anilazine		N											0		0	0		No knowledge of being present in the groundwater influent.
ortho-Anisidine hydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
ortho-Anisidine		N											0		0	0		No knowledge of being present in the groundwater influent.
para-Anisidine		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony pentachloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony potassium tartrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony tribromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony trichloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony trifluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Antimony trioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Arsenic disulfide		N											0		0	0		No knowledge of being present in the groundwater influent.

Arsenic pentoxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Arsenic trichloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Arsenic trioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Arsenic trisulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Avitrol*		N											0		0	0		No knowledge of being present in the groundwater influent.
Azodrin*		N											0		0	0		No knowledge of being present in the groundwater influent.
1-(3-Chloroallyl)-3,5,7-triaza-1-Azoniaadamantane chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Bandane*		N											0		0	0		No knowledge of being present in the groundwater influent.
Bendiocarb		N											0		0	0		No knowledge of being present in the groundwater influent.
Bentazon		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzaldehyde		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Benzamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzeneacetic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Benzenedicarboxaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzenepropanoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzo(e)pyrene		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzo(j)fluoranthene		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzo(rst)pentaphene		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoic acid, ammonium salt		N											0		0	0		No knowledge of being present in the groundwater influent.

Benzonitrile		N											0		0	0		No knowledge of being present in the groundwater influent.
2-(Thiocyanomethyltrio)Benzothiazole		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoyl chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Benzoyl peroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Beryllium chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Beryllium fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Beryllium nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Bidrin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Bifenthrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Bis(2-chloro-1-methylethyl)ether		N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Bis(methylisocyanate)cyclohexane		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Bis(methylisocyanate)cyclohexane		N											0		0	0		No knowledge of being present in the groundwater influent.
Bis(pentabromophenyl)ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Bismuth, Total		N											0		0	0		No knowledge of being present in the groundwater influent.
Bomyl*		N											0		0	0		No knowledge of being present in the groundwater influent.
Boron trichloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Boron trifluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Brodifacoum (Talon)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromacil, lithium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromadialone (Maki)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromethalin*		N											0		0	0		No knowledge of being present in the groundwater influent.

Bromine		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Bromo-1-(bromomethyl)-1,3-propane dicarbonitrile		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromophos		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromoxynil		N											0		0	0		No knowledge of being present in the groundwater influent.
Bromoxynil octanoate		N											0		0	0		No knowledge of being present in the groundwater influent.
Bronopol		N											0		0	0		No knowledge of being present in the groundwater influent.
Brucine		N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Butadiene		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Butanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Butyl acrylate		N											0		0	0		No knowledge of being present in the groundwater influent.
sec-Butyl alcohol		N											0		0	0		No knowledge of being present in the groundwater influent.
Butylacetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Butylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Butylbenzene sulfonamide		N											0		0	0		No knowledge of being present in the groundwater influent.
4,4-Butyldenebis-(6-T-butyl-M-cresol)		N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Butylene oxide		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Butylphthalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Butyraldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Butyric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
4-(4-Chloro-2-methylphenoxy) Butyric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Acid Green 3		N											0		0	0		No knowledge of being present in the groundwater influent.

C.I. Acid Red 114		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Basic Green 4		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Basic Red 1		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Direct Black 38		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Direct Blue 218		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Direct Blue 6		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Direct Brown 95		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Disperse Yellow 3		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Food Red 15		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Food Red 5		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Solvent Orange 7		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Solvent Yellow 14		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Solvent Yellow 3		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Solvent Yellow 34 (Auramine)		N											0		0	0		No knowledge of being present in the groundwater influent.
C.I. Vat Yellow 4		N											0		0	0		No knowledge of being present in the groundwater influent.
Cacodylic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Cadmium acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cadmium bromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Cadmium chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium arsenate		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium arsenite		N											0		0	0		No knowledge of being present in the groundwater influent.

Calcium carbide		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium cyanamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium cyanide*		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium dodecylbenzenesulfonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Calcium hypochlorite		N											0		0	0		No knowledge of being present in the groundwater influent.
Caprolactam		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Captafol		N											0		0	0		No knowledge of being present in the groundwater influent.
Carbamates		N											0		0	0		No knowledge of being present in the groundwater influent.
Carbazole		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Carbonyl sulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Catechol		N											0		0	0		No knowledge of being present in the groundwater influent.
Chinomethionat		N											0		0	0		No knowledge of being present in the groundwater influent.
Chloral		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorendic Acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorfenvinphos (Birlane)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorimuron ethyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorine		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorine dioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chloro-2-methyl-1-propene		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Chloro-3,5-dimethylphenol		N											0		0	0		No knowledge of being present in the groundwater influent.

Chloroacetic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Chloroacetophenone		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Chlorobenzoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorophacinone (Rozol)*		N											0		0	0		No knowledge of being present in the groundwater influent.
para-Chlorophenyl isocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Chloropicrin*		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Chloropropionitrile		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorosulfonic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorotetrafluoroethane		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorothymol		N											0		0	0		No knowledge of being present in the groundwater influent.
Chlorsulfuron		N											0		0	0		No knowledge of being present in the groundwater influent.
Cholecalciferol (Quintox)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Chromic acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Chromic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Chromic sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Chromous chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Cimectacarb		N											0		0	0		No knowledge of being present in the groundwater influent.
Clopyralid		N											0		0	0		No knowledge of being present in the groundwater influent.
Cobaltous bromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Cobaltous formate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cobaltous sulfamate		N											0		0	0		No knowledge of being present in the groundwater influent.

Creosote		N											0		0	0		No knowledge of being present in the groundwater influent.
para-Cresidine		N											0		0	0		No knowledge of being present in the groundwater influent.
Crotonaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupferron		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric acetoarsenite		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric oxalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric sulfate ammoniated		N											0		0	0		No knowledge of being present in the groundwater influent.
Cupric tartrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyanogen chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Cycloate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexamide (Actidone)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexane		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
1,4-Cyclohexane diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexanone		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexanone oxime		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclohexene		N											0		0	0		No knowledge of being present in the groundwater influent.

Cyclohexylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclopentanone		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyclotrimethylenetrinitramine		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyfluthrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Cyhalothrin		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-DP		N											0		0	0		No knowledge of being present in the groundwater influent.
Daminozide (Alar)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Dasanit*		N											0		0	0		No knowledge of being present in the groundwater influent.
Dazomet		N											0		0	0		No knowledge of being present in the groundwater influent.
Dazomet, sodium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
Decanal		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Diaminoanisole sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Diaminoanisole		N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Diaminodiphenyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Diaminotoluene (mixed isomers)		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenz(a,h)acridine		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenz(a,j)acridine		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenzo(a,e)fluoranthene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenzo(a,e)pyrene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenzo(a,h)pyrene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibenzo(a,l)pyrene		N											0		0	0		No knowledge of being present in the groundwater influent.

Dibenzo(c,g)carbazole, 7HDibutyltin		N											0		0	0		No knowledge of being present in the groundwater influent.
chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Dibutyltin dilaurate		N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlobenil		N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlone		N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dichloro-1,4-napthoquinone (Dichlone)		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Dichloro-2-butene		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dichlorobenzidine dihydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dichlorobenzidine sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Dichlorobutane		N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlorophene		N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dichlorophenol		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), 2-ethylhexyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), propylene glycol butyl ether ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), 2-ethyl-4-methylpentyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), butoxyethyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), butyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), chlorooctyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), isopropyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), sodium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dichlorophenoxyacetic acid (2,4-D), isobutyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.

2,3-Dichloropropene		N											0		0	0		No knowledge of being present in the groundwater influent.
2,2-Dichloropropionic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Dichlorotetrafluoroethane (CFC-114)		N											0		0	0		No knowledge of being present in the groundwater influent.
α,α-Dichlorotoluene		N											0		0	0		No knowledge of being present in the groundwater influent.
Diclofop methyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Dicyclohexylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Dicyclopentadiene		N											0		0	0		No knowledge of being present in the groundwater influent.
Diepoxybutane		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethanolamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethatyl ethyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyl formamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyl maleate		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyl mercury		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyl sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethylaminoethanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyldiisocyanatobenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethylene glycol		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethylene glycol monoethyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethylhexylphthalate isomer		N											0		0	0		No knowledge of being present in the groundwater influent.
Diethyltin dycaprylate		N											0		0	0		No knowledge of being present in the groundwater influent.

Diflubenzuron*		N											0		0	0		No knowledge of being present in the groundwater influent.
Diglycidyl resorcinol ether		N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dihydro-1,6-dimethyl-1H-indene		N											0		0	0		No knowledge of being present in the groundwater influent.
2,3-Dihydro-1-methyl-1H-indene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dihydrosafrole		N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Diisocyanatodiphenyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4'-Diisocyanatodiphenyl sulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Diisopropyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Diisopropylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethipin		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethoxybenzidine dihydrochloride,		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethoxybenzidine hydrochloride,		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethoxybenzidine,		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethoxybenzidine-4,4'-diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyl chlorothiophosphate		N											0		0	0		No knowledge of being present in the groundwater influent.
trans-1,4-Dimethyl cyclohexane		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyl sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
2,2-Dimethyl-2,3-Dihydro-7-Benzofuranol		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'- Dimethyl-4,4'-diphenylene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylamine dicamba		N											0		0	0		No knowledge of being present in the groundwater influent.

3,3'- Dimethylbenzidine dihydrochloride (o-Tolidine dihydrochloride)		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethylbenzidine dihydrofluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylcarbamyl chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyldichlorosilane		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyldioxane		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3'-Dimethyldiphenylmethane-4,4'-diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethyldithiocarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
2,5-Dimethylfuran		N											0		0	0		No knowledge of being present in the groundwater influent.
1,1-Dimethylhydrazine		N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Dimethylhydrazine		N											0		0	0		No knowledge of being present in the groundwater influent.
2,6-Dimethylphenol		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylphenylcarbinol		N											0		0	0		No knowledge of being present in the groundwater influent.
Dimethylterephthalate		N											0		0	0		No knowledge of being present in the groundwater influent.
ortho-Dinitrobenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
para-Dinitrobenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Dinitrophenol*		N											0		0	0		No knowledge of being present in the groundwater influent.
Dinocap		N											0		0	0		No knowledge of being present in the groundwater influent.
Diphacinone*		N											0		0	0		No knowledge of being present in the groundwater influent.
Dipropyl isocinchomeronate		N											0		0	0		No knowledge of being present in the groundwater influent.
Diquat		N											0		0	0		No knowledge of being present in the groundwater influent.
Disodium cyanodithioimidocarbonate		N											0		0	0		No knowledge of being present in the groundwater influent.

Di-Syston*		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4-Dithiobiuret		N											0		0	0		No knowledge of being present in the groundwater influent.
Dithiocarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Dodecanoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Dodecene-4		N											0		0	0		No knowledge of being present in the groundwater influent.
Dodecylbenzesulfonic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Dyphonate*		N											0		0	0		No knowledge of being present in the groundwater influent.
EDTA		N											0		0	0		No knowledge of being present in the groundwater influent.
EDTA, Ammoniated		N											0		0	0		No knowledge of being present in the groundwater influent.
EPN*		N											0		0	0		No knowledge of being present in the groundwater influent.
Epichlorohydrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethoprop*		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Ethoxyethanol acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl acrylate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl chloroformate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl di-n-propylthiocarbamate (EPTC)		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyl mercuric chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylene		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylene cyanohydrin		N											0		0	0		No knowledge of being present in the groundwater influent.

Ethylene dichloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylene glycol dinitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethylenediamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Ethyleneimine (Aziridine)		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenamiphos*		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenarimol		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenbutatin oxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenoxaprop ethyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenoxycarb		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenpropathrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Fenvalerate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric ammonium citrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric ammonium oxalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferric sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferricyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferrocyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferrous ammonium sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Ferrous sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.

Ferrous chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluazifop butyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluoride, Complex		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluoride, Free		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluorine		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluoroborates		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluorouracil		N											0		0	0		No knowledge of being present in the groundwater influent.
Fluvalinate		N											0		0	0		No knowledge of being present in the groundwater influent.
Fomesafen		N											0		0	0		No knowledge of being present in the groundwater influent.
Formetanate hydrochloride (Carazol SP)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Formic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Fumaric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Fumarin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Furan		N											0		0	0		No knowledge of being present in the groundwater influent.
Furazolidone		N											0		0	0		No knowledge of being present in the groundwater influent.
Furfural		N											0		0	0		No knowledge of being present in the groundwater influent.
Furium		N											0		0	0		No knowledge of being present in the groundwater influent.
Glycidaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Guthion*		N											0		0	0		No knowledge of being present in the groundwater influent.
n-Heptane		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Heptanol		N											0		0	0		No knowledge of being present in the groundwater influent.

2-Heptanol		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Heptanol		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Heptanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexachloronaphthalene		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexamethyl benzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexamethylene diamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexamethylene-1,6-diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexamethylphosphoramide		N											0		0	0		No knowledge of being present in the groundwater influent.
Hexanate		N											0		0	0		No knowledge of being present in the groundwater influent.
n-Hexane		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Hexanone		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydramethylnon		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrazine sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrochloric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrofluoric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrogen cyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrogen fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Hydrogen peroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
α-Hydroxy-α-methylbenzeneacetic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Hydroxycarbofuran		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Hydroxyethylidene		N											0		0	0		No knowledge of being present in the groundwater influent.

Hydroxyquinoline, total		N											0		0	0		No knowledge of being present in the groundwater influent.
Imazalil		N											0		0	0		No knowledge of being present in the groundwater influent.
Iodide (as I)		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Iodo-2-propynyl butylcarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Iron pentacarbonyl		N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Isobenzofurandione		N											0		0	0		No knowledge of being present in the groundwater influent.
1,(3H)-Isobenzofuranone		N											0		0	0		No knowledge of being present in the groundwater influent.
Isobutyraldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Isofenphos*		N											0		0	0		No knowledge of being present in the groundwater influent.
Isophorone diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Isoprene		N											0		0	0		No knowledge of being present in the groundwater influent.
Isopropanolamine		N											0		0	0		No knowledge of being present in the groundwater influent.
dodecylbenzenesulfonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Isopropyl alcohol		N											0		0	0		No knowledge of being present in the groundwater influent.
Isopropylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Isopropylbenzene hydroperoxide		N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Isopropylidenediphenol		N											0		0	0		No knowledge of being present in the groundwater influent.
Karbutilate		N											0		0	0		No knowledge of being present in the groundwater influent.
Kelthane		N											0		0	0		No knowledge of being present in the groundwater influent.
Lactofen		N											0		0	0		No knowledge of being present in the groundwater influent.
Lanthanum, Total		N											0		0	0		No knowledge of being present in the groundwater influent.

Lead acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead arsenate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead flourite		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead fluoborate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead iodide		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead stearate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead sulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Lead thiocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lethane 384*		N											0		0	0		No knowledge of being present in the groundwater influent.
Lithium carbonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lithium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Lithium, Total		N											0		0	0		No knowledge of being present in the groundwater influent.
2,5-Lutidine		N											0		0	0		No knowledge of being present in the groundwater influent.
Magnesium phosphide*		N											0		0	0		No knowledge of being present in the groundwater influent.
Maleic anhydride		N											0		0	0		No knowledge of being present in the groundwater influent.
Maleic hydrazide		N											0		0	0		No knowledge of being present in the groundwater influent.
Malononitrile		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercaptodimethur		N											0		0	0		No knowledge of being present in the groundwater influent.

Mercuric cyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercuric nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercuric sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercuric thiocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Mercurous nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Merphos		N											0		0	0		No knowledge of being present in the groundwater influent.
Methacrylamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Methacrylate		N											0		0	0		No knowledge of being present in the groundwater influent.
Methanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Methazole		N											0		0	0		No knowledge of being present in the groundwater influent.
Methoprene*		N											0		0	0		No knowledge of being present in the groundwater influent.
Methoxone sodium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methoxy-5-nitroaniline		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methoxyethanol acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methoxyethanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Methoxypropylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl acetate		N	µg/L										0		0	0		
2-Methyl benzene sulfonamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl chlorocarbonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl isobutyl ketone		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Methyl isocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.

Methyl isothiocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl mercaptan		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl mercury		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyl tert-butyl ether		N	µg/L										0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
2-Methyl-2-propanol		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Methyl-4-(1-methyethenyl)cyclohexene		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylanthracene		N											0		0	0		No knowledge of being present in the groundwater influent.
9-Methylanthracene		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylbenzaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Methylbenzaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methylbenzaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methylbenzene sulfonamide		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methylbenzenemethanol		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Methylbenzoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
3-Methylbenzoic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
5-Methylchrysene		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylcyclopentane		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Methyldiphenylmethane-3,4-diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
1,1-Methylene bis(4-isocyanatocyclohexane)		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylenebis(phenylisocyanate) (MDI)		N											0		0	0		No knowledge of being present in the groundwater influent.

4,4'-Methylenedianiline		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Methylnaphthalene		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylolmethacrylamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Methylphthalate		N											0		0	0		No knowledge of being present in the groundwater influent.
Methyltrichlorosilane		N											0		0	0		No knowledge of being present in the groundwater influent.
Metiram		N											0		0	0		No knowledge of being present in the groundwater influent.
Metolachlor		N											0		0	0		No knowledge of being present in the groundwater influent.
Michler's ketone		N											0		0	0		No knowledge of being present in the groundwater influent.
Molinate		N											0		0	0		No knowledge of being present in the groundwater influent.
Molybdenum trioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Monitor*		N											0		0	0		No knowledge of being present in the groundwater influent.
Monochlorobenzyl trifluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Monoethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Monomethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Mustard gas (1,1'-thiobis[2-chloro-]Ethane)		N											0		0	0		No knowledge of being present in the groundwater influent.
Myclobutanil		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Methyl-2-pyrrolidone		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Methylolacrylamide		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitroso-N-methyl urea		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosodi-N-butylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosodiethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.

N-Nitrosomethylvinylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
N-Nitrosonornicotine		N											0		0	0		No knowledge of being present in the groundwater influent.
1,5-Naphthalene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Naphthenic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
α-Naphthyl thiourea*		N											0		0	0		No knowledge of being present in the groundwater influent.
Nickel ammonium sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Nickel chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Nickel hydroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Nickel nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Nickel sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Nicotine alkaloid*		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrapyrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Nitrobiphenyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrocyclohexane		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrofen		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrofurans		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrofurantoin		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrofurazone		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrogen dioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Nitrogen mustard		N											0		0	0		No knowledge of being present in the groundwater influent.

Nitroglycerin		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Nitropropane		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Nitropyrene		N											0		0	0		No knowledge of being present in the groundwater influent.
para-Nitrosodiphenylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Nonanal		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Nonanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Norflurazon		N											0		0	0		No knowledge of being present in the groundwater influent.
Octachlorocyclopentene		N											0		0	0		No knowledge of being present in the groundwater influent.
Octachloronaphthalene		N											0		0	0		No knowledge of being present in the groundwater influent.
Octachlorostyrene*		N											0		0	0		No knowledge of being present in the groundwater influent.
Octamethylpyrophosphoramine		N											0		0	0		No knowledge of being present in the groundwater influent.
Oryzalin		N											0		0	0		No knowledge of being present in the groundwater influent.
Osmium tetroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Oxalic acid, benzyl ester		N											0		0	0		No knowledge of being present in the groundwater influent.
Oxydemeton methyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Oxydiazon		N											0		0	0		No knowledge of being present in the groundwater influent.
Oxyfluorfen		N											0		0	0		No knowledge of being present in the groundwater influent.
Ozone		N											0		0	0		No knowledge of being present in the groundwater influent.
Paraformeldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Paraldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Paraquat dichloride		N											0		0	0		No knowledge of being present in the groundwater influent.

Pebulate		N											0		0	0		No knowledge of being present in the groundwater influent.
Pentac		N											0		0	0		No knowledge of being present in the groundwater influent.
Pentanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Pentobarbital sodium		N											0		0	0		No knowledge of being present in the groundwater influent.
Peracetic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Perchloromethyl mercaptan		N											0		0	0		No knowledge of being present in the groundwater influent.
Permethrin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Phenothrin		N											0		0	0		No knowledge of being present in the groundwater influent.
1,3-Phenylene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Phenylene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
1,2-Phenylenediamine dihydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Phenylenediamine dihydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Phenylmercuric acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
2-Phenylphenol		N											0		0	0		No knowledge of being present in the groundwater influent.
4-Phenylphenol		N											0		0	0		No knowledge of being present in the groundwater influent.
Phenytoin		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosdrin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosgene		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphamidon*		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphate, Ortho		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphate, as PO4		N											0		0	0		No knowledge of being present in the groundwater influent.

Phosphine		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphoric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphorus oxychloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphorus pentasulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Phosphorustrichloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Photomirex*		N											0		0	0		No knowledge of being present in the groundwater influent.
Phthalate Esters		N											0		0	0		No knowledge of being present in the groundwater influent.
Picric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Piperonyl butoxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Pirimiphos methyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Pival*		N											0		0	0		No knowledge of being present in the groundwater influent.
Polybutene(1-propene, 2-methyl homopolymer)		N											0		0	0		No knowledge of being present in the groundwater influent.
Polymeric diphenylmethane diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Polymethacrylic Acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium N-methyldithiocarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium arsenate		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium arsenite		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium bichromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium bromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium cyanide		N											0		0	0		No knowledge of being present in the groundwater influent.

Potassium hydroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Potassium permanganate		N											0		0	0		No knowledge of being present in the groundwater influent.
Prodiamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Profenofos		N											0		0	0		No knowledge of being present in the groundwater influent.
Propane sultone		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Propanol		N											0		0	0		No knowledge of being present in the groundwater influent.
Propargite		N											0		0	0		No knowledge of being present in the groundwater influent.
Propargyl alcohol		N											0		0	0		No knowledge of being present in the groundwater influent.
1-Propene		N											0		0	0		No knowledge of being present in the groundwater influent.
Propetamphos		N											0		0	0		No knowledge of being present in the groundwater influent.
Propiconazole		N											0		0	0		No knowledge of being present in the groundwater influent.
β-Propiolactone		N											0		0	0		No knowledge of being present in the groundwater influent.
Propionaldehyde		N											0		0	0		No knowledge of being present in the groundwater influent.
Propionic acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Propionic anhydride		N											0		0	0		No knowledge of being present in the groundwater influent.
Propylene glycol		N											0		0	0		No knowledge of being present in the groundwater influent.
Propylene glycol monoethyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Propylene glycol monomethyl ether		N											0		0	0		No knowledge of being present in the groundwater influent.
Propylene oxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Propyleneimine		N											0		0	0		No knowledge of being present in the groundwater influent.
Pyrethrins		N											0		0	0		No knowledge of being present in the groundwater influent.

Quinoline		N											0		0	0		No knowledge of being present in the groundwater influent.
Quinone		N											0		0	0		No knowledge of being present in the groundwater influent.
1,4-Quinone dioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Quizalofop ethyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Randox*		N											0		0	0		No knowledge of being present in the groundwater influent.
Reserpine		N											0		0	0		No knowledge of being present in the groundwater influent.
Resmethrin		N											0		0	0		No knowledge of being present in the groundwater influent.
Resorcinol		N											0		0	0		No knowledge of being present in the groundwater influent.
Rhodamine WT		N											0		0	0		No knowledge of being present in the groundwater influent.
Rotenone		N											0		0	0		No knowledge of being present in the groundwater influent.
Saccharin (manufacturing)		N											0		0	0		No knowledge of being present in the groundwater influent.
Schradan*		N											0		0	0		No knowledge of being present in the groundwater influent.
Selenium oxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sethoxydim		N											0		0	0		No knowledge of being present in the groundwater influent.
Sevin		N											0		0	0		No knowledge of being present in the groundwater influent.
Silver nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium		Y	µg/L		81800								0		0	0		Lab Project ID: 245791 Sampled on 12/11/2024
Sodium Molybdate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium Nitrite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium Sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium adipate, disodium salt		N											0		0	0		No knowledge of being present in the groundwater influent.

Sodium arsenate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium arsenite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium azide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium bichromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium bifluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium bisulfite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium cyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium dicamba		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium diethyldithiocarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium dodecylbenzenesulfonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium fluoroacetate*		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium hydrosulfide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium hydroxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium hypochlorite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium methylate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium nitrite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium o-phenylphenoxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium pentachlorophenate		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodium phosphate (tribasic)		N											0		0	0		No knowledge of being present in the groundwater influent.

Sodium selenite		N											0		0	0		No knowledge of being present in the groundwater influent.
Sodum phosphate (dibasic)		N											0		0	0		No knowledge of being present in the groundwater influent.
Strontium chromate		N											0		0	0		No knowledge of being present in the groundwater influent.
Strychnine*		N											0		0	0		No knowledge of being present in the groundwater influent.
Styrene oxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Sulfotepp*		N											0		0	0		No knowledge of being present in the groundwater influent.
Sulfur moriochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Sulfuric acid		N											0		0	0		No knowledge of being present in the groundwater influent.
Sulfuryl fluoride (Vikane)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Supracide*		N											0		0	0		No knowledge of being present in the groundwater influent.
Tellurium, Total		N											0		0	0		No knowledge of being present in the groundwater influent.
Temephos		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetrachlorodiphenyl ethane (TDE)		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetracycline hydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetraethyl lead		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetraethyl pyrophosphate*		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetraethyl tin		N											0		0	0		No knowledge of being present in the groundwater influent.
Tetramethrin		N											0		0	0		No knowledge of being present in the groundwater influent.
1,2,4,5-Tetramethylbenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Thallium sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
2-(4-Thiazolyl)-1H-benzimidazole		N											0		0	0		No knowledge of being present in the groundwater influent.

Thioacetamide		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiobencarb		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
4,4'-Thiodianiline		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiodicarb		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiofanox		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiophanate ethyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiophanate methyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiosemicarbazide		N											0		0	0		No knowledge of being present in the groundwater influent.
Thiourea		N											0		0	0		No knowledge of being present in the groundwater influent.
Thorium dioxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Titanium tetrachloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Toluene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
Toluene-2,6-diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
ortho-Toluidine hydrochloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Tri-N-butyl phosphate		N											0		0	0		No knowledge of being present in the groundwater influent.
Triallate		N											0		0	0		No knowledge of being present in the groundwater influent.
Tribenuron methyl		N											0		0	0		No knowledge of being present in the groundwater influent.
Tributyltin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Tributyltin fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Tributyltin methacrylate		N											0		0	0		No knowledge of being present in the groundwater influent.

S,S,S-Tributyltrithiophosphate (DEF)		N											0		0	0		No knowledge of being present in the groundwater influent.
Trichlorfon		N											0		0	0		No knowledge of being present in the groundwater influent.
Trichloroacetyl chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Trichlorofon		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorophenoxy acetic acid, amines		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,5-Trichlorophenoxy acetic acid salts		N											0		0	0		No knowledge of being present in the groundwater influent.
Trichlorophenoxy propanoic acid (2,4,5-TP), esters		N											0		0	0		No knowledge of being present in the groundwater influent.
α,α,α-Trichlorotoluene		N											0		0	0		No knowledge of being present in the groundwater influent.
Triclopyr triethylammonium salt		N											0		0	0		No knowledge of being present in the groundwater influent.
Triethanolamine dodecylbenzenesulfonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Triethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
Triforine		N											0		0	0		No knowledge of being present in the groundwater influent.
Trimethyl phosphate		N											0		0	0		No knowledge of being present in the groundwater influent.
Trimethylamine		N											0		0	0		No knowledge of being present in the groundwater influent.
1,3,5-Trimethylbenzene		N											0		0	0		No knowledge of being present in the groundwater influent.
Trimethylchlorosilane		N											0		0	0		No knowledge of being present in the groundwater influent.
3,3,5-Trimethylcyclohexanone		N											0		0	0		No knowledge of being present in the groundwater influent.
2,2,4-Trimethylhexamethylene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
2,4,4-Trimethylhexamethylene diisocyanate		N											0		0	0		No knowledge of being present in the groundwater influent.
2,3,5-Trimethylphenyl methylcarbamate		N											0		0	0		No knowledge of being present in the groundwater influent.
Triphenyltin chloride		N											0		0	0		No knowledge of being present in the groundwater influent.

Tris(2,3-dibromopropyl) phosphate		N											0		0	0		No knowledge of being present in the groundwater influent.
Trypan blue		N											0		0	0		No knowledge of being present in the groundwater influent.
Uranyl acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Uranyl nitiate		N											0		0	0		No knowledge of being present in the groundwater influent.
Urethane (Ethyl carbamate)		N											0		0	0		No knowledge of being present in the groundwater influent.
Valone (PMP)*		N											0		0	0		No knowledge of being present in the groundwater influent.
Vanadium pentoxide		N											0		0	0		No knowledge of being present in the groundwater influent.
Vernolate		N											0		0	0		No knowledge of being present in the groundwater influent.
Vinclozolin		N											0		0	0		No knowledge of being present in the groundwater influent.
Vinylidene chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Vinyl bromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Vinyl fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Vanadyl sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Warfarin*		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc acetate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc ammonium chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc borate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc bromide		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc carbonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc chloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc fluoride		N											0		0	0		No knowledge of being present in the groundwater influent.

Zinc formate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc hydrosulfite		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc phenolsulfonate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc phosphide*		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc silicofluoride		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zirconium nitrate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zirconium potassium flouride		N											0		0	0		No knowledge of being present in the groundwater influent.
Zirconium sulfate		N											0		0	0		No knowledge of being present in the groundwater influent.
Zirconium tetrachloride		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinc cyanide		N											0		0	0		No knowledge of being present in the groundwater influent.
Zinophos*		N											0		0	0		No knowledge of being present in the groundwater influent.
Notes: *These pollutants either have FDA fish flesh concentration limits, are identified as Bioaccumulative Chemicals of Concerns (BCCs), or are restricted pesticides.																		

Appendix B – Analytical Reports

ANALYTICAL REPORT

Lab Number:	L2461774
Client:	Groundwater Treatment & Technology 627 Mount Hope Road Wharton, NJ 07885
ATTN:	Rob Orlando
Phone:	(973) 983-0901
Project Name:	TONAWANDA
Project Number:	Not Specified
Report Date:	10/30/24

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2461774-01	INFLUENT	WATER	NY	10/23/24 14:00	10/23/24

Project Name:	TONAWANDA	**Lab Number:**	L2461774
Project Number:	Not Specified	**Report Date:**	10/30/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments and solids are reported on a dry weight basis unless otherwise noted. Tissues are reported "as received" or on a wet weight basis, unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Dissolved Organic Carbon

The samples were field filtered; a filter blank was not received.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Caitlin Walukevich

Title: Technical Director/Representative Date: 10/30/24

INORGANICS
&
MISCELLANEOUS

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

SAMPLE RESULTS

Lab ID: L2461774-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 10/23/24 14:00
Date Received: 10/23/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Phosphorus, Orthophosphate	0.002	J	mg/l	0.005	0.001	1	-	10/25/24 01:35	121,4500P-E	CAR
Chemical Oxygen Demand	480		mg/l	20	6.0	1	10/29/24 10:00	10/29/24 13:38	44,410.4	CVN
COD, Soluble	93.		mg/l	20	6.0	1	10/29/24 10:00	10/29/24 13:33	44,410.4	CVN
BOD, 5 day	32		mg/l	10	NA	5	10/24/24 22:42	10/29/24 18:07	121,5210B	JRG
Total Organic Carbon	21.		mg/l	5.0	0.97	10	-	10/28/24 02:19	1,9060A	DEW
Dissolved Organic Carbon	21.		mg/l	10	0.43	10	-	10/28/24 02:19	1,9060A	DEW

Project Name: TONAWANDA
Project Number: Not Specified
Lab Number: L2461774
Report Date: 10/30/24

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1988813-1										
BOD, 5 day	ND		mg/l	2.0	NA	1	10/24/24 22:42	10/29/24 18:07	121,5210B	JRG
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1988854-1										
Phosphorus, Orthophosphate	ND		mg/l	0.005	0.001	1	-	10/25/24 01:34	121,4500P-E	CAR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1989711-1										
Dissolved Organic Carbon	ND		mg/l	1.0	0.04	1	-	10/28/24 02:19	1,9060A	DEW
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1989712-1										
Total Organic Carbon	ND		mg/l	0.50	0.09	1	-	10/28/24 02:19	1,9060A	DEW
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1990300-1										
Chemical Oxygen Demand	ND		mg/l	20	6.0	1	10/29/24 10:00	10/29/24 13:36	44,410.4	CVN
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1990303-1										
COD, Soluble	ND		mg/l	20	6.0	1	10/29/24 10:00	10/29/24 13:34	44,410.4	CVN

Lab Control Sample Analysis

Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1988813-2								
BOD, 5 day	100		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1988854-2								
Phosphorus, Orthophosphate	99		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1989711-2								
Dissolved Organic Carbon	102		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1989712-2								
Total Organic Carbon	102		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1990300-2								
Chemical Oxygen Demand	97		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1990303-2								
COD, Soluble	98		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1988813-4 QC Sample: L2461774-01 Client ID: INFLUENT												
BOD, 5 day	32	400	430	100		-	-		50-145	-		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1988854-4 QC Sample: L2462054-01 Client ID: MS Sample												
Phosphorus, Orthophosphate	0.001J	0.5	0.486	97		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1989711-4 QC Sample: L2461774-01 Client ID: INFLUENT												
Dissolved Organic Carbon	21.	160	200	109		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1989712-4 QC Sample: L2461774-01 Client ID: INFLUENT												
Total Organic Carbon	21.	160	200	114		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1990300-3 QC Sample: L2461925-01 Client ID: MS Sample												
Chemical Oxygen Demand	160	238	400	99		-	-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1990303-3 QC Sample: L2461774-01 Client ID: INFLUENT												
COD, Soluble	93.	238	320	94		-	-		90-110	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1988813-3 QC Sample: L2461774-01 Client ID: INFLUENT						
BOD, 5 day	32	25	mg/l	25		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1988854-3 QC Sample: L2462054-01 Client ID: DUP Sample						
Phosphorus, Orthophosphate	0.001J	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1989711-3 QC Sample: L2461774-01 Client ID: INFLUENT						
Dissolved Organic Carbon	21.	21	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1989712-3 QC Sample: L2461774-01 Client ID: INFLUENT						
Total Organic Carbon	21.	21	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1990300-4 QC Sample: L2461925-01 Client ID: DUP Sample						
Chemical Oxygen Demand	160	170	mg/l	6		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1990303-4 QC Sample: L2461774-01 Client ID: INFLUENT						
COD, Soluble	93.	88	mg/l	6		20

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2461774
Report Date: 10/30/24

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2461774-01A	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		DOC-9060(28)
L2461774-01B	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		DOC-9060(28)
L2461774-01C	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		DOC-9060(28)
L2461774-01D	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		TOC-9060(28)
L2461774-01E	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		TOC-9060(28)
L2461774-01F	Vial H2SO4 preserved	A	NA		4.2	Y	Absent		TOC-9060(28)
L2461774-01G	Plastic 250ml H2SO4 preserved	A	<2	<2	4.2	Y	Absent		COD-410(28)
L2461774-01H	Plastic 250ml unpreserved	A	9	9	4.2	Y	Absent		FILTER(1)
L2461774-01J	Plastic 950ml unpreserved	A	9	9	4.2	Y	Absent		OPHOS-4500(2),BOD-5210(2)
L2461774-01X	Plastic 120ml H2SO4 preserved Filtrates	A	<2	<2	4.2	Y	Absent		SCOD-410(28)

*Values in parentheses indicate holding time in days

Project Name:	TONAWANDA	**Lab Number:**	L2461774
Project Number:	Not Specified	**Report Date:**	10/30/24

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	TONAWANDA	**Lab Number:**	L2461774
Project Number:	Not Specified	**Report Date:**	10/30/24

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	TONAWANDA	**Lab Number:**	L2461774
Project Number:	Not Specified	**Report Date:**	10/30/24

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: TONAWANDA
Project Number: Not Specified
Lab Number: L2461774
Report Date: 10/30/24

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

44 Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine, 2,6-Dichlorophenol.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Nonpotable Water: EPA RSK-175 Dissolved Gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW JERSEY CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab 10/24/24

L2461774
GWTT – NJ
30OCT24

Client Information

Client: GWTT
Address: 627 Mt. Hope Rd
Wharton NJ 07885
Phone: 973-983-0501
Fax: 973-983-0903
Email: [illegible]@gwttllc.com

Project Information

Project Name: TONAWANDA
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: ROB ORLANDO
ALPHAQuote #:

Turn-Around Time

Standard ☒ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☐ NJ Full / Reduced
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Billing Information

☒ Same as Client Info
PO #

Regulatory Requirement

☐ SRS Residential/Non Residential
☐ SRS Impact to Groundwater
☐ NJ Ground Water Quality Standards
☐ NJ IGW SPLP Leachate Criteria
☐ Other

Site Information

Is this site impacted by Petroleum? Yes ☐
Petroleum Product:

These samples have been previously analyzed by Alpha ☐

For EPH, selection is REQUIRED:
☐ Category 1
☐ Category 2

For VOC, selection is REQUIRED:
☐ 1,4-Dioxane
☐ 8011

Other project specific requirements/comments:
Please specify Metals or TAL.

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	SVOC	BOD-5210 (CBOD-5210)	CBOD	COD	TOC				Total Bottle
L2461774-01	INFLUENT	10/23/24	1400	WW	RMO	X	X	X	X	X				9

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

Sample Specific Comments

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	P	P	P	V	V				
Preservative	A	A	D	D	D				

Relinquished By:	Date/Time	Received By:	Date/Time
GWTT	10/23/24 1600	PAGE	10/23/24 1430
PAGE	10/23/24 1820	PAGE	10/23/24 1843
PAGE	10/23/24	[illegible]	10/24 0180

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-14 HC (rev. 30-Sept-2013)

ANALYTICAL REPORT

Lab Number:	L2445224
Client:	Groundwater Treatment & Technology 627 Mount Hope Road Wharton, NJ 07885
ATTN:	Rob Orlando
Phone:	(973) 983-0901
Project Name:	TONAWANDA
Project Number:	Not Specified
Report Date:	08/19/24

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0826), IL (200077), IN (C-MA-03), KY (KY98045), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), OR (MA-1316), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #525-23-122-91930A1).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2445224-01	INFLUENT	WATER	NY	08/09/24 12:10	08/09/24

Project Name:	TONAWANDA	**Lab Number:**	L2445224
Project Number:	Not Specified	**Report Date:**	08/19/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments and solids are reported on a dry weight basis unless otherwise noted. Tissues are reported "as received" or on a wet weight basis, unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Oil & Grease, Hem-Grav

L2445224-01: The sample was received above the appropriate pH for the Oil & Grease analysis. The laboratory added HCl to a pH <2 just prior to analysis.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Melissa Sturgis Melissa Sturgis

Title: Technical Director/Representative Date: 08/19/24

ORGANICS

VOLATILES

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

SAMPLE RESULTS

Lab ID: L2445224-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 08/09/24 12:10
Date Received: 08/09/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260D
Analytical Date: 08/13/24 16:43
Analyst: MAG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Benzene	27		ug/l	0.50	0.16	1
Toluene	1.7	J	ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
Xylenes, Total	ND		ug/l	2.5	0.70	1
Styrene	ND		ug/l	2.5	0.70	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	103		70-130

Project Name: TONAWANDA
Project Number: Not Specified
Lab Number: L2445224
Report Date: 08/19/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 08/13/24 08:33
Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1958877-5					
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
Styrene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1958877-3 WG1958877-4								
Benzene	110		110		70-130	0		20
Toluene	120		110		70-130	9		20
Ethylbenzene	110		110		70-130	0		20
p/m-Xylene	110		110		70-130	0		20
o-Xylene	110		110		70-130	0		20
Styrene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	101		104		70-130
Toluene-d8	107		100		70-130
4-Bromofluorobenzene	92		95		70-130
Dibromofluoromethane	102		103		70-130

SEMIVOLATILES

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

SAMPLE RESULTS

Lab ID: L2445224-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 08/09/24 12:10
Date Received: 08/09/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E
Analytical Date: 08/16/24 18:34
Analyst: EK

Extraction Method: EPA 3510C
Extraction Date: 08/16/24 05:37

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.3		ug/l	2.0	0.54	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.4	1
Benzo(a)anthracene	1.9	J	ug/l	2.0	0.32	1
Benzo(b)fluoranthene	2.4		ug/l	2.0	0.53	1
Benzo(k)fluoranthene	ND		ug/l	2.0	0.62	1
Chrysene	1.8	J	ug/l	2.0	0.22	1
Fluorene	1.2	J	ug/l	2.0	0.44	1
Phenanthrene	3.4		ug/l	2.0	0.42	1
Indeno(1,2,3-cd)pyrene	1.1	J	ug/l	2.0	0.48	1
Biphenyl	ND		ug/l	2.0	0.20	1
2,4-Dimethylphenol	6.6		ug/l	5.0	2.0	1
Phenol	58.		ug/l	5.0	0.35	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	36		21-120
Phenol-d6	32		10-120
Nitrobenzene-d5	56		23-120
2-Fluorobiphenyl	55		15-120
2,4,6-Tribromophenol	40		10-120
4-Terphenyl-d14	56		41-149

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

SAMPLE RESULTS

Lab ID: L2445224-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 08/09/24 12:10
Date Received: 08/09/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 08/13/24 21:25
Analyst: CSP

Extraction Method: EPA 3510C
Extraction Date: 08/12/24 15:25

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	570.		ng/l	136	30.8	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	35		15-110

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 08/13/24 14:25
Analyst: CSP

Extraction Method: EPA 3510C
Extraction Date: 08/12/24 15:25

Parameter	Result	Qualifier	Units	RL	MDL
1,4 Dioxane by 8270E-SIM - Mansfield Lab for sample(s): 01 Batch: WG1958338-1					
1,4-Dioxane	ND		ng/l	150	33.9

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	44		15-110

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 08/16/24 12:14
Analyst: EK

Extraction Method: EPA 3510C
Extraction Date: 08/16/24 05:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1960010-1					
Naphthalene	ND		ug/l	2.0	0.54
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.4
Benzo(a)anthracene	ND		ug/l	2.0	0.32
Benzo(b)fluoranthene	ND		ug/l	2.0	0.53
Benzo(k)fluoranthene	ND		ug/l	2.0	0.62
Chrysene	ND		ug/l	2.0	0.22
Fluorene	ND		ug/l	2.0	0.44
Phenanthrene	ND		ug/l	2.0	0.42
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	0.48
Biphenyl	ND		ug/l	2.0	0.20
2,4-Dimethylphenol	ND		ug/l	5.0	2.0
Phenol	ND		ug/l	5.0	0.35

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	55		21-120
Phenol-d6	40		10-120
Nitrobenzene-d5	62		23-120
2-Fluorobiphenyl	62		15-120
2,4,6-Tribromophenol	43		10-120
4-Terphenyl-d14	58		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
1,4 Dioxane by 8270E-SIM - Mansfield Lab Associated sample(s): 01 Batch: WG1958338-2 WG1958338-3								
1,4-Dioxane	110		111		40-140	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,4-Dioxane-d8	41		45		15-110

Lab Control Sample Analysis
Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1960010-2 WG1960010-3								
Naphthalene	68		66		40-140	3		30
Bis(2-ethylhexyl)phthalate	76		77		40-140	1		30
Benzo(a)anthracene	73		73		40-140	0		30
Benzo(b)fluoranthene	74		72		40-140	3		30
Benzo(k)fluoranthene	78		76		40-140	3		30
Chrysene	73		74		40-140	1		30
Fluorene	76		73		40-140	4		30
Phenanthrene	75		78		40-140	4		30
Indeno(1,2,3-cd)pyrene	77		77		40-140	0		30
Biphenyl	64		62		40-140	3		30
2,4-Dimethylphenol	75		75		30-130	0		30
Phenol	48		46		12-110	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	61		59		21-120
Phenol-d6	47		45		10-120
Nitrobenzene-d5	72		69		23-120
2-Fluorobiphenyl	71		69		15-120
2,4,6-Tribromophenol	61		65		10-120
4-Terphenyl-d14	71		71		41-149

PESTICIDES

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

SAMPLE RESULTS

Lab ID: L2445224-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 08/09/24 12:10
Date Received: 08/09/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 08/17/24 10:33
Analyst: JAG

Extraction Method: EPA 3510C
Extraction Date: 08/15/24 07:23

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Organochlorine Pesticides by GC - Westborough Lab							
Delta-BHC	ND		ug/l	0.014	0.003	1	A
Lindane	ND		ug/l	0.014	0.003	1	A
Beta-BHC	ND		ug/l	0.014	0.004	1	A
cis-Chlordane	ND		ug/l	0.014	0.005	1	A
trans-Chlordane	ND		ug/l	0.014	0.004	1	A
Chlordane	ND		ug/l	0.143	0.033	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	51		30-150	A
Decachlorobiphenyl	**25**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	70		30-150	B
Decachlorobiphenyl	56		30-150	B

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/15/24 08:44
Analyst: PEG

Extraction Method: EPA 3510C
Extraction Date: 08/14/24 07:37

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01 Batch: WG1959080-1						
Delta-BHC	ND		ug/l	0.014	0.003	A
Lindane	ND		ug/l	0.014	0.003	A
Beta-BHC	ND		ug/l	0.014	0.004	A
cis-Chlordane	ND		ug/l	0.014	0.005	A
trans-Chlordane	ND		ug/l	0.014	0.004	A
Chlordane	ND		ug/l	0.143	0.033	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	73		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		30-150	B
Decachlorobiphenyl	65		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: TONAWANDA

Project Number: Not Specified

Lab Number: L2445224

Report Date: 08/19/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01 Batch: WG1959080-2 WG1959080-3									
Delta-BHC	74		76		30-150	4		20	A
Lindane	83		84		30-150	1		20	A
Beta-BHC	83		85		30-150	1		20	A
cis-Chlordane	80		82		30-150	3		20	A
trans-Chlordane	98		99		30-150	1		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		71		30-150	A
Decachlorobiphenyl	59		70		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		63		30-150	B
Decachlorobiphenyl	55		65		30-150	B

INORGANICS
&
MISCELLANEOUS

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

SAMPLE RESULTS

Lab ID: L2445224-01
Client ID: INFLUENT
Sample Location: NY

Date Collected: 08/09/24 12:10
Date Received: 08/09/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Oil & Grease, Hem-Grav	4.8		mg/l	4.0	4.0	1	08/15/24 16:25	08/15/24 21:31	140,1664B	IYM

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1959902-1										
Oil & Grease, Hem-Grav	ND		mg/l	4.0	4.0	1	08/15/24 16:25	08/15/24 20:40	140,1664B	IYM

Lab Control Sample Analysis

Batch Quality Control

Project Name: TONAWANDA

Project Number: Not Specified

Lab Number: L2445224

Report Date: 08/19/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1959902-2								
Oil & Grease, Hem-Grav	90		-		78-114	-		18

Matrix Spike Analysis
Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1959902-4 QC Sample: L2445332-01 Client ID: MS Sample												
Oil & Grease, Hem-Grav	47	38.8	85	97		-	-		78-114	-		18

Lab Duplicate Analysis

Batch Quality Control

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1959902-3 QC Sample: L2445332-01 Client ID: DUP Sample						
Oil & Grease, Hem-Grav	47	46	mg/l	2		18

Project Name: TONAWANDA
Project Number: Not Specified

Lab Number: L2445224
Report Date: 08/19/24

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent
D	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2445224-01A	Vial HCl preserved	D	NA		2.0	Y	Absent		NYTCL-8260(14)
L2445224-01B	Vial HCl preserved	D	NA		2.0	Y	Absent		NYTCL-8260(14)
L2445224-01C	Vial HCl preserved	D	NA		2.0	Y	Absent		NYTCL-8260(14)
L2445224-01D	Amber 100ml unpreserved	D	7	7	2.0	Y	Absent		NYTCL-8270-RVT(7)
L2445224-01E	Amber 100ml unpreserved	D	7	7	2.0	Y	Absent		NYTCL-8270-RVT(7)
L2445224-01F	Amber 120ml unpreserved	D	7	7	2.0	Y	Absent		NYTCL-8081(7)
L2445224-01G	Amber 120ml unpreserved	D	7	7	2.0	Y	Absent		NYTCL-8081(7)
L2445224-01H	Amber 250ml unpreserved	D	7	7	2.0	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2445224-01J	Amber 250ml unpreserved	D	7	7	2.0	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2445224-01K	Amber 1000ml HCl preserved	D	NA		2.0	Y	Absent		OG-1664(28)
L2445224-01L	Amber 1000ml HCl preserved	D	NA		2.0	Y	Absent		OG-1664(28)

*Values in parentheses indicate holding time in days

Project Name:	TONAWANDA	**Lab Number:**	L2445224
Project Number:	Not Specified	**Report Date:**	08/19/24

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	TONAWANDA	**Lab Number:**	L2445224
Project Number:	Not Specified	**Report Date:**	08/19/24

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	TONAWANDA	**Lab Number:**	L2445224
Project Number:	Not Specified	**Report Date:**	08/19/24

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	TONAWANDA	**Lab Number:**	L2445224
Project Number:	Not Specified	**Report Date:**	08/19/24

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

140 Method 1664,Revision B: N-Hexane Extractable Material (HEM; Oil & Grease) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry, EPA-821-R-10-001, February 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Nonpotable Water: EPA RSK-175 Dissolved Gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW JERSEY CHAIN OF CUSTODY

L2445224 16AUG24
GWTT – NJ

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab 8/9/24

Client Information
Client: GWTT
Address: 627 Mt. Horeb Rd
Lebanon, NJ 07885
Phone: 973-983-0901
Fax: 973-983-0903
Email: corlando@gwtt.com

Project Information
Project Name: TONAWANDA
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: ROB ORLANDO
ALPHAQuote #:

Turn-Around Time
Standard ☒ Due Date:
Rush (only if pre approved) ☐ # of Days:

These samples have been previously analyzed by Alpha ☐

Deliverables
☐ NJ Full / Reduced
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement
☐ SRS Residential/Non Residential
☐ SRS Impact to Groundwater
☐ NJ Ground Water Quality Standards
☐ NJ IGW SPLP Leachate Criteria
☐ Other

Billing Information
☒ Same as Client Info
PO #

Site Information
Is this site impacted by Petroleum? Yes ☐
Petroleum Product:

For EPH, selection is REQUIRED:
☐ Category 1
☐ Category 2

For VOC, selection is REQUIRED:
☐ 1,4-Dioxane
☐ 8011

Other project specific requirements/comments:
See LIST
Please specify Metals or TAL.

Sample Filtration
☒ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	VOCs	SVOCs	PESTICIDES	1,4-DIOXANE	OIL & GREASE				Total Bottle	Sample Specific Comments
45224-01	INFLUENT	8/9/24	12:10	GW	SS	X	X	X	X	X					

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	V	A	A	A	A			
Preservative	B	A	A	A	B			

Relinquished By:	Date/Time	Received By:	Date/Time
	8/9/24 1300	Don D Pace	8/9/24 1330
Don D Pace	8/9/24 1435	Paul Mazzella	8/9/24 1700
Paul Mazzella	8/9/24 2290		8/10/24 22:20

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-14 HC (rev. 30-Sept-2013)

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Analytical Report For

Inventum Engineering, P.C.

For Lab Project ID

245791

Referencing

December 2024 GWTS

Prepared

Friday, December 27, 2024

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Emily Farmen

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

Ammonia-N

Analyte	Result	Units	Qualifier	Date Analyzed
Ammonia	**4.0**	mg/L		12/16/2024

CCV recovered below acceptable limits.
Method Reference(s): EPA 350.1 Rev 2.0
Subcontractor ELAP ID: 10709

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.79**	mg/L	L	12/13/2024

Method Reference(s): EPA 335.4 Rev 1.0
Subcontractor ELAP ID: 10709

Herbicides

Analyte	Result	Units	Qualifier	Date Analyzed
2,4,5-T	<6.0	ug/L		12/17/2024
2,4,5-TP (Silvex)	<6.0	ug/L		12/17/2024
2,4-D	<10.0	ug/L		12/17/2024

Surrogate outliers indicate probable matrix interference
Method Reference(s): EPA 8321B
Subcontractor ELAP ID: 10709

Low Level Mercury

Analyte	Result	Units	Qualifier	Date Analyzed
Mercury	**70.4**	ng/L		12/16/2024

Method Reference(s): EPA 1631E
Subcontractor ELAP ID: 10709

TAL Metals (ICP)

Analyte	Result	Units	Qualifier	Date Analyzed
Aluminum	**0.288**	mg/L		12/13/2024 08:07
Antimony	< 0.0600	mg/L		12/13/2024 08:07

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

Arsenic	< 0.0100	mg/L	12/13/2024 08:07
Barium	< 0.100	mg/L	12/13/2024 08:07
Beryllium	< 0.00500	mg/L	12/13/2024 08:07
Cadmium	< 0.00500	mg/L	12/13/2024 08:07
Calcium	**187**	mg/L	12/13/2024 08:07
Chromium	< 0.0100	mg/L	12/13/2024 08:07
Cobalt	< 0.0500	mg/L	12/13/2024 08:07
Copper	**0.0299**	mg/L	12/13/2024 08:07
Iron	**2.86**	mg/L	12/13/2024 08:07
Lead	< 0.0100	mg/L	12/13/2024 08:07
Magnesium	**22.7**	mg/L	12/13/2024 08:07
Manganese	**0.352**	mg/L	12/13/2024 08:07
Nickel	< 0.0400	mg/L	12/13/2024 08:07
Potassium	**29.4**	mg/L	12/13/2024 08:07
Selenium	< 0.0200	mg/L	12/13/2024 08:07
Silver	< 0.0100	mg/L	12/13/2024 08:07
Sodium	**81.8**	mg/L	12/13/2024 08:07
Thallium	< 0.0250	mg/L	12/13/2024 08:07
Vanadium	< 0.0250	mg/L	12/13/2024 08:07
Zinc	< 0.0600	mg/L	12/13/2024 08:07

Method Reference(s): EPA 6010C
EPA 3005A
Preparation Date: 12/12/2024
Data File: 241213A

PCBs

Analyte	Result	Units	Qualifier	Date Analyzed
PCB-1016	< 1.02	ug/L		12/13/2024 18:20
PCB-1221	< 1.02	ug/L		12/13/2024 18:20
PCB-1232	< 1.02	ug/L		12/13/2024 18:20
PCB-1242	< 1.02	ug/L		12/13/2024 18:20
PCB-1248	< 1.02	ug/L		12/13/2024 18:20

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

PCB-1254	< 1.02	ug/L		12/13/2024 18:20
PCB-1260	< 1.02	ug/L		12/13/2024 18:20
PCB-1262	< 1.02	ug/L		12/13/2024 18:20
PCB-1268	< 1.02	ug/L		12/13/2024 18:20

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
Tetrachloro-m-xylene	**69.4**	14.5 - 95.5		12/13/2024 18:20

Method Reference(s): EPA 8082A
EPA 3510C
Preparation Date: 12/13/2024

pH

Analyte	Result	Units	Qualifier	Date Analyzed
pH	6.91 @ 14.1 C	S.U.		12/11/2024 17:13

Method Reference(s): SM22 4500 H+ B / EPA 9040
ELAP does not offer this test for approval as part of their laboratory certification program.

Semi-Volatile Organics (PAHs)

Analyte	Result	Units	Qualifier	Date Analyzed
2-Methylnapthalene	< 10.4	ug/L		12/17/2024 18:14
Acenaphthene	< 10.4	ug/L		12/17/2024 18:14
Acenaphthylene	< 10.4	ug/L		12/17/2024 18:14
Anthracene	< 10.4	ug/L		12/17/2024 18:14
Benzo (a) anthracene	< 10.4	ug/L		12/17/2024 18:14
Benzo (a) pyrene	< 10.4	ug/L		12/17/2024 18:14
Benzo (b) fluoranthene	< 10.4	ug/L		12/17/2024 18:14
Benzo (g,h,i) perylene	< 10.4	ug/L		12/17/2024 18:14
Benzo (k) fluoranthene	< 10.4	ug/L		12/17/2024 18:14
Chrysene	< 10.4	ug/L		12/17/2024 18:14
Dibenz (a,h) anthracene	< 10.4	ug/L		12/17/2024 18:14
Fluoranthene	< 10.4	ug/L		12/17/2024 18:14
Fluorene	< 10.4	ug/L		12/17/2024 18:14
Indeno (1,2,3-cd) pyrene	< 10.4	ug/L		12/17/2024 18:14

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

Naphthalene	**11.7**	ug/L		12/17/2024 18:14
Phenanthrene	< 10.4	ug/L		12/17/2024 18:14
Pyrene	< 10.4	ug/L		12/17/2024 18:14

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**63.7**	15.2 - 100		12/17/2024 18:14
Nitrobenzene-d5	**77.8**	47.4 - 98.9		12/17/2024 18:14
Terphenyl-d14	**74.5**	56 - 111		12/17/2024 18:14

Method Reference(s): EPA 625.1
Preparation Date: 12/16/2024
Data File: B75557.D

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Result	Units	Qualifier	Date Analyzed
1,1-Biphenyl	< 10.5	ug/L		12/17/2024 02:42
1,2,4,5-Tetrachlorobenzene	< 10.5	ug/L		12/17/2024 02:42
1,2,4-Trichlorobenzene	< 10.5	ug/L		12/17/2024 02:42
1,2-Dichlorobenzene	< 10.5	ug/L		12/17/2024 02:42
1,3-Dichlorobenzene	< 10.5	ug/L		12/17/2024 02:42
1,4-Dichlorobenzene	< 10.5	ug/L		12/17/2024 02:42
2,2-Oxybis (1-chloropropane)	< 10.5	ug/L		12/17/2024 02:42
2,3,4,6-Tetrachlorophenol	< 10.5	ug/L		12/17/2024 02:42
2,4,5-Trichlorophenol	< 10.5	ug/L		12/17/2024 02:42
2,4,6-Trichlorophenol	< 20.9	ug/L		12/17/2024 02:42
2,4-Dichlorophenol	< 10.5	ug/L		12/17/2024 02:42
2,4-Dimethylphenol	**12.8**	ug/L		12/17/2024 02:42
2,4-Dinitrophenol	< 20.9	ug/L		12/17/2024 02:42
2,4-Dinitrotoluene	< 10.5	ug/L		12/17/2024 02:42
2,6-Dinitrotoluene	< 10.5	ug/L		12/17/2024 02:42
2-Chloronaphthalene	< 10.5	ug/L		12/17/2024 02:42
2-Chlorophenol	< 10.5	ug/L		12/17/2024 02:42
2-Methylnapthalene	< 10.5	ug/L		12/17/2024 02:42

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

2-Methylphenol	**14.3**	ug/L	12/17/2024 02:42
2-Nitroaniline	< 20.9	ug/L	12/17/2024 02:42
2-Nitrophenol	< 10.5	ug/L	12/17/2024 02:42
3&4-Methylphenol	**25.0**	ug/L	12/17/2024 02:42
3,3'-Dichlorobenzidine	< 10.5	ug/L	12/17/2024 02:42
3-Nitroaniline	< 20.9	ug/L	12/17/2024 02:42
4,6-Dinitro-2-methylphenol	< 20.9	ug/L	12/17/2024 02:42
4-Bromophenyl phenyl ether	< 10.5	ug/L	12/17/2024 02:42
4-Chloro-3-methylphenol	< 10.5	ug/L	12/17/2024 02:42
4-Chloroaniline	< 10.5	ug/L	12/17/2024 02:42
4-Chlorophenyl phenyl ether	< 10.5	ug/L	12/17/2024 02:42
4-Nitroaniline	< 20.9	ug/L	12/17/2024 02:42
4-Nitrophenol	< 20.9	ug/L	12/17/2024 02:42
Acenaphthene	< 10.5	ug/L	12/17/2024 02:42
Acenaphthylene	< 10.5	ug/L	12/17/2024 02:42
Acetophenone	< 10.5	ug/L	12/17/2024 02:42
Anthracene	< 10.5	ug/L	12/17/2024 02:42
Atrazine	< 26.2	ug/L	12/17/2024 02:42
Benzaldehyde	< 10.5	ug/L	12/17/2024 02:42
Benzo (a) anthracene	< 10.5	ug/L	12/17/2024 02:42
Benzo (a) pyrene	< 10.5	ug/L	12/17/2024 02:42
Benzo (b) fluoranthene	< 10.5	ug/L	12/17/2024 02:42
Benzo (g,h,i) perylene	< 10.5	ug/L	12/17/2024 02:42
Benzo (k) fluoranthene	< 10.5	ug/L	12/17/2024 02:42
Bis (2-chloroethoxy) methane	< 10.5	ug/L	12/17/2024 02:42
Bis (2-chloroethyl) ether	< 10.5	ug/L	12/17/2024 02:42
Bis (2-ethylhexyl) phthalate	< 10.5	ug/L	12/17/2024 02:42
Butylbenzylphthalate	< 10.5	ug/L	12/17/2024 02:42
Caprolactam	< 10.5	ug/L	12/17/2024 02:42
Carbazole	< 10.5	ug/L	12/17/2024 02:42

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

Chrysene	< 10.5	ug/L	12/17/2024 02:42
Dibenz (a,h) anthracene	< 10.5	ug/L	12/17/2024 02:42
Dibenzofuran	< 10.5	ug/L	12/17/2024 02:42
Diethyl phthalate	< 10.5	ug/L	12/17/2024 02:42
Dimethyl phthalate	< 20.9	ug/L	12/17/2024 02:42
Di-n-butyl phthalate	< 10.5	ug/L	12/17/2024 02:42
Di-n-octylphthalate	< 10.5	ug/L	12/17/2024 02:42
Fluoranthene	< 10.5	ug/L	12/17/2024 02:42
Fluorene	< 10.5	ug/L	12/17/2024 02:42
Hexachlorobenzene	< 10.5	ug/L	12/17/2024 02:42
Hexachlorobutadiene	< 10.5	ug/L	12/17/2024 02:42
Hexachlorocyclopentadiene	< 10.5	ug/L	12/17/2024 02:42
Hexachloroethane	< 10.5	ug/L	12/17/2024 02:42
Indeno (1,2,3-cd) pyrene	< 10.5	ug/L	12/17/2024 02:42
Isophorone	< 10.5	ug/L	12/17/2024 02:42
Naphthalene	**18.7**	ug/L	12/17/2024 02:42
Nitrobenzene	< 10.5	ug/L	12/17/2024 02:42
N-Nitroso-di-n-propylamine	< 10.5	ug/L	12/17/2024 02:42
N-Nitrosodiphenylamine	< 10.5	ug/L	12/17/2024 02:42
Pentachlorophenol	< 20.9	ug/L	12/17/2024 02:42
Phenanthrene	< 10.5	ug/L	12/17/2024 02:42
Phenol	**12.3**	ug/L	12/17/2024 02:42
Pyrene	< 10.5	ug/L	12/17/2024 02:42
Pyridine	< 10.5	ug/L	12/17/2024 02:42

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024

Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00

Matrix: Aq Liquid **Date Received** 12/11/2024

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2,4,6-Tribromophenol	**94.9**	49.6 - 117		12/17/2024 02:42
2-Fluorobiphenyl	**64.3**	15.2 - 100		12/17/2024 02:42
2-Fluorophenol	**44.3**	12.7 - 105		12/17/2024 02:42
Nitrobenzene-d5	**85.1**	47.4 - 98.9		12/17/2024 02:42
Phenol-d5	**29.6**	10 - 108		12/17/2024 02:42
Terphenyl-d14	**92.8**	56 - 111		12/17/2024 02:42

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024
Data File: B75526.D

Total Suspended Solids

Analyte	Result	Units	Qualifier	Date Analyzed
Solids, Suspended	**17.0**	mg/L		12/16/2024

Method Reference(s): SM 2540 D - 2015
Subcontractor ELAP ID: 10709

Chlorinated Pesticides

Analyte	Result	Units	Qualifier	Date Analyzed
4,4-DDD	<0.098	ug/L		12/13/2024
4,4-DDE	<0.098	ug/L		12/13/2024
4,4-DDT	<0.098	ug/L		12/13/2024
Aldrin	<0.049	ug/L		12/13/2024
alpha-BHC	<0.049	ug/L		12/13/2024
beta-BHC	<0.049	ug/L		12/13/2024
cis-Chlordane	<0.049	ug/L		12/13/2024
delta-BHC	<0.049	ug/L		12/13/2024
Dieldrin	<0.098	ug/L		12/13/2024
Endosulfan I	<0.049	ug/L		12/13/2024
Endosulfan II	<0.098	ug/L	L	12/13/2024
Endosulfan Sulfate	<0.098	ug/L	L	12/13/2024

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

Endrin	<0.098	ug/L		12/13/2024
Endrin Aldehyde	<0.098	ug/L	L	12/13/2024
Endrin Ketone	<0.098	ug/L	L	12/13/2024
gamma-BHC (Lindane)	<0.049	ug/L		12/13/2024
Heptachlor	<0.049	ug/L		12/13/2024
Heptachlor Epoxide	<0.049	ug/L		12/13/2024
Methoxychlor	<0.490	ug/L	L	12/13/2024
Toxaphene	<0.980	ug/L		12/13/2024
trans-Chlordane	<0.049	ug/L		12/13/2024

Method Reference(s): EPA 8081B
Subcontractor ELAP ID: 10709

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/18/2024 13:27
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/18/2024 13:27
1,1,2-Trichloroethane	< 2.00	ug/L		12/18/2024 13:27
1,1-Dichloroethane	< 2.00	ug/L		12/18/2024 13:27
1,1-Dichloroethene	< 2.00	ug/L		12/18/2024 13:27
1,2,3-Trichlorobenzene	< 5.00	ug/L		12/18/2024 13:27
1,2,4-Trichlorobenzene	< 5.00	ug/L		12/18/2024 13:27
1,2-Dibromo-3-Chloropropane	< 10.0	ug/L		12/18/2024 13:27
1,2-Dibromoethane	< 2.00	ug/L		12/18/2024 13:27
1,2-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:27
1,2-Dichloroethane	< 2.00	ug/L		12/18/2024 13:27
1,2-Dichloropropane	< 2.00	ug/L		12/18/2024 13:27
1,3-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:27
1,4-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:27
1,4-Dioxane	< 20.0	ug/L		12/18/2024 13:27
2-Butanone	< 10.0	ug/L		12/18/2024 13:27
2-Hexanone	< 5.00	ug/L		12/18/2024 13:27

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00
Matrix: Aq Liquid **Date Received** 12/11/2024

4-Methyl-2-pentanone	< 5.00	ug/L		12/18/2024	13:27
Acetone	< 10.0	ug/L		12/18/2024	13:27
Benzene	**4.29**	ug/L		12/18/2024	13:27
Bromochloromethane	< 5.00	ug/L		12/18/2024	13:27
Bromodichloromethane	< 2.00	ug/L		12/18/2024	13:27
Bromoform	< 5.00	ug/L		12/18/2024	13:27
Bromomethane	< 2.00	ug/L		12/18/2024	13:27
Carbon disulfide	< 2.00	ug/L		12/18/2024	13:27
Carbon Tetrachloride	< 2.00	ug/L		12/18/2024	13:27
Chlorobenzene	< 2.00	ug/L		12/18/2024	13:27
Chloroethane	< 2.00	ug/L		12/18/2024	13:27
Chloroform	< 2.00	ug/L		12/18/2024	13:27
Chloromethane	< 2.00	ug/L		12/18/2024	13:27
cis-1,2-Dichloroethene	< 2.00	ug/L		12/18/2024	13:27
cis-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024	13:27
Cyclohexane	< 10.0	ug/L		12/18/2024	13:27
Dibromochloromethane	< 2.00	ug/L		12/18/2024	13:27
Dichlorodifluoromethane	< 2.00	ug/L		12/18/2024	13:27
Ethylbenzene	**5.77**	ug/L		12/18/2024	13:27
Freon 113	< 2.00	ug/L		12/18/2024	13:27
Isopropylbenzene	< 2.00	ug/L		12/18/2024	13:27
m,p-Xylene	**2.84**	ug/L		12/18/2024	13:27
Methyl acetate	< 2.00	ug/L		12/18/2024	13:27
Methyl tert-butyl Ether	< 2.00	ug/L		12/18/2024	13:27
Methylcyclohexane	< 2.00	ug/L		12/18/2024	13:27
Methylene chloride	**14.2**	ug/L	BL	12/18/2024	13:27
o-Xylene	**4.02**	ug/L		12/18/2024	13:27
Styrene	< 5.00	ug/L		12/18/2024	13:27
Tetrachloroethene	< 2.00	ug/L		12/18/2024	13:27
Toluene	**2.08**	ug/L		12/18/2024	13:27

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024

Lab Sample ID: 245791-01 **Date Sampled** 12/11/2024 11:00

Matrix: Aq Liquid **Date Received** 12/11/2024

trans-1,2-Dichloroethene	< 2.00	ug/L		12/18/2024 13:27
trans-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024 13:27
Trichloroethene	< 2.00	ug/L		12/18/2024 13:27
Trichlorofluoromethane	< 2.00	ug/L		12/18/2024 13:27
Vinyl chloride	< 2.00	ug/L		12/18/2024 13:27

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**92.7**	80.5 - 124		12/18/2024 13:27
4-Bromofluorobenzene	**92.4**	78.2 - 114		12/18/2024 13:27
Pentafluorobenzene	**104**	90.8 - 109		12/18/2024 13:27
Toluene-D8	**99.8**	90.3 - 110		12/18/2024 13:27

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z28394.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Ammonia-N

Analyte	Result	Units	Qualifier	Date Analyzed
Ammonia	**4.2**	mg/L		12/16/2024

CCV recovered below acceptable limits.
Method Reference(s): EPA 350.1 Rev 2.0
Subcontractor ELAP ID: 10709

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.17**	mg/L	L	12/13/2024

Method Reference(s): EPA 335.4 Rev 1.0
Subcontractor ELAP ID: 10709

Herbicides

Analyte	Result	Units	Qualifier	Date Analyzed
2,4,5-T	<6.0	ug/L		12/17/2024
2,4,5-TP (Silvex)	<6.0	ug/L		12/17/2024
2,4-D	<10.0	ug/L		12/17/2024

Surrogate outliers indicate probable matrix interference
Method Reference(s): EPA 8321B
Subcontractor ELAP ID: 10709

Low Level Mercury

Analyte	Result	Units	Qualifier	Date Analyzed
Mercury	**10.9**	ng/L		12/16/2024

Method Reference(s): EPA 1631E
Subcontractor ELAP ID: 10709

TAL Metals (ICP)

Analyte	Result	Units	Qualifier	Date Analyzed
Aluminum	< 0.100	mg/L		12/13/2024 08:10
Antimony	< 0.0600	mg/L		12/13/2024 08:10

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Arsenic	< 0.0100	mg/L		12/13/2024 08:10
Barium	< 0.100	mg/L		12/13/2024 08:10
Beryllium	< 0.00500	mg/L		12/13/2024 08:10
Cadmium	< 0.00500	mg/L		12/13/2024 08:10
Calcium	**231**	mg/L		12/13/2024 08:10
Chromium	< 0.0100	mg/L		12/13/2024 08:10
Cobalt	< 0.0500	mg/L		12/13/2024 08:10
Copper	< 0.0200	mg/L		12/13/2024 08:10
Iron	**0.191**	mg/L		12/13/2024 08:10
Lead	< 0.0100	mg/L		12/13/2024 08:10
Magnesium	**28.1**	mg/L		12/13/2024 08:10
Manganese	**0.422**	mg/L		12/13/2024 08:10
Nickel	< 0.0400	mg/L		12/13/2024 08:10
Potassium	**20.0**	mg/L		12/13/2024 08:10
Selenium	< 0.0200	mg/L		12/13/2024 08:10
Silver	< 0.0100	mg/L		12/13/2024 08:10
Sodium	**95.2**	mg/L	M	12/13/2024 08:10
Thallium	< 0.0250	mg/L		12/13/2024 08:10
Vanadium	< 0.0250	mg/L		12/13/2024 08:10
Zinc	< 0.0600	mg/L		12/13/2024 08:10

Method Reference(s): EPA 6010C
EPA 3005A
Preparation Date: 12/12/2024
Data File: 241213A

PCBs

Analyte	Result	Units	Qualifier	Date Analyzed
PCB-1016	< 1.08	ug/L		12/13/2024 18:34
PCB-1221	< 1.08	ug/L		12/13/2024 18:34
PCB-1232	< 1.08	ug/L		12/13/2024 18:34
PCB-1242	< 1.08	ug/L		12/13/2024 18:34
PCB-1248	< 1.08	ug/L		12/13/2024 18:34

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

PCB-1254	< 1.08	ug/L		12/13/2024 18:34
PCB-1260	< 1.08	ug/L		12/13/2024 18:34
PCB-1262	< 1.08	ug/L		12/13/2024 18:34
PCB-1268	< 1.08	ug/L		12/13/2024 18:34

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
Tetrachloro-m-xylene	**86.9**	14.5 - 95.5		12/13/2024 18:34

Method Reference(s): EPA 8082A
EPA 3510C
Preparation Date: 12/13/2024

pH

Analyte	Result	Units	Qualifier	Date Analyzed
pH	7.35 @ 14.7 C	S.U.		12/11/2024 17:18

Method Reference(s): SM22 4500 H+ B / EPA 9040
ELAP does not offer this test for approval as part of their laboratory certification program.

Semi-Volatile Organics (PAHs)

Analyte	Result	Units	Qualifier	Date Analyzed
2-Methylnapthalene	< 10.8	ug/L		12/17/2024 18:41
Acenaphthene	< 10.8	ug/L		12/17/2024 18:41
Acenaphthylene	< 10.8	ug/L		12/17/2024 18:41
Anthracene	< 10.8	ug/L		12/17/2024 18:41
Benzo (a) anthracene	< 10.8	ug/L		12/17/2024 18:41
Benzo (a) pyrene	< 10.8	ug/L		12/17/2024 18:41
Benzo (b) fluoranthene	< 10.8	ug/L		12/17/2024 18:41
Benzo (g,h,i) perylene	< 10.8	ug/L		12/17/2024 18:41
Benzo (k) fluoranthene	< 10.8	ug/L		12/17/2024 18:41
Chrysene	< 10.8	ug/L		12/17/2024 18:41
Dibenz (a,h) anthracene	< 10.8	ug/L		12/17/2024 18:41
Fluoranthene	< 10.8	ug/L		12/17/2024 18:41
Fluorene	< 10.8	ug/L		12/17/2024 18:41
Indeno (1,2,3-cd) pyrene	< 10.8	ug/L		12/17/2024 18:41

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Naphthalene	< 10.8	ug/L		12/17/2024 18:41
Phenanthrene	< 10.8	ug/L		12/17/2024 18:41
Pyrene	< 10.8	ug/L		12/17/2024 18:41

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**56.8**	15.2 - 100		12/17/2024 18:41
Nitrobenzene-d5	**65.0**	47.4 - 98.9		12/17/2024 18:41
Terphenyl-d14	**74.7**	56 - 111		12/17/2024 18:41

Method Reference(s): EPA 625.1
Preparation Date: 12/16/2024
Data File: B75558.D

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Result	Units	Qualifier	Date Analyzed
1,1-Biphenyl	< 10.4	ug/L		12/17/2024 03:10
1,2,4,5-Tetrachlorobenzene	< 10.4	ug/L		12/17/2024 03:10
1,2,4-Trichlorobenzene	< 10.4	ug/L		12/17/2024 03:10
1,2-Dichlorobenzene	< 10.4	ug/L		12/17/2024 03:10
1,3-Dichlorobenzene	< 10.4	ug/L		12/17/2024 03:10
1,4-Dichlorobenzene	< 10.4	ug/L		12/17/2024 03:10
2,2-Oxybis (1-chloropropane)	< 10.4	ug/L		12/17/2024 03:10
2,3,4,6-Tetrachlorophenol	< 10.4	ug/L		12/17/2024 03:10
2,4,5-Trichlorophenol	< 10.4	ug/L		12/17/2024 03:10
2,4,6-Trichlorophenol	< 20.8	ug/L		12/17/2024 03:10
2,4-Dichlorophenol	< 10.4	ug/L		12/17/2024 03:10
2,4-Dimethylphenol	< 10.4	ug/L		12/17/2024 03:10
2,4-Dinitrophenol	< 20.8	ug/L		12/17/2024 03:10
2,4-Dinitrotoluene	< 10.4	ug/L		12/17/2024 03:10
2,6-Dinitrotoluene	< 10.4	ug/L		12/17/2024 03:10
2-Chloronaphthalene	< 10.4	ug/L		12/17/2024 03:10
2-Chlorophenol	< 10.4	ug/L		12/17/2024 03:10
2-Methylnapthalene	< 10.4	ug/L		12/17/2024 03:10

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

2-Methylphenol	< 10.4	ug/L	12/17/2024 03:10
2-Nitroaniline	< 20.8	ug/L	12/17/2024 03:10
2-Nitrophenol	< 10.4	ug/L	12/17/2024 03:10
3&4-Methylphenol	< 10.4	ug/L	12/17/2024 03:10
3,3'-Dichlorobenzidine	< 10.4	ug/L	12/17/2024 03:10
3-Nitroaniline	< 20.8	ug/L	12/17/2024 03:10
4,6-Dinitro-2-methylphenol	< 20.8	ug/L	12/17/2024 03:10
4-Bromophenyl phenyl ether	< 10.4	ug/L	12/17/2024 03:10
4-Chloro-3-methylphenol	< 10.4	ug/L	12/17/2024 03:10
4-Chloroaniline	< 10.4	ug/L	12/17/2024 03:10
4-Chlorophenyl phenyl ether	< 10.4	ug/L	12/17/2024 03:10
4-Nitroaniline	< 20.8	ug/L	12/17/2024 03:10
4-Nitrophenol	< 20.8	ug/L	12/17/2024 03:10
Acenaphthene	< 10.4	ug/L	12/17/2024 03:10
Acenaphthylene	< 10.4	ug/L	12/17/2024 03:10
Acetophenone	< 10.4	ug/L	12/17/2024 03:10
Anthracene	< 10.4	ug/L	12/17/2024 03:10
Atrazine	< 26.0	ug/L	12/17/2024 03:10
Benzaldehyde	< 10.4	ug/L	12/17/2024 03:10
Benzo (a) anthracene	< 10.4	ug/L	12/17/2024 03:10
Benzo (a) pyrene	< 10.4	ug/L	12/17/2024 03:10
Benzo (b) fluoranthene	< 10.4	ug/L	12/17/2024 03:10
Benzo (g,h,i) perylene	< 10.4	ug/L	12/17/2024 03:10
Benzo (k) fluoranthene	< 10.4	ug/L	12/17/2024 03:10
Bis (2-chloroethoxy) methane	< 10.4	ug/L	12/17/2024 03:10
Bis (2-chloroethyl) ether	< 10.4	ug/L	12/17/2024 03:10
Bis (2-ethylhexyl) phthalate	< 10.4	ug/L	12/17/2024 03:10
Butylbenzylphthalate	< 10.4	ug/L	12/17/2024 03:10
Caprolactam	< 10.4	ug/L	12/17/2024 03:10
Carbazole	< 10.4	ug/L	12/17/2024 03:10

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Chrysene	< 10.4	ug/L	12/17/2024 03:10
Dibenz (a,h) anthracene	< 10.4	ug/L	12/17/2024 03:10
Dibenzofuran	< 10.4	ug/L	12/17/2024 03:10
Diethyl phthalate	< 10.4	ug/L	12/17/2024 03:10
Dimethyl phthalate	< 20.8	ug/L	12/17/2024 03:10
Di-n-butyl phthalate	< 10.4	ug/L	12/17/2024 03:10
Di-n-octylphthalate	< 10.4	ug/L	12/17/2024 03:10
Fluoranthene	< 10.4	ug/L	12/17/2024 03:10
Fluorene	< 10.4	ug/L	12/17/2024 03:10
Hexachlorobenzene	< 10.4	ug/L	12/17/2024 03:10
Hexachlorobutadiene	< 10.4	ug/L	12/17/2024 03:10
Hexachlorocyclopentadiene	< 10.4	ug/L	12/17/2024 03:10
Hexachloroethane	< 10.4	ug/L	12/17/2024 03:10
Indeno (1,2,3-cd) pyrene	< 10.4	ug/L	12/17/2024 03:10
Isophorone	< 10.4	ug/L	12/17/2024 03:10
Naphthalene	< 10.4	ug/L	12/17/2024 03:10
Nitrobenzene	< 10.4	ug/L	12/17/2024 03:10
N-Nitroso-di-n-propylamine	< 10.4	ug/L	12/17/2024 03:10
N-Nitrosodiphenylamine	< 10.4	ug/L	12/17/2024 03:10
Pentachlorophenol	< 20.8	ug/L	12/17/2024 03:10
Phenanthrene	< 10.4	ug/L	12/17/2024 03:10
Phenol	< 10.4	ug/L	12/17/2024 03:10
Pyrene	< 10.4	ug/L	12/17/2024 03:10
Pyridine	< 10.4	ug/L	12/17/2024 03:10

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2,4,6-Tribromophenol	**88.6**	49.6 - 117		12/17/2024 03:10
2-Fluorobiphenyl	**58.9**	15.2 - 100		12/17/2024 03:10
2-Fluorophenol	**43.0**	12.7 - 105		12/17/2024 03:10
Nitrobenzene-d5	**79.3**	47.4 - 98.9		12/17/2024 03:10
Phenol-d5	**28.7**	10 - 108		12/17/2024 03:10
Terphenyl-d14	**85.7**	56 - 111		12/17/2024 03:10

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024
Data File: B75527.D

Total Suspended Solids

Analyte	Result	Units	Qualifier	Date Analyzed
Solids, Suspended	**2.3**	mg/L		12/16/2024

Method Reference(s): SM 2540 D - 2015
Subcontractor ELAP ID: 10709

Chlorinated Pesticides

Analyte	Result	Units	Qualifier	Date Analyzed
4,4-DDD	<0.100	ug/L		12/13/2024
4,4-DDE	<0.100	ug/L		12/13/2024
4,4-DDT	<0.100	ug/L		12/13/2024
Aldrin	<0.050	ug/L		12/13/2024
alpha-BHC	<0.050	ug/L		12/13/2024
beta-BHC	<0.050	ug/L		12/13/2024
cis-Chlordane	<0.050	ug/L		12/13/2024
delta-BHC	<0.050	ug/L		12/13/2024
Dieldrin	<0.100	ug/L		12/13/2024
Endosulfan I	<0.050	ug/L		12/13/2024
Endosulfan II	<0.100	ug/L	L	12/13/2024
Endosulfan Sulfate	<0.100	ug/L	L	12/13/2024

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

Endrin	<0.100	ug/L		12/13/2024
Endrin Aldehyde	<0.100	ug/L	L	12/13/2024
Endrin Ketone	<0.100	ug/L	L	12/13/2024
gamma-BHC (Lindane)	<0.050	ug/L		12/13/2024
Heptachlor	<0.050	ug/L		12/13/2024
Heptachlor Epoxide	<0.050	ug/L		12/13/2024
Methoxychlor	<0.500	ug/L	L	12/13/2024
Toxaphene	<1.00	ug/L		12/13/2024
trans-Chlordane	<0.050	ug/L		12/13/2024

Method Reference(s): EPA 8081B
Subcontractor ELAP ID: 10709

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/18/2024 13:47
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/18/2024 13:47
1,1,2-Trichloroethane	< 2.00	ug/L		12/18/2024 13:47
1,1-Dichloroethane	< 2.00	ug/L		12/18/2024 13:47
1,1-Dichloroethene	< 2.00	ug/L		12/18/2024 13:47
1,2,3-Trichlorobenzene	< 5.00	ug/L		12/18/2024 13:47
1,2,4-Trichlorobenzene	< 5.00	ug/L		12/18/2024 13:47
1,2-Dibromo-3-Chloropropane	< 10.0	ug/L		12/18/2024 13:47
1,2-Dibromoethane	< 2.00	ug/L		12/18/2024 13:47
1,2-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:47
1,2-Dichloroethane	< 2.00	ug/L		12/18/2024 13:47
1,2-Dichloropropane	< 2.00	ug/L		12/18/2024 13:47
1,3-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:47
1,4-Dichlorobenzene	< 2.00	ug/L		12/18/2024 13:47
1,4-Dioxane	< 20.0	ug/L		12/18/2024 13:47
2-Butanone	< 10.0	ug/L		12/18/2024 13:47
2-Hexanone	< 5.00	ug/L		12/18/2024 13:47

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

4-Methyl-2-pentanone	< 5.00	ug/L		12/18/2024	13:47
Acetone	< 10.0	ug/L		12/18/2024	13:47
Benzene	< 1.00	ug/L		12/18/2024	13:47
Bromochloromethane	< 5.00	ug/L		12/18/2024	13:47
Bromodichloromethane	< 2.00	ug/L		12/18/2024	13:47
Bromoform	< 5.00	ug/L		12/18/2024	13:47
Bromomethane	< 2.00	ug/L		12/18/2024	13:47
Carbon disulfide	< 2.00	ug/L		12/18/2024	13:47
Carbon Tetrachloride	< 2.00	ug/L		12/18/2024	13:47
Chlorobenzene	< 2.00	ug/L		12/18/2024	13:47
Chloroethane	< 2.00	ug/L		12/18/2024	13:47
Chloroform	< 2.00	ug/L		12/18/2024	13:47
Chloromethane	< 2.00	ug/L		12/18/2024	13:47
cis-1,2-Dichloroethene	< 2.00	ug/L		12/18/2024	13:47
cis-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024	13:47
Cyclohexane	< 10.0	ug/L		12/18/2024	13:47
Dibromochloromethane	< 2.00	ug/L		12/18/2024	13:47
Dichlorodifluoromethane	< 2.00	ug/L		12/18/2024	13:47
Ethylbenzene	< 2.00	ug/L		12/18/2024	13:47
Freon 113	< 2.00	ug/L		12/18/2024	13:47
Isopropylbenzene	< 2.00	ug/L		12/18/2024	13:47
m,p-Xylene	< 2.00	ug/L		12/18/2024	13:47
Methyl acetate	< 2.00	ug/L		12/18/2024	13:47
Methyl tert-butyl Ether	< 2.00	ug/L		12/18/2024	13:47
Methylcyclohexane	< 2.00	ug/L		12/18/2024	13:47
Methylene chloride	**17.5**	ug/L	BL	12/18/2024	13:47
o-Xylene	< 2.00	ug/L		12/18/2024	13:47
Styrene	< 5.00	ug/L		12/18/2024	13:47
Tetrachloroethene	< 2.00	ug/L		12/18/2024	13:47
Toluene	< 2.00	ug/L		12/18/2024	13:47

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled** 12/11/2024 11:10
Matrix: Aq Liquid **Date Received** 12/11/2024

trans-1,2-Dichloroethene	< 2.00	ug/L		12/18/2024 13:47
trans-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024 13:47
Trichloroethene	< 2.00	ug/L		12/18/2024 13:47
Trichlorofluoromethane	< 2.00	ug/L		12/18/2024 13:47
Vinyl chloride	< 2.00	ug/L		12/18/2024 13:47

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**95.3**	80.5 - 124		12/18/2024 13:47
4-Bromofluorobenzene	**88.8**	78.2 - 114		12/18/2024 13:47
Pentafluorobenzene	**102**	90.8 - 109		12/18/2024 13:47
Toluene-D8	**99.8**	90.3 - 110		12/18/2024 13:47

Method Reference(s): EPA 8260C
EPA 5030C
Data File: z28395.D

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier:	Between GAC-12112024		
Lab Sample ID:	245791-03	**Date Sampled**	12/11/2024 11:25
Matrix:	Aq Liquid	**Date Received**	12/11/2024

Total Cyanide

Analyte	Result	Units	Qualifier	Date Analyzed
Cyanide, Total	**0.17**	mg/L		12/17/2024

Method Reference(s): EPA 9012B
Subcontractor ELAP ID: 10709

Semi-Volatile Organics (PAHs)

Analyte	Result	Units	Qualifier	Date Analyzed
2-Methylnapthalene	< 10.1	ug/L		12/17/2024 19:08
Acenaphthene	< 10.1	ug/L		12/17/2024 19:08
Acenaphthylene	< 10.1	ug/L		12/17/2024 19:08
Anthracene	< 10.1	ug/L		12/17/2024 19:08
Benzo (a) anthracene	< 10.1	ug/L		12/17/2024 19:08
Benzo (a) pyrene	< 10.1	ug/L		12/17/2024 19:08
Benzo (b) fluoranthene	< 10.1	ug/L		12/17/2024 19:08
Benzo (g,h,i) perylene	< 10.1	ug/L		12/17/2024 19:08
Benzo (k) fluoranthene	< 10.1	ug/L		12/17/2024 19:08
Chrysene	< 10.1	ug/L		12/17/2024 19:08
Dibenz (a,h) anthracene	< 10.1	ug/L		12/17/2024 19:08
Fluoranthene	< 10.1	ug/L		12/17/2024 19:08
Fluorene	< 10.1	ug/L		12/17/2024 19:08
Indeno (1,2,3-cd) pyrene	< 10.1	ug/L		12/17/2024 19:08
Naphthalene	< 10.1	ug/L		12/17/2024 19:08
Phenanthrene	< 10.1	ug/L		12/17/2024 19:08
Pyrene	< 10.1	ug/L		12/17/2024 19:08

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PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Between GAC-12112024
Lab Sample ID: 245791-03 **Date Sampled** 12/11/2024 11:25
Matrix: Aq Liquid **Date Received** 12/11/2024

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2-Fluorobiphenyl	**59.8**	15.2 - 100		12/17/2024 19:08
Nitrobenzene-d5	**66.4**	47.4 - 98.9		12/17/2024 19:08
Terphenyl-d14	**66.9**	56 - 111		12/17/2024 19:08

Method Reference(s): EPA 625.1
Preparation Date: 12/16/2024
Data File: B75559.D

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed
1,1,1-Trichloroethane	< 2.00	ug/L		12/18/2024 14:07
1,1,2,2-Tetrachloroethane	< 2.00	ug/L		12/18/2024 14:07
1,1,2-Trichloroethane	< 2.00	ug/L		12/18/2024 14:07
1,1-Dichloroethane	< 2.00	ug/L		12/18/2024 14:07
1,1-Dichloroethene	< 2.00	ug/L		12/18/2024 14:07
1,2-Dichlorobenzene	< 2.00	ug/L		12/18/2024 14:07
1,2-Dichloroethane	< 2.00	ug/L		12/18/2024 14:07
1,2-Dichloropropane	< 2.00	ug/L		12/18/2024 14:07
1,3-Dichlorobenzene	< 2.00	ug/L		12/18/2024 14:07
1,4-Dichlorobenzene	< 2.00	ug/L		12/18/2024 14:07
2-Chloroethyl vinyl Ether	< 5.00	ug/L		12/18/2024 14:07
Benzene	< 1.00	ug/L		12/18/2024 14:07
Bromodichloromethane	< 2.00	ug/L		12/18/2024 14:07
Bromoform	< 5.00	ug/L		12/18/2024 14:07
Bromomethane	< 2.00	ug/L		12/18/2024 14:07
Carbon Tetrachloride	< 2.00	ug/L		12/18/2024 14:07
Chlorobenzene	< 2.00	ug/L		12/18/2024 14:07
Chloroethane	< 2.00	ug/L		12/18/2024 14:07
Chloroform	< 2.00	ug/L		12/18/2024 14:07
Chloromethane	< 2.00	ug/L		12/18/2024 14:07
cis-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024 14:07

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Between GAC-12112024
Lab Sample ID: 245791-03 **Date Sampled** 12/11/2024 11:25
Matrix: Aq Liquid **Date Received** 12/11/2024

Dibromochloromethane	< 2.00	ug/L		12/18/2024	14:07
Ethylbenzene	< 2.00	ug/L		12/18/2024	14:07
Methylene chloride	**18.3**	ug/L	BL	12/18/2024	14:07
Tetrachloroethene	< 2.00	ug/L		12/18/2024	14:07
Toluene	< 2.00	ug/L		12/18/2024	14:07
trans-1,2-Dichloroethene	< 2.00	ug/L		12/18/2024	14:07
trans-1,3-Dichloropropene	< 2.00	ug/L		12/18/2024	14:07
Trichloroethene	< 2.00	ug/L		12/18/2024	14:07
Trichlorofluoromethane	< 2.00	ug/L		12/18/2024	14:07
Vinyl chloride	< 2.00	ug/L		12/18/2024	14:07

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed	
1,2-Dichloroethane-d4	**96.9**	80.5 - 124		12/18/2024	14:07
4-Bromofluorobenzene	**91.4**	78.2 - 114		12/18/2024	14:07
Pentafluorobenzene	**105**	90.8 - 109		12/18/2024	14:07
Toluene-D8	**103**	90.3 - 110		12/18/2024	14:07

Method Reference(s): EPA 624.1
Data File: z28396.D
The analyte 2-Chloroethyl vinyl Ether does not recover from acid preserved VOA vials.

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled:** 12/11/2024
Matrix: Aq Liquid **Date Received:** 12/11/2024

Semi-Volatile Tentatively Identified Compounds

Tentatively Identified Compound	Result	Units	Qualifier	Date Analyzed
Unknown	**13.2**	ug/L		12/17/2024
Unknown alkyl phenol	**11.0**	ug/L		12/17/2024
Unknown organic acid	**20.3**	ug/L		12/17/2024
Unknown	**45.1**	ug/L	B	12/17/2024
Unknown amide	**29.4**	ug/L	B	12/17/2024
Unknown amide	**294**	ug/L	B	12/17/2024
Unknown amide	**21.1**	ug/L	B	12/17/2024
Total Reported TICS	**434**	ug/L		12/17/2024

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Influent-12112024
Lab Sample ID: 245791-01 **Date Sampled:** 12/11/2024
Matrix: Aq Liquid **Date Received:** 12/11/2024

Volatile Tentatively Identified Compounds

Tentatively Identified Compound	Result	Units	Qualifier	Date Analyzed
Indane	**8.83**	ug/L		12/18/2024
Indene	**8.58**	ug/L		12/18/2024
Naphthalene	**26.6**	ug/L		12/18/2024
Total Reported TICS	**44.0**	ug/L		12/18/2024

Method Reference(s): EPA 8260C
EPA 5030C

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

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PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier: Effluent-12112024
Lab Sample ID: 245791-02 **Date Sampled:** 12/11/2024
Matrix: Aq Liquid **Date Received:** 12/11/2024

Semi-Volatile Tentatively Identified Compounds

Tentatively Identified Compound	Result	Units	Qualifier	Date Analyzed
Unknown organic acid	**19.7**	ug/L		12/17/2024
Unknown	**42.0**	ug/L	B	12/17/2024
Unknown amide	**32.0**	ug/L	B	12/17/2024
Unknown amide	**329**	ug/L	B	12/17/2024
Unknown amide	**24.0**	ug/L	B	12/17/2024
Total Reported TICS	**447**	ug/L		12/17/2024

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245791

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Sample Identifier:	Effluent-12112024		
Lab Sample ID:	245791-02	**Date Sampled:**	12/11/2024
Matrix:	Aq Liquid	**Date Received:**	12/11/2024

Volatile Tentatively Identified Compounds

Tentatively Identified Compound	Result	Units	Qualifier	Date Analyzed
None Found	< 5.00	ug/L		12/18/2024
Total Reported TICS	< 5.00	ug/L		12/18/2024

Method Reference(s): EPA 8260C
EPA 5030C

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

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PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

TAL Metals (ICP)

Analyte	Result	Units	Qualifier	Date Analyzed	
Aluminum	<0.100	mg/L		12/13/2024	07:44
Antimony	<0.0600	mg/L		12/13/2024	07:44
Arsenic	<0.0100	mg/L		12/13/2024	07:44
Barium	<0.100	mg/L		12/13/2024	07:44
Beryllium	<0.00500	mg/L		12/13/2024	07:44
Cadmium	<0.00500	mg/L		12/13/2024	07:44
Calcium	<2.50	mg/L		12/13/2024	07:44
Chromium	<0.0100	mg/L		12/13/2024	07:44
Cobalt	<0.0500	mg/L		12/13/2024	07:44
Copper	<0.0200	mg/L		12/13/2024	07:44
Iron	<0.100	mg/L		12/13/2024	07:44
Lead	<0.0100	mg/L		12/13/2024	07:44
Magnesium	<2.50	mg/L		12/13/2024	07:44
Manganese	<0.0150	mg/L		12/13/2024	07:44
Nickel	<0.0400	mg/L		12/13/2024	07:44
Potassium	<2.50	mg/L		12/13/2024	07:44
Selenium	<0.0200	mg/L		12/13/2024	07:44
Silver	<0.0100	mg/L		12/13/2024	07:44
Sodium	<2.50	mg/L		12/13/2024	07:44
Thallium	<0.0250	mg/L		12/13/2024	07:44
Vanadium	<0.0250	mg/L		12/13/2024	07:44
Zinc	<0.0600	mg/L		12/13/2024	07:44

Method Reference(s): EPA 6010C
EPA 3005A

Preparation Date: 12/12/2024

Data File: 241213A

QC Batch ID: QC241212water

QC Number: Blk 1

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample and Control Sample Duplicate

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

TAL Metals (ICP)

Analyte	LCS Added	LCSD Added	Spike Units	LCS Result	LCSD Result	LCS % Recovery	LCSD % Recovery	% Rec Limits	LCS Outliers	LCSD Outliers	Relative % Difference	RPD Limit	RPD Outliers	Date Analyzed
Aluminum	2.50	2.50	mg/L	2.40	2.43	96.0	97.3	80 - 120			1.32	20		12/13/2024
Antimony	2.50	2.50	mg/L	2.56	2.54	102	102	80 - 120			0.549	20		12/13/2024
Arsenic	2.50	2.50	mg/L	2.50	2.48	99.8	99.2	80 - 120			0.683	20		12/13/2024
Barium	2.50	2.50	mg/L	2.48	2.46	99.2	98.4	80 - 120			0.850	20		12/13/2024
Beryllium	0.500	0.500	mg/L	0.480	0.479	96.1	95.8	80 - 120			0.292	20		12/13/2024
Cadmium	1.00	1.00	mg/L	0.997	0.980	99.7	98.0	80 - 120			1.75	20		12/13/2024
Calcium	4.00	4.00	mg/L	3.94	4.01	98.5	100	80 - 120			1.89	20		12/13/2024
Chromium	2.50	2.50	mg/L	2.38	2.36	95.3	94.3	80 - 120			1.10	20		12/13/2024
Cobalt	1.00	1.00	mg/L	1.00	0.990	100	99.0	80 - 120			1.10	20		12/13/2024
Copper	2.50	2.50	mg/L	2.47	2.47	98.7	99.0	80 - 120			0.243	20		12/13/2024
Iron	2.50	2.50	mg/L	2.37	2.37	94.6	94.7	80 - 120			0.0845	20		12/13/2024
Lead	2.50	2.50	mg/L	2.50	2.45	99.8	97.8	80 - 120			2.06	20		12/13/2024
Magnesium	8.00	8.00	mg/L	8.25	8.43	103	105	80 - 120			2.18	20		12/13/2024
Manganese	1.00	1.00	mg/L	1.00	0.988	100	98.8	80 - 120			1.25	20		12/13/2024
Nickel	5.00	5.00	mg/L	5.21	5.11	104	102	80 - 120			1.98	20		12/13/2024
Potassium	42.5	42.5	mg/L	41.0	41.7	96.5	98.1	80 - 120			1.67	20		12/13/2024

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample and Control Sample Duplicate

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

TAL Metals (ICP)

Analyte	LCS Added	LCSD Added	Spike Units	LCS Result	LCSD Result	LCS % Recovery	LCSD % Recovery	% Rec Limits	LCS Outliers	LCSD Outliers	Relative % Difference	RPD Limit	RPD Outliers	Date Analyzed
Selenium	2.50	2.50	mg/L	2.48	2.46	99.3	98.4	80 - 120			0.850	20		12/13/2024
Silver	0.250	0.250	mg/L	0.238	0.239	95.2	95.5	80 - 120			0.378	20		12/13/2024
Sodium	12.0	12.0	mg/L	11.6	11.8	96.2	98.2	80 - 120			2.06	20		12/13/2024
Thallium	2.50	2.50	mg/L	2.44	2.39	97.5	95.5	80 - 120			2.03	20		12/13/2024
Vanadium	1.00	1.00	mg/L	0.983	0.975	98.3	97.5	80 - 120			0.848	20		12/13/2024
Zinc	2.50	2.50	mg/L	2.52	2.50	101	99.9	80 - 120			1.08	20		12/13/2024

Method Reference(s): EPA 6010C
EPA 3005A
Preparation Date: 12/12/2024
Data File: 241213A
QC Number: 1
QC Batch ID: QC241212water

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Report Prepared Friday, December 13, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

QC Report for Sample Spike and Sample Duplicate

Client: **Inventum Engineering, P.C.** **Lab Project ID:** 245791

Project Reference: December 2024 GWTS

Lab Sample ID: 245791-02 **Date Sampled:** 12/11/2024
Sample Identifier: Effluent-12112024 **Date Received:** 12/11/2024
Matrix: Aq Liquid

TAL Metals (ICP)

Analyte	Sample Results	Result Units	Spike Added	Spike Result	Spike % Recovery	% Rec Limits	Spike Outliers	Duplicate Result	Relative % Difference	RPD Limit	RPD Outliers	Date Analyzed
Aluminum	< 0.100	mg/L	2.50	2.40	96.2	75 - 125		<0.100	NC	20		12/13/2024
Antimony	< 0.0600	mg/L	2.50	2.64	105	75 - 125		<0.0600	NC	20		12/13/2024
Arsenic	< 0.0100	mg/L	2.50	2.60	104	75 - 125		<0.0100	NC	20		12/13/2024
Barium	< 0.100	mg/L	2.50	2.46	98.6	75 - 125		<0.100	NC	20		12/13/2024
Beryllium	< 0.00500	mg/L	0.500	0.491	98.2	75 - 125		<0.00500	NC	20		12/13/2024
Cadmium	< 0.00500	mg/L	1.00	0.958	95.8	75 - 125		<0.00500	NC	20		12/13/2024
Calcium	**231**	mg/L	4.00	226	NC	75 - 125		227	1.79	20		12/13/2024
Chromium	< 0.0100	mg/L	2.50	2.37	94.9	75 - 125		<0.0100	NC	20		12/13/2024
Cobalt	< 0.0500	mg/L	1.00	0.993	99.3	75 - 125		<0.0500	NC	20		12/13/2024
Copper	< 0.0200	mg/L	2.50	2.63	105	75 - 125		<0.0200	NC	20		12/13/2024
Iron	**0.191**	mg/L	2.50	2.58	95.5	75 - 125		0.189	0.894	20		12/13/2024
Lead	< 0.0100	mg/L	2.50	2.43	97.3	75 - 125		<0.0100	NC	20		12/13/2024
Magnesium	**28.1**	mg/L	8.00	35.1	87.5	75 - 125		27.6	1.83	20		12/13/2024
Manganese	**0.422**	mg/L	1.00	1.40	98.3	75 - 125		0.424	0.402	20		12/13/2024

NC = Not Calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added.

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Report Prepared Friday, December 13, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

QC Report for Sample Spike and Sample Duplicate

Client: **Inventum Engineering, P.C.** **Lab Project ID:** 245791

Project Reference: December 2024 GWTS

Lab Sample ID: 245791-02 **Date Sampled:** 12/11/2024
Sample Identifier: Effluent-12112024 **Date Received:** 12/11/2024
Matrix: Aq Liquid

TAL Metals (ICP)

Analyte	Sample Results	Result Units	Spike Added	Spike Result	Spike % Recovery	% Rec Limits	Spike Outliers	Duplicate Result	Relative % Difference	RPD Limit	RPD Outliers	Date Analyzed
Nickel	< 0.0400	mg/L	5.00	5.15	103	75 - 125		<0.0400	NC	20		12/13/2024
Potassium	**20.0**	mg/L	42.5	62.4	99.6	75 - 125		19.6	2.37	20		12/13/2024
Selenium	< 0.0200	mg/L	2.50	2.49	99.5	75 - 125		<0.0200	NC	20		12/13/2024
Silver	< 0.0100	mg/L	0.250	0.247	98.8	75 - 125		<0.0100	NC	20		12/13/2024
Sodium	**95.2**	mg/L	12.0	102	56.2	75 - 125	*	92.8	2.57	20		12/13/2024
Thallium	< 0.0250	mg/L	2.50	2.37	94.8	75 - 125		<0.0250	NC	20		12/13/2024
Vanadium	< 0.0250	mg/L	1.00	1.00	100	75 - 125		<0.0250	NC	20		12/13/2024
Zinc	< 0.0600	mg/L	2.50	2.53	101	75 - 125		<0.0600	NC	20		12/13/2024

Method Reference(s): EPA 6010C
EPA 3005A
Preparation Date: 12/12/2024
241213A
QC Batch ID: QC241212water

NC = Not Calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added.

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Report Prepared Friday, December 13, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

PCBs

Analyte	Result	Units	Qualifier	Date Analyzed
PCB-1016		ug/L		12/13/2024 17:39
PCB-1221	<1.00	ug/L		12/13/2024 17:39
PCB-1232	<1.00	ug/L		12/13/2024 17:39
PCB-1242	<1.00	ug/L		12/13/2024 17:39
PCB-1248	<1.00	ug/L		12/13/2024 17:39
PCB-1254	<1.00	ug/L		12/13/2024 17:39
PCB-1260	<1.00	ug/L		12/13/2024 17:39
PCB-1262	<1.00	ug/L		12/13/2024 17:39
PCB-1268	<1.00	ug/L		12/13/2024 17:39

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
Tetrachloro-m-xylene	**61.5**	14.5 - 95.5		12/13/2024 17:39

Method Reference(s): EPA 8082A
EPA 3510C

Preparation Date: 12/13/2024

Data File: A0025598.D

QC Batch ID: QC241213PCBW

QC Number: Blk 1

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

PCBs

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
PCB-1016/1260	5.00	ug/L	3.85	76.9	31.3 - 92.2		12/13/2024

Method Reference(s): EPA 8082A
EPA 3510C
Preparation Date: 12/13/2024
QC Number: LCS 1
QC Batch ID: QC241213PCBW

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Report Prepared Wednesday, December 18, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Semi-Volatile Organics (PAHs)

Analyte	Result	Units	Qualifier	Date Analyzed	
2-Methylnapthalene	<10.0	ug/L		12/17/2024	16:27
Acenaphthene	<10.0	ug/L		12/17/2024	16:27
Acenaphthylene	<10.0	ug/L		12/17/2024	16:27
Anthracene	<10.0	ug/L		12/17/2024	16:27
Benzo (a) anthracene	<10.0	ug/L		12/17/2024	16:27
Benzo (a) pyrene	<10.0	ug/L		12/17/2024	16:27
Benzo (b) fluoranthene	<10.0	ug/L		12/17/2024	16:27
Benzo (g,h,i) perylene	<10.0	ug/L		12/17/2024	16:27
Benzo (k) fluoranthene	<10.0	ug/L		12/17/2024	16:27
Chrysene	<10.0	ug/L		12/17/2024	16:27
Dibenz (a,h) anthracene	<10.0	ug/L		12/17/2024	16:27
Fluoranthene	<10.0	ug/L		12/17/2024	16:27
Fluorene	<10.0	ug/L		12/17/2024	16:27
Indeno (1,2,3-cd) pyrene	<10.0	ug/L		12/17/2024	16:27
Naphthalene	<10.0	ug/L		12/17/2024	16:27
Phenanthrene	<10.0	ug/L		12/17/2024	16:27
Pyrene	<10.0	ug/L		12/17/2024	16:27

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed	
2-Fluorobiphenyl	**64.7**	15.2 - 100		12/17/2024	16:27
Nitrobenzene-d5	**83.8**	47.4 - 98.9		12/17/2024	16:27
Terphenyl-d14	**93.8**	56 - 111		12/17/2024	16:27

Method Reference(s): EPA 625.1
Preparation Date: 12/16/2024
Data File: B75553.D
QC Batch ID: QC241216625W
QC Number: Blk 1

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Organics (PAHs)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
1,2,4-Trichlorobenzene	50.0	ug/L	40.5	81.0	57 - 130		12/17/2024
2,2-Oxybis (1-chloropropane)	50.0	ug/L	40.1	80.2	63 - 139		12/17/2024
2,4,6-Trichlorophenol	75.0	ug/L	72.8	97.1	52 - 129		12/17/2024
2,4-Dichlorophenol	75.0	ug/L	66.8	89.0	53 - 122		12/17/2024
2,4-Dimethylphenol	75.0	ug/L	67.7	90.3	42 - 120		12/17/2024
2,4-Dinitrophenol	75.0	ug/L	77.8	104	0 - 173		12/17/2024
2,4-Dinitrotoluene	50.0	ug/L	46.4	92.8	48 - 127		12/17/2024
2,6-Dinitrotoluene	50.0	ug/L	46.4	92.8	68 - 137		12/17/2024
2-Chloronaphthalene	50.0	ug/L	41.4	82.7	65 - 120		12/17/2024
2-Chlorophenol	75.0	ug/L	62.8	83.7	36 - 120		12/17/2024
2-Nitrophenol	75.0	ug/L	67.3	89.8	45 - 167		12/17/2024
4,6-Dinitro-2-methylphenol	75.0	ug/L	69.2	92.2	53 - 130		12/17/2024
4-Bromophenyl phenyl ether	50.0	ug/L	46.5	93.0	65 - 120		12/17/2024
4-Chloro-3-methylphenol	75.0	ug/L	71.2	94.9	41 - 128		12/17/2024
4-Chlorophenyl phenyl ether	50.0	ug/L	46.4	92.7	38 - 145		12/17/2024
4-Nitrophenol	75.0	ug/L	28.8	38.5	13 - 129		12/17/2024

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PARADIGM ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Semi-Volatile Organics (PAHs)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Acenaphthene	50.0	ug/L	45.0	90.0	60 - 132		12/17/2024
Acenaphthylene	50.0	ug/L	41.1	82.3	54 - 126		12/17/2024
Anthracene	50.0	ug/L	45.7	91.5	43 - 120		12/17/2024
Benzo (a) anthracene	50.0	ug/L	46.0	92.0	42 - 133		12/17/2024
Benzo (a) pyrene	50.0	ug/L	44.2	88.4	32 - 148		12/17/2024
Benzo (b) fluoranthene	50.0	ug/L	41.3	82.6	42 - 140		12/17/2024
Benzo (g,h,i) perylene	50.0	ug/L	43.1	86.1	0 - 195		12/17/2024
Benzo (k) fluoranthene	50.0	ug/L	46.4	92.8	25 - 126		12/17/2024
Bis (2-chloroethoxy) methane	50.0	ug/L	45.5	91.0	49 - 165		12/17/2024
Bis (2-chloroethyl) ether	50.0	ug/L	42.7	85.5	43 - 126		12/17/2024
Bis (2-ethylhexyl) phthalate	50.0	ug/L	53.4	107	29 - 137		12/17/2024
Butylbenzylphthalate	50.0	ug/L	54.1	108	0 - 140		12/17/2024
Chrysene	50.0	ug/L	42.4	84.7	44 - 140		12/17/2024
Dibenz (a,h) anthracene	50.0	ug/L	23.0	46.0	0 - 200		12/17/2024
Diethyl phthalate	50.0	ug/L	48.8	97.6	0 - 120		12/17/2024
Dimethyl phthalate	50.0	ug/L	48.1	96.1	0 - 120		12/17/2024

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Report Prepared Wednesday, December 18, 2024

PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Organics (PAHs)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Di-n-butyl phthalate	50.0	ug/L	48.3	96.5	8 - 120		12/17/2024
Di-n-octylphthalate	50.0	ug/L	53.7	107	19 - 132		12/17/2024
Fluoranthene	50.0	ug/L	45.6	91.1	43 - 121		12/17/2024
Fluorene	50.0	ug/L	47.0	94.0	70 - 120		12/17/2024
Hexachlorobenzene	50.0	ug/L	46.8	93.5	8 - 142		12/17/2024
Hexachlorobutadiene	50.0	ug/L	41.8	83.7	38 - 120		12/17/2024
Hexachlorocyclopentadiene	50.0	ug/L	34.9	69.9	10 - 112		12/17/2024
Hexachloroethane	50.0	ug/L	39.1	78.2	55 - 120		12/17/2024
Indeno (1,2,3-cd) pyrene	50.0	ug/L	39.1	78.3	0 - 151		12/17/2024
Isophorone	50.0	ug/L	43.7	87.5	47 - 180		12/17/2024
Naphthalene	50.0	ug/L	41.3	82.5	36 - 120		12/17/2024
Nitrobenzene	50.0	ug/L	46.7	93.5	54 - 158		12/17/2024
N-Nitrosodimethylamine	50.0	ug/L	31.4	62.7	25.3 - 71.6		12/17/2024
N-Nitroso-di-n-propylamine	50.0	ug/L	45.7	91.4	14 - 198		12/17/2024
N-Nitrosodiphenylamine	50.0	ug/L	38.0	76.1	42.8 - 89.9		12/17/2024
Pentachlorophenol	75.0	ug/L	61.2	81.7	38 - 152		12/17/2024

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Organics (PAHs)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Phenanthrene	50.0	ug/L	46.9	93.8	65 - 120		12/17/2024
Phenol	75.0	ug/L	23.6	31.5	17 - 120		12/17/2024
Pyrene	50.0	ug/L	48.9	97.7	70 - 120		12/17/2024

Method Reference(s): EPA 625.1
Preparation Date: 12/16/2024
Data File: B75551.D
QC Number: LCS 1
QC Batch ID: QC241216625W

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Report Prepared Wednesday, December 18, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Result	Units	Qualifier	Date Analyzed	
1,1-Biphenyl	<10.0	ug/L		12/17/2024	00:26
1,2,4,5-Tetrachlorobenzene	<10.0	ug/L		12/17/2024	00:26
1,2,4-Trichlorobenzene	<10.0	ug/L		12/17/2024	00:26
1,2-Dichlorobenzene	<10.0	ug/L		12/17/2024	00:26
1,3-Dichlorobenzene	<10.0	ug/L		12/17/2024	00:26
1,4-Dichlorobenzene	<10.0	ug/L		12/17/2024	00:26
2,2-Oxybis (1-chloropropane)	<10.0	ug/L		12/17/2024	00:26
2,3,4,6-Tetrachlorophenol	<10.0	ug/L		12/17/2024	00:26
2,4,5-Trichlorophenol	<10.0	ug/L		12/17/2024	00:26
2,4,6-Trichlorophenol	<20.0	ug/L		12/17/2024	00:26
2,4-Dichlorophenol	<10.0	ug/L		12/17/2024	00:26
2,4-Dimethylphenol	<10.0	ug/L		12/17/2024	00:26
2,4-Dinitrophenol	<20.0	ug/L		12/17/2024	00:26
2,4-Dinitrotoluene	<10.0	ug/L		12/17/2024	00:26
2,6-Dinitrotoluene	<10.0	ug/L		12/17/2024	00:26
2-Chloronaphthalene	<10.0	ug/L		12/17/2024	00:26
2-Chlorophenol	<10.0	ug/L		12/17/2024	00:26
2-Methylnapthalene	<10.0	ug/L		12/17/2024	00:26
2-Methylphenol	<10.0	ug/L		12/17/2024	00:26
2-Nitroaniline	<20.0	ug/L		12/17/2024	00:26
2-Nitrophenol	<10.0	ug/L		12/17/2024	00:26
3&4-Methylphenol	<10.0	ug/L		12/17/2024	00:26
3,3'-Dichlorobenzidine	<10.0	ug/L		12/17/2024	00:26
3-Nitroaniline	<20.0	ug/L		12/17/2024	00:26
4,6-Dinitro-2-methylphenol	<20.0	ug/L		12/17/2024	00:26
4-Bromophenyl phenyl ether	<10.0	ug/L		12/17/2024	00:26
4-Chloro-3-methylphenol	<10.0	ug/L		12/17/2024	00:26

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Result	Units	Qualifier	Date Analyzed	
4-Chloroaniline	<10.0	ug/L		12/17/2024	00:26
4-Chlorophenyl phenyl ether	<10.0	ug/L		12/17/2024	00:26
4-Nitroaniline	<20.0	ug/L		12/17/2024	00:26
4-Nitrophenol	<20.0	ug/L		12/17/2024	00:26
Acenaphthene	<10.0	ug/L		12/17/2024	00:26
Acenaphthylene	<10.0	ug/L		12/17/2024	00:26
Acetophenone	<10.0	ug/L		12/17/2024	00:26
Anthracene	<10.0	ug/L		12/17/2024	00:26
Atrazine	<25.0	ug/L		12/17/2024	00:26
Benzaldehyde	<10.0	ug/L		12/17/2024	00:26
Benzo (a) anthracene	<10.0	ug/L		12/17/2024	00:26
Benzo (a) pyrene	<10.0	ug/L		12/17/2024	00:26
Benzo (b) fluoranthene	<10.0	ug/L		12/17/2024	00:26
Benzo (g,h,i) perylene	<10.0	ug/L		12/17/2024	00:26
Benzo (k) fluoranthene	<10.0	ug/L		12/17/2024	00:26
Bis (2-chloroethoxy) methane	<10.0	ug/L		12/17/2024	00:26
Bis (2-chloroethyl) ether	<10.0	ug/L		12/17/2024	00:26
Bis (2-ethylhexyl) phthalate	<10.0	ug/L		12/17/2024	00:26
Butylbenzylphthalate	<10.0	ug/L		12/17/2024	00:26
Caprolactam	<10.0	ug/L		12/17/2024	00:26
Carbazole	<10.0	ug/L		12/17/2024	00:26
Chrysene	<10.0	ug/L		12/17/2024	00:26
Dibenz (a,h) anthracene	<10.0	ug/L		12/17/2024	00:26
Dibenzofuran	<10.0	ug/L		12/17/2024	00:26
Diethyl phthalate	<10.0	ug/L		12/17/2024	00:26
Dimethyl phthalate	<20.0	ug/L		12/17/2024	00:26
Di-n-butyl phthalate	<10.0	ug/L		12/17/2024	00:26
Di-n-octylphthalate	<10.0	ug/L		12/17/2024	00:26

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Result	Units	Qualifier	Date Analyzed
Fluoranthene	<10.0	ug/L		12/17/2024 00:26
Fluorene	<10.0	ug/L		12/17/2024 00:26
Hexachlorobenzene	<10.0	ug/L		12/17/2024 00:26
Hexachlorobutadiene	<10.0	ug/L		12/17/2024 00:26
Hexachlorocyclopentadiene	<10.0	ug/L		12/17/2024 00:26
Hexachloroethane	<10.0	ug/L		12/17/2024 00:26
Indeno (1,2,3-cd) pyrene	<10.0	ug/L		12/17/2024 00:26
Isophorone	<10.0	ug/L		12/17/2024 00:26
Naphthalene	<10.0	ug/L		12/17/2024 00:26
Nitrobenzene	<10.0	ug/L		12/17/2024 00:26
N-Nitroso-di-n-propylamine	<10.0	ug/L		12/17/2024 00:26
N-Nitrosodiphenylamine	<10.0	ug/L		12/17/2024 00:26
Pentachlorophenol	<20.0	ug/L		12/17/2024 00:26
Phenanthrene	<10.0	ug/L		12/17/2024 00:26
Phenol	<10.0	ug/L		12/17/2024 00:26
Pyrene	<10.0	ug/L		12/17/2024 00:26

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
2,4,6-Tribromophenol	**80.3**	49.6 - 117		12/17/2024 00:26
2-Fluorobiphenyl	**49.3**	15.2 - 100		12/17/2024 00:26
2-Fluorophenol	**38.9**	12.7 - 105		12/17/2024 00:26
Nitrobenzene-d5	**73.4**	47.4 - 98.9		12/17/2024 00:26
Phenol-d5	**24.4**	10 - 108		12/17/2024 00:26
Terphenyl-d14	**81.9**	56 - 111		12/17/2024 00:26

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024
Data File: B75521.D
QC Batch ID: QC241216ABNW
QC Number: Blk 1

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
1,2,4-Trichlorobenzene	50.0	ug/L	28.5	57.0	23.9 - 76.6		12/17/2024
1,4-Dichlorobenzene	50.0	ug/L	25.0	50.0	18.4 - 92.9		12/17/2024
2,3,4,6-Tetrachlorophenol	75.0	ug/L	66.8	89.0	28.4 - 119		12/17/2024
2,4,6-Trichlorophenol	75.0	ug/L	68.7	91.6	51 - 116		12/17/2024
2,4-Dichlorophenol	75.0	ug/L	61.0	81.3	49.8 - 102		12/17/2024
2,4-Dimethylphenol	75.0	ug/L	66.5	88.7	43.4 - 104		12/17/2024
2,4-Dinitrophenol	75.0	ug/L	66.8	89.1	10 - 116		12/17/2024
2,4-Dinitrotoluene	50.0	ug/L	44.2	88.4	52.9 - 110		12/17/2024
2,6-Dichlorophenol	75.0	ug/L	63.0	84.0	39.5 - 109		12/17/2024
2-Chlorophenol	75.0	ug/L	55.2	73.6	43.3 - 94.4		12/17/2024
2-Nitrophenol	75.0	ug/L	58.0	77.4	39.8 - 108		12/17/2024
4,6-Dinitro-2-methylphenol	75.0	ug/L	58.9	78.5	10 - 124		12/17/2024
4-Chloro-3-methylphenol	75.0	ug/L	65.7	87.6	54.9 - 104		12/17/2024
4-Nitrophenol	75.0	ug/L	26.7	35.6	10 - 59.4		12/17/2024
Acenaphthene	50.0	ug/L	39.4	78.7	48 - 90.7		12/17/2024
N-Nitroso-di-n-propylamine	50.0	ug/L	40.7	81.5	55.6 - 102		12/17/2024

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Organics (Acid/Base Neutrals)

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Pentachlorophenol	75.0	ug/L	55.0	73.4	43.9 - 139		12/17/2024
Phenol	75.0	ug/L	21.4	28.5	18.6 - 42.5		12/17/2024
Pyrene	50.0	ug/L	45.0	89.9	56 - 105		12/17/2024

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024
Data File: B75522.D
QC Number: LCS 1
QC Batch ID: QC241216ABNW

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PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed	
1,1,1-Trichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1,2,2-Tetrachloroethane	<2.00	ug/L		12/18/2024	13:05
1,1,2-Trichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1-Dichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1-Dichloroethene	<2.00	ug/L		12/18/2024	13:05
1,2-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
1,2-Dichloroethane	<2.00	ug/L		12/18/2024	13:05
1,2-Dichloropropane	<2.00	ug/L		12/18/2024	13:05
1,3-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
1,4-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
2-Chloroethyl vinyl Ether	<5.00	ug/L		12/18/2024	13:05
Benzene	<1.00	ug/L		12/18/2024	13:05
Bromodichloromethane	<2.00	ug/L		12/18/2024	13:05
Bromoform	<5.00	ug/L		12/18/2024	13:05
Bromomethane	<2.00	ug/L		12/18/2024	13:05
Carbon Tetrachloride	<2.00	ug/L		12/18/2024	13:05
Chlorobenzene	<2.00	ug/L		12/18/2024	13:05
Chloroethane	<2.00	ug/L		12/18/2024	13:05
Chloroform	<2.00	ug/L		12/18/2024	13:05
Chloromethane	<2.00	ug/L		12/18/2024	13:05
cis-1,3-Dichloropropene	<2.00	ug/L		12/18/2024	13:05
Dibromochloromethane	<2.00	ug/L		12/18/2024	13:05
Ethylbenzene	<2.00	ug/L		12/18/2024	13:05
Methylene chloride	**12.0**	ug/L		12/18/2024	13:05
Tetrachloroethene	<2.00	ug/L		12/18/2024	13:05
Toluene	<2.00	ug/L		12/18/2024	13:05
trans-1,2-Dichloroethene	<2.00	ug/L		12/18/2024	13:05

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed	
trans-1,3-Dichloropropene	<2.00	ug/L		12/18/2024	13:05
Trichloroethene	<2.00	ug/L		12/18/2024	13:05
Trichlorofluoromethane	<2.00	ug/L		12/18/2024	13:05
Vinyl chloride	<2.00	ug/L		12/18/2024	13:05

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed	
1,2-Dichloroethane-d4	**98.7**	80.5 - 124		12/18/2024	13:05
4-Bromofluorobenzene	**91.1**	78.2 - 114		12/18/2024	13:05
Pentafluorobenzene	**106**	90.8 - 109		12/18/2024	13:05
Toluene-D8	**104**	90.3 - 110		12/18/2024	13:05

Method Reference(s): EPA 624.1
Data File: z28393.D
QC Batch ID: voaw241218
QC Number: Blk 1

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PARADIGM ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
1,1,1-Trichloroethane	20.0	ug/L	19.1	95.4	79.8 - 110		12/18/2024
1,1,2,2-Tetrachloroethane	20.0	ug/L	20.0	100	81.6 - 118		12/18/2024
1,1,2-Trichloroethane	20.0	ug/L	20.1	100	82.5 - 112		12/18/2024
1,1-Dichloroethane	20.0	ug/L	18.9	94.5	82.7 - 107		12/18/2024
1,1-Dichloroethene	20.0	ug/L	16.1	80.7	77.3 - 110		12/18/2024
1,2-Dichlorobenzene	20.0	ug/L	20.1	101	85.8 - 108		12/18/2024
1,2-Dichloroethane	20.0	ug/L	18.6	92.9	77.5 - 120		12/18/2024
1,2-Dichloropropane	20.0	ug/L	20.7	104	82.8 - 107		12/18/2024
1,3-Dichlorobenzene	20.0	ug/L	19.8	98.8	85.8 - 107		12/18/2024
1,4-Dichlorobenzene	20.0	ug/L	19.8	99.1	81.1 - 105		12/18/2024
Benzene	20.0	ug/L	19.6	98.2	83.4 - 108		12/18/2024
Bromodichloromethane	20.0	ug/L	18.5	92.4	82.2 - 110		12/18/2024
Bromoform	20.0	ug/L	20.7	103	80.2 - 114		12/18/2024
Bromomethane	20.0	ug/L	17.2	85.9	51 - 140		12/18/2024
Carbon Tetrachloride	20.0	ug/L	19.2	95.9	78 - 112		12/18/2024
Chlorobenzene	20.0	ug/L	20.2	101	86.7 - 109		12/18/2024

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Chloroethane	20.0	ug/L	18.6	93.1	77.7 - 114		12/18/2024
Chloroform	20.0	ug/L	19.0	95.0	81.8 - 108		12/18/2024
Chloromethane	20.0	ug/L	18.6	93.1	60.2 - 127		12/18/2024
cis-1,3-Dichloropropene	20.0	ug/L	19.5	97.4	81.7 - 106		12/18/2024
Dibromochloromethane	20.0	ug/L	20.1	101	82.7 - 110		12/18/2024
Ethylbenzene	20.0	ug/L	19.4	96.9	83.3 - 107		12/18/2024
Methylene chloride	20.0	ug/L	35.1	175	64.2 - 138	*	12/18/2024
Tetrachloroethene	20.0	ug/L	20.3	102	77.1 - 116		12/18/2024
Toluene	20.0	ug/L	20.6	103	84.8 - 106		12/18/2024
trans-1,2-Dichloroethene	20.0	ug/L	19.1	95.3	82.4 - 108		12/18/2024
trans-1,3-Dichloropropene	20.0	ug/L	19.3	96.6	81.3 - 109		12/18/2024
Trichloroethene	20.0	ug/L	20.1	101	86.3 - 110		12/18/2024
Trichlorofluoromethane	20.0	ug/L	19.2	96.0	75.9 - 119		12/18/2024
Vinyl chloride	20.0	ug/L	17.5	87.7	70 - 124		12/18/2024

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Report Prepared *Thursday, December 19, 2024*

PARADIGM ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed

Method Reference(s): EPA 624.1
Data File: z28392.D
QC Number: LCS 1
QC Batch ID: voaw241218

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Report Prepared Thursday, December 19, 2024

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed	
1,1,1-Trichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1,2,2-Tetrachloroethane	<2.00	ug/L		12/18/2024	13:05
1,1,2-Trichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1-Dichloroethane	<2.00	ug/L		12/18/2024	13:05
1,1-Dichloroethene	<2.00	ug/L		12/18/2024	13:05
1,2,3-Trichlorobenzene	<5.00	ug/L		12/18/2024	13:05
1,2,4-Trichlorobenzene	<5.00	ug/L		12/18/2024	13:05
1,2-Dibromo-3-Chloropropane	<10.0	ug/L		12/18/2024	13:05
1,2-Dibromoethane	<2.00	ug/L		12/18/2024	13:05
1,2-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
1,2-Dichloroethane	<2.00	ug/L		12/18/2024	13:05
1,2-Dichloropropane	<2.00	ug/L		12/18/2024	13:05
1,3-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
1,4-Dichlorobenzene	<2.00	ug/L		12/18/2024	13:05
1,4-Dioxane	<20.0	ug/L		12/18/2024	13:05
2-Butanone	<10.0	ug/L		12/18/2024	13:05
2-Hexanone	<5.00	ug/L		12/18/2024	13:05
4-Methyl-2-pentanone	<5.00	ug/L		12/18/2024	13:05
Acetone	<10.0	ug/L		12/18/2024	13:05
Benzene	<1.00	ug/L		12/18/2024	13:05
Bromochloromethane	<5.00	ug/L		12/18/2024	13:05
Bromodichloromethane	<2.00	ug/L		12/18/2024	13:05
Bromoform	<5.00	ug/L		12/18/2024	13:05
Bromomethane	<2.00	ug/L		12/18/2024	13:05
Carbon disulfide	<2.00	ug/L		12/18/2024	13:05
Carbon Tetrachloride	<2.00	ug/L		12/18/2024	13:05
Chlorobenzene	<2.00	ug/L		12/18/2024	13:05

PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed	
Chloroethane	<2.00	ug/L		12/18/2024	13:05
Chloroform	<2.00	ug/L		12/18/2024	13:05
Chloromethane	<2.00	ug/L		12/18/2024	13:05
cis-1,2-Dichloroethene	<2.00	ug/L		12/18/2024	13:05
cis-1,3-Dichloropropene	<2.00	ug/L		12/18/2024	13:05
Cyclohexane	<10.0	ug/L		12/18/2024	13:05
Dibromochloromethane	<2.00	ug/L		12/18/2024	13:05
Dichlorodifluoromethane	<2.00	ug/L		12/18/2024	13:05
Ethylbenzene	<2.00	ug/L		12/18/2024	13:05
Freon 113	<2.00	ug/L		12/18/2024	13:05
Isopropylbenzene	<2.00	ug/L		12/18/2024	13:05
m,p-Xylene	<2.00	ug/L		12/18/2024	13:05
Methyl acetate	<2.00	ug/L		12/18/2024	13:05
Methyl tert-butyl Ether	<2.00	ug/L		12/18/2024	13:05
Methylcyclohexane	<2.00	ug/L		12/18/2024	13:05
Methylene chloride	**12.0**	ug/L		12/18/2024	13:05
o-Xylene	<2.00	ug/L		12/18/2024	13:05
Styrene	<5.00	ug/L		12/18/2024	13:05
Tetrachloroethene	<2.00	ug/L		12/18/2024	13:05
Toluene	<2.00	ug/L		12/18/2024	13:05
trans-1,2-Dichloroethene	<2.00	ug/L		12/18/2024	13:05
trans-1,3-Dichloropropene	<2.00	ug/L		12/18/2024	13:05
Trichloroethene	<2.00	ug/L		12/18/2024	13:05
Trichlorofluoromethane	<2.00	ug/L		12/18/2024	13:05
Vinyl chloride	<2.00	ug/L		12/18/2024	13:05

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PARADIGM ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**

Project Reference: December 2024 GWTS

Lab Project ID: 245791

Matrix: Aq Liquid

Volatile Organics

Analyte	Result	Units	Qualifier	Date Analyzed

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**98.7**	80.5 - 124		12/18/2024 13:05
4-Bromofluorobenzene	**91.1**	78.2 - 114		12/18/2024 13:05
Pentafluorobenzene	**106**	90.8 - 109		12/18/2024 13:05
Toluene-D8	**104**	90.3 - 110		12/18/2024 13:05

Method Reference(s): EPA 8260C
EPA 5030C

Data File: z28393.D

QC Batch ID: voaw241218

QC Number: Blk 1

PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
1,1,1-Trichloroethane	20.0	ug/L	19.1	95.4	79.8 - 110		12/18/2024
1,1,2,2-Tetrachloroethane	20.0	ug/L	20.0	100	81.6 - 118		12/18/2024
1,1,2-Trichloroethane	20.0	ug/L	20.1	100	82.5 - 112		12/18/2024
1,1-Dichloroethane	20.0	ug/L	18.9	94.5	82.7 - 107		12/18/2024
1,1-Dichloroethene	20.0	ug/L	16.1	80.7	77.3 - 110		12/18/2024
1,2-Dichlorobenzene	20.0	ug/L	20.1	101	85.8 - 108		12/18/2024
1,2-Dichloroethane	20.0	ug/L	18.6	92.9	77.5 - 120		12/18/2024
1,2-Dichloropropane	20.0	ug/L	20.7	104	82.8 - 107		12/18/2024
1,3-Dichlorobenzene	20.0	ug/L	19.8	98.8	85.8 - 107		12/18/2024
1,4-Dichlorobenzene	20.0	ug/L	19.8	99.1	81.1 - 105		12/18/2024
Benzene	20.0	ug/L	19.6	98.2	83.4 - 108		12/18/2024
Bromodichloromethane	20.0	ug/L	18.5	92.4	82.2 - 110		12/18/2024
Bromoform	20.0	ug/L	20.7	103	80.2 - 114		12/18/2024
Bromomethane	20.0	ug/L	17.2	85.9	51 - 140		12/18/2024
Carbon Tetrachloride	20.0	ug/L	19.2	95.9	78 - 112		12/18/2024
Chlorobenzene	20.0	ug/L	20.2	101	86.7 - 109		12/18/2024

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PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed
Chloroethane	20.0	ug/L	18.6	93.1	77.7 - 114		12/18/2024
Chloroform	20.0	ug/L	19.0	95.0	81.8 - 108		12/18/2024
Chloromethane	20.0	ug/L	18.6	93.1	60.2 - 127		12/18/2024
cis-1,3-Dichloropropene	20.0	ug/L	19.5	97.4	81.7 - 106		12/18/2024
Dibromochloromethane	20.0	ug/L	20.1	101	82.7 - 110		12/18/2024
Ethylbenzene	20.0	ug/L	19.4	96.9	83.3 - 107		12/18/2024
Methylene chloride	20.0	ug/L	35.1	175	64.2 - 138	*	12/18/2024
Tetrachloroethene	20.0	ug/L	20.3	102	77.1 - 116		12/18/2024
Toluene	20.0	ug/L	20.6	103	84.8 - 106		12/18/2024
trans-1,2-Dichloroethene	20.0	ug/L	19.1	95.3	82.4 - 108		12/18/2024
trans-1,3-Dichloropropene	20.0	ug/L	19.3	96.6	81.3 - 109		12/18/2024
Trichloroethene	20.0	ug/L	20.1	101	86.3 - 110		12/18/2024
Trichlorofluoromethane	20.0	ug/L	19.2	96.0	75.9 - 119		12/18/2024
Vinyl chloride	20.0	ug/L	17.5	87.7	70 - 124		12/18/2024

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

Report Prepared *Thursday, December 19, 2024*

PARADIGM
ENVIRONMENTAL SERVICES, INC.

QC Report for Laboratory Control Sample

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Volatile Organics

Analyte	Spike Added	Spike Units	LCS Result	LCS % Recovery	% Rec Limits	LCS Outliers	Date Analyzed

Method Reference(s): EPA 8260C
EPA 5030C
Data File: z28392.D
QC Number: LCS 1
QC Batch ID: voaw241218

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

Report Prepared Thursday, December 19, 2024

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Semi-Volatile Tentatively Identified Compounds

Analyte	Result	Units	Qualifier	Date Analyzed
Unknown	**38.3**	ug/L		12/16/2024
Unknown amide	**20.6**	ug/L		12/16/2024
Unknown	**20.2**	ug/L		12/16/2024
Unknown amide	**213**	ug/L		12/16/2024
Unknown amide	**13.2**	ug/L		12/16/2024

Method Reference(s): EPA 8270D
EPA 3510C
Preparation Date: 12/16/2024
QC Batch ID: QC241216STICS
QC Number: 1

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

Report Prepared Wednesday, December 18, 2024

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Method Blank Report

Client: **Inventum Engineering, P.C.**
Project Reference: December 2024 GWTS
Lab Project ID: 245791
Matrix: Aq Liquid

Volatile Tentatively Identified Compounds

Analyte	Result	Units	Qualifier	Date Analyzed
None Found	<5.00	ug/L		12/18/2024

Method Reference(s): EPA 8260C
EPA 5030C
QC Batch ID: voat241218
QC Number: 1

Tentatively Identified Compound results are estimated values, based on Internal Standard response factors.

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

Report Prepared Thursday, December 19, 2024

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

All soil/sludge samples have been reported on a dry weight basis, unless qualified “reported as received”. Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an “A” suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

“<” = Analyzed for but not detected at or above the quantitation limit.
“E” = Result has been estimated, calibration limit exceeded.
“H” = Denotes a parameter analyzed outside of holding time.
“Z” = See case narrative.
“D” = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
“M” = Matrix spike recoveries outside QC limits. Matrix bias indicated.
“B” = Method blank contained trace levels of analyte. Refer to included method blank report.
“J” = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
“P” = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 2

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES

December

GP 12/11/24

PROJECT REFERENCE: November 2024 GWTS

REPORT TO:	INVOICE TO:	LAB PROJECT ID
COMPANY: Inventum Engineering	COMPANY: SAME	245791
address: 441 Carlisle Dr. Suite C	ADDRESS:	Quotation #:
CITY: Herndon STATE: VA ZIP: -	CITY: STATE: ZIP:	
PHONE: (518) 844-5745 FAX: -	PHONE: FAX:	Email:
ATTN: Austin.Oare@inventumeng.com	ATTN: James.Edwards@inventumeng.com	

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	T. Ammonia	pH	Cyanide (9014)	Cyanide (335.4)	624.1 PVL	TAL Metals	TSS	PAHs	TCL SVOCs, TICs	Pest / Herbs	PCBs	LL Hg	VOCs, TCL+TICs	PFAS 1633	REMARKS	PARADIGM LAB SAMPLE NUMBER
12/11/24	11:00		X	INFLUENT-12112024	AQ	16	X	X		X		X	X	X	X	X	X	X	X	X	Please report	01
12/11/24	11:10		X	EFFLUENT-12112024	AQ	16	X	X		X		X	X	X	X	X	X	X	X	X	pyridine.	02
12/11/24	11:25		X	BETWEENGAC-12112024	AQ	4			X		X			X								03
																					Please provide a partial while waiting for PFAS	
																					PFAS sent directly to sub lab. GP 12/11/24	

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	None Required		None Required	
10 day		Batch QC	X	Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	X
Rush 2 day		Category B			
Rush 1 day					
Other		Other		Other EDD	
please indicate date needed:		please indicate package needed:		please indicate EDD needed :	

Austin Oare — 12/11/24 — Sampled By / Date/Time

Relinquished By — 12/11/24 11:45 — Date/Time

Received By — Brian Z — 12/11/24 1250 — Date/Time

Received @ Lab By — 12/11/24 16:30 — Date/Time

Total Cost:

P.I.F.

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

4°C iced 12/11/24 16:26

See additional page for sample conditions.

PARADIGM
ENVIRONMENTAL SERVICES

Chain of Custody Supplement

Client: Inventum
Completed by: Cedric M
Lab Project ID: 245791
Date: 12/11/24

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt		
	Yes	No	N/A
Container Type	X		
Comments			
Transferred to method-compliant container			X
Headspace (<1 mL)	X VOA		X
Comments			
Preservation	X Metals TCN Ammonia VOA (per label) LL Hg (per label)		X
Comments			
Chlorine Absent (<0.10 ppm per test strip)	X Pest PCB SVOA PAH		X
Comments	VOA: Cl⁻ mg		
Holding Time	X	X pH	
Comments			
Temperature	X		X pH metals (except Hg)
Comments	4.0°C iced		
Compliant Sample Quantity/Type	X		
Comments	PFAs sent directly to sub-lab		

ANALYTICAL REPORT

Lab Number:	L2472611
Client:	Paradigm Environmental Services 179 Lake Avenue Rochester, NY 14608
ATTN:	Steve DeVito
Phone:	(585) 647-2530
Project Name:	NOVEMBER 2024 GWTS
Project Number:	NOVEMBER 2024 GWTS
Report Date:	12/26/24

The original project report/data package is held by Pace Analytical Services. This report/data package is paginated and should be reproduced only in its entirety. Pace Analytical Services holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (9110), MN (025-999-495), NJ (MA015), NY (11627), NC (685), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708A1), USFWS (Permit #A24920).

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS

Lab Number: L2472611
Report Date: 12/26/24

Lab Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2472611-01	INFLUENT- 12112024	WATER	Not Specified	12/11/24 11:00	12/11/24
L2472611-02	EFFLUENT- 12112024	WATER	Not Specified	12/11/24 11:10	12/11/24

Project Name:	NOVEMBER 2024 GWTS	**Lab Number:**	L2472611
Project Number:	NOVEMBER 2024 GWTS	**Report Date:**	12/26/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Pace Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments and solids are reported on a dry weight basis unless otherwise noted. Tissues are reported "as received" or on a wet weight basis, unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Pace's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Pace Project Manager and made arrangements for Pace to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	NOVEMBER 2024 GWTS	**Lab Number:**	L2472611
Project Number:	NOVEMBER 2024 GWTS	**Report Date:**	12/26/24

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by 1633

L2472611-01: The Extracted Internal Standard recoveries were above the acceptance criteria for 1h,1h,2h,2h-perfluoro[1,2-13c2]hexanesulfonic acid (m2-4:2fts) (254%), perfluoro[1,2,3,4-13c4]heptanoic acid (m4pfhpa) (169%), 1h,1h,2h,2h-perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (293%), and 2,3,3,3-tetrafluoro-2-[1,1,2,2,3,3,3-heptafluoropropoxy]-13c3-propanoic acid (m3hfpo-da) (134%); however, any associated target analytes detected above the RL are not reported from this analysis.

L2472611-01: The sample was re-analyzed on dilution due to EIS failure in the original analysis. The results of the re-analysis are reported for the associated target compounds.

L2472611-02: The Extracted Internal Standard recoveries were above the acceptance criteria for 1h,1h,2h,2h-perfluoro[1,2-13c2]hexanesulfonic acid (m2-4:2fts) (292%), perfluoro[1,2,3,4-13c4]heptanoic acid (m4pfhpa) (191%), 1h,1h,2h,2h-perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (329%), and 2,3,3,3-tetrafluoro-2-[1,1,2,2,3,3,3-heptafluoropropoxy]-13c3-propanoic acid (m3hfpo-da) (148%). Since the sample was non-detect to the RL for all associated target analytes, re-analysis was not required.

The Extracted Internal Standard recovery for the WG2011978-2 LCS, associated with L2472611-01, -01D, and -02, is outside the acceptance criteria for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (181%); however, all associated target analytes are within overall LCS criteria; therefore, no further action was taken.

The WG2011978-3 LCS recovery, associated with L2472611-01, -01D, and -02, is above the acceptance criteria for nonafluoro-3,6-dioxaheptanoic acid (nfdha) (161%); however, the associated samples are non-detect to the reporting limit for this target analyte. The results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative Date: 12/26/24

ORGANICS

SEMIVOLATILES

Project Name: NOVEMBER 2024 GWTS
Lab Number: L2472611
Project Number: NOVEMBER 2024 GWTS
Report Date: 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-01
Client ID: INFLUENT- 12112024
Sample Location: Not Specified

Date Collected: 12/11/24 11:00
Date Received: 12/11/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 144,1633
Analytical Date: 12/22/24 18:24
Analyst: ANH

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	34.6		ng/l	6.26	0.516	1
Perfluoropentanoic Acid (PFPeA)	13.5		ng/l	3.13	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	2.19		ng/l	1.56	0.391	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	6.26	0.892	1
Perfluorohexanoic Acid (PFHxA)	6.23		ng/l	1.56	0.242	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.56	0.203	1
Perfluorohexanesulfonic Acid (PFHxS)	1.67		ng/l	1.56	0.133	1
Perfluorooctanoic Acid (PFOA)	10.0		ng/l	1.56	0.258	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	6.26	4.71	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.56	0.196	1
Perfluorononanoic Acid (PFNA)	1.19	J	ng/l	1.56	0.258	1
Perfluorooctanesulfonic Acid (PFOS)	2.85		ng/l	1.56	0.258	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.56	0.203	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	6.26	1.20	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.56	0.196	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.56	0.469	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.56	0.172	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.56	0.133	1
Perfluorooctanesulfonamide (PFOSA)	ND		ng/l	1.56	0.094	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.56	0.469	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.56	0.211	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.56	0.180	1
Perfluorotetradecanoic Acid (PFTeDA)	ND		ng/l	1.56	0.156	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	6.26	1.56	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	6.26	0.368	1
Perfluorododecanesulfonic Acid (PFDoS)	ND		ng/l	1.56	0.235	1

Project Name: NOVEMBER 2024 GWTS **Lab Number:** L2472611

Project Number: NOVEMBER 2024 GWTS **Report Date:** 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-01 Date Collected: 12/11/24 11:00

Client ID: INFLUENT- 12112024 Date Received: 12/11/24

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	6.26	0.430	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	6.26	0.438	1
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	1.56	0.219	1
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	ND		ng/l	1.56	0.344	1
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	15.6	1.27	1
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	15.6	1.08	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	3.13	0.242	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	3.13	0.352	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	3.13	0.321	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	3.13	0.532	1
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	ND		ng/l	7.82	0.524	1
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	ND		ng/l	39.1	4.16	1
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	ND		ng/l	39.1	3.11	1

Project Name: NOVEMBER 2024 GWTS **Lab Number:** L2472611

Project Number: NOVEMBER 2024 GWTS **Report Date:** 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-01 Date Collected: 12/11/24 11:00

Client ID: INFLUENT- 12112024 Date Received: 12/11/24

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	70		5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	68		40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	93		40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	**254**	Q	40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	124		40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	**169**	Q	40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	92		40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	51		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	**293**	Q	40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	87		40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	89		40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	86		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	245		40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	118		40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	75		30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	80		40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	101		25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	78		10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	48		10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	**134**	Q	40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	58		10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	53		10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	50		10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	47		10-130

Project Name: NOVEMBER 2024 GWTS
Lab Number: L2472611
Project Number: NOVEMBER 2024 GWTS
Report Date: 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-01 D
Client ID: INFLUENT- 12112024
Sample Location: Not Specified

Date Collected: 12/11/24 11:00
Date Received: 12/11/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 144,1633
Analytical Date: 12/23/24 19:16
Analyst: JW

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						
Perfluoroheptanoic Acid (PFHpA)	3.36	J	ng/l	15.6	2.35	10

Project Name: NOVEMBER 2024 GWTS **Lab Number:** L2472611

Project Number: NOVEMBER 2024 GWTS **Report Date:** 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-01 D
Client ID: INFLUENT- 12112024
Sample Location: Not Specified

Date Collected: 12/11/24 11:00
Date Received: 12/11/24
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	77		5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	69		40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	73		40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	111		40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	76		40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	88		40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	81		40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	68		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	116		40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	68		40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	72		40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	66		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	74		40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	113		40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	57		30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	55		40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	55		25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	48		10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	34		10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	70		40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	51		10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	44		10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	40		10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	41		10-130

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-02
Client ID: EFFLUENT- 12112024
Sample Location: Not Specified

Date Collected: 12/11/24 11:10
Date Received: 12/11/24
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 144,1633
Analytical Date: 12/22/24 18:33
Analyst: ANH

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	40.4		ng/l	6.04	0.498	1
Perfluoropentanoic Acid (PFPeA)	13.5		ng/l	3.02	0.340	1
Perfluorobutanesulfonic Acid (PFBS)	1.00	JF	ng/l	1.51	0.378	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	6.04	0.861	1
Perfluorohexanoic Acid (PFHxA)	4.74		ng/l	1.51	0.234	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.51	0.196	1
Perfluoroheptanoic Acid (PFHpA)	1.13	J	ng/l	1.51	0.226	1
Perfluorohexanesulfonic Acid (PFHxS)	0.430	J	ng/l	1.51	0.128	1
Perfluorooctanoic Acid (PFOA)	3.32		ng/l	1.51	0.249	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	6.04	4.55	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.51	0.189	1
Perfluorononanoic Acid (PFNA)	0.287	J	ng/l	1.51	0.249	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.51	0.249	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.51	0.196	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	6.04	1.16	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.51	0.189	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.51	0.453	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.51	0.166	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.51	0.128	1
Perfluorooctanesulfonamide (PFOSA)	ND		ng/l	1.51	0.091	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.51	0.453	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.51	0.204	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.51	0.174	1
Perfluorotetradecanoic Acid (PFTeDA)	ND		ng/l	1.51	0.151	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	6.04	1.51	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	6.04	0.355	1
Perfluorododecanesulfonic Acid (PFDoS)	ND		ng/l	1.51	0.226	1

Project Name: NOVEMBER 2024 GWTS **Lab Number:** L2472611

Project Number: NOVEMBER 2024 GWTS **Report Date:** 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-02 Date Collected: 12/11/24 11:10

Client ID: EFFLUENT- 12112024 Date Received: 12/11/24

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	6.04	0.415	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	6.04	0.423	1
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	1.51	0.211	1
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	ND		ng/l	1.51	0.332	1
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	15.1	1.23	1
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	15.1	1.04	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	3.02	0.234	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	3.02	0.340	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	3.02	0.310	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	3.02	0.514	1
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	ND		ng/l	7.55	0.506	1
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	ND		ng/l	37.8	4.02	1
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	ND		ng/l	37.8	3.00	1

Project Name: NOVEMBER 2024 GWTS **Lab Number:** L2472611

Project Number: NOVEMBER 2024 GWTS **Report Date:** 12/26/24

SAMPLE RESULTS

Lab ID: L2472611-02 Date Collected: 12/11/24 11:10

Client ID: EFFLUENT- 12112024 Date Received: 12/11/24

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	73		5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	77		40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	107		40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	**292**	Q	40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	127		40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	**191**	Q	40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	99		40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	54		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	**329**	Q	40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	92		40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	104		40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	92		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	267		40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	138		40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	78		30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	89		40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	101		25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	73		10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	60		10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	**148**	Q	40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	67		10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	68		10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	56		10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	58		10-130

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 144,1633
Analytical Date: 12/22/24 15:10
Analyst: ANH

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab for sample(s): 01-02 Batch: WG2011978-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	6.40	0.528
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	3.20	0.360
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.60	0.400
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	6.40	0.912
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.60	0.248
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.60	0.208
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.60	0.240
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.60	0.136
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.60	0.264
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	6.40	4.82
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.60	0.200
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.60	0.264
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.60	0.264
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.60	0.208
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	6.40	1.22
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.60	0.200
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.60	0.480
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.60	0.176
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.60	0.136
Perfluorooctanesulfonamide (PFOSA)	ND		ng/l	1.60	0.096
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.60	0.480
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.60	0.216
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.60	0.184
Perfluorotetradecanoic Acid (PFTeDA)	ND		ng/l	1.60	0.160
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	6.40	1.60
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	6.40	0.376
Perfluorododecanesulfonic Acid (PFDoS)	ND		ng/l	1.60	0.240

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 144,1633
Analytical Date: 12/22/24 15:10
Analyst: ANH

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab for sample(s): 01-02 Batch: WG2011978-1					
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	6.40	0.440
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	6.40	0.448
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	1.60	0.224
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	1.06	J	ng/l	1.60	0.352
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	16.0	1.30
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	16.0	1.10
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	3.20	0.248
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	3.20	0.360
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	3.20	0.328
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	3.20	0.544
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	ND		ng/l	8.00	0.536
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	ND		ng/l	40.0	4.26
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	ND		ng/l	40.0	3.18

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 144,1633
Analytical Date: 12/22/24 15:10
Analyst: ANH

Extraction Method: EPA 1633
Extraction Date: 12/20/24 18:14

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab for sample(s): 01-02 Batch: WG2011978-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	100		5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	116		40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	104		40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	89		40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	98		40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	97		40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	97		40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	105		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	86		40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	108		40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	109		40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	106		40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	81		40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	155		40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	100		30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	104		40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	82		25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	90		10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	79		10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	119		40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	73		10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	80		10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	88		10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	92		10-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Parameter	Low Level LCS %Recovery	Qual	Low Level LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-2 LOW LEVEL								
Perfluorobutanoic Acid (PFBA)	109		-		70-140	-		30
Perfluoropentanoic Acid (PFPeA)	103		-		65-135	-		30
Perfluorobutanesulfonic Acid (PFBS)	111		-		60-145	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	109		-		70-145	-		30
Perfluorohexanoic Acid (PFHxA)	116		-		70-145	-		30
Perfluoropentanesulfonic Acid (PFPeS)	95		-		65-140	-		30
Perfluoroheptanoic Acid (PFHpA)	117		-		70-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	92		-		65-145	-		30
Perfluorooctanoic Acid (PFOA)	114		-		70-150	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	122		-		65-155	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	99		-		70-150	-		30
Perfluorononanoic Acid (PFNA)	108		-		70-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	101		-		55-150	-		30
Perfluorodecanoic Acid (PFDA)	116		-		70-140	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	102		-		60-150	-		30
Perfluorononanesulfonic Acid (PFNS)	98		-		65-145	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	106		-		50-140	-		30
Perfluoroundecanoic Acid (PFUnA)	108		-		70-145	-		30
Perfluorodecanesulfonic Acid (PFDS)	92		-		60-145	-		30
Perfluorooctanesulfonamide (PFOSA)	104		-		70-145	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	123		-		70-145	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Parameter	Low Level LCS %Recovery	Qual	Low Level LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-2 LOW LEVEL								
Perfluorododecanoic Acid (PFDoA)	108		-		70-140	-		30
Perfluorotridecanoic Acid (PFTrDA)	103		-		65-140	-		30
Perfluorotetradecanoic Acid (PFTeDA)	116		-		60-140	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	112		-		70-140	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	99		-		65-145	-		30
Perfluorododecanesulfonic Acid (PFDoS)	100		-		50-145	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	109		-		70-155	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	98		-		55-160	-		30
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	106		-		60-150	-		30
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	100		-		65-145	-		30
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	100		-		70-145	-		30
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	104		-		70-135	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	101		-		55-140	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	105		-		60-150	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	125		-		70-140	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	150		-		50-150	-		30
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	120		-		65-130	-		30
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	123		-		70-135	-		30
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	103		-		50-145	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Parameter	Low Level LCS %Recovery	Qual	Low Level LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-2 LOW LEVEL								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	102				5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	96				40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	108				40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	97				40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	84				40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	83				40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	104				40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	97				40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	87				40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	102				40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	108				40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	99				40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	87				40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	**181**	Q			40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	95				30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	102				40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	77				25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	89				10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	77				10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93				40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	74				10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	77				10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	85				10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	87				10-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS

Lab Number: L2472611
Report Date: 12/26/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-3								
Perfluorobutanoic Acid (PFBA)	118		-		70-140	-		30
Perfluoropentanoic Acid (PFPeA)	111		-		65-135	-		30
Perfluorobutanesulfonic Acid (PFBS)	119		-		60-145	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	108		-		70-145	-		30
Perfluorohexanoic Acid (PFHxA)	117		-		70-145	-		30
Perfluoropentanesulfonic Acid (PFPeS)	107		-		65-140	-		30
Perfluoroheptanoic Acid (PFHpA)	110		-		70-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	108		-		65-145	-		30
Perfluorooctanoic Acid (PFOA)	102		-		70-150	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	125		-		65-155	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	114		-		70-150	-		30
Perfluorononanoic Acid (PFNA)	110		-		70-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	108		-		55-150	-		30
Perfluorodecanoic Acid (PFDA)	105		-		70-140	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	120		-		60-150	-		30
Perfluorononanesulfonic Acid (PFNS)	108		-		65-145	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	103		-		50-140	-		30
Perfluoroundecanoic Acid (PFUnA)	113		-		70-145	-		30
Perfluorodecanesulfonic Acid (PFDS)	94		-		60-145	-		30
Perfluorooctanesulfonamide (PFOSA)	106		-		70-145	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	119		-		70-145	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-3								
Perfluorododecanoic Acid (PFDoA)	127		-		70-140	-		30
Perfluorotridecanoic Acid (PFTrDA)	117		-		65-140	-		30
Perfluorotetradecanoic Acid (PFTeDA)	109		-		60-140	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	116		-		70-140	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	102		-		65-145	-		30
Perfluorododecanesulfonic Acid (PFDoS)	101		-		50-145	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	116		-		70-155	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	100		-		55-160	-		30
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	103		-		60-150	-		30
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	106		-		65-145	-		30
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	104		-		70-145	-		30
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	108		-		70-135	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	108		-		55-140	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	102		-		60-150	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	126		-		70-140	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	**161**	Q	-		50-150	-		30
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	111		-		65-130	-		30
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	107		-		70-135	-		30
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	82		-		50-145	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 1633 - Mansfield Lab Associated sample(s): 01-02 Batch: WG2011978-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[13C4]Butanoic Acid (13C4-PFBA)	103				5-130
Perfluoro-n-[13C5]Pentanoic Acid (13C5-PFPeA)	114				40-130
Perfluoro-1-[2,3,4-13C3]Butanesulfonic Acid (13C3-PFBS)	104				40-135
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Hexanesulfonic Acid (13C2-4:2FTS)	93				40-200
Perfluoro-n-[1,2,3,4,6-13C5]Hexanoic Acid (13C5-PFHxA)	97				40-130
Perfluoro-n-[1,2,3,4-13C4]Heptanoic Acid (13C4-PFHpA)	107				40-130
Perfluoro-1-[1,2,3-13C3]Hexanesulfonic Acid (13C3-PFHxS)	101				40-130
Perfluoro-n-[13C8]Octanoic Acid (13C8-PFOA)	102				40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Octanesulfonic Acid (13C2-6:2FTS)	88				40-200
Perfluoro-n-[13C9]Nonanoic Acid (13C9-PFNA)	91				40-130
Perfluoro-1-[13C8]Octanesulfonic Acid (13C8-PFOS)	101				40-130
Perfluoro-n-[1,2,3,4,5,6-13C6]Decanoic Acid (13C6-PFDA)	106				40-130
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2]Decanesulfonic Acid (13C2-8:2FTS)	83				40-300
N-Methyl-d3-perfluoro-1-octanesulfonamidoacetic Acid (D3-NMeFOSAA)	132				40-170
Perfluoro-n-[1,2,3,4,5,6,7-13C7]Undecanoic Acid (13C7-PFUnA)	96				30-130
Perfluoro-1-[13C8]Octanesulfonamide (13C8-PFOSA)	96				40-130
N-Ethyl-d5-perfluoro-1-octanesulfonamidoacetic Acid (D5-NEtFOSAA)	73				25-135
Perfluoro-n-[1,2-13C2]Dodecanoic Acid (13C2-PFDoA)	87				10-130
Perfluoro-n-[1,2-13C2]Tetradecanoic Acid (13C2-PFTeDA)	83				10-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	117				40-130
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (D3-NMeFOSA)	78				10-130
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (D5-NEtFOSA)	81				10-130
N-Methyl-d7-Perfluorooctanesulfonamidoethanol (D7-NMeFOSE)	79				10-130
N-Ethyl-d9-Perfluorooctanesulfonamidoethanol (D9-NEtFOSE)	81				10-130

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS

Lab Number: L2472611
Report Date: 12/26/24

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2472611-01A	Plastic 500ml unpreserved	A	NA		4.0	Y	Absent		A2-NY-1633(28)
L2472611-01B	Plastic 500ml unpreserved	A	NA		4.0	Y	Absent		A2-NY-1633(28)
L2472611-02A	Plastic 500ml unpreserved	A	NA		4.0	Y	Absent		A2-NY-1633(28)
L2472611-02B	Plastic 500ml unpreserved	A	NA		4.0	Y	Absent		A2-NY-1633(28)

*Values in parentheses indicate holding time in days

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS

Lab Number: L2472611
Report Date: 12/26/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS

Lab Number: L2472611
Report Date: 12/26/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	NOVEMBER 2024 GWTS	**Lab Number:**	L2472611
Project Number:	NOVEMBER 2024 GWTS	**Report Date:**	12/26/24

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NOVEMBER 2024 GWTS	**Lab Number:**	L2472611
Project Number:	NOVEMBER 2024 GWTS	**Report Date:**	12/26/24

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	NOVEMBER 2024 GWTS	**Lab Number:**	L2472611
Project Number:	NOVEMBER 2024 GWTS	**Report Date:**	12/26/24

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: NOVEMBER 2024 GWTS
Project Number: NOVEMBER 2024 GWTS
Lab Number: L2472611
Report Date: 12/26/24

REFERENCES

144 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS. Draft EPA Method 1633, EPA Document 821-D-22-001, June 2022.

LIMITATION OF LIABILITIES

Pace Analytical Services performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Pace Analytical Services shall be to re-perform the work at it's own expense. In no event shall Pace Analytical Services be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Pace Analytical Services.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility – 8 Walkup Dr. Westborough, MA 01581
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility – 320 Forbes Blvd. Mansfield, MA 02048
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Nonpotable Water: EPA RSK-175 Dissolved Gases
Biological Tissue Matrix: EPA 3050B

Mansfield Facility – 120 Forbes Blvd. Mansfield, MA 02048
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Nonpotable Water: EPA RSK-175 Dissolved Gases

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility – 8 Walkup Dr. Westborough, MA 01581

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility – 320 Forbes Blvd. Mansfield, MA 02048

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Project Manager.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

PARADIGM ENVIRONMENTAL SERVICES, INC.

CHAIN OF CUSTODY

12/12/24 L2472611 11148

REPORT TO:		INVOICE TO:		
CLIENT:	Paradigm Environmental	CLIENT:	Same	LAB PROJECT ID
ADDRESS:	179 Lake Ave	ADDRESS:		
CITY:	Rochester STATE: NY ZIP 14608	CITY:	STATE: ZIP:	Quotation #: 202200110
PHONE:		PHONE:		Email: reporting@paradigmenv.com
ATTN:	Reporting	ATTN:		

PROJECT REFERENCE
November 2024
GWTS

Matrix Codes:
AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	PFAS 1633	REMARKS	PARADIGM LAB SAMPLE NUMBER
12/11/24	11:00		X	Influent - 12112024	AQ	2	X		-01
12/11/24	11:10		X	Effluent - 12112024	AQ	2	X		-02
								Project: SP2022	

rec: 12/12/24 0650 RM Montoya AAL 12/12/24 0650

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard Turn	☒	None Required	☐	None Required	☐
10 day	☐	Batch QC	☒	Basic EDD	☐
Rush 3 day	☐	Category A	☐	NYSDEC EDD	☒
Rush 2 day	☐	Category B	☐		
Rush 1 day	☐				
Other (please indicate date needed:)	☐	Other (please indicate package needed:)	☐	Other EDD (please indicate EDD needed:)	☐

Client

Sampled By: Brian Zuch — Date/Time: 12/11/24 13:05 — Total Cost:

Relinquished By: Jocelyn Filley (PACE) — Date/Time: 12/11/24 13:05

Received By: Jocelyn Filley (PACE) — Date/Time: 12/11/24 13:05 — P.I.F.

~~Received @ Lab By~~ RELINQUISHED BY: Buffalo Service Center — Date/Time: 12/11/24 13:05

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

Russell B Bixby 12/11/24 16:13

12/12/24 0230

See additional page for sample conditions.

Appendix C – CAMP

INVENTUM ENGINEERING, PC

Community Air Monitoring Plan
For Remedial Actions

Riverview Innovation & Technology Campus

Brownfield Cleanup Program Site No. C915353

3875 River Road
Tonawanda, NY 14150

March 28, 2025

441 CARLISLE DRIVE
SUITE C
HERNDON, VA 20170
WWW.INVENTUMENG.COM

Table of Contents

1 Overview 1
2 Community Air Monitoring Plan 1
3 VOC Monitoring, Response Levels, and Actions 3
4 Particulate Monitoring, Response Levels, and Actions 4
Appendix 1 5
Appendix 2 8

1 Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required.

- *The Riverview Site will have a perimeter air monitoring program during the Remedial Action work until all areas of the BCP Site meet commercial or unrestricted use criteria. If there are detections at the property line, additional monitoring requirements will be considered*[1].
- *Three (3) perimeter air monitoring units (1 Upwind and 2 Downwind) were installed on the BCP Site in 2020 and will continue operation for the work outlined in Remedial Action Work Plans. Monitoring locations are shown on the Figure provided in Appendix 2.*
- *A fourth monitoring station will be in operation at the limits of the work area during intrusive earthwork and soil solidification for work outlined in the Remedial Action work plans.*

Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

- *There are no sensitive receptors on the property. The closest residence is more than 0.25 miles away from the property boundary.*

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

2 Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy

[1] The text in *italic font* are comments inserted by Riverview in addition to the standard CAMP Template.

metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

- *VOC and particulate monitoring will be incorporated into the Remedial Action activities.*

Continuous monitoring will be required for all ground intrusive activities during Remedial Action work of contaminated or potentially contaminated material consisting of test pitting, mass earth moving, soil solidification/mixing, and material placement.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of surface soil samples. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while accessing surface soils and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

- *During sampling periodic monitoring will be implemented with hand-held instruments.*

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre- determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

3 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5. The NYSDEC and NYSDOH project managers will be notified there is an exceedance of the VOC action levels.

4 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

4. The NYSDEC and NYSDOH project managers will be notified where there is an exceedance of the CAMP particulate monitoring action levels.

Appendix 1
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;

(b) Measurement Ranges: 0.001 to 400 mg/m^3 (1 to 400,000 :ug/m^3);

(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m^3 for one second averaging; and +/- 1.5 g/m^3 for sixty second averaging;

(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);

(e) Resolution: 0.1% of reading or 1g/m^3, whichever is larger;

(f) Particle Size Range of Maximum Response: 0.1-10;

(g) Total Number of Data Points in Memory: 10,000;

(h) Logged Data: Each data point with average concentration, time/date and data point number

(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;

(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;

(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;

(l) Operating Temperature: -10 to 50° C (14 to 122° F);

(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m^3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m^3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential-- such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during earth work activities:

(a) Applying water on haul roads;

(b) Wetting equipment and excavation faces;

(c) Spraying water on buckets during excavation and dumping;

(d) Hauling materials in properly tarped or watertight containers;

(e) Restricting vehicle speeds to 10 mph;

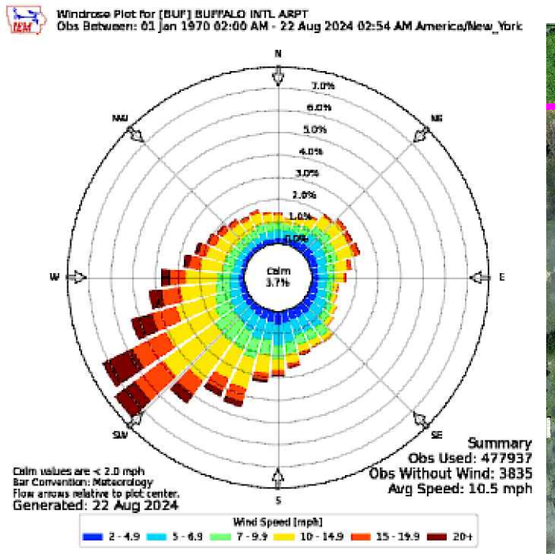
(f) Covering excavated areas and material after excavation activity ceases; and

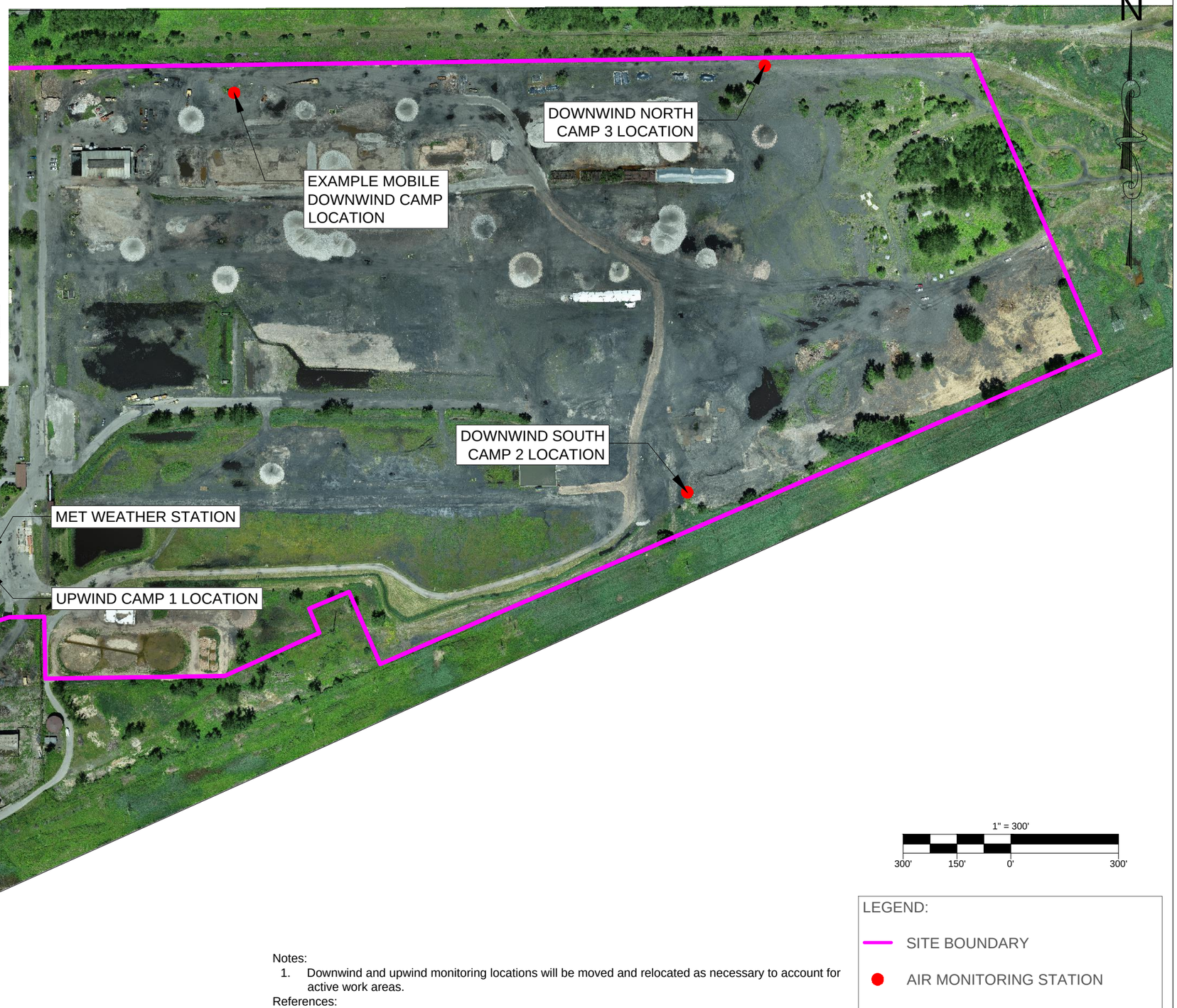
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m^3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Appendix 2
Perimeter Air Monitoring Locations





1" = 300'

300' 150' 0' 300'

LEGEND:

- SITE BOUNDARY
- AIR MONITORING STATION
- WEATHER MONITORING STATION

Notes:

1. Downwind and upwind monitoring locations will be moved and relocated as necessary to account for active work areas.

References:

1. Wind Rose Rochester/Monroe County, Iowa State University IEM, https://mesonet.agron.iastate.edu/

B

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COMMUNITY AIR MONITORING PLAN (CAMP)
RIVERVIEW INNOVATION AND TECHNOLOGY CAMPUS
3875 RIVER ROAD
TONAWANDA, NEW YORK

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170

DRAWING NUMBER
CAMP

Appendix D – Engineering Report – Stormwater Management

Engineer's Report for

Riverview Innovation & Technology Campus

Site 109 – OU2, NYSDEC Site #915055
BCP Site – NYSDEC Site #915353
3821 River Road - NYSDEC Site # C915003
Site 110 - OU1, NYSDEC Site 915055

Prepared for:

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Prepared by:

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March 11, 2026

BME Project #2968

Table of Contents

Figure 01 – Location Map
Figure 02 – Aerial Photo Exhibit

1) Introduction 1
2) Water Supply 1
3) Sanitary Sewer 2
4) Stormwater 2
    a. Overview 2
    b. Methodology 2
    c. Soils 3
    d. Existing Conditions 4
    e. Proposed Conditions 6
    f. Proposed Stormwater Management Facility 7
    g. Stormwater Quantity Results 9
    h. Channel Protection 9
    i. Stormwater Quality 10
    j. Stormwater Quantity and Quality Results and Analysis 11
5) Storm Sewers 12
6) Erosion and Sediment Control 12

Appendices

Appendix 1: Background Information
- Figure 03 – Soil Map
- Northeast Regional Climent Center Extreme Precipitation Events

Appendix 2: Stormwater Quantity
- Figure 04 – Existing Conditions Drainage Exhibits
- Figure 05 – Proposed Conditions Drainage Exhibits
- Stormwater Hydrographs

Appendix 3: Channel Protection and Stormwater Management Facility Calculations
- Figure 06 – Channel Protection Volume Exhibit
- SWMF Channel Protection Volume Calculations
- SWMF Channel Protection Orifice & Spillway Calculations
- SWMF Forebay and Deep Pool Sizing Calculations

Appendix 4: Stormwater Quality
- Figure 07 – Existing Conditions Landcover Exhibit
- Figure 08 – Proposed Conditions Landcover Exhibit

Appendix 5: Storm Sewers
- Figure 09 – Storm Sewer Map
- Storm Sewer Sizing Calculations
- Rip-Rap Outlet Sizing Calculations

Appendix 6: Water and Sewer
- Water and Sewer Use Estimates

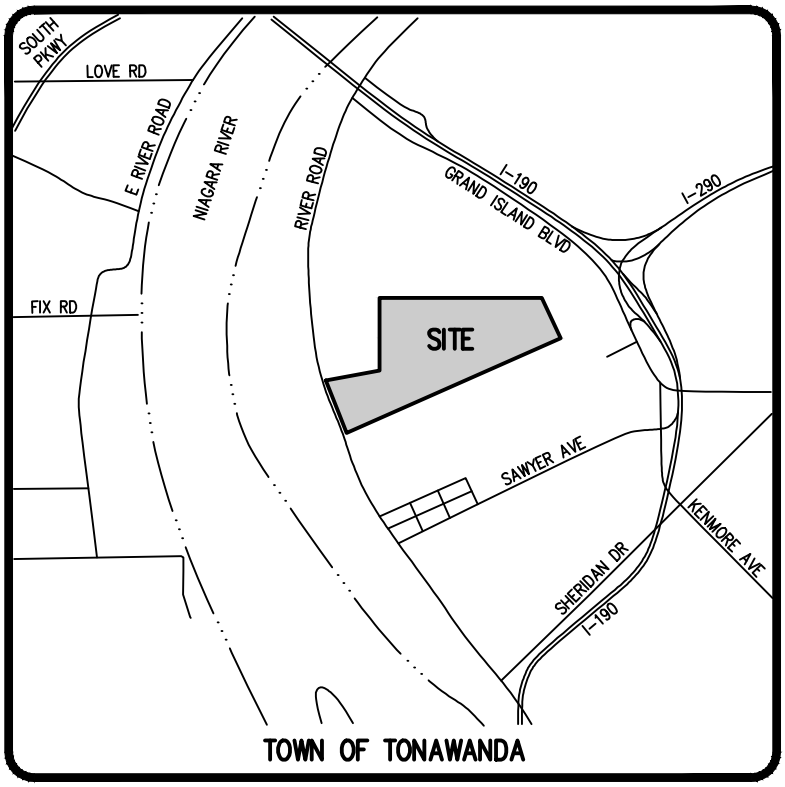

FIGURE 01 – LOCATION MAP

NOT TO SCALE

P:\2968\Drawings\Final\2968 Drainage Base.dwg

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

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Drawing Alteration
The following is an excerpt from the New York State Education Law Article 145 Section 7209 and applies to this drawing:
"It is a violation of this law for any person, unless he is acting under the direction of a licensed professional engineer or land surveyor to alter any item in any way. If an item bearing the seal of an engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration."

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PROJECT: RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
LOCATION: TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK STATE
CLIENT: INVENTIUM ENGINEERING
441 CARLISLE DRIVE
HERNDON, VIRGINIA 20170
DRAWING TITLE: AERIAL IMAGE EXHIBIT

PROJECT MANAGER	
PGV	
PROJECT ENGINEER	
JGC	
DRAWN BY	
JGC	
SCALE	DATE ISSUED
AS NOTED	DECEMBER 2024

PROJECT NO.
2968
DRAWING NO.
FIGURE 02

1. Introduction

The Riverview Innovation and Technology Campus located along River Road in Tonawanda, New York 14150, is undergoing an environmental site remediation and restoration project with the intent to redevelop the properties for new industrial and/or commercial uses. Inventum Engineering contracted with BME Associates to assist in designing some site improvements to enable remediation activities and potential future development.

This report focuses primarily on the remediation sites located to the East of River Road (see Figure 02) including;

1. Site 109 – OU2, NYSDEC Site #915055
2. BCP Site – NYSDEC Site #915353
3. 3821 River Road - NYSDEC Site # C915003
4. Site 110 - OU1, NYSDEC Site 915055

The overall project will ultimately include additional remediation and site improvements located on the property West of River Road which receives runoff from the properties listed above but is not included in the discussions or analysis contained in this report.

5. Site 108 – OU3, NYSDEC Site # 915055

The project is currently served by two existing entrances located along River Road, one in Site 109 and 3821 River Road, which will remain in approximately the same locations for the post developed condition. The proposed road will be designed to accommodate a fire apparatus and full-sized tractor trailer movements.

The site is currently served by public water and sewer services which extend from the River Road right-of-way and east into the property. However, as part of the remediation and site improvements the existing services will be abandoned, removed as necessary, or reconnected to for the new water and sanitary sewer mains to serve the future development.

Stormwater drainage will be managed via installation of a new stormwater management facility, conveyance swales, and culverts. Runoff will be collected and released at controlled rates to the same location as under existing conditions, ultimately discharging into the Niagara River along the western limits of Site 108.

The following report provides the technical data to support the proposed overall development, with a focus on the stormwater management controls. The report also includes discussion on the water and sanitary sewer service, construction erosion control, environmental setting, and other site design components.

2. Water Supply System

The properties to the east of River Road will be supplied by a new private watermain service, which will be extended from the existing public watermains located within the right-of-way. The new watermain will connect to the public water system near the entrance of Site 109 and extend along the proposed loop road to serve the future development and fire hydrants. A new master meter and backflow devices will be provided in a hotbox or vault near the point of connection in Site 109. The approximate location of the new watermain is identified on the construction drawings for Site 109. The final size of the watermain,

meter, and backflow equipment will need to be verified based on the final uses, and the existing public water systems available pressure and flow rates.

Water usage for the entire development, including Site 108, is approximately 33,050 gallons per day and calculations have been included in Appendix 6.

3. Sanitary Sewer System

The properties to the east of River Road will be supplied by a new 8" private sanitary sewer main, which will be extended from the existing public sewer mains located on site near the River Road right-of-way. The new sanitary sewer will connect to the public sewer system near the entrance of Site 109 and extend along the proposed loop road to serve the future development. The initial phase of construction within Site 109 will include construction of the sanitary sewer main, which will be left with a stub near the eastern limits along the BCP Site for future extension through the development area.

Wastewater generated for the entire development, including Site 108, is consistent with the anticipated water usage and is approximately 33,050 gallons per day and calculations have been included in Appendix 6.

4. Stormwater Management Analysis

4.a. Overview

Stormwater runoff associated with the proposed redevelopment project will be treated during and after construction to meet New York State Department of Environment Conservation (NYSDEC) water quality and quantity requirements. This section of the report focuses on the existing and proposed stormwater conditions for the remediation properties located to the east of River Road identified in Section A.

The remediation activities will include construction of a large stormwater management facility which is intended to detain and treat stormwater runoff from the eastern portion of the future development areas before being released downstream toward River Road and ultimately through Site 108 to the Niagara River. Due to the properties previous use and required remediation activities, infiltration of surface water into the subsoils should be avoided, which limits the use of some of the green infrastructure measure typically used with development and redevelopment. However, the properties redevelopment is intended to result in a decrease in impervious surfaces at the project site over 25% from its pre-remediation and redevelopment activities to satisfy the water quality requirements.

The stormwater management plan for the project is designed in accordance with the current rules and regulations set in the NYSDEC Stormwater Management Design Manual (July 2024) and the current SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-25-001).

The post construction stormwater controls for the proposed development have been designed with 30% green space being provided within the developable areas, exclusive of the loop road, adjacent lawn areas, stormwater management facility (SWMF), substation area, and known building and access areas for the large building located on the BCP property. See Figure 08 in Appendix 4 for the assumed land cover areas under post developed conditions.

The final design and development of the properties located to the east of River Road will need to be reviewed for compliance against the assumptions within this report for the overall stormwater management outlined. Additional stormwater quantity or quality controls may be required based upon the final development configuration.

4.b. Methodology

The NYSDEC Stormwater Management Design Manual provides specifications and sizing criteria for stormwater management practices for stormwater discharges. The proposed stormwater management for this project has been designed to meet the five key criteria outlined in the Design Manual:

- Water quality volume (WQv) to meet pollutant removal goals;
- Runoff reduction volume (RRv) by application of runoff reduction practices to replicate pre-development flows;
- Channel protection volume (Cpv) to reduce channel erosion;
- Overbank flood protection (Qp) to prevent overbank flooding; and
- Extreme storm protection (Qf) to help control extreme floods.

The proposed site modifications are classified as a redevelopment project considering the disturbance of an existing developed site with existing impervious surface areas per the New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activities, General Permit Number GP-0-25-001 (General Permit), and the 2024 New York State Stormwater Management Design Manual (SWDM) "Chapter 9 – Redevelopment - Projects" guidelines. Given the anticipated site disturbance of over 1 acre of land area, the site development must address Water Quality Volume (WQv), Runoff Reduction (RRv) and Water Quantity criteria per the SWDM "Chapter 9 – Redevelopment - Projects" guidelines.

The quality criteria, WQv and RRv, will be satisfied by reduction of existing impervious surfaces on the property by more than 25%. The quantity criteria, Cpv, Qp, and Qf, will be satisfied by construction of a large stormwater management facility, which will collect post development runoff from a portion of the project site before releasing it at controlled rates to the downstream areas.

There are two existing storm sewers which convey stormwater runoff from the property to the south, and through 3821 River Road, to Analysis Point A. No modifications to the offsite drainage area are proposed, and the runoff entering the project area from the adjacent property will continue to be bypassed under the post development conditions utilizing the existing pipes or pipes with equivalent conveyance capacity if relocation of the pipes is necessary.

The existing and proposed drainage conditions at the project site were analyzed following the methods outlined in Soil Conservation Service Technical Release No. 20 & 55. Peak runoff rates for existing and post-development conditions were modeled for the 1, 2, 5, 10, 25, 50, and 100-year design storm events using the HydroCAD V10.20-5c software. Runoff rates were determined based on the hydrologic characteristics of the site (soil conditions, existing and proposed land cover, time of concentration for the contributing drainage areas) and the hydraulic characteristics of the proposed stormwater management facility (type of storage, size of facility and outlet structure features and sizing as applicable). Twenty-four (24) hour extreme storm event precipitation amounts were obtained from Northeast Regional Climate Center online web tool and have been included in Appendix 1 for reference. Appendix 2 contains the stormwater hydrographs and subarea information. These stormwater hydrograph reports show the subarea routings, subarea data, stormwater management facility and outlet structure sizing, estimated detention times, storage volumes, peak ponding elevations, and discharge rates.

4.c. Soils

The Natural Resources Conservation Service (NRCS) indicates the project sites contain soils primarily listed as Urban Land (Ud), which doesn't have a hydrologic soil classification. There are some small

areas of hydrologic soil D along the southern and eastern most site limits consisting of Cayuga silt loam (CfB & CfC), Lakemont silt loam (La), and Odessa silt loam (Od & Oe). A soils map has been included as Figure 03 in Appendix 1 for reference.

For purposes of the analysis contained within this report all the Urban Land soils have been evaluated as hydrologic soil class D. This is supported by test pits which confirm an underlying clay layer and relatively shallow groundwater elevation compared to surface grades and by field observations which indicate poor water infiltration in several locations from standing water for a period after a rain event occurs.

4.d. Existing Conditions

The analyzed watershed for the project area east of River Road, totals approximately 134.2 acres and under existing conditions consists of 2 analysis points and 4 drainage areas (see Figure 4 in Appendix 2). The analysis points are described below, followed by existing subarea information (Table 1), detailed subarea discussions, and information regarding the hydrologic modeling of the existing stormwater ponds/structures relevant to the stormwater quantity analysis.

Analysis Point A
Analysis Point A was selected at the inlet of the existing box culvert located along the River Road right-of-way limits on the eastern portion of Site 109. This analysis point receives runoff directly from most of the development area allowing for a comparison between pre and post condition peak flow rates. Once runoff flows past the analysis point and through the existing box culvert below River Road, it is conveyed through Site 108 and ultimately into the Niagara River. This subarea also receives runoff from the property south of the development properties which is bypassed through 3821 River Road in an existing 36" and 48" culverts and discharges immediately upstream of Analysis Point A.

Analysis Point B
Analysis Point B was selected as the entire southern property limits of 3821 River Road and the BCP Site. The entire property limits were selected for the analysis point because the post developed conditions will reduce the area and runoff flowing offsite generally long the entire length, and this allows for comparison between pre and post condition peak flow rate. Runoff flowing past the Analysis Point B Limits and on the adjacent property eventually reaches two existing culverts which convey it back through 3821 River Road and toward Analysis Point A.

Table 1: SCS Hydrologic Data, Existing Conditions

Subarea	Area	Curve Number (CN)	Time of Concentration (Tc)
Ex Subarea A-1	31.5 acres	89	18.2 min
Ex Subarea A-2	40.1 acres	96	24.5 min
Ex Subarea A-3	51.0 acres	93	88.9 min
Ex Subarea B-1	11.6 acres	85	8.0 min

Ex Subarea A-1 (31.5 acres)
This subarea consists of the western portion of the properties including a majority of Site 109 and 3821 River Road, and a small portion of the BCP Site. This subarea consists of impervious surfaces from previous industrial use, brush, and lawn areas. Runoff from this subarea begins as sheet flow in the western portion before concentrating and reaching the existing drainage swales in Site 109 or through the

existing storm sewer located with 3821 River Road. Runoff eventually is conveyed through this subarea west toward River Road and through an existing box culvert (Analysis Point A), before flowing through site 108 and reaching the Niagara River.

Ex Subarea A-2 (40.1 acres)
This subarea consists of the central portion of the BCP Site. This subarea consists of primarily impervious surfaces from the former industrial uses, with some small lawn areas along the drainage swales. Runoff from this subarea begins as sheet flow in the western portion before concentrating into the existing stormwater swales and flowing west to a small kidney shaped pond, west of Site 109. Runoff entering the small pond is discharged through an outlet pipe and into the existing drainage swale along the southern limits of Site 109, before reaching the box culvert below River Road (Analysis Point A). This pond functions as a settling basin for stormwater runoff before being discharged from it. See below for additional information regarding the hydrologic modeling of the kidney shaped pond.

Ex Subarea A-3 (51.0 acres)
This subarea consists of the northern part of the BCP Site, western portion of Site 110, and some offsite area to the north which flows into the property. The portion of this subarea within the project limits consists of primarily impervious surfaces from the former industrial uses, with some small lawn areas along the drainage swales, and brush areas in the eastern portion. The offsite area which drains into the project site is brush. Runoff from this subarea begins as sheet flow before concentrating into the existing stormwater swales or being collected in some of the existing storm sewers in this area. Runoff from this subarea is directed toward a collection pit where several storm sewers route to, before being discharged through a 24" culvert. See below for additional information regarding the hydrologic modeling of the collection sump. The outfall culvert conveys runoff south into Site 109, where it enters an existing water quality facility composed of multiple cells. This structure was previously used by the industrial use as a settling basin for stormwater runoff before being discharged downstream and doesn't provide any substantial stormwater storage volume or attenuation of flows before being discharged from it. Runoff leaving the facility is routed through a 24" pipe which discharges into the existing drainage swale along the southern limits of Site 109, before reaching the box culvert below River Road (Analysis Point A).

Ex Subarea B-1 (11.6 acres)
This subarea consists of the southern portions of 3821 River Road and the BCP Site, which drain directly off the property to the south. This subarea consists of impervious surfaces from the former industrial uses and brush areas. Runoff from this subarea begins as sheet flow and generally flows south offsite onto the adjacent property into a brush/wetland area located within an overhead utility corridor. To allow for comparison to post developed conditions the entire southern property limits were selected as Analysis Point B. Runoff flowing onto the adjoining property from Ex Subarea B, eventually flows west along the utility corridor and enters one of two existing culverts, which convey runoff through 3821 River Road and discharge near Analysis Point A.

Hydrologic Model Discussion for Existing Conditions
The existing conditions hydrologic model includes two existing pond nodes to model the existing kidney shaped pond (Ex Kidney Pond) in the western portion of Ex Subarea A-2, and the existing collection sump (Ex Collection Sump) in the northwest corner of Ex Subarea A-3.

The existing kidney pond serves as a settling basin for stormwater runoff in Ex Subarea A-2, which is generally conveyed to it via overland flow and existing drainage ditches. This facility doesn't provide any substantial storage volume between the normal ponding and adjacent surface grades within its immediate limits. However, the elevation at which this facility would overflow would require ponding through a large portion of the contributing drainage swales and relatively flat upper areas of the drainage before it would be able to overflow. In effect, this additional upstream storage, which appears as surface storage or water stored in the upper limits of the subgrade soils does provide a large amount of storage volume,

allowing the facility to attenuate existing flows and discharge all storm events through its existing 12" outlet pipe. To model this configuration the storage volume for the facility was entered into the HydroCAD pond node for this facility, but the top 1' of storage modeled the surface area was increased beyond the immediate pond area. Modeling it with this configuration allows the model to function consistently with observed field conditions and results in a lower peak discharge rate to Analysis Point A for a conservative estimate and more restrictive design criteria.

The existing collection sump located at the northwest corner of the site functions similarly to the existing kidney pond. This collection sump is the converging location for several drainage pipes within Subarea A-3, which all are discharged through an existing 24" outlet pipe which routes to the existing water quality treatment unit in Site 109. This sump provides minimal storage within it compared to the contributing drainage area, however the upstream swales and surface areas in this subarea provide additional storage volume which allows for the structure to attenuate existing flows. Similarly to the kidney pond, the top 1' of storage modeled for the collection sump structure was greatly increased, allowing the model to function consistently with observed field conditions, which results in a lower peak discharge rate to Analysis Point A for a conservative estimate and more restrictive design criteria. As noted above the existing water quality unit within Site 109 doesn't provide any attenuation of flows and therefore was excluded from the hydrologic modeling for the existing conditions.

4.e Proposed Conditions

The drainage subareas for the post-development conditions (see Figure 05 in Appendix 2) have been delineated per the proposed grading of the site development and assumed final land cover conditions (See Figure 08 in Appendix 2). The proposed subareas are based on assumptions provided in this report and will require verification per the final development plans. The analyzed drainage area includes approximately 134.2 acres, which matches the existing conditions, and is composed of 3 subareas. Drainage under the proposed conditions will continue to drain toward the analysis points to allow for a comparison to pre-development flow rates. Table 2 below provides a summary of the proposed subareas, which are described in further detail following the table.

Table 2: SCS Hydrologic Data, Proposed Conditions

Subarea	Area	Curve Number (CN)	Time of Concentration (Tc)
Pr Subarea A-1	32.8 acres	91	22.1 min
Pr Subarea A-2	93.5 acres	91	25.1 min
Pr Subarea B-1	7.9 acres	86	7.2 min

Pr Subarea A-1 (32.8 acres)
This subarea contains the western portion of the overall development area including a majority of Site 109, 3821 River Road, and a small portion the BCP Site. The post developed condition for this subarea is assumed to have 70% impervious area and 30% lawn area for all areas excluding the proposed road corridor (impervious and adjacent lawn area) and areas within the River Road right-of-way. Runoff from this subarea under post developed conditions will flow westward via the proposed road corridor or future storm sewers and reach Analysis Point A. No post construction stormwater quantity controls area proposed within the subarea at this time, however the final developed condition will need to be re-evaluated to confirm compliance with the stormwater quantity requirements.

Pr Subarea A-2 (93.5 acres)
This subarea will include the majority of the BCP Site. The post developed condition for this subarea based on the proposed development and future potential development areas assumed to have 70% impervious area and 30% lawn area. Runoff from this subarea will be collected via a proposed drainage swale along the east and northern limits of the property, the proposed road corridor, and other storm sewers installed during the final site development. Runoff from this subarea will be directed to a large stormwater management facility located along the western limits of the BCP site. The stormwater facility will be capable of detaining greater than the 100-year storm event and releasing the runoff downstream through a proposed storm sewer system through Site 109, toward Analysis Point A.

Pr Subarea B-1 (7.9 acres)
This subarea includes the southern area between the proposed road and southern property limits within 3821 River Road and the BCP Site, and the eastern substation in the southeast corner of the project area. Runoff from this area will continue to sheet flow over the southern property limits, Analysis Point B, to allow for comparison to predevelopment flow rates. This subarea is consistent with Existing Subarea B-1, and runoff will flow west after passing Analysis Point B, and eventually being conveyed back through 3821 River Road in culverts toward Analysis Point A. Reconfiguration of the bypass culverts within 3821 River Road may be necessary based on the final post development condition, however flows will continue to be conveyed from the property south through the site toward Analysis Point A.

4.f Proposed Stormwater Management Facility

The proposed remediation and redevelopment activities will include one new stormwater management facility (SWMF), which will be located along the western limits within the BCP Site and constructed as a Wet Pond (P-2), per the 2015 NYSDEC SWDM. As described previously this facility will receive runoff from a majority of the BCP site (PR Subarea A-2). Runoff entering the SWMF will be treated and attenuated before being released through an engineered outlet structure and a new storm sewer system within Site 109, to Analysis Point A near the River Road right-of-way limits.

The facility will detain and treat the post-development runoff and discharge it toward Analysis Point A. Sufficient storage volume is provided in the facilities to effectively detain the 1, 2, 5, 10, 25, 50 and 100-year storms and release them to Analysis Point A at controlled rates, to reduce the total peak runoff for the overall project. The outlet structure is designed to control the rate at which runoff is discharged from the site, ensuring that runoff rates will remain at or below those for the existing conditions. The outlet structure consists of a 15” outlet pipe, a 12” inverted pipe extending into the stormwater facility’s deep pool, and a 24” x 24” flat outlet grate. The 12” inverted pipe will discharge runoff from the bottom of the deep pool where it cooler in temperature. Details of the outlet structure are also provided on the design plans. The facility also includes a 60’ wide spillway which was set approximately 3’ above the 100-year ponding elevation and will allow the facility to release runoff in the case of an extreme rain event exceeding the storage volume of the facility. Table 3 below contains the ponding elevation and outflow data for each SWMF.

Table 3: - Stormwater Management Facility (SWMF) Summary

Design Storm Event	Post-Dev. Inflow (cfs)	Post Deve. Outflow (cfs)	Time to Peak Outflow (hrs)	Ponding Elevation (ft)	Storage Volume Used (cf)
1-yr	76.82	3.59	15.82	591.40	893,575
2-yr	98.24	4.43	16.28	591.87	973,560
5-yr	128.82	5.31	16.38	592.47	1,079,738
10-yr	158.32	5.74	16.75	593.03	1,184,563
25-yr	206.48	6.11	17.54	593.92	1,359,098
50-yr	249.40	6.43	18.18	594.73	1,525,507
100-yr	301.89	6.77	18.75	595.63	1,720,337
15” Outlet Pipe Elev Inv Elev.	589.00		Total Available Storage Volume @ Elev = 601.50 (cf)		2,542,547
12” Inverted Pipe Inv Elev.	590.00				
2’x2’ Grate Elev.	594.00				
Spillway Elev.	599.50				
Top of Berm Elev.	591.5 - 592.00				

4.g. Stormwater Quantity Results:

The calculations provided within the appendices show that the proposed project does not result in an increase to stormwater runoff rates at the Analysis Point A or B, for both the 10-year (Qp) and 100-year (Qf) events as required by the NYSDEC Stormwater Design Manual quantity criteria.

A summary of the existing vs. proposed runoff rates at the Analysis Point has been summarized with Table 4 below.

Table 4: Comparison of Existing and Proposed Peak Runoff Rates at Analysis Points

	Design Storm	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)
Analysis Point A	1	30.60	29.79
	2	40.12	38.69
	5	53.02	50.90
	10	**65.50**	**62.43**
	25	86.05	81.12
	50	104.00	97.59
	100	**125.58**	**117.60**
Analysis Point B	1	10.01	7.79
	2	14.16	10.79
	5	19.51	14.63
	10	**24.78**	**18.41**
	25	33.87	24.90
	50	41.78	30.48
	100	**51.58**	**37.40**

4.h. Channel Protection:

The 2015 NYSDEC Stormwater Design Manual Chapter 4 defines the CPv requirement as extended detention of the post-developed 1-Year, 24-hour storm event. This requirement is intended to protect stream channels from erosion. Since the project is considered a redevelopment, the Chapter 9 criteria for Channel Protection may be applied, which states,

"Channel protection for redevelopment activities is not required if there are no changes to hydrology that increase the discharge rater from the project site. This criterion as defined in Chapter 4 of this Manual, is not based on a pre versus post-development comparison. However, for redevelopment activities this requirement is relaxed. If the hydrology and hydrologic analysis for the project site shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required".

The peak flow rates identified at Analysis Point A and B in the previous sections are both less under proposed conditions than existing, and therefore the channel protection criteria for the project are satisfied.

However, the SWMF will attenuate peak flow rates during the 1-year storm event and release the runoff over a period greater than 24 hours, and therefore the facility will be providing Channel Protection Volume for the project although not required. To show compliance with the standards in Chapter 4 if this project was considered all new development, the required Channel Protection Volume was calculated based upon the property limits within the proposed subareas (see Figure 06 in Appendix 3). The calculated volume is provided in the SWMF located within the BCP Site (Subarea A-2) between the maintained water elevation (590.00) and grate elevation (594.00).

The channel protection volume calculations are provided in Appendix 3 and summarized below.

CPv Required if entirely new development = 83,699 cf
CPv Provided in SWMF = 701,885 cf

4.i. Stormwater Quality:

The August 2015 NYSDEC Stormwater Management Design Manual outlines numerous practices that can be constructed to improve the water quality and reduce the runoff volume of stormwater runoff. Reduced Runoff Volume (RRv) is the reduction of the total Water Quality Volume (WQv) by application of green infrastructure techniques and standard management practices to replicate pre-development hydrology. The intent of the green infrastructure measures is to replicate the pre-construction infiltration, peak runoff flow and discharge volume, as well as minimization of concentrated flow by using runoff control techniques to provide treatment in a distributed manner before runoff reaches offsite discharge locations.

As discussed previously, the proposed site modifications are classified as a redevelopment project per the NYSDEC 2015 SWDM, Chapter 9, and therefore the project must satisfy the Water Quality criteria (RRv and WQv) identified there. This project proposed to utilize Option I in Chapter 9.2.1.B, which states,

"The plan proposed a reduction of existing impervious cover by a minimum of 25% of the total disturbed, impervious area. A reduction in site imperviousness will reduce the volume of stormwater runoff, thereby achieving, at least in part, stormwater criteria for water quality and quantity."

The previous industrial uses of the properties created a large amount of asphalt and compacted gravel areas throughout a majority of the site, totaling approximately 100.1 acres (to Analysis Point A & B). The proposed remediation and future development the property will are anticipated to reduce the existing impervious surfaces to approximately 77.65 acres (to Analysis Point A & B, based on the assumptions for the final land cover conditions, which is a 22.4% reduction from existing. It is anticipated the total future development will not reach 77.65 acres of impervious surfaces within the analyzed drainage areas and therefore satisfies the Chapter 9 quality criteria for WQv and RRV. Figure 07 and 08 in Appendix 4 identify the assumed land cover utilized for the existing and proposed conditions, which were determined based upon historical photos, current aerial drone imagery (Figure 02), and on-site observation.

The total impervious surfaces created will need to be verified with the final development plans and additional RRv practices may be required if the final development does not reduce the impervious area compared to existing by more than 25%

Although the WQv criteria is anticipated to be satisfied via reduction of the total impervious surfaces on site, the SWMF proposed for the project will provide additional WQv in the forebay and deep pool areas, totaling approximately 524,036 cf. The information regarding water quality is summarized below.

Stormwater Quality Summary

Existing Impervious (within drainage analyzed Drainage Areas) = 100.10 acres
Proposed Impervious (within drainage analyzed Drainage Areas) = 77.65 acres
Percent Impervious Reduction = 22.4%
WQv Required = N/A, criteria satisfied since reduction of impervious cover is anticipated to be >25%
RRv Required = N/A, criteria satisfied since reduction of impervious cover is anticipated to be >25%
WQv Provided in SWMF = 524,036 cf

Additional WQv or RRv practices may be necessary depending on the final development plans, which will need to be verified based upon these assumptions.

4.j. Stormwater Quantity and Quality Analysis and Results:

The calculations provided within the appendices show the proposed project results in a reduction of stormwater runoff rates at the Analysis Points for both the 10-year and 100-year events as required by the NYSDEC Stormwater Design Manual quantity criteria. The previous sections showed the project also satisfies all key criteria including Qp, Qf, CPv, WQv, and RRv. These values have been summarized in Table 5 below.

Table 5. Compliance with NYSDEC Sizing Requirements

New York Stormwater Sizing Criteria	**Compliance**
Overbank Flood Protection (Qp) *Control peak discharge from 10-year storm to 10-year pre-development rates*	Analysis Point A **62.43** cfs (Proposed) < **65.50** cfs (Existing) **OK** Analysis Point B **18.41** cfs (Proposed) < **24.78** cfs (Existing) **OK**
Extreme Storm Protection (Qf) *Control peak discharge from 100-year storm to 100-year pre-development rates*	Analysis Point A **117.60** cfs (Proposed) < **125.58** cfs (Existing) **OK** Analysis Point B **37.40** cfs (Proposed) < **51.58** cfs (Existing) **OK**
Channel Protection Volume (CPv)	Post 1-year discharge < Existing 1-year discharge, therefore CPv criteria is satisfied. **OK** CPv Provided in SWMF = 701,885 cf
Water Quality Volume (WQv)	N/A, criteria satisfied since reduction of impervious cover is anticipated to be >25% **OK**
Runoff Reduction Volume (RRv)	N/A, criteria satisfied since reduction of impervious cover is anticipated to be >25% **OK**

Based on the above information, the proposed stormwater management design for the project satisfies the key criteria of the Stormwater Management Design Manual guidelines and will require a five-day Notice of Intent review to acquire permit coverage from NYSDEC under General Permit GP-0-25-001.

The final design and development of the properties located to the east of River Road will need to be reviewed for compliance against the assumptions within this report for the overall stormwater management outlined. Additional stormwater quantity or quality controls may be required based upon the final development configuration.

5. Storm Sewers

The development will include installation of storm sewers through the property to collect and convey stormwater runoff to the proposed SWMF and analysis points. The storm sewers located from the SWMF's outlet structure, and through Site 109 along the access drive will be installed with the initial phases of redevelopment and have been sized the stormwater discharges from the SWMF and the assumed drainage areas which drain into the proposed road and will be collected by the new gutter inlets. Appendix 5 contains the stormwater calculations and assumed drainage areas (Figure 09). Rip rap calculations were also completed for the proposed end section near Site 109.

Sizing for the storm sewers along the proposed loop road, substation area, and +/-495,000 sf building (BCP Site and 3821 River Road) has been also included in Appendix 5. Additional storm sewers will be necessary with the future development areas, however they will need to be designed based upon the final use and configuration of the property.

6. Erosion and Sediment Control

The property is currently undergoing remediation activities and a SWPPP may already be in place for site disturbances. All work on site should be completed to minimize erosion to the downstream areas (Analysis Points A & B), and the contractors should implement any additional erosion control measures necessary based on field conditions to prevent erosion in accordance with the New York Standards and Specifications for Erosion and Sediment Control. A 5-acre waiver will be required for the project if not already obtained through an existing SWPPP.

The proposed stormwater management facility and an erosion control plan have been designed to control sediment runoff and provide water quality treatment during and after the site construction. As required by the NYSDEC, the project will include a Stormwater Pollution Prevention Plan (SWPPP), if not already in place, that will combine the design presented in this report and on the plans with the requirements of NYSDEC GP-0-25-001 to outline how the owner will address the construction and post construction stormwater condition. The construction erosion control plan has been designed per the New York Standards and Specifications for Erosion and Sediment Control. The SWMF will be used as a settling basin for stormwater runoff during construction. After development the SWMF permanent pools volumes should be verified, and any accumulated sediment should be removed. The erosion control practices proposed are shown on the design plans and detailed on the detail sheets. The details are per the New York State Standards and Specifications for Erosion and Sediment Control.

Additional erosion control measures will be implemented during construction to control silt and minimize disturbance to the existing swales and drainage conditions. Typical practices include the installation and maintenance of silt fence, stone check dams, rip rap outlet protection, and filter fabric inlet protection. The disturbed areas will be seeded and mulched as soon as possible to control erosion. Pipe outlet control rip-rap measures are also proposed with the storm sewer system. A stabilized construction entrance will also be installed near the right-of-way limits to access the site during construction.

The design plans include a general sequence of construction however due to the remediation activities which may be required on site, order of site operations is subject to change. The contractor should review the proposed improvement activities and sequence with the site engineers to ensure appropriate erosion control measures are in place for any areas actively being worked in or susceptible to erosion.

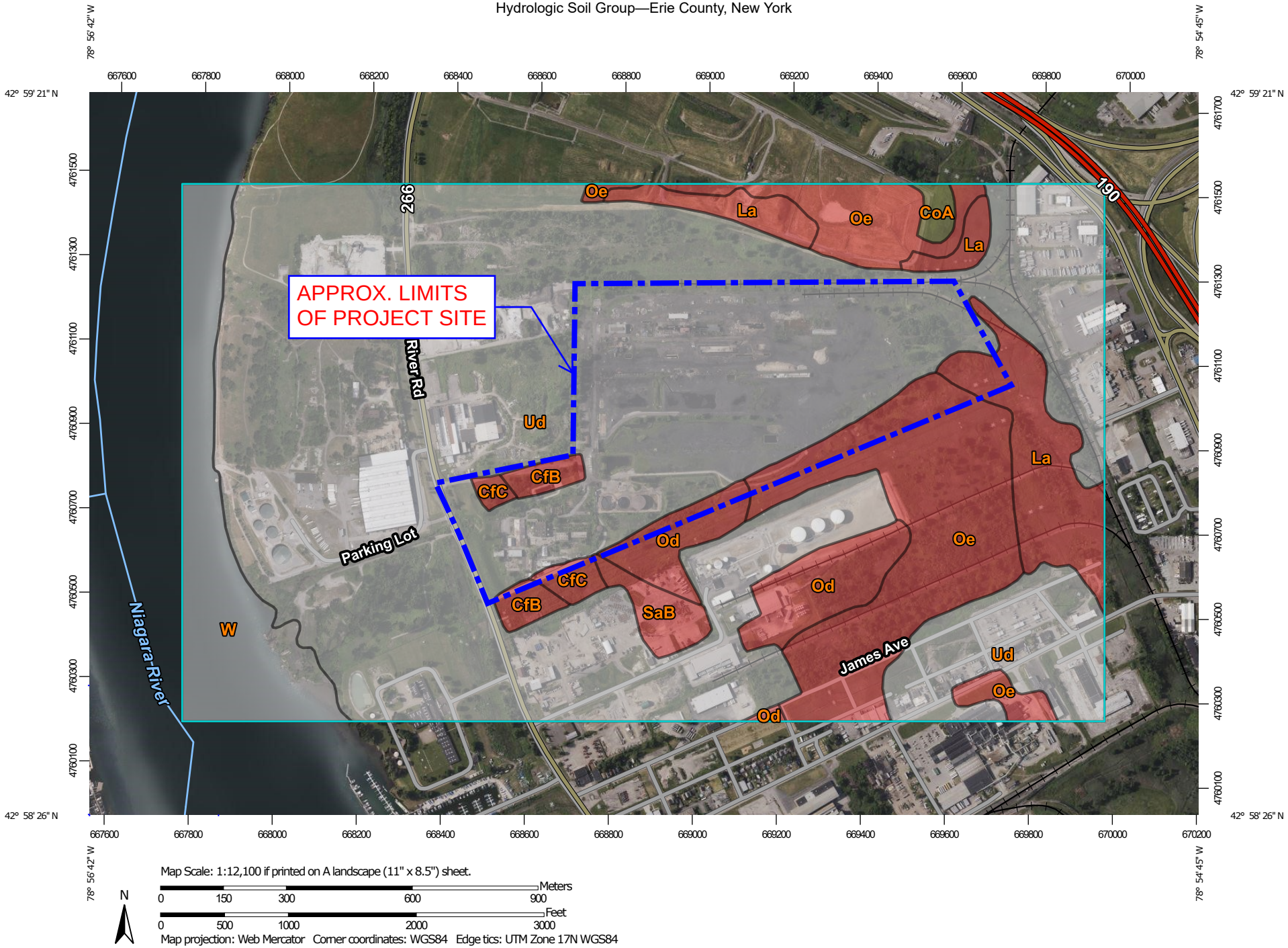
The final component of the erosion control plan will be maintenance. The contractor will be responsible for installing the erosion control features, as well as maintaining and replacing them as necessary throughout construction. An owner's representative will review the erosion control measures to determine their efficiency, need for replacement, or need for additional measures. The SWPPP for the project is to be kept on-site throughout the soil disturbing activities and until groundcover is established.

Appendix 1
Background Information

Figure 03 – Soil Map
Northeast Regional Climent Center Extreme Precipitation Events

Figure 03 - Soil Map

Hydrologic Soil Group—Erie County, New York



Map Scale: 1:12,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Erie County, New York
Survey Area Data: Version 24, Aug 25, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 9, 2022—Aug 15, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CfB	Cayuga silt loam, 3 to 8 percent slopes	D	6.3	0.9%
CfC	Cayuga silt loam, 8 to 15 percent slopes	D	4.4	0.6%
CoA	Churchville silt loam, 0 to 3 percent slopes	C/D	2.6	0.4%
La	Lakemont silt loam, 0 to 3 percent slopes	D	37.0	5.3%
Od	Odessa silt loam, 0 to 3 percent slopes	D	25.6	3.7%
Oe	Odessa-Lakemont complex, 0 to 3 percent slopes	D	84.2	12.1%
SaB	Schoharie silt loam, 3 to 8 percent slopes	D	6.7	1.0%
Ud	Urban land		480.5	69.2%
W	Water		46.8	6.7%
Totals for Area of Interest			**694.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New York
Location	New York, United States
Latitude	42.983 degrees North
Longitude	78.928 degrees West
Elevation	180 feet
Date/Time	Thu Dec 19 2024 15:19:16 GMT-0500 (Eastern Standard Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.66	0.82	1.00	**1yr**	0.71	0.92	1.12	1.33	1.55	1.78	2.08	**1yr**	1.58	2.00	2.40	2.90	3.38	**1yr**
2yr	0.30	0.46	0.57	0.75	0.94	1.16	**2yr**	0.81	1.06	1.31	1.57	1.85	2.17	2.46	**2yr**	1.92	2.36	2.78	3.30	3.79	**2yr**
5yr	0.35	0.55	0.68	0.92	1.17	1.45	**5yr**	1.01	1.32	1.64	1.95	2.27	2.62	2.99	**5yr**	2.32	2.88	3.35	3.95	4.51	**5yr**
10yr	0.39	0.62	0.78	1.07	1.39	1.72	**10yr**	1.20	1.57	1.95	2.30	2.66	3.04	3.47	**10yr**	2.69	3.34	3.87	4.53	5.16	**10yr**
25yr	0.47	0.74	0.95	1.31	1.74	2.16	**25yr**	1.50	1.96	2.44	2.86	3.27	3.68	4.23	**25yr**	3.26	4.06	4.68	5.43	6.15	**25yr**
50yr	0.53	0.85	1.09	1.53	2.06	2.57	**50yr**	1.78	2.33	2.90	3.37	3.83	4.27	4.91	**50yr**	3.78	4.72	5.41	6.23	7.03	**50yr**
100yr	0.60	0.98	1.26	1.79	2.44	3.05	**100yr**	2.11	2.77	3.44	3.98	4.48	4.95	5.70	**100yr**	4.38	5.48	6.25	7.16	8.04	**100yr**
200yr	0.70	1.13	1.47	2.11	2.91	3.63	**200yr**	2.51	3.30	4.08	4.69	5.24	5.74	6.63	**200yr**	5.08	6.37	7.23	8.22	9.20	**200yr**
500yr	0.83	1.37	1.79	2.61	3.66	4.56	**500yr**	3.15	4.16	5.12	5.84	6.46	7.00	8.09	**500yr**	6.19	7.78	8.77	9.87	10.99	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.34	0.42	0.56	0.69	0.82	**1yr**	0.59	0.80	0.87	1.11	1.37	1.60	1.84	**1yr**	1.41	1.77	2.19	2.67	3.04	**1yr**
2yr	0.28	0.44	0.54	0.73	0.90	1.03	**2yr**	0.77	1.01	1.14	1.39	1.67	2.07	2.34	**2yr**	1.84	2.25	2.69	3.17	3.63	**2yr**
5yr	0.32	0.49	0.61	0.83	1.06	1.22	**5yr**	0.91	1.19	1.34	1.63	1.97	2.39	2.68	**5yr**	2.11	2.57	3.10	3.57	4.07	**5yr**
10yr	0.35	0.53	0.66	0.92	1.19	1.37	**10yr**	1.03	1.34	1.51	1.83	2.21	2.63	2.94	**10yr**	2.33	2.83	3.45	3.88	4.41	**10yr**
25yr	0.39	0.59	0.74	1.05	1.38	1.59	**25yr**	1.19	1.56	1.75	2.11	2.55	2.97	3.30	**25yr**	2.63	3.17	3.94	4.28	4.87	**25yr**
50yr	0.42	0.64	0.80	1.14	1.54	1.77	**50yr**	1.33	1.74	1.94	2.34	2.83	3.25	3.58	**50yr**	2.87	3.45	4.36	4.59	5.22	**50yr**
100yr	0.45	0.69	0.86	1.24	1.70	1.98	**100yr**	1.47	1.94	2.16	2.60	3.14	3.54	3.85	**100yr**	3.14	3.71	4.81	4.90	5.58	**100yr**
200yr	0.49	0.74	0.94	1.36	1.90	2.21	**200yr**	1.64	2.16	2.40	2.87	3.47	3.86	4.13	**200yr**	3.42	3.97	5.29	5.20	5.93	**200yr**
500yr	0.55	0.81	1.05	1.52	2.16	2.54	**500yr**	1.86	2.48	2.73	3.25	3.93	4.32	4.48	**500yr**	3.82	4.31	5.97	5.55	6.35	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.57	0.76	0.94	1.08	**1yr**	0.81	1.05	1.20	1.44	1.73	1.95	2.36	**1yr**	1.72	2.27	2.60	3.11	3.70	**1yr**
2yr	0.31	0.48	0.59	0.80	0.99	1.13	**2yr**	0.85	1.11	1.26	1.53	1.84	2.26	2.58	**2yr**	2.00	2.48	2.88	3.46	3.98	**2yr**
5yr	0.38	0.59	0.74	1.01	1.28	1.49	**5yr**	1.11	1.46	1.65	2.01	2.41	2.87	3.31	**5yr**	2.54	3.18	3.60	4.35	5.00	**5yr**
10yr	0.46	0.71	0.88	1.22	1.58	1.84	**10yr**	1.36	1.80	2.04	2.48	2.97	3.45	4.02	**10yr**	3.06	3.86	4.28	5.18	5.97	**10yr**
25yr	0.59	0.89	1.11	1.59	2.09	2.45	**25yr**	1.80	2.39	2.72	3.29	3.91	4.42	5.20	**25yr**	3.91	5.00	5.40	6.55	7.55	**25yr**
50yr	0.70	1.07	1.33	1.91	2.57	3.03	**50yr**	2.22	2.96	3.37	4.06	4.81	5.33	6.32	**50yr**	4.72	6.08	6.44	7.84	9.05	**50yr**
100yr	0.84	1.28	1.60	2.31	3.17	3.75	**100yr**	2.73	3.67	4.18	5.02	5.93	6.41	7.70	**100yr**	5.67	7.40	7.69	9.38	10.82	**100yr**
200yr	1.01	1.52	1.93	2.80	3.90	4.64	**200yr**	3.36	4.54	5.20	6.21	7.29	7.71	9.36	**200yr**	6.83	9.00	9.20	11.23	12.97	**200yr**
500yr	1.30	1.93	2.48	3.61	5.13	6.15	**500yr**	4.43	6.01	6.91	8.21	9.58	9.87	12.13	**500yr**	8.73	11.67	11.65	14.28	16.44	**500yr**

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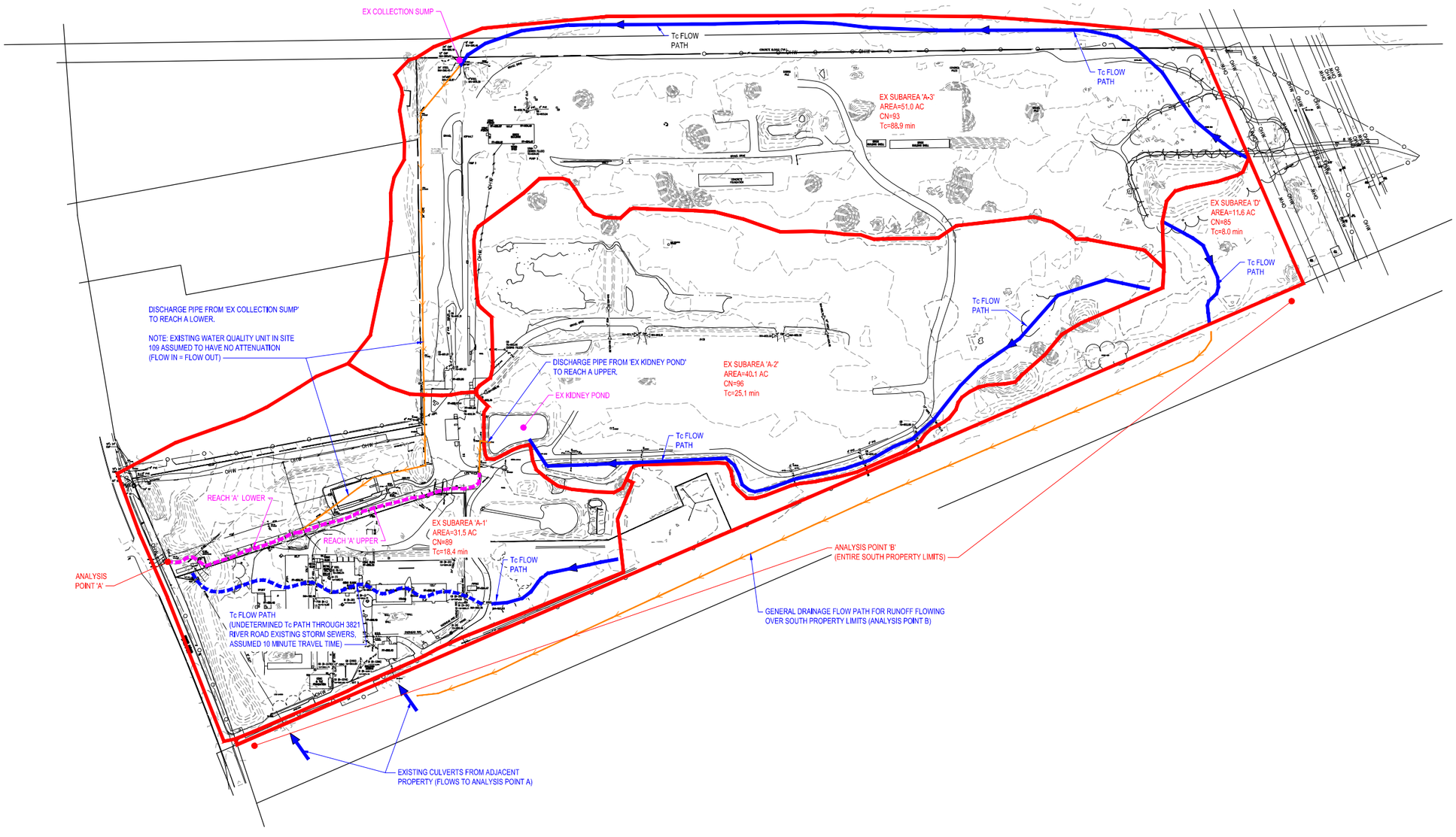
Appendix 2
Stormwater Quantity

Figure 04 – Existing Conditions Drainage Exhibits
Figure 05 – Proposed Conditions Drainage Exhibits
Stormwater Hydrographs

P:\2968\Drawings\Final\2968 Drainage Base.dwg



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 ft.

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The following is an excerpt from the New York State Education Law Article 145 Section 7209 and applies to this drawing:
"It is a violation of this law for any person, unless he is acting under the direction of a licensed professional engineer or land surveyor to alter any item in any way. If an item bearing the seal of an engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration."

7			
6			
5			
4			
3			
2			
1			
	REVISIONS	DATE	BY

BME ASSOCIATES
ENGINEERS • SURVEYORS • LANDSCAPE ARCHITECTS
10 LIFTBRIDGE LANE EAST
FAIRPORT, NEW YORK 14450
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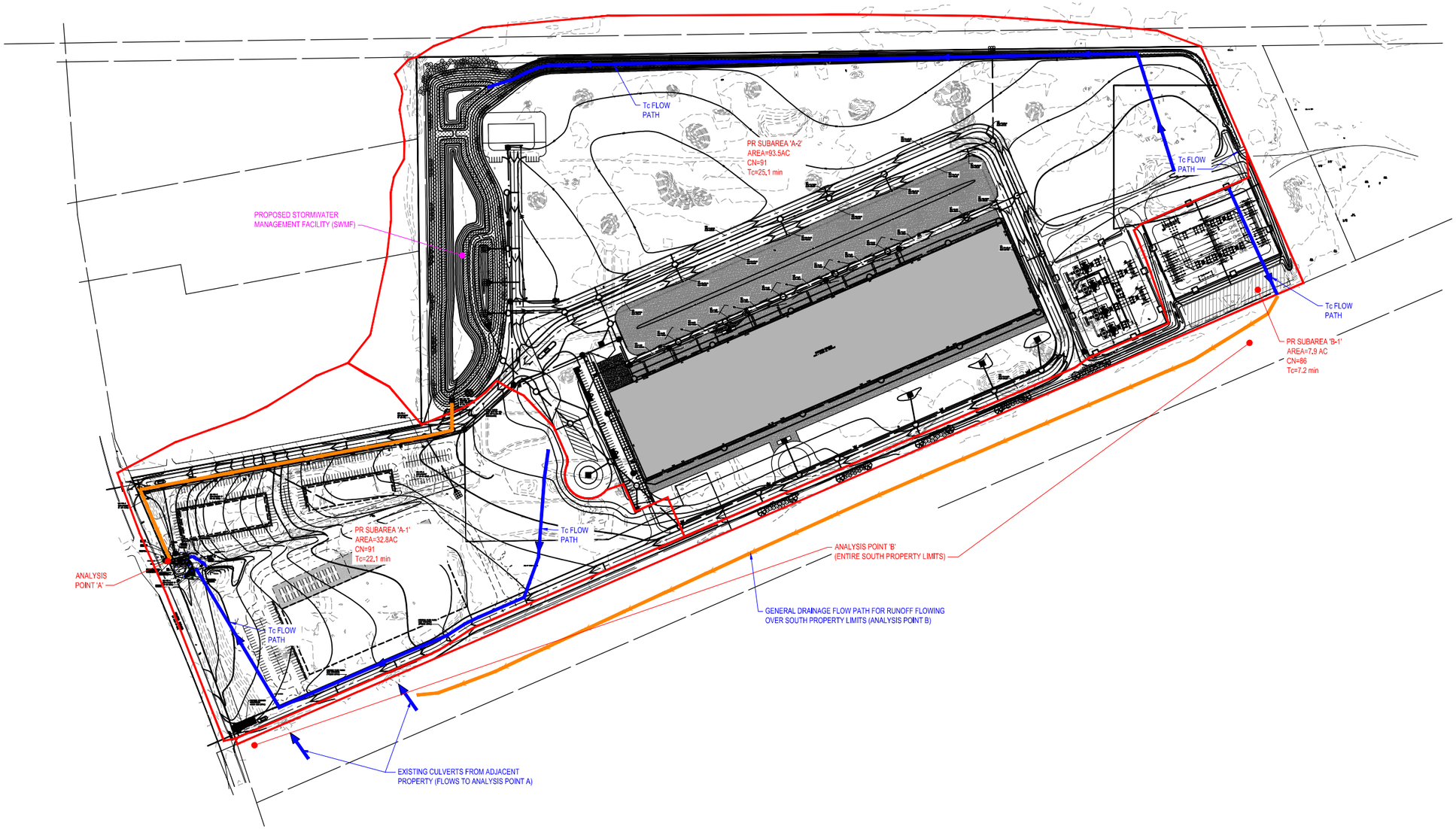
585-377-7360

PROJECT: RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
LOCATION: TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK STATE
CLIENT: INVENTIUM ENGINEERING
441 CARLISLE DRIVE
HERNDON, VIRGINIA 20170
DRAWING TITLE: EXISTING DRAINAGE CONDITIONS

PROJECT MANAGER	
PGV	
PROJECT ENGINEER	
JGC	
DRAWN BY	
JGC	
SCALE	DATE ISSUED
AS NOTED	DECEMBER 2024
PROJECT NO.	
2968	
DRAWING NO.	
FIGURE 04	

P:\2968\Drawings\Final\2968 Drainage Base.dwg



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

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Drawing Alteration
The following is an excerpt from the New York State Education Law Article 145 Section 7209 and applies to this drawing:
"It is a violation of this law for any person, unless he is acting under the direction of a licensed professional engineer or land surveyor to alter any item in any way. If an item bearing the seal of an engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration."

7			
6			
5			
4			
3			
2			
1			
	REVISIONS	DATE	BY

BME ASSOCIATES
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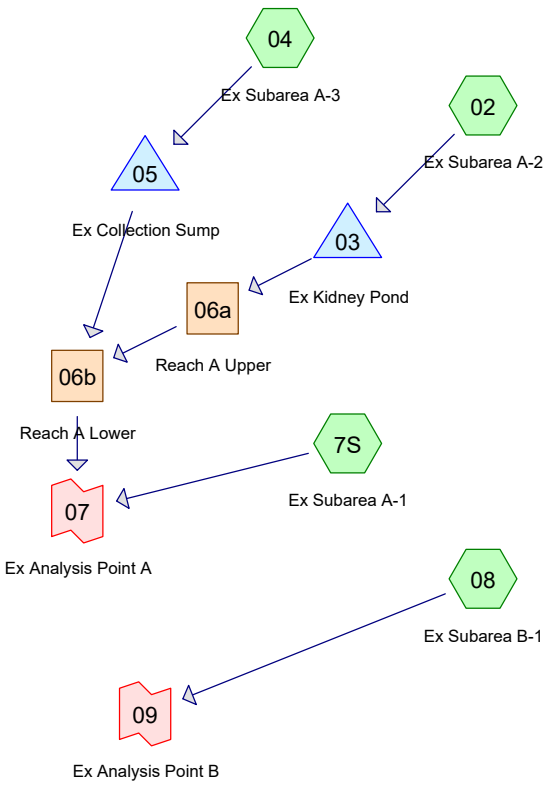
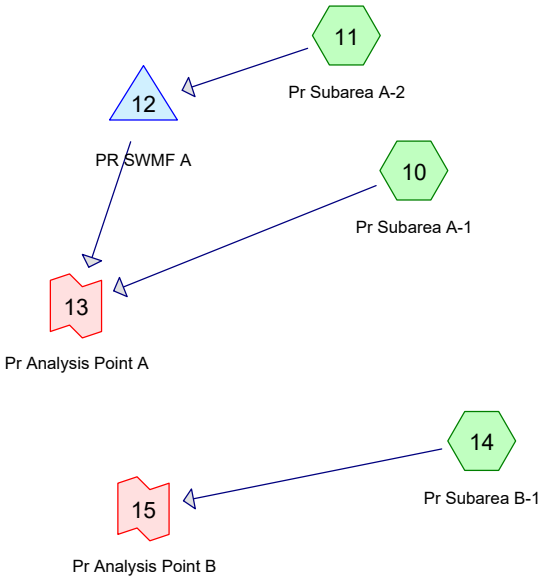
PROJECT: RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
LOCATION: TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK STATE
CLIENT: INVENTIUM ENGINEERING
441 CARLISLE DRIVE
HERNDON, VIRGINIA 20170
DRAWING TITLE: PROPOSED DRAINAGE CONDITIONS

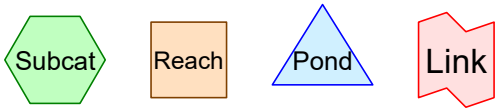
PROJECT MANAGER	
PGV	
PROJECT ENGINEER	
JGC	
DRAWN BY	
JGC	
SCALE	DATE ISSUED
AS NOTED	DECEMBER 2024
PROJECT NO.	
2968	
DRAWING NO.	
FIGURE 05	

EXISTING DRAINAGE



PROPOSED DRAINAGE





Routing Diagram for 2968 Drainage 2026-03-09
Prepared by BME Associates, Printed 3/11/2026
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2968 Drainage 2026-03-09

Prepared by BME Associates

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	project rain 24-hr S1	1-yr	Default	24.00	1	1.78	2
2	2-yr	project rain 24-hr S1	2-yr	Default	24.00	1	2.17	2
3	5-yr	project rain 24-hr S1	5-yr	Default	24.00	1	2.62	2
4	10-yr	project rain 24-hr S1	10-yr	Default	24.00	1	3.03	2
5	25-yr	project rain 24-hr S1	25-yr	Default	24.00	1	3.67	2
6	50-yr	project rain 24-hr S1	50-yr	Default	24.00	1	4.26	2
7	100-yr	project rain 24-hr S1	100-yr	Default	24.00	1	4.93	2

Summary for Subcatchment 02: Ex Subarea A-2

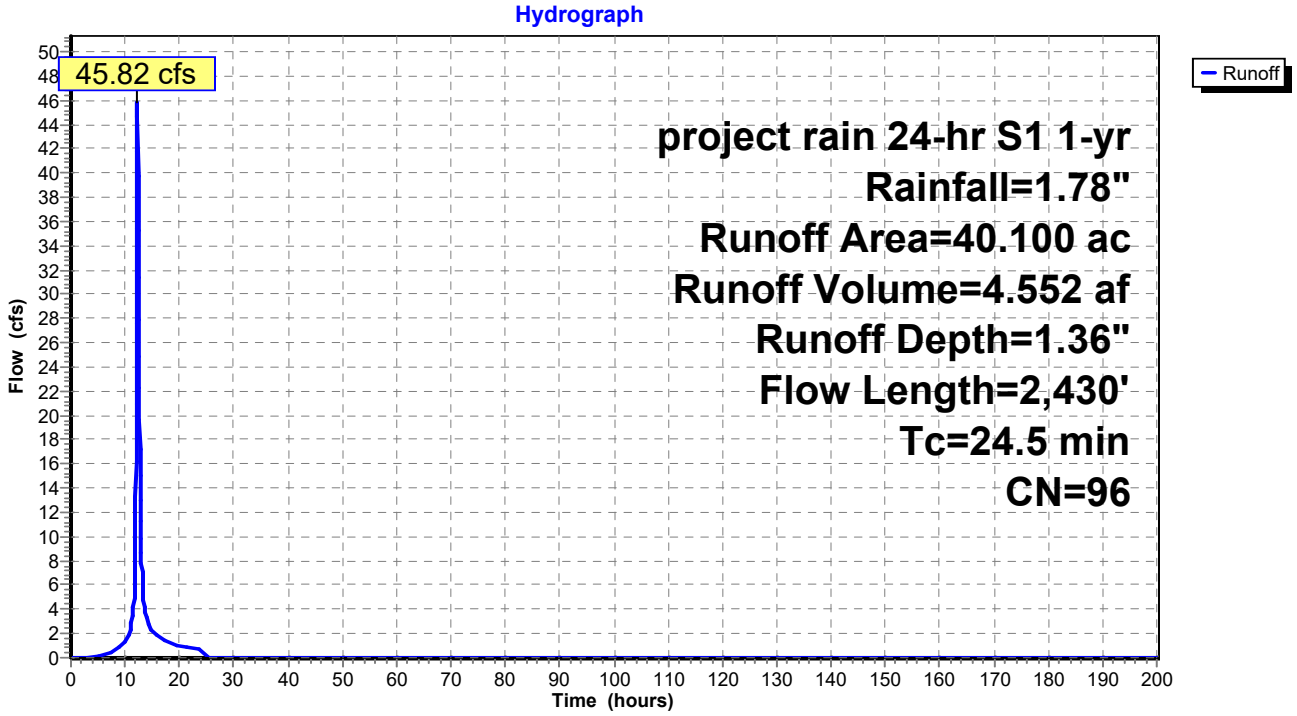
Runoff = 45.82 cfs @ 12.28 hrs, Volume= 4.552 af, Depth= 1.36"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 1.36" for 1-yr event
Inflow = 45.82 cfs @ 12.28 hrs, Volume= 4.552 af
Outflow = 7.18 cfs @ 13.09 hrs, Volume= 4.547 af, Atten= 84%, Lag= 48.4 min
Primary = 7.18 cfs @ 13.09 hrs, Volume= 4.547 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.11' @ 13.09 hrs Surf.Area= 2.146 ac Storage= 2.318 af

Plug-Flow detention time= 204.4 min calculated for 4.545 af (100% of inflow)
Center-of-Mass det. time= 205.9 min (1,015.4 - 809.5)

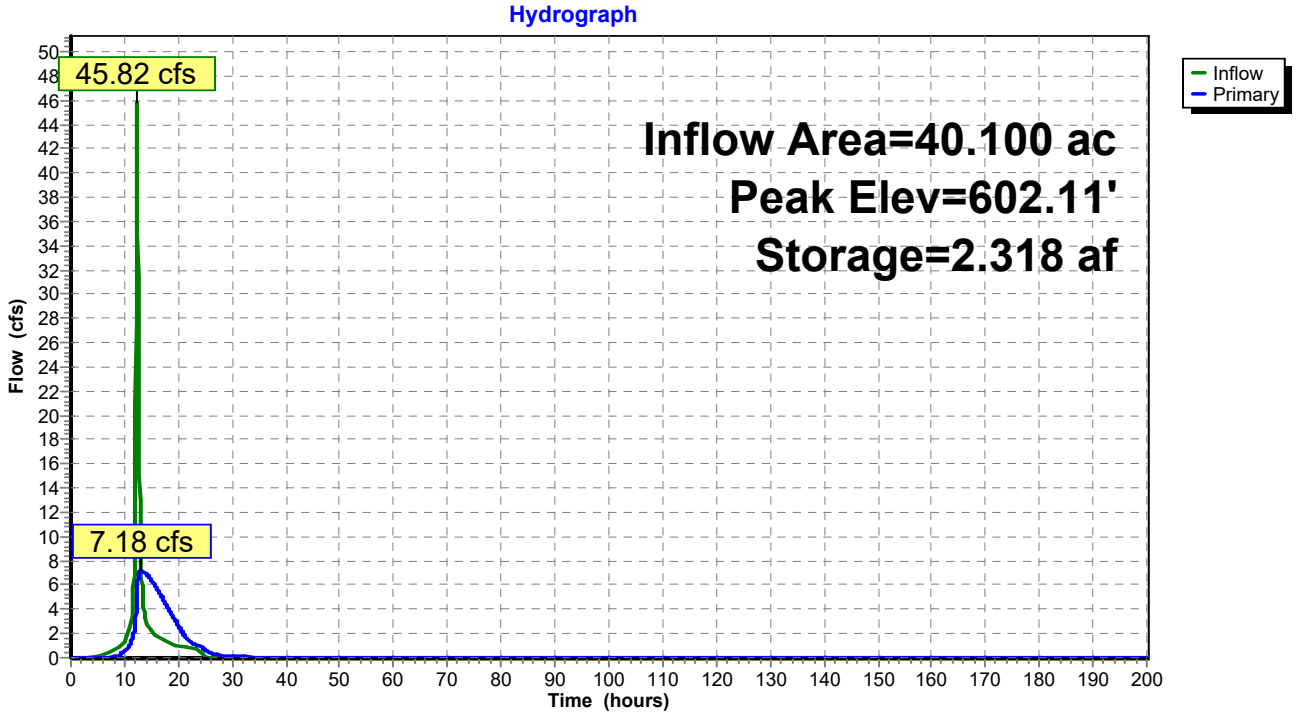
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.18 cfs @ 13.09 hrs HW=602.11' TW=598.27' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.18 cfs of 9.21 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.18 cfs @ 9.14 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

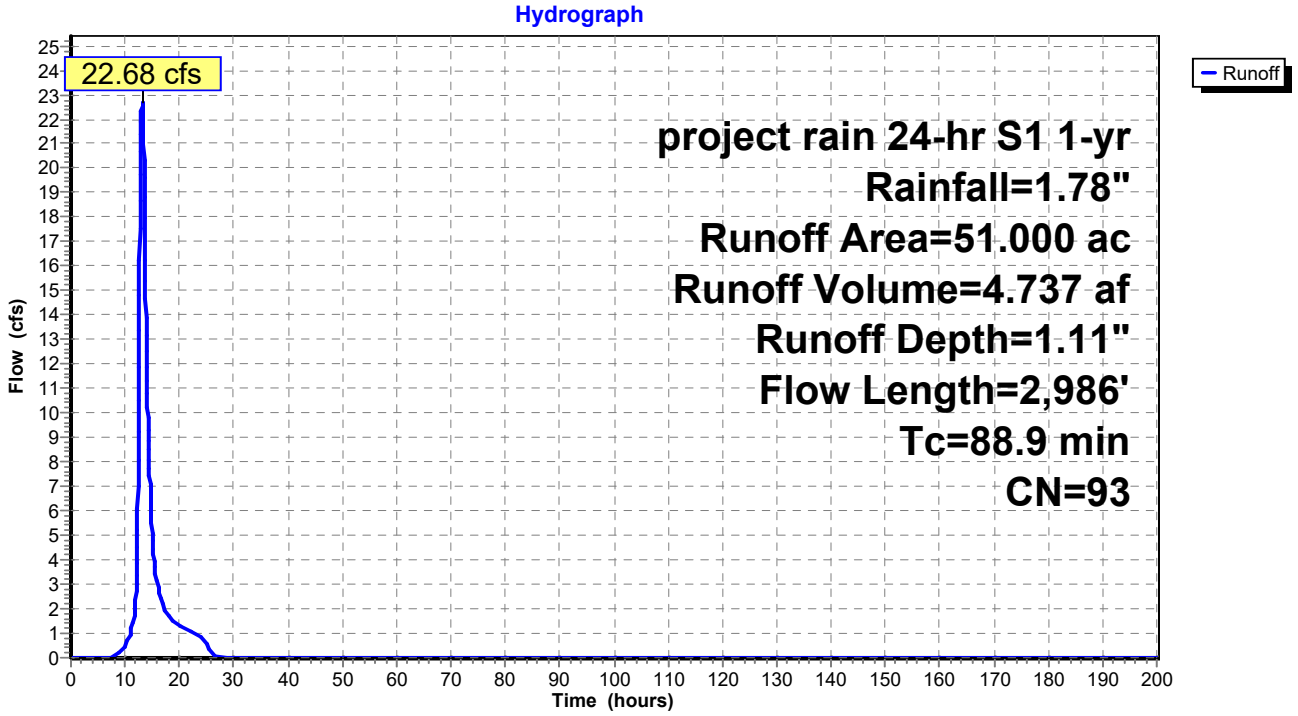
Runoff = 22.68 cfs @ 13.15 hrs, Volume= 4.737 af, Depth= 1.11"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 1.11" for 1-yr event
Inflow = 22.68 cfs @ 13.15 hrs, Volume= 4.737 af
Outflow = 8.94 cfs @ 14.29 hrs, Volume= 4.706 af, Atten= 61%, Lag= 68.9 min
Primary = 8.94 cfs @ 14.29 hrs, Volume= 4.706 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 598.57' @ 14.29 hrs Surf.Area= 1.000 ac Storage= 2.118 af

Plug-Flow detention time= 333.2 min calculated for 4.706 af (99% of inflow)
Center-of-Mass det. time= 329.0 min (1,220.2 - 891.2)

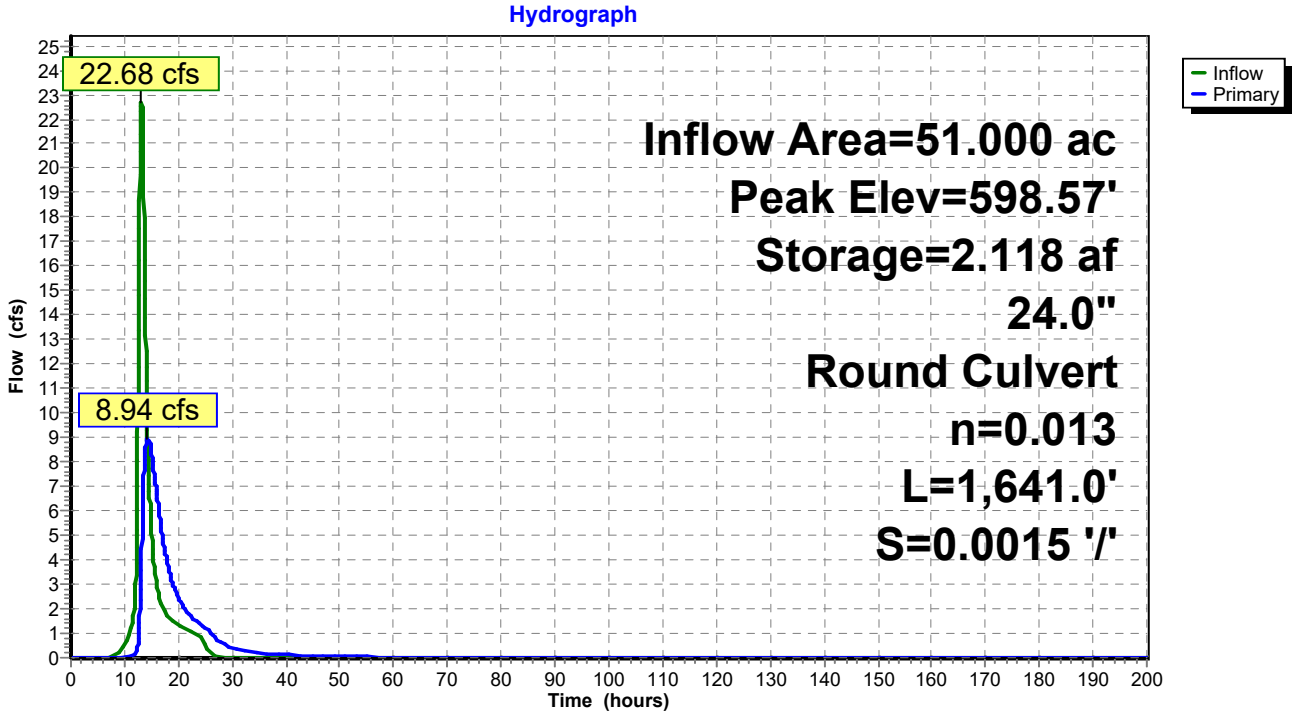
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.94 cfs @ 14.29 hrs HW=598.57' TW=584.05' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 8.94 cfs @ 3.34 fps)

Pond 05: Ex Collection Sump



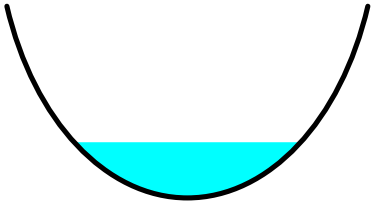
Summary for Reach 06a: Reach A Upper

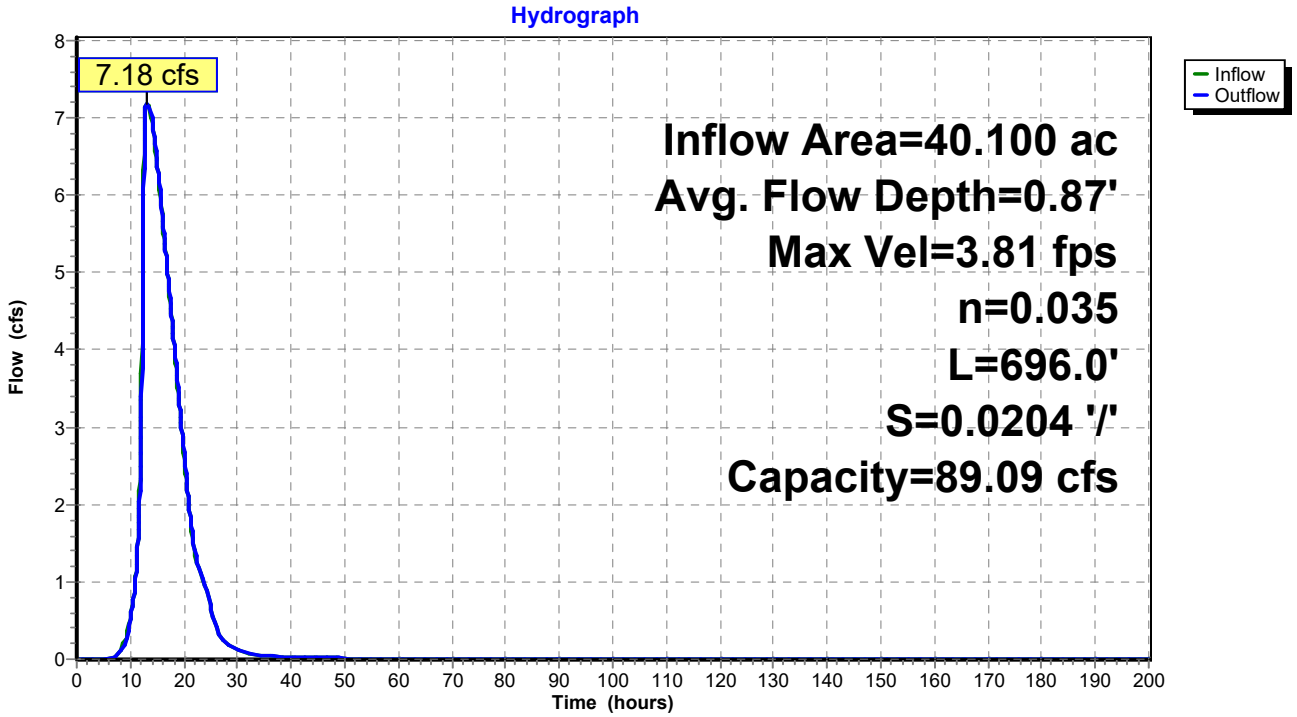
Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 1.36" for 1-yr event
Inflow = 7.18 cfs @ 13.09 hrs, Volume= 4.547 af
Outflow = 7.18 cfs @ 13.13 hrs, Volume= 4.547 af, Atten= 0%, Lag= 2.3 min
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.81 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 16.3 min

Peak Storage= 1,311 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.87' , Surface Width= 3.24'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'





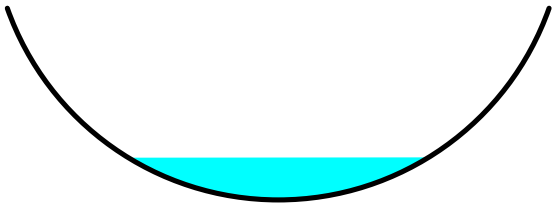
Summary for Reach 06b: Reach A Lower

Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 1.22" for 1-yr event
Inflow = 15.82 cfs @ 14.14 hrs, Volume= 9.253 af
Outflow = 15.82 cfs @ 14.16 hrs, Volume= 9.253 af, Atten= 0%, Lag= 1.2 min
Routed to Link 07 : Ex Analysis Point A

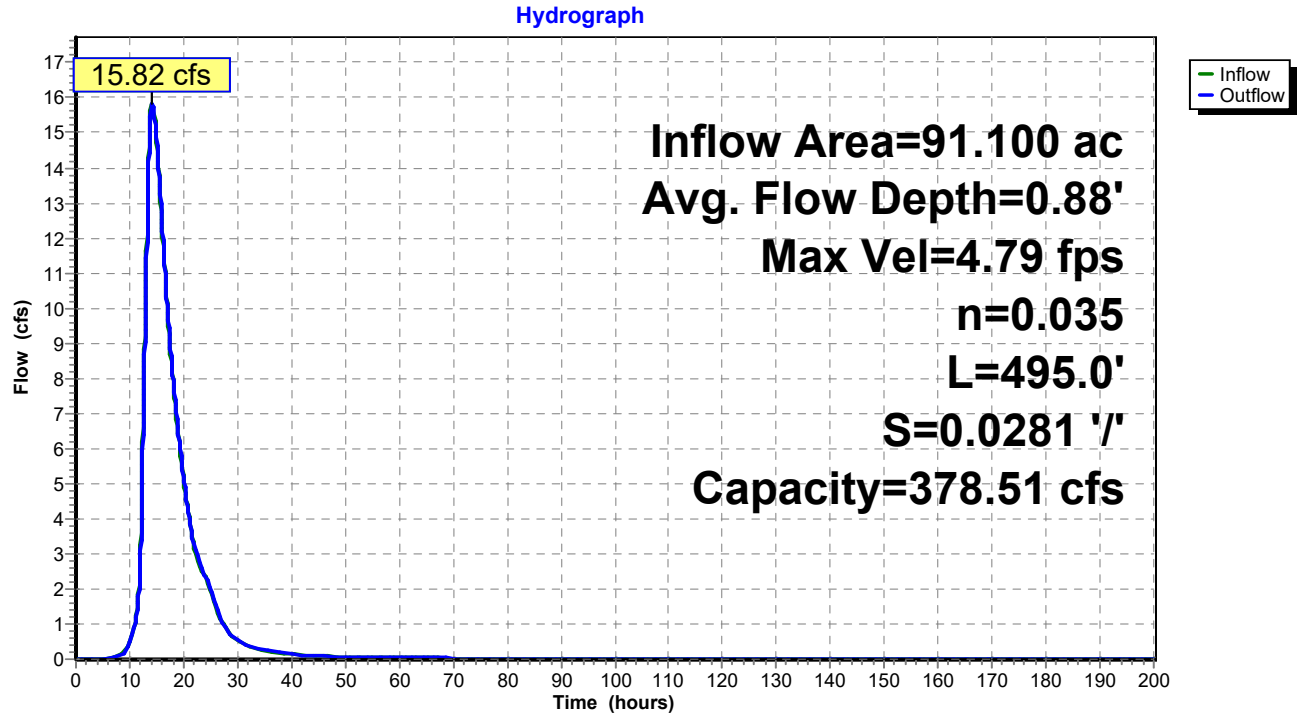
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.79 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 8.4 min

Peak Storage= 1,634 cf @ 14.16 hrs
Average Depth at Peak Storage= 0.88' , Surface Width= 5.63'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



Reach 06b: Reach A Lower

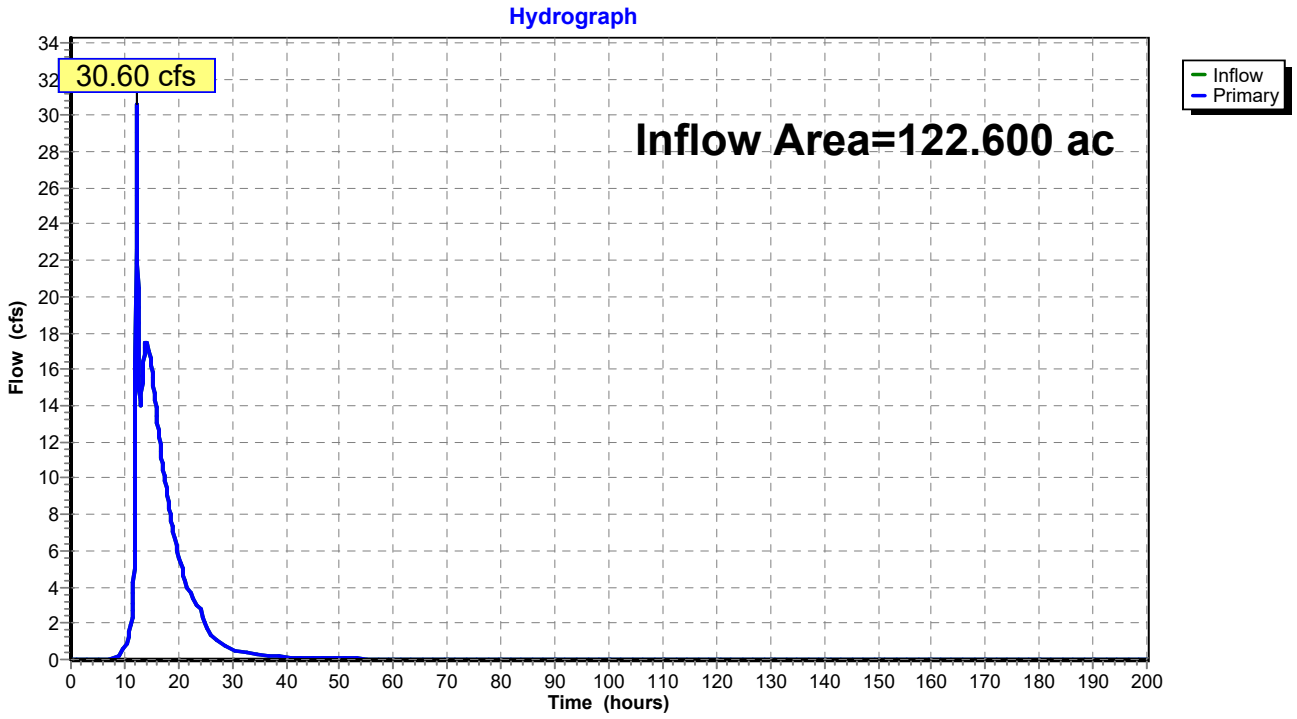


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 1.12" for 1-yr event
Inflow = 30.60 cfs @ 12.22 hrs, Volume= 11.480 af
Primary = 30.60 cfs @ 12.22 hrs, Volume= 11.480 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

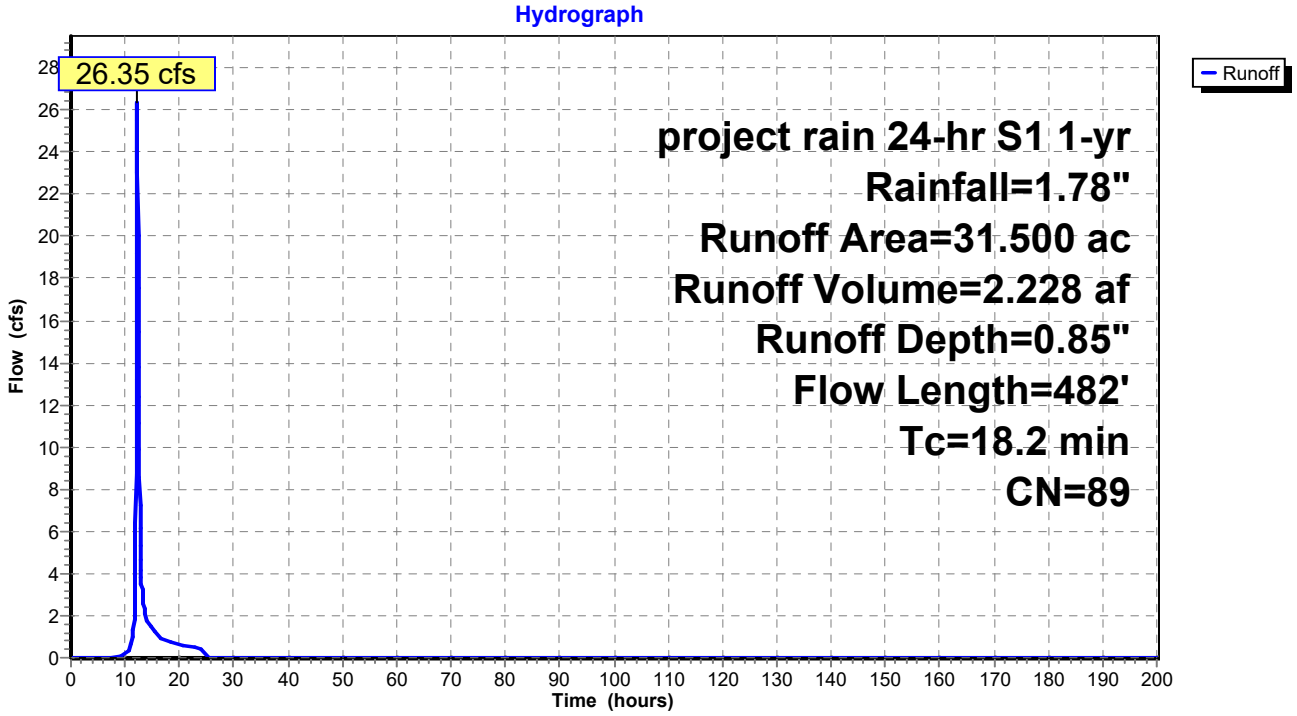
Runoff = 26.35 cfs @ 12.21 hrs, Volume= 2.228 af, Depth= 0.85"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

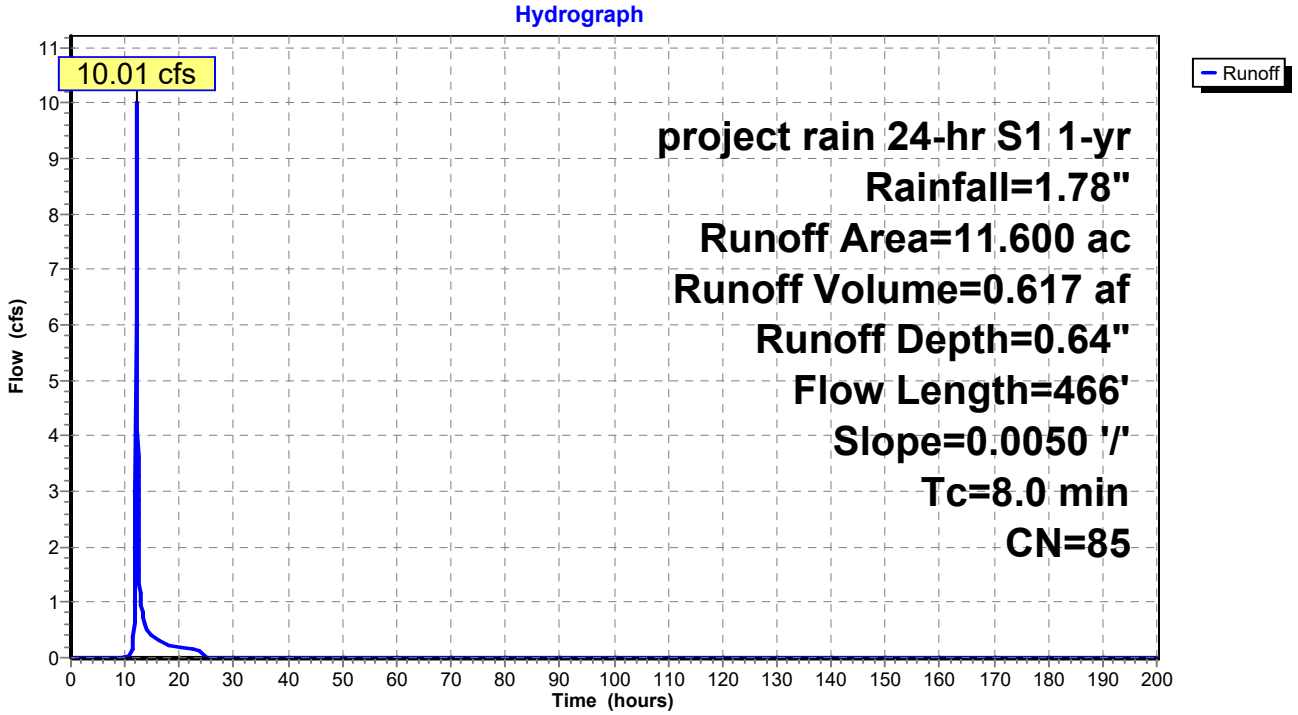
Runoff = 10.01 cfs @ 12.07 hrs, Volume= 0.617 af, Depth= 0.64"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

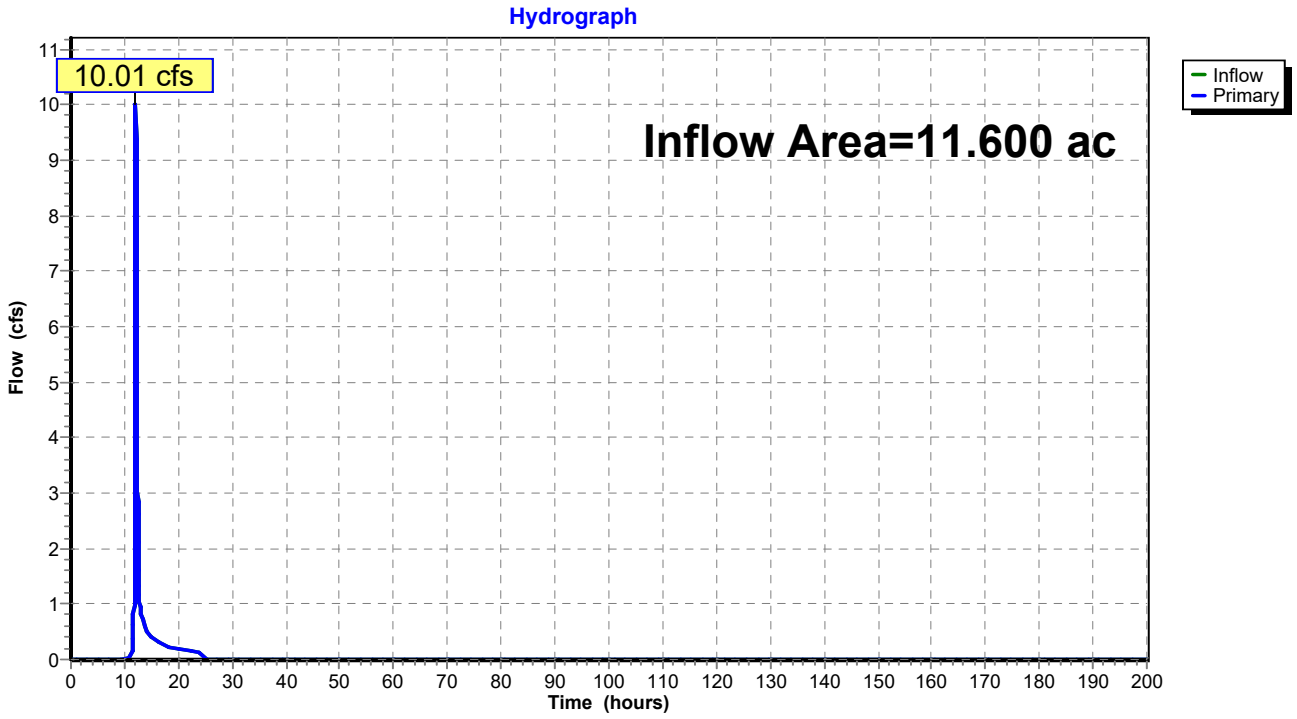


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 0.64" for 1-yr event
Inflow = 10.01 cfs @ 12.07 hrs, Volume= 0.617 af
Primary = 10.01 cfs @ 12.07 hrs, Volume= 0.617 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

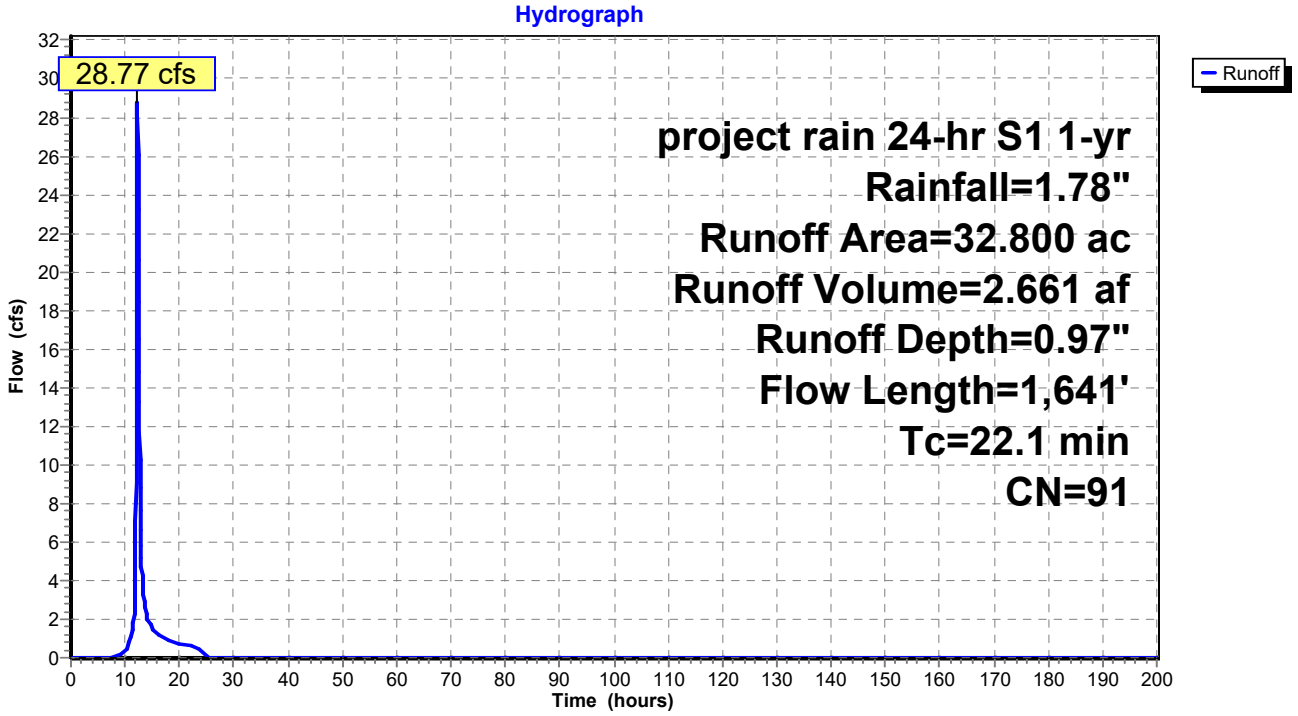
Runoff = 28.77 cfs @ 12.26 hrs, Volume= 2.661 af, Depth= 0.97"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

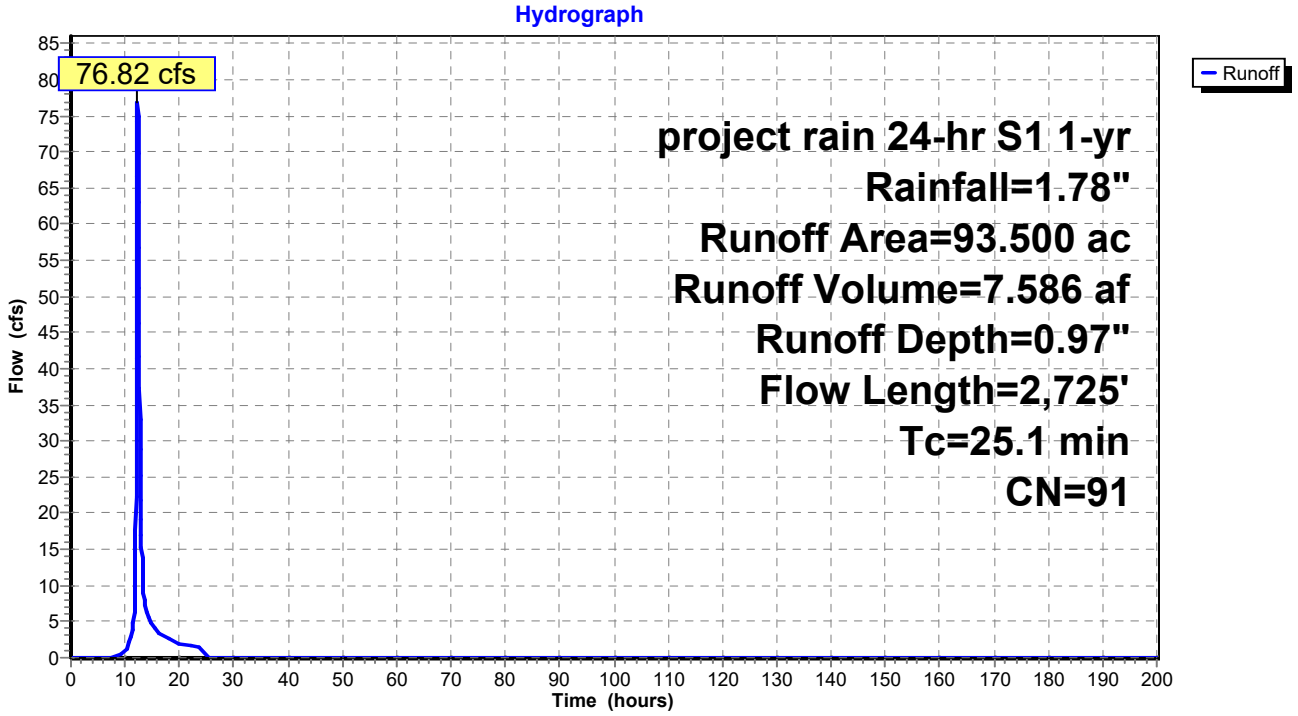
Runoff = 76.82 cfs @ 12.30 hrs, Volume= 7.586 af, Depth= 0.97"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 0.97" for 1-yr event
Inflow = 76.82 cfs @ 12.30 hrs, Volume= 7.586 af
Outflow = 3.59 cfs @ 15.82 hrs, Volume= 7.404 af, Atten= 95%, Lag= 211.1 min
Primary = 3.59 cfs @ 15.82 hrs, Volume= 7.404 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 591.40' @ 15.82 hrs Surf.Area= 315,019 sf Storage= 893,575 cf (220,994 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,150.3 min (1,993.8 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

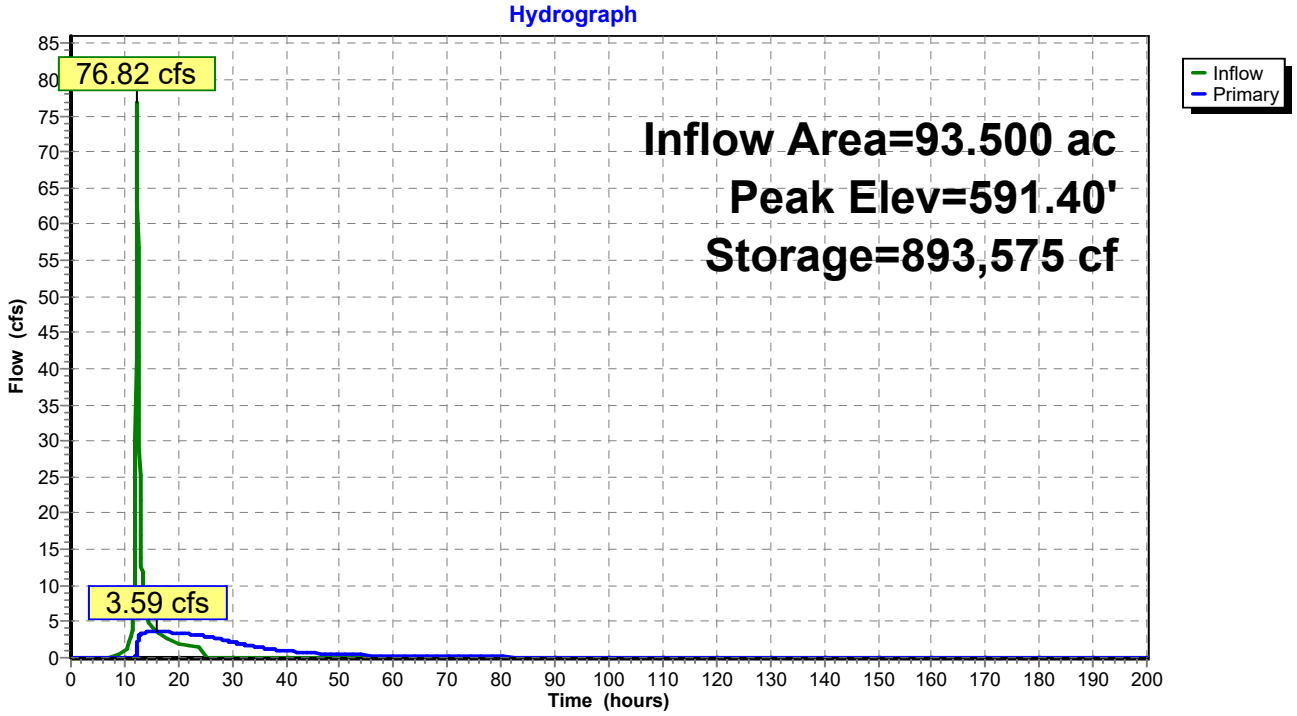
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.59 cfs @ 15.82 hrs HW=591.40' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 3.59 cfs of 4.99 cfs potential flow)
  - **2=Culvert** (Inlet Controls 3.59 cfs @ 4.58 fps)
  - **3=Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

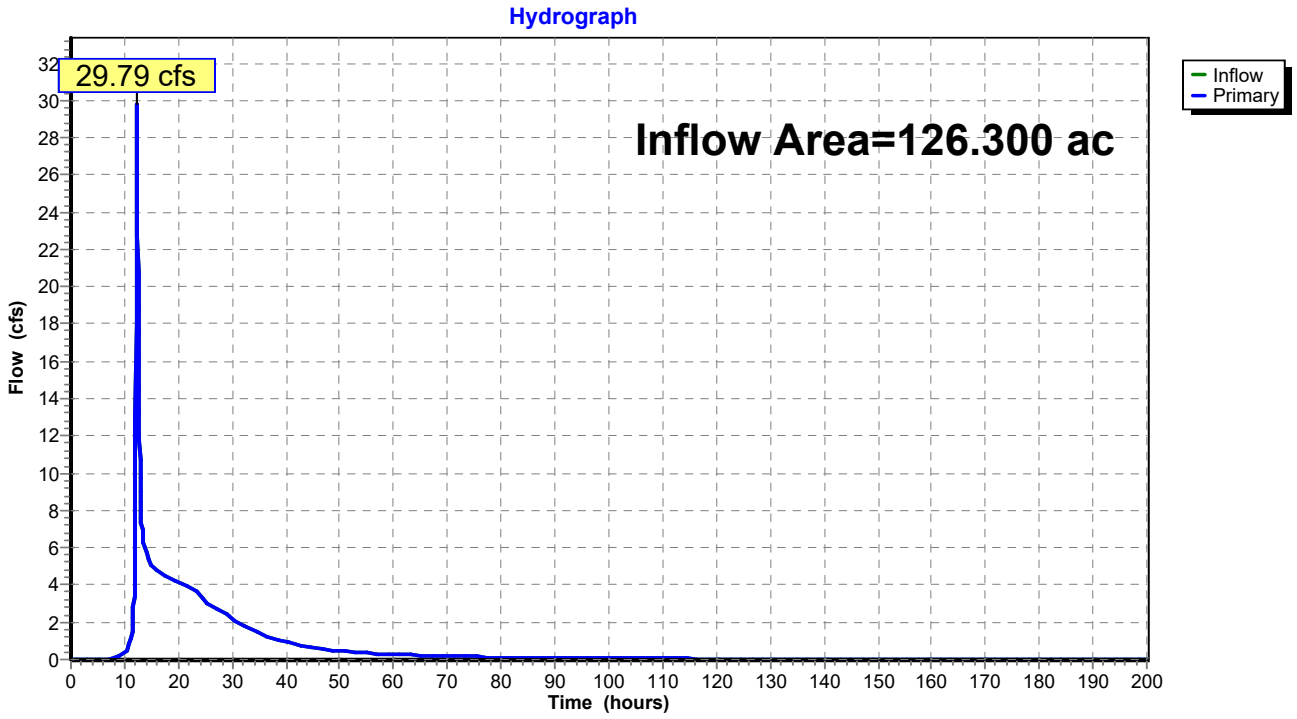


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 0.96" for 1-yr event
Inflow = 29.79 cfs @ 12.27 hrs, Volume= 10.066 af
Primary = 29.79 cfs @ 12.27 hrs, Volume= 10.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

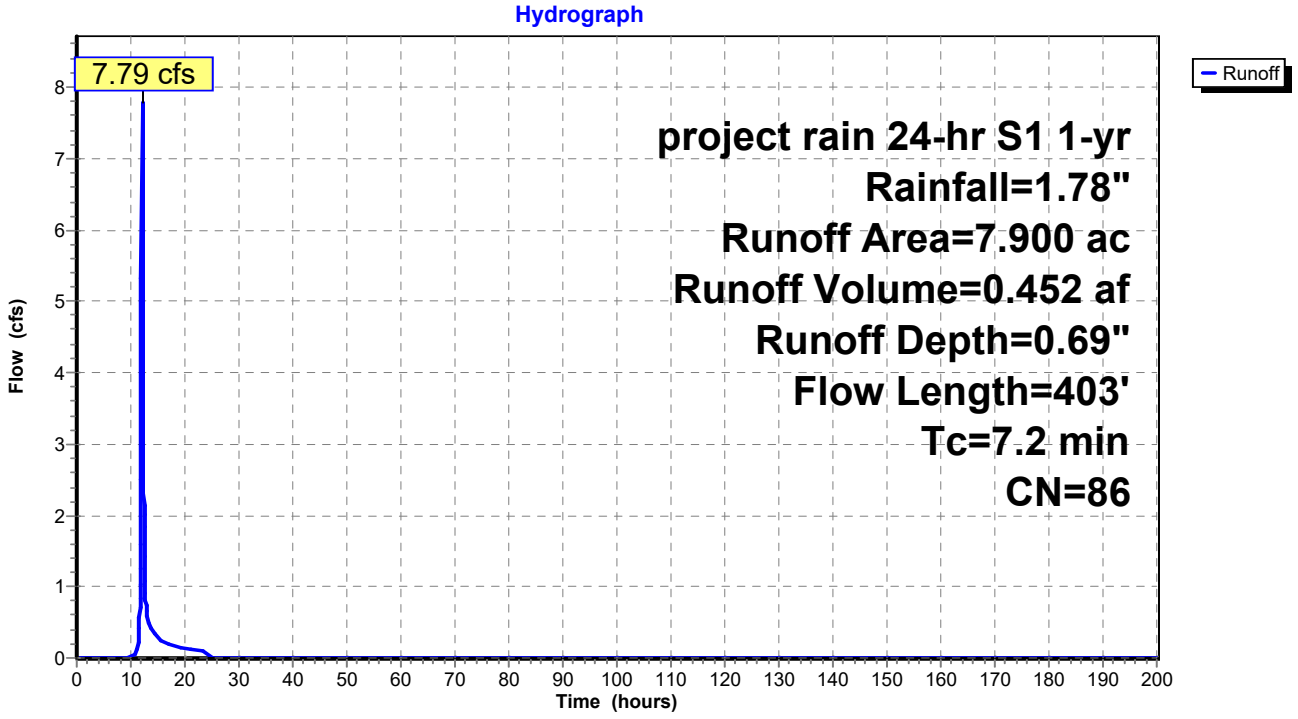
Runoff = 7.79 cfs @ 12.06 hrs, Volume= 0.452 af, Depth= 0.69"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 1-yr Rainfall=1.78"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

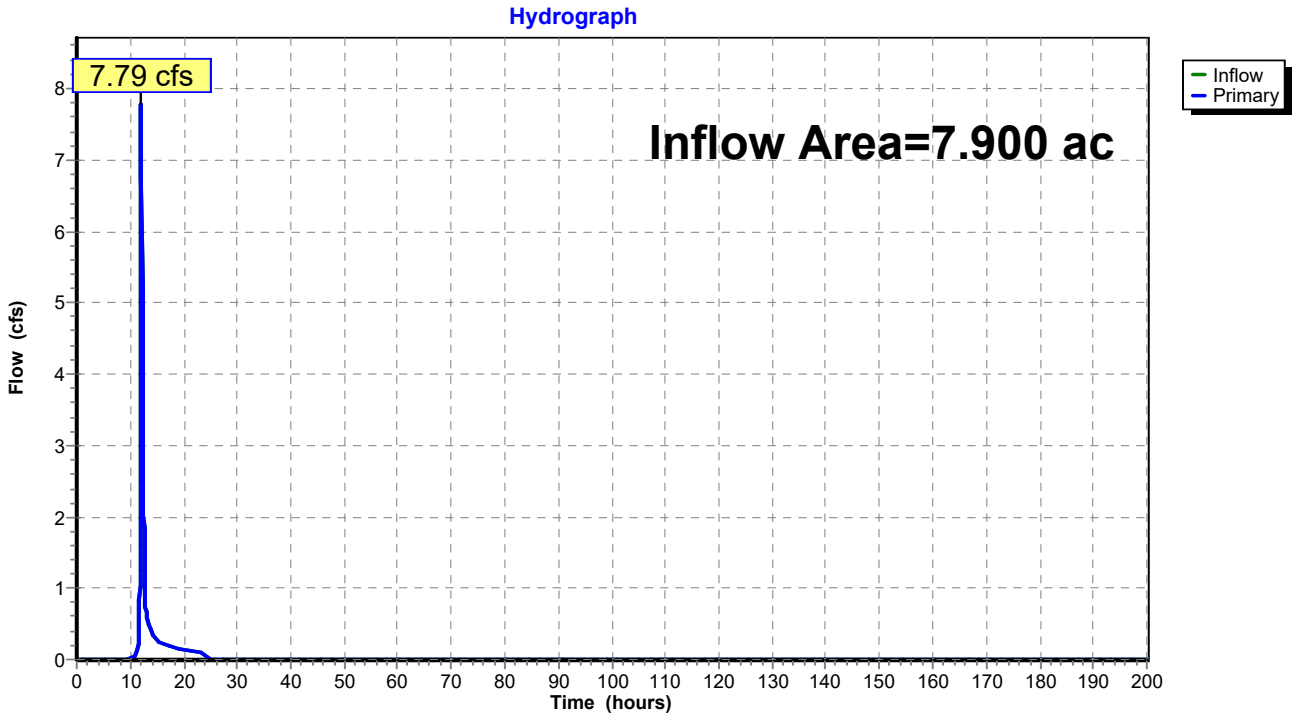


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 0.69" for 1-yr event
Inflow = 7.79 cfs @ 12.06 hrs, Volume= 0.452 af
Primary = 7.79 cfs @ 12.06 hrs, Volume= 0.452 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

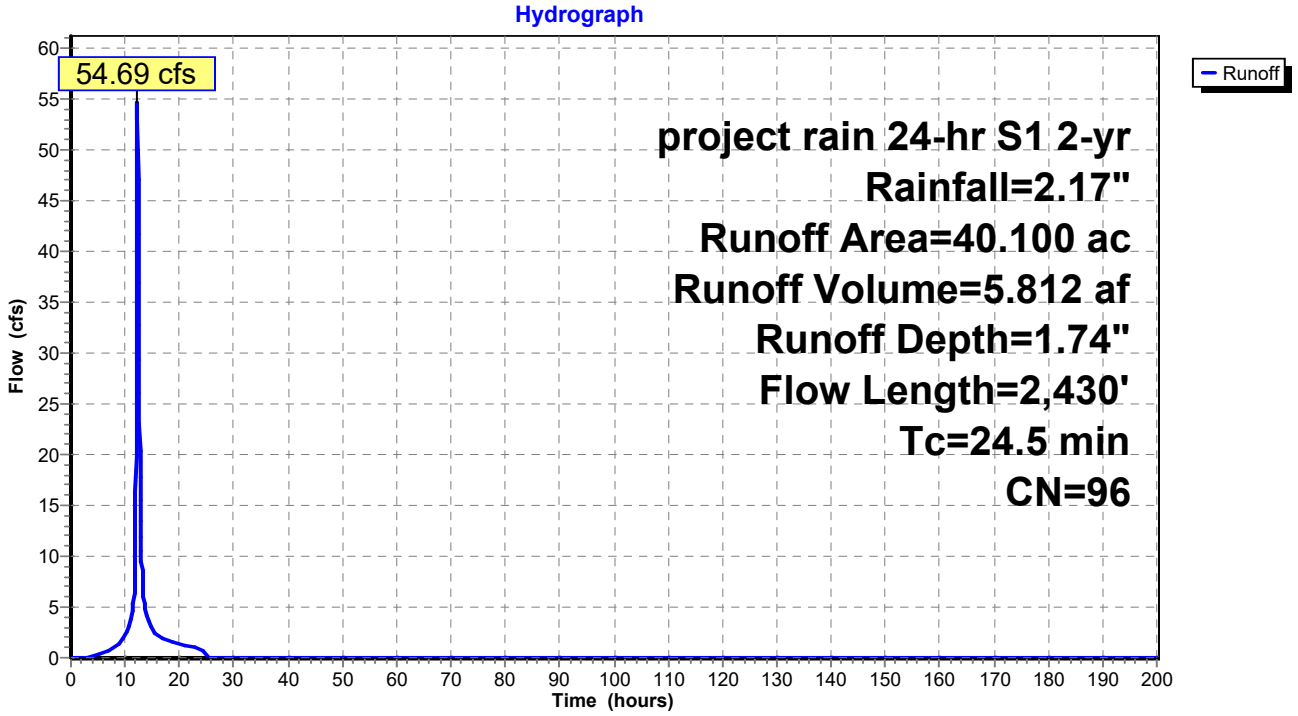
Runoff = 54.69 cfs @ 12.28 hrs, Volume= 5.812 af, Depth= 1.74"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 54.69 cfs @ 12.28 hrs, Volume= 5.812 af
Outflow = 7.35 cfs @ 13.21 hrs, Volume= 5.807 af, Atten= 87%, Lag= 55.7 min
Primary = 7.35 cfs @ 13.21 hrs, Volume= 5.807 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.28' @ 13.21 hrs Surf.Area= 4.631 ac Storage= 2.904 af

Plug-Flow detention time= 217.9 min calculated for 5.806 af (100% of inflow)
Center-of-Mass det. time= 219.5 min (1,024.8 - 805.3)

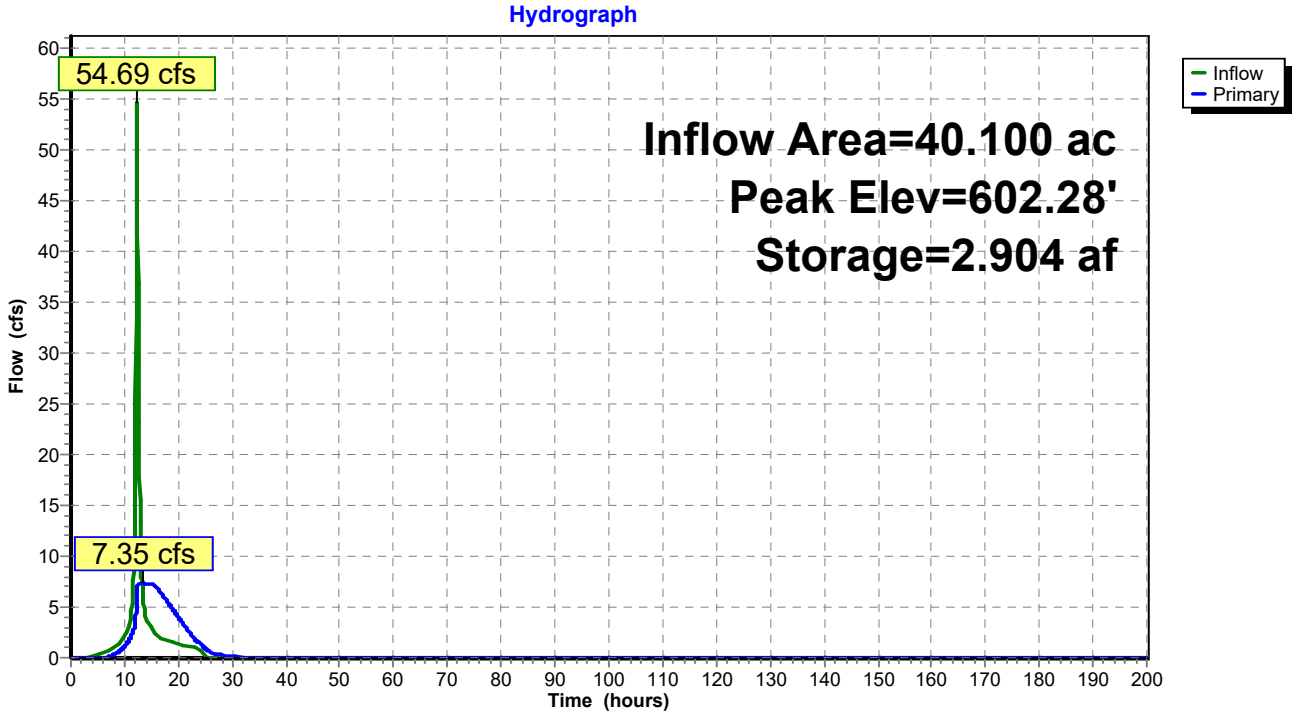
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.35 cfs @ 13.21 hrs HW=602.28' TW=598.28' (Dynamic Tailwater)
↑**1=Culvert** (Passes 7.35 cfs of 9.44 cfs potential flow)
↑**2=Orifice** (Orifice Controls 7.35 cfs @ 9.36 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

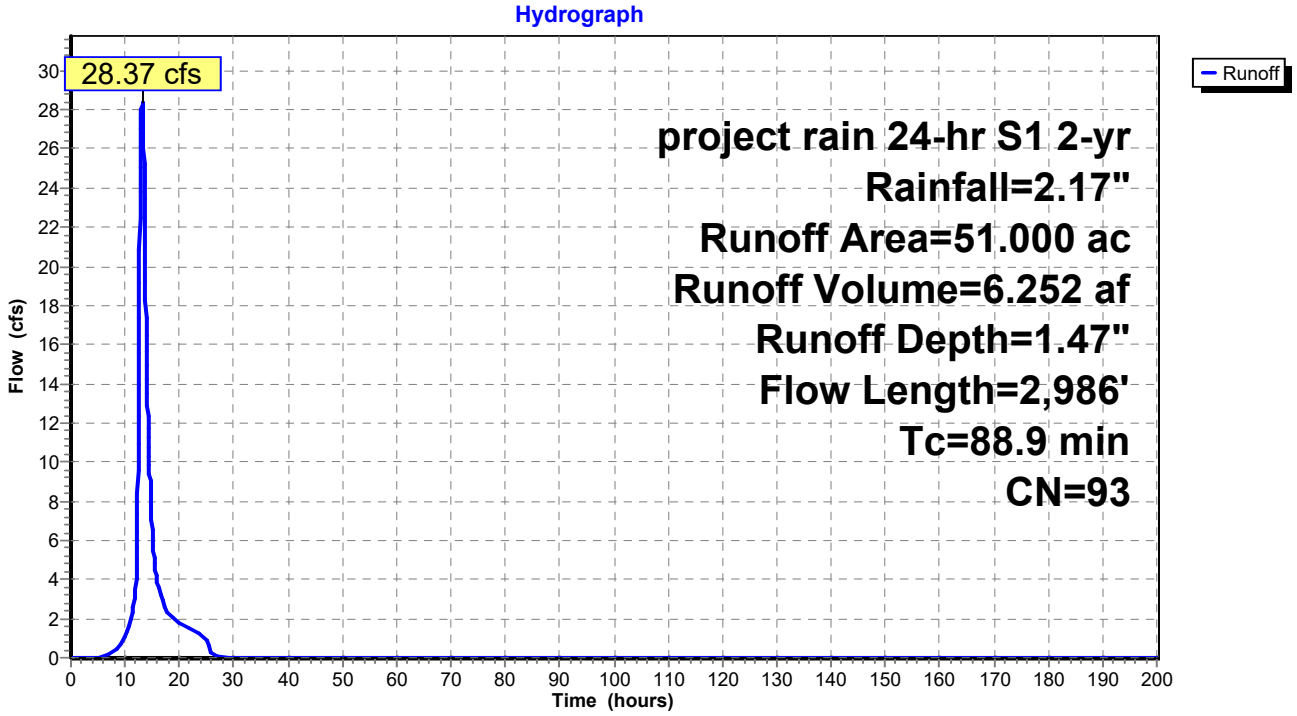
Runoff = 28.37 cfs @ 13.14 hrs, Volume= 6.252 af, Depth= 1.47"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 1.47" for 2-yr event
Inflow = 28.37 cfs @ 13.14 hrs, Volume= 6.252 af
Outflow = 10.10 cfs @ 15.48 hrs, Volume= 6.221 af, Atten= 64%, Lag= 140.7 min
Primary = 10.10 cfs @ 15.48 hrs, Volume= 6.221 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 599.23' @ 14.47 hrs Surf.Area= 1.000 ac Storage= 2.777 af

Plug-Flow detention time= 297.9 min calculated for 6.220 af (99% of inflow)
Center-of-Mass det. time= 297.1 min (1,184.4 - 887.3)

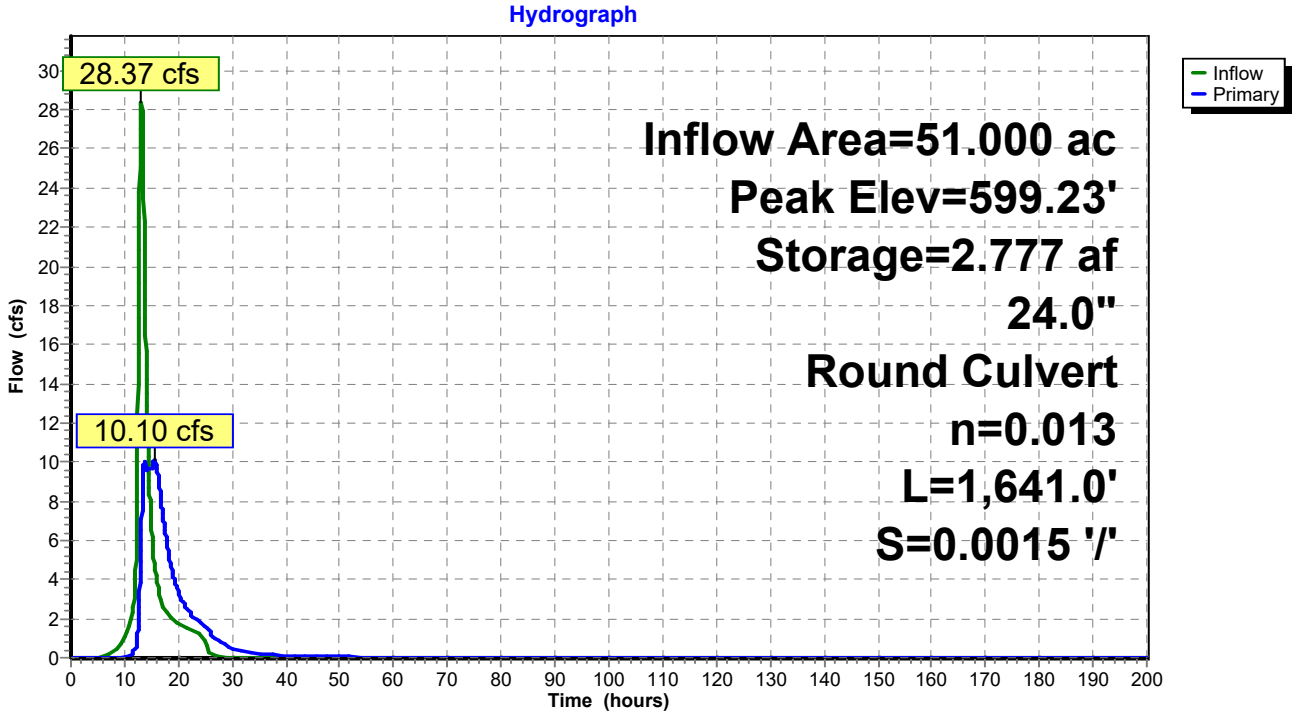
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.10 cfs @ 15.48 hrs HW=598.98' TW=584.09' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 10.10 cfs @ 3.28 fps)

Pond 05: Ex Collection Sump



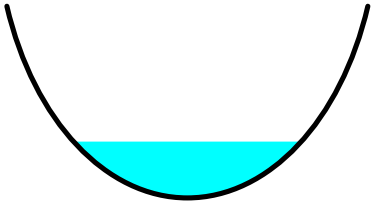
Summary for Reach 06a: Reach A Upper

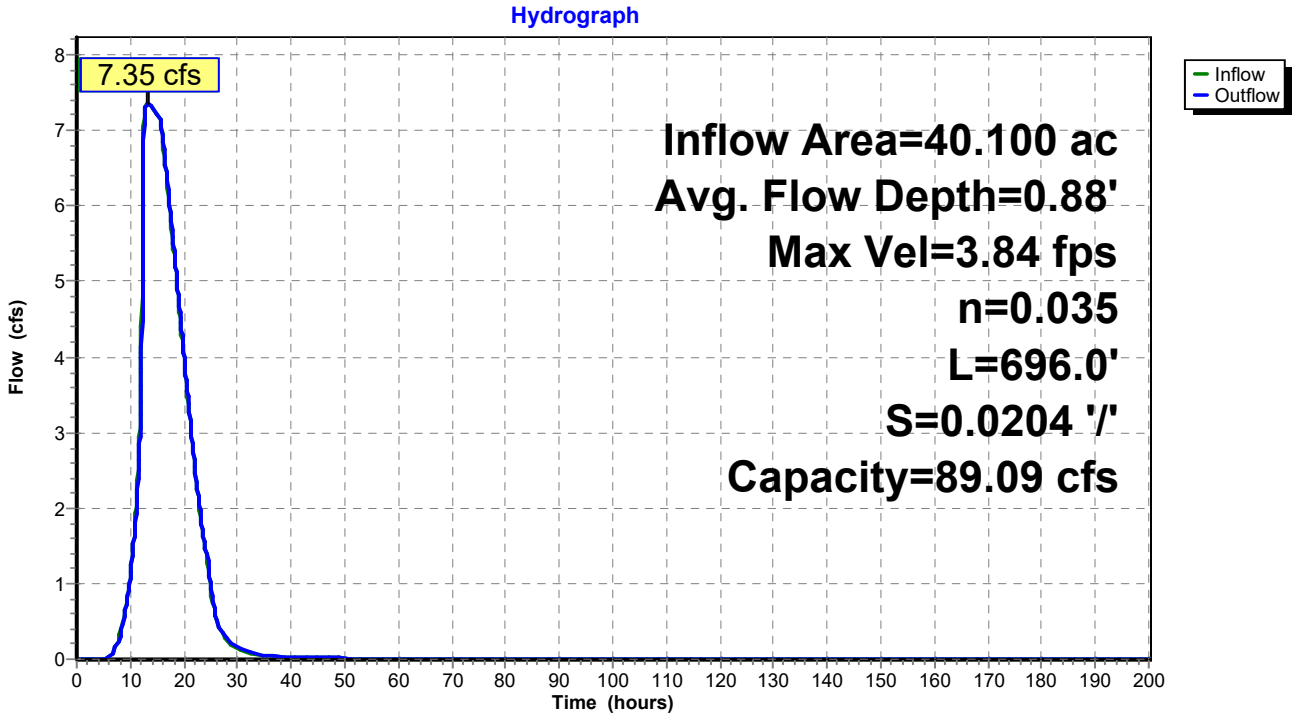
Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 1.74" for 2-yr event
Inflow = 7.35 cfs @ 13.21 hrs, Volume= 5.807 af
Outflow = 7.35 cfs @ 13.25 hrs, Volume= 5.807 af, Atten= 0%, Lag= 2.3 min
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 15.5 min

Peak Storage= 1,333 cf @ 13.25 hrs
Average Depth at Peak Storage= 0.88' , Surface Width= 3.25'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'





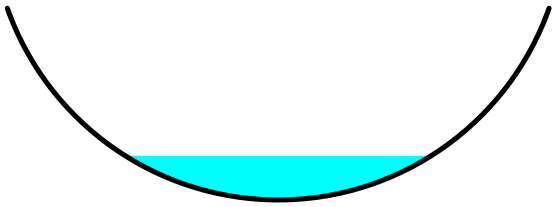
Summary for Reach 06b: Reach A Lower

Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 1.58" for 2-yr event
Inflow = 17.44 cfs @ 13.74 hrs, Volume= 12.028 af
Outflow = 17.44 cfs @ 13.76 hrs, Volume= 12.028 af, Atten= 0%, Lag= 1.2 min
Routed to Link 07 : Ex Analysis Point A

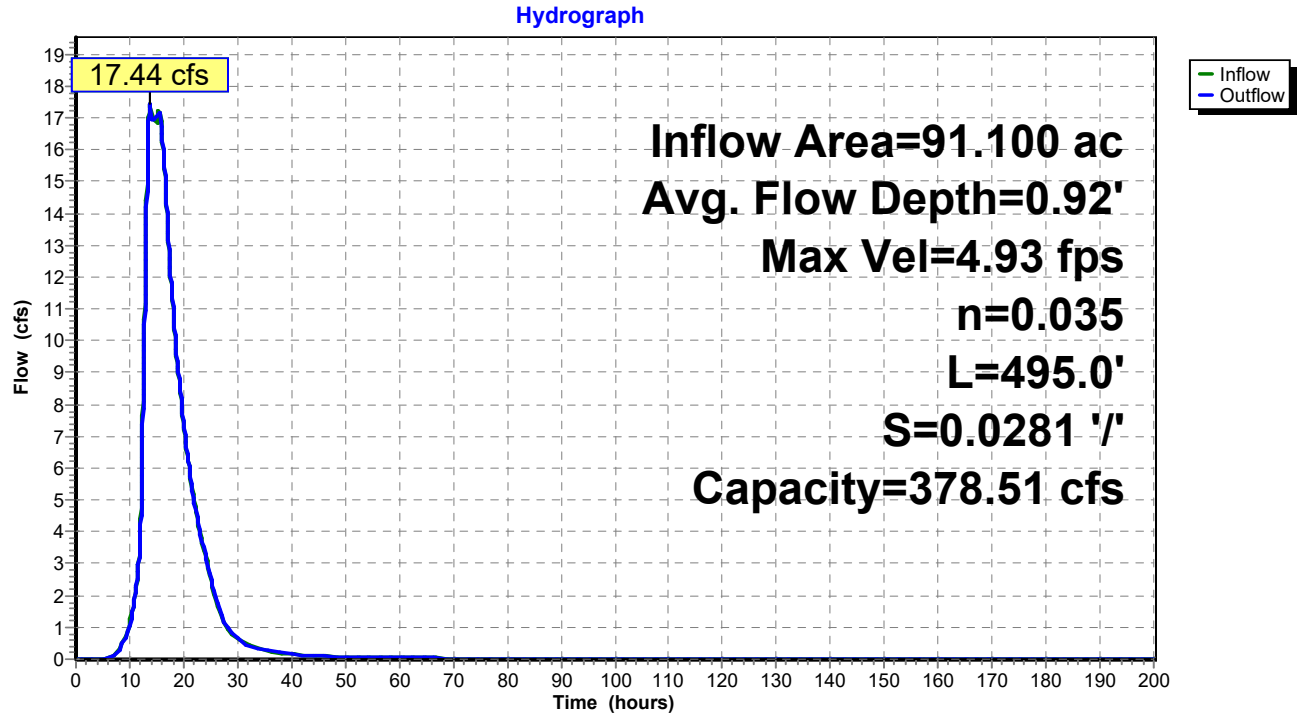
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.93 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 8.1 min

Peak Storage= 1,750 cf @ 13.76 hrs
Average Depth at Peak Storage= 0.92' , Surface Width= 5.76'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



Reach 06b: Reach A Lower

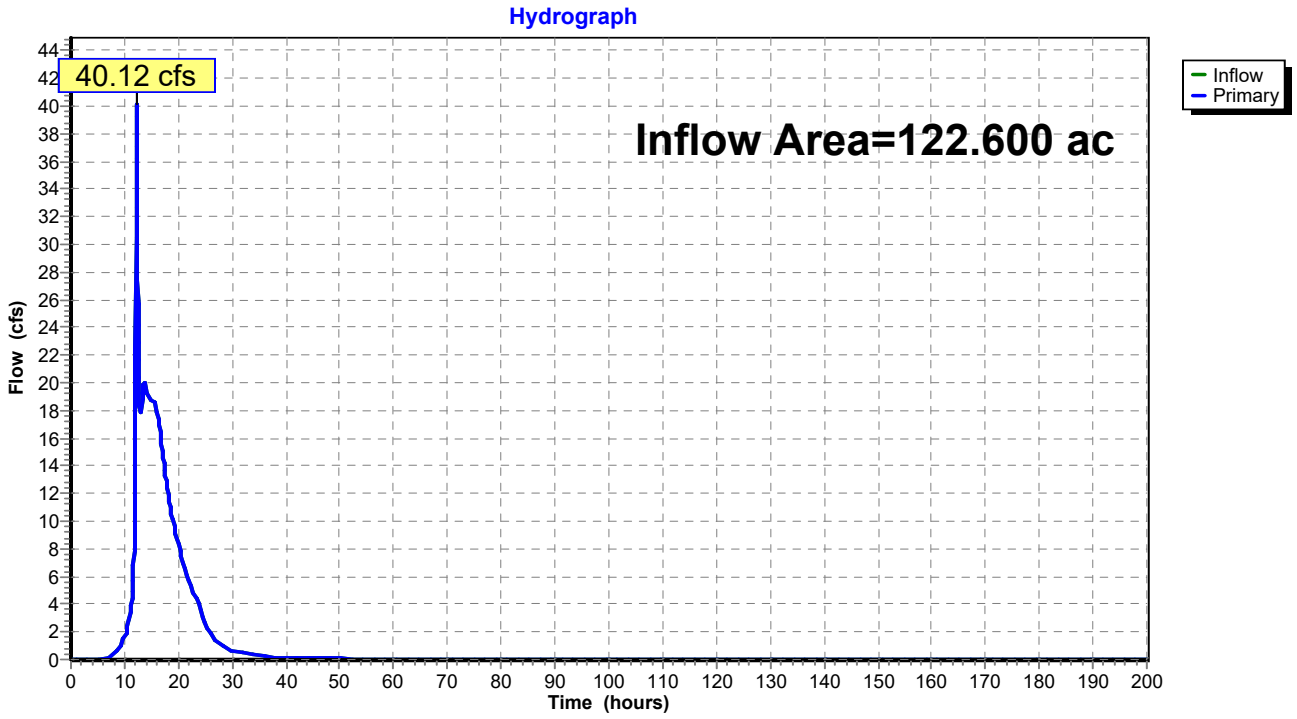


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 1.48" for 2-yr event
Inflow = 40.12 cfs @ 12.21 hrs, Volume= 15.101 af
Primary = 40.12 cfs @ 12.21 hrs, Volume= 15.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

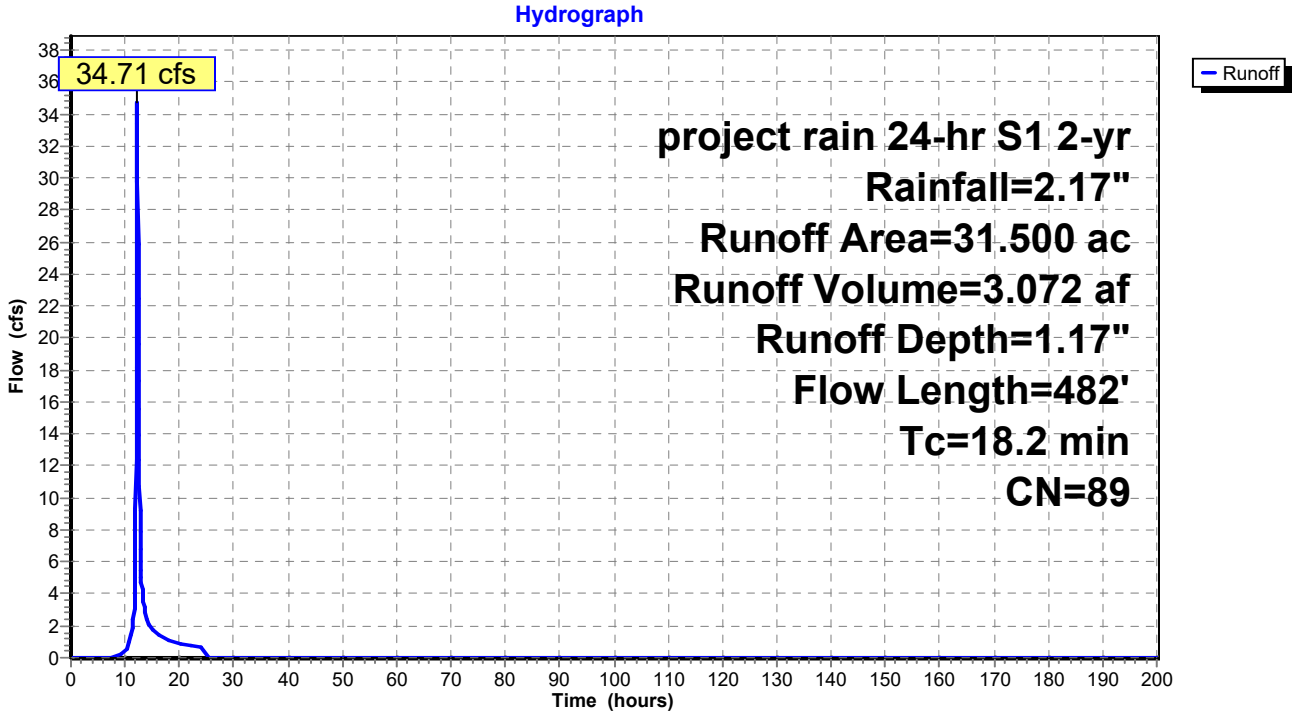
Runoff = 34.71 cfs @ 12.21 hrs, Volume= 3.072 af, Depth= 1.17"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

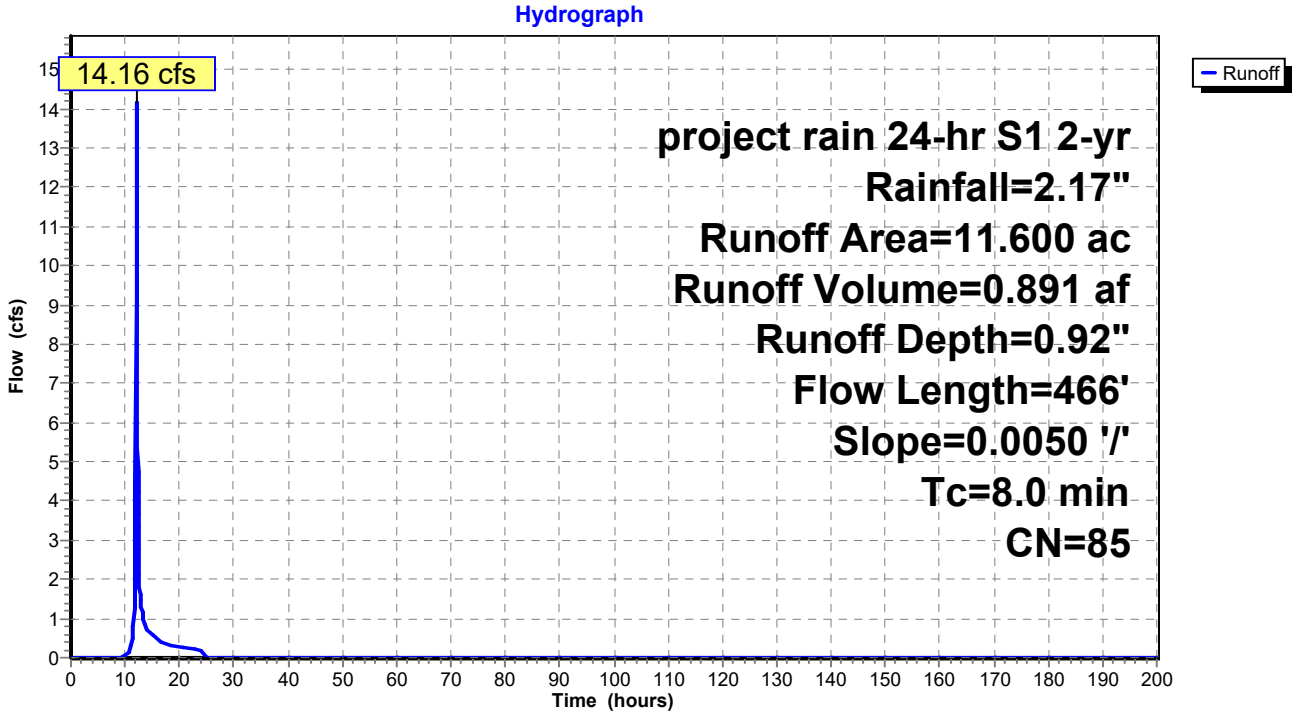
Runoff = 14.16 cfs @ 12.07 hrs, Volume= 0.891 af, Depth= 0.92"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

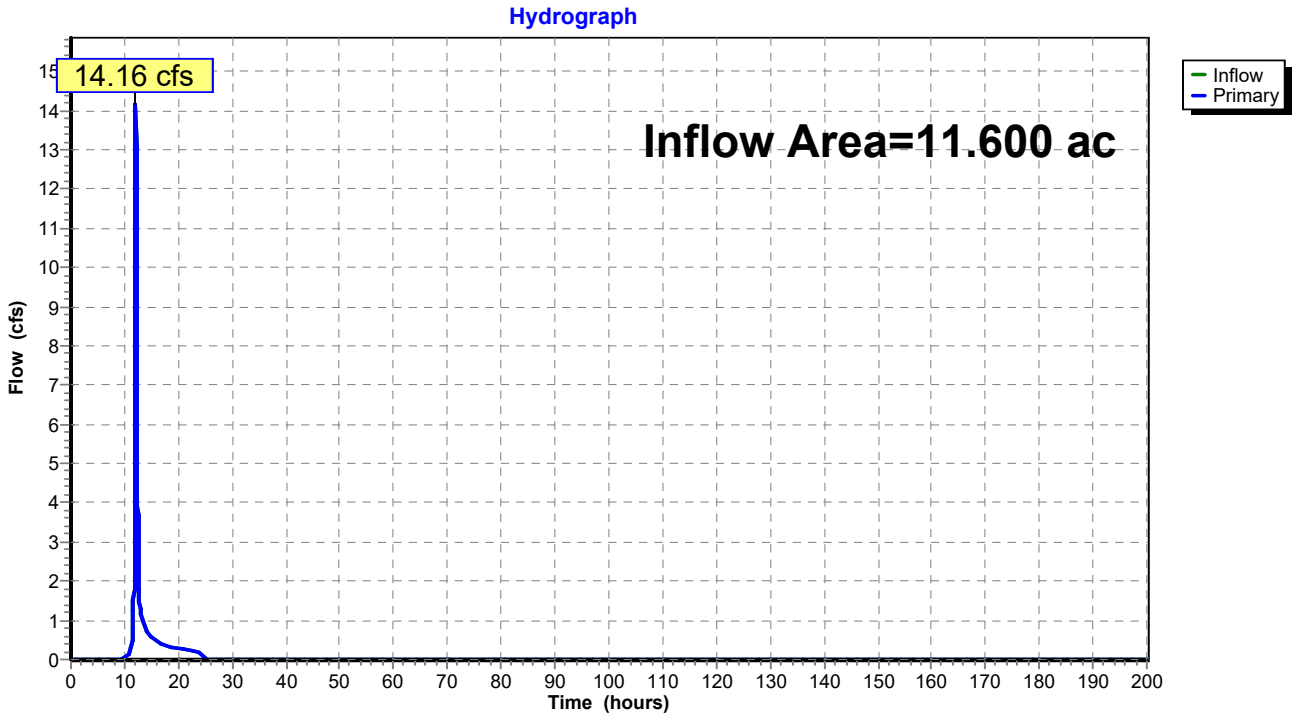


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 0.92" for 2-yr event
Inflow = 14.16 cfs @ 12.07 hrs, Volume= 0.891 af
Primary = 14.16 cfs @ 12.07 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

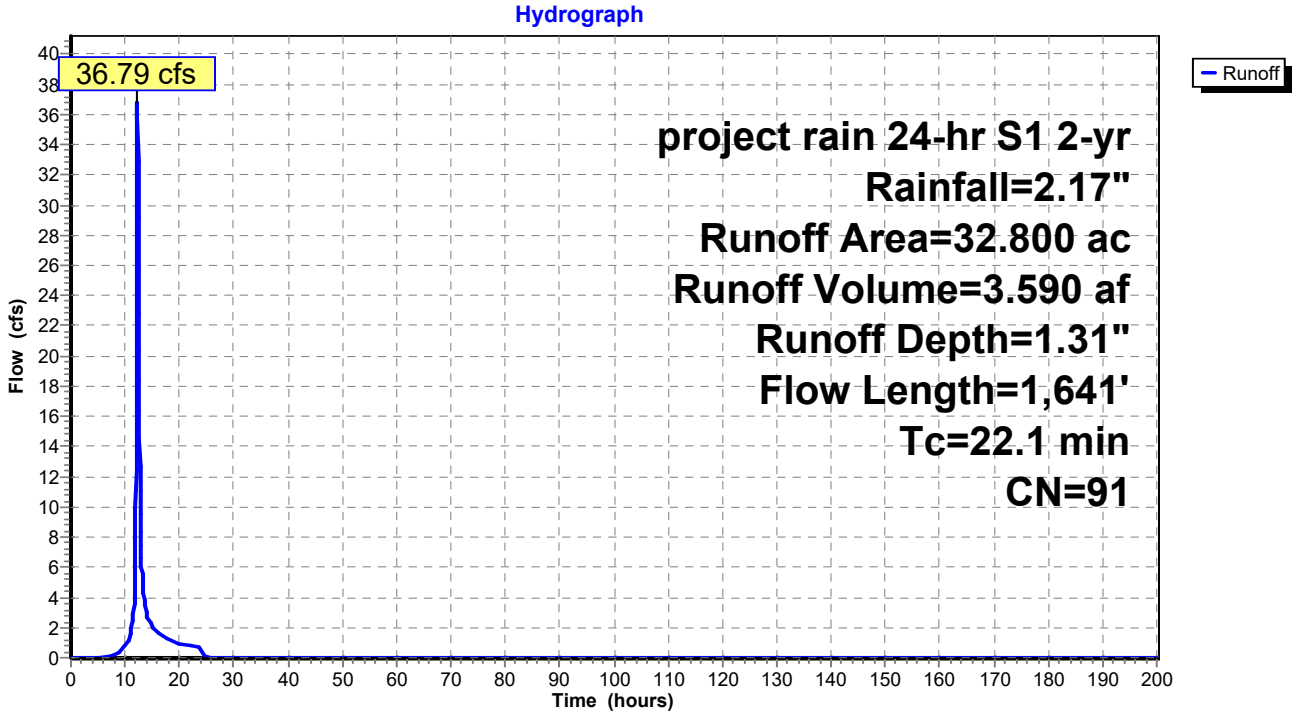
Runoff = 36.79 cfs @ 12.26 hrs, Volume= 3.590 af, Depth= 1.31"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

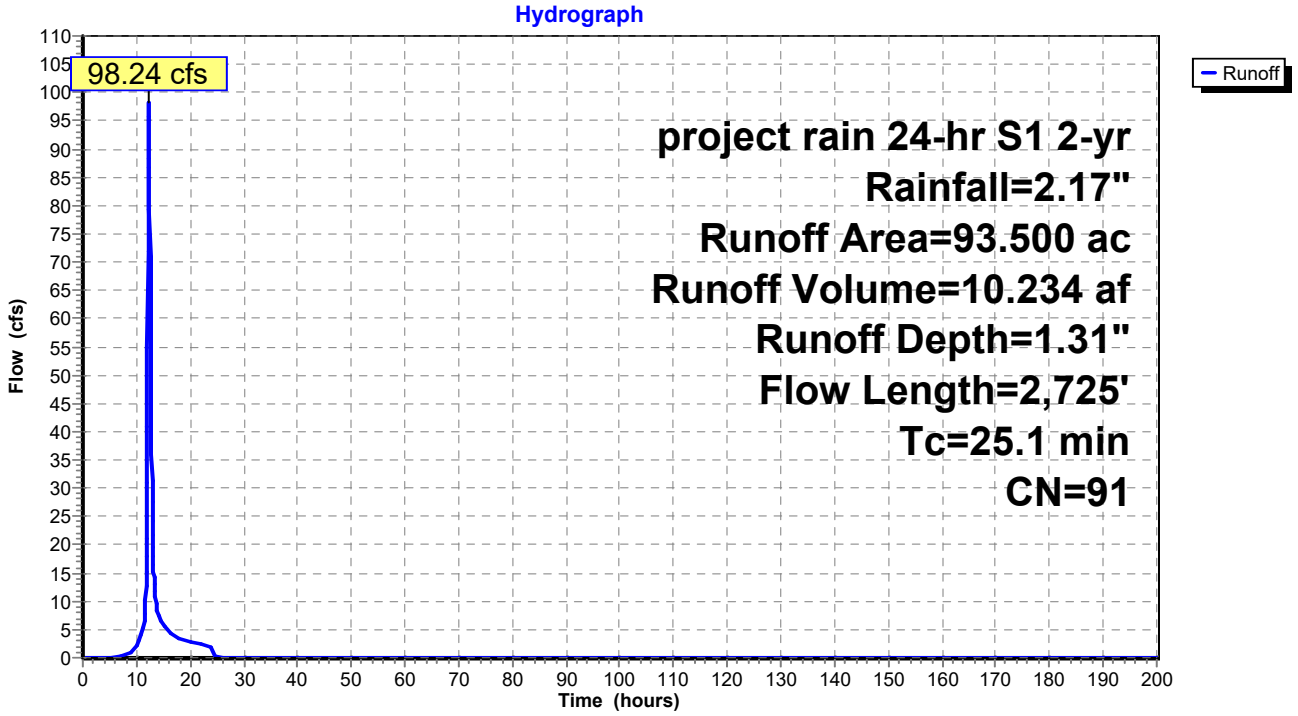
Runoff = 98.24 cfs @ 12.30 hrs, Volume= 10.234 af, Depth= 1.31"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 1.31" for 2-yr event
Inflow = 98.24 cfs @ 12.30 hrs, Volume= 10.234 af
Outflow = 4.43 cfs @ 16.28 hrs, Volume= 10.046 af, Atten= 95%, Lag= 239.0 min
Primary = 4.43 cfs @ 16.28 hrs, Volume= 10.046 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 591.87' @ 16.28 hrs Surf.Area= 321,495 sf Storage= 973,560 cf (300,979 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,147.5 min (1,987.2 - 839.7)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

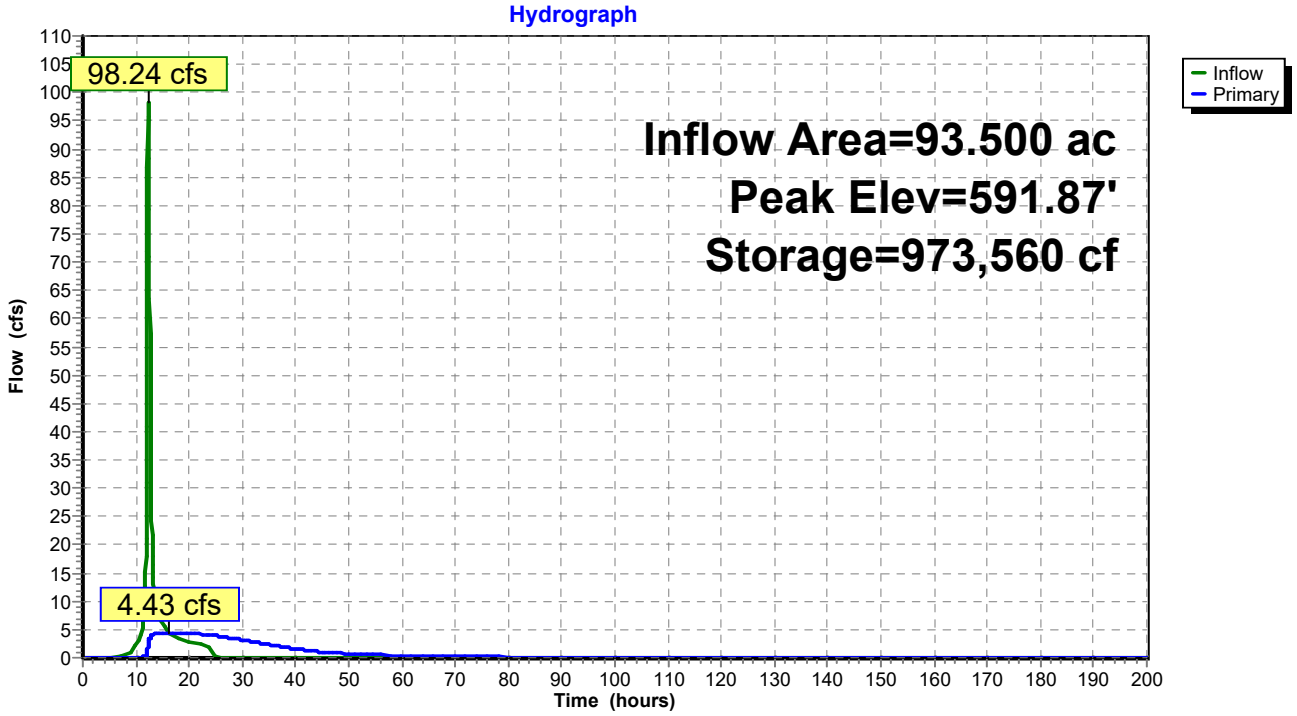
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.43 cfs @ 16.28 hrs HW=591.87' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.43 cfs of 5.22 cfs potential flow)
  - **2=Culvert** (Inlet Controls 4.43 cfs @ 5.64 fps)
  - **3=Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

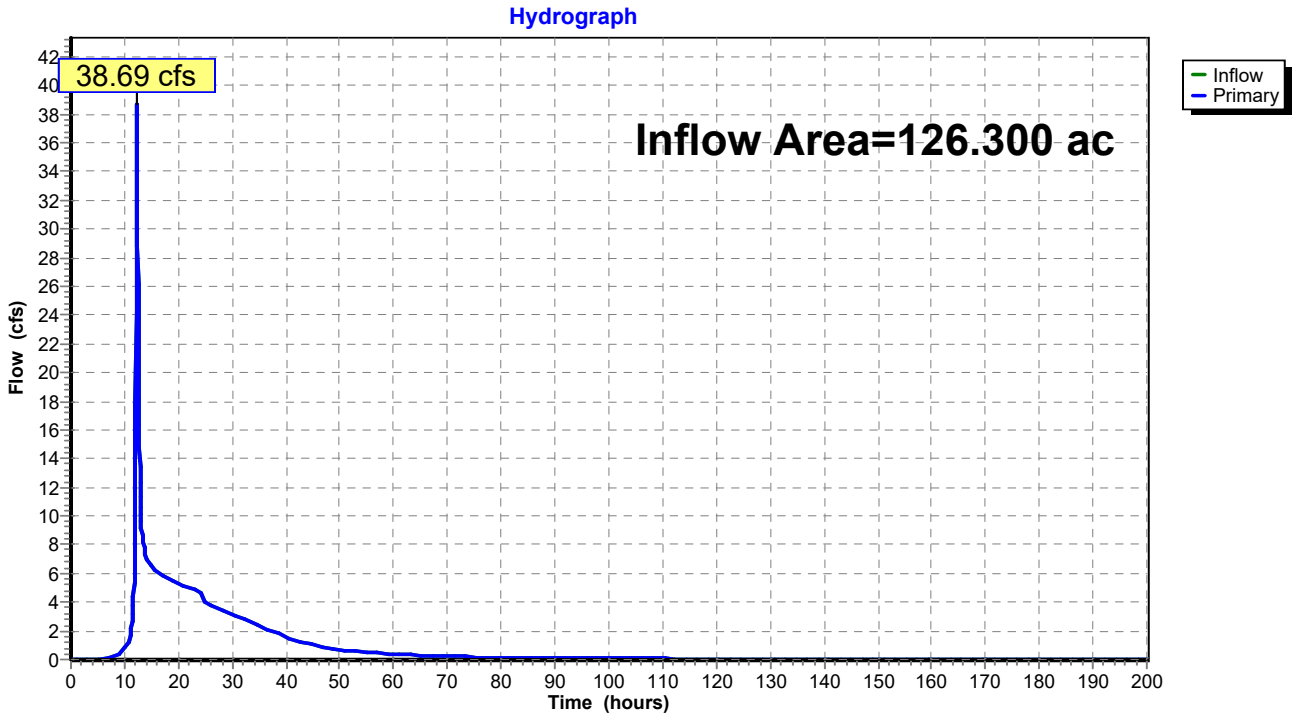


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 1.30" for 2-yr event
Inflow = 38.69 cfs @ 12.27 hrs, Volume= 13.636 af
Primary = 38.69 cfs @ 12.27 hrs, Volume= 13.636 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

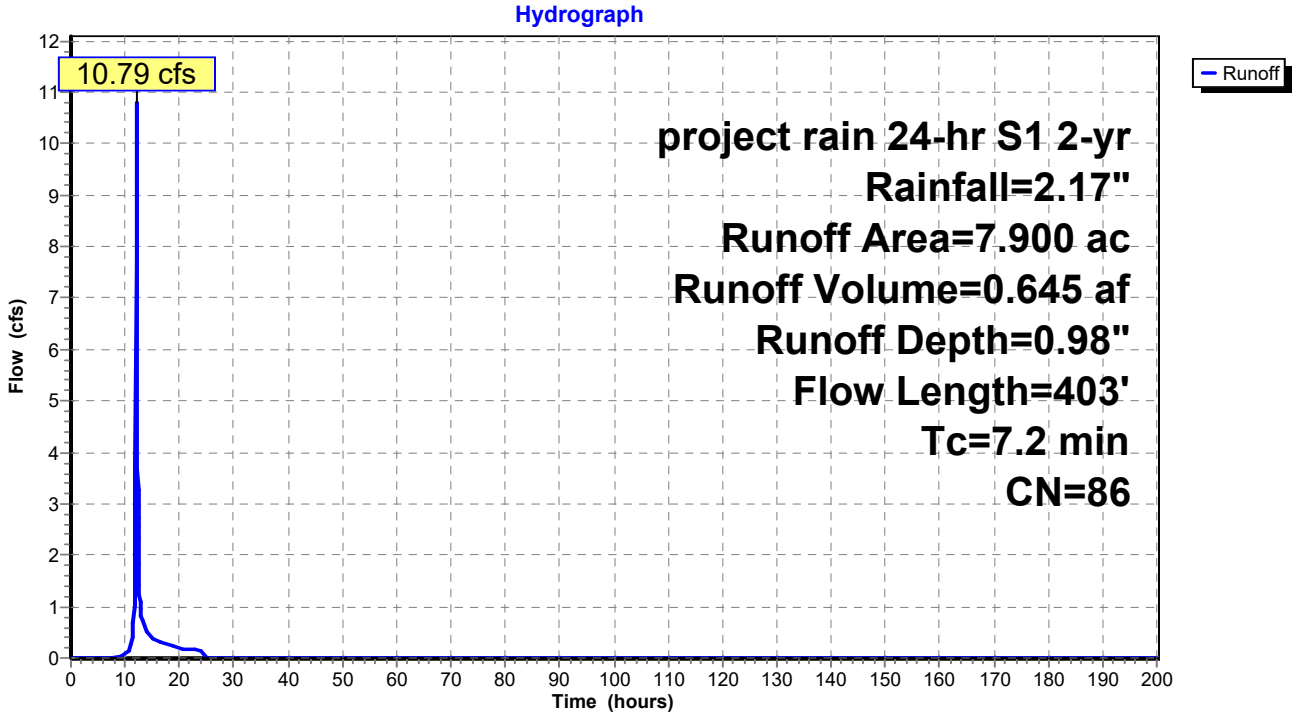
Runoff = 10.79 cfs @ 12.06 hrs, Volume= 0.645 af, Depth= 0.98"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 2-yr Rainfall=2.17"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

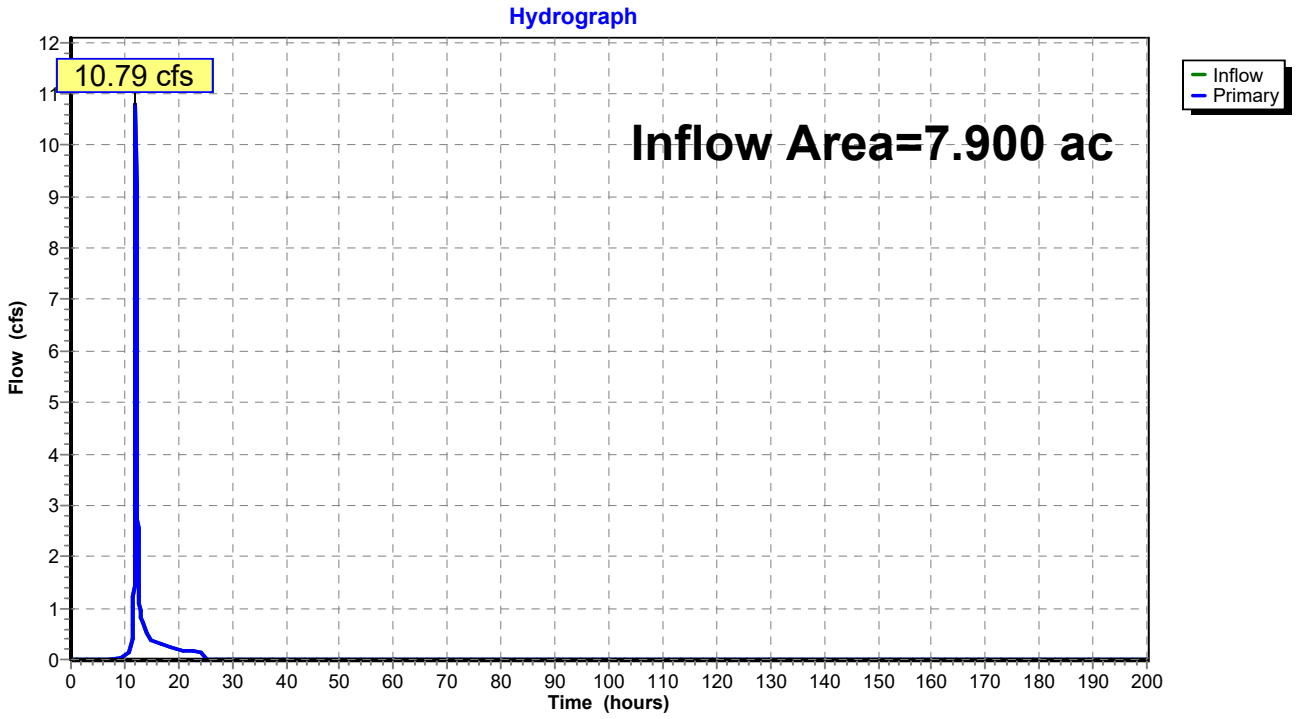


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 0.98" for 2-yr event
Inflow = 10.79 cfs @ 12.06 hrs, Volume= 0.645 af
Primary = 10.79 cfs @ 12.06 hrs, Volume= 0.645 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

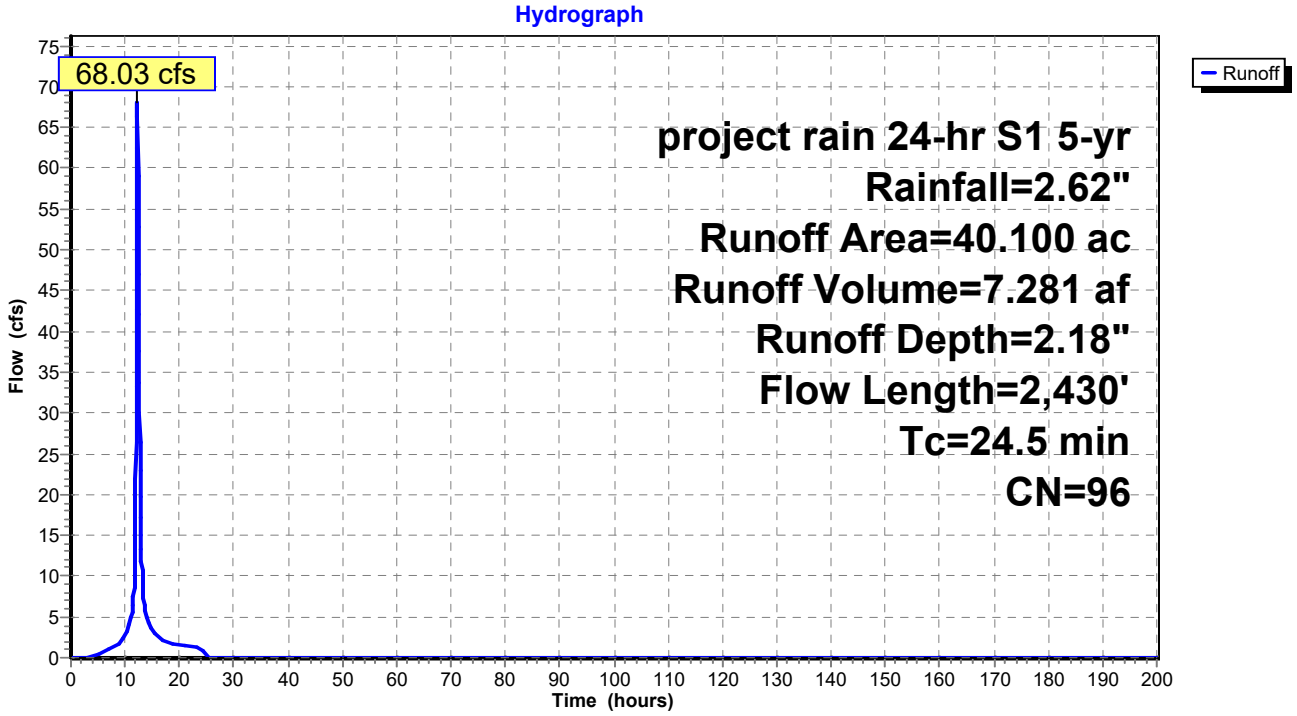
Runoff = 68.03 cfs @ 12.28 hrs, Volume= 7.281 af, Depth= 2.18"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 2.18" for 5-yr event
Inflow = 68.03 cfs @ 12.28 hrs, Volume= 7.281 af
Outflow = 7.51 cfs @ 13.35 hrs, Volume= 7.275 af, Atten= 89%, Lag= 64.1 min
Primary = 7.51 cfs @ 13.35 hrs, Volume= 7.275 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.44' @ 13.35 hrs Surf.Area= 6.937 ac Storage= 3.831 af

Plug-Flow detention time= 255.0 min calculated for 7.275 af (100% of inflow)
Center-of-Mass det. time= 254.5 min (1,052.5 - 798.0)

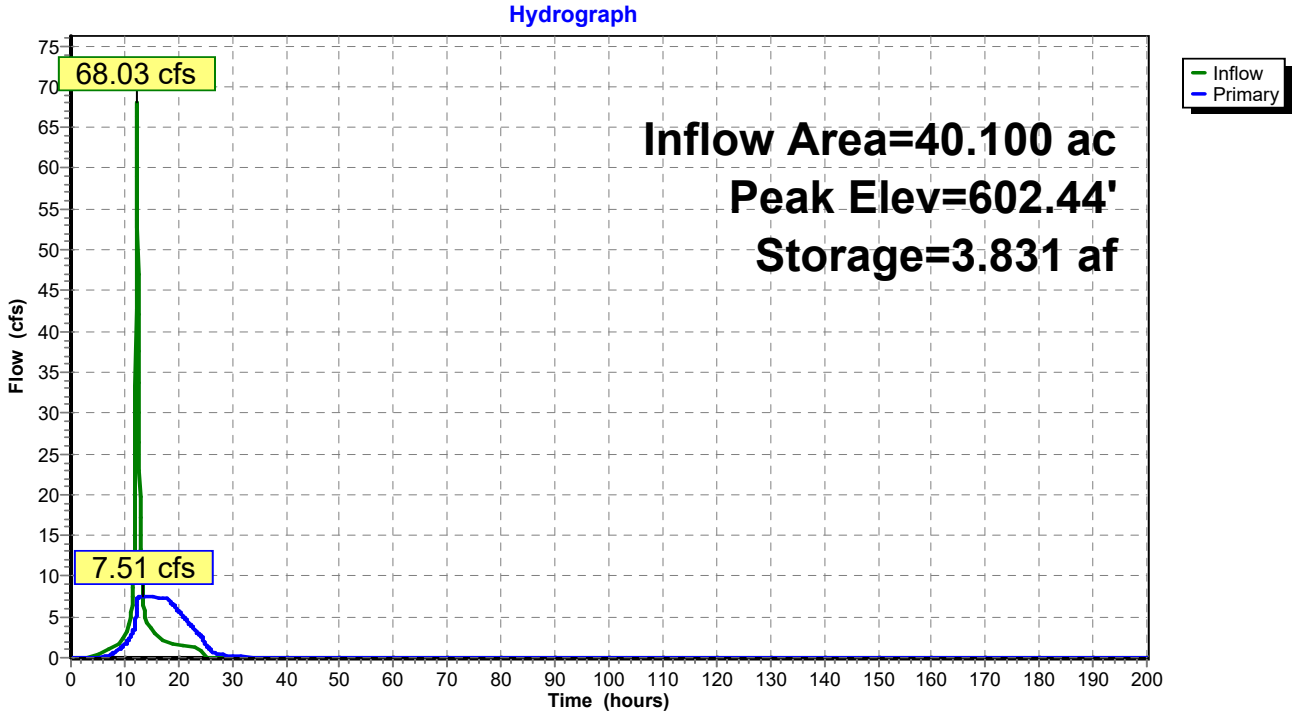
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.51 cfs @ 13.35 hrs HW=602.44' TW=598.29' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.51 cfs of 9.65 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.51 cfs @ 9.56 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

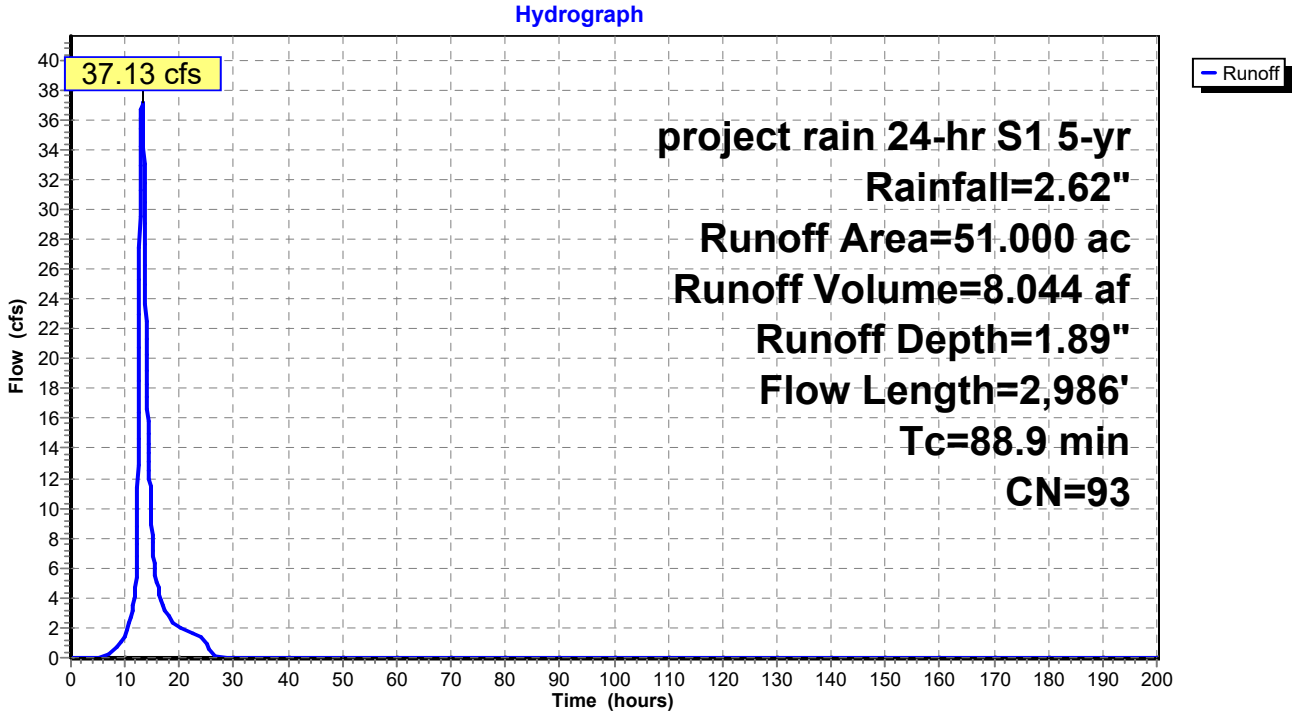
Runoff = 37.13 cfs @ 13.14 hrs, Volume= 8.044 af, Depth= 1.89"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 1.89" for 5-yr event
Inflow = 37.13 cfs @ 13.14 hrs, Volume= 8.044 af
Outflow = 11.11 cfs @ 14.59 hrs, Volume= 8.013 af, Atten= 70%, Lag= 87.0 min
Primary = 11.11 cfs @ 14.59 hrs, Volume= 8.013 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 600.25' @ 14.59 hrs Surf.Area= 1.000 ac Storage= 3.804 af

Plug-Flow detention time= 288.7 min calculated for 8.011 af (100% of inflow)
Center-of-Mass det. time= 288.6 min (1,166.8 - 878.2)

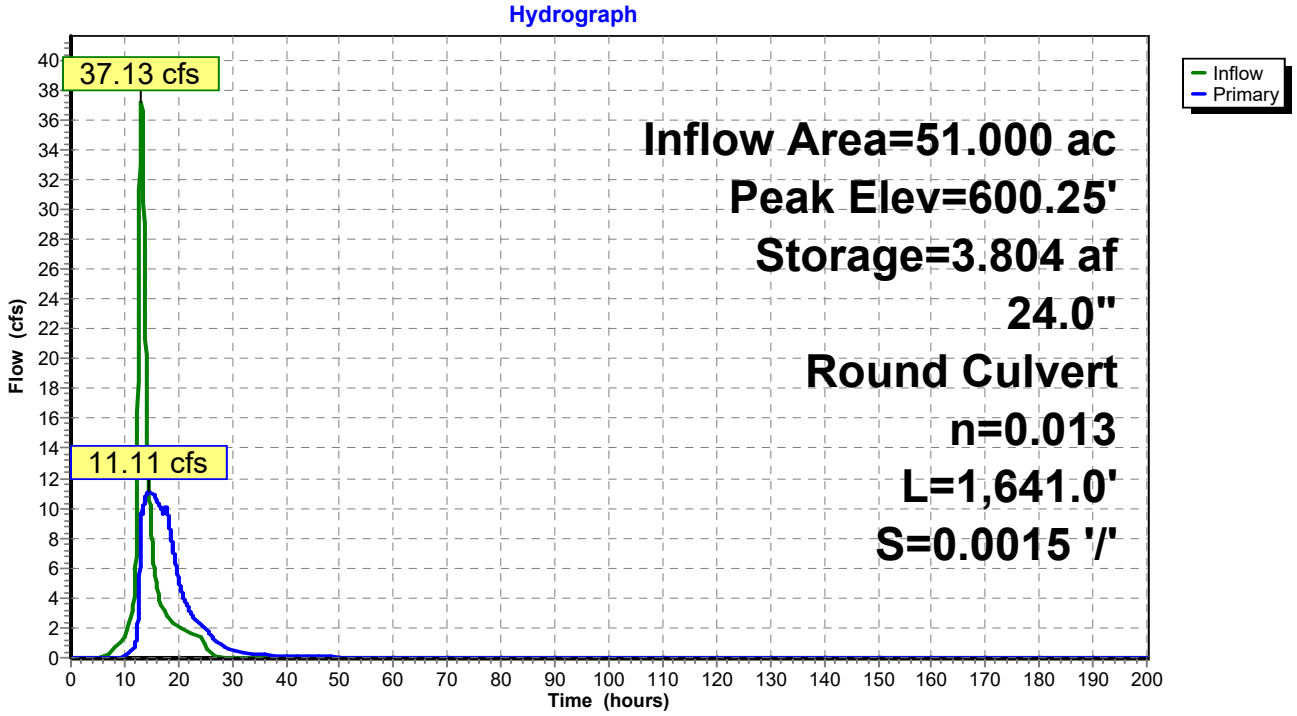
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.11 cfs @ 14.59 hrs HW=600.25' TW=584.12' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 11.11 cfs @ 3.54 fps)

Pond 05: Ex Collection Sump



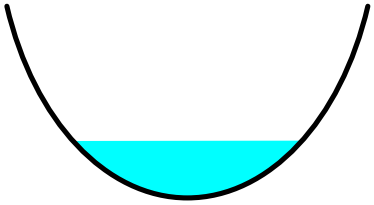
Summary for Reach 06a: Reach A Upper

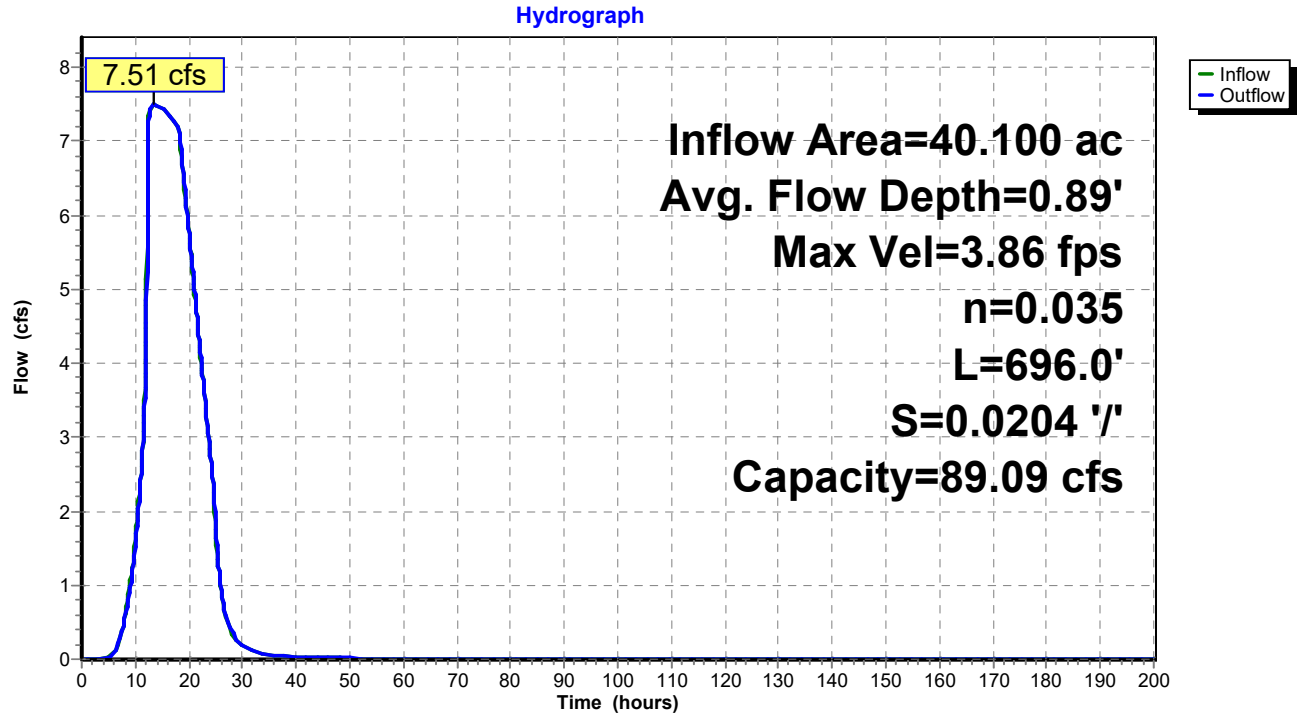
Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 2.18" for 5-yr event
Inflow = 7.51 cfs @ 13.35 hrs, Volume= 7.275 af
Outflow = 7.51 cfs @ 13.39 hrs, Volume= 7.275 af, Atten= 0%, Lag= 2.3 min
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.86 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 14.8 min

Peak Storage= 1,353 cf @ 13.39 hrs
Average Depth at Peak Storage= 0.89' , Surface Width= 3.27'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'





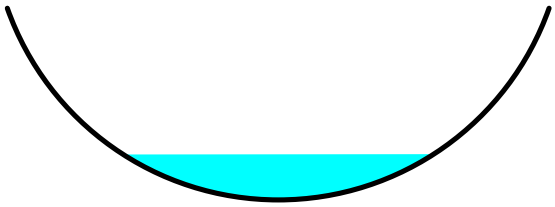
Summary for Reach 06b: Reach A Lower

Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 2.01" for 5-yr event
Inflow = 18.59 cfs @ 14.55 hrs, Volume= 15.288 af
Outflow = 18.59 cfs @ 14.57 hrs, Volume= 15.288 af, Atten= 0%, Lag= 1.2 min
Routed to Link 07 : Ex Analysis Point A

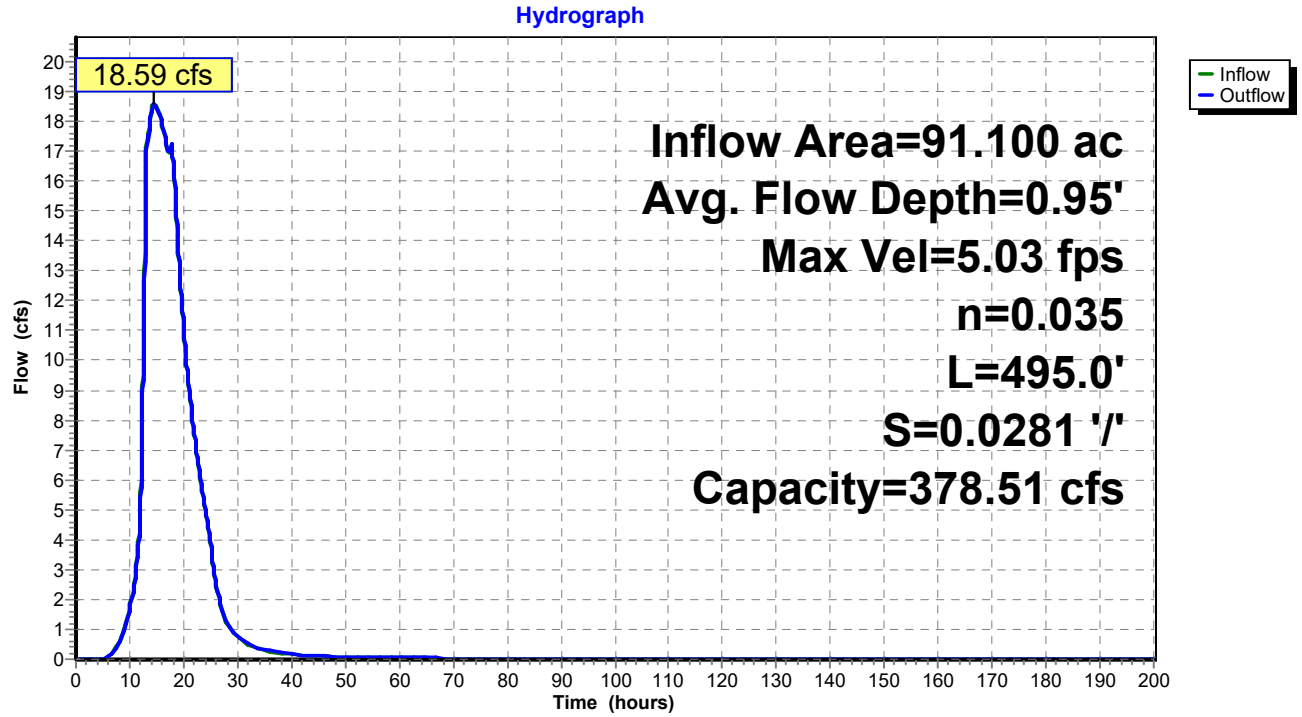
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.03 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,830 cf @ 14.57 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 5.84'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



Reach 06b: Reach A Lower

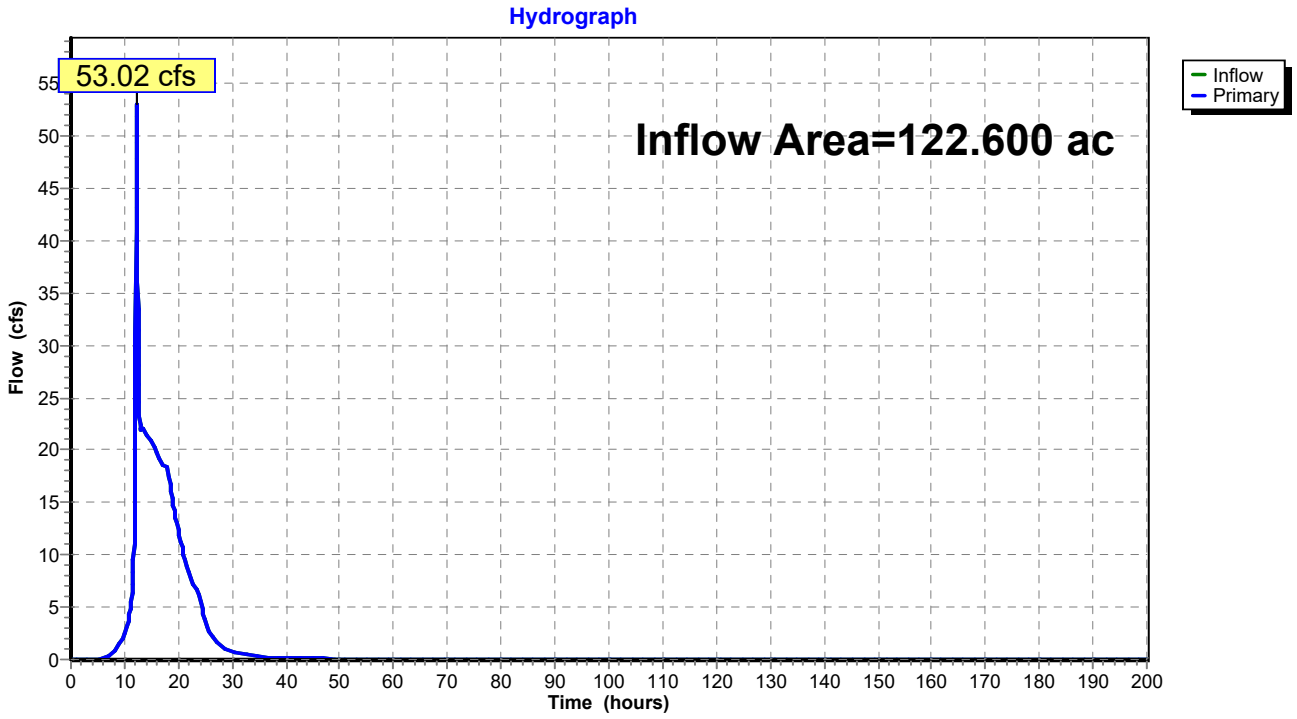


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 1.90" for 5-yr event
Inflow = 53.02 cfs @ 12.21 hrs, Volume= 19.383 af
Primary = 53.02 cfs @ 12.21 hrs, Volume= 19.383 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

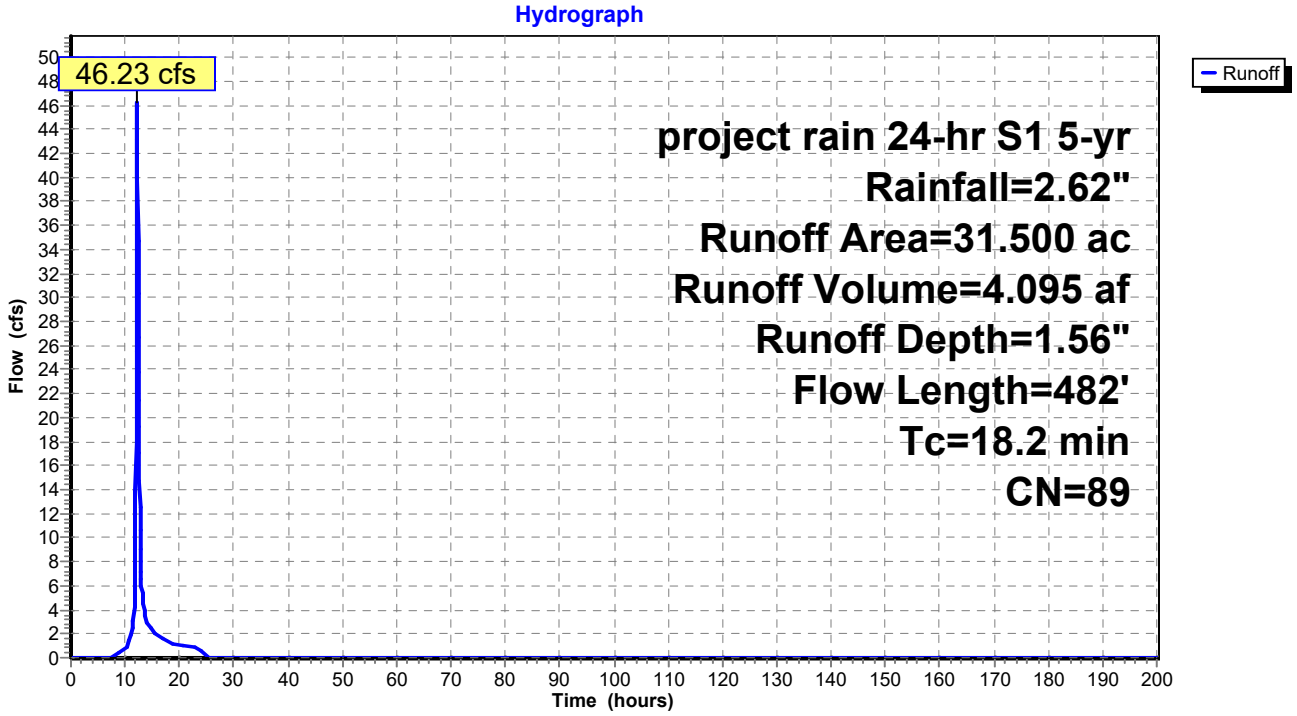
Runoff = 46.23 cfs @ 12.21 hrs, Volume= 4.095 af, Depth= 1.56"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

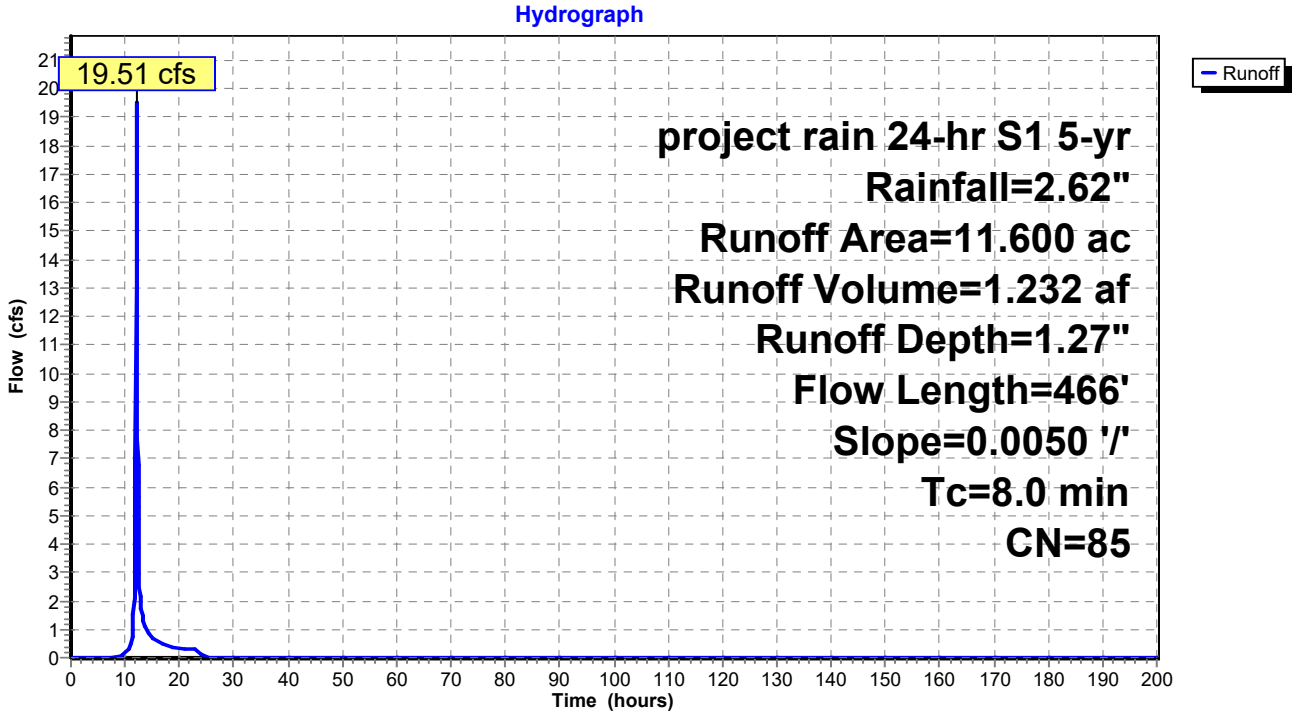
Runoff = 19.51 cfs @ 12.07 hrs, Volume= 1.232 af, Depth= 1.27"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

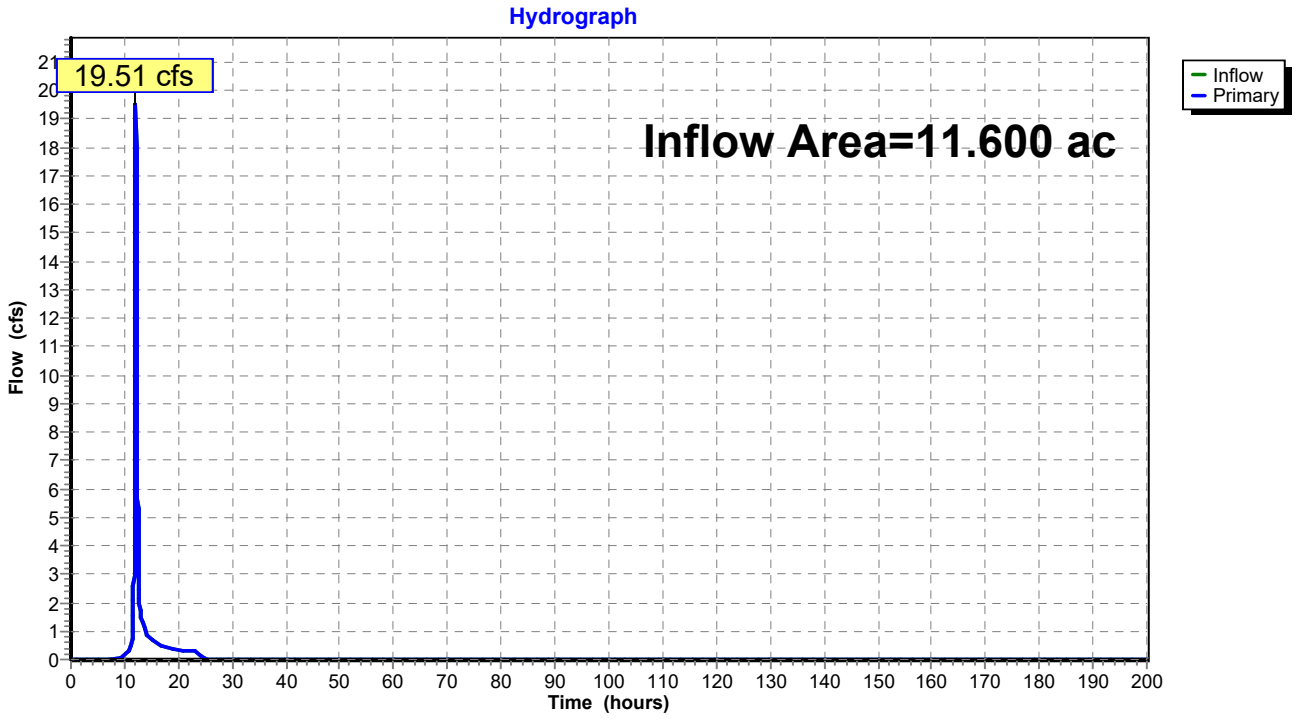


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 1.27" for 5-yr event
Inflow = 19.51 cfs @ 12.07 hrs, Volume= 1.232 af
Primary = 19.51 cfs @ 12.07 hrs, Volume= 1.232 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

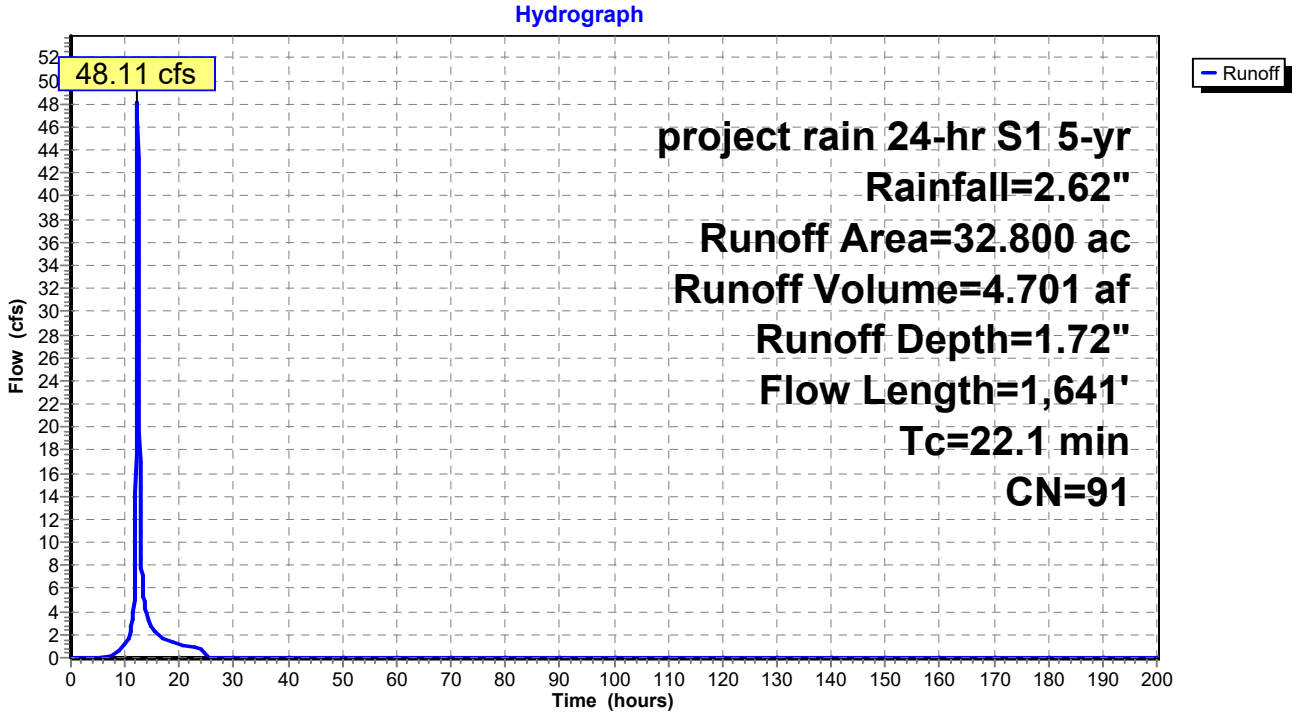
Runoff = 48.11 cfs @ 12.26 hrs, Volume= 4.701 af, Depth= 1.72"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

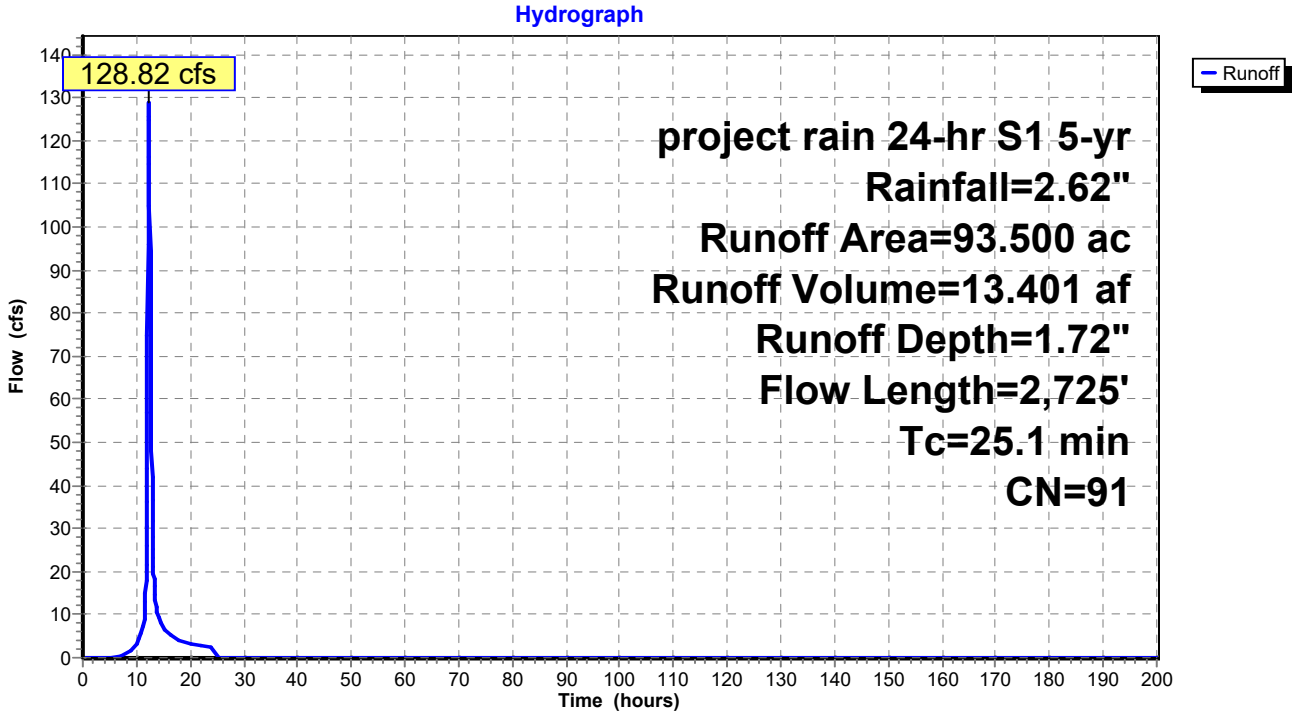
Runoff = 128.82 cfs @ 12.30 hrs, Volume= 13.401 af, Depth= 1.72"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 1.72" for 5-yr event
Inflow = 128.82 cfs @ 12.30 hrs, Volume= 13.401 af
Outflow = 5.31 cfs @ 16.38 hrs, Volume= 13.206 af, Atten= 96%, Lag= 245.2 min
Primary = 5.31 cfs @ 16.38 hrs, Volume= 13.206 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 592.47' @ 16.38 hrs Surf.Area= 329,777 sf Storage= 1,079,738 cf (407,157 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 1,188.2 min (2,017.9 - 829.7)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

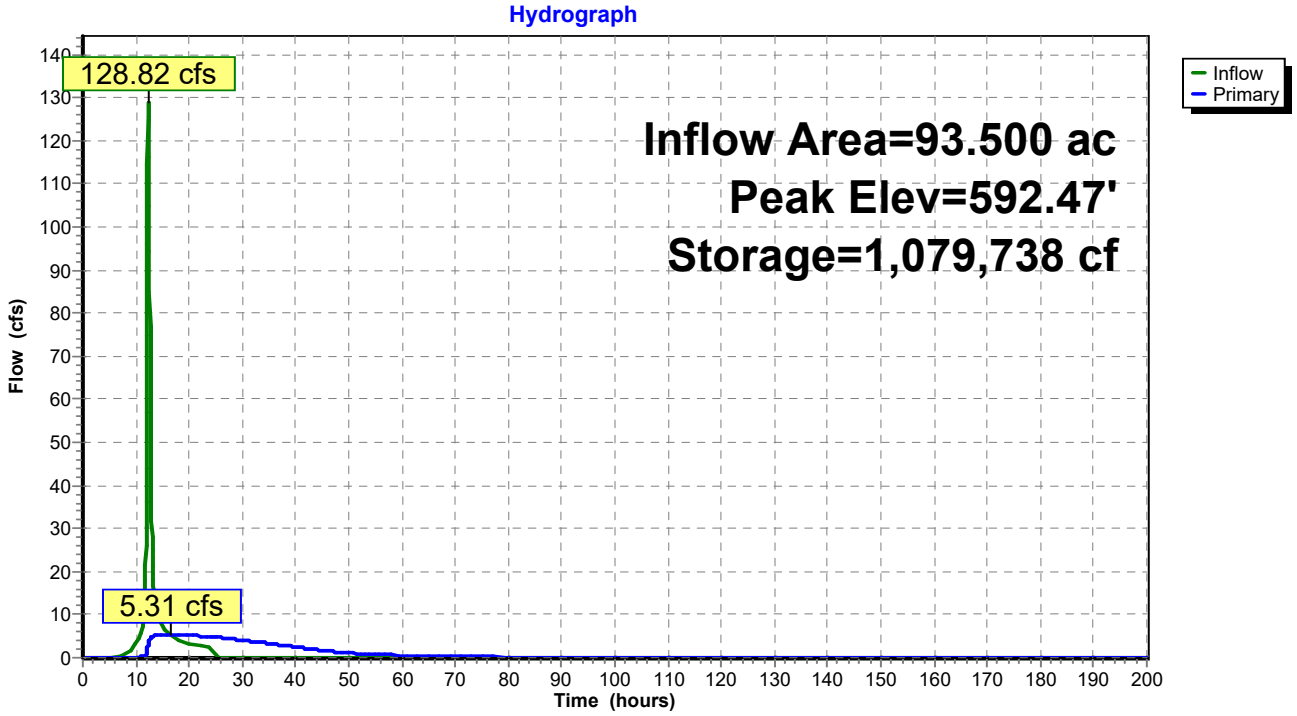
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.31 cfs @ 16.38 hrs HW=592.47' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 5.31 cfs of 5.49 cfs potential flow)
  - **2=Culvert** (Inlet Controls 5.31 cfs @ 6.76 fps)
  - **3=Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

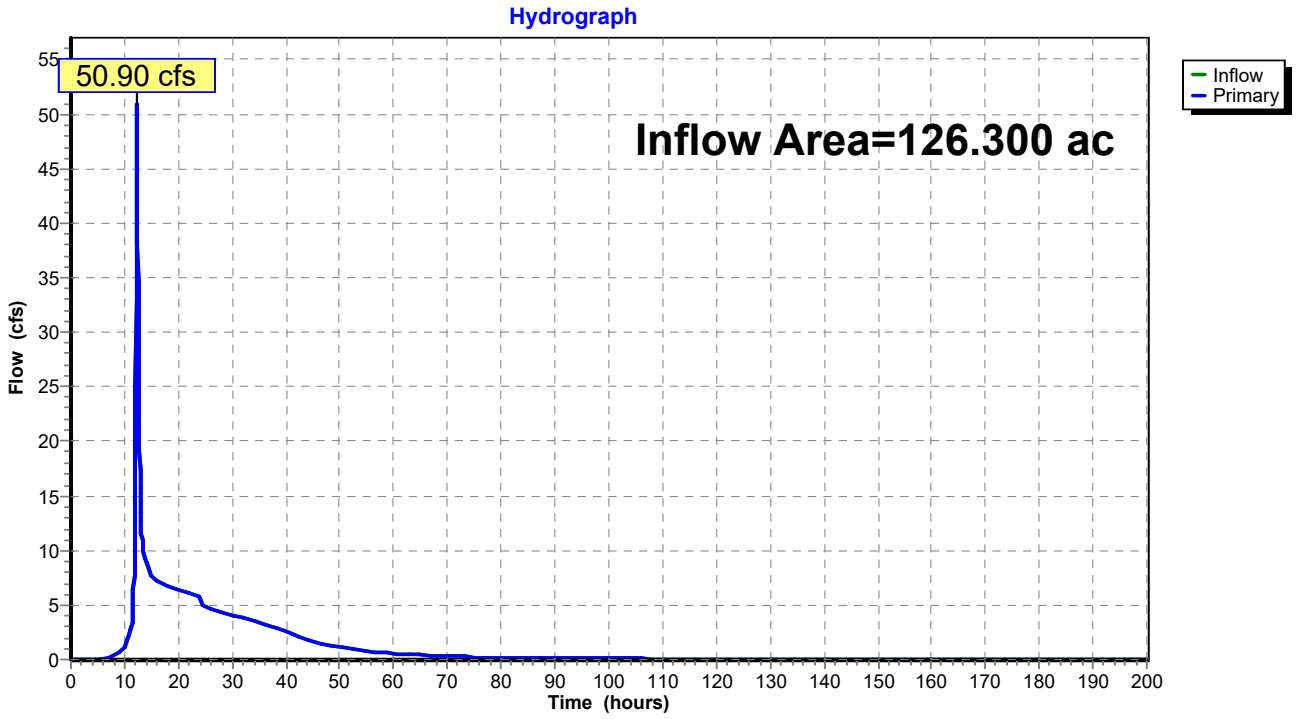


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 1.70" for 5-yr event
Inflow = 50.90 cfs @ 12.26 hrs, Volume= 17.907 af
Primary = 50.90 cfs @ 12.26 hrs, Volume= 17.907 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

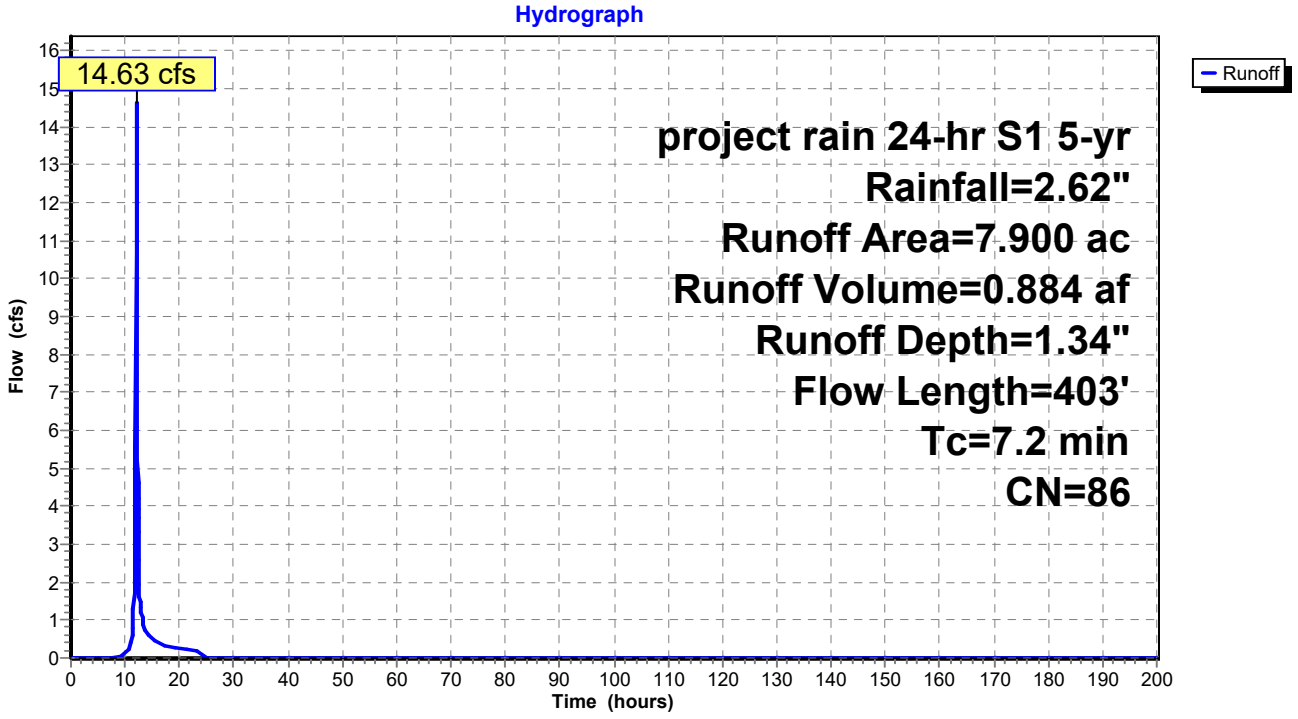
Runoff = 14.63 cfs @ 12.06 hrs, Volume= 0.884 af, Depth= 1.34"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 5-yr Rainfall=2.62"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

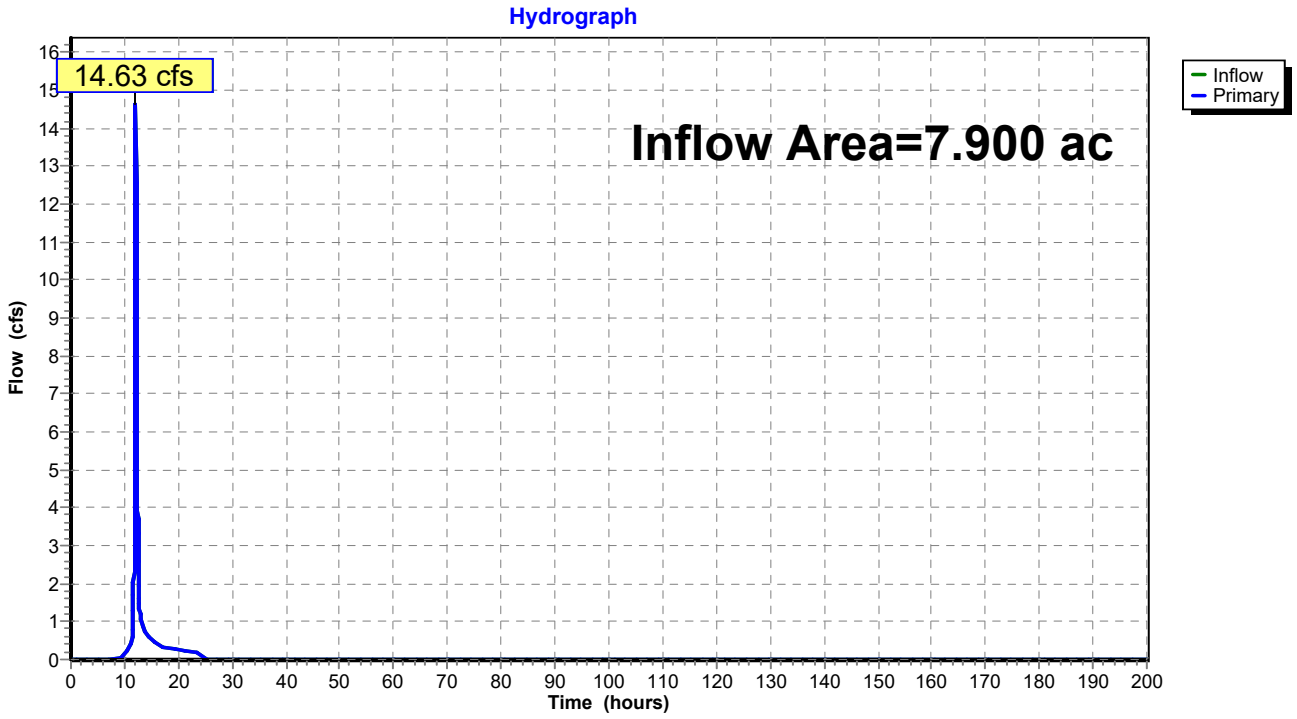


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 1.34" for 5-yr event
Inflow = 14.63 cfs @ 12.06 hrs, Volume= 0.884 af
Primary = 14.63 cfs @ 12.06 hrs, Volume= 0.884 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

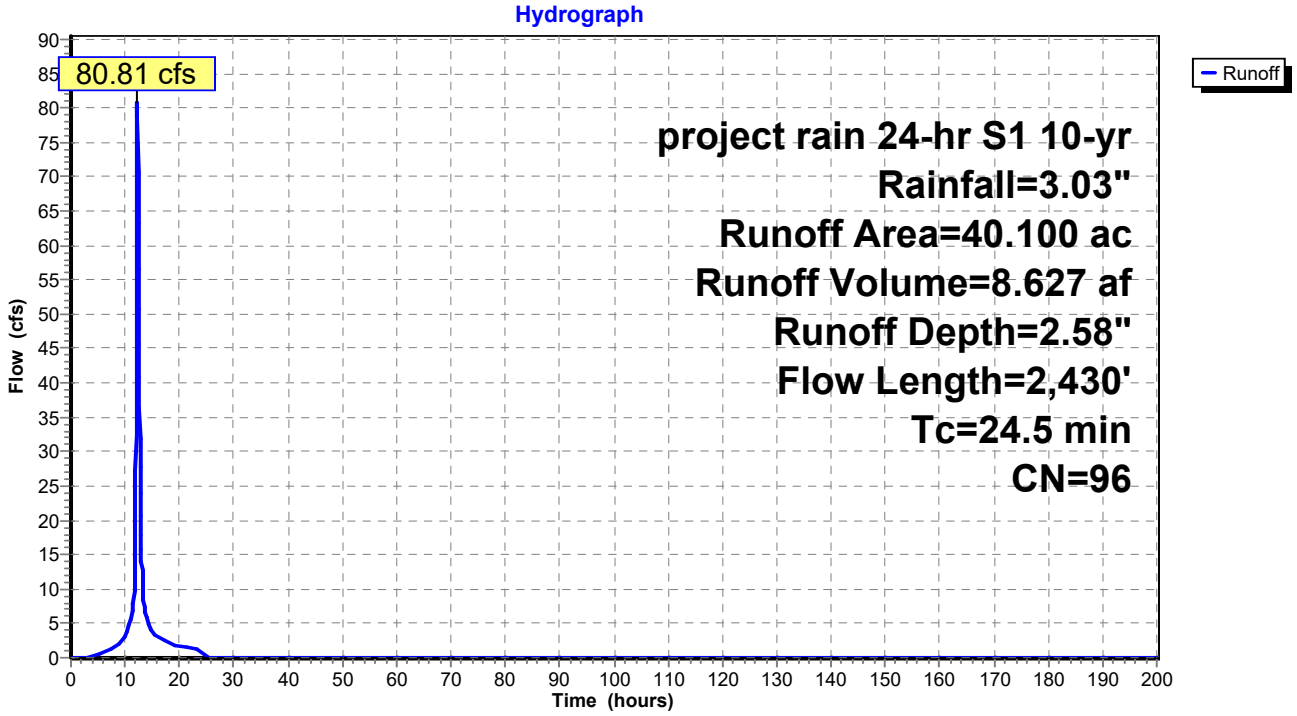
Runoff = 80.81 cfs @ 12.28 hrs, Volume= 8.627 af, Depth= 2.58"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 2.58" for 10-yr event
Inflow = 80.81 cfs @ 12.28 hrs, Volume= 8.627 af
Outflow = 7.62 cfs @ 13.48 hrs, Volume= 8.622 af, Atten= 91%, Lag= 72.1 min
Primary = 7.62 cfs @ 13.48 hrs, Volume= 8.622 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.56' @ 13.48 hrs Surf.Area= 8.606 ac Storage= 4.732 af

Plug-Flow detention time= 294.7 min calculated for 8.622 af (100% of inflow)
Center-of-Mass det. time= 294.2 min (1,086.9 - 792.7)

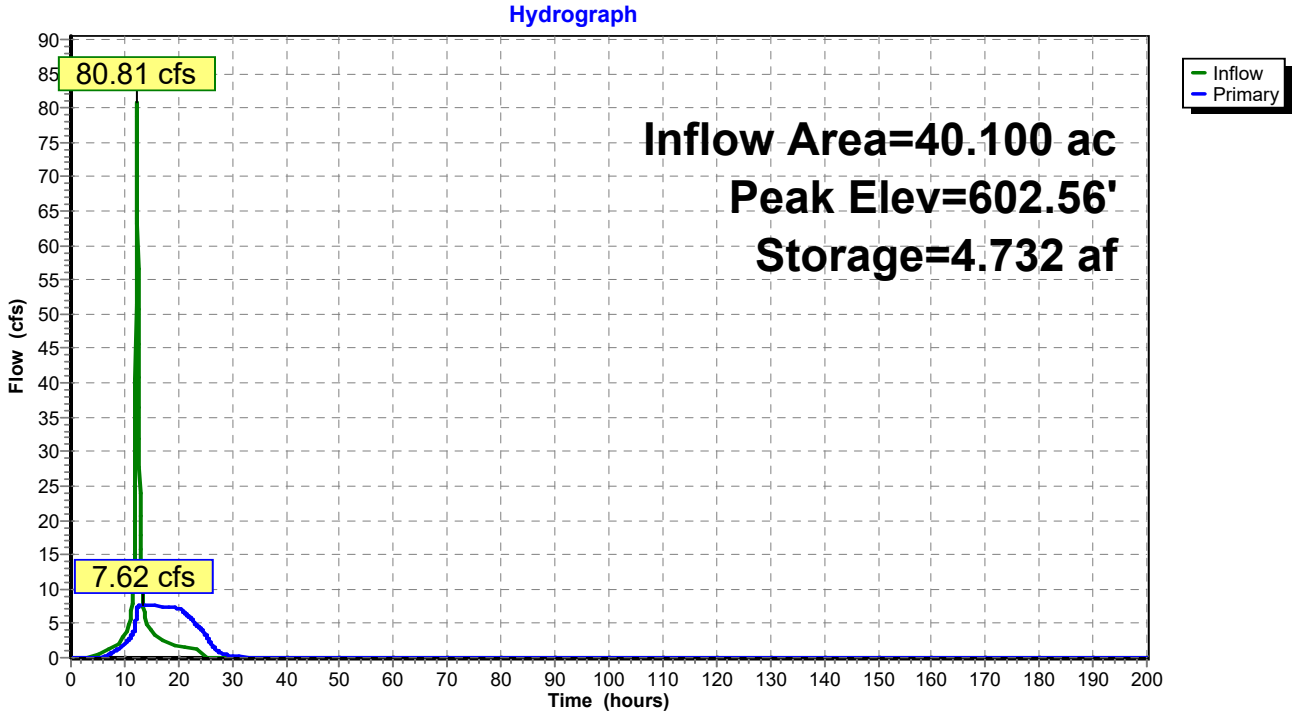
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.62 cfs @ 13.48 hrs HW=602.56' TW=598.30' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.62 cfs of 9.79 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.62 cfs @ 9.70 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

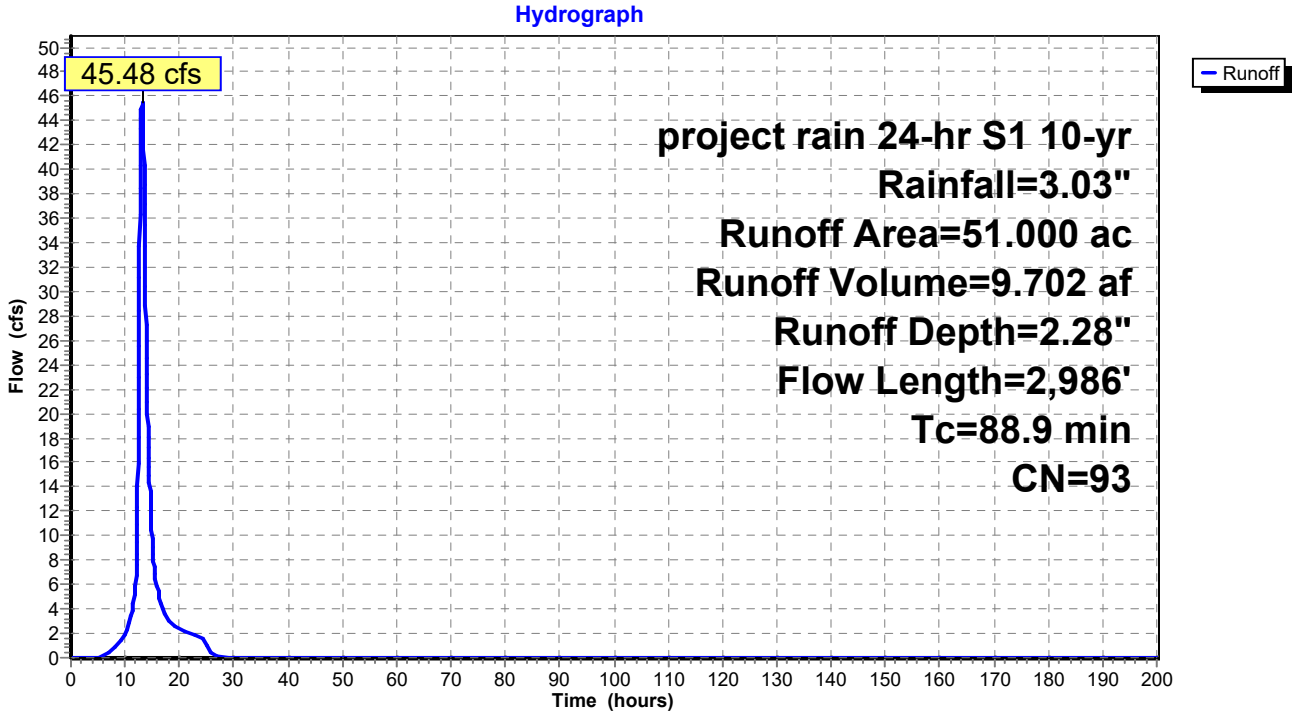
Runoff = 45.48 cfs @ 13.14 hrs, Volume= 9.702 af, Depth= 2.28"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 2.28" for 10-yr event
Inflow = 45.48 cfs @ 13.14 hrs, Volume= 9.702 af
Outflow = 12.34 cfs @ 14.67 hrs, Volume= 9.671 af, Atten= 73%, Lag= 92.1 min
Primary = 12.34 cfs @ 14.67 hrs, Volume= 9.671 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 601.25' @ 14.67 hrs Surf.Area= 1.000 ac Storage= 4.796 af

Plug-Flow detention time= 293.0 min calculated for 9.671 af (100% of inflow)
Center-of-Mass det. time= 290.8 min (1,162.4 - 871.6)

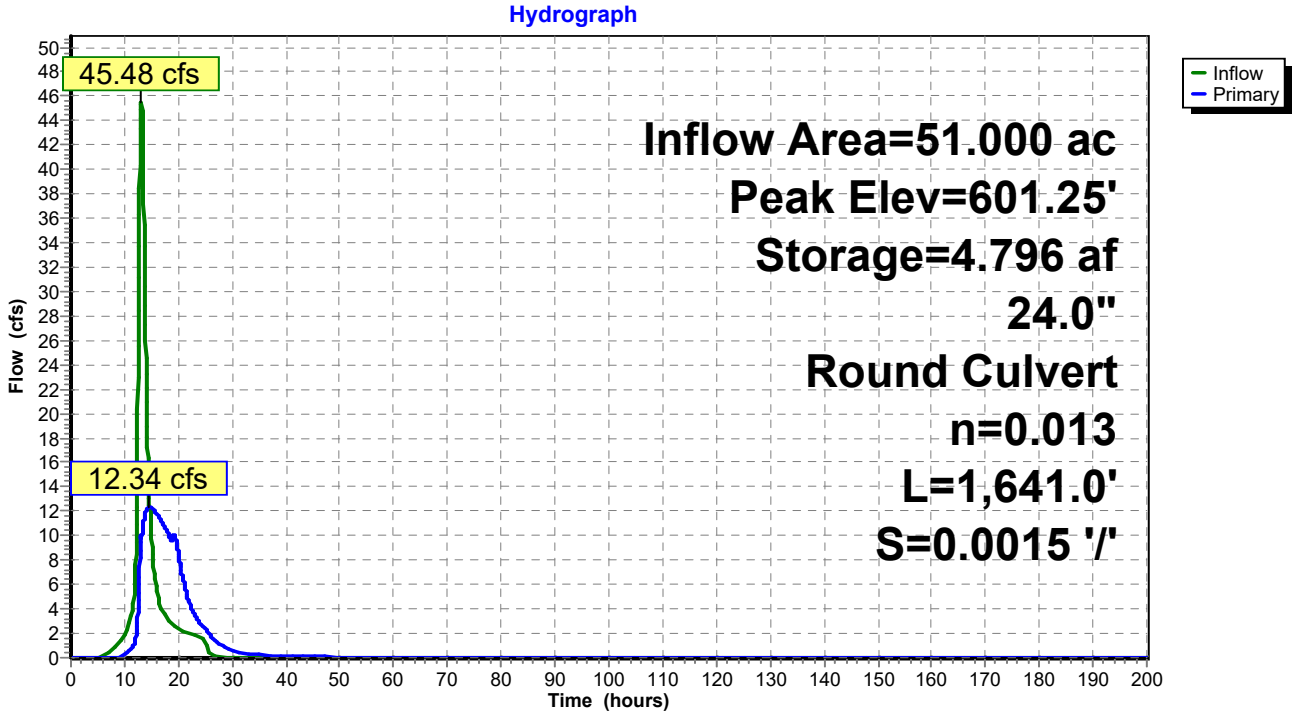
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.34 cfs @ 14.67 hrs HW=601.25' TW=584.15' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 12.34 cfs @ 3.93 fps)

Pond 05: Ex Collection Sump



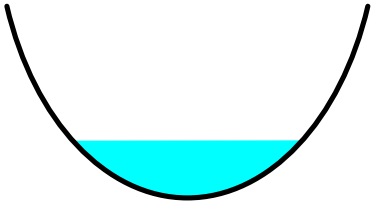
Summary for Reach 06a: Reach A Upper

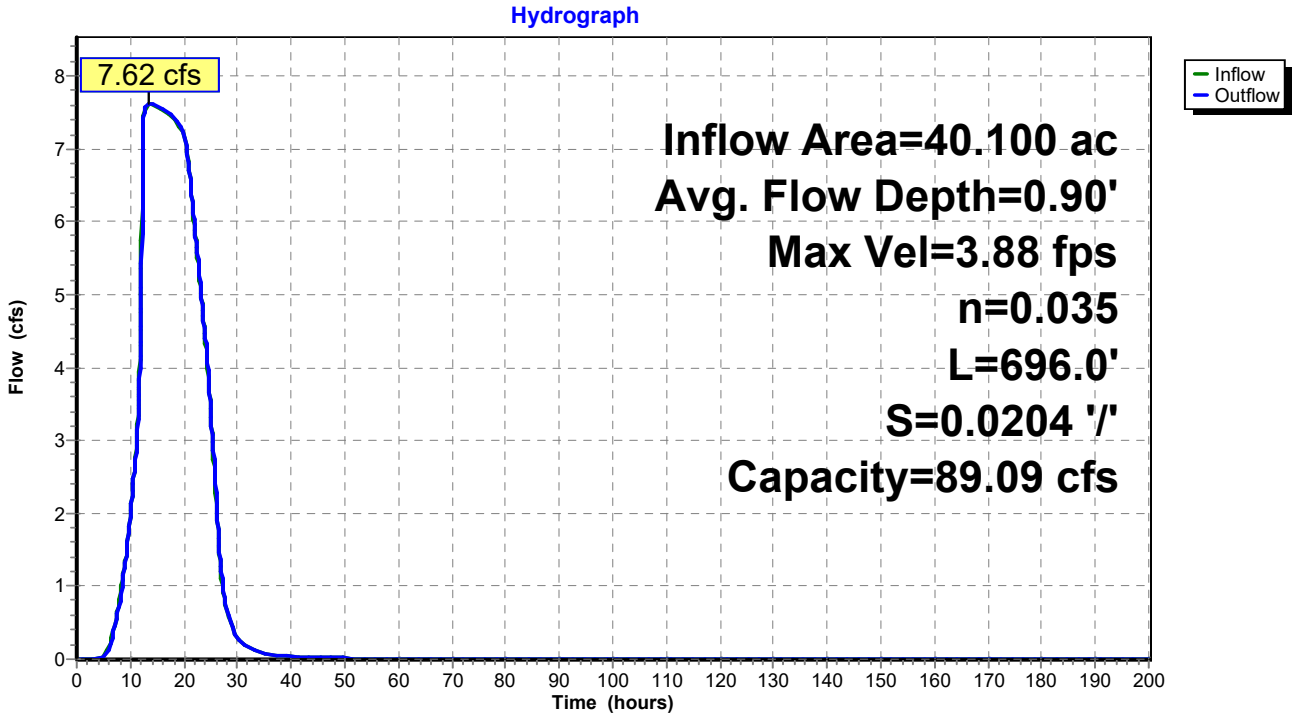
Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 2.58" for 10-yr event
Inflow = 7.62 cfs @ 13.48 hrs, Volume= 8.622 af
Outflow = 7.62 cfs @ 13.52 hrs, Volume= 8.622 af, Atten= 0%, Lag= 2.3 min
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.88 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 14.2 min

Peak Storage= 1,368 cf @ 13.52 hrs
Average Depth at Peak Storage= 0.90' , Surface Width= 3.28'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'





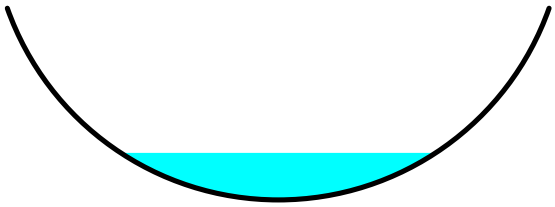
Summary for Reach 06b: Reach A Lower

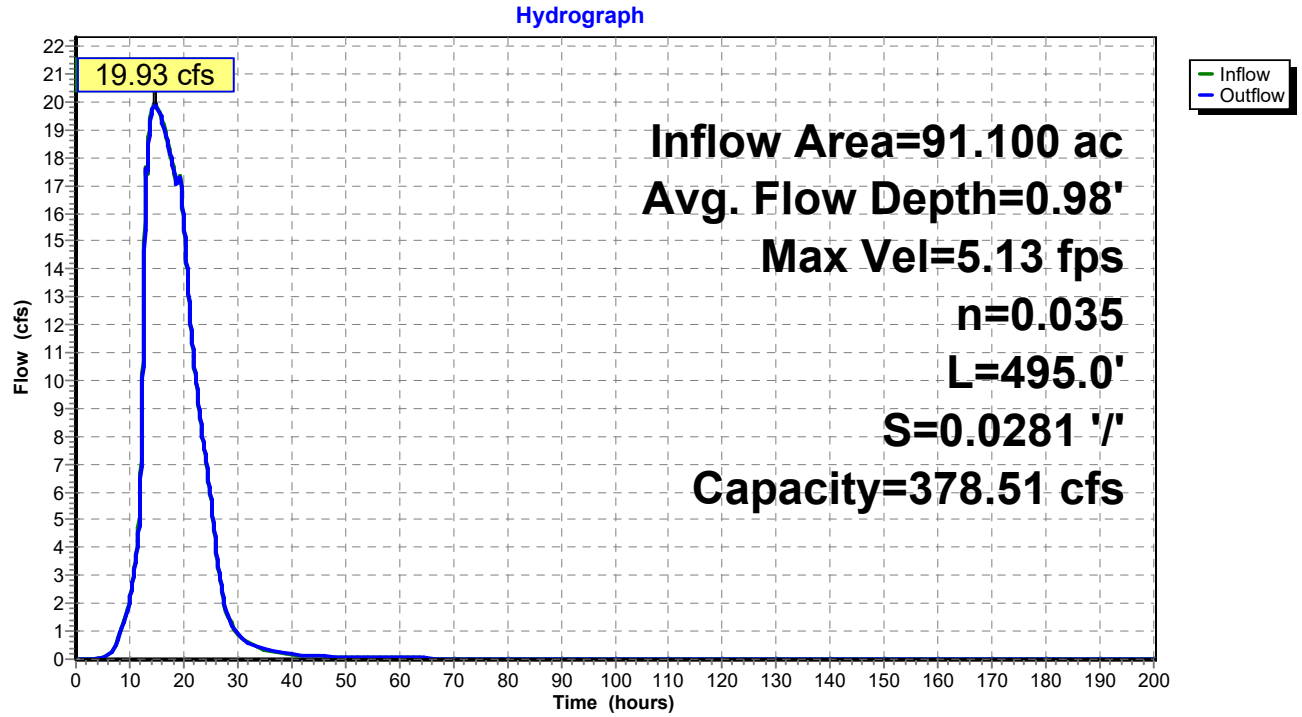
Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 2.41" for 10-yr event
Inflow = 19.93 cfs @ 14.64 hrs, Volume= 18.292 af
Outflow = 19.93 cfs @ 14.66 hrs, Volume= 18.292 af, Atten= 0%, Lag= 1.2 min
Routed to Link 07 : Ex Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.13 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 7.5 min

Peak Storage= 1,922 cf @ 14.66 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 5.94'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



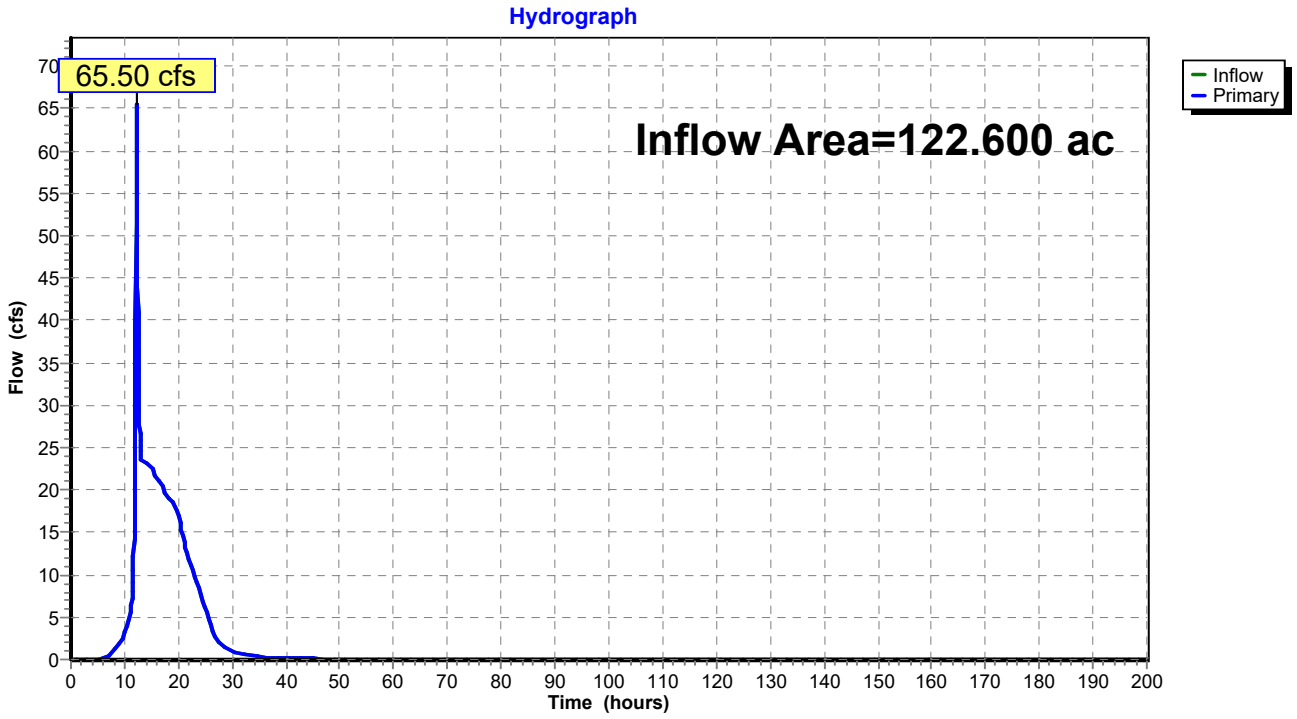


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 2.29" for 10-yr event
Inflow = 65.50 cfs @ 12.21 hrs, Volume= 23.350 af
Primary = 65.50 cfs @ 12.21 hrs, Volume= 23.350 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

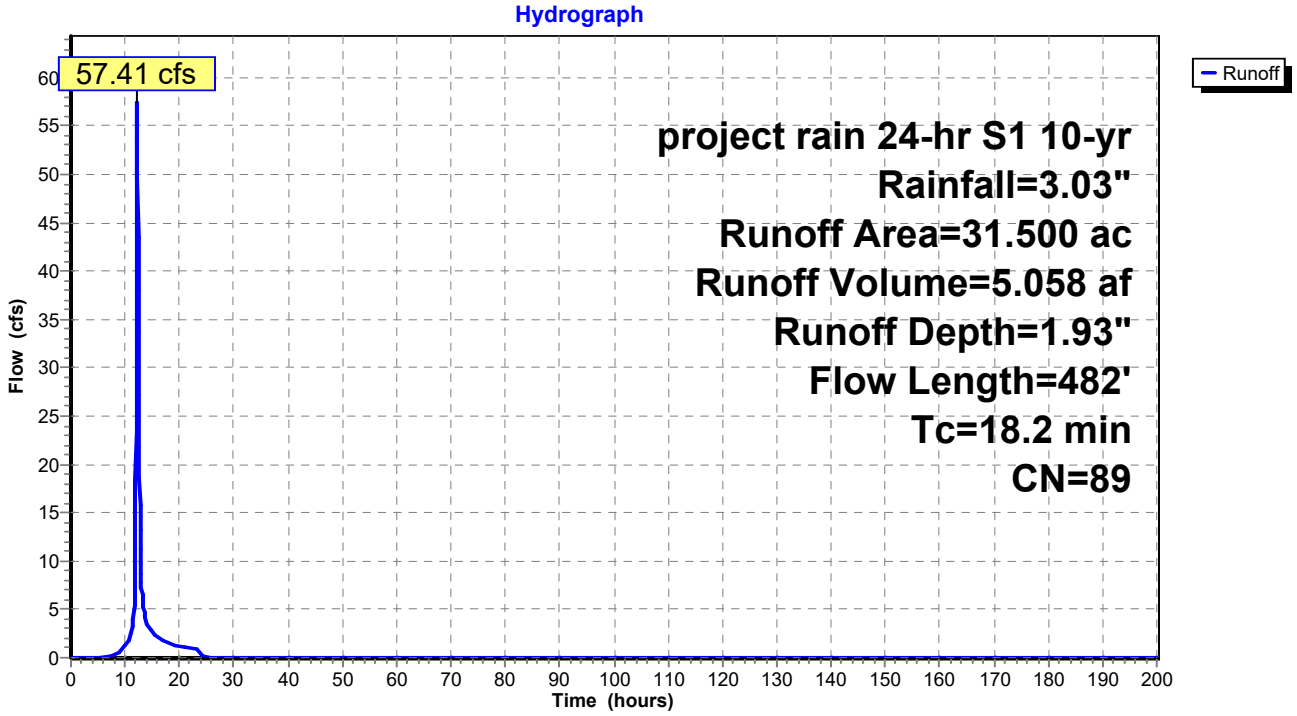
Runoff = 57.41 cfs @ 12.21 hrs, Volume= 5.058 af, Depth= 1.93"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

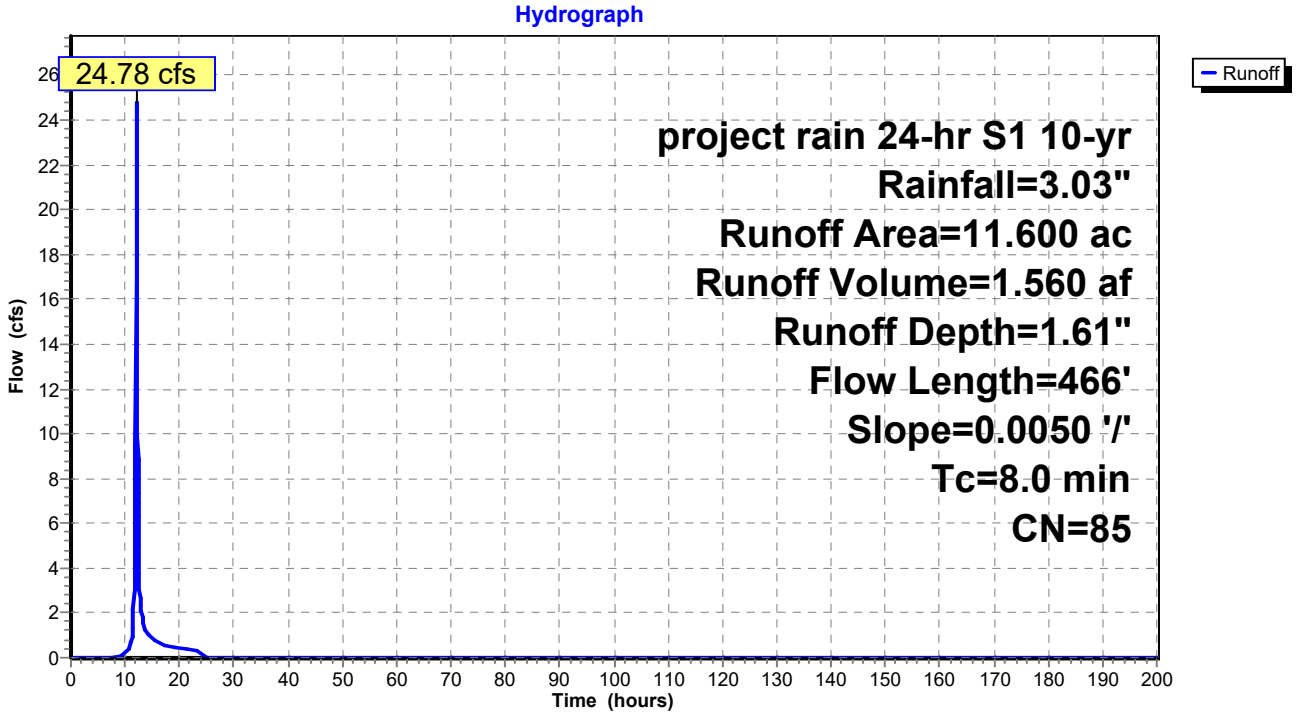
Runoff = 24.78 cfs @ 12.07 hrs, Volume= 1.560 af, Depth= 1.61"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

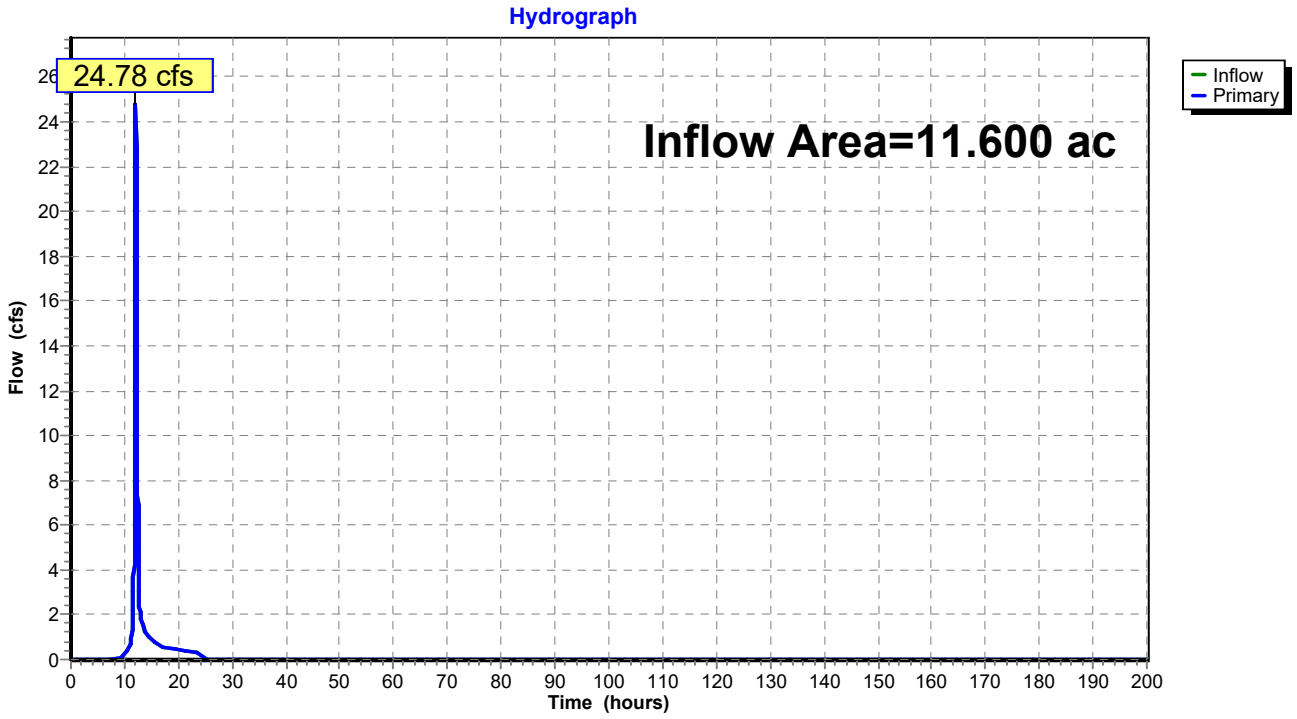


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 1.61" for 10-yr event
Inflow = 24.78 cfs @ 12.07 hrs, Volume= 1.560 af
Primary = 24.78 cfs @ 12.07 hrs, Volume= 1.560 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

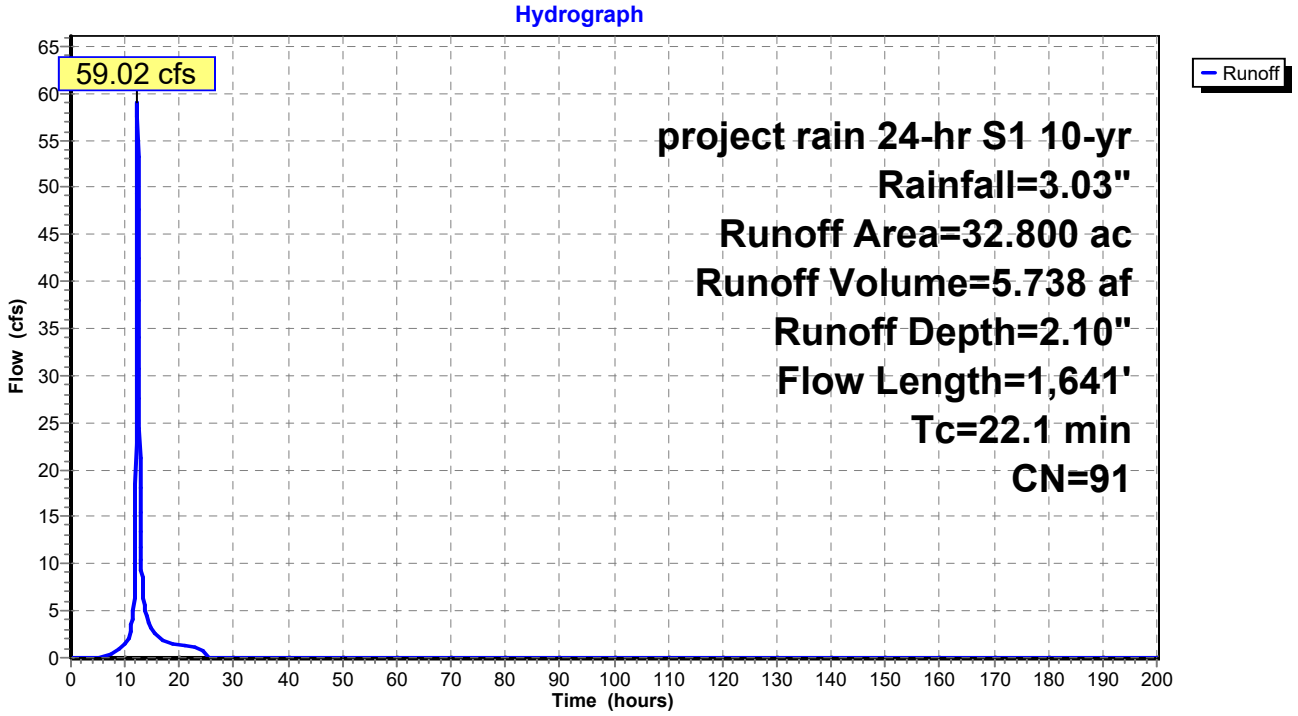
Runoff = 59.02 cfs @ 12.26 hrs, Volume= 5.738 af, Depth= 2.10"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

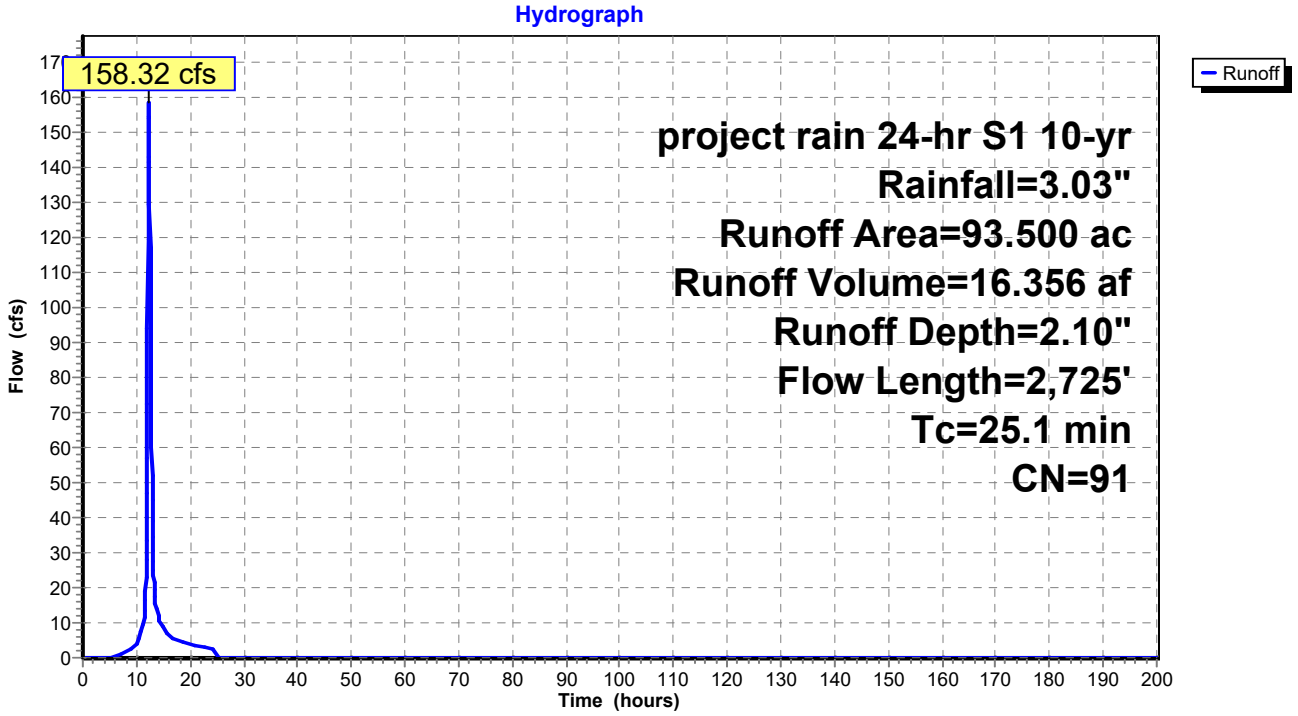
Runoff = 158.32 cfs @ 12.30 hrs, Volume= 16.356 af, Depth= 2.10"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 2.10" for 10-yr event
Inflow = 158.32 cfs @ 12.30 hrs, Volume= 16.356 af
Outflow = 5.74 cfs @ 16.75 hrs, Volume= 16.154 af, Atten= 96%, Lag= 267.3 min
Primary = 5.74 cfs @ 16.75 hrs, Volume= 16.154 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 593.03' @ 16.75 hrs Surf.Area= 337,610 sf Storage= 1,184,563 cf (511,982 cf above start)

Plug-Flow detention time= 6,035.1 min calculated for 0.713 af (4% of inflow)
Center-of-Mass det. time= 1,259.9 min (2,082.3 - 822.3)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

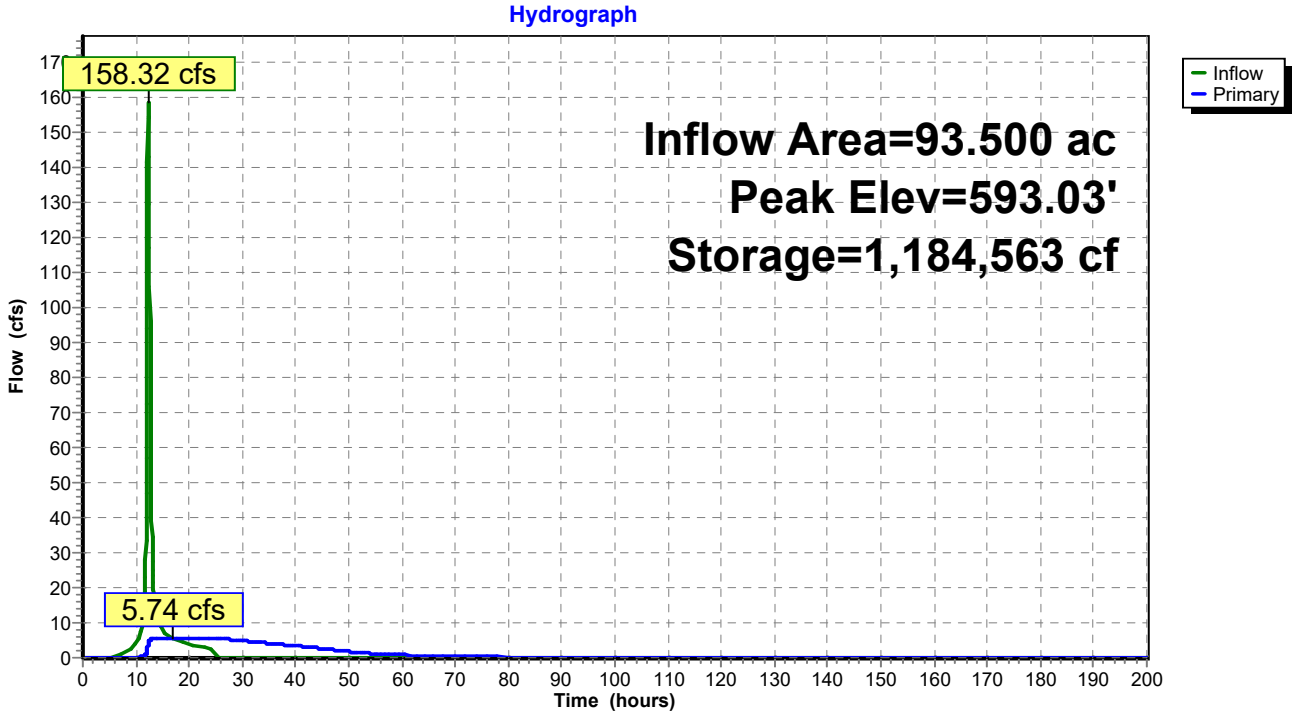
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.74 cfs @ 16.75 hrs HW=593.03' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 5.74 cfs @ 4.68 fps)
  - **2=Culvert** (Passes 5.74 cfs of 6.02 cfs potential flow)
  - **3=Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

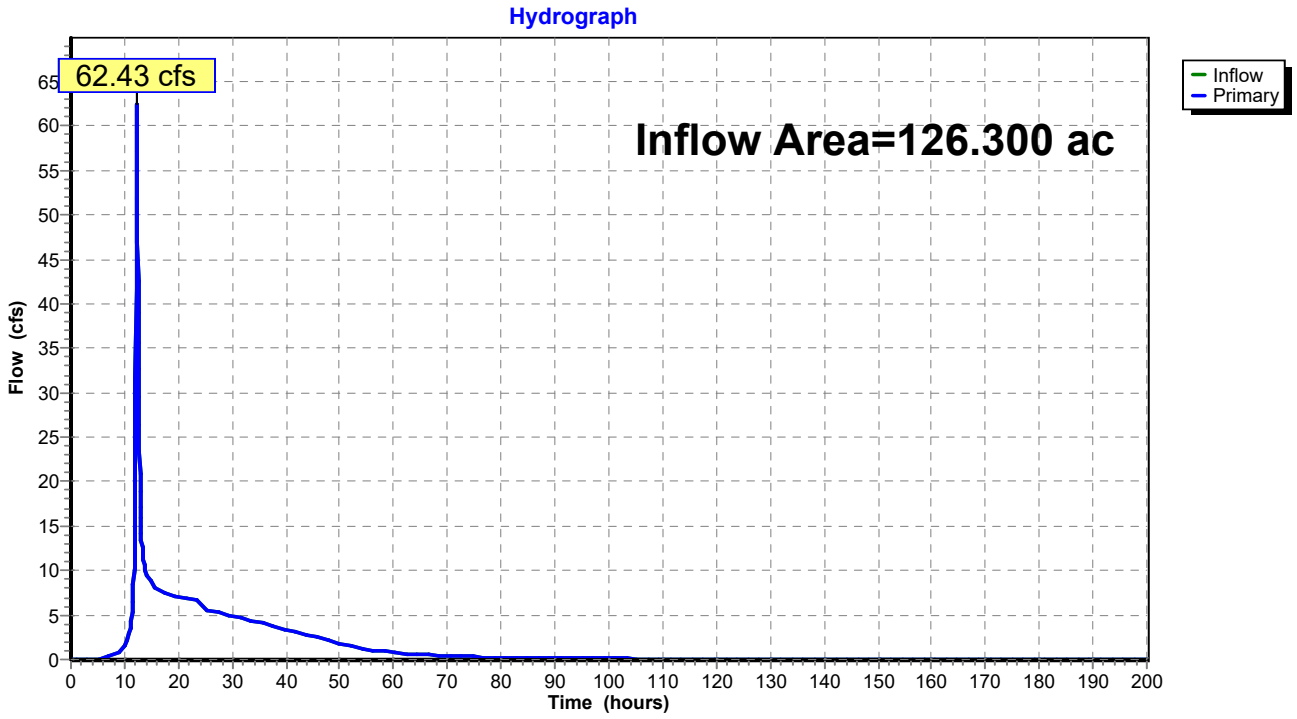


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 2.08" for 10-yr event
Inflow = 62.43 cfs @ 12.26 hrs, Volume= 21.892 af
Primary = 62.43 cfs @ 12.26 hrs, Volume= 21.892 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

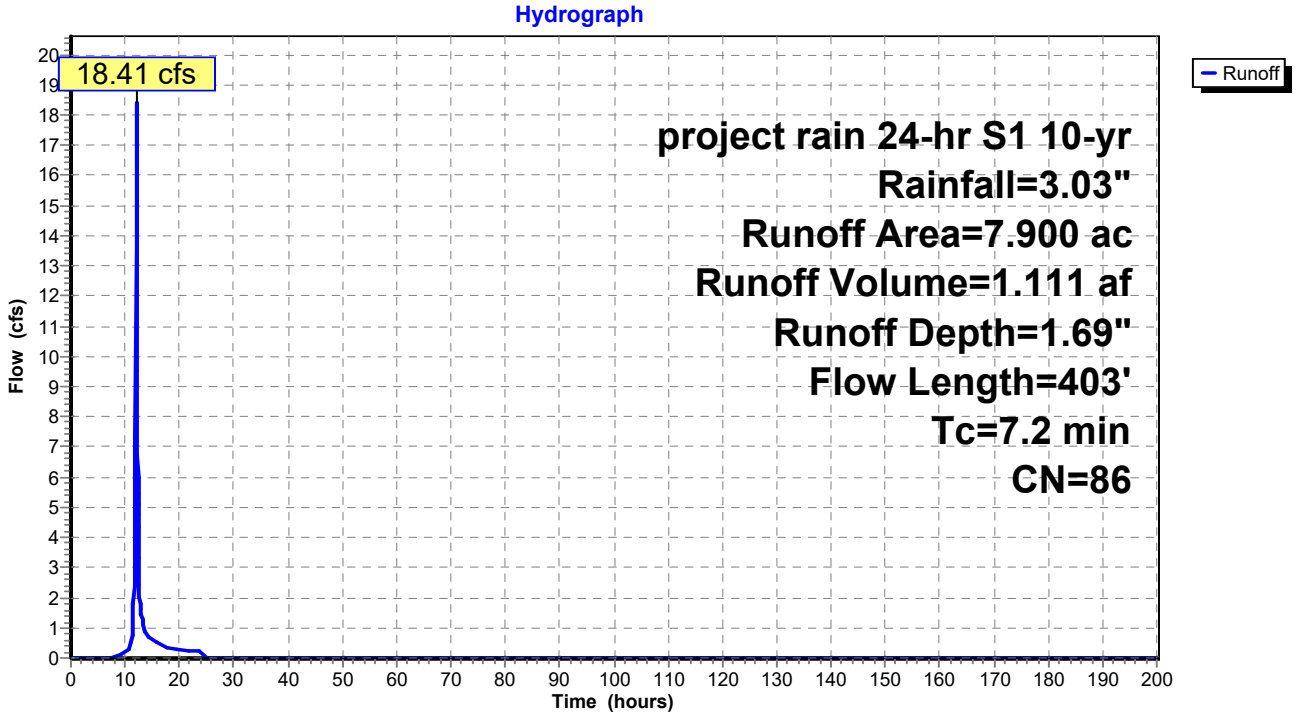
Runoff = 18.41 cfs @ 12.06 hrs, Volume= 1.111 af, Depth= 1.69"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 10-yr Rainfall=3.03"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

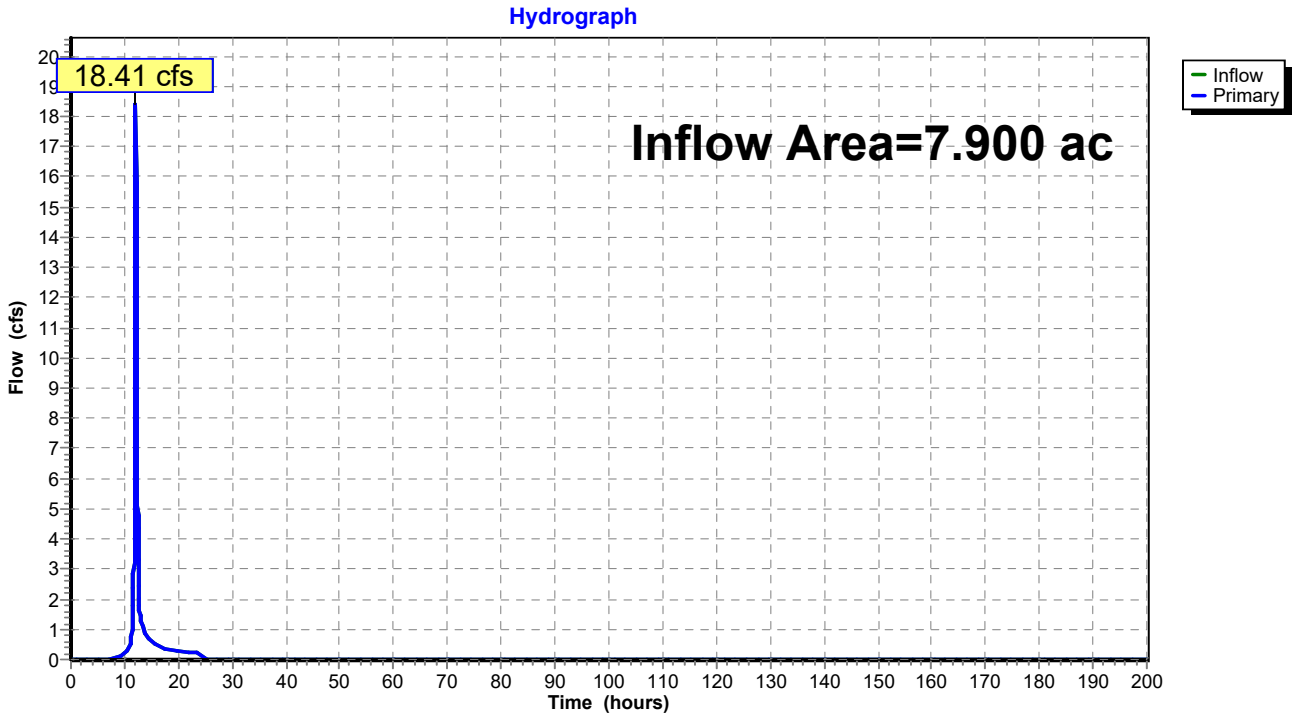


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 1.69" for 10-yr event
Inflow = 18.41 cfs @ 12.06 hrs, Volume= 1.111 af
Primary = 18.41 cfs @ 12.06 hrs, Volume= 1.111 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

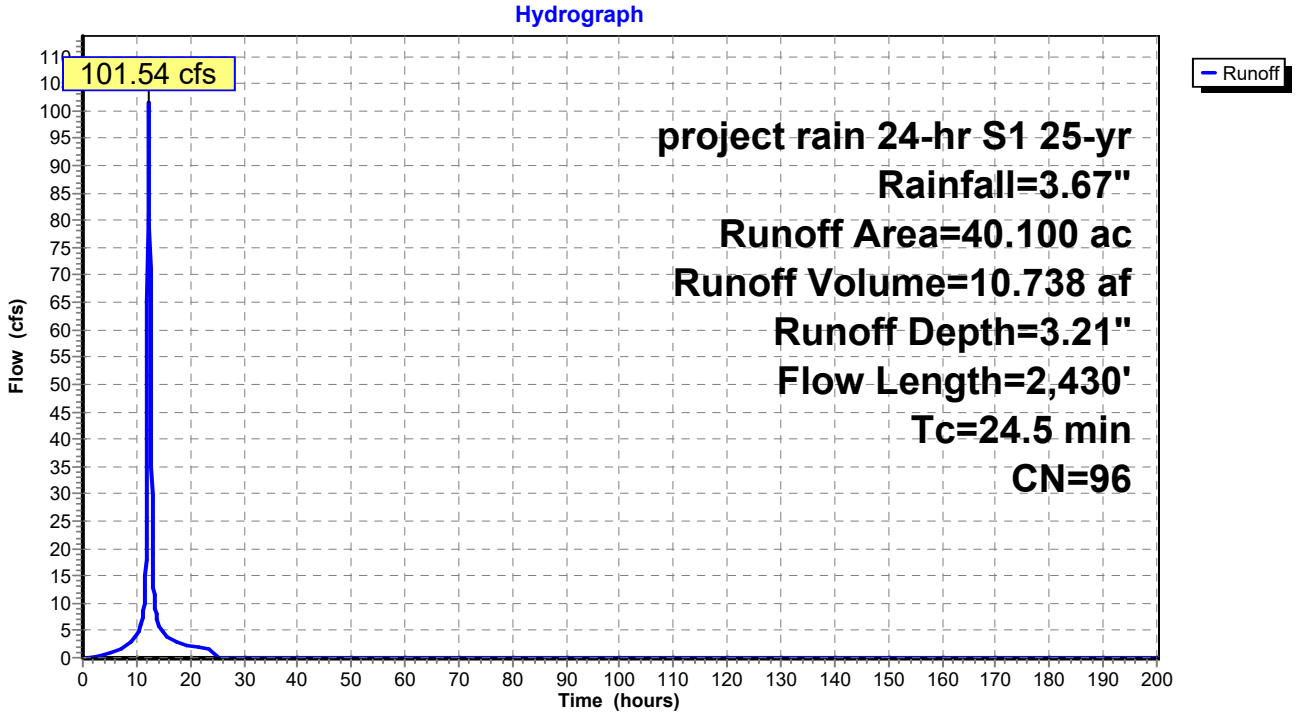
Runoff = 101.54 cfs @ 12.28 hrs, Volume= 10.738 af, Depth= 3.21"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 3.21" for 25-yr event
Inflow = 101.54 cfs @ 12.28 hrs, Volume= 10.738 af
Outflow = 7.75 cfs @ 13.71 hrs, Volume= 10.733 af, Atten= 92%, Lag= 85.8 min
Primary = 7.75 cfs @ 13.71 hrs, Volume= 10.733 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.70' @ 13.71 hrs Surf.Area= 10.752 ac Storage= 6.176 af

Plug-Flow detention time= 360.5 min calculated for 10.730 af (100% of inflow)
Center-of-Mass det. time= 362.2 min (1,148.8 - 786.6)

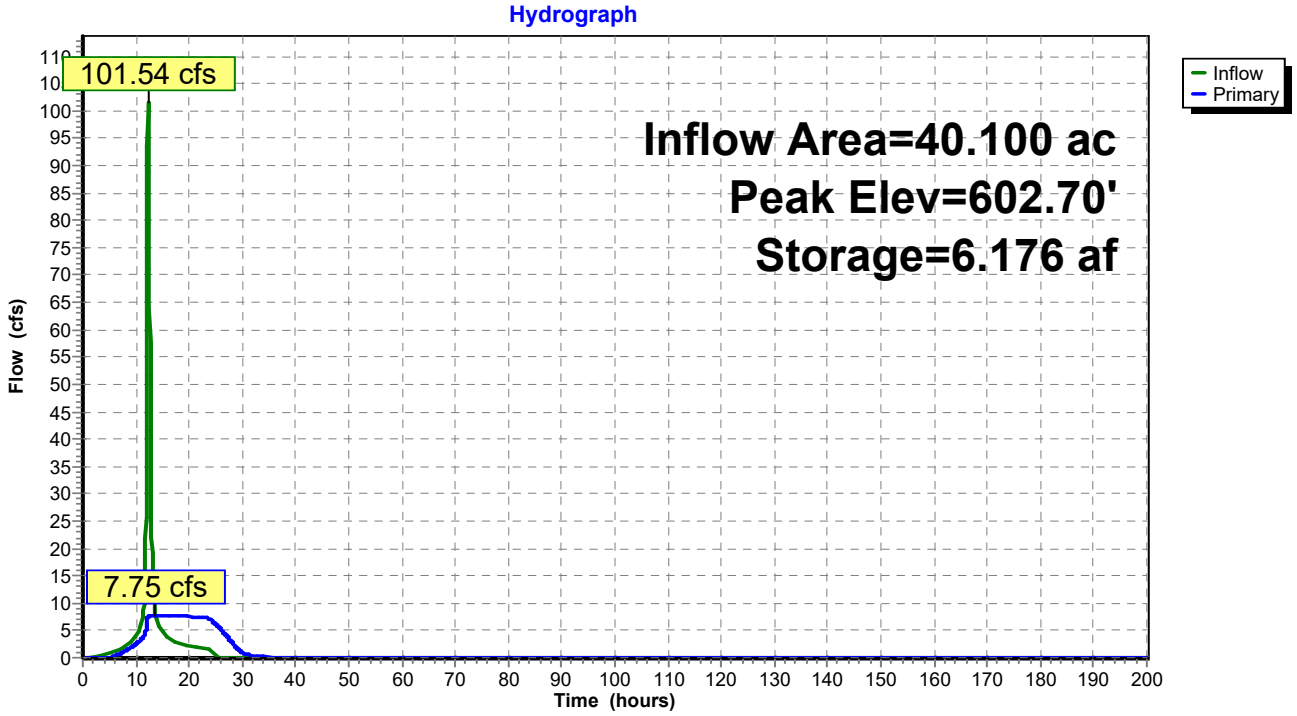
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.75 cfs @ 13.71 hrs HW=602.70' TW=598.31' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.75 cfs of 9.98 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.75 cfs @ 9.87 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

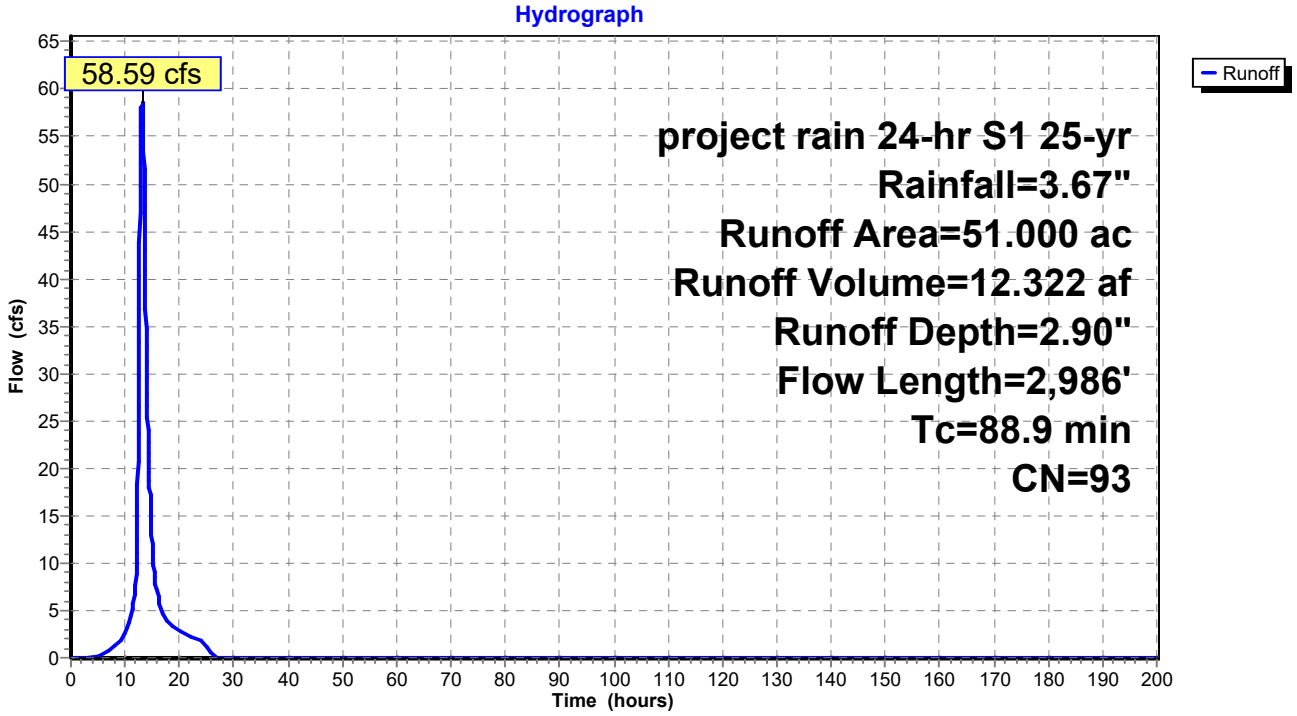
Runoff = 58.59 cfs @ 13.13 hrs, Volume= 12.322 af, Depth= 2.90"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 2.90" for 25-yr event
Inflow = 58.59 cfs @ 13.13 hrs, Volume= 12.322 af
Outflow = 12.90 cfs @ 14.89 hrs, Volume= 12.291 af, Atten= 78%, Lag= 105.0 min
Primary = 12.90 cfs @ 14.89 hrs, Volume= 12.291 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 601.73' @ 14.89 hrs Surf.Area= 11.283 ac Storage= 6.485 af

Plug-Flow detention time= 313.5 min calculated for 12.291 af (100% of inflow)
Center-of-Mass det. time= 311.8 min (1,175.6 - 863.9)

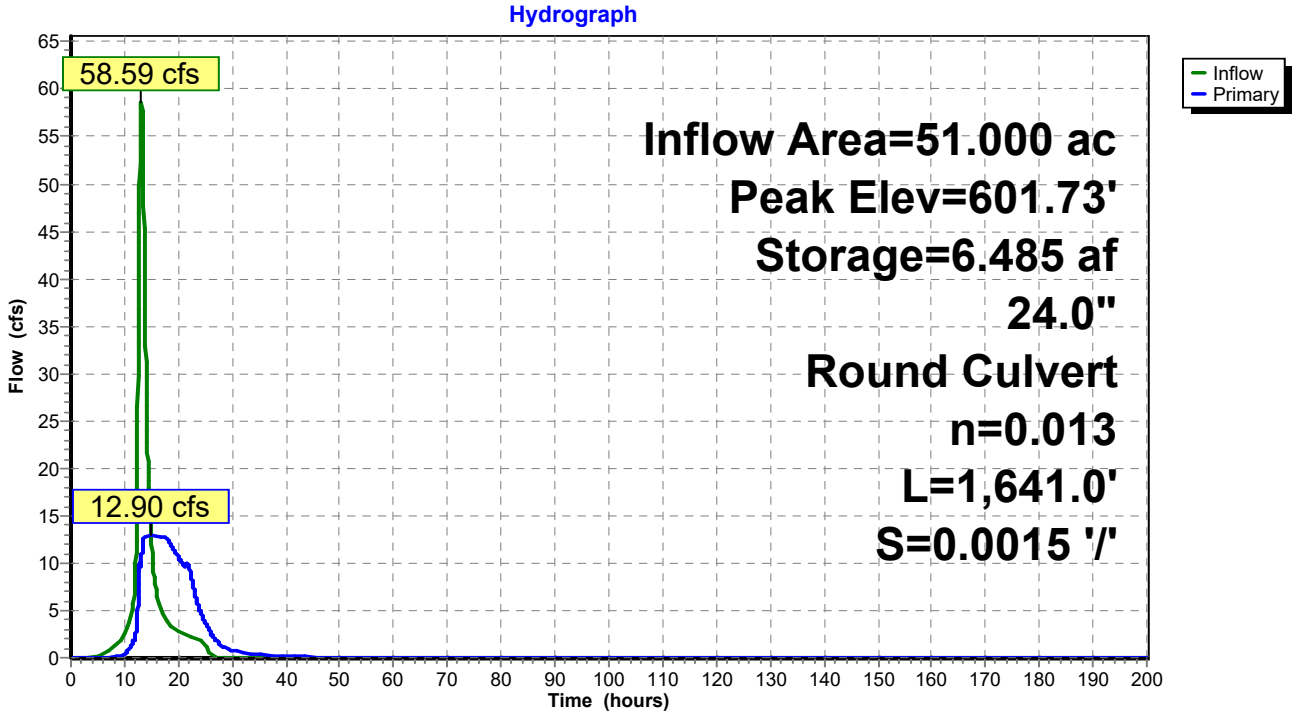
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.90 cfs @ 14.89 hrs HW=601.73' TW=584.17' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 12.90 cfs @ 4.10 fps)

Pond 05: Ex Collection Sump



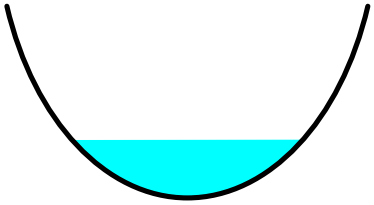
Summary for Reach 06a: Reach A Upper

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 3.21" for 25-yr event
Inflow = 7.75 cfs @ 13.71 hrs, Volume= 10.733 af
Outflow = 7.75 cfs @ 13.75 hrs, Volume= 10.733 af, Atten= 0%, Lag= 2.2 min
Routed to Reach 06b : Reach A Lower

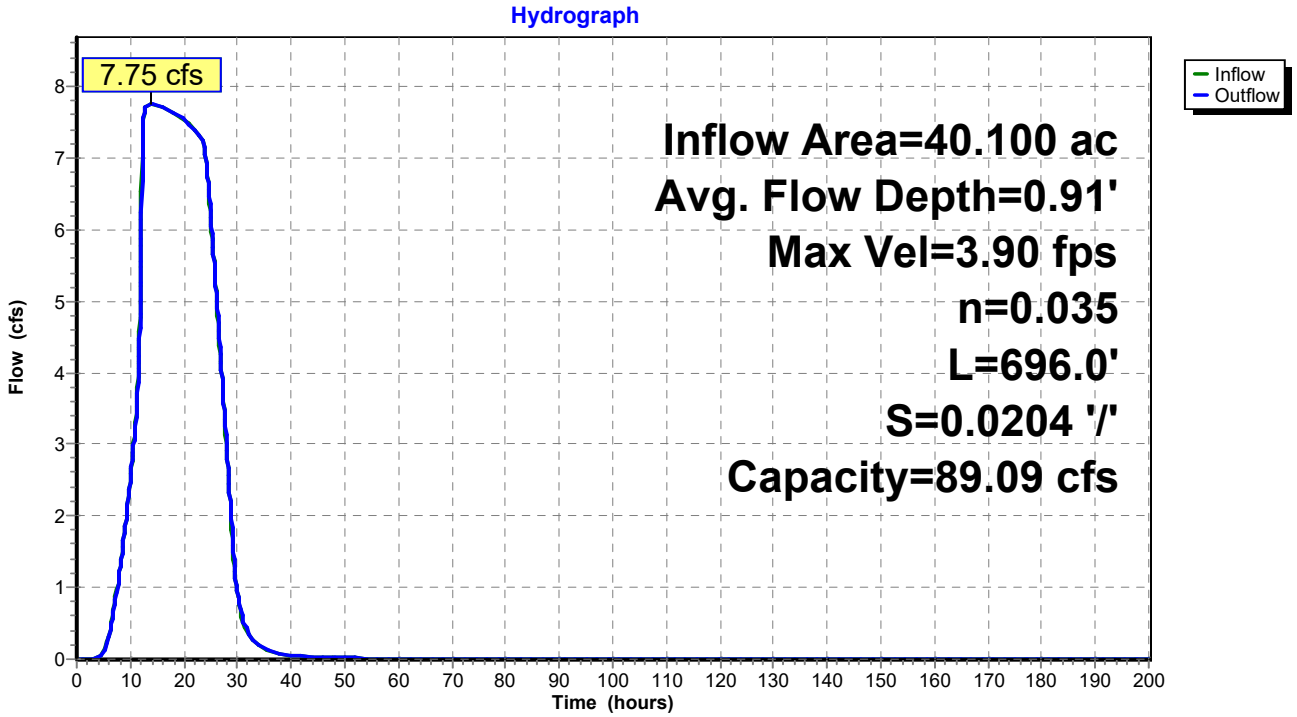
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.90 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 13.3 min

Peak Storage= 1,386 cf @ 13.75 hrs
Average Depth at Peak Storage= 0.91' , Surface Width= 3.30'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'



Reach 06a: Reach A Upper



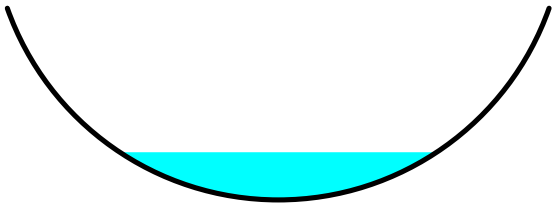
Summary for Reach 06b: Reach A Lower

Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 3.03" for 25-yr event
Inflow = 20.64 cfs @ 14.69 hrs, Volume= 23.024 af
Outflow = 20.64 cfs @ 14.71 hrs, Volume= 23.024 af, Atten= 0%, Lag= 1.2 min
Routed to Link 07 : Ex Analysis Point A

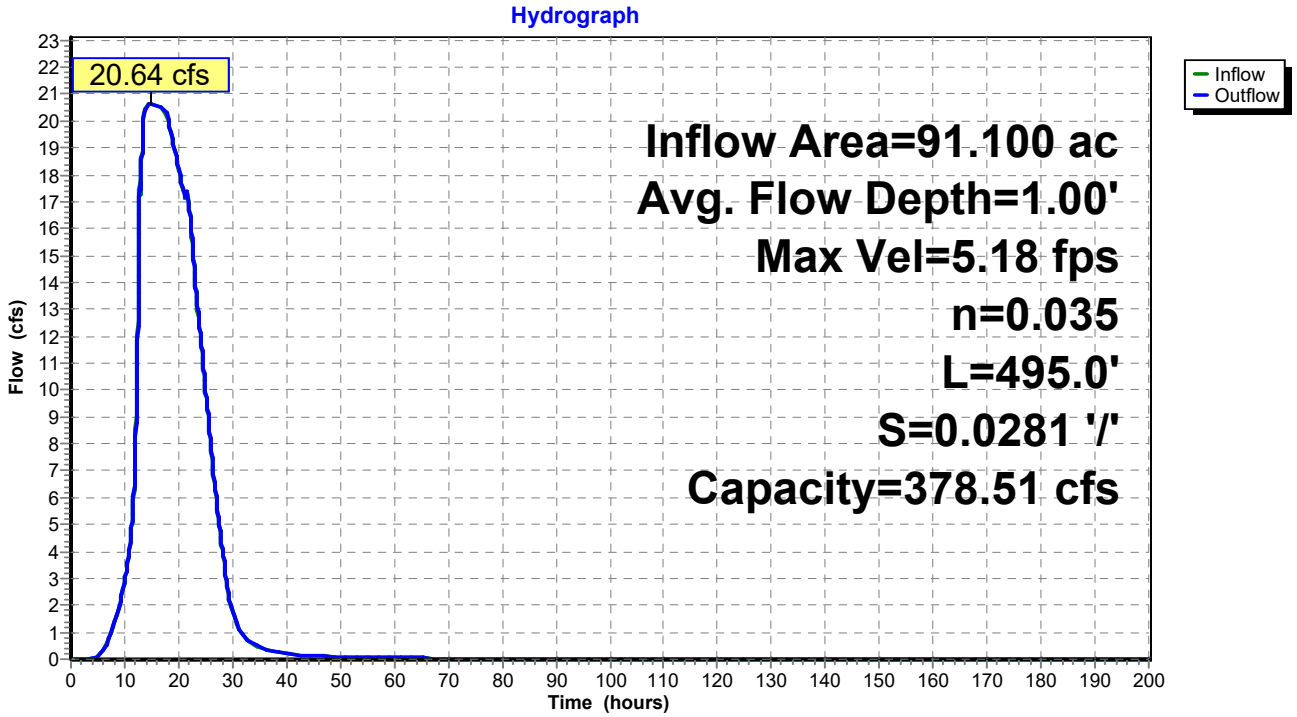
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.18 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 7.2 min

Peak Storage= 1,970 cf @ 14.71 hrs
Average Depth at Peak Storage= 1.00' , Surface Width= 5.99'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



Reach 06b: Reach A Lower

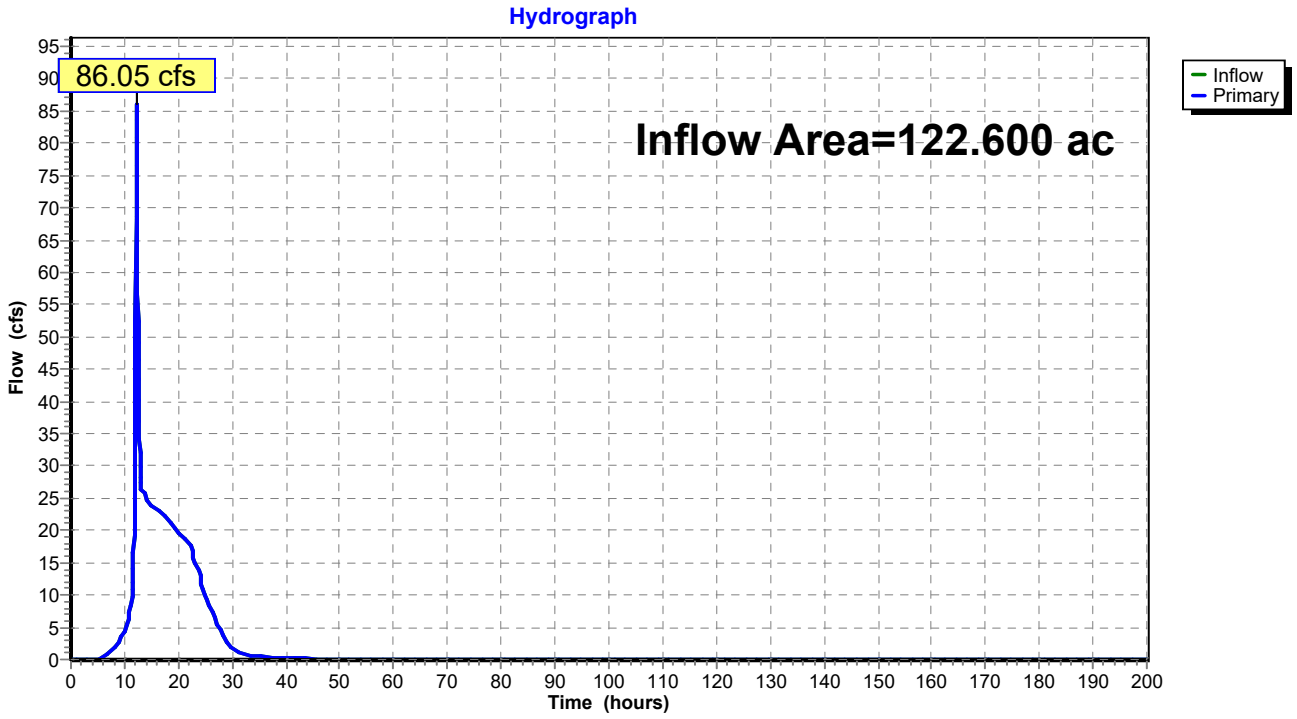


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 2.90" for 25-yr event
Inflow = 86.05 cfs @ 12.21 hrs, Volume= 29.625 af
Primary = 86.05 cfs @ 12.21 hrs, Volume= 29.625 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

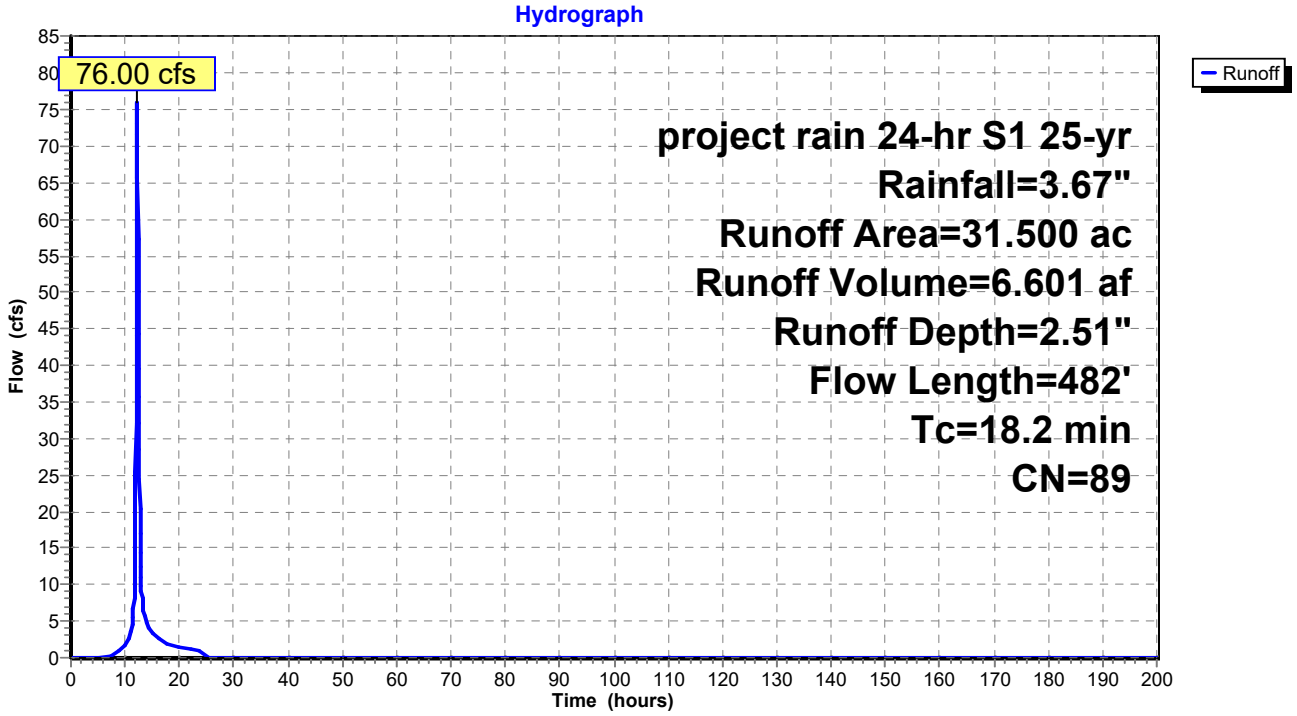
Runoff = 76.00 cfs @ 12.21 hrs, Volume= 6.601 af, Depth= 2.51"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

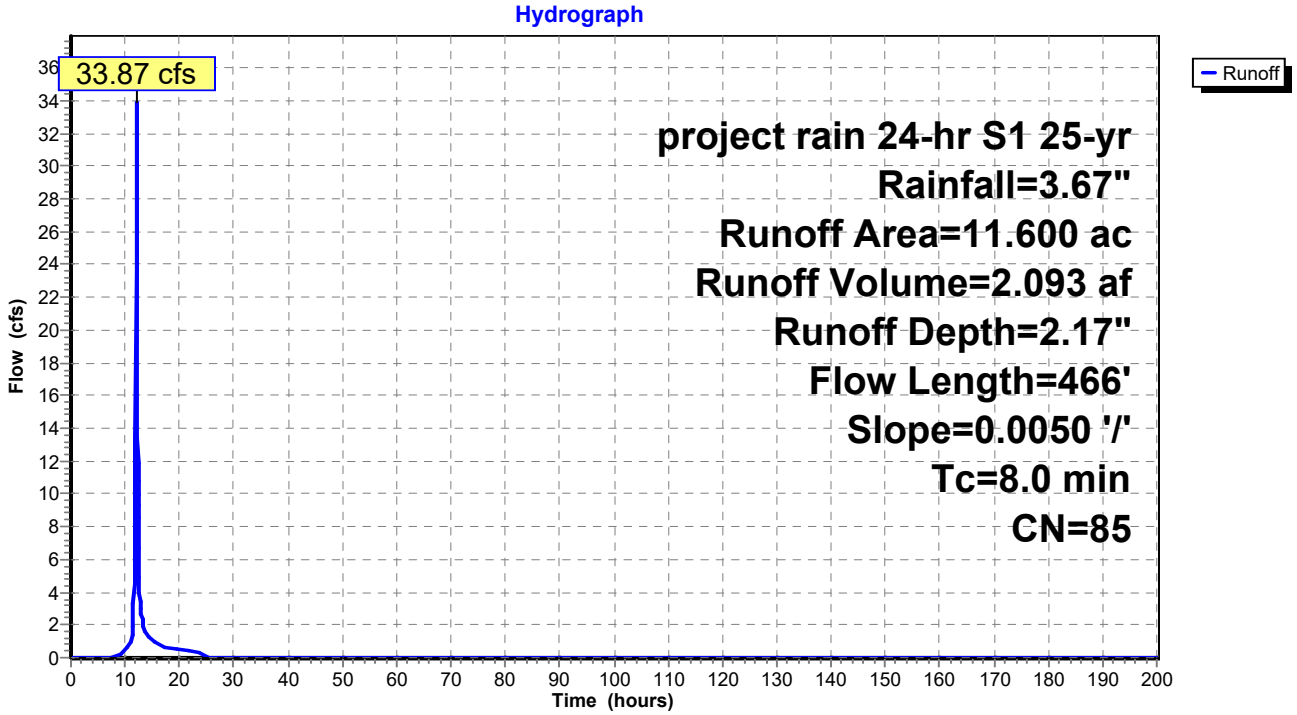
Runoff = 33.87 cfs @ 12.07 hrs, Volume= 2.093 af, Depth= 2.17"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

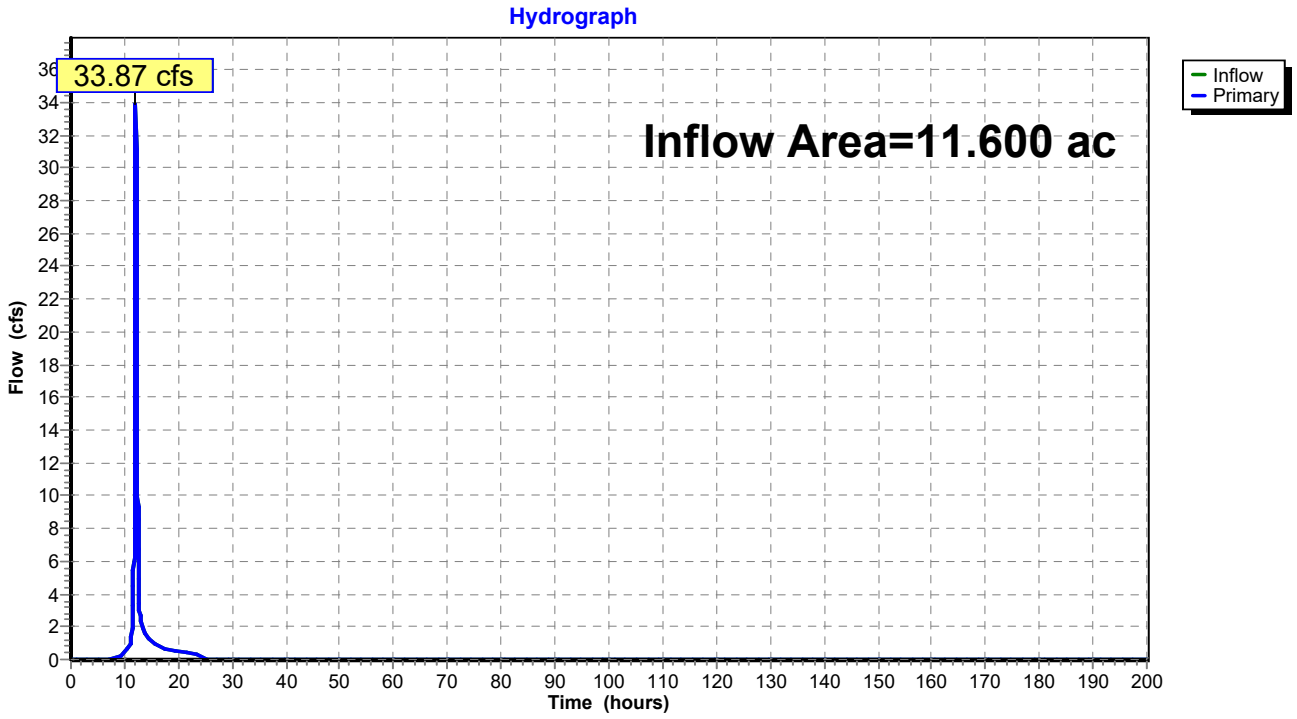


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 2.17" for 25-yr event
Inflow = 33.87 cfs @ 12.07 hrs, Volume= 2.093 af
Primary = 33.87 cfs @ 12.07 hrs, Volume= 2.093 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

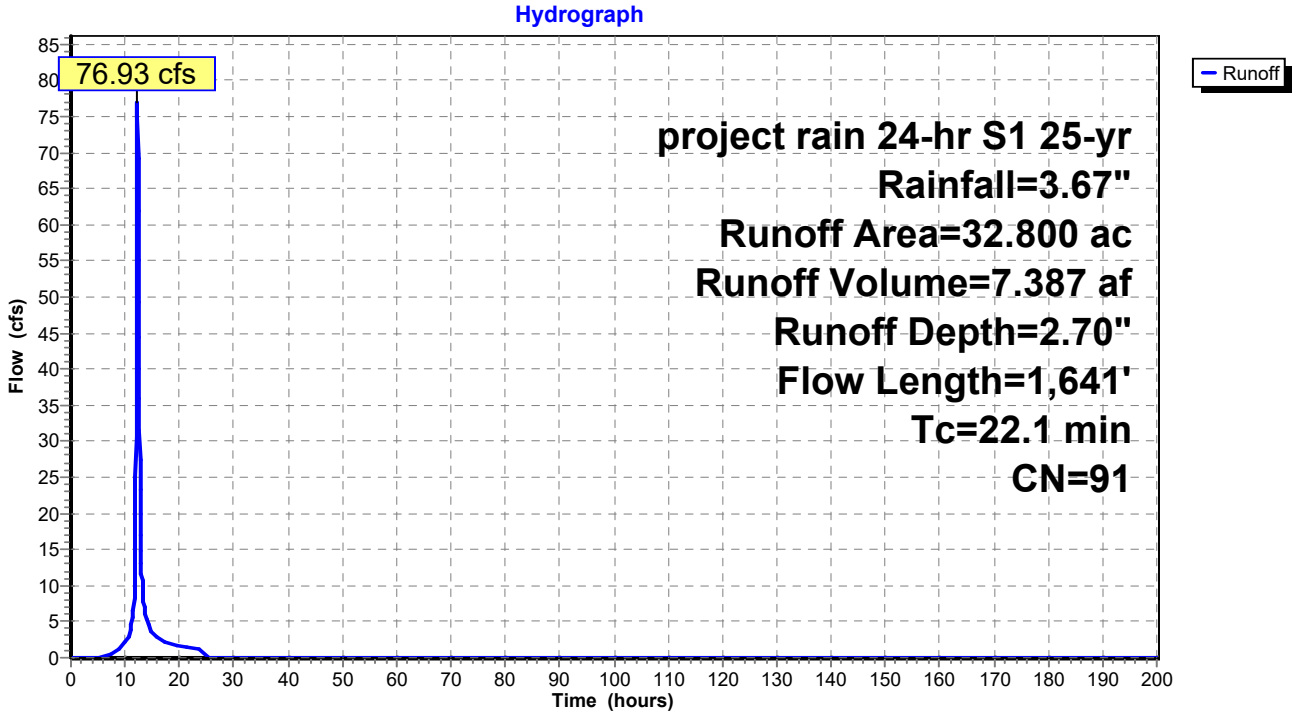
Runoff = 76.93 cfs @ 12.26 hrs, Volume= 7.387 af, Depth= 2.70"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

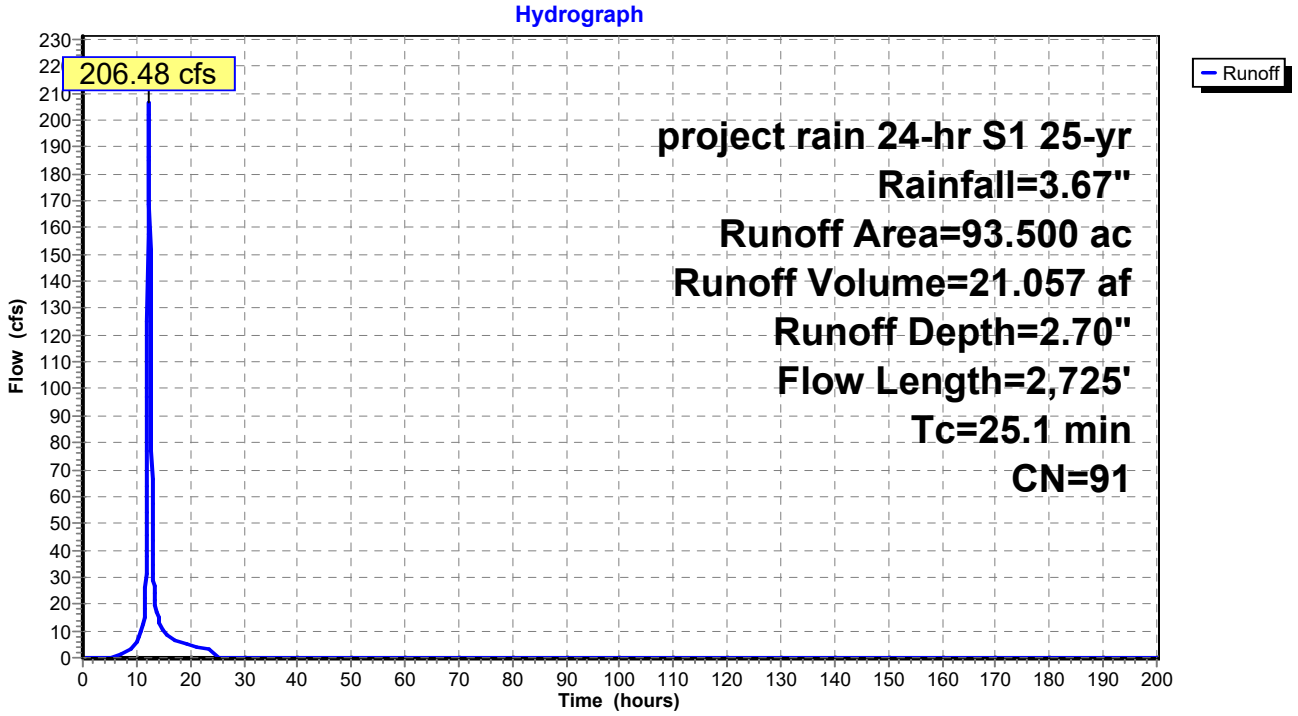
Runoff = 206.48 cfs @ 12.30 hrs, Volume= 21.057 af, Depth= 2.70"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 2.70" for 25-yr event
Inflow = 206.48 cfs @ 12.30 hrs, Volume= 21.057 af
Outflow = 6.11 cfs @ 17.54 hrs, Volume= 20.842 af, Atten= 97%, Lag= 314.8 min
Primary = 6.11 cfs @ 17.54 hrs, Volume= 20.842 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 593.92' @ 17.54 hrs Surf.Area= 349,979 sf Storage= 1,359,098 cf (686,517 cf above start)

Plug-Flow detention time= 3,221.5 min calculated for 5.402 af (26% of inflow)
Center-of-Mass det. time= 1,425.6 min (2,239.4 - 813.8)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

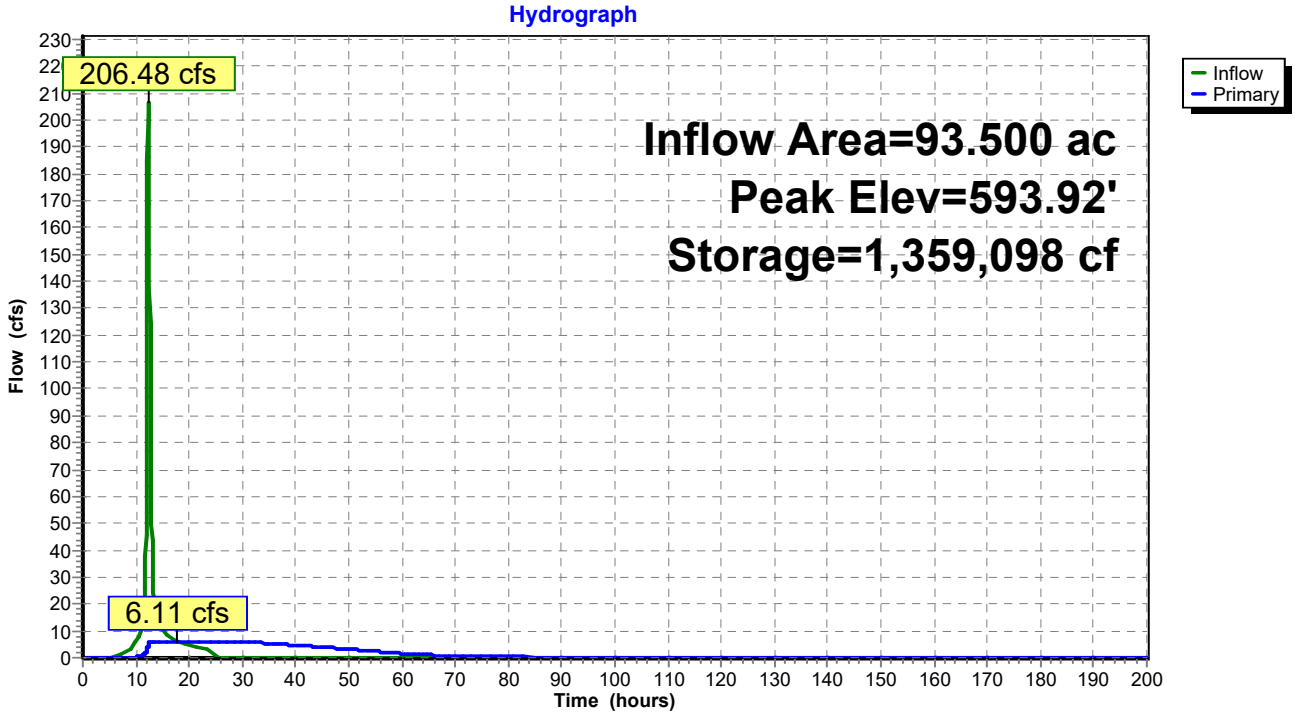
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.11 cfs @ 17.54 hrs HW=593.92' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 6.11 cfs @ 4.98 fps)
  - **2=Culvert** (Passes 6.11 cfs of 7.00 cfs potential flow)
  - **3=Grate** (Controls 0.00 cfs)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

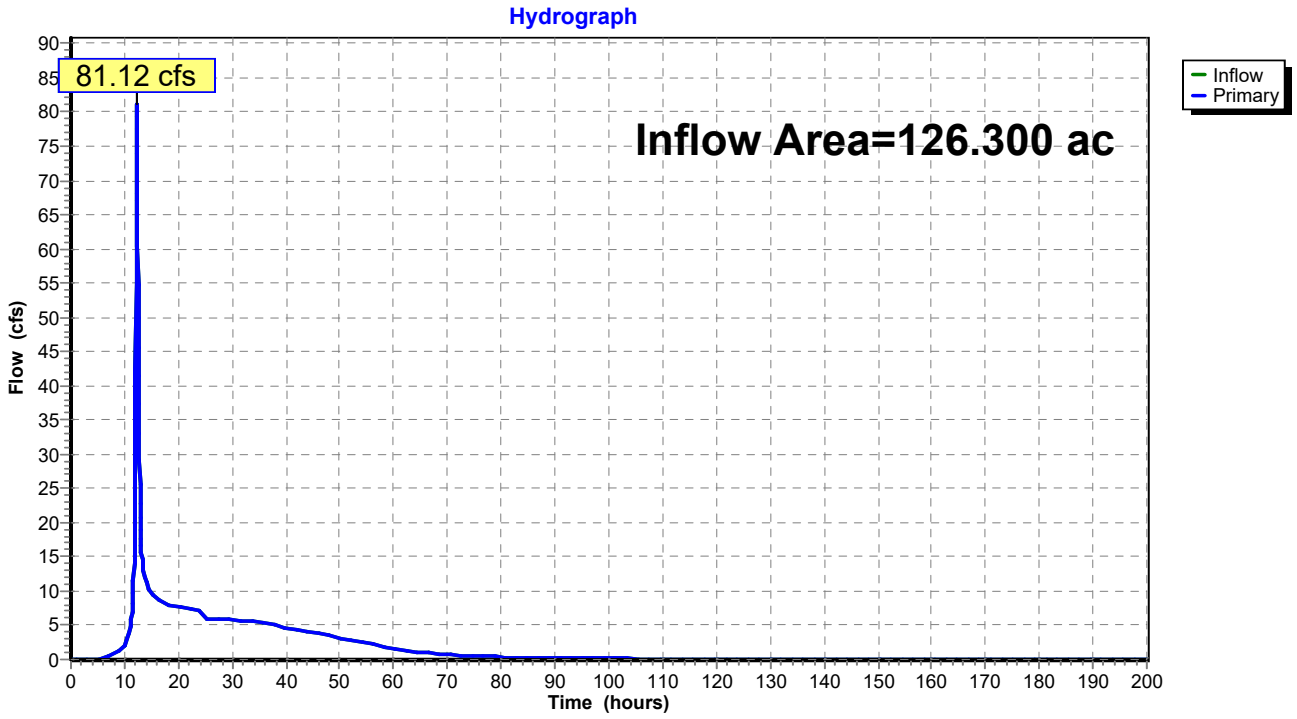


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 2.68" for 25-yr event
Inflow = 81.12 cfs @ 12.26 hrs, Volume= 28.229 af
Primary = 81.12 cfs @ 12.26 hrs, Volume= 28.229 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

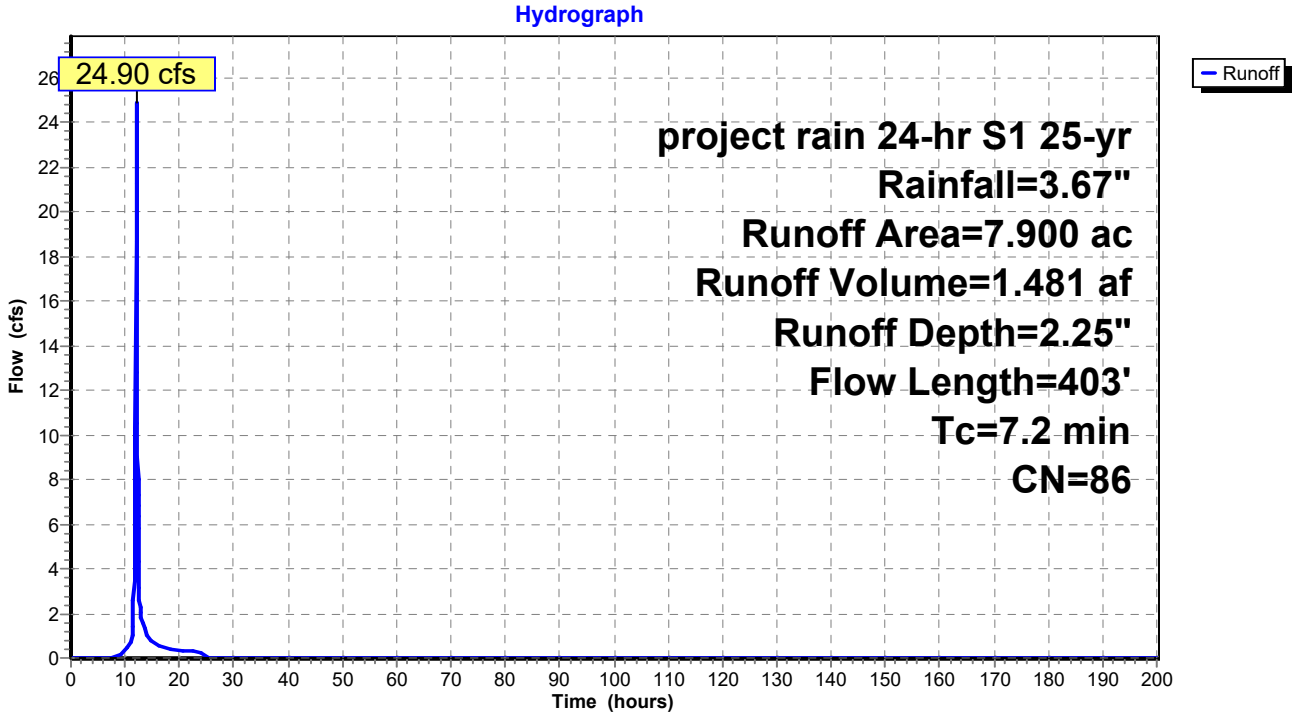
Runoff = 24.90 cfs @ 12.06 hrs, Volume= 1.481 af, Depth= 2.25"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 25-yr Rainfall=3.67"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

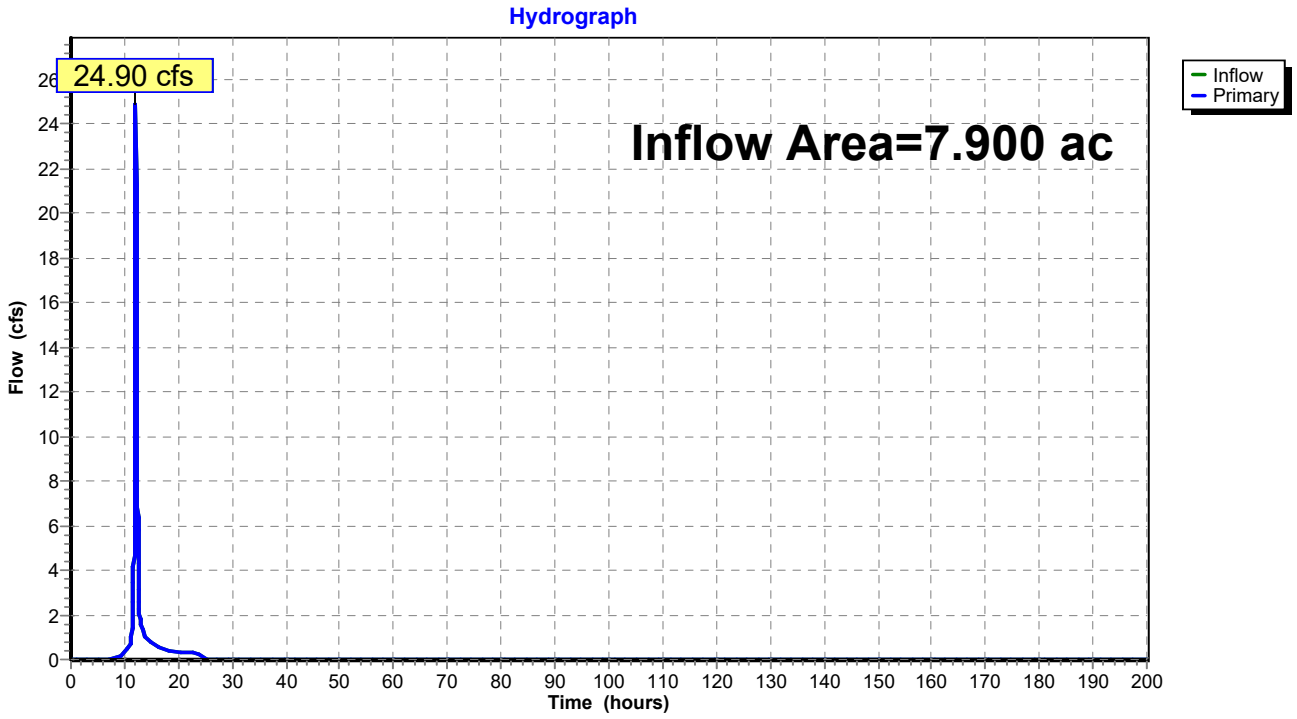


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 2.25" for 25-yr event
Inflow = 24.90 cfs @ 12.06 hrs, Volume= 1.481 af
Primary = 24.90 cfs @ 12.06 hrs, Volume= 1.481 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

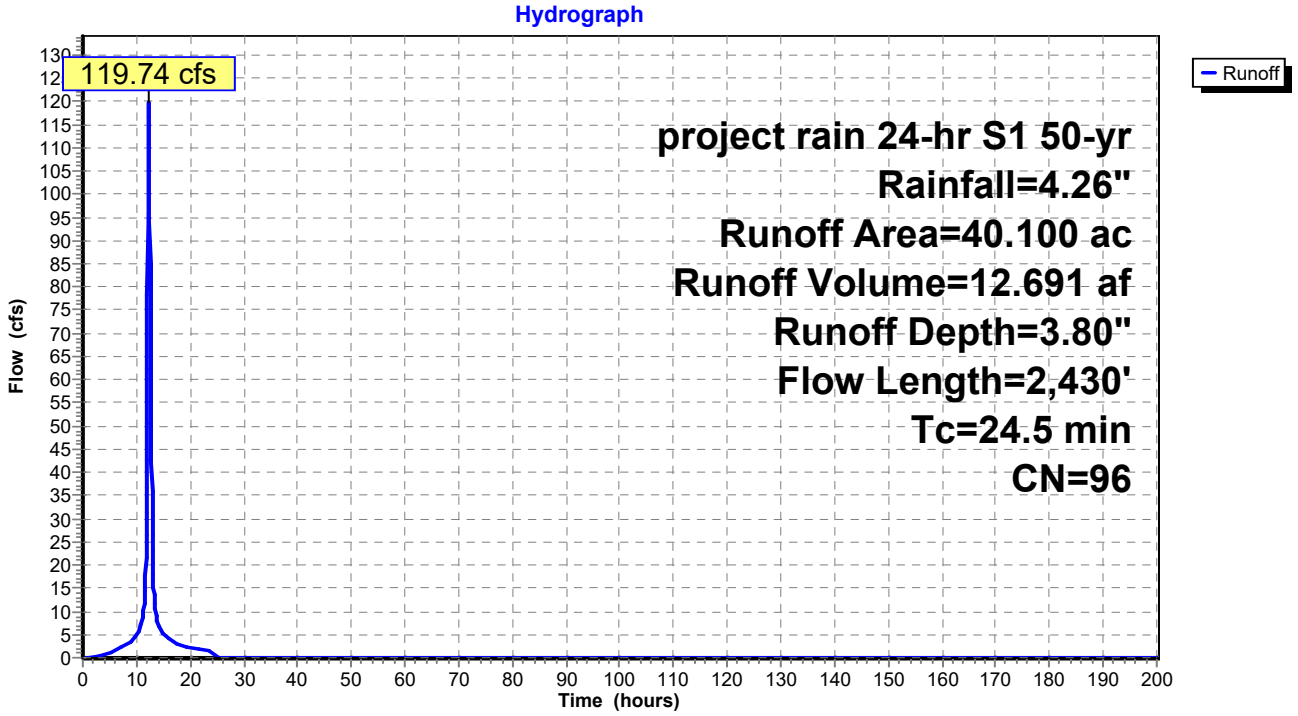
Runoff = 119.74 cfs @ 12.28 hrs, Volume= 12.691 af, Depth= 3.80"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 3.80" for 50-yr event
Inflow = 119.74 cfs @ 12.28 hrs, Volume= 12.691 af
Outflow = 7.86 cfs @ 13.93 hrs, Volume= 12.685 af, Atten= 93%, Lag= 99.1 min
Primary = 7.86 cfs @ 13.93 hrs, Volume= 12.685 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.82' @ 13.93 hrs Surf.Area= 12.468 ac Storage= 7.561 af

Plug-Flow detention time= 428.8 min calculated for 12.685 af (100% of inflow)
Center-of-Mass det. time= 428.4 min (1,210.7 - 782.3)

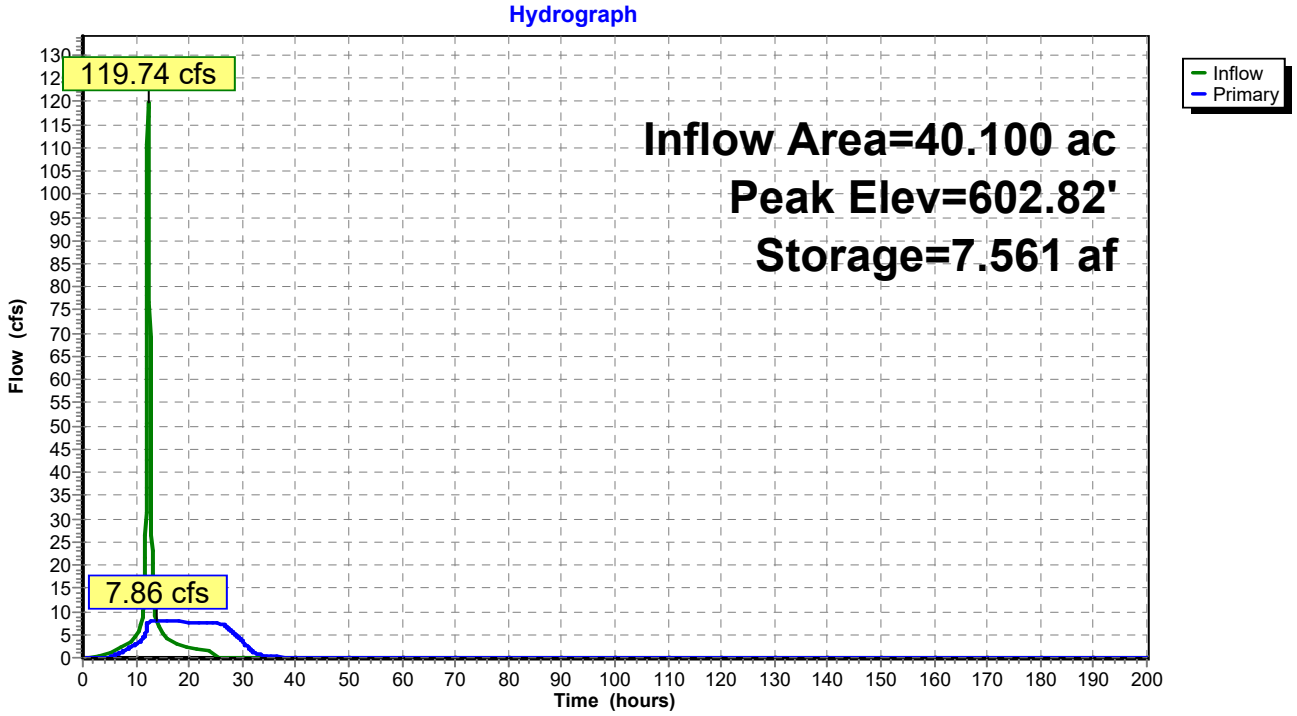
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.86 cfs @ 13.93 hrs HW=602.82' TW=598.31' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.86 cfs of 10.13 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.86 cfs @ 10.01 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

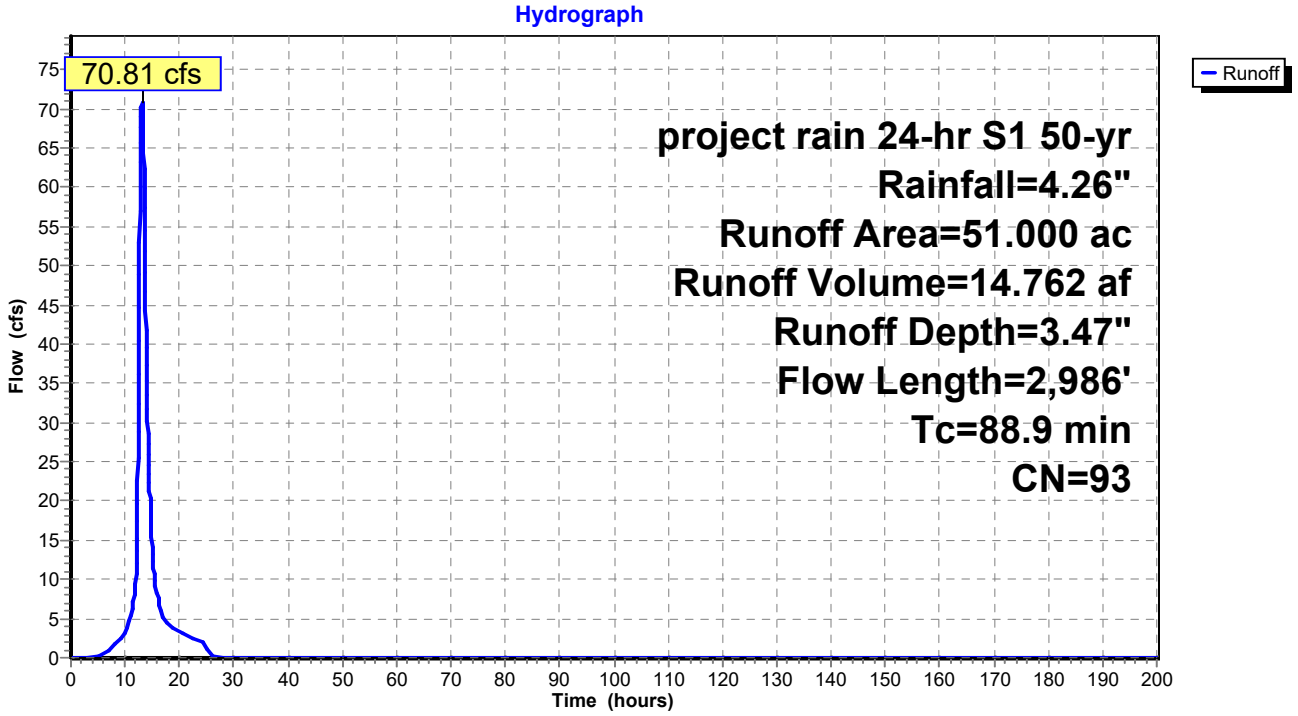
Runoff = 70.81 cfs @ 13.13 hrs, Volume= 14.762 af, Depth= 3.47"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 3.47" for 50-yr event
Inflow = 70.81 cfs @ 13.13 hrs, Volume= 14.762 af
Outflow = 13.03 cfs @ 15.08 hrs, Volume= 14.730 af, Atten= 82%, Lag= 117.0 min
Primary = 13.03 cfs @ 15.08 hrs, Volume= 14.730 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 601.86' @ 15.08 hrs Surf.Area= 16.633 ac Storage= 8.182 af

Plug-Flow detention time= 349.1 min calculated for 14.730 af (100% of inflow)
Center-of-Mass det. time= 347.6 min (1,205.9 - 858.3)

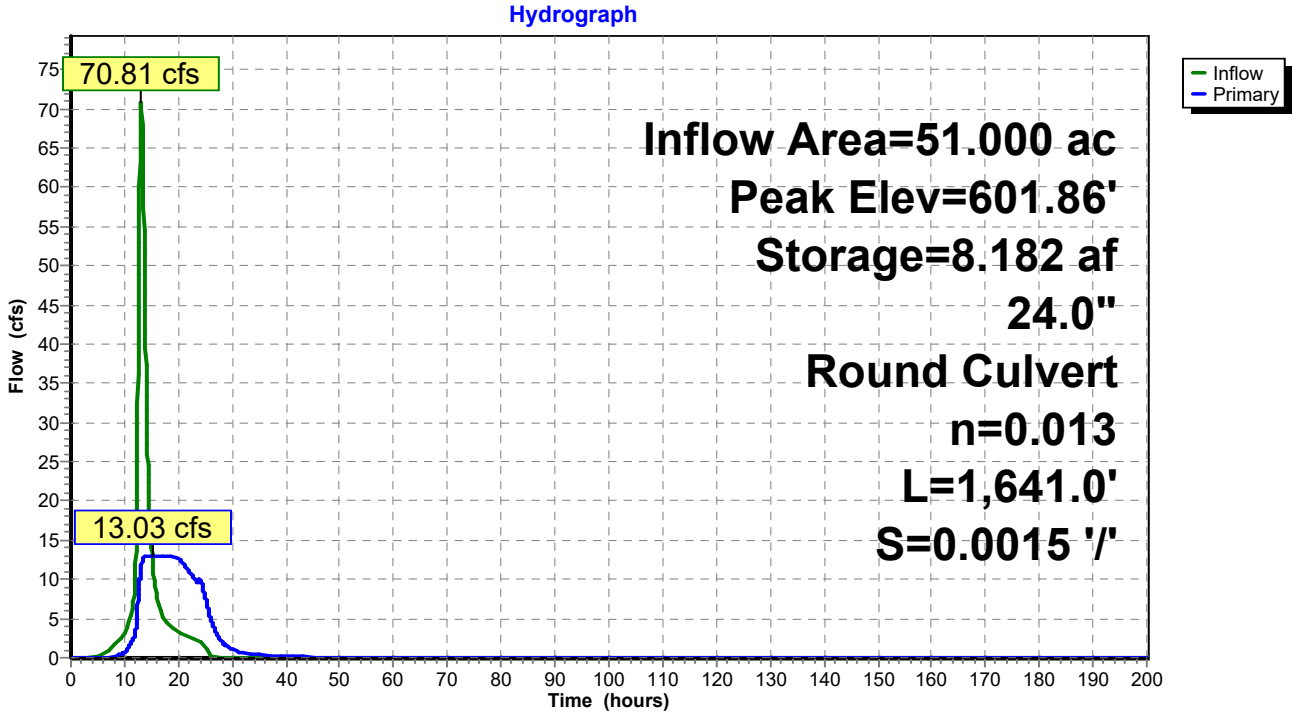
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=13.03 cfs @ 15.08 hrs HW=601.86' TW=584.17' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 13.03 cfs @ 4.15 fps)

Pond 05: Ex Collection Sump



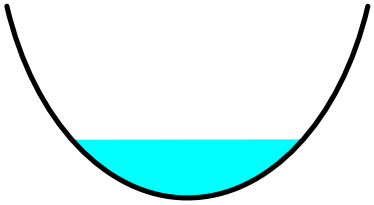
Summary for Reach 06a: Reach A Upper

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 3.80" for 50-yr event
Inflow = 7.86 cfs @ 13.93 hrs, Volume= 12.685 af
Outflow = 7.86 cfs @ 13.97 hrs, Volume= 12.685 af, Atten= 0%, Lag= 2.2 min
Routed to Reach 06b : Reach A Lower

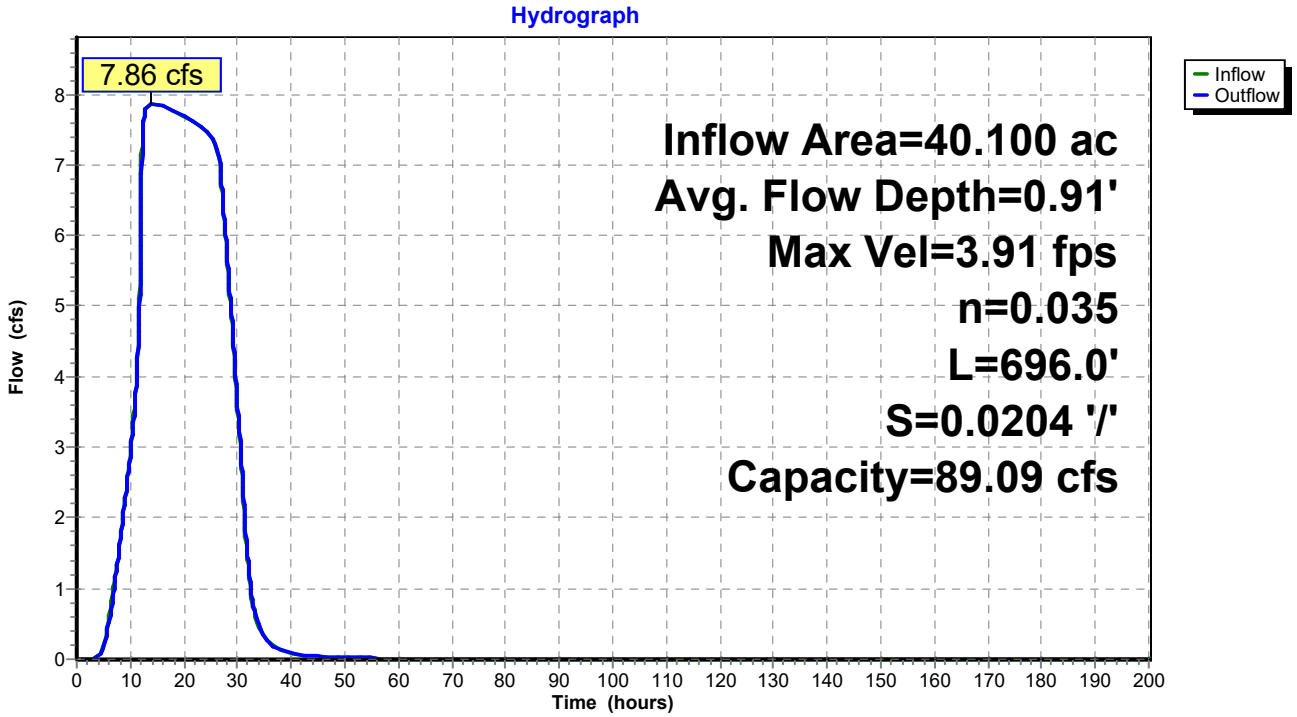
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.91 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 12.5 min

Peak Storage= 1,400 cf @ 13.97 hrs
Average Depth at Peak Storage= 0.91' , Surface Width= 3.31'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'



Reach 06a: Reach A Upper



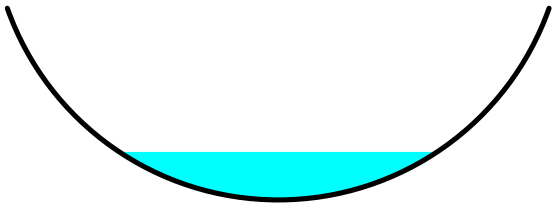
Summary for Reach 06b: Reach A Lower

Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 3.61" for 50-yr event
Inflow = 20.89 cfs @ 14.85 hrs, Volume= 27.416 af
Outflow = 20.89 cfs @ 14.87 hrs, Volume= 27.415 af, Atten= 0%, Lag= 1.1 min
Routed to Link 07 : Ex Analysis Point A

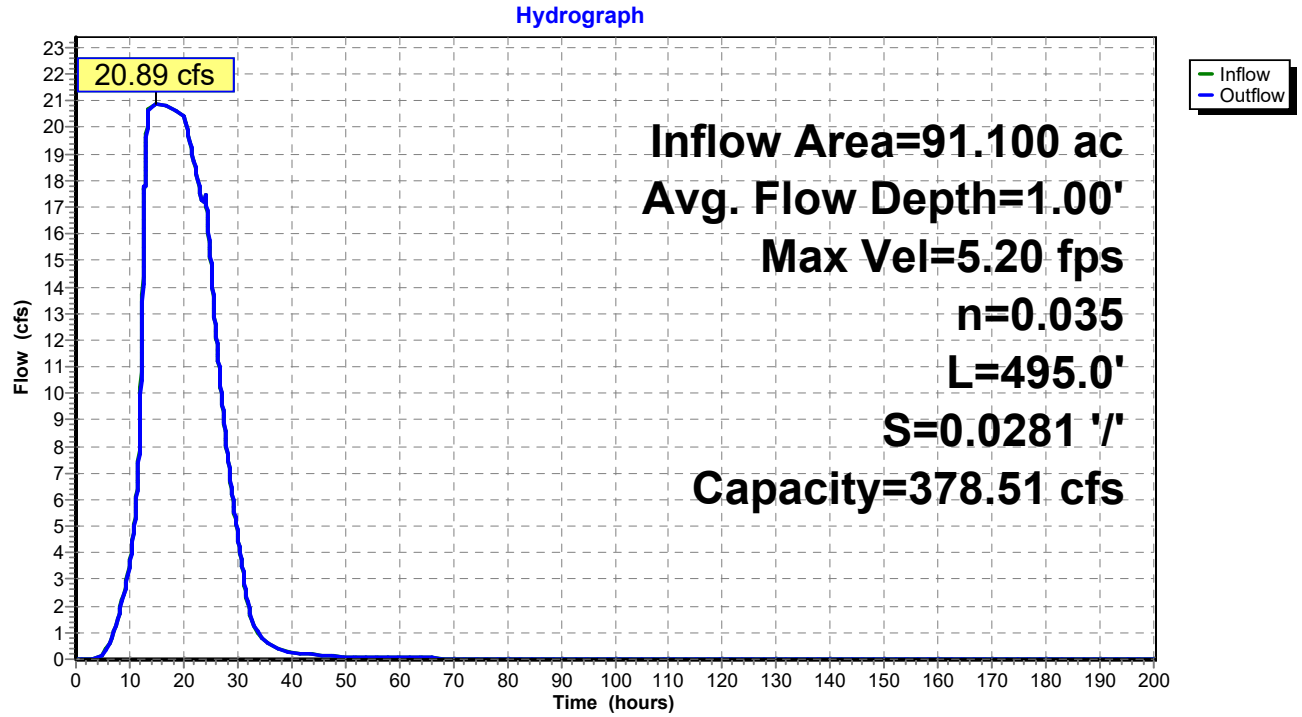
Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.20 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 6.8 min

Peak Storage= 1,987 cf @ 14.87 hrs
Average Depth at Peak Storage= 1.00' , Surface Width= 6.01'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



Reach 06b: Reach A Lower

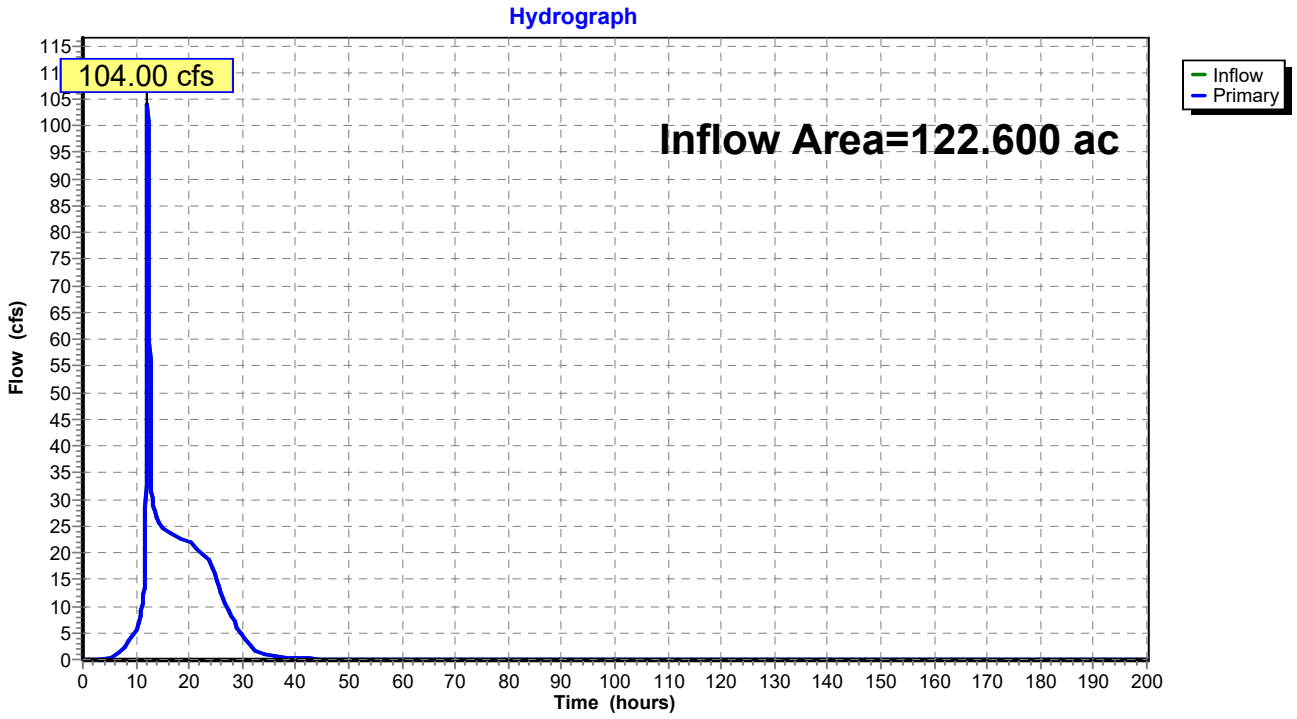


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 3.47" for 50-yr event
Inflow = 104.00 cfs @ 12.21 hrs, Volume= 35.469 af
Primary = 104.00 cfs @ 12.21 hrs, Volume= 35.469 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

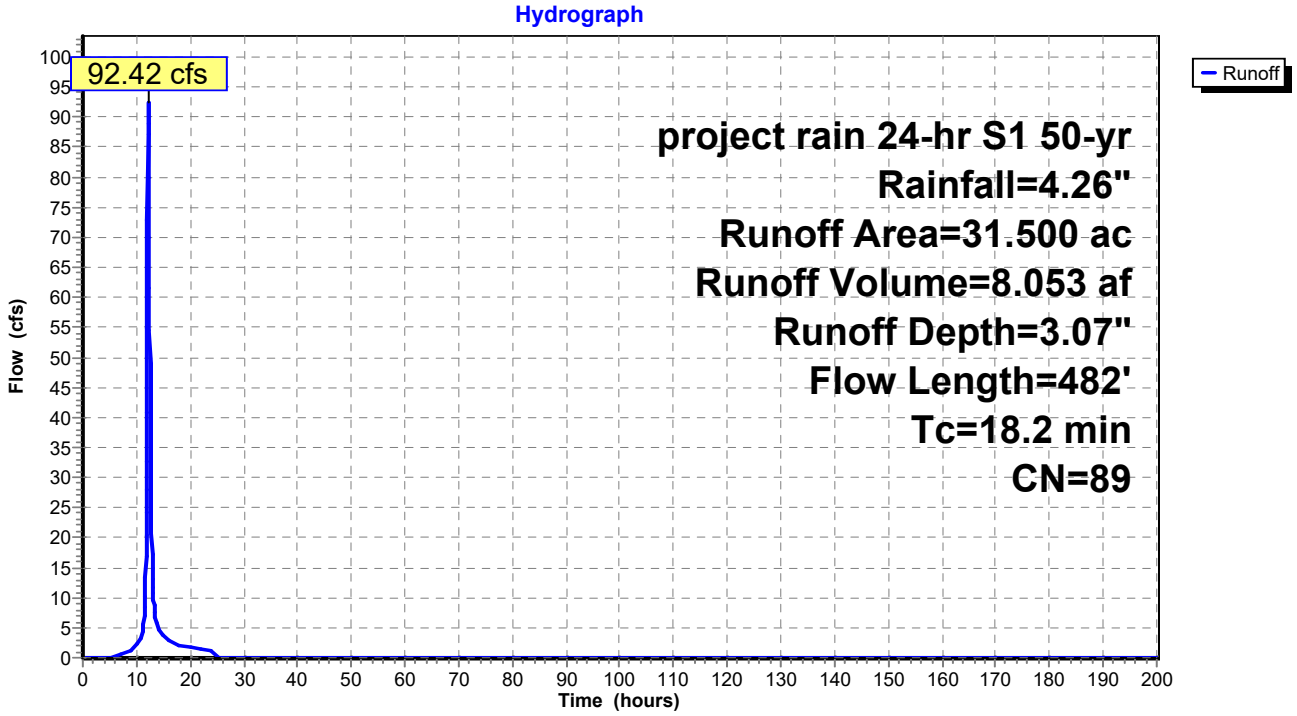
Runoff = 92.42 cfs @ 12.20 hrs, Volume= 8.053 af, Depth= 3.07"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

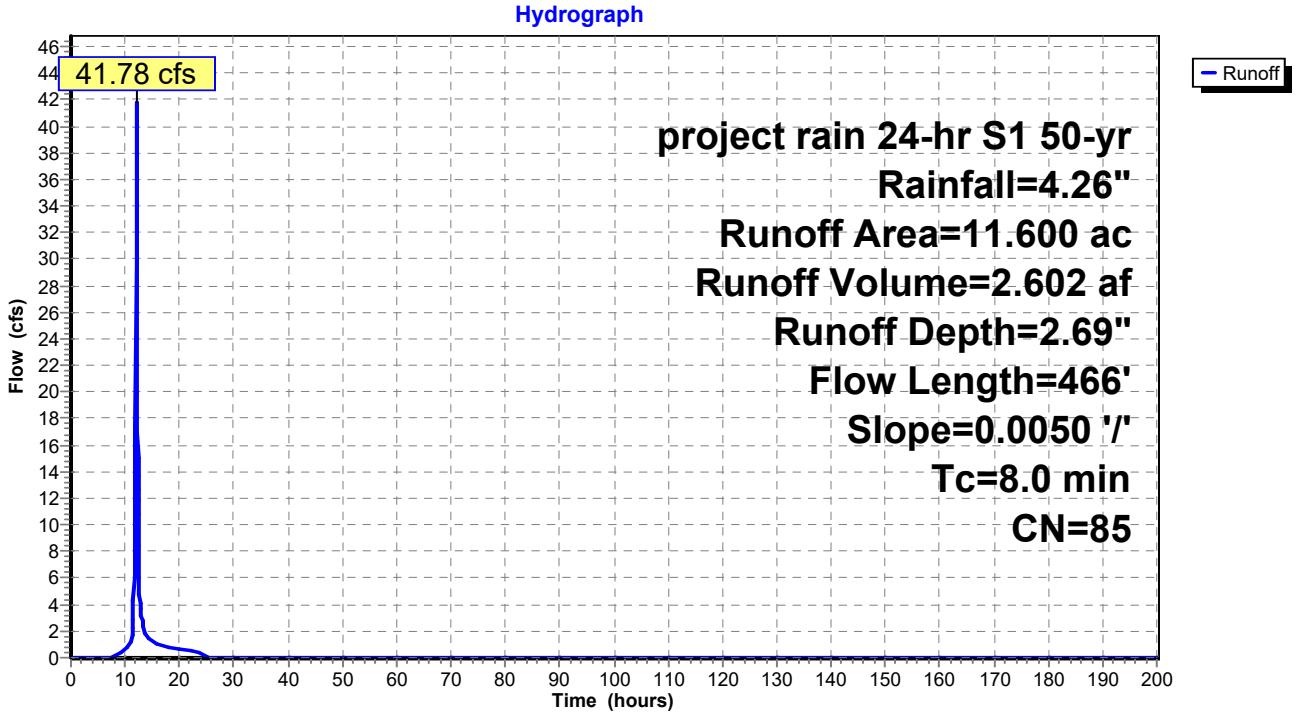
Runoff = 41.78 cfs @ 12.07 hrs, Volume= 2.602 af, Depth= 2.69"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

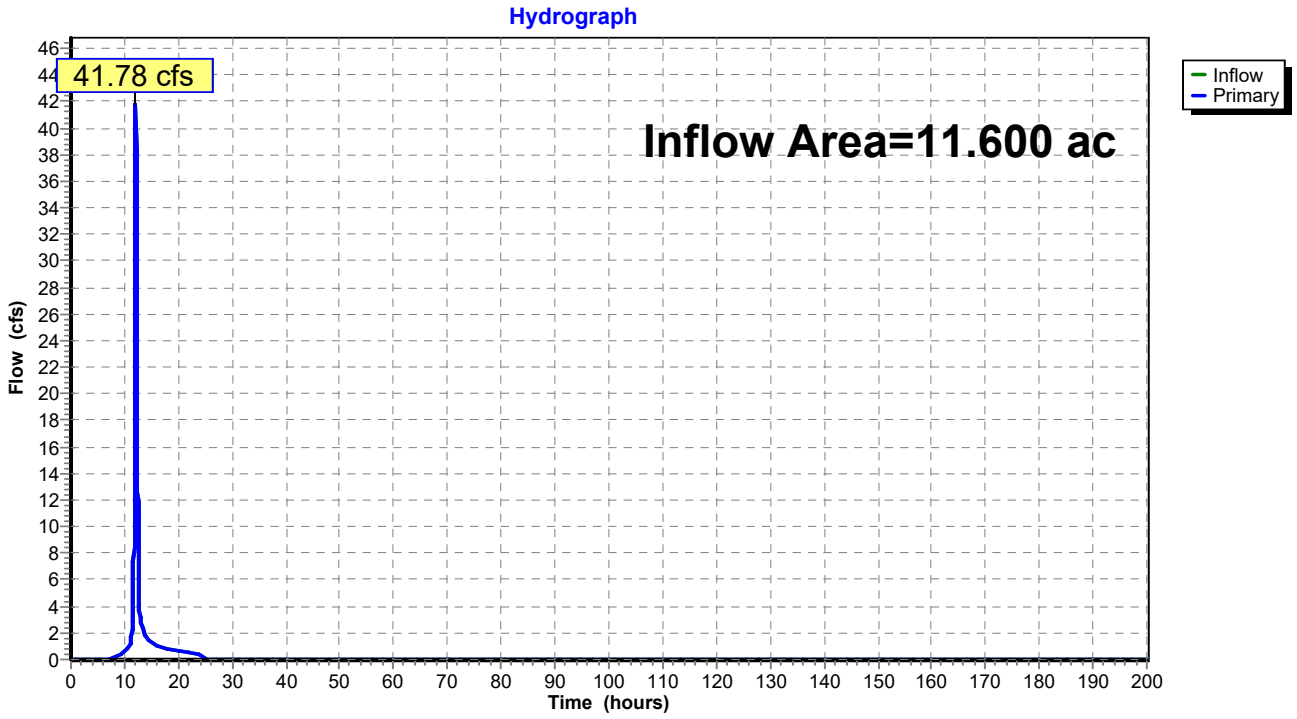


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 2.69" for 50-yr event
Inflow = 41.78 cfs @ 12.07 hrs, Volume= 2.602 af
Primary = 41.78 cfs @ 12.07 hrs, Volume= 2.602 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

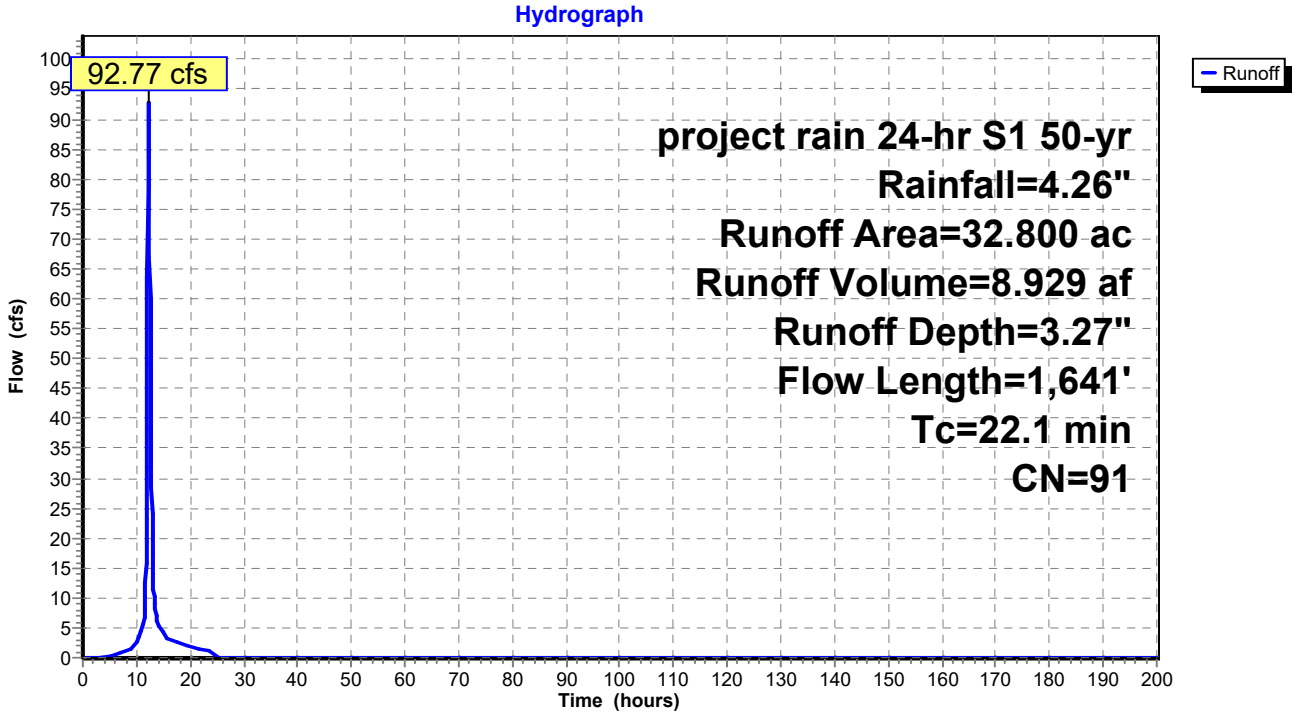
Runoff = 92.77 cfs @ 12.26 hrs, Volume= 8.929 af, Depth= 3.27"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

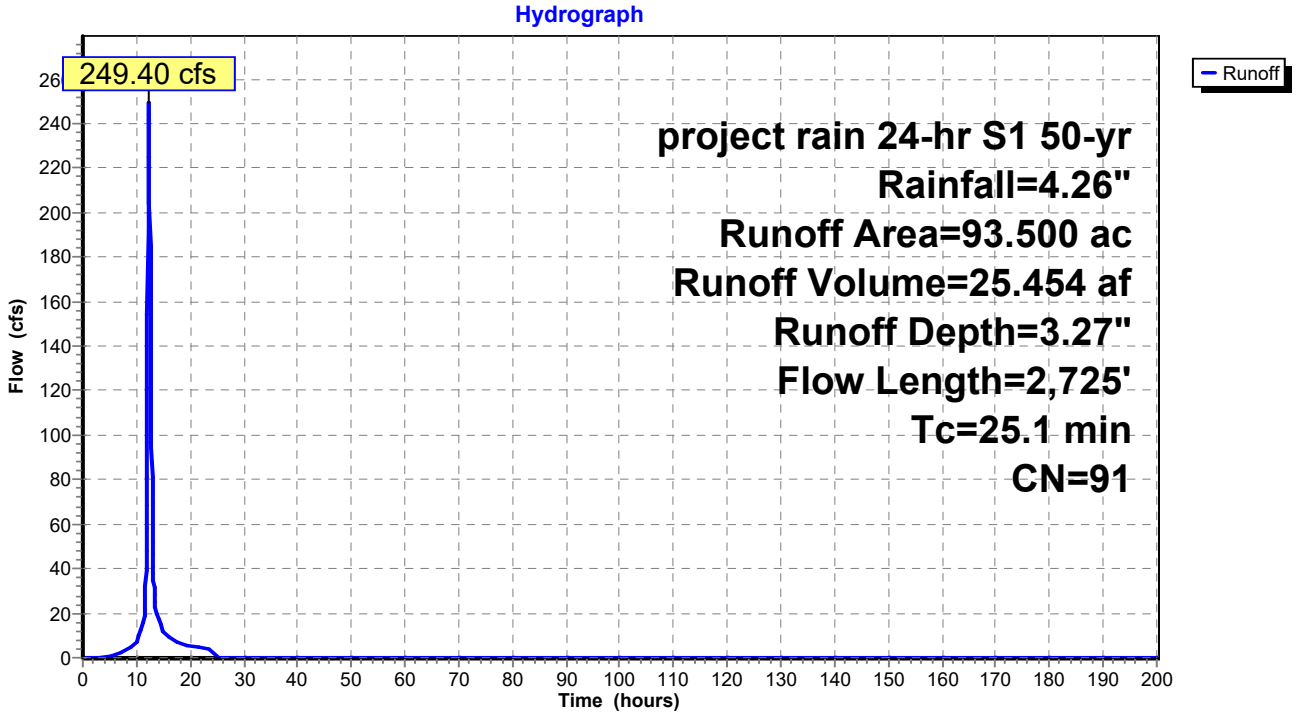
Runoff = 249.40 cfs @ 12.30 hrs, Volume= 25.454 af, Depth= 3.27"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 3.27" for 50-yr event
Inflow = 249.40 cfs @ 12.30 hrs, Volume= 25.454 af
Outflow = 6.43 cfs @ 18.18 hrs, Volume= 25.228 af, Atten= 97%, Lag= 353.4 min
Primary = 6.43 cfs @ 18.18 hrs, Volume= 25.228 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 594.73' @ 18.18 hrs Surf.Area= 359,045 sf Storage= 1,525,507 cf (852,926 cf above start)

Plug-Flow detention time= 2,980.6 min calculated for 9.788 af (38% of inflow)
Center-of-Mass det. time= 1,589.0 min (2,396.8 - 807.7)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

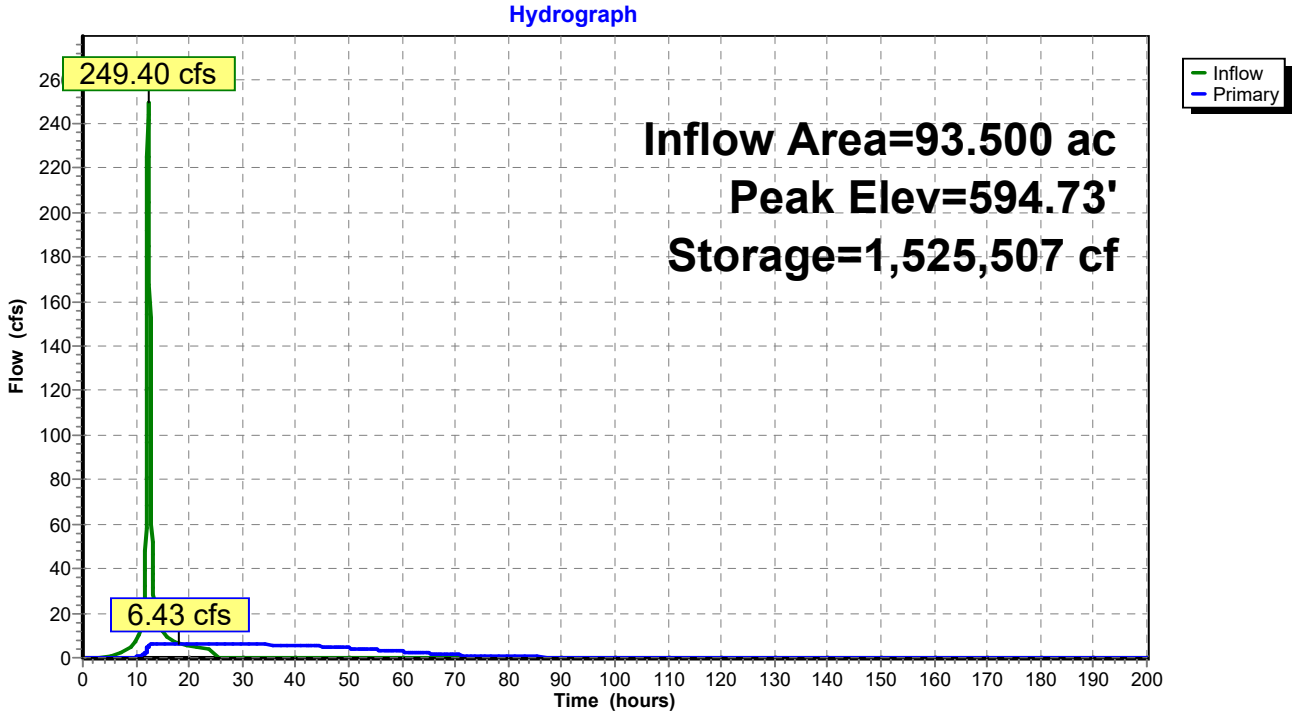
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.43 cfs @ 18.18 hrs HW=594.73' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 6.43 cfs @ 5.24 fps)
  - **2=Culvert** (Passes < 7.78 cfs potential flow)
  - **3=Grate** (Passes < 16.28 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

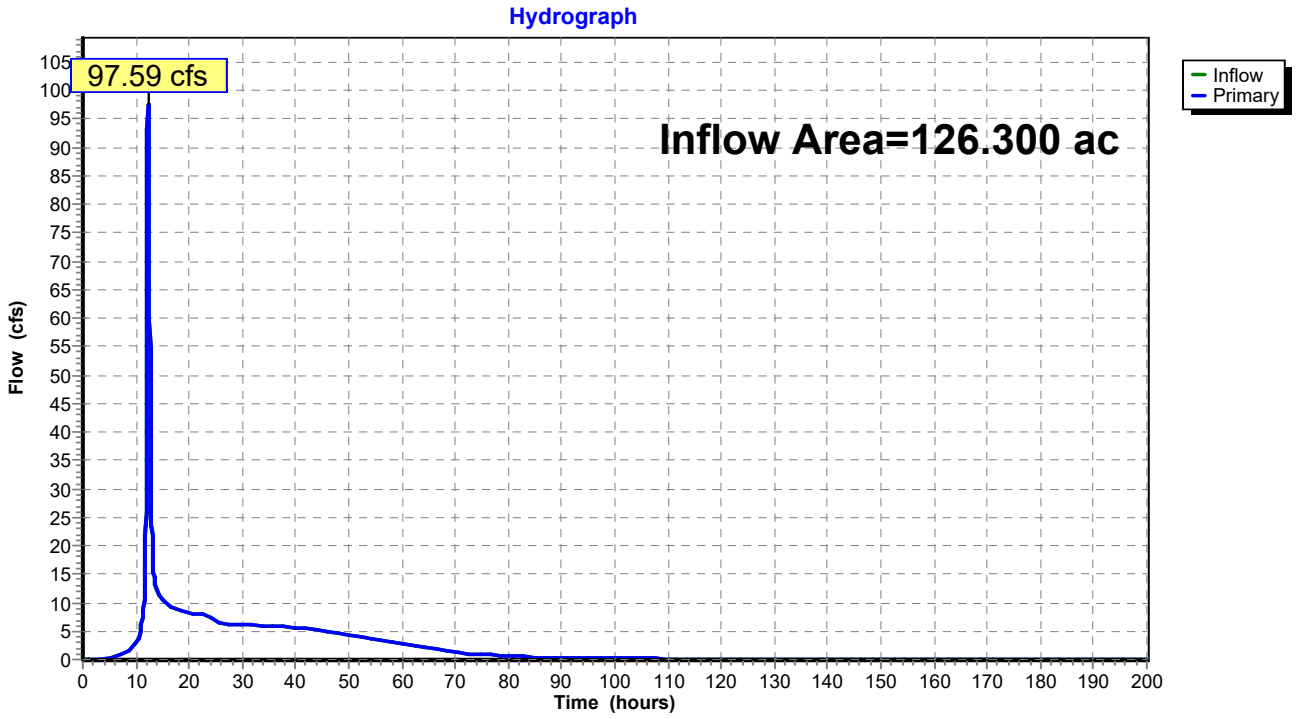


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 3.25" for 50-yr event
Inflow = 97.59 cfs @ 12.26 hrs, Volume= 34.157 af
Primary = 97.59 cfs @ 12.26 hrs, Volume= 34.157 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

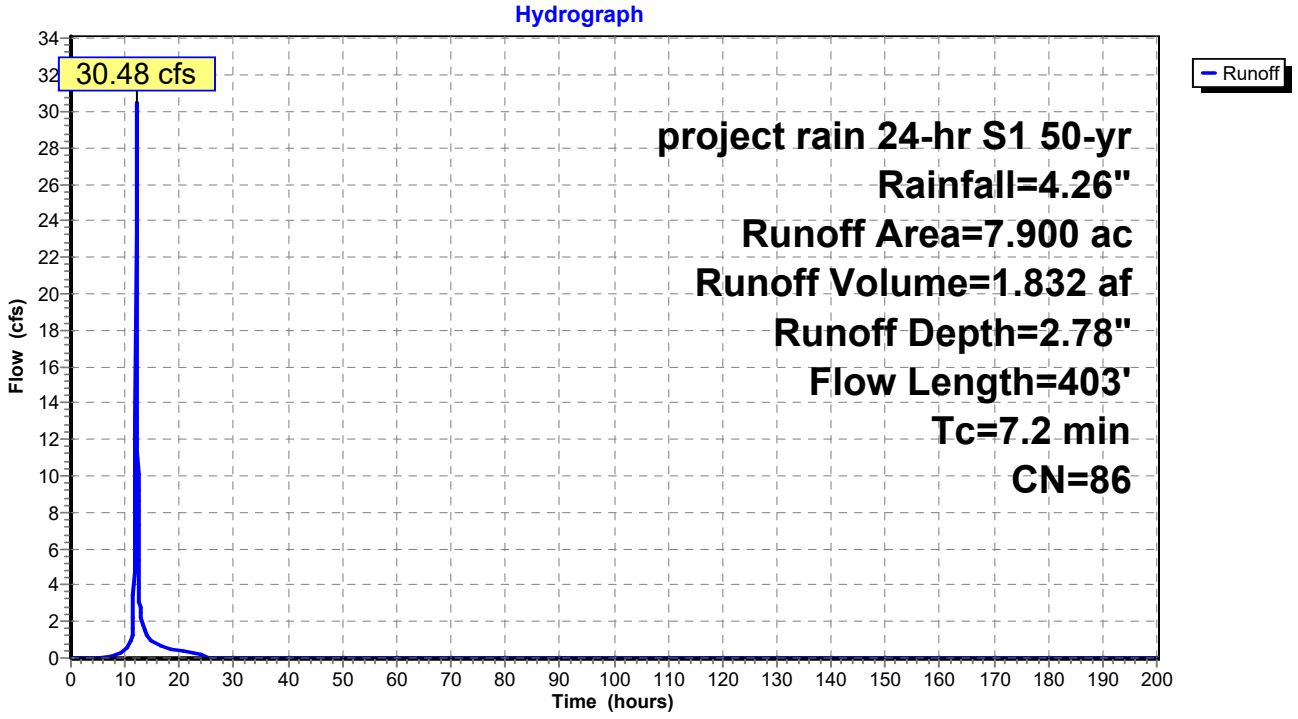
Runoff = 30.48 cfs @ 12.06 hrs, Volume= 1.832 af, Depth= 2.78"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 50-yr Rainfall=4.26"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

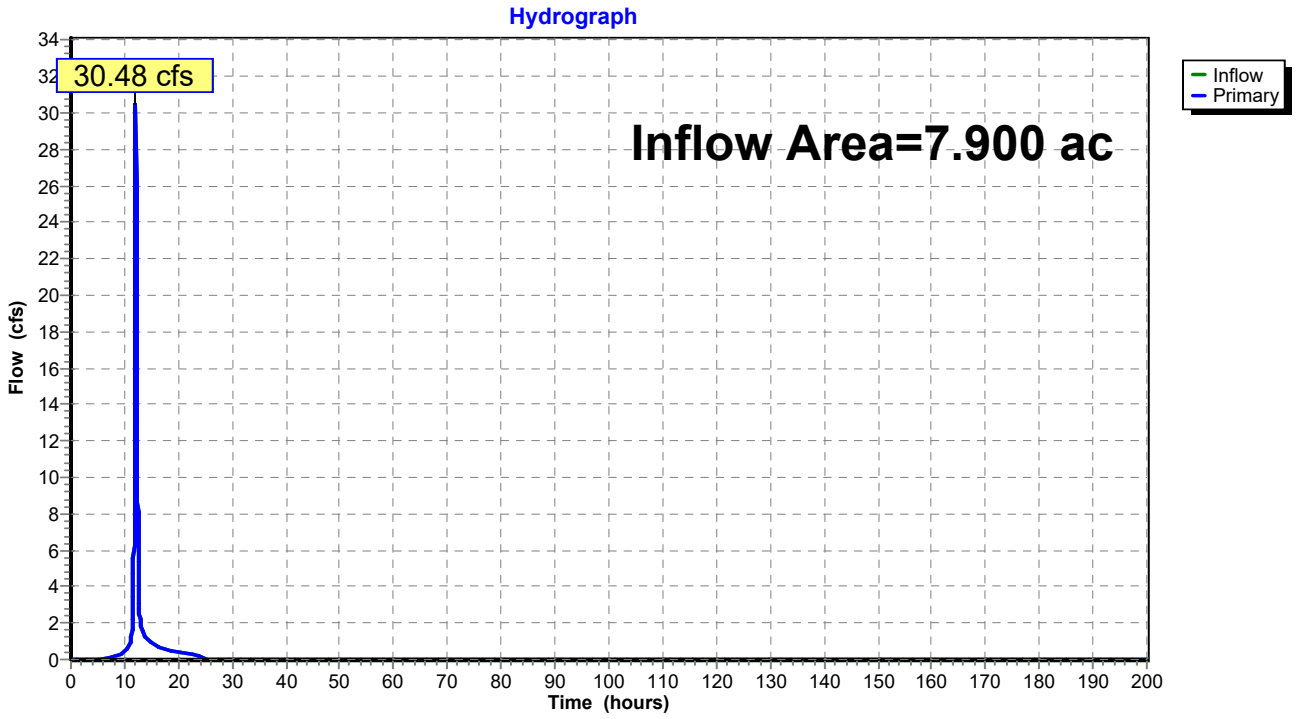


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 2.78" for 50-yr event
Inflow = 30.48 cfs @ 12.06 hrs, Volume= 1.832 af
Primary = 30.48 cfs @ 12.06 hrs, Volume= 1.832 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Summary for Subcatchment 02: Ex Subarea A-2

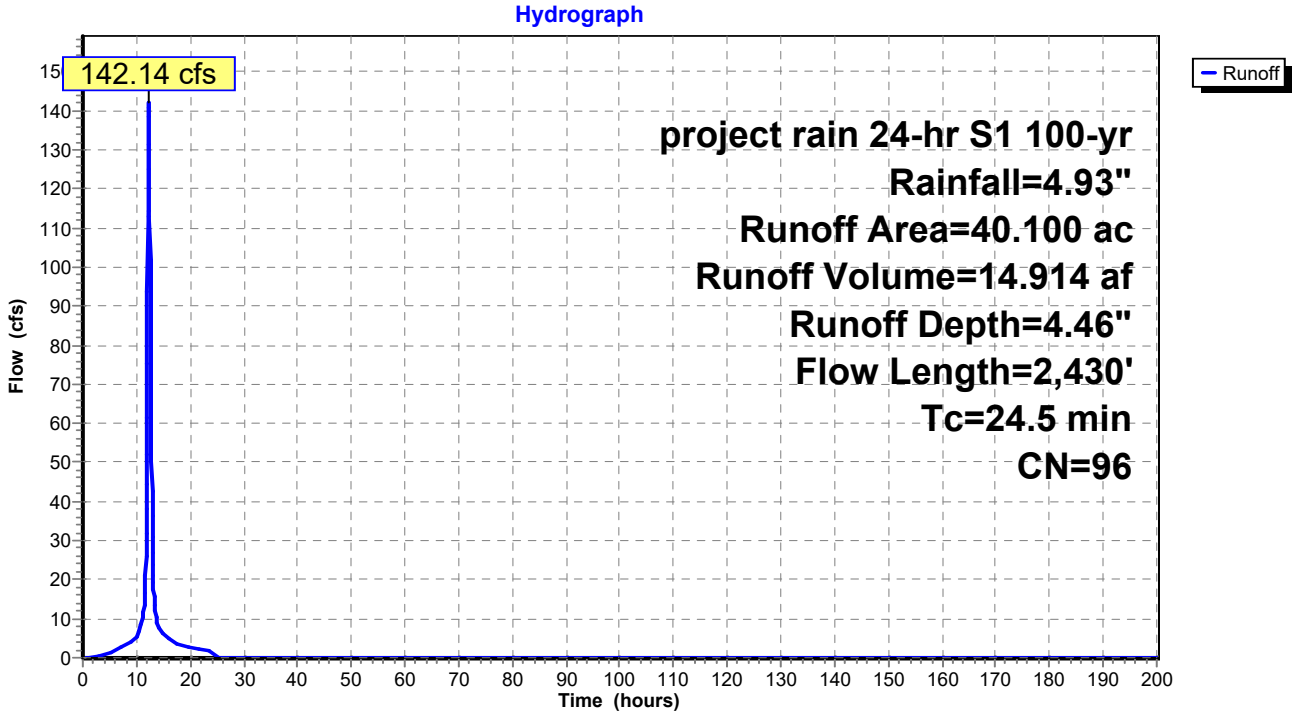
Runoff = 142.14 cfs @ 12.28 hrs, Volume= 14.914 af, Depth= 4.46"
Routed to Pond 03 : Ex Kidney Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

Area (ac)	CN	Description
35.600	98	Paved parking, HSG D
4.000	80	>75% Grass cover, Good, HSG D
0.500	98	Water Surface, 0% imp, HSG D
40.100	96	Weighted Average
4.500		11.22% Pervious Area
35.600		88.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
16.1	850	0.0030	0.88		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.5	1,480	0.0020	3.78	340.49	**Channel Flow, Channel Flow** Area= 90.0 sf Perim= 32.0' r= 2.81' n= 0.035 Earth, dense weeds
24.5	2,430	Total			

Subcatchment 02: Ex Subarea A-2



Summary for Pond 03: Ex Kidney Pond

Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 4.46" for 100-yr event
Inflow = 142.14 cfs @ 12.28 hrs, Volume= 14.914 af
Outflow = 7.98 cfs @ 14.18 hrs, Volume= 14.908 af, Atten= 94%, Lag= 113.6 min
Primary = 7.98 cfs @ 14.18 hrs, Volume= 14.908 af
Routed to Reach 06a : Reach A Upper

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 602.95' @ 14.18 hrs Surf.Area= 14.265 ac Storage= 9.230 af

Plug-Flow detention time= 504.9 min calculated for 14.905 af (100% of inflow)
Center-of-Mass det. time= 506.5 min (1,284.6 - 778.2)

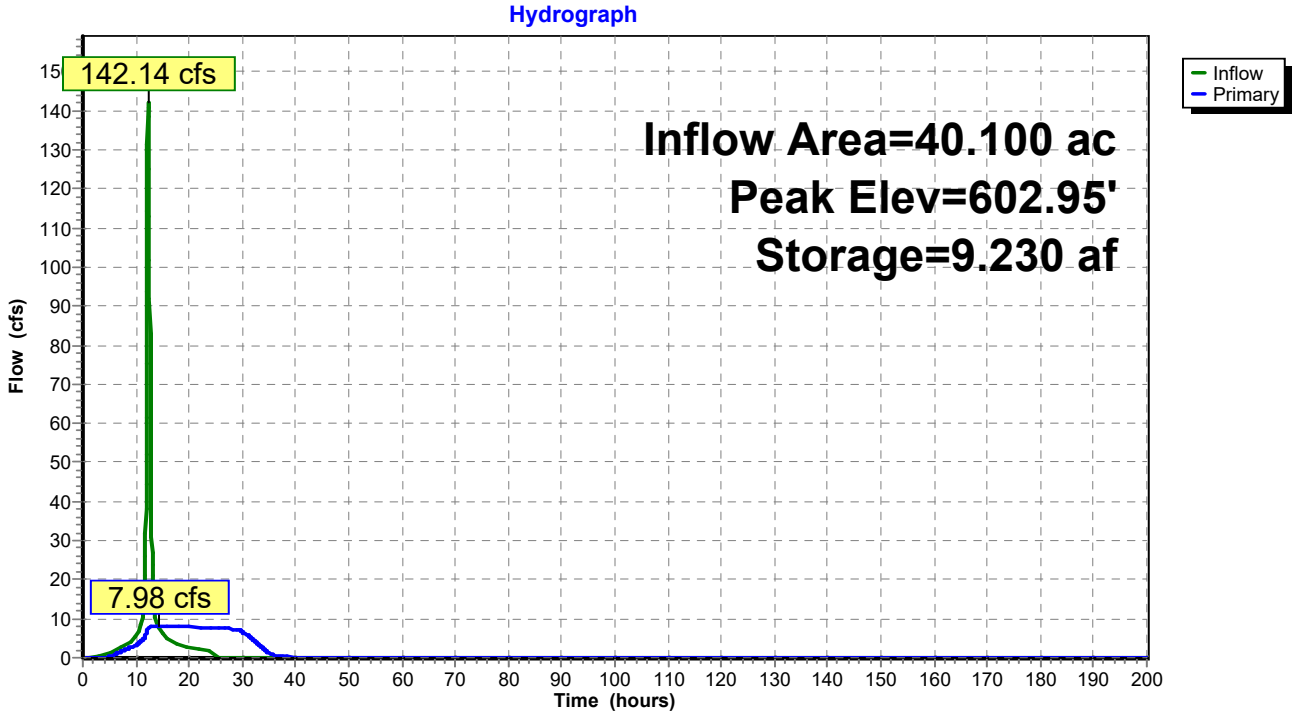
Volume	Invert	Avail.Storage	Storage Description
#1	598.00'	9.978 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
598.00	0.470	0.000	0.000
599.00	0.509	0.490	0.490
600.00	0.543	0.526	1.016
601.00	0.578	0.561	1.576
602.00	0.613	0.595	2.172
603.00	15.000	7.807	9.978

Device	Routing	Invert	Outlet Devices
#1	Primary	598.00'	**15.0" Round Culvert** L= 105.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 598.00' / 597.40' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	598.00'	**12.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.98 cfs @ 14.18 hrs HW=602.95' TW=598.32' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 7.98 cfs of 10.28 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 7.98 cfs @ 10.16 fps)

Pond 03: Ex Kidney Pond



Summary for Subcatchment 04: Ex Subarea A-3

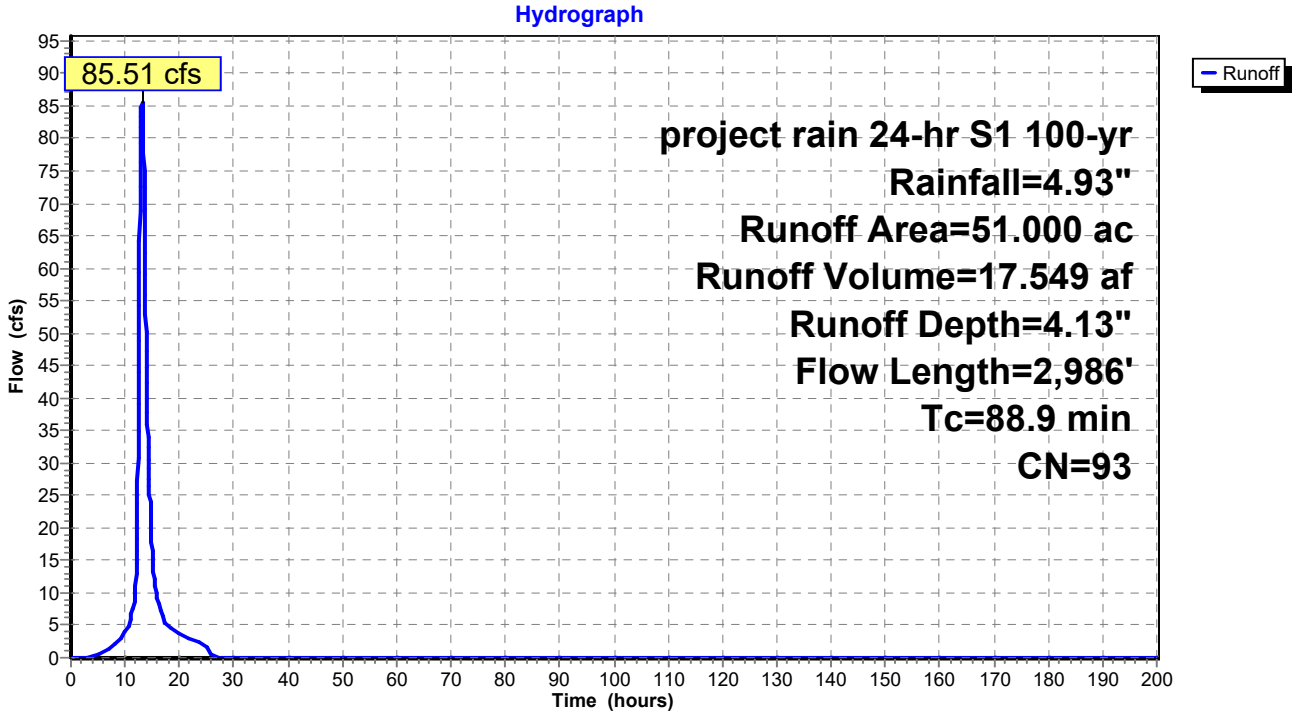
Runoff = 85.51 cfs @ 13.13 hrs, Volume= 17.549 af, Depth= 4.13"
Routed to Pond 05 : Ex Collection Sump

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

	Area (ac)	CN	Description
*	39.100	98	Paved parking, HSG D
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.800	96	Gravel surface, HSG D (Offsite)
	2.200	73	Brush, Good, HSG D
	51.000	93	Weighted Average
	11.900		23.33% Pervious Area
	39.100		76.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	100	0.0100	0.05		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.17"
6.7	456	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
9.8	670	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
38.0	1,760	0.0023	0.77		**Shallow Concentrated Flow, Shallow Conc (Offsite)** Unpaved Kv= 16.1 fps
88.9	2,986	Total			

Subcatchment 04: Ex Subarea A-3



Summary for Pond 05: Ex Collection Sump

Inflow Area = 51.000 ac, 76.67% Impervious, Inflow Depth = 4.13" for 100-yr event
Inflow = 85.51 cfs @ 13.13 hrs, Volume= 17.549 af
Outflow = 13.15 cfs @ 15.28 hrs, Volume= 17.517 af, Atten= 85%, Lag= 129.1 min
Primary = 13.15 cfs @ 15.28 hrs, Volume= 17.517 af
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 601.96' @ 15.28 hrs Surf.Area= 21.407 ac Storage= 10.246 af

Plug-Flow detention time= 398.5 min calculated for 17.513 af (100% of inflow)
Center-of-Mass det. time= 399.5 min (1,252.5 - 853.0)

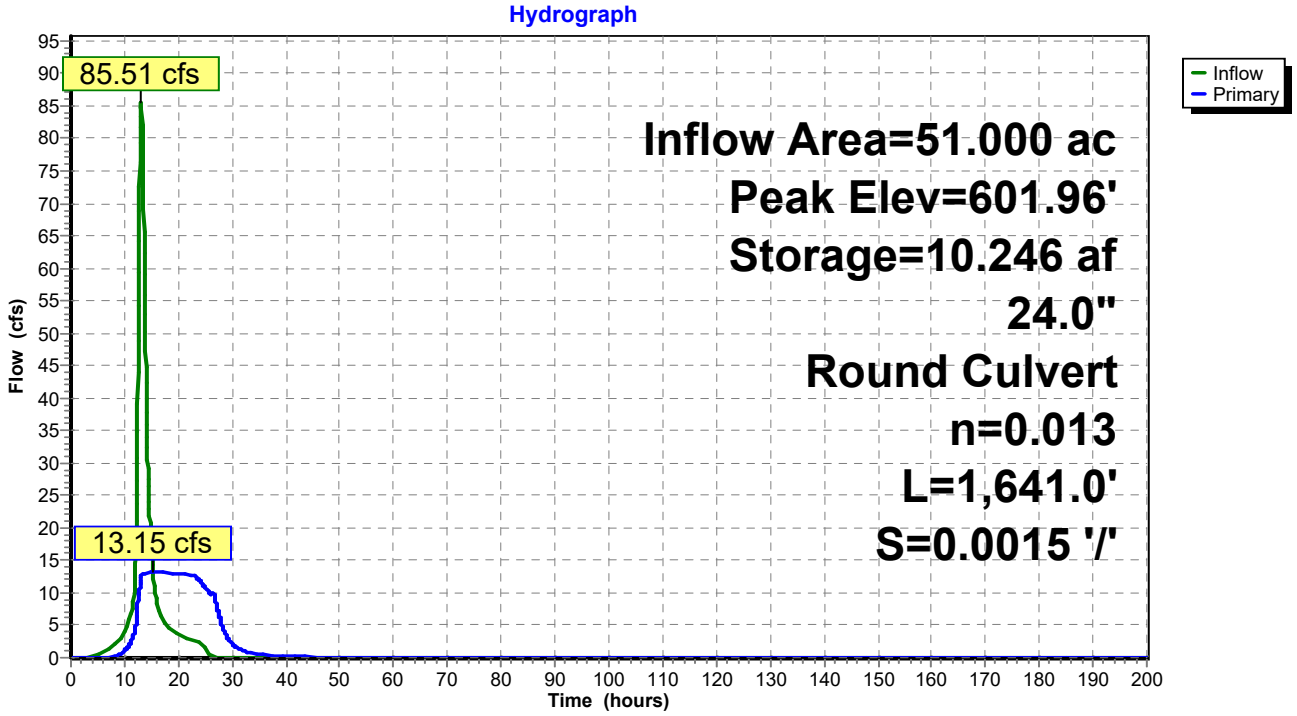
Volume	Invert	Avail.Storage	Storage Description
#1	596.45'	11.050 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
596.45	1.000	0.000	0.000
601.50	1.000	5.050	5.050
602.00	23.000	6.000	11.050

Device	Routing	Invert	Outlet Devices
#1	Primary	596.45'	**24.0" Round Culvert** L= 1,641.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 596.45' / 593.99' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=13.15 cfs @ 15.28 hrs HW=601.96' TW=584.18' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 13.15 cfs @ 4.19 fps)

Pond 05: Ex Collection Sump



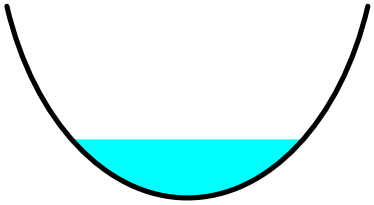
Summary for Reach 06a: Reach A Upper

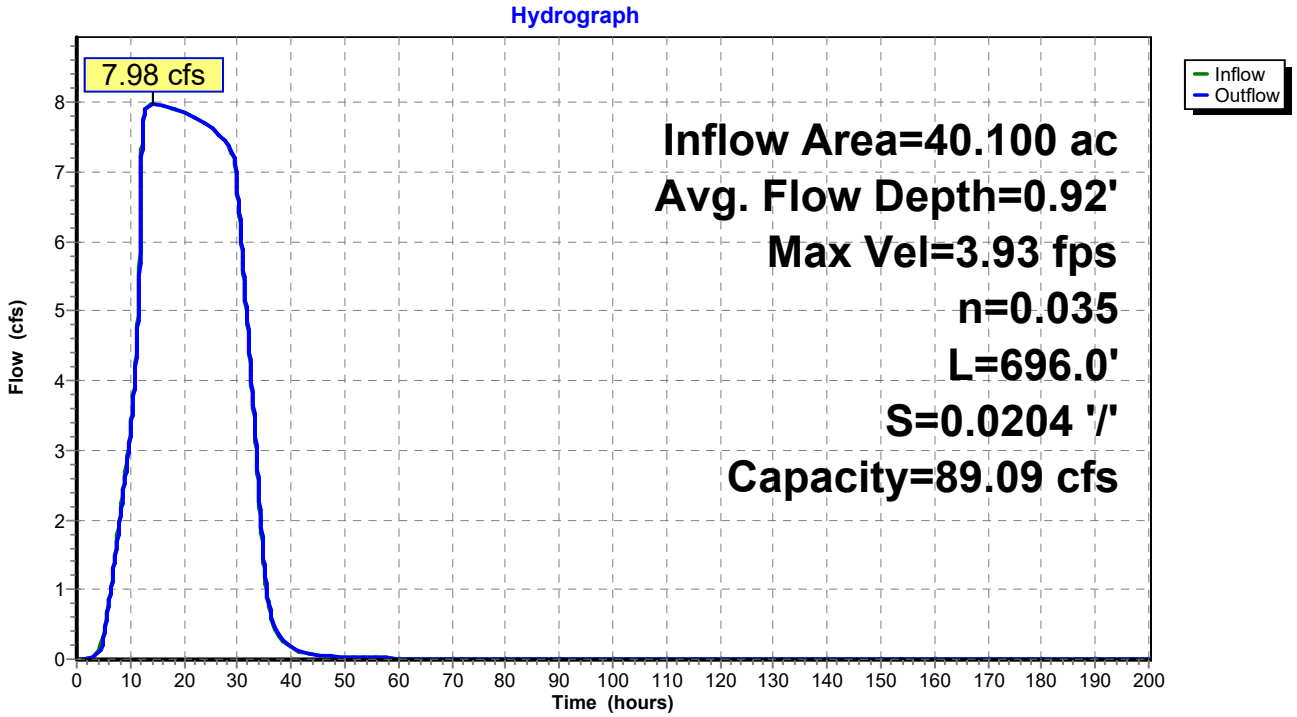
Inflow Area = 40.100 ac, 88.78% Impervious, Inflow Depth = 4.46" for 100-yr event
Inflow = 7.98 cfs @ 14.18 hrs, Volume= 14.908 af
Outflow = 7.98 cfs @ 14.21 hrs, Volume= 14.908 af, Atten= 0%, Lag= 2.2 min
Routed to Reach 06b : Reach A Lower

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 11.8 min

Peak Storage= 1,414 cf @ 14.21 hrs
Average Depth at Peak Storage= 0.92' , Surface Width= 3.32'
Bank-Full Depth= 3.00' Flow Area= 12.0 sf, Capacity= 89.09 cfs

6.00' x 3.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 696.0' Slope= 0.0204 '/'
Inlet Invert= 597.40', Outlet Invert= 583.17'





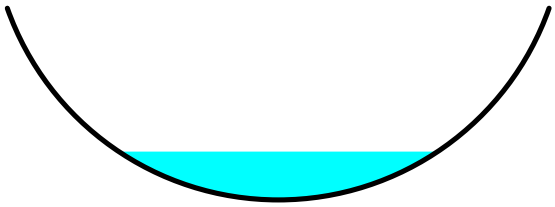
Summary for Reach 06b: Reach A Lower

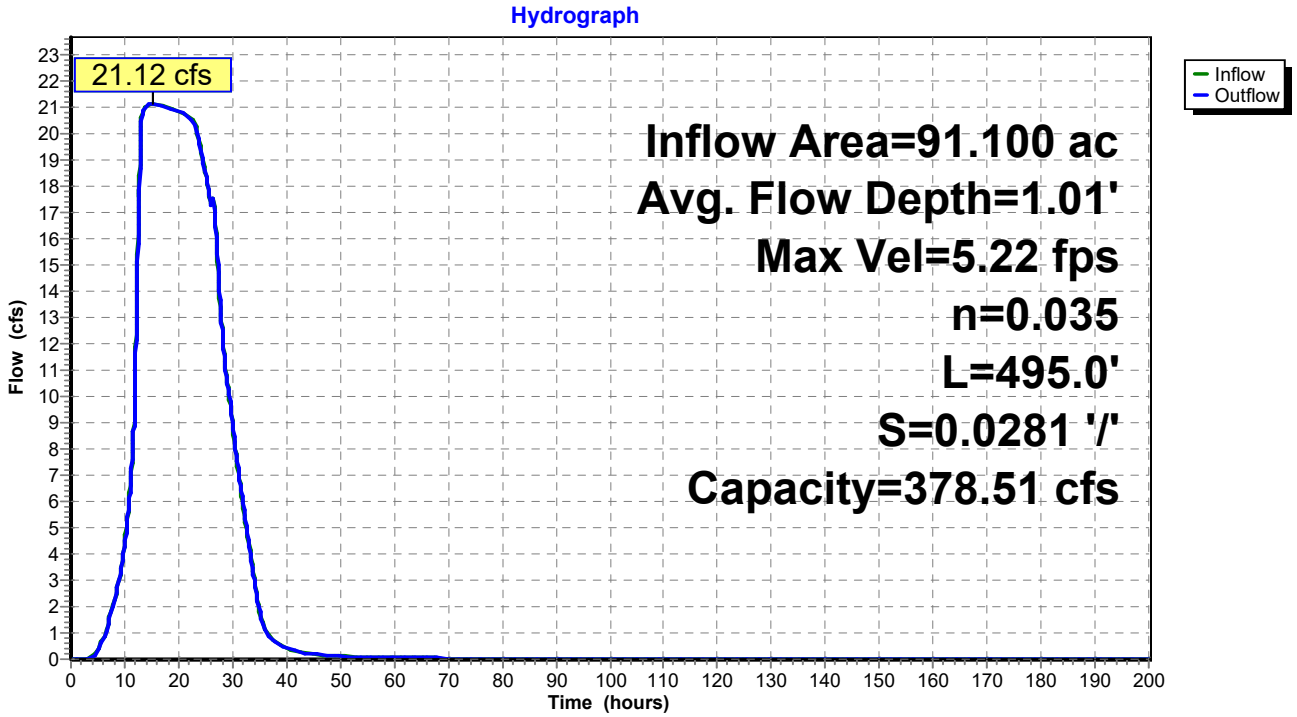
Inflow Area = 91.100 ac, 82.00% Impervious, Inflow Depth > 4.27" for 100-yr event
Inflow = 21.12 cfs @ 15.04 hrs, Volume= 32.425 af
Outflow = 21.12 cfs @ 15.06 hrs, Volume= 32.425 af, Atten= 0%, Lag= 1.1 min
Routed to Link 07 : Ex Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.22 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 6.4 min

Peak Storage= 2,003 cf @ 15.06 hrs
Average Depth at Peak Storage= 1.01' , Surface Width= 6.02'
Bank-Full Depth= 4.00' Flow Area= 32.0 sf, Capacity= 378.51 cfs

12.00' x 4.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 495.0' Slope= 0.0281 '/'
Inlet Invert= 583.17', Outlet Invert= 569.25'



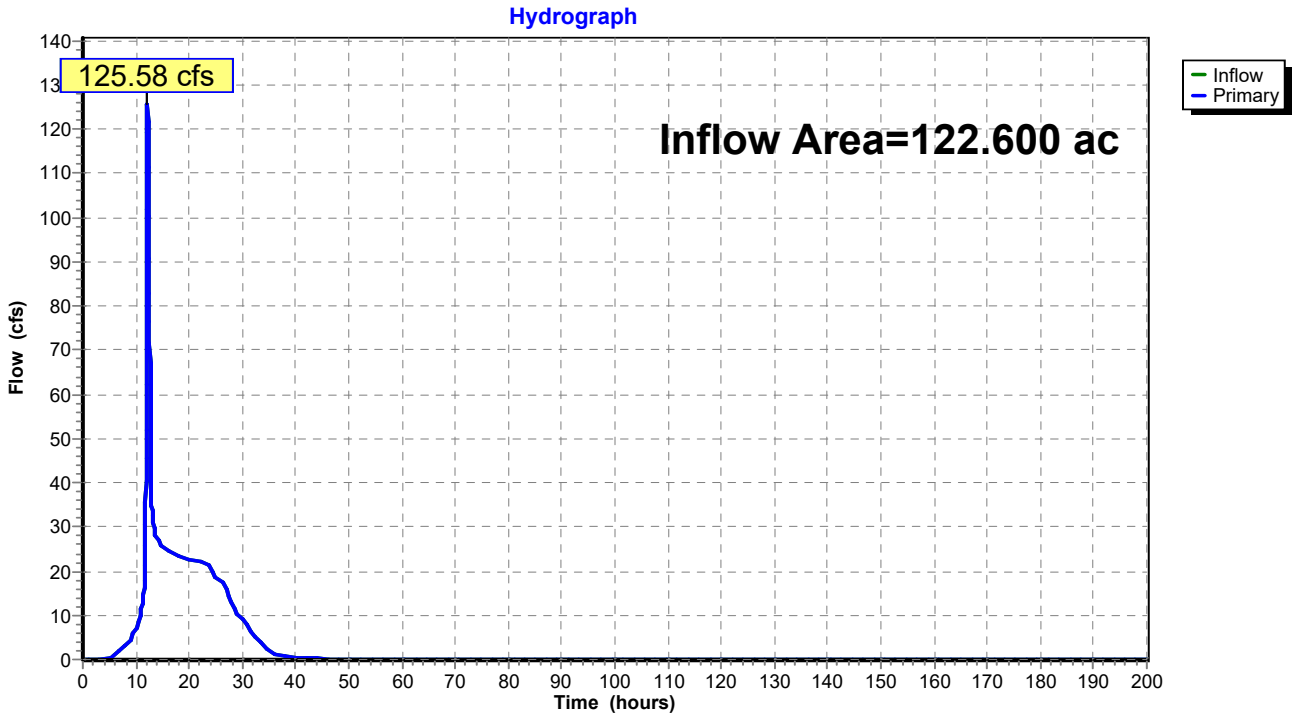


Summary for Link 07: Ex Analysis Point A

Inflow Area = 122.600 ac, 75.86% Impervious, Inflow Depth = 4.13" for 100-yr event
Inflow = 125.58 cfs @ 12.21 hrs, Volume= 42.151 af
Primary = 125.58 cfs @ 12.21 hrs, Volume= 42.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 07: Ex Analysis Point A



Summary for Subcatchment 7S: Ex Subarea A-1

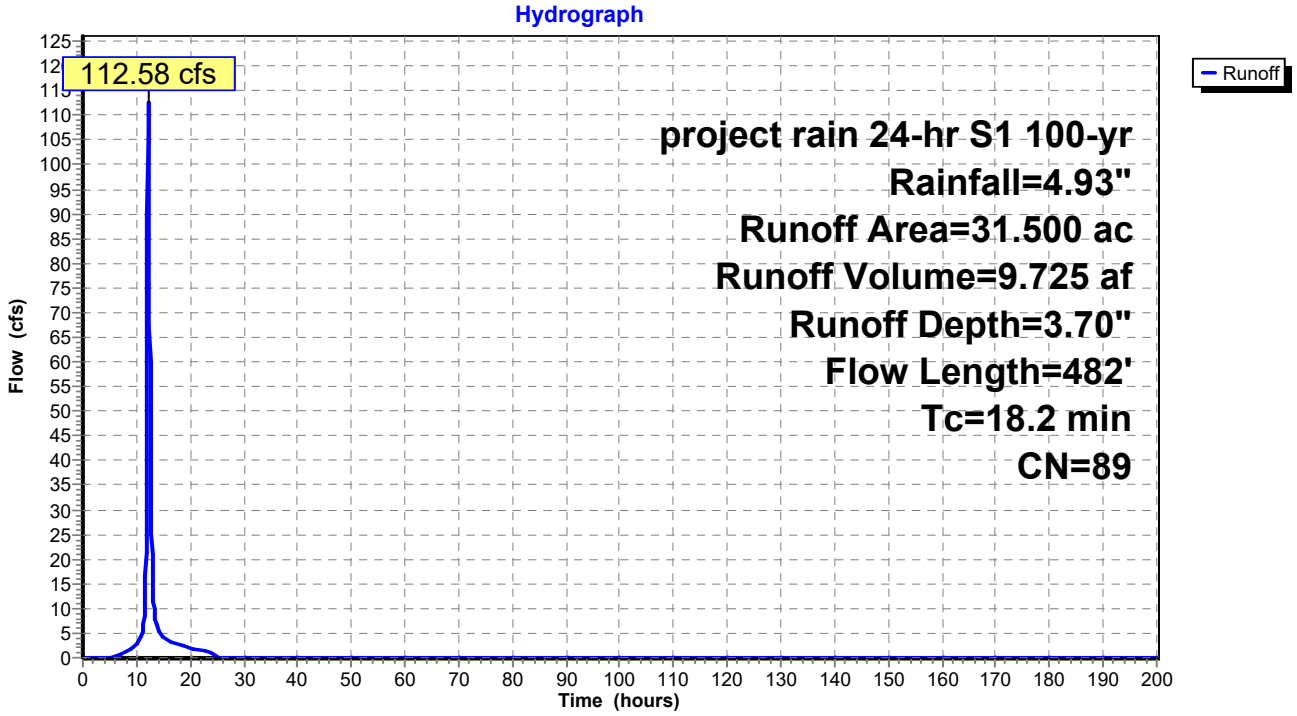
Runoff = 112.58 cfs @ 12.20 hrs, Volume= 9.725 af, Depth= 3.70"
Routed to Link 07 : Ex Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

	Area (ac)	CN	Description
*	17.100	98	Paved parking, HSG D
*	2.000	73	Brush, Good, HSG D (Offsite)
*	0.700	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	1.200	98	Paved parking, HSG D (Offsite)
	5.200	80	>75% Grass cover, Good, HSG D
	5.100	73	Brush, Good, HSG D
	31.500	89	Weighted Average
	13.200		41.90% Pervious Area
	18.300		58.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0300	0.16		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
1.8	197	0.0130	1.84		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
1.3	185	0.0130	2.31		**Shallow Concentrated Flow, Shallow Conc** Paved Kv= 20.3 fps
5.0					**Direct Entry, Assumed Tc for SS thru Plastics to AP A**
18.2	482	Total			

Subcatchment 7S: Ex Subarea A-1



Summary for Subcatchment 08: Ex Subarea B-1

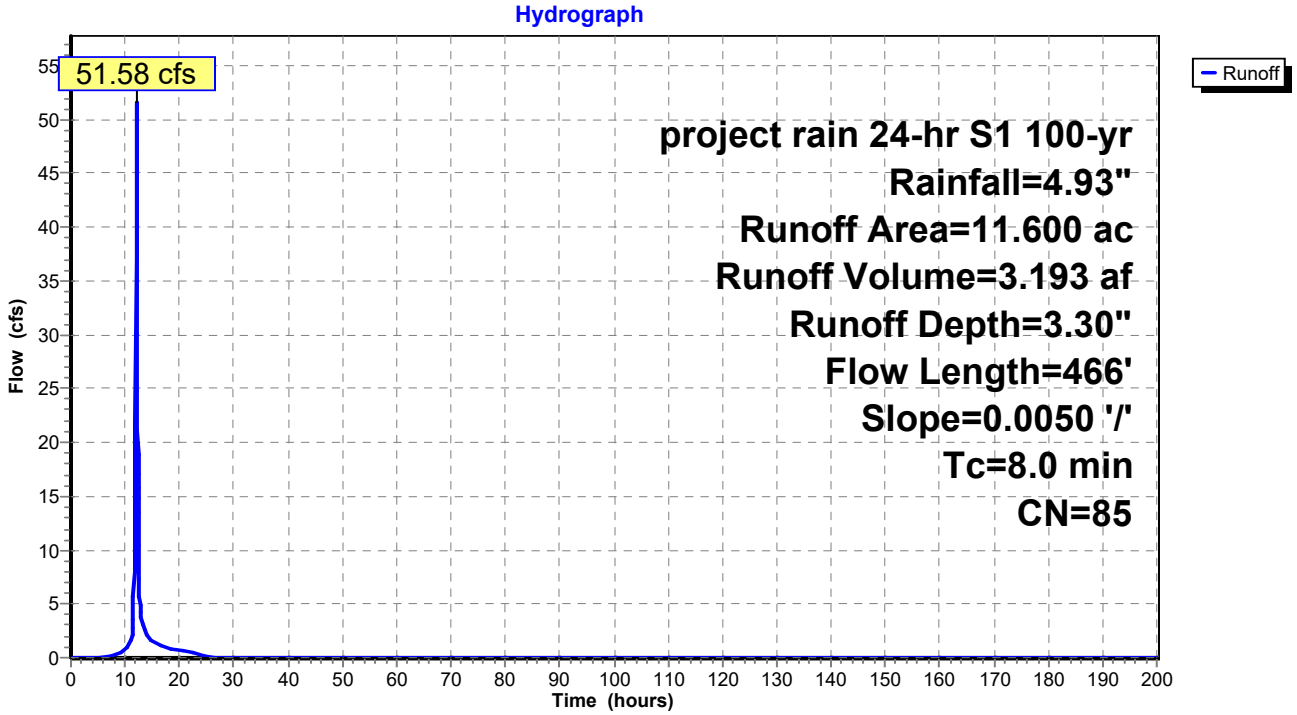
Runoff = 51.58 cfs @ 12.06 hrs, Volume= 3.193 af, Depth= 3.30"
Routed to Link 09 : Ex Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

Area (ac)	CN	Description
5.600	98	Paved parking, HSG D
6.000	73	Brush, Good, HSG D
11.600	85	Weighted Average
6.000		51.72% Pervious Area
5.600		48.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	100	0.0050	0.65		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.17"
5.4	366	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
8.0	466	Total			

Subcatchment 08: Ex Subarea B-1

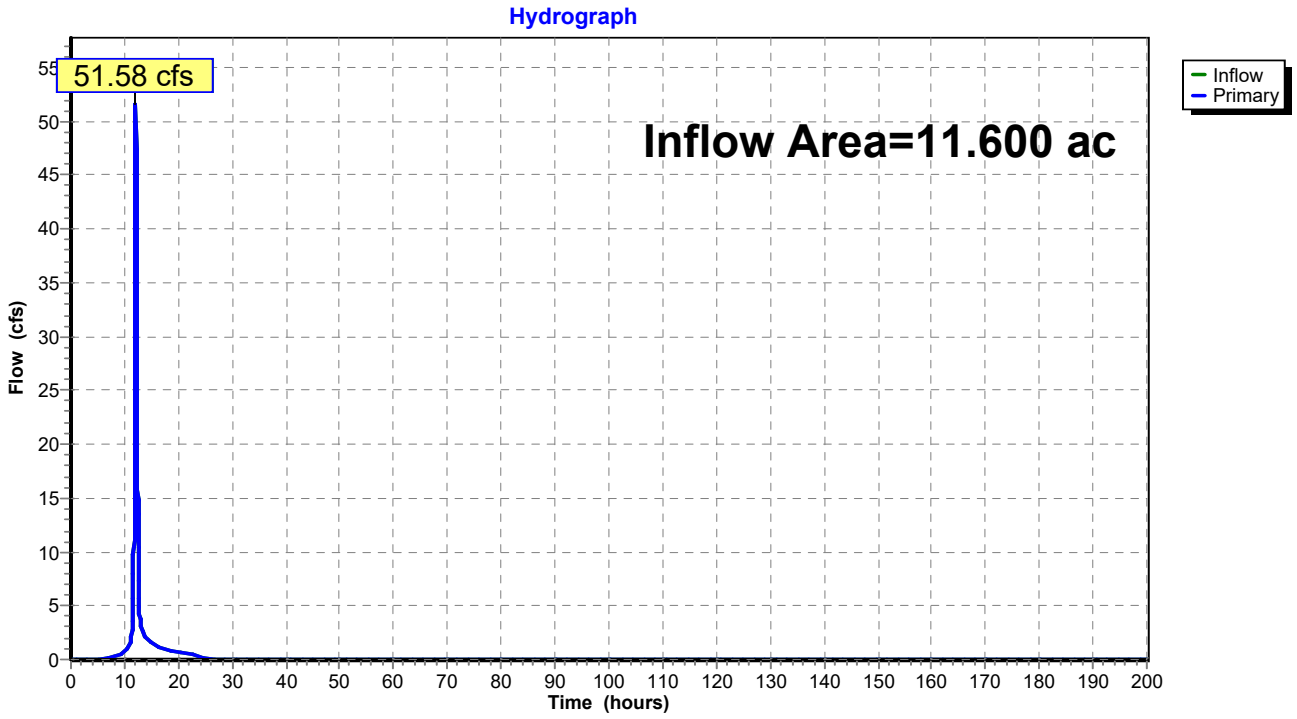


Summary for Link 09: Ex Analysis Point B

Inflow Area = 11.600 ac, 48.28% Impervious, Inflow Depth = 3.30" for 100-yr event
Inflow = 51.58 cfs @ 12.06 hrs, Volume= 3.193 af
Primary = 51.58 cfs @ 12.06 hrs, Volume= 3.193 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 09: Ex Analysis Point B



Summary for Subcatchment 10: Pr Subarea A-1

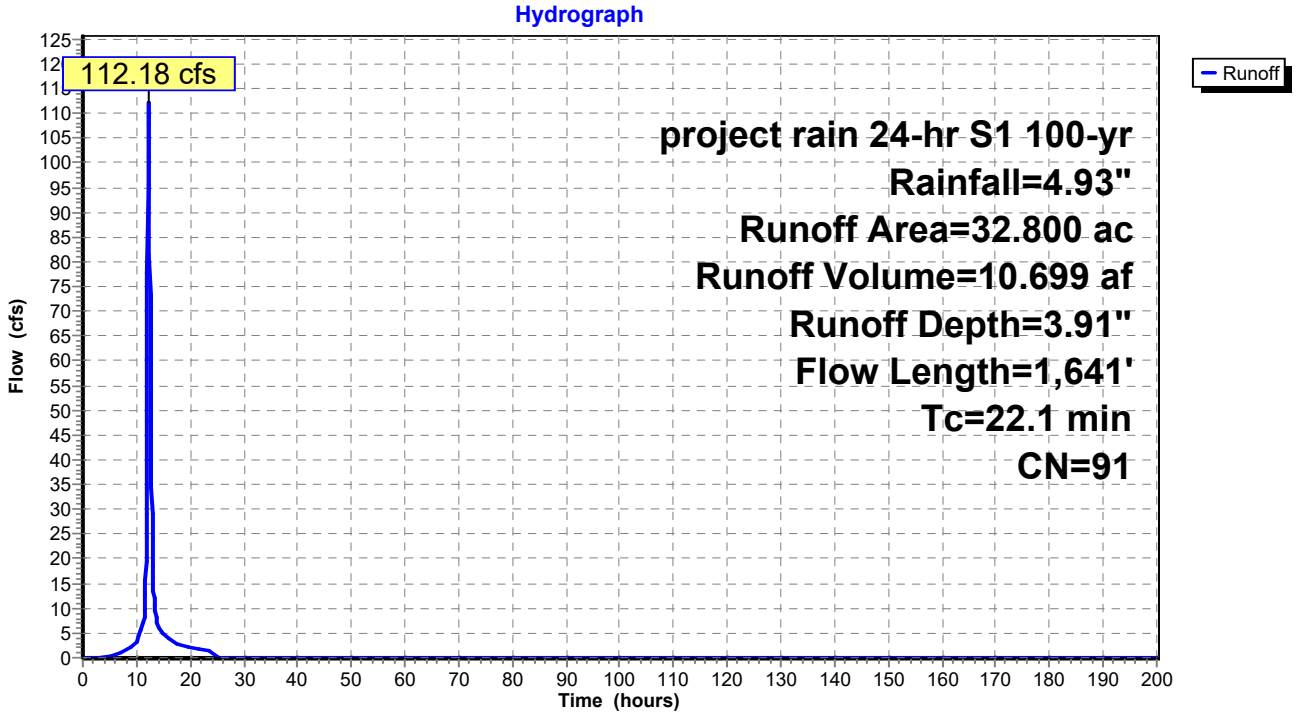
Runoff = 112.18 cfs @ 12.26 hrs, Volume= 10.699 af, Depth= 3.91"
Routed to Link 13 : Pr Analysis Point A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

	Area (ac)	CN	Description
*	2.800	98	Paved parking, HSG D (Road and Public Road in ROW)
*	2.000	73	Brush, Good, HSG D (Offsite)
*	1.800	80	>75% Grass cover, Good, HSG D (ROW and Public ROW)
*	7.400	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	17.300	98	Paved parking, HSG D (Lots @ 70% IMP)
*	0.600	96	Gravel surface, HSG D (Offsite)
*	0.200	80	>75% Grass cover, Good, HSG D (Offsite)
*	0.700	98	Paved parking, HSG D (Offsite)
	32.800	91	Weighted Average
	12.000		36.59% Pervious Area
	20.800		63.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow (Assumed)** Grass: Short n= 0.150 P2= 2.17"
3.4	330	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Assumed)** Unpaved Kv= 16.1 fps
3.0	1,211	0.0090	6.83	21.46	**Pipe Channel, SS (Assumed)** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
22.1	1,641	Total			

Subcatchment 10: Pr Subarea A-1



Summary for Subcatchment 11: Pr Subarea A-2

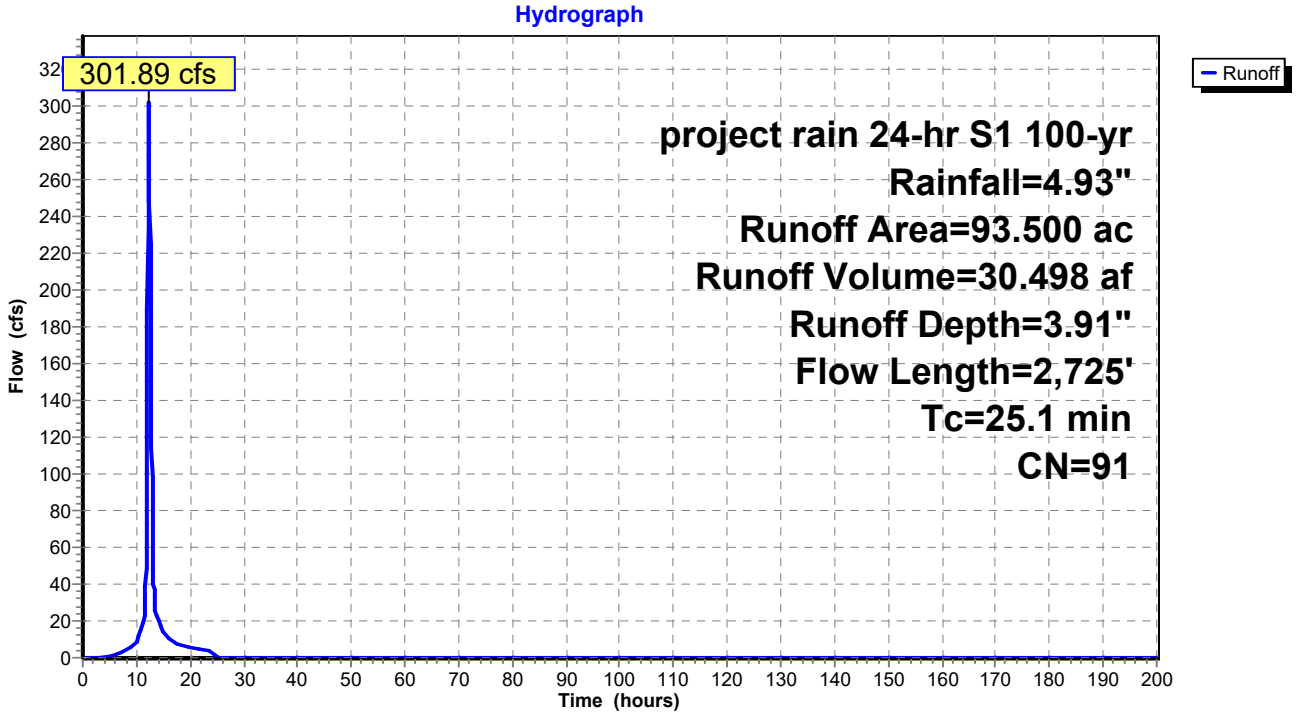
Runoff = 301.89 cfs @ 12.29 hrs, Volume= 30.498 af, Depth= 3.91"
Routed to Pond 12 : PR SWMF A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

	Area (ac)	CN	Description
*	31.000	98	Paved parking, HSG D (ROAD & Building)
	6.350	98	Water Surface, 0% imp, HSG D
	16.500	80	>75% Grass cover, Good, HSG D
*	8.300	80	>75% Grass cover, Good, HSG D (Lots @ 30% Pervious)
*	19.100	98	Paved parking, HSG D (Lots @ 70% IMP)
*	2.450	96	Gravel surface, HSG D (Substation Area)
*	8.900	73	Brush, Good, HSG D (Offsite)
*	0.900	96	Gravel surface, HSG D (Offsite)
	93.500	91	Weighted Average
	43.400		46.42% Pervious Area
	50.100		53.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.17"
2.8	330	0.0150	1.97		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
6.6	2,295	0.0050	5.81	627.91	**Channel Flow, Perimeter Channel (Dimention @ Halfway Pt)** Area= 108.0 sf Perim= 32.8' r= 3.29' n= 0.040 Earth, cobble bottom, clean sides
25.1	2,725	Total			

Subcatchment 11: Pr Subarea A-2



Summary for Pond 12: PR SWMF A

Inflow Area = 93.500 ac, 53.58% Impervious, Inflow Depth = 3.91" for 100-yr event
Inflow = 301.89 cfs @ 12.29 hrs, Volume= 30.498 af
Outflow = 6.77 cfs @ 18.75 hrs, Volume= 30.257 af, Atten= 98%, Lag= 387.5 min
Primary = 6.77 cfs @ 18.75 hrs, Volume= 30.257 af
Routed to Link 13 : Pr Analysis Point A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Starting Elev= 590.00' Surf.Area= 295,658 sf Storage= 672,581 cf
Peak Elev= 595.63' @ 18.75 hrs Surf.Area= 368,953 sf Storage= 1,720,337 cf (1,047,756 cf above start)

Plug-Flow detention time= 2,975.6 min calculated for 14.817 af (49% of inflow)
Center-of-Mass det. time= 1,778.0 min (2,579.8 - 801.8)

Volume	Invert	Avail.Storage	Storage Description
#1	590.00'	2,542,547 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	584.00'	55,389 cf	**Forebay (North) (Prismatic)** Listed below (Recalc)
#3	584.00'	33,522 cf	**Forebay (East) (Prismatic)** Listed below (Recalc)
#4	580.00'	583,671 cf	**Deep Pool (Prismatic)** Listed below (Recalc)
		3,215,128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
590.00	147,829	0	0
592.00	175,427	323,256	323,256
594.00	203,203	378,630	701,886
596.00	225,189	428,392	1,130,278
598.00	247,675	472,864	1,603,142
600.00	269,946	517,621	2,120,763
601.50	292,432	421,784	2,542,547

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	4,689	0	0
586.00	7,082	11,771	11,771
588.00	9,938	17,020	28,791
589.00	11,463	10,701	39,492
590.00	20,332	15,898	55,389

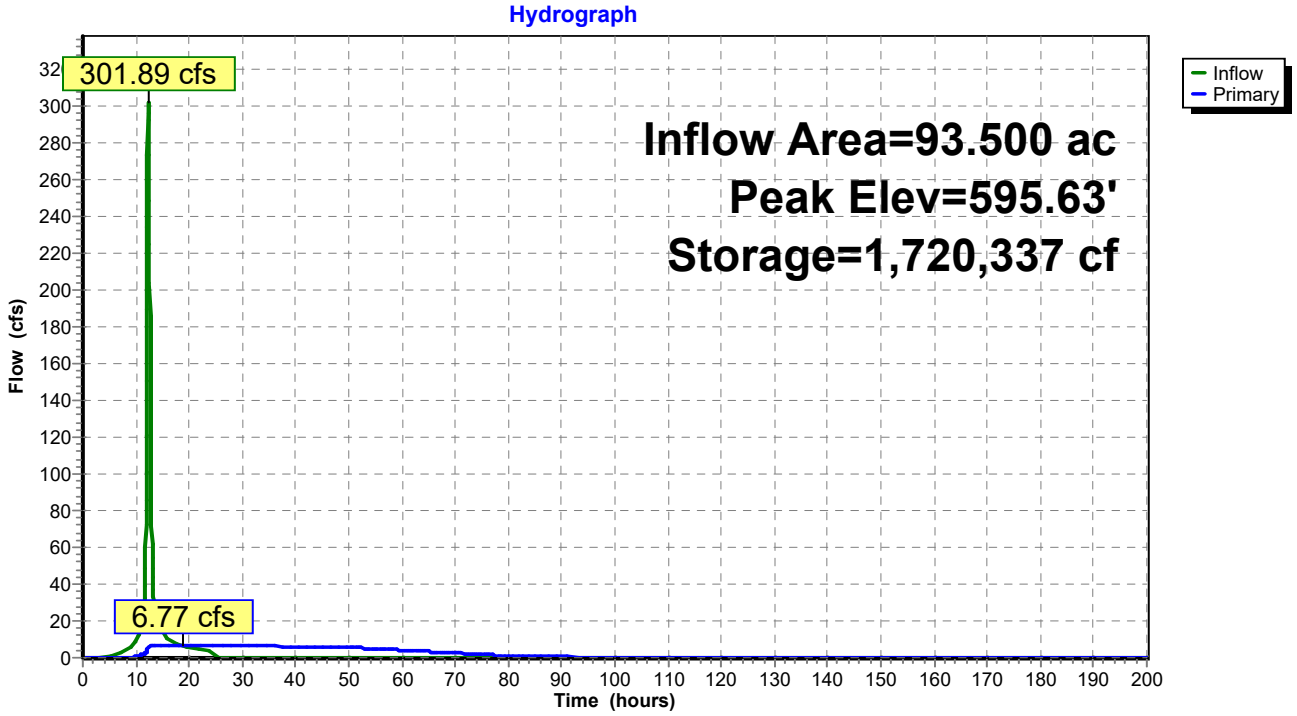
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.00	820	0	0
586.00	3,325	4,145	4,145
588.00	6,305	9,630	13,775
589.00	7,888	7,097	20,872
590.00	17,412	12,650	33,522

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
580.00	29,839	0	0
582.00	40,383	70,222	70,222
584.00	51,248	91,631	161,853
586.00	62,480	113,728	275,581
588.00	73,904	136,384	411,965
589.00	79,711	76,808	488,773
590.00	110,085	94,898	583,671

Device	Routing	Invert	Outlet Devices
#1	Primary	589.00'	**15.0" Round Culvert** L= 775.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 589.00' / 585.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	590.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 590.00' / 589.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 1	594.00'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	599.50'	**60.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.77 cfs @ 18.75 hrs HW=595.63' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 6.77 cfs @ 5.52 fps)
  - **2=Culvert** (Passes < 8.54 cfs potential flow)
  - **3=Grate** (Passes < 24.59 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 12: PR SWMF A

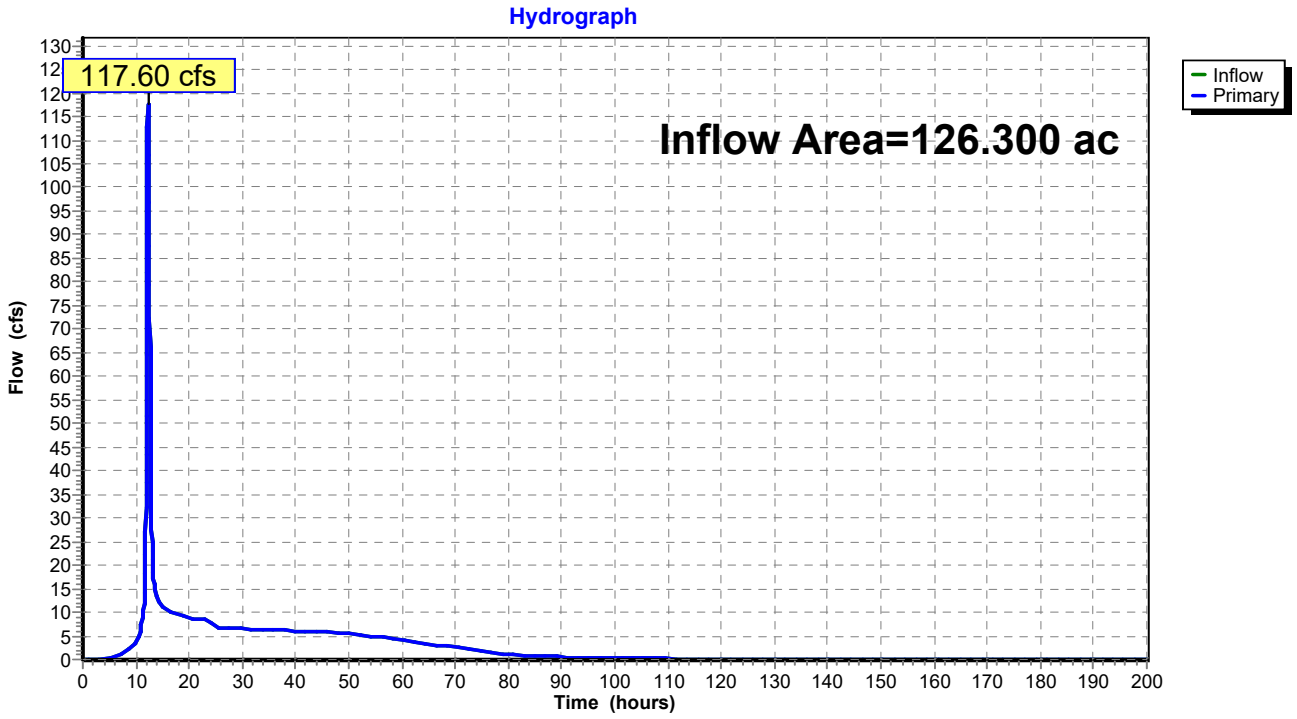


Summary for Link 13: Pr Analysis Point A

Inflow Area = 126.300 ac, 56.14% Impervious, Inflow Depth > 3.89" for 100-yr event
Inflow = 117.60 cfs @ 12.26 hrs, Volume= 40.956 af
Primary = 117.60 cfs @ 12.26 hrs, Volume= 40.956 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 13: Pr Analysis Point A



Summary for Subcatchment 14: Pr Subarea B-1

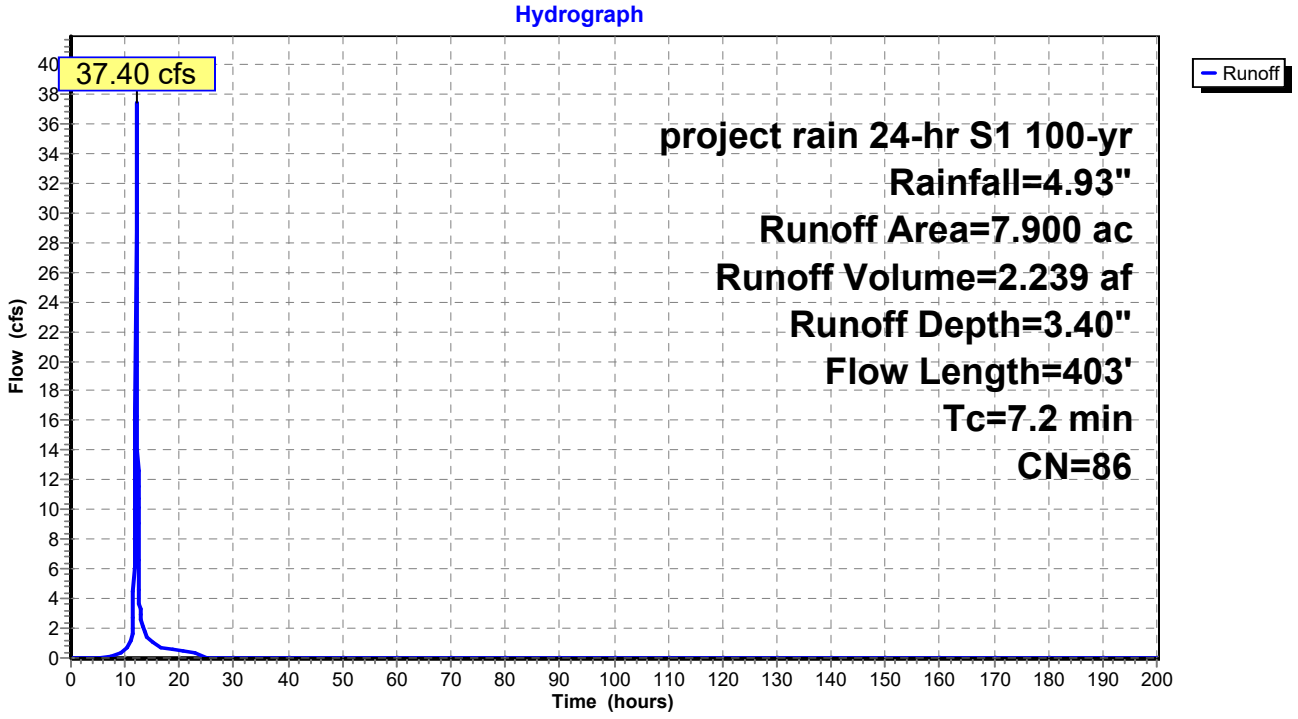
Runoff = 37.40 cfs @ 12.06 hrs, Volume= 2.239 af, Depth= 3.40"
Routed to Link 15 : Pr Analysis Point B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
project rain 24-hr S1 100-yr Rainfall=4.93"

Area (ac)	CN	Description
5.100	80	>75% Grass cover, Good, HSG D
2.800	96	Gravel surface, HSG D
7.900	86	Weighted Average
7.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.0100	0.38		**Sheet Flow, Sheet Flow (Gravel)** n= 0.030 P2= 2.17"
2.2	213	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc (Gravel)** Unpaved Kv= 16.1 fps
0.7	90	0.0200	2.28		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
7.2	403	Total			

Subcatchment 14: Pr Subarea B-1

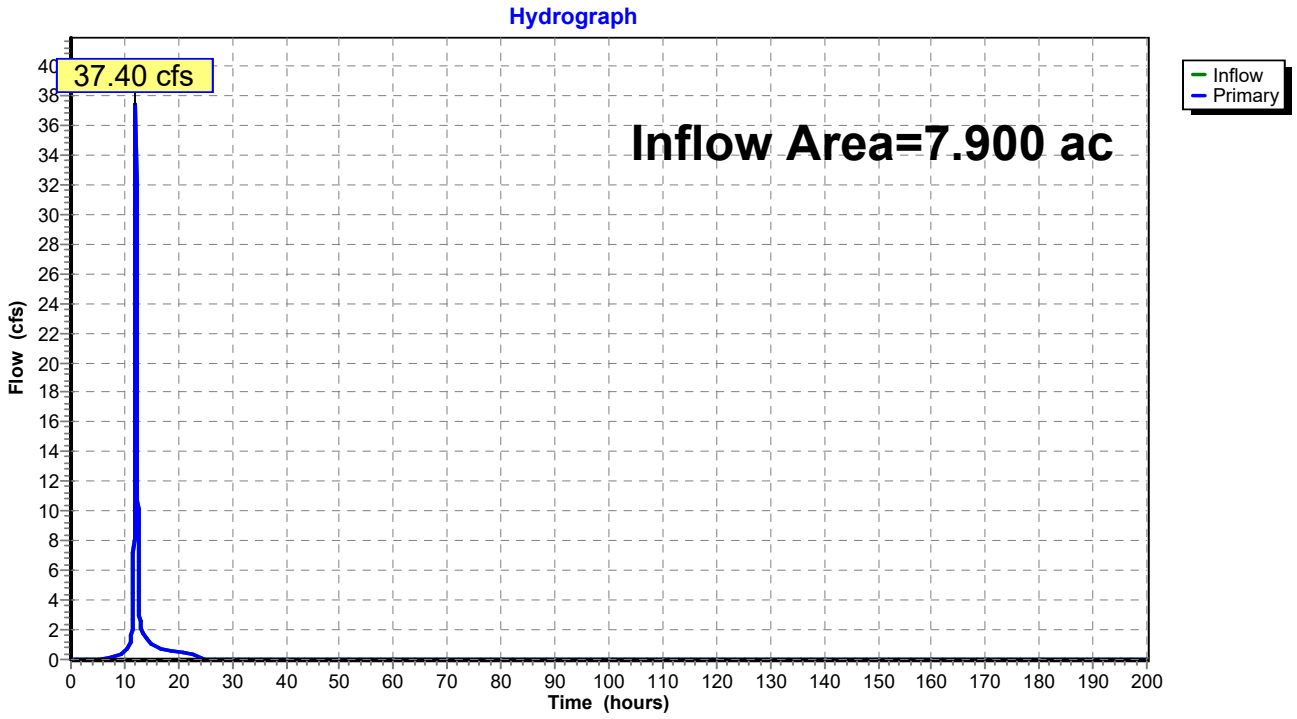


Summary for Link 15: Pr Analysis Point B

Inflow Area = 7.900 ac, 0.00% Impervious, Inflow Depth = 3.40" for 100-yr event
Inflow = 37.40 cfs @ 12.06 hrs, Volume= 2.239 af
Primary = 37.40 cfs @ 12.06 hrs, Volume= 2.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Link 15: Pr Analysis Point B



Appendix 3
Channel Protection and Stormwater Management Facility Calculations

Figure 06 – Channel Protection Volume Exhibit
SWMF Channel Protection Volume Calculations
SWMF Channel Protection Orifice & Spillway Calculations
SWMF Forebay and Deep Pool Sizing Calculations

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CALCULATIONS:

Project: **Channel Protection Volume Calculations**
Riverview Innovation and Tech. Campus

Project No.: **2968**
Date: **3/11/2026**
By: **JGC**
Sheet **1 of 3**

NOTE: CPV Requirements (NYSDEC SWMD Chapter 9) for this redevelopment project are met by reducing 1year post development peak discharge rates. However, CPv Volume is provided in the SWMF as part of the quanity controls which would satisfy the Chapter 4 criteria for New Development.

COMPUTE CHANNEL PROTECTION VOLUME - STORMWATER MANAGEMENT FACILITY

Channel Protection Volume: Provide 24 hours of extended detention (T) for one-year event.

Design Storms 1-YEAR (in) 1.78

1. DETERMINE THE VALUE OF THE UNIT PEAK DISCHARGE (qu) USING TR-55 AND TYPE II

PROPERTY LIMITS= **119.80 acres**

COMPOSITE RUNOFF CURVE NUMBER (CN) **92** *(COMPSITE CN FOR ONLY PROPERY LIMITS)*

Ia = (200/CN - 2) **Ia VALUE =** **0.174**

Ia/P **Ia/P VALUE =** **0.098**

TIME OF CONCENTRATION (Tc) = **0.418 hrs.** *(PR SUBAREA A-2, SEE DRAINAGE CALCS)*

Peak Unit Discharge, (qu) (Exhibit 4-II) **qu =** **590 csm/in**

When T=24 hours, find qo/qi (Figure 3-15) **qo/qi =** **0.030**

$Vs/Vr = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3$
where Vs = channel protection storage (Cpv) and Vr = volume of runoff in inches

Vs/Vr **Vs/Vr VALUE =** **0.642**

Direct Runoff, Q (Figure 2-1) **Q VALUE =** **0.30 inches**

Channel Protection Storage, Vs
Vs = Cpv = (Vs/Vr)(Q)(1/12)(AREA)

Vs **Vs VALUE =** **1.921 ac-ft**
83699 CF **CPv =** **83699 CF**

Release Rate over 24 Hours 83699 ft^3 / [(24 hr) (3600 sec / hr)] = **0.969 cfs**

CHANNEL PROTECTION VOLUME PROVIDED

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
590.00	147,828	0
592.00	175,427	323,255
594.00	203,203	701,885

701,885 > 83,699
OK

Figure 2-1 Solution of runoff equation.

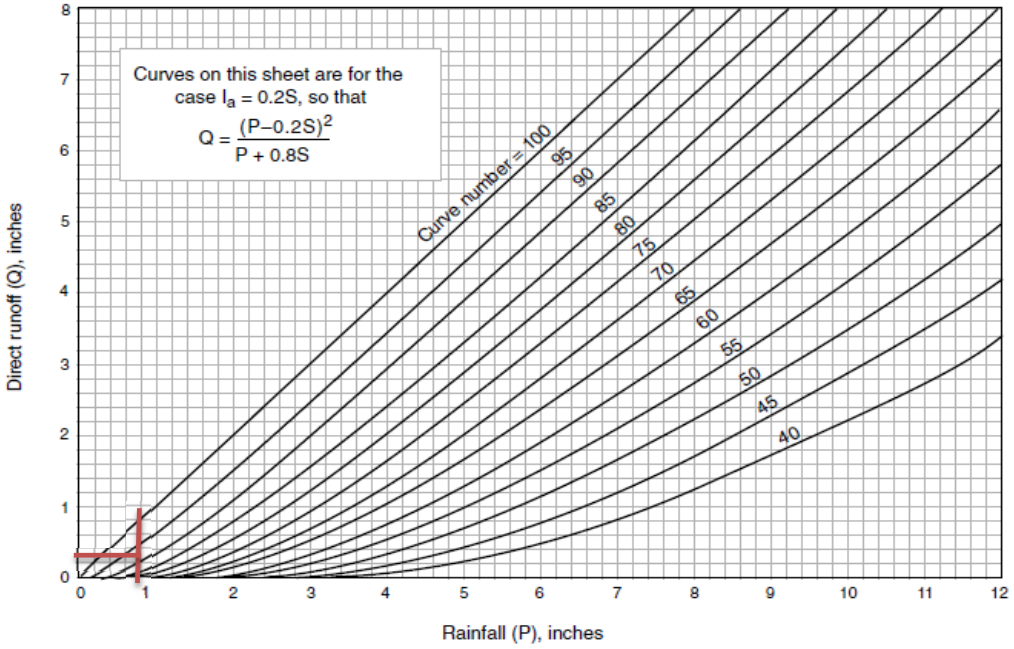


Figure 3-15. Detention Time vs. Discharge Ratios
(Source: Maryland Department of the Environment, 1998)

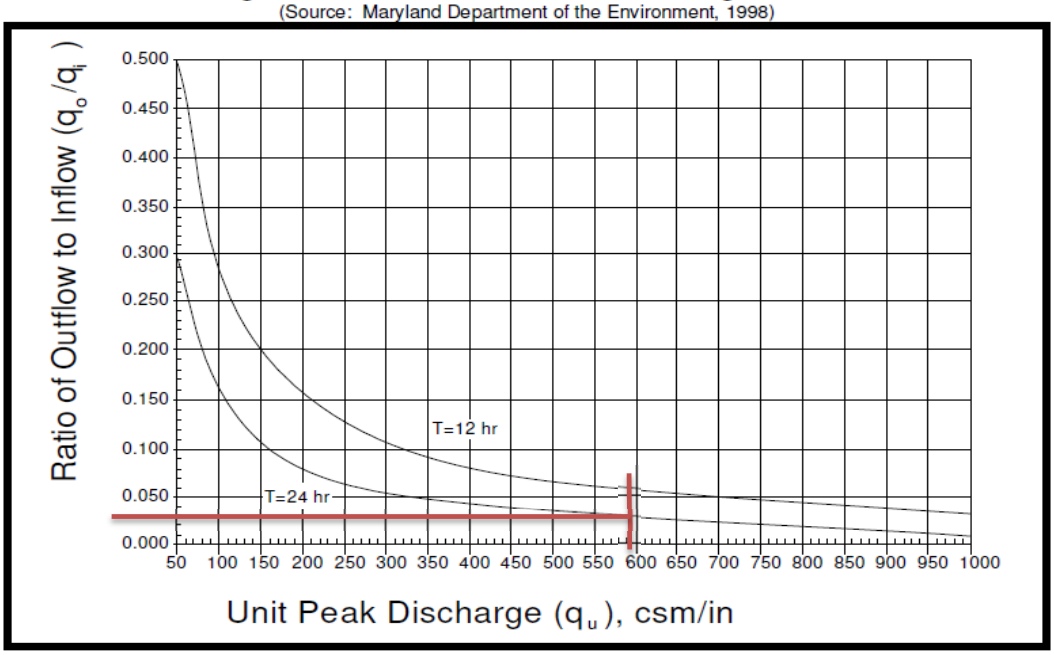
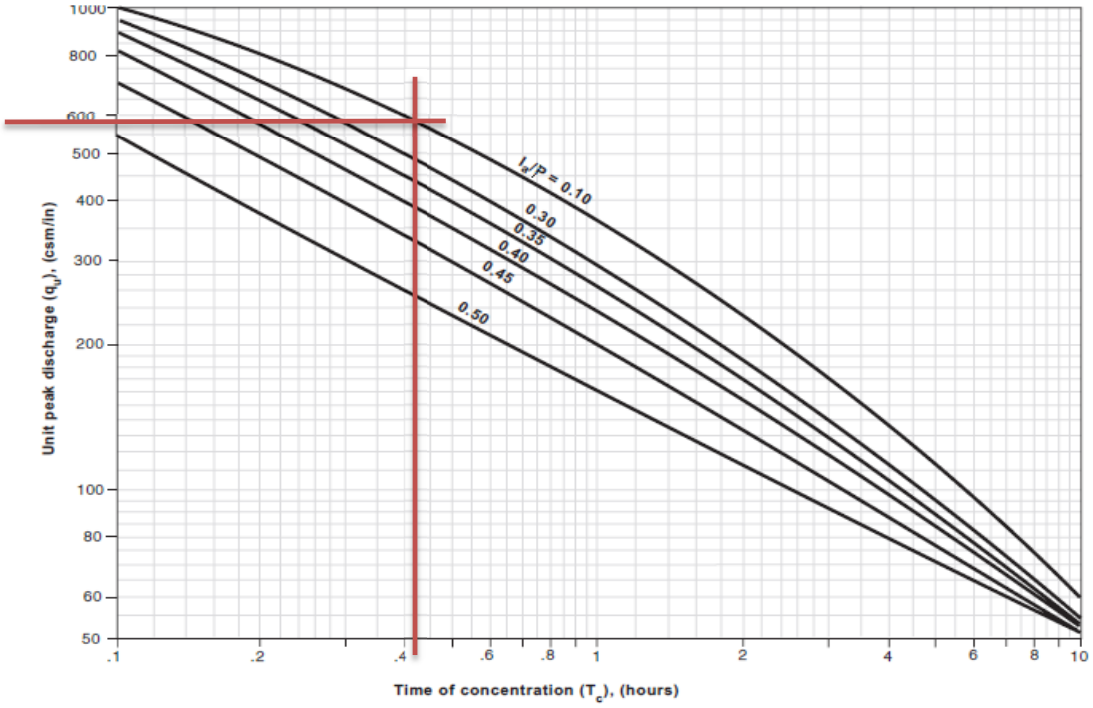


Exhibit 4-II Unit peal discharge (q_u) for NRCS (SCS) type II rainfall distribution



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CALCULATIONS:

Project: **Orifice / Spillway Calculations**
Riverview Innovation and Tech. Campus

Project No.:	**2968**
Date:	**3/11/2026**
By:	**JGC**
Sheet	**1 of 1**

COMPUTE OFIFICE DIAMETER

Required Channel Protection Volume (RCPv)= **83699 cf**

Elevation at RCPv = **590.55**

Flow Required to release RCPv over 24 Hrs.= **0.97 cfs**

OUTLET ORIFICE = **12 inch dimeter**

Invert @ Orifice = **590** Average Head = **0.02 ft**

Center of Orifice = **0.5 FT**

Q = CA[2GH]1/2= **Q= 0.60 cfs**
Where C= 0.6

If Avearge Outflow Rate using oriface < Rate to release RCPv over 24 hrs "OK"
*(unless using smallest recommended orifice of 3")

0.598 < 0.97

OK

SPILLWAY CALCULATION

Extreme Flood Protection, Q of undetained 100-year inflow Hydrograph

100-year Storm Event Inflow (Q) to SMWF = **302** cfs

Height (H) from Spillway Invert to Top of Berm= **2.00** ft

Q =(0.666)*C*L*((2g)^.5)H^(3/2) L = **39.92** ft **Use L = 50 ft**
Where C= 0.5

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CALCULATIONS:

Project: **Forebay / Deep Pool Sizing Calculations**
Riverview Innovation and Tech. Campus

Project No.:	**2968**
Date:	**3/11/2026**
By:	**JGC**
Sheet	**1 of 1**

WATER QUALITY VOLUME, WQv

Note: WQv calculated for the SWMF is to be used for pond sizing calculations only, and does not apply to overall site WQv Requirements.

DRAINAGE AREA (A) TO FACILITY= **93.50 acres**

IMPERVIOUS AREA = **53.45 acres**

90 PERCENTILE RAINFALL EVENT = **1.00 inches**

CURVE NUMBER (CN) = **92.0**

TIME OF CONCENTRATION (Tc) = **0.418 hours**

IMPERVIOUS COVER (I) = **0.57**

RUNOFF COEFFICENT (Rv) = **0.56**
Rv = 0.05 + (I)(0.9)

WATER QUALITY VOLUME (WQv) = **4.398 acre-ft** **191591 cf**
WQv = P * Rv * A / 12

PRE-TREATMENT VOLUME (NORTH FOREBAY)

10% WQv * 55% = 10,538 ft^3 (required)

* Recieves Approx 55% of Post Construction Area

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
584.00	See Hydrographs (PR SWMF A)	0
590.00	See Hydrographs (PR SWMF A)	55,389
		55,389 > 10,538 OK

PRE-TREATMENT VOLUME (EAST FOREBAY)

10% WQv = 8,622 ft^3 (required)

* Recieves Approx 45% of Post Construction Area

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
584.00	See Hydrographs (PR SWMF A)	0
590.00	See Hydrographs (PR SWMF A)	33,522
		33,522 > 8,622 OK

PERMANENT POOL VOLUME (DEEP POOL)

50% WQv = 95,796 ft^3 (required)

ELEVATION (ft)	CONTOUR AREA (ft^2)	TOTAL STORAGE (ft^3)
582.00	See Hydrographs (PR SWMF A)	0
590.00	See Hydrographs (PR SWMF A)	583,671
		583,671 > 95,796 OK

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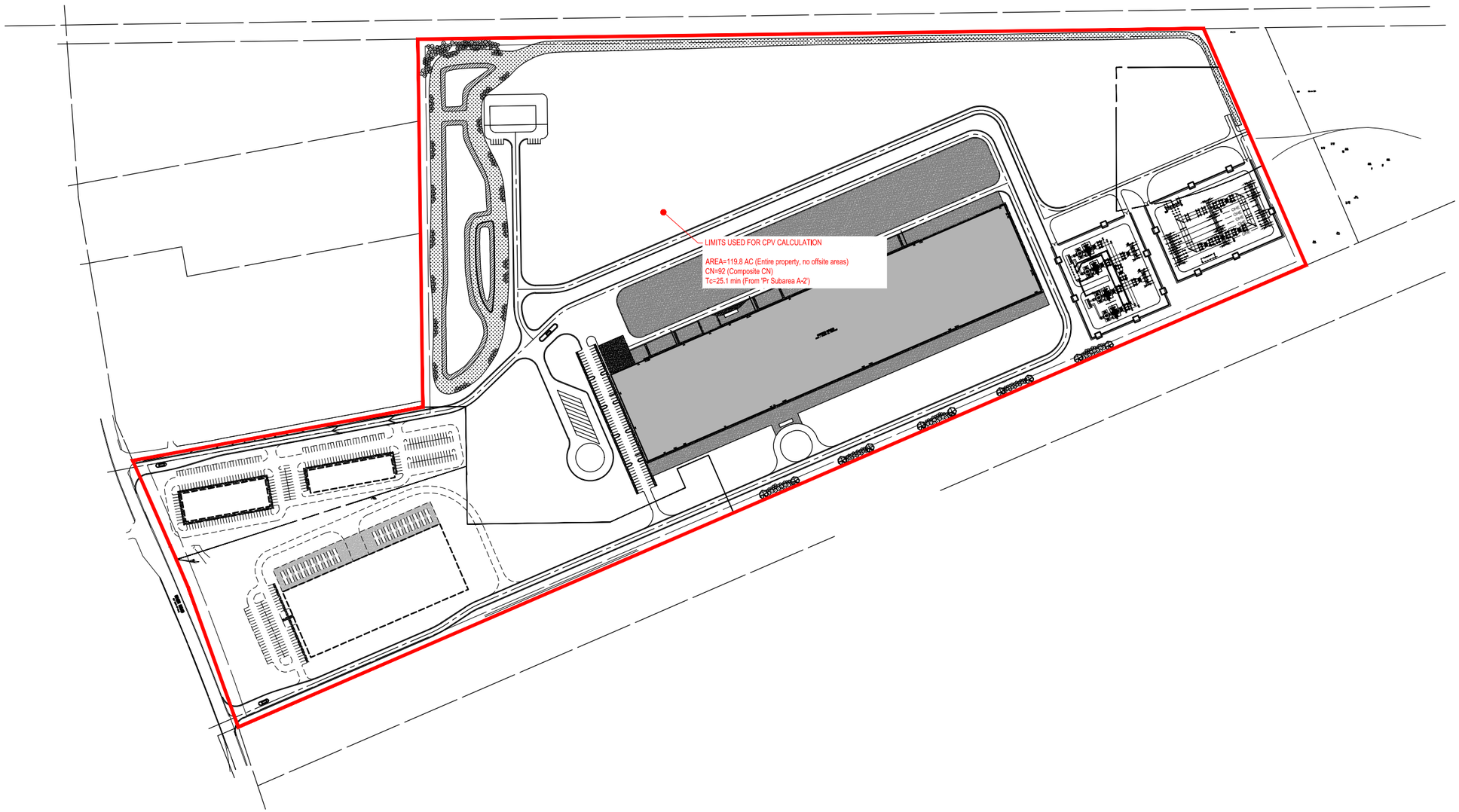

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

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Drawing Alteration

The following is an excerpt from the New York State Education Law Article 145 Section 7209 and applies to this drawing:

"It is a violation of this law for any person, unless he is acting under the direction of a licensed professional engineer or land surveyor to alter any item in any way. If an item bearing the seal of an engineer or land surveyor is altered, the altering engineer or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration."

	REVISIONS	DATE	BY
7			
6			
5			
4			
3			
2			
1			

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10 LIFTBRIDGE LANE EAST
FAIRPORT, NEW YORK 14450
WWW.BMEPC.COM
585-377-7360

PROJECT: RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
LOCATION: TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK STATE
CLIENT: INVENTUM ENGINEERING
441 CARLISLE DRIVE
HERNDON, VIRGINIA 20170
DRAWING TITLE: CHANNEL PROTECTION VOLUME EXHIBIT

PROJECT MANAGER	
PGV	
PROJECT ENGINEER	
JGC	
DRAWN BY	
JGC	
SCALE	DATE ISSUED
AS NOTED	MARCH 2026
PROJECT NO.	
2968	
DRAWING NO.	
FIGURE 06	

Appendix 4
Stormwater Quality

Figure 07 – Existing Conditions Landcover Exhibit
Figure 08 – Proposed Conditions Landcover Exhibit

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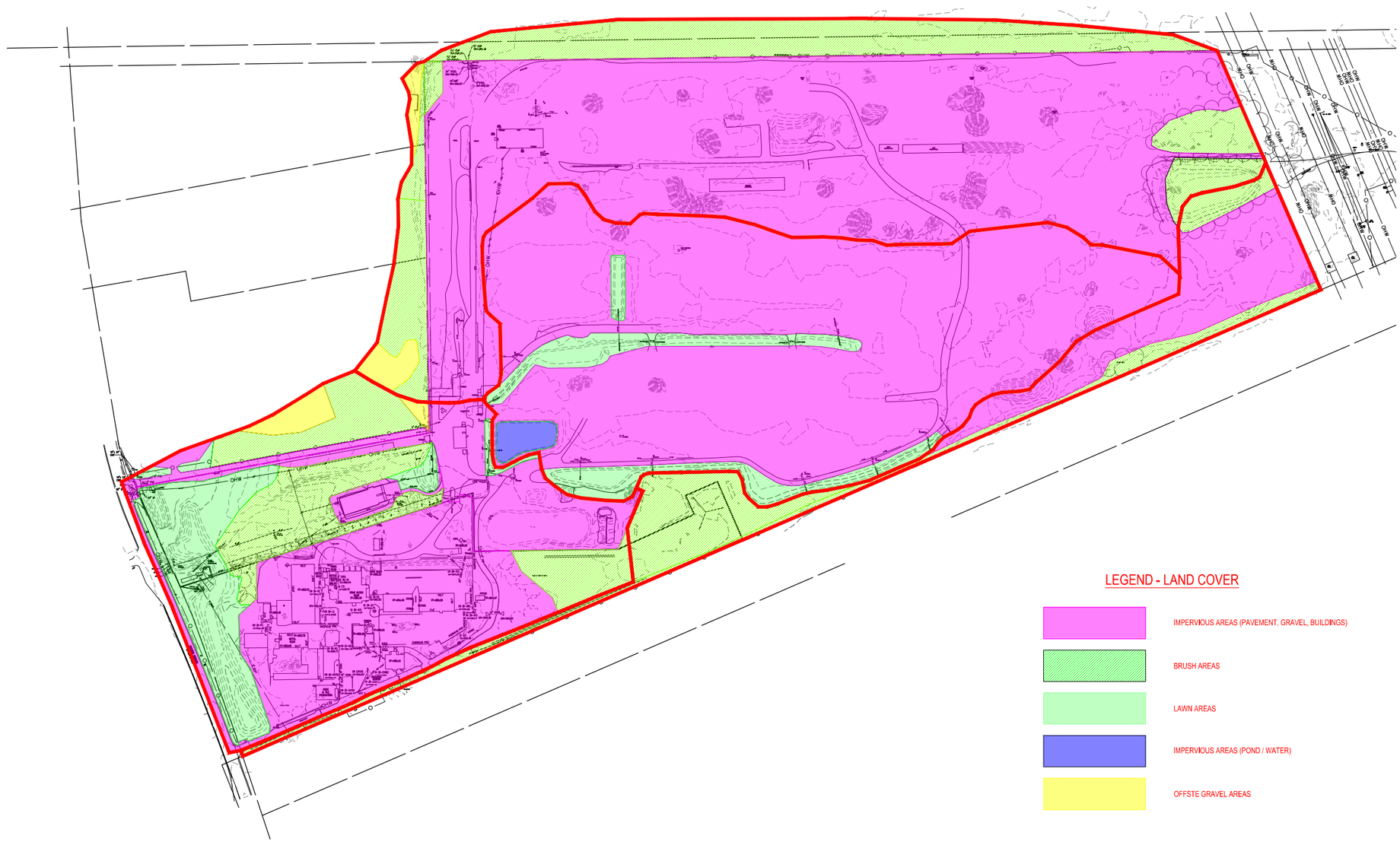
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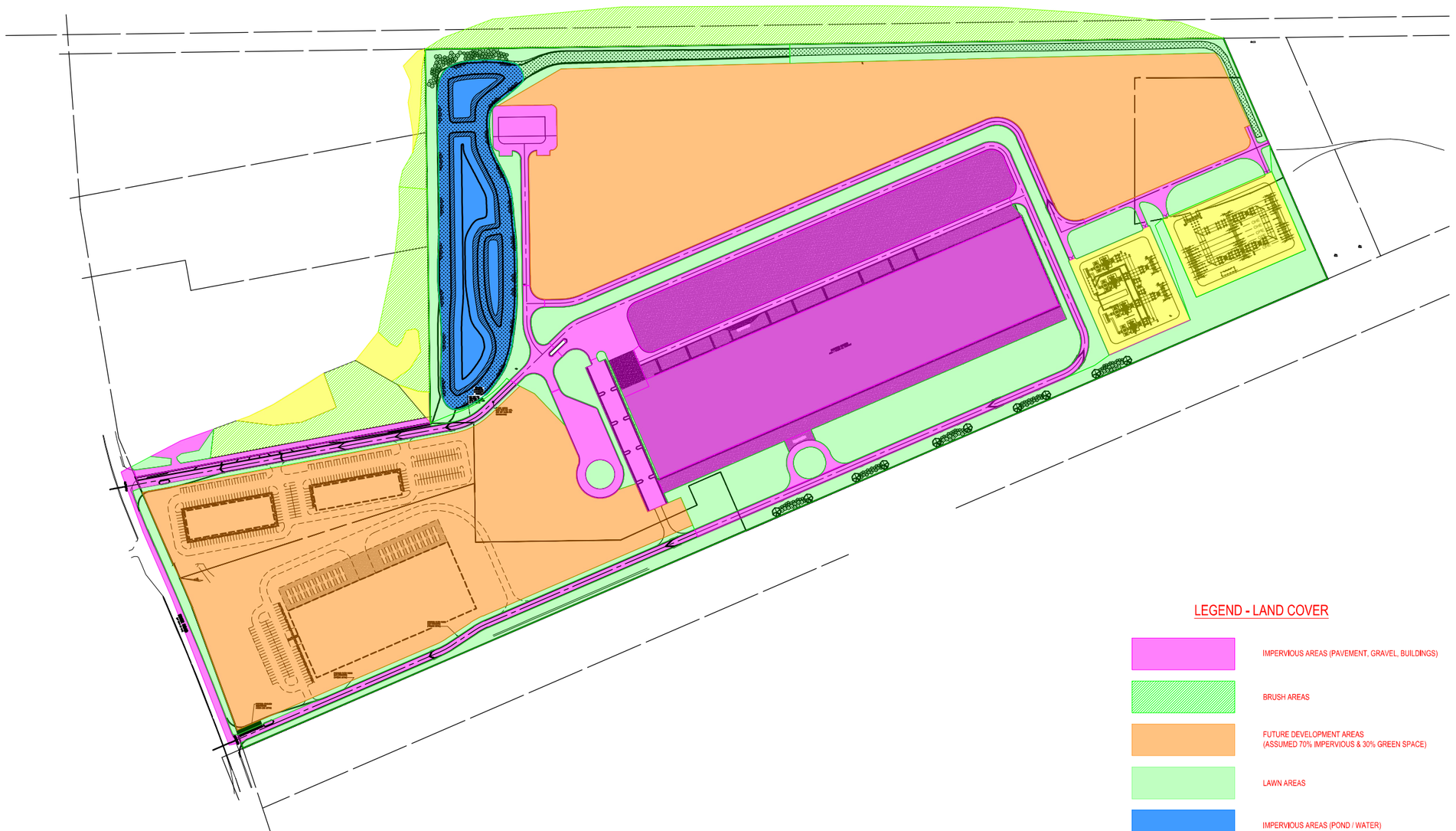

LEGEND - LAND COVER

- IMPERVIOUS AREAS (PAVEMENT, GRAVEL, BUILDINGS)
- BRUSH AREAS
- FUTURE DEVELOPMENT AREAS (ASSUMED 70% IMPERVIOUS & 30% GREEN SPACE)
- LAWN AREAS
- IMPERVIOUS AREAS (POND / WATER)
- OFFSTE GRAVEL AREAS

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

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	DATE	BY
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REVISIONS

BME ASSOCIATES
ENGINEERS • SURVEYORS • LANDSCAPE ARCHITECTS
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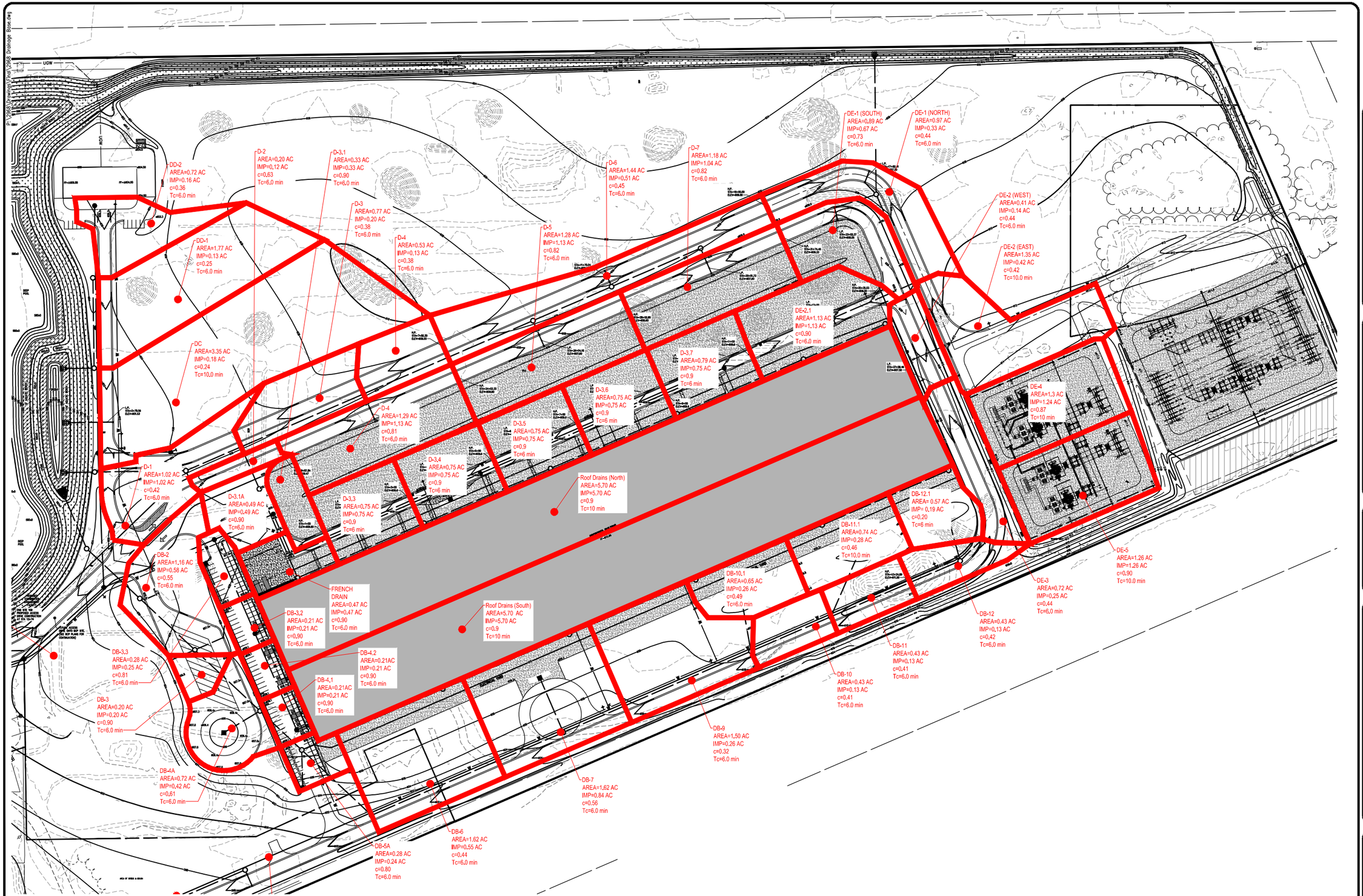
PROJECT: RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
LOCATION: TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK STATE
CLIENT: INVENTIUM ENGINEERING
441 CARLISLE DRIVE
HERNDON, VIRGINIA 20170
DRAWING TITLE: PROPOSED LAND COVER EXHIBIT

PROJECT MANAGER	PCV
PROJECT ENGINEER	JGC
DRAWN BY	JGC
SCALE	AS NOTED
DATE ISSUED	MARCH 2026
PROJECT NO.	2968
DRAWING NO.	FIGURE 08

Appendix 5
Storm Sewers

Figure 09 –Storm Sewer Map
Storm Sewer Sizing Calculations
Rip-Rap Outlet Sizing Calculations


DD-2
AREA=0.72 AC
IMP=0.16 AC
c=0.36
Tc=6.0 min
DD-1
AREA=1.77 AC
IMP=0.13 AC
c=0.25
Tc=6.0 min
DC
AREA=3.35 AC
IMP=0.18 AC
c=0.24
Tc=10.0 min
D-1
AREA=1.02 AC
IMP=1.02 AC
c=0.42
Tc=6.0 min
D-2
AREA=0.20 AC
IMP=0.12 AC
c=0.63
Tc=6.0 min
D-3,1
AREA=0.33 AC
IMP=0.33 AC
c=0.90
Tc=6.0 min
D-3
AREA=0.77 AC
IMP=0.20 AC
c=0.38
Tc=6.0 min
D-4
AREA=0.53 AC
IMP=0.13 AC
c=0.38
Tc=6.0 min
D-5
AREA=1.28 AC
IMP=1.13 AC
c=0.82
Tc=6.0 min
D-6
AREA=1.44 AC
IMP=0.51 AC
c=0.45
Tc=6.0 min
D-7
AREA=1.18 AC
IMP=1.04 AC
c=0.82
Tc=6.0 min
DE-1 (SOUTH)
AREA=0.89 AC
IMP=0.67 AC
c=0.73
Tc=6.0 min
DE-1 (NORTH)
AREA=0.97 AC
IMP=0.33 AC
c=0.44
Tc=6.0 min
DE-2 (WEST)
AREA=0.41 AC
IMP=0.14 AC
c=0.44
Tc=6.0 min
DE-2 (EAST)
AREA=1.35 AC
IMP=0.42 AC
c=0.42
Tc=10.0 min
DE-2.1
AREA=1.13 AC
IMP=1.13 AC
c=0.90
Tc=6.0 min
D-4
AREA=1.29 AC
IMP=1.13 AC
c=0.81
Tc=6.0 min
D-3,6
AREA=0.75 AC
IMP=0.75 AC
c=0.9
Tc=6 min
D-3,7
AREA=0.79 AC
IMP=0.75 AC
c=0.9
Tc=6 min
D-3,5
AREA=0.75 AC
IMP=0.75 AC
c=0.9
Tc=6 min
D-3,4
AREA=0.75 AC
IMP=0.75 AC
c=0.9
Tc=6 min
D-3,3
AREA=0.75 AC
IMP=0.75 AC
c=0.9
Tc=6 min
D-3,1A
AREA=0.49 AC
IMP=0.49 AC
c=0.90
Tc=6.0 min
Roof Drains (North)
AREA=5.70 AC
IMP=5.70 AC
c=0.9
Tc=10 min
DE-4
AREA=1.3 AC
IMP=1.24 AC
c=0.87
Tc=10 min
DB-12.1
AREA= 0.57 AC
IMP= 0.19 AC
c=0.20
Tc=6 min
DB-11.1
AREA=0.74 AC
IMP=0.28 AC
c=0.46
Tc=10.0 min
DB-10.1
AREA=0.65 AC
IMP=0.26 AC
c=0.49
Tc=6.0 min
DB-12
AREA=0.43 AC
IMP=0.13 AC
c=0.42
Tc=6.0 min
DB-11
AREA=0.43 AC
IMP=0.13 AC
c=0.41
Tc=6.0 min
DB-10
AREA=0.43 AC
IMP=0.13 AC
c=0.41
Tc=6.0 min
DE-3
AREA=0.72 AC
IMP=0.25 AC
c=0.44
Tc=6.0 min
DE-5
AREA=1.26 AC
IMP=1.26 AC
c=0.90
Tc=10.0 min
DB-2
AREA=1.16 AC
IMP=0.58 AC
c=0.55
Tc=6.0 min
FRENCH DRAIN
AREA=0.47 AC
IMP=0.47 AC
c=0.90
Tc=6.0 min
DB-3,2
AREA=0.21 AC
IMP=0.21 AC
c=0.90
Tc=6.0 min
Roof Drains (South)
AREA=5.70 AC
IMP=5.70 AC
c=0.9
Tc=10 min
DB-4.2
AREA=0.21AC
IMP=0.21 AC
c=0.90
Tc=6.0 min
DB-4.1
AREA=0.21AC
IMP=0.21 AC
c=0.90
Tc=6.0 min
DB-3,3
AREA=0.28 AC
IMP=0.25 AC
c=0.81
Tc=6.0 min
DB-3
AREA=0.20 AC
IMP=0.20 AC
c=0.90
Tc=6.0 min
DB-4A
AREA=0.72 AC
IMP=0.42 AC
c=0.61
Tc=6.0 min
DB-9
AREA=1.50 AC
IMP=0.26 AC
c=0.32
Tc=6.0 min
DB-7
AREA=1.62 AC
IMP=0.84 AC
c=0.56
Tc=6.0 min
DB-6
AREA=1.62 AC
IMP=0.55 AC
c=0.44
Tc=6.0 min
DB-5A
AREA=0.28 AC
IMP=0.24 AC
c=0.80
Tc=6.0 min
UGW
DEEP POOL
ENGINEER'S NOTE:
CONTRACTOR SHALL REVIEW ALL SITE UTILITIES AND COORDINATE WITH ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION.

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Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	1 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	D-7	D-6	6.0	0.8	1.18	0.97				0.97	6.0	5.12	4.95	18	HDPE	0.012	211	0.50	1.06	8.06	0.58	4.84	0.7	D-6	6.7
INV	601.49	600.43																							
MH	D-6	D-5	6.0	0.5	1.44	0.65	D-7	6.7	0.97	1.62	6.7	4.98	8.04	24	HDPE	0.012	186	0.50	0.93	17.37	0.48	5.42	0.6	D-5	7.3
INV	600.43	599.50																							
MH	D-5	D-4	6.0	0.8	1.28	1.05	D-6	7.3	1.62	2.67	7.3	4.87	12.98	24	HDPE	0.012	402	0.50	2.01	17.37	0.67	6.14	1.1	D-4	8.4
INV	599.50	597.49																							
MH	D-4	D-3	6.0	0.4	0.53	0.20	D-5	8.4	2.67	2.87	8.4	4.68	13.43	24	HDPE	0.012	291	0.50	1.46	17.37	0.69	6.18	0.8	D-3	9.2
INV	597.49	596.04																							
MH	D-3.7	D-3.6	6.0	0.9	0.79	0.71				0.71	6.0	5.12	3.64	15	HDPE	0.012	200	0.50	1.00	4.96	0.66	4.47	0.7	D-3.6	6.7
INV	604.90	603.90																							
MH	D-3.6	D-3.5	6.0	0.9	0.75	0.68	D-3.7	6.7	0.71	1.39	6.7	4.97	6.89	18	HDPE	0.012	200	0.50	1.00	8.06	0.75	5.17	0.6	D-3.5	7.4
INV	603.65	602.65																							
MH	D-3.5	D-3.4	6.0	0.9	0.75	0.68	D-3.6	7.4	1.39	2.06	7.4	4.86	10.01	24	HDPE	0.012	221	0.50	1.11	17.37	0.55	5.77	0.6	D-3.4	8.0
INV	602.15	601.04																							
MH	D-3.4	D-3.3	6.0	0.9	0.75	0.68	D-3.5	8.0	2.06	2.74	8.0	4.75	12.98	24	HDPE	0.012	179	0.50	0.89	17.37	0.67	6.14	0.5	D-3.3	8.5
INV	601.04	600.15																							
MH	D-3.3	D-3.2	6.0	0.9	0.75	0.68	D-3.4	8.5	2.74	3.41	8.5	4.66	15.91	24	HDPE	0.012	194	0.50	0.97	17.37	0.82	6.30	0.5	D-3.2	9.0
INV	600.15	599.18																							
MH	D-3.2F	D-3.2E	6.0	0.9	1.14	1.03				1.03	6.0	5.12	5.25	18	HDPE	0.012	194	0.50	0.97	8.06	0.61	4.91	0.7	D-3.2E	6.7
INV	607.50	606.53																							
MH	D-3.2E	D-3.2D	6.0	0.9	1.14	1.03	D-3.2F	6.7	1.03	2.05	6.7	4.99	10.24	24	HDPE	0.012	300	0.50	1.50	17.37	0.56	5.80	0.9	D-3.2D	7.5
INV	606.03	604.53																							
MH	D-3.2D	D-3.2C	6.0	0.9	1.14	1.03	D-3.2E	7.5	2.05	3.08	7.5	4.83	14.88	24	HDPE	0.012	300	0.50	1.50	17.37	0.75	6.27	0.8	D-3.2C	8.3
INV	604.53	603.03																							

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Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	2 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	D-3.2C	D-3.2B	6.0	0.9	1.14	1.03	D-3.2D	8.32	3.08	4.10	8.3	4.70	19.28	36	HDPE	0.01	300	0.50	1.50	51.20	0.42	6.67	0.7	D-3.2E	9.1
INV	602.03	600.53																							
MH	D-3.2B	D-3.2A	6.0	0.9	1.14	1.03	D-3.2C	9.1	4.10	5.13	9.1	4.58	23.47	36	HDPE	0.01	300	0.50	1.50	51.20	0.47	7.08	0.7	D-3.2A	9.8
INV	600.53	599.03																							
MH	TD	D-3.2A	6.0	0.9	0.47	0.42				0.42	6.0	5.12	2.16	12	HDPE	0.01	8	27.70	2.22	20.36	0.23	17.31	0.0	D-3.2A	6.0
INV	603.25	601.03																							
MH	D-3.2A	D-3.2	0.0	0.0	0.00	0.00	D-3.2B	9.8	5.13	5.55	9.8	4.47	24.81	36	HDPE	0.01	57	1.50	0.86	88.69	0.35	10.58	0.1	D-3.2	9.9
							TD	6.0	0.42																
INV	599.03	598.18																							
MH	D-3.2	D-3.1	0.0	0.0	0.00	0.00	D-3.2A	9.9	5.55	8.96	9.9	4.45	39.92	36	HDPE	0.01	154	0.50	0.77	51.20	0.70	8.10	0.3	D-3.1	10.2
							D-3.3	9.0	3.41																
INV	598.18	597.41																							
MH	D-3.1A	D-3.1	6.0	0.9	0.49	0.44				0.44	6.0	5.12	2.26	12	HDPE	0.01	78	5.89	4.59	9.39	0.32	9.66	0.1	D-3.1	6.1
INV	604.00	599.41																							
MH	D-3.1	D-3	6.0	0.9	0.33	0.30	D-3.1A	6.1	0.44	9.70	10.2	4.41	42.76	36	HDPE	0.01	100	1.37	1.37	84.76	0.51	12.05	0.1	D-3	10.3
							D-3.2	10.2	8.96																
INV	597.41	596.04																							
MH	D-3	D-2	6.0	0.4	0.77	0.31	D-3.1	10.3	9.70	12.88	10.3	4.39	56.49	36	HDPE	0.01	131	1.00	1.31	72.41	0.70	11.46	0.2	D-2	10.5
							D-4	9.2	2.87																
INV	596.04	594.73																							
MH	D-2	D-1	6.0	0.6	0.20	0.12	D-3	10.5	12.88	13.00	10.5	4.36	56.66	36	HDPE	0.01	199	1.00	1.99	72.41	0.70	11.47	0.3	D-1	10.8
INV	594.73	592.74																							
MH	D-1	D	6.0	0.4	1.02	0.41	D-2	10.8	13.00	13.40	10.8	4.32	57.89	36	HDPE	0.01	55	5.90	3.25	175.89	0.38	22.01	0.0	D	10.8
INV	592.74	589.50																							

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Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	3 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DB12.1	DB-12	6.0	0.2	0.57	0.11				0.11	6.0	5.12	0.58	12	HDPE	0.012	104	0.86	0.90	3.59	0.27	3.34	0.5	DB-12	6.5
INV	604.50	603.60																							
MH	DB-12	DB-11	6.0	0.4	0.43	0.18	DB12.1	6.5	0.11	0.29	6.5	5.01	1.48	12	HDPE	0.012	307	0.50	1.53	2.74	0.53	3.57	1.4	DB-11	8.0
INV	603.60	602.07																							
MH	DB-11.1	DB-11	10.0	0.5	0.74	0.34				0.34	10.0	4.43	1.51	12	HDPE	0.012	151	1.61	2.43	4.91	0.37	5.42	0.5	DB-11	10.5
INV	604.50	602.07																							
MH	DB-11	DB-10	6.0	0.4	0.43	0.18	DB-11.1	10.5	0.34	0.81	10.5	4.37	3.54	15	HDPE	0.012	190	0.50	0.95	4.96	0.65	4.45	0.7	DB-10	11.2
INV	601.82	600.87					DB-12	8.0	0.29																
MH	DB-10.1	DB-10	6.0	0.5	0.65	0.32				0.32	6.0	5.12	1.63	12	HDPE	0.012	106	3.19	3.38	6.91	0.32	7.07	0.2	DB-10	6.2
INV	604.50	601.12																							
MH	DB-10	DB-9	6.0	0.4	0.43	0.18	DB-10.1	6.2	0.32	1.31	11.2	4.27	5.57	24	HDPE	0.012	300	0.50	1.50	17.37	0.38	4.85	1.0	DB-9	12.2
INV	600.12	598.62					DB-11	11.2	0.81																
MH	DB-9	DB-8	6.0	0.3	1.50	0.48	DB-10	12.2	1.31	1.79	12.2	4.13	7.38	24	HDPE	0.012	145	0.50	0.73	17.37	0.45	5.28	0.5	DB-8	12.7
INV	598.62	597.89																							
MH	DB-8	DB-7	0.0	0	0.00	0.00	DB-9	12.7	1.79	1.79	12.7	4.07	7.27	24	HDPE	0.012	155	0.50	0.77	17.37	0.45	5.26	0.5	DB-7	13.2
INV	597.89	597.12																							
MH	DB-7	DB-6	6.0	0.6	1.62	0.91	DB-8	13.2	1.79	2.69	13.2	4.01	10.80	24	HDPE	0.012	300	0.50	1.50	17.37	0.59	5.89	0.8	DB-6	14.0
INV	597.12	595.62																							
MH	DB-6	DB-5	6.0	0.4	1.62	0.71	DB-7	14.0	2.69	3.41	14.0	3.91	13.32	24	HDPE	0.012	208	0.40	0.83	15.53	0.75	5.61	0.6	DB-5	14.6
INV	595.62	594.79																							
MH	DB-5A	DB-5	6.0	0.8	0.28	0.22				0.22	6.0	5.12	1.15	12	HDPE	0.012	84	7.55	6.31	10.63	0.23	9.06	0.2	DB-5	6.2
INV	602.10	595.79																							
MH	DB-5.5	DB-5.4	6.0	0.9	1.14	1.03				1.03	6.0	5.12	5.25	18	HDPE	0.012	300	0.50	1.50	8.06	0.61	4.91	1.0	DB-5.4	7.0
INV	607.50	606.00																							

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Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	4 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DB-5.4	DB-5.3	6.0	0.9	1.14	1.03	DB-5.5	7.02	1.03	2.05	7.0	4.92	10.10	24	HDPE	0.012	300	0.50	1.50	17.37	0.56	5.78	0.9	DB-5.3	7.9
INV	605.50	604.00																							
MH	DB-5.3	DB-5.2	6.0	0.9	1.14	1.03	DB-5.4	7.9	2.05	3.08	7.9	4.77	14.68	24	HDPE	0.012	300	0.50	1.50	17.37	0.74	6.26	0.8	DB-5.2	8.7
INV	604.00	602.50																							
MH	DB-5.2	DB-5.1	6.0	0.9	1.14	1.03	DB-5.3	8.7	3.08	4.10	8.7	4.64	19.03	36	HDPE	0.012	300	0.50	1.50	51.20	0.41	6.65	0.8	DB-5.1	9.4
INV	601.50	600.00																							
MH	DB-5.1	DB-5	6.0	0.9	1.14	1.03	DB-5.2	9.4	4.10	5.13	9.4	4.52	23.18	36	HDPE	0.012	335	1.86	6.23	98.76	0.32	11.21	0.5	DB-5	9.9
INV	600.00	593.77																							
MH	DB-5	DB-4	0.0	0	0.00	0.00	DB-5.1	9.9	5.13	8.76	14.6	3.84	33.65	36	HDPE	0.012	124	0.40	0.50	45.80	0.66	7.17	0.3	DB-4	14.9
INV	593.79	593.29					DB-5A	6.15	0.22																
							DB-6	14.6	3.41																
MH	DB-4A	DB-4	6.0	0.6	0.72	0.43				0.43	6.0	5.12	2.21	12	HDPE	0.012	92	7.73	7.11	10.75	0.30	10.60	0.1	DB-4	6.1
INV	602.40	595.29																							
MH	DB-4.2	DB-4.1	6.0	0.9	0.21	0.19				0.19	6.0	5.12	0.97	12	HDPE	0.012	17	0.50	0.09	2.74	0.40	3.15	0.1	DB-4.1	6.1
INV	604.68	604.60																							
MH	DB-4.1	DB-4	6.0	0.9	0.21	0.19	DB-4.2	6.1	0.19	0.38	6.1	5.10	1.93	12	HDPE	0.012	22	43.00	9.31	25.37	0.18	18.88	0.0	DB-4	6.1
INV	604.60	595.29																							
MH	DB-4	DB-3	0.0	0	0.00	0.00	DB-4A	6.1	0.43	9.57	14.9	3.81	36.46	36	HDPE	0.012	195	0.40	0.78	45.80	0.71	7.27	0.4	DB-3	15.4
INV	593.29	592.51					DB-4.1	6.1	0.38																
							DB-5	14.9	8.76																
MH	DB-3.3	DB-3.2	6.0	0.8	0.28	0.22				0.22	6.0	5.12	1.15	12	HDPE	0.012	110	0.50	0.55	2.74	0.45	3.31	0.6	DB-3.2	6.6
INV	604.01	603.46																							
MH	DB-3.2	DB-3.1	6.0	0.9	0.21	0.19	DB-3.3	6.6	0.22	0.41	6.6	5.01	2.07	12	HDPE	0.012	60	0.50	0.30	2.74	0.68	3.88	0.3	DB-3.1	6.8
INV	603.46	603.16																							

BME ASSOCIATES

Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	5 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DB-3.1	DB-3	0.0	0	0.00	0.00	DB-3.2	6.81	0.41	0.41	6.8	4.96	2.05	12	HDPE	0.01	68	12.78	8.65	13.83	0.26	12.59	0.1	DB-3	6.9
INV	603.16	594.51																							
MH	DB-3	DB-2	6.0	0.9	0.20	0.18	DB-3.1	6.9	0.41	10.16	15.4	3.76	38.23	36	HDPE	0.01	164	0.40	0.66	45.80	0.73	7.32	0.4	DB-2	15.7
INV	592.51	591.85					DB-4	15.4	9.57																
MH	DB-2	DB-1	6.0	0.6	1.16	0.70	DB-3	15.7	10.16	10.86	15.7	3.72	40.42	36	HDPE	0.01	159	0.40	0.64	45.80	0.77	7.37	0.4	DB-1	16.1
INV	591.85	591.21																							
MH	DB-1	DB	0.0	0	0.00	0.00	DB-2	16.1	10.86	10.86	16.1	3.68	40.01	36	HDPE	0.01	117	1.03	1.21	73.49	0.53	10.68	0.2	DB	16.3
INV	591.21	590.00																							
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BME ASSOCIATES

Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	6 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DC-1	DC	10.0	0.2	3.35	0.80				0.80	10.0	4.43	3.56	12	HDPE	0.012	63	11.94	7.57	13.37	0.34	14.16	0.1	DC	10.1
INV	597.57	590.00																							
MH																									
INV																									
MH																									
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BME ASSOCIATES

Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	7 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DD-2	DD-1	6.0	0.4	0.72	0.26				0.26	6.0	5.12	1.33	12	HDPE	0.012	197	1.52	3.00	4.77	0.35	5.11	0.6	DD-1	6.6
INV	599.00	596.00																							
MH	DD-1	DD	6.0	0.3	1.77	0.44	DD-2	6.6	0.26	0.70	6.6	4.99	3.50	12	HDPE	0.012	55	10.97	6.00	12.81	0.35	13.67	0.1	DD	6.7
INV	596.00	590.00																							
MH																									
INV																									
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BME ASSOCIATES

Project:	Riverview
Project No:	2968
Date:	03/12/26
By:	DTT
Sheet	8 of 8

STORM SEWER NETWORK CALCULATIONS

	Drainage Structure		Local				Upstream contribution			Total cA	Controlling Tc	I	Q (cfs)	Pipe			Length of pipe (ft.)	% slope	Diff. In INV	Capacity (cfs)	Ratio of liquid to dia of pipe	velocity (fps)	flow time (min)	Next Point	
	From	To	Tc	c	A	cA	From	Tc	cA					DIA (in)	MATL	n								To	Tc
MH	DE-5	DE-4	10.0	0.9	1.26	1.10				1.10	10.0	4.43	4.86	18	HDPE	0.012	318	0.50	1.59	8.06	0.57	4.82	1.1	DE-4	11.1
INV	610.00	608.41																							
MH	DE-4	DE-3	10.0	0.9	1.26	1.10	DE-5	11.1	1.10	2.19	11.1	4.28	9.38	18	HDPE	0.012	54	10.64	5.78	37.20	0.33	17.23	0.1	DE-3	11.2
INV	608.41	602.63																							
MH	DE-3	DE-2	6.0	0.4	0.72	0.32	DE-4	11.2	2.19	2.51	11.2	4.27	10.71	24	HDPE	0.012	223	0.50	1.12	17.37	0.58	5.87	0.6	DE-2	11.8
INV	602.63	601.51																							
MH	DE-2.1	DE-2	6.0	0.9	1.13	1.02				1.02	6.0	5.12	5.20	18	HDPE	0.012	194	0.50	0.97	8.06	0.60	4.90	0.7	DE-2	6.7
INV	602.48	601.51																							
MH	DE-2(W	DE-2	6.0	0.4	0.41	0.18				0.18	6.0	5.12	0.92	12	HDPE	0.012	40	10.81	4.30	12.72	0.18	9.35	0.1	DE-2	6.1
INV	605.81	601.51																							
MH	DE-2(E)	DE-2	10.0	0.4	1.35	0.57				0.57	10.0	4.43	2.51	12	HDPE	0.012	9	22.27	2.06	18.25	0.25	16.35	0.0	DE-2	10.0
INV	605.57	603.51																							
MH	DE-2	DE-1	10.0	0.4	1.35	0.57	DE-2.1	6.7	1.02	2.33	10.0	4.43	10.33	24	HDPE	0.012	210	0.50	1.05	17.37	0.57	5.82	0.6	DE-1	10.6
INV	601.51	600.46					DE-2(W	6.1	0.18																
							DE-2(E	10.0	0.57																
MH	DE-1(N)	DE-1	6.0	0.4	0.97	0.43				0.43	6.0	5.12	2.18	12	HDPE	0.012	36	7.83	2.80	10.82	0.30	10.62	0.1	DE-1	6.1
INV	603.27	600.47																							
MH	DE-1(S)	DE-1	6.0	0.7	0.89	0.65				0.65	6.0	5.12	3.32	12	HDPE	0.012	95	3.79	3.60	7.53	0.46	9.26	0.2	DE-1	6.2
INV	604.07	600.47																							
MH	DE-1	DE	0.0	0	0.00	0.00	DE-1(S	6.2	0.65	3.41	10.6	4.34	14.81	24	HDPE	0.012	291	0.50	1.46	17.37	0.75	6.26	0.8	DE	11.4
INV	600.46	599.00					DE-1(N	6.1	0.43																
							DE-2	10.6	2.33																

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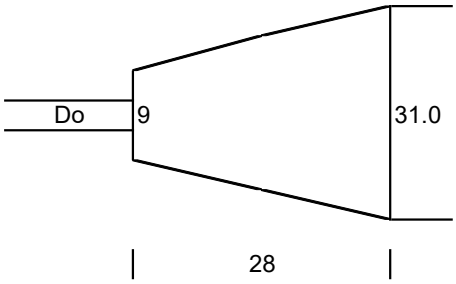
CALCULATIONS :

Project: Rip Rap Calculations

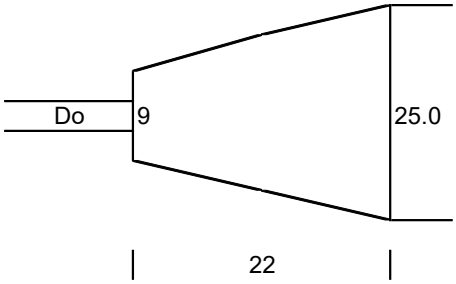
Project No.: 2968
Date: 3/12/2026
By: DTT
Sheet 1 of 2

DESIGNATION	**D**	
Do-DIA. OF PIPE	36	in
DISCHARGE	57.9	cfs
d50 RIP-RAP SIZE	0.7	ft
La-LENGTH OF APRON	28.0	ft
W=Do+La	31.0	ft
SY OF RIP RAP	62	sy
MIN BLANKET THICKNESS	19	in
AVE WEIGHT	75	lbs



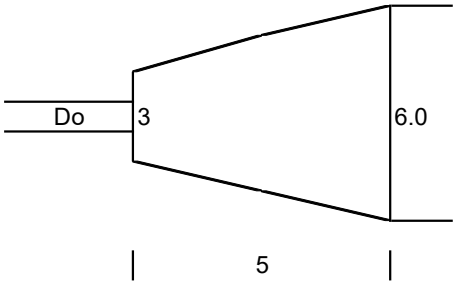
NOTES:

DESIGNATION	**DB**	
Do-DIA. OF PIPE	36	in
DISCHARGE	40.0	cfs
d50 RIP-RAP SIZE	0.6	ft
La-LENGTH OF APRON	22.0	ft
W=Do+La	25.0	ft
SY OF RIP RAP	42	sy
MIN BLANKET THICKNESS	16	in
AVE WEIGHT	50	lbs



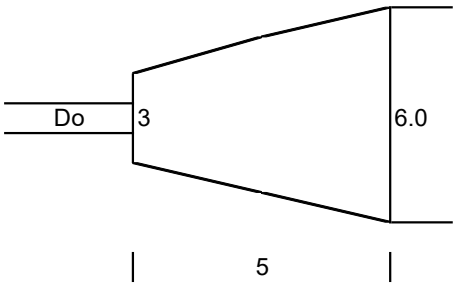
NOTES:

DESIGNATION	**DC**	
Do-DIA. OF PIPE	12	in
DISCHARGE	3.6	cfs
d50 RIP-RAP SIZE	0.5	ft
La-LENGTH OF APRON	5.0	ft
W=Do+La	6.0	ft
SY OF RIP RAP	5	sy
MIN BLANKET THICKNESS	14	in
AVE WEIGHT	50	lbs



NOTES:

DESIGNATION	**DD**	
Do-DIA. OF PIPE	12	in
DISCHARGE	3.5	cfs
d50 RIP-RAP SIZE	0.5	ft
La-LENGTH OF APRON	5.0	ft
W=Do+La	6.0	ft
SY OF RIP RAP	5	sy
MIN BLANKET THICKNESS	14	in
AVE WEIGHT	50	lbs



NOTES:

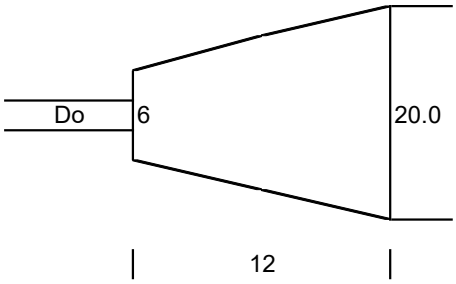
BME ASSOCIATES

CALCULATIONS :

Project: Rip Rap Calculations

Project No.:	2968
Date:	3/12/2026
By:	DTT
Sheet	1 of 2

DESIGNATION	**DE**	
Do-DIA. OF PIPE	24	in
DISCHARGE	14.8	cfs
d50 RIP-RAP SIZE	0.4	ft
La-LENGTH OF APRON	12.0	ft
W=Do+La	20.0	ft
SY OF RIP RAP	17	sy
MIN BLANKET THICKNESS	11	in
AVE WEIGHT	50	lbs



NOTES:

Appendix 6
Water and Sewer

Water and Sewer Use Estimates

BME ASSOCIATES

CALCULATIONS **:**

Project: Riverview Innovation and Tech Center

Domestic Water and Sanitary Use

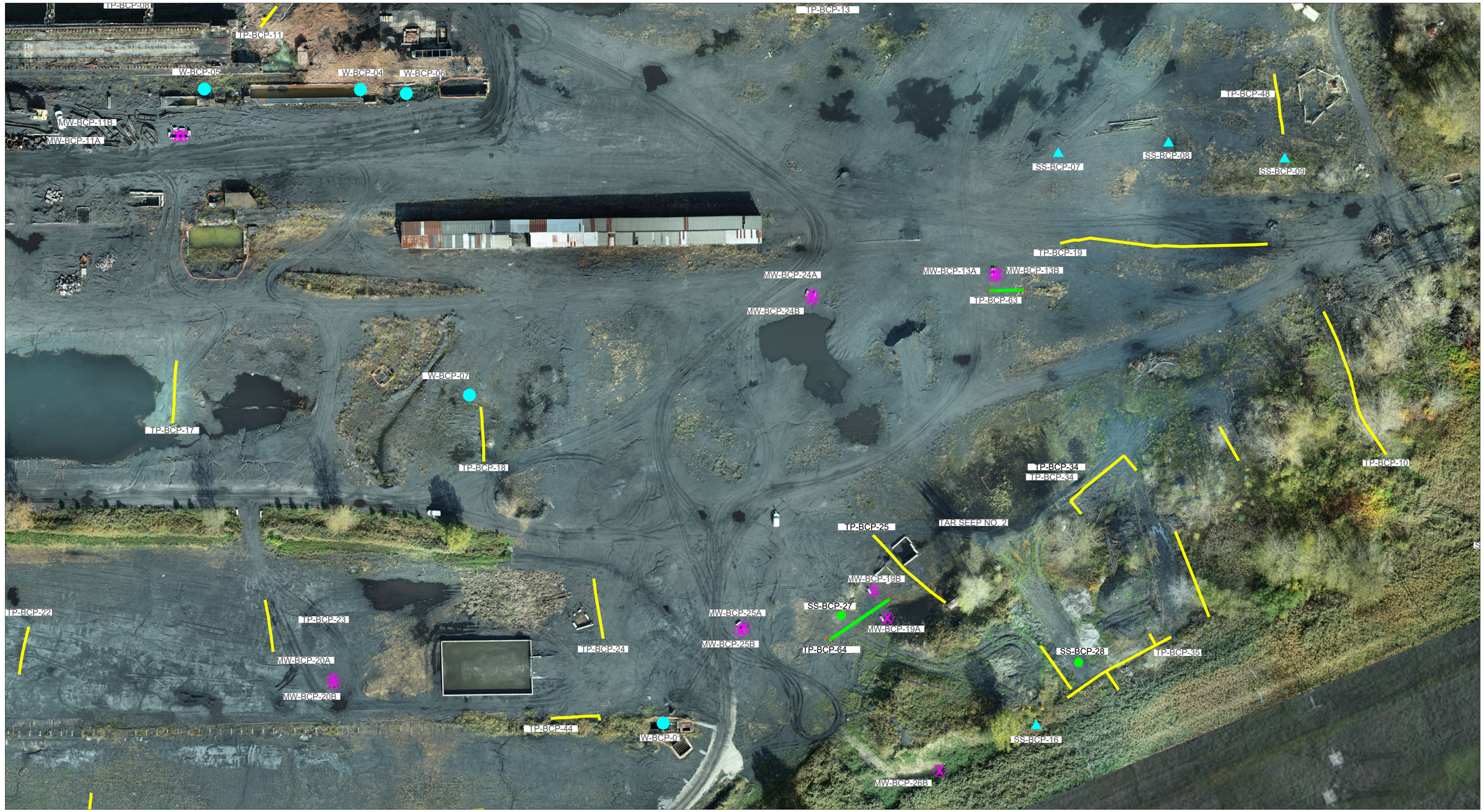
Project No.: 2968
Date: 3/10/2026
By: JGC
Sheet 1 of 1

Domestic Water and Wastewater Estimated Use

**** Note all water useage rates are approximate per the New York State Design Standards for Intermediate Sized Wastewater Treatment Systems March 5, 2014, Table B-3 (Typical Per-Unit Hydraulic Loading Rates)***

LOCATION & USE	UNITS	TOTALS
BCP Site -		
Factory/Distribution Warehouse (495,000 sf Building)		
30 gpd per employee w/ showers	200 Employees	6000 gpd
Factory/Distribution Warehouse (Existing 10,675 sf Building)		
20 gpd per employee	10 Employees	200 gpd
Factory/Distribution Warehouse (Future Potential Development)		
30 gpd per employee w/ showers	150 Employees	4500 gpm
Plastics -		
Factory/Distribution Warehouse (150,000 sf Industrial Building)		
30 gpd per employee w/ showers	100 Employees	3000 gpd
Site 109		
Office Building (30,000 sf Commerical Building)		
15 gpd per employee	75 Employees	1125 gpd
Office Building (24,000 sf Commerical Building)		
15 gpd per employee	75 Employees	1125 gpd
Site 108		
Factory/Distribution Warehouse (160,650 sf Building)		
30 gpd per employee w/ showers	100 Employees	3000 gpd
Resturant (100 seats inside 47,960 sf Building)		
35 gpd per seat	100 seats	3500 gpd
Apartments (10x 2-bedroom units inside 47,960 sf Building)		
110 gpd per bedroom	20 bedrooms	2200 gpd
Marina (25 slips)		
20 gpd per slip	20 slips	400 gpd
Total Estimated Water & Sewer Use		**25050 gpd**

Appendix E – Supplemental Test Pits – MW-BCP-13 and MW-BCP-19



N

LEGEND

- MONITORING WELL
- REMEDIAL INVESTIGATION TEST PIT
- REMEDIAL INVESTIGATION SURFACE SAMPLE
- REMEDIAL INVESTIGATION SURFACE WATER SAMPLE
- PRE-DESIGN INVESTIGATION BENCH SCALE SAMPLE LOCATION - SS-BCP-XXX
- PRE-DESIGN INVESTIGATION SOIL BORING - SB-BCP-XXX
- PRE-DESIGN INVESTIGATION TEST PIT
- AREA OF INVESTIGATION (AOI)

D

50 0 25 50 100 200

1 INCH = 50 FEET (22X34)

DRAWING BY RB
CHECKED
APPROVED

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SAMPLE LOCATIONS - RI AND PRE-DESIGN

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

DRAWING NUMBER

RITC
3875 River Road, Tonawanda NY
Pre-Design Investigation Test Pit Logs

Test Pit No. TP-BCP-63

Date: 4/19/2023 End Time: 13:00 Start Time: 12:30

Notetaker Name: Peter Zaffram

Surface conditions: Test Trench in the vicinity of MW-BCP-13 heading west to east. Approximately 35 feet long.

ID	Distance from Start (Ft.)	Depth (in.)	Soil Type	Color	Consistency	Moisture	PiD (ppm)	Evidence of Waste
0W to 35E	0 to 35	0 to 52 inches	Sand and gravel (breeze)	Black	Loose to dense	Low	Not recorded	Fill material observed, brick, and nodules
		52 to 62	Silty Clay	Red	Stiff	Low	Not recorded	
		62 to 76	Industrial Fill	Mottled	Dense	Saturated	Not recorded	Fill material observed, stone, nodules
		76	Silty Clay	Red	Stiff	Wet	0	
Sample collected at approximately 76 inches below grade								

RITC
3875 River Road, Tonawanda NY
Pre-Design Investigation Test Pit Logs

Test Pit No. TP-BCP-64

Date: 4/19/2023 End Time: 13:45 Start Time: 13:10

Notetaker Name: Peter Zaffram

Surface conditions: Test Trench in the vicinity of MW-BCP-19 heading east to west. Approximately 60 feet long.

ID	Distance from Start (Ft.)	Depth (in.)	Soil Type	Color	Consistency	Moisture	PiD (ppm)	Evidence of Waste
0E to 31W	0 to 31	0 to 36	Sand and gravel (breeze)	Black	Loose to dense	Low	0	
		36 to 38	Sand and gravel (breeze)	Black	Loose to dense	Low	Not recorded	Tar seam observed at 36 inches bgs
		38 to 52	Sand and gravel (breeze)	Black	Loose to dense	Low	0	
		52 to 62	Silty Clay	Black to gray	Soft	Medium	Not recorded	Stained clay, transition from black to light gray
		62	Silty Clay	Red	Stiff	Low	0	
31E to 60W		0 to 60	Sand and gravel (breeze)	Black	Loose to dense	Low	0	
		60 to 70	Silty Clay	Red	Stiff	Low	0	
Sample collected at approximately 70 inches.								

Table 3D
Pre-Design Investigation Work Plan - Test Pits
Riverview Innovation & Technology Campus, Inc.
Tonawanda, New York

ANALYTE	SAMPLE ID:	TP-BCP-53-04182023		TP-BCP-63-04182023		TP-BCP-64-04182023		TP-BCP-65-04182023	
	LAB ID:	L2321003-01		L2321003-02		L2321003-03		L2321003-04	
	COLLECTION DATE:	4/18/2023		4/19/2023		4/19/2023		4/19/2023	
	SAMPLE MATRIX:	SOIL		SOIL		SOIL		SOIL	
	DESCRIPTION:	NORTHWEST PROPERTY CORNER, NORTH RAIL		NEAR WELL CLUSTER MW-BCP-13		NEAR WELL CLUSTER MW-BCP-19		SOUTHEAST PROPERTY CORNER, MW-BCP-27A	
	Part 375 SCO Commercial								
	(mg/kg)								
VOLATILE ORGANICS BY GC/MS									
1,1,1-Trichloroethane	500	<0.00021	U	<0.0002	U	<0.00018	U	<0.00031	U
1,1,2,2-Tetrachloroethane		<0.00021	U	<0.0002	U	<0.00018	U	<0.00031	U
1,1,2-Trichloroethane		<0.00034	U	<0.00032	U	<0.00029	U	<0.0005	U
1,1-Dichloroethane	240	<0.00018	U	<0.00018	U	<0.00016	U	<0.00027	U
1,1-Dichloroethene	500	<0.0003	U	<0.00029	U	<0.00026	U	<0.00044	U
1,2,4-Trichlorobenzene		<0.00035	U	<0.00033	U	<0.00029	U	<0.00051	U
1,2,4-Trimethylbenzene	190	<0.00043	U	**0.0022**	J	<0.00036	U	**0.0035**	J
1,2-Dibromo-3-chloropropane		<0.0013	U	<0.0012	U	<0.0011	U	<0.0019	U
1,2-Dibromoethane		<0.00036	U	<0.00034	U	<0.0003	U	<0.00052	U
1,2-Dichlorobenzene	500	<0.00018	U	<0.00017	U	<0.00015	U	<0.00027	U
1,2-Dichloroethane	30	<0.00033	U	<0.00031	U	<0.00028	U	<0.00048	U
1,2-Dichloropropane		<0.00016	U	<0.00015	U	<0.00013	U	<0.00023	U
1,3-Dichlorobenzene	280	<0.00019	U	<0.00018	U	<0.00016	U	<0.00028	U
1,4-Dichlorobenzene	130	<0.00022	U	<0.00021	U	<0.00018	U	<0.00032	U
1,3,5-Trimethylbenzene	190	<0.00025	U	**0.0011**	J	<0.00021	U	**0.00081**	J
1,3-Dichlorobenzene	280	<0.00019	U	<0.00018	U	<0.00016	U	<0.00028	U
1,4-Dichlorobenzene	130	<0.00022	U	<0.00021	U	<0.00018	U	<0.00032	U
2-Butanone	500	<0.0028	U	<0.0027	U	**0.0049**	J	<0.0042	U
2-Hexanone		<0.0015	U	<0.0014	U	<0.0013	U	<0.0022	U
4-Methyl-2-pentanone		<0.0016	U	<0.0016	U	<0.0014	U	<0.0024	U
Acetone	500	<0.0062	U	**0.052**		**0.079**		**0.011**	J
Benzene	44	<0.00021	U	<0.0002	U	<0.00018	U	**0.0093**	
Bromodichloromethane		<0.00014	U	<0.00013	U	<0.00012	U	<0.0002	U
Bromoform		<0.00031	U	<0.0003	U	<0.00026	U	<0.00046	U
Bromomethane		<0.00074	U	<0.0007	U	<0.00062	U	<0.0011	U
Carbon disulfide		<0.0058	U	<0.0055	U	<0.0049	U	<0.0085	U
Carbon tetrachloride	22	<0.00029	U	<0.00028	U	<0.00025	U	<0.00043	U
Chlorobenzene	500	<0.00016	U	<0.00015	U	<0.00014	U	<0.00024	U
Chloroethane		<0.00058	U	<0.00055	U	<0.00048	U	<0.00084	U
Chloroform	350	<0.00018	U	<0.00017	U	<0.00015	U	<0.00026	U
Chloromethane		<0.0012	U	<0.0011	U	<0.001	U	<0.0017	U
cis-1,2-Dichloroethene	500	<0.00022	U	<0.00021	U	<0.00019	U	<0.00033	U
cis-1,3-Dichloropropene		<0.0002	U	<0.00019	U	<0.00017	U	<0.0003	U
Cyclohexane		<0.0007	U	<0.00066	U	<0.00058	U	<0.001	U
Dibromochloromethane		<0.00018	U	<0.00017	U	<0.00015	U	<0.00026	U
Dichlorodifluoromethane		<0.0012	U	<0.0011	U	<0.00098	U	<0.0017	U
Ethylbenzene	390	<0.00018	U	**0.0047**		0.00081	J	**0.002**	
Freon-113		<0.00089	U	<0.00084	U	<0.00074	U	<0.0013	U
Isopropylbenzene		<0.00014	U	**0.0023**		**0.00016**	J	**0.00074**	J
Methyl Acetate		<0.0012	U	<0.0012	U	<0.001	U	<0.0018	U
Methyl cyclohexane		<0.00077	U	<0.00073	U	<0.00065	U	<0.0011	U
Methyl tert butyl ether	500	<0.00026	U	<0.00024	U	<0.00022	U	<0.00038	U
Methylene chloride	500	<0.0029	U	<0.0028	U	<0.0025	U	<0.0043	U
n-Butylbenzene	500	<0.00021	U	**0.00077**	J	<0.00018	U	<0.00031	U
n-Propylbenzene	500	<0.00022	U	**0.0017**		<0.00018	U	**0.0011**	J
Naphthalene	500	<0.00083	U	**0.013**		**0.0021**	J	**0.057**	
o-Xylene		<0.00037	U	**0.0032**		**0.0034**		**0.0034**	
p-Isopropyltoluene		<0.00014	U	**0.00024**	J	**0.00024**	J	<0.0002	U
p/m-Xylene		<0.00072	U	**0.0011**	J	**0.001**	J	**0.004**	
sec-Butylbenzene	500	<0.00019	U	<0.00018	U	<0.00016	U	<0.00027	U
Styrene		<0.00025	U	<0.00024	U	<0.00021	U	**0.0009**	J
tert-Butylbenzene	500	<0.00015	U	<0.00014	U	<0.00013	U	<0.00022	U
Tetrachloroethene	150	<0.00025	U	<0.00024	U	<0.00021	U	<0.00037	U
Toluene	500	<0.00069	U	<0.00066	U	<0.00058	U	**0.0022**	
trans-1,2-Dichloroethene	500	<0.00018	U	<0.00016	U	<0.00015	U	<0.00026	U
trans-1,3-Dichloropropene		<0.00035	U	<0.00033	U	<0.00029	U	<0.00051	U
Trichloroethene	200	<0.00018	U	<0.00016	U	<0.00015	U	<0.00026	U
Trichlorofluoromethane		<0.00089	U	<0.00084	U	<0.00075	U	<0.0013	U
Vinyl chloride	13	<0.00043	U	<0.0004	U	<0.00036	U	<0.00063	U
Total VOCs		-	-	**0.08231**	-	**0.09161**	-	**0.09595**	-
SEMIVOLATILE ORGANICS BY GC/MS									
1,2,4,5-Tetrachlorobenzene		<0.022	U	<0.021	U	<0.022	U	<0.035	U
2,3,4,6-Tetrachlorophenol		<0.042	U	<0.041	U	<0.042	U	<0.067	U
2,4,5-Trichlorophenol		<0.04	U	<0.039	U	<0.039	U	<0.064	U
2,4,6-Trichlorophenol		<0.04	U	<0.038	U	<0.039	U	<0.063	U
2,4-Dichlorophenol		<0.034	U	<0.032	U	<0.033	U	<0.053	U
2,4-Dimethylphenol		<0.069	U	<0.067	U	<0.068	U	<0.11	U
2,4-Dinitrophenol		<0.097	U	<0.094	U	<0.096	U	<0.16	U
2,4-Dinitrotoluene		<0.042	U	<0.04	U	<0.041	U	<0.066	U
2,6-Dinitrotoluene		<0.036	U	<0.035	U	<0.035	U	<0.057	U
2-Chloronaphthalene		<0.021	U	<0.02	U	<0.02	U	<0.033	U
2-Chlorophenol		<0.025	U	<0.024	U	<0.024	U	<0.039	U
2-Methylnaphthalene		<0.025	U	<0.024	U	<0.025	U	**9.4**	
2-Methylphenol	500	<0.032	U	<0.031	U	<0.032	U	**0.057**	J
2-Nitroaniline		<0.04	U	<0.039	U	<0.04	U	<0.064	U
2-Nitrophenol		<0.079	U	<0.076	U	<0.077	U	<0.12	U
3,3'-Dichlorobenzidine		<0.056	U	<0.054	U	<0.055	U	<0.088	U
3-Methylphenol/4-Methylphenol	500	<0.033	U	<0.032	U	<0.032	U	**0.17**	J
3-Nitroaniline		<0.039	U	<0.038	U	<0.039	U	<0.063	U
4,6-Dinitro-o-cresol		<0.1	U	<0.097	U	<0.099	U	<0.16	U
4-Bromophenyl phenyl ether		<0.032	U	<0.031	U	<0.031	U	<0.051	U
4-Chloroaniline		<0.038	U	<0.037	U	<0.038	U	<0.06	U
4-Chlorophenyl phenyl ether		<0.022	U	<0.022	U	<0.022	U	<0.036	U
4-Nitroaniline		<0.087	U	<0.084	U	<0.085	U	<0.14	U
4-Nitrophenol		<0.085	U	<0.083	U	<0.084	U	<0.14	U
Acenaphthene	500	<0.022	U	**1.4**		<0.021	U	**2**	
Acenaphthylene	500	<0.032	U	**1.9**		<0.032	U	**19**	
Acetophenone		<0.026	U	<0.025	U	<0.026	U	**0.068**	J
Anthracene	500	<0.041	U	**3.8**		<0.04	U	**21**	
Atrazine		<0.073	U	<0.071	U	<0.072	U	<0.12	U
Benzaldehyde		<0.056	U	<0.055	U	<0.056	U	<0.09	U
Benzo(a)anthracene	5.6	<0.024	U	**3.5**		<0.023	U	**28**	
Benzo(a)pyrene	1	<0.051	U	**2.9**		<0.05	U	**29**	
Benzo(b)fluoranthene	5.6	<0.035	U	**3.3**		<0.035	U	**32**	
Benzo(ghi)perylene	500	<0.025	U	**1.5**		<0.024	U	**16**	
Benzo(k)fluoranthene	56	<0.033	U	**1.3**		<0.033	U	**9.2**	
Biphenyl		<0.027	U	**1.3**		<0.027	U	**3.3**	
Bis(2-chloroethoxy)methane		<0.021	U	<0.02	U	<0.021	U	<0.033	U

Table 3D
Pre-Design Investigation Work Plan - Test Pits
Riverview Innovation & Technology Campus, Inc.
Tonawanda, New York

ANALYTE	SAMPLE ID:	TP-BCP-53-04182023		TP-BCP-63-04182023		TP-BCP-64-04182023		TP-BCP-65-04182023	
	LAB ID:	L2321003-01		L2321003-02		L2321003-03		L2321003-04	
	COLLECTION DATE:	4/18/2023		4/19/2023		4/19/2023		4/19/2023	
	SAMPLE MATRIX:	SOIL		SOIL		SOIL		SOIL	
	DESCRIPTION:	NORTHWEST PROPERTY CORNER, NORTH RAIL		NEAR WELL CLUSTER MW-BCP-13		NEAR WELL CLUSTER MW-BCP-19		SOUTHEAST PROPERTY CORNER, MW-BCP-27A	
	Part 375 SCO Commercial								
	(mg/kg)								
Bis(2-chloroethyl)ether		<0.028	U	<0.027	U	<0.028	U	<0.045	U
Bis(2-chloroisopropyl)ether		<0.036	U	<0.035	U	<0.035	U	<0.057	U
Bis(2-ethylhexyl)phthalate		<0.072	U	<0.07	U	<0.071	U	<0.12	U
Butyl benzyl phthalate		<0.053	U	<0.051	U	<0.052	U	<0.084	U
Caprolactam		<0.064	U	<0.062	U	<0.063	U	<0.1	U
Carbazole		<0.02	U	**1.4**		<0.02	U	**8.1**	
Chrysene	56	<0.022	U	**3.1**		<0.021	U	**29**	
Di-n-butylphthalate		<0.04	U	<0.038	U	<0.039	U	<0.063	U
Di-n-octylphthalate		<0.071	U	<0.069	U	<0.07	U	<0.11	U
Dibenzo(a,h)anthracene	0.56	<0.024	U	**0.43**		<0.024	U	**3.4**	
Dibenzofuran	350	<0.02	U	**3.3**		<0.019	U	**12**	
Diethyl phthalate		<0.019	U	<0.019	U	<0.019	U	<0.031	U
Dimethyl phthalate		<0.044	U	<0.042	U	<0.043	U	<0.07	U
Fluoranthene	500	<0.024	U	**11**		<0.024	U	**93**	
Fluorene	500	<0.02	U	**4.5**		<0.02	U	**20**	
Hexachlorobenzene	6	<0.023	U	<0.023	U	<0.023	U	<0.037	U
Hexachlorobutadiene		<0.031	U	<0.03	U	<0.03	U	<0.049	U
Hexachlorocyclopentadiene		<0.19	U	<0.18	U	<0.19	U	<0.3	U
Hexachloroethane		<0.034	U	<0.033	U	<0.033	U	<0.054	U
Indeno(1,2,3-cd)pyrene	5.6	<0.029	U	**1.9**		<0.029	U	**18**	
Isophorone		<0.027	U	<0.026	U	<0.027	U	<0.043	U
n-Nitrosodi-n-propylamine		<0.032	U	<0.031	U	**0.1**	J	<0.051	U
Naphthalene	500	<0.025	U	**0.13**	J	<0.025	U	**19**	
NDPA/DPA		<0.024	U	<0.023	U	<0.023	U	<0.038	U
Nitrobenzene		<0.031	U	<0.03	U	<0.03	U	<0.049	U
p-Chloro-m-cresol		<0.031	U	<0.03	U	<0.031	U	<0.05	U
Pentachlorophenol	6.7	<0.046	U	<0.044	U	<0.045	U	<0.073	U
Phenanthrene	500	<0.025	U	**17**		<0.025	U	**100**	
Phenol	500	<0.032	U	<0.03	U	<0.031	U	**0.12**	J
Pyrene	500	<0.021	U	**6.4**		<0.02	U	**70**	
Total SVOCs		-	-	63.26	-	0.1	-	437.815	-
TOTAL METALS									
Aluminum, Total		**18800**		**17000**		**16400**		**2960**	
Antimony, Total		<0.368	U	<0.36	U	<0.365	U	**0.654**	J
Arsenic, Total	16	**7.66**		**5.6**		**6**		**3.4**	
Barium, Total	400	**159**		**185**		**132**		**62.1**	
Beryllium, Total	590	**0.979**		**0.796**		**0.686**		<0.05	U
Cadmium, Total	9.3	<0.095	U	<0.093	U	<0.094	U	<0.149	U
Calcium, Total		**3980**		**16800**		**37600**		**3020**	
Chromium, Total		**24.6**		**22.2**		**20.8**		**5.96**	
Cobalt, Total		**13.8**		**12.4**		**13.3**		**1.36**	J
Copper, Total	270	**22.5**		**24.6**		**23**		**22.8**	
Iron, Total		**32900**		**26700**		**28600**		**9270**	
Lead, Total	1000	**12.1**		**12.3**		**11.6**		**67.3**	
Magnesium, Total		**6430**		**9700**		**13400**		**415**	
Manganese, Total	10000	**644**		**880**		**1110**		**18.4**	
Mercury, Total	2.8	<0.053	U	<0.057	U	<0.053	U	<0.087	U
Nickel, Total	310	**34.5**		**29.2**		**29**		**8.73**	
Potassium, Total		**1400**		**1440**		**1660**		**1110**	
Selenium, Total	1500	<0.25	U	<0.244	U	<0.248	U	<0.393	U
Silver, Total	1500	<0.274	U	<0.268	U	<0.272	U	<0.431	U
Sodium, Total		**99.9**	J	**125**	J	**152**	J	**112**	J
Thallium, Total		<0.305	U	<0.298	U	<0.302	U	<0.48	U
Vanadium, Total		**34**		**29.3**		**28.6**		**7.2**	
Zinc, Total	10000	**79.6**		**69.3**		**69.4**		**8.85**	
POLYCHLORINATED BIPHENYLS BY GC									
Aroclor 1016	1	<0.00525	U	-		-		<0.00859	U
Aroclor 1221	1	<0.00593	U	-		-		<0.00969	U
Aroclor 1232	1	<0.0125	U	-		-		<0.0205	U
Aroclor 1242	1	<0.00797	U	-		-		<0.013	U
Aroclor 1248	1	<0.00887	U	-		-		**0.054**	J
Aroclor 1254	1	<0.00647	U	-		-		**0.0359**	J
Aroclor 1260	1	<0.0109	U	-		-		<0.0179	U
Aroclor 1262	1	<0.00751	U	-		-		<0.0123	U
Aroclor 1268	1	<0.00613	U	-		-		<0.01	U
ORGANOCHLORINE PESTICIDES BY GC									
4,4'-DDD	92	<0.000688	U	-		-		<0.0011	U
4,4'-DDE	62	<0.000446	U	-		-		<0.000713	U
4,4'-DDT	47	<0.00155	U	-		-		<0.00248	U
Aldrin	0.68	<0.000679	U	-		-		<0.00109	U
Alpha-BHC	3.4	<0.000228	U	-		-		<0.000365	U
Beta-BHC	3	<0.000731	U	-		-		<0.00117	U
Chlordane		<0.00639	U	-		-		<0.0102	U
cis-Chlordane	24	<0.000672	U	-		-		<0.00107	U
Delta-BHC	500	<0.000378	U	-		-		<0.000604	U
Dieldrin	1.4	<0.000602	U	-		-		<0.000964	U
Endosulfan I	200	<0.000455	U	-		-		<0.000729	U
Endosulfan II	200	<0.000644	U	-		-		<0.00103	U
Endosulfan sulfate	200	<0.000382	U	-		-		<0.000612	U
Endrin	89	<0.000329	U	-		-		<0.000527	U
Endrin aldehyde		<0.000843	U	-		-		<0.00135	U
Endrin ketone		<0.000496	U	-		-		<0.000794	U
Heptachlor	15	<0.000432	U	-		-		<0.000692	U
Heptachlor epoxide		<0.00108	U	-		-		<0.00174	U
Lindane	9.2	<0.000359	U	-		-		<0.000575	U
Methoxychlor		<0.00112	U	-		-		<0.0018	U
Toxaphene		<0.0101	U	-		-		<0.0162	U
trans-Chlordane		<0.000636	U	-		-		<0.00102	U

Table 3D
Pre-Design Investigation Work Plan - Test Pits
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Tonawanda, New York

ANALYTE	SAMPLE ID:	TP-BCP-53-04182023		TP-BCP-63-04182023		TP-BCP-64-04182023		TP-BCP-65-04182023	
	LAB ID:	L2321003-01		L2321003-02		L2321003-03		L2321003-04	
	COLLECTION DATE:	4/18/2023		4/19/2023		4/19/2023		4/19/2023	
	SAMPLE MATRIX:	SOIL		SOIL		SOIL		SOIL	
	DESCRIPTION:	NORTHWEST PROPERTY CORNER, NORTH RAIL		NEAR WELL CLUSTER MW-BCP-13		NEAR WELL CLUSTER MW-BCP-19		SOUTHEAST PROPERTY CORNER, MW-BCP-27A	
	Part 375 SCO Commercial								
	(mg/kg)								
CHLORINATED HERBICIDES BY GC									
2,4,5-T		<0.0066	U	-		-		<0.0102	U
2,4,5-TP (Silvex)	500	<0.00566	U	-		-		<0.00871	U
2,4-D		<0.0134	U	-		-		<0.0206	U
PERFLUORINATED ALKYL ACIDS BY EPA 1633									
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		<0.000384	U	-	-	-	-	-	-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		<0.000277	U	-	-	-	-	-	-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		<0.000082	U	-	-	-	-	-	-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		<0.000099	U	-	-	-	-	-	-
Perfluorobutanesulfonic Acid (PFBS)		<0.000043	U	-	-	-	-	-	-
Perfluorobutanoic Acid (PFBA)		<0.00005	U	-	-	-	-	-	-
Perfluorodecanesulfonic Acid (PFDS)		<0.000032	U	-	-	-	-	-	-
Perfluorodecanoic Acid (PFDA)		<0.000075	U	-	-	-	-	-	-
Perfluorododecanoic Acid (PFDoA)		<0.00004	U	-	-	-	-	-	-
Perfluoroheptanesulfonic Acid (PFHpS)		<0.000036	U	-	-	-	-	-	-
Perfluoroheptanoic Acid (PFHpA)		<0.000023	U	-	-	-	-	-	-
Perfluorohexanesulfonic Acid (PFHxS)		<0.000059	U	-	-	-	-	-	-
Perfluorohexanoic Acid (PFHxA)		<0.000046	U	-	-	-	-	-	-
Perfluorononanoic Acid (PFNA)		<0.000078	U	-	-	-	-	-	-
Perfluorooctanesulfonamide (PFOSA)		<0.000043	U	-	-	-	-	-	-
Perfluorooctanesulfonic Acid (PFOS)		<0.000078	U	-	-	-	-	-	-
Perfluorooctanoic Acid (PFOA)		<0.000052	U	-	-	-	-	-	-
Perfluoropentanoic Acid (PFPeA)		<0.000056	U	-	-	-	-	-	-
Perfluorotetradecanoic Acid (PFTeDA)		<0.000105	U	-	-	-	-	-	-
Perfluorotridecanoic Acid (PFTrDA)		<0.000052	U	-	-	-	-	-	-
Perfluoroundecanoic Acid (PFUnA)		<0.000051	U	-	-	-	-	-	-
PFOA/PFOS, Total		<0.000052	U	-	-	-	-	-	-
GENERAL CHEMISTRY									
Cyanide, Total	27	<0.26	U	<0.25	U	**0.66**	J	**2.3**	
Nitrogen, Ammonia		-		**24**		**100**		**150**	
Solids, Total		**77.9**		**80.8**		**79.5**		**49.8**	

* Comparison is not performed on parameters with non-numeric criteria.
NY-RESC: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
NY-RESI: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Qualifiers:
U - Not detected at the reported detection limit for the sample.
J - Presumptive evidence of compound.
Bold - Compound is detected
Green Highlight - Exceeds NYS Part 375 Commercial SCOs

Appendix F – Remedial Action Monitoring Plan

INVENTUM ENGINEERING, PC

Remedial Action Monitoring Plan

Riverview Innovation & Technology Campus

Site No. C915353

3875 River Road

Tonawanda, NY 14150

June 29, 2026

441 CARLISLE DRIVE
SUITE C
HERNDON, VA 20170
WWW.INVENTUMENG.COM

Table of Contents

1 Introduction 1
2 Data Quality Objectives 2
2.1 QA Objectives for Chemical Data Management 2
3 Sampling Locations, Custody, Holding Times, and Analysis 3
4 Remedial Action Monitoring Scope of Work 4
4.1 Remedial Actions Sampling Requirements 4
4.1.1 Procurement 4
4.1.2 Confirmation Sampling 4
4.1.3 Treatment 5
4.1.4 Consolidation 6
4.1.5 Groundwater Collection System Installation 7
4.1.6 Surface Water Management 7
4.1.7 Cover Placement 8
4.1.8 Consolidation Cell 9
4.1.9 Groundwater Treatment System Installation and Startup 10
4.1.10 Monitoring System 10
4.1.11 Survey 11
4.2 Excavation Protocols 12
4.2.1 General 12
4.2.2 Excavation in Track 1 – Retention Basin Area 12
4.2.3 Excavation in Track 1 – Perimeter Area 13
4.2.4 Excavation of Solidified Materials 13
4.2.5 Excavation of Blue-stained Soils 13
4.2.6 Excavation of the Iron Oxide Pile, Thaw Shed Area, and EPA Soil Piles 13
4.2.7 Excavation of the Ammonia Source Materials 14
4.2.8 MW-BCP-13 and MW-BCP-19 Areas 14
4.2.9 Excavation in the Elevated Measurement Level Areas – Sheet S-18 14
4.3 Field Modification Notifications 15
5 Sample Naming Nomenclature 16
6 Storage of Data 17
7 Electronic Data Deliverables 18

Table

Appendix

Appendix A – Quality Assurance Project Plan (QAPP)

1 Introduction

The purpose of this Remedial Action Monitoring Plan (RAMP) is to serve as a guidance document during sampling activities during the Remedial Action Implementation for the Riverview Innovation & Technology Campus Brownfield Cleanup Program (BCP) Site #C915353 at 3875 River Road, on behalf of Riverview Innovation & Technology Campus, Inc. The remedial actions are being completed in accordance with the Decision Document dated August 2024 and the Brownfield Cleanup Agreement (BCA) executed by RITC and the New York State Department of Environmental Conservation (NYSDEC).

The environmental sample types and corresponding analytical parameters/methods are provided in Table 1.

The laboratory Quality Assurance (QA) Manager will be responsible for performing project-specific audits and overseeing the quality control data generated.

2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of data required to support the investigation of the Site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing the definitive data category, as outlined in Guidance for the Data Quality Objectives Process, EPA QA/G-4 (September 1994). All samples will provide definitive data, which are generated using rigorous analytical methods, such as the reference methods approved by the United States Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC).

2.1 QA Objectives for Chemical Data Management

Laboratories will be instructed that completed Sample Preparation and Analysis Summary forms are to be submitted with the analytical data packages. The laboratory will also be instructed that matrix interferences must be cleaned up, to the extent practicable.

3 Sampling Locations, Custody, Holding Times, and Analysis

Sample locations and procedures are discussed in the Remedial Action Work Plan, the following sections of this RAMP, and the accompanying Tables and Figures of the RAWP and the Quality Assurance Project Plan (QAPP). Procedures for chain of custody, holding times and laboratory analyses shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan and the QAPP. All holding times begin with validated time of sample receipt (VTSR) at the laboratory. The laboratory must meet the method required detection limits which are referenced within the EPA Methods.

In addition, for the emerging contaminants, the laboratory must meet the detection limits for PFAS specified in the NYSDEC's April 2023 *Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs* and 0.09 milligrams per kilograms (mg/kg) for 1,4-Dioxane.

4 Remedial Action Monitoring Scope of Work

The remedial action monitoring scope of work was designed to provide the data to confirm the Remedial Action Objectives (RAWP, Inventum 2026) have been achieved. All RAMP work will be conducted in accordance with the following supplemental documents:

- Quality Assurance Project Plan (QAPP) – Appendix A – defines the data quality objectives, sampling and analytical method requirements, QA/QC sample collection frequency, quality control requirements, data management, and data review, validation, and verification requirements to be followed during completion of the remedial action.
- Community Air Monitoring Plan (CAMP) – Appendix C of the RAWP – defines the appropriate air monitoring requirements and designated protocols to be followed to monitor the air quality emanating from work areas (personal air monitoring is covered by the HASP) during completion of the remedial action.
- Health and Safety Plan (HASP) – Appendix H of the RAWP – defines the appropriate health and safety requirements and designated protocols to be followed during completion of the remedial action.

Table 1 summarizes the sampling program for and includes information on proposed sample type, sample depth, and rationale for each remedial action requiring sampling.

4.1 Remedial Actions Sampling Requirements

The remedial actions are described in detail in the RAWP. The associated monitoring and testing requirements are described in the sections below and Table 3-3.

4.1.1 Procurement

Soil materials being procured offsite must be tested to confirm they meet the required SCOs before they are transported to the BCP Site. The associated testing requirements are described below:

1. Topsoil – Testing to confirm each source meets the Commercial SCOs. See Soil Cover.
2. Gravel – Areas that are going to be covered with pavement or buildings may receive a gravel subbase in lieu of a soil cover. The granular materials shall be tested in accordance with DER-10, Table 5.4 (e)10 but testing will for the most part be limited to grain-size analysis to confirm less than 10 percent passes the No. 80 sieve.

4.1.2 Confirmation Sampling

The perimeter/extent of three excavations and the absence of impacts from the mixing pad on the underlying fill must be confirmed. The associated testing requirements are described below:

1. MW-BCP-13 and MW-BCP-19 Areas - The area around both MW-BCP-13 and MW-BCP-19 are being excavated to remove potential sources of VOCs to groundwater. The sidewalls and base of the excavation will be sampled and tested to confirm the excavation has removed silty clay with VOCs in excess of the protection of groundwater SCOs. The samples will be collected from the sidewalls at the depth of the highest PiD readings or in the absence of any elevated readings, at 15 feet below the ground surface on each sidewall at a frequency of approximately one sample per 50 LF. The base sample(s) will be collected from the final soil recovered in the excavator bucket. Each sample will represent less than 900 SF. The excavation shall be filled with silty clay borrow from the retention basin. The excavated materials shall be placed in the consolidation area unless sampled, tested and the concentrations are less the protection of groundwater SCOs. Soil with concentrations of less than the protection of groundwater SCOs shall be used as fill.

2. Mixing Pad Area – The mixing pad was decontaminated in accordance with the Mixing Pad Closure IRM Work Plan and documented in the approved Construction Completion Report (Inventum 2021). Five samples were collected to verify the constituents of the materials managed on the pad did not penetrate the concrete. Five samples at approximately the same locations as the concrete cores will be collected of the underlying fill to confirm the concentrations of site-related constituents in the underlying fill are not significantly different than the surrounding fill.
3. Exhauster Building Area Sump Excavations – The former sumps at the exhauster building will be excavated to remove the former sump structures and any residual materials that were not removed by the USEPA. The samples will be collected from the sidewalls at the depth of the highest PiD readings or in the absence of any elevated readings, at 15 feet below the ground surface. The base sample will be collected from the final soil recovered in the excavator bucket no less than 1/900 SF of the base and 1 per 50 LF of wall to confirm the silty clay meets the protection of groundwater SCOs. The excavation shall be filled with silty clay borrow from the retention basin. The excavated materials shall be placed in the consolidation area unless sampled, tested and the concentrations are less the protection of groundwater SCOs. Soil with concentrations of less than the protection of groundwater SCOs shall be used as fill.

4.1.3 Treatment

Although the IRMs were intended to treat the fill that could potentially act as a source of ground water contamination, there are several classes of materials that may be encountered or generated during the implementation of this RAWP that will require treatment. The associated testing requirements are described below:

1. Residual viscous tar or fill with Nonaqueous Phase Liquids (NAPLs), collectively Grossly Contaminated Materials [GCMs] encountered during excavation – Testing of the resulting solidified material to ensure it does not exhibit the characteristics of toxicity and contains no free liquid (EPA SW-846 Method 9095B);
2. Compressible purifier wastes – Testing to verify that the materials will support the consolidation area capping system. Paint filters tests will be used (1/1,000 cubic yards) to confirm there is no free liquid before placing in the cell. The placed and compacted materials will be field tested to verify the unconfined compressive strength meets or exceeds 500 pounds per square foot (PSF);
3. In-situ Solidification of Blue-Stained Soils – Paint filters tests will be used (1/100 cubic yards) to confirm there is no free liquid before placing in the cell. The placed and compacted materials will be field tested to verify the unconfined compressive strength exceeds 500 pounds per square foot (PSF) Confirm soils are non-hazardous. Hazardous Characterization Testing of 1 sample per 100 cubic yards solidified, no less than 1 per location.
4. Petroleum impacted fill – Testing to confirm the underlying constituents have been biodegraded and that the resulting materials do not pose a nuisance. Sampling (1/100 tons which is 1/60 CY) will be conducted after no olfactory nuisance is detected; both VOCs and SVOCs shall be confirmed to meet the commercial SCOs. If the soils do not meet commercial SCOs they can only be used as fill below the demarcation layer, not as part of the cover systems;
5. Ammonia impacted fill - Following treatment each pile will be sampled (1/100 CY). If the ammonia in the fill is less than the ammonia SCO it will be used as fill below the cover system, if the ammonia concentration exceeds the ammonia SCO the material will be retreated or placed in the consolidation cell. Although not anticipated, materials to be used as fill below the groundwater surface will be tested to verify the material meets the protection of groundwater SCO.

6. Construction water – Testing in accordance with the Town of Tonawanda Industrial Waste Discharge Permit No. 331.

4.1.4 Consolidation

Materials to be managed at the site are distributed throughout the property. Rather than leave solidified materials in isolated areas across the property, especially those materials that may have to be avoided or managed during redevelopment, the materials will be placed in a consolidation area.

The testing required for each material to be placed in the consolidation cell are listed below:

1. Solidified Fill
    a. Production Areas – Former Light Oil/MW-BCP-05 area to Pump House – No testing required, confirmation and verification sampling conducted during the IRM;
    b. Production Area – Light Oil Area – No testing required, confirmation and verification sampling conducted during the IRM;
    c. Satellite Areas – Thaw Shed – No testing required, confirmation and verification sampling conducted during the IRM;
    d. Tar Seep No. 2 Area – No testing required, confirmation and verification sampling conducted during the IRM;

2. Purifier Materials
    a. Iron Oxide Pile and Purifier Box Residuals
        - Sampling the area following removal to verify underlying fill meets the protection of groundwater SCO for cyanide, 1 sample per 900 SF.
        - Field testing of the unconsolidated compressive strength to confirm the material can support 500 pounds per square foot (PSF) of overburden pressure. For reference the weight of earth moving equipment exceeds this requirement so if the fill does not deflect under the weight of equipment, testing is not required.
        - Paint filter test – Materials with free liquids will be solidified before placement in the consolidation cell.

3. EPA Soil Pile Materials – TCLP sampling from each pile. Material above surrounding grade elevation will be excavated and placed in the consolidation cell.
4. Potential TENORM Materials
    a. In accordance with the TENORM Management Plan
        - Material with gamma (γ) counts per minute (CPM) >12,000 γ CPM and ≤ 17,000 γ CPM designated as TENORM (Background-comparable), may be consolidated into the proposed Consolidation Cell or capped onsite under no less than 2 feet of cover.
        - For material greater than 17,000 γ CPM which is designated as TENORM Fill, a representative sample shall be collected to verify the Ra-226 activity and then shall be placed inside the TENORM Consolidation Cell area; provided that the activity is greater than 5.0 picocuries per gram (pCi/g) threshold for TENORM Fill and below the 15 pCi/g threshold for TENORM Waste.
        - For material with Ra-226 activity is greater than 15 pCi/g (TENORM Waste) out of state transportation and disposal will be arranged.

4.1.5 Groundwater Collection System Installation

The groundwater collection system has been designed using groundwater data collected during the groundwater IRM and to protect the consolidation cell from groundwater intrusion. During the excavation of each collection or conveyance system the following observations will be conducted:

1. Fill will be inspected for grossly contaminated materials; viscous tar or other NAPL (Light Oil). Grossly contaminated materials shall be solidified in accordance with the RAWP and placed in the consolidation cell;
2. The base of the conveyance line trenches shall be no less than 3-inches below the conveyance pipe grades;
3. The base of the collection trench shall be no less than 6-inches below the top of the native silty clay (direct observation or if flooded, by observing clay in the excavator bucket; and
4. The base of the collection sump shall be no less than 12-inches below the lowest elevation of the collection trench.

Note: There are no collection systems in the vicinity of potential TENORM materials.

No less than 2 weeks following completion of each collection system, the following measurements and sampling shall be conducted:

1. The depth to water shall be measured and the volume of groundwater shall be estimated;
2. The accumulated water shall be considered construction water and shall be pumped, pretreated, and discharged to the Town of Tonawanda Publicly Owned Treatment Works (POTW) under Permit No. 331;
3. The groundwater from each collection sump will be allowed to recharge to within 90 percent of the elevation (bottom of sump to top of water) and a sample of water will be collected for comparison to the bench-scale influent water quality.

The groundwater from the following collection systems will be sampled for VOCs, SVOCs, cyanide, metals, mercury, pesticides/herbicides, ammonia, and PFAS/1,4-Dioxane during the completion of the RAWP:

1. Perimeter Drains PD-1 and PD-4 of the consolidation cell.
2. Collection System No. 3 along new perimeter road.
3. Collection System No. 5 north of the production area.
4. Collection System No. 6 former Battery tunnel collection system.
5. Collection Sump No. 7 former north end of coal yard tunnel.
6. Collection System No. 8 –north of the former compressor building, south of Track 1 area.
7. Collection System No. 9 in the vicinity of MW-BCP-12A and the Former Purifier Boxes.
8. Collection Systems BD-2 and BD-3 – Base drainage for consolidation cell if groundwater is recoverable[1].

4.1.6 Surface Water Management

The surface water management systems have been designed to comply with the NYSDEC and Town of Tonawanda General Permits (MS4). Following completion of the vegetative cover, the water at the stormwater basin outfall will be sampled for compliance with the MS4 requirements.

[1] Note: the base drains may not recharge and therefore may not be sampled.

4.1.7 Cover Placement

The cover placement will provide physical barriers between any residuals that do not meet the commercial SCOs and visitors or employees on the BCP Site. The cover systems sampling will be used to confirm conformance with the design criteria and that all cover soils within 12-inches of the ground surface will meet the commercial SCOs.

4.1.7.1 Subgrade Preparation

During the earthmoving required to create the stormwater management systems (including the retention basin), the subgrade preparation will include, but not be limited to, elimination of the areas that retain surface water on the BCP Site and forming the subgrade for the cover systems. . Erosion and Sediment Controls (E&SC) will be monitored throughout the earthmoving activities.

Along the boundary of the property, the fill will be removed to expose underlying silty clay. Any upper stained silty clay will be removed, and the underlying silty clay will be sampled to confirm it meets the unrestricted SCOs. Samples will be collected at a spacing of approximately 250 feet (approximately 1 sample per 10,000 square feet) and tested for VOCs, SVOCs, metals, cyanide and ammonia.

During the subgrade preparation the following will be monitored:

1. The presence of any Grossly Contaminated Materials. Any GCM will be excavated, solidified, tested to confirm the solidified material is not characteristically hazardous, and placed in the consolidation cell.
2. The materials excavated within and within 100 feet around the EMLs will be screened for CPM and suspected potential TENORM materials encountered outside the EMLs will be screened and managed in accordance with the follow criteria as outline in the TENORM Management Plan.

- Background comparable TENORM ≤ 12,000 γ CPM may be moved around the site freely without radiological restrictions
- Material with gamma CPM >12,000 γ CPM and ≤ 17,000 γ CPM: designated as TENORM (Background-comparable), may be consolidated into the proposed Consolidation Cell or capped onsite under no less than 2 feet of cover
- Material with gamma CPM >17,000: designated as TENORM Fill. A representative sample and/or meter-to-activity concentration correlation will be used to verify that the material does not exceed the 15 pCi/g threshold for TENORM Waste. Material that does not exceed the 15 pCi/g threshold for TENORM Waste may be consolidated in the TENORM Consolidation Area if the TENORM needs to be excavated
- Any material greater than 15 pCi/g will be disposed of at an authorized out of state facility.

In addition, the mixing pad will be removed during site preparation. The soils below the mixing pad shall be sampled to confirm none of the underlying soils are characteristically hazardous. The mixing pad covers approximately 6,000 square feet, so 6 samples for VOCs, SVOCs, and Hazardous Characteristics will be collected from the base to 2 feet below the former base. The VOC sample will be collected at the depth of the highest PiD reading.

4.1.7.2 Soil Cover

As areas of fill outside the limits of the perimeter road or building areas, reach the associated subgrade elevations a soil cover will be placed. The soil cover shall consist of a minimum of 12-inches of cover that meets the commercial SCOs over a demarcation layer:

1. The demarcation layer shall be covered with 9-inches of unclassified fill that meets the commercial SCOs recovered from the retention basin, ditch, or consolidation area excavations.

a. The unclassified fill placement shall be monitored to verify the demarcation layer is not compromised;
b. The unclassified fill to be excavated onsite will be tested prior to excavation to verify it meets the commercial SCOs. The testing will comply with Table 5.4(e)10 of DER-10, with the following exceptions that are based on the findings of the pre-design investigation:
    i. Only the upper 10 percent (by volume) of the excavated soil intended for use in the soil cover will be tested for PCBs and PFAS/1,4 Dioxane.
    ii. If any upper silty clay sample contains PCBs or PFAS/1,4 Dioxane above the commercial SCO , the underlying clay at that location will be tested for those compounds.

2. A three-inch (minimum) topsoil layer from offsite sources meeting the commercial SCOs shall be placed and compacted over the unclassified fill to bring the soil cover thickness to no less than 12-inches.
    a. The topsoil shall be tested in accordance with Table5.4(e)10 of DER-10 as modified by current approved sampling, detailed in a memorandum (Import Materials Request and Proposed Sampling, Inventum 2025) approved by NYSDEC, and only imported after approval of an import notification. The modified sampling frequencies are:
        i. New topsoil sources follow DER 10, Table 5.4 (e) 10 , for the first 1,000 CY of material.
        ii. Ammonia and Cyanide samples will be included as part of the inorganics sampling criteria.
        iii. For each additional 1,000 CY a reduced sampling frequency will be performed.
        iv. If PFAS results are below unrestricted criteria for the first 1,000 CYS, no additional PFAS samples will be collected.
        v. Every additional 1,000 CY will require 2 VOC, 1 SVOC, 1 TAL Metals, 1 Ammonia and 1 Cyanide sample
        vi. Every Additional 2,000 CY will require 1 PCB, 1 Pesticide, 1 Herbicide, 1 Ammonia, and 1 Cyanide sample in conjunction with the VOC, SVOC, and Metals sampling stated above.

3. In areas of proposed roads, pavement, or buildings, a 12-inch crushed stone cover may be placed as the soil cover over the demarcation layer.
    a. Granular material with less than 10 percent passing the No. 80 sieve from a virgin source will not be tested for analytical parameters.
    b. Granular material with greater than 10 percent passing the No. 80 sieve from a virgin source or other source shall be tested in accordance with Table5.4(e)10 of DER-10, and only imported after approval of an import notification.

4.1.8 Consolidation Cell

Silty clay at the consolidation cell location has been sampled, Table 3-4 of the RAWP. The silty clay will be placed in stockpiles or direct placed as backfill or cover system material while the consolidation cell is being excavated. The silty clay from the excavation may be used for either the unclassified fill in the consolidation cell cap or for the unclassified fill in the site-wide soil cover.

4.1.8.1 Consolidation Cell Capping System

The consolidation cell capping system includes multiple layers of protection for the contained materials:

1. Perimeter drains shall be constructed around the perimeter of the liner/anchor trench. The perimeter drains media must be clean stone and will be tested for grain size analysis before purchase;
2. A minimum of 21-inches of compacted unclassified silty clay fill shall be placed and compacted over the upper geotextile. Material placed more than 24-inches below final grade will be placed and compacted. Materials within 12-inches of final grade will meet commercial SCOs; and
3. No less than 3-inches of compacted topsoil will complete the cover (See 3.14). Topsoil will be placed over the entire area including the consolidation cell and will be tested in accordance with Table5.4(e)10 of DER-10 following the approved modified topsoil sampling plan for the site to verify it meets commercial SCOs prior to purchase.

4.1.9 Groundwater Treatment System Installation and Startup

The groundwater treatment system will be a new system owned or leased by RITC (the current system is a lease arrangement) assembled, tested and operated in the former machine shop/maintenance building. The system will be designed to meet anticipated surface water discharge criteria although it will have the connections required to discharge to the Town of Tonawanda under Industrial Waste Discharge Permit No. 331 during startup and maintenance.

Prior to final release of the initial groundwater treatment system effluent to surface water, a set of confirmation samples will be collected of the influent, three treatment train samples, and one effluent sample to confirm the system is operating and designed as permitted. While the testing of the system may include other samples, the requirements for approval and acceptance will be the final set of data:

- VOCs (Site Specific List) – Method 624.1
- SVOCs (Site Specific List) – Method 625.1
- Metals (Cd, Al, Fe, Mg and Mn) – Method 200.7
- Mercury Low Level – Method 1631E
- Cyanide – Method 335.4
- pH – Method pH
- Oil and Grease – Method – 1664B(HEM) 2010
- BOD 5-Day – Method SM 5210B
- Total Dissolved Solids – SM2540C
- Total Suspended Solids – Method 2540D
- Settleable Solids – Method SM 2540F
- Total Recoverable Phenolics – Method 420.1
- Ammonia – Method 350.1
- PFAS (List of 40 based on EPA Method) – Method 1633A

Following the initial set of samples, The measurement frequency of parameters listed on this page shall be Monthly following a period of 12 (twelve) consecutive weekly sampling events showing no exceedances of the stated discharge limitations. If discharge limitation of any parameter listed on this page exceeds the stated limit, the measurement frequency for all parameters listed on this page shall again be weekly, until a period of four consecutive sampling events showing no exceedances at which point monthly monitoring may resume

4.1.10 Monitoring System

The location, installation specifications and testing of the proposed monitoring locations are proposed on Sheets S-35 and S-36. Any existing monitoring wells that are not included in the final monitoring system will be completely excavated or abandoned by a NY licensed well driller. The figures show the proposed

groundwater monitoring points, details of monitoring well construction, details of the surface water monitoring and sampling location(s), and the required infrastructure to provide access and protect the monitoring locations. It should be noted the locations were selected with the understanding that a RITC wide monitoring program will provide an integrated set of data to understand conditions across the 140-acre campus. Monitoring Well cluster MW-BCP-16 is retained until the 3821 River Road BCP Site remedial action is completed, at that time, the need for retention of the MW-BCP-16 cluster shall be reevaluated.

The monitoring systems includes the groundwater metrics for verifying that any required sub slab depressurization systems are properly inspected and recorded.

4.1.10.1 Monitoring Well Installation

The groundwater monitoring program proposed in the RAWP includes the use of existing and the installation of new or replacement monitoring wells in the fill, upper clay, and lower clay. The monitoring wells will be screened in the fill at the top of the silty clay, in the B-zone defined in the RI and in the C-zone and named in accordance with that nomenclature.

Liquid level measurements will be collected from the monitoring wells no sooner than 2 weeks after development. The depth to water and overall total depth of the wells will be collected using an oil/water interface probe and recorded in the SMP[2] field notebook. The total depth of the well will be verified to ensure it has not accumulated sediment. The wells will be developed as follows:

Upon completion of monitoring well installation, well development will begin within one-week to two-weeks, no sooner than 24-hours after completion. Monitoring wells will be developed with a submersible pump (typhoon or Hurricane pump) or traditional hand bailer. An Interface Probe will be used to measure depth to product (not expected), depth to water, and depth to bottom. A water quality meter will be used to document water temperature, pH, turbidity (NTU), dissolved oxygen (DO), oxidation reduction potential (ORP), and specific conductivity during development. A minimum of three (3) well volumes will be removed with water quality measurements taken between each well volume. If the wells remain turbid or above 50 NTU after 3 well volumes, additional groundwater will be removed until turbidity decreases or the well goes dry. If sediments remain after several well volumes have been removed additional development methods such as surging or flushing the well with potable water may be required. In the event a well goes dry during development, time should be allowed for the well to recharge with groundwater and additional volumes of groundwater should be removed until water quality improves. Development water will be containerized in buckets or totes and pumped to the onsite groundwater treatment system for pretreatment. A minimum of two (2) weeks should pass after well development before conducting groundwater sampling. A minimum of three well volumes will be purged from the monitoring wells using a bailer or peristaltic pump or the well be purged dry prior to collecting groundwater samples. Field measurements of pH, temperature, conductivity, turbidity, dissolved oxygen, and oxygen reduction potential (ORP) will be recorded at three intervals during the purging process for standard purge. Groundwater samples will be collected with a bailer or with dedicated polyethylene tubing and a peristaltic pump.

4.1.11 Survey

Monitoring wells will be surveyed by a surveyor licensed in the state of New York consistent with standard technical practices. Horizontal locations will reference the North American Datum of 1983 and the New York State Plane system and be accurate to within ±0.1 foot. Vertical elevations from the ground surface

[2] While the SMP may not have been approved by this time, the SMP field books will be initiated with the installation and testing of the monitoring well network.

and top of casing (TOC) will be referenced to the North American Vertical Datum of 1988 and reported in feet above mean sea level. Vertical measurements will be accurate to within ±0.01 foot.

Soil sample locations will be measured with onsite GPS equipment. The Topcon GPS equipment used at the site is accurate within 0.01 foot (0.08 inch) horizontally and 0.01 foot (0.09 inch) vertically at 300 meters from the base station.

All sample locations will be provided on the as-built Figures in the FER and the monitoring well location data will be provided in the SMP.

4.2 Excavation Protocols

Significant excavation is required across the BCP Site to establish grades, to install the perimeter shallow groundwater barrier and to remove the materials to be placed in the consolidation area. Specific protocols apply to several aspects of the earthmoving on the BCP Site:

- General – Observations, Screening, and Excavation of Soils below the Shallow Groundwater System
- Excavation of the Solidified Materials – Sheet S-11
- Excavation of Blue-stained soils – Sheet S-12
- Excavation of VOC-impacted Soil – Sheet S-13
- Excavation of the USEPA Soil Piles
- Excavation of the Ammonia Source Materials – Sheets S-17
- Excavation in the Elevated Measurement Level Areas – Sheet S-18

4.2.1 General

Throughout the excavation program, the following operations and procedures shall be followed for all excavations:

- The excavated materials will be observed to confirm no unanticipated grossly contaminated materials are exposed. Grossly contaminated materials are those with layers of viscous tar or NAPL. Viscous tar and NAPL containing materials shall be solidified with Portland Cement or LKD and placed in the consolidation area.
- The excavated materials will be observed to confirm no unanticipated, blue-stained materials are exposed. Blue-stained soil materials shall be solidified with Portland Cement or LKD in-situ or placed in the consolidation area.
- Groundwater that must be removed from excavations shall be managed by pumping the water through a 25-micoron filter and discharging the water to the POTW under Permit No. 331 or to the Groundwater IRM system for additional treatment. In either case the pumped water must be free of sediment. For limited excavations, use of silty clay as a barrier to shallow groundwater inflow is appropriate.

4.2.2 Excavation in Track 1 – Retention Basin Area

The basin excavation will be sampled in accordance with the requirements of DER-10 for import with the exception that only the upper samples will be tested for PFAS. If PFAS compounds are not detected the deeper samples will not be tested for PFAS or 1,4 Dioxane. Four soil borings have been advanced as part of the pre-design investigations and the data meet both unrestricted and commercial SCOs.

There will be limited fill placed in the retention basin excavation other than riprap with less than 10 percent passing the No. 80 sieve and limited amounts of soil to support revegetation of areas above the

normal pool elevations (Sheet S-27). All soil placed within the Track 1 areas of the retention basin shall be tested to confirm it meets the unrestricted SCOs.

4.2.3 Excavation in Track 1 – Perimeter Area

The perimeter areas will be excavated to allow installation of a perimeter silty clay barrier. The surface of the silty clay that is exposed will be sampled to confirm it meets the unrestricted SCOs. The samples will be collected at approximately 50-foot intervals or (1/900 SF) whichever is the greater number of samples. The fill placed in the Track 1 areas will be from the retention basin unclassified fill source, crushed stone with less than 10 percent passing a No. 80 sieve, and/or soil meeting the unrestricted SCOs.

4.2.4 Excavation of Solidified Materials

The limits of the solidified materials have been surveyed (Sheet S-11). The fill used to protect the solidified materials surface, where used, shall be removed, and used as fill above the groundwater but below the proposed cover subgrade. All solidified fill within the limits surveyed during the Solidification IRM shall be excavated and transported to the consolidation area, where it shall be placed and compacted. The excavated area will be sampled at a rate of 1 sample per 900 SF for both VOCs and SVOCs. If any compound exceeds the rule of 20 for TCLP criterion, a TCLP Test will be completed. Materials exhibiting the characteristics of hazardous waste will be solidified and placed in the consolidation cell.

4.2.5 Excavation of Blue-stained Soils

There are blue-stained soils in four locations on the BCP Site (Sheet S-12); the TP-BCP-46 area, the TP-BCP-35 Area, the SS-BCP-15 Area and the Iron Oxide and Purifier Box stockpiles. The blue-stained soils that must be excavated (along the southern boundary, the iron oxide pile, the stockpiled materials, and the TP-BCP-46 area) will be excavated solidified and placed in the consolidation area. The below grade blue-stained soils (Sheet S-15) will be solidified in place.

The excavation of the blue-stained soils will involve removal and stockpiling of un-stained soil, exposing the layer of blue-stained material. The layer of blue-stained material will then be solidified and transported to the consolidation area, where it will be placed and compacted.

4.2.6 Excavation of the Iron Oxide Pile, Thaw Shed Area, and EPA Soil Piles

The USEPA soil piles (Sheet S-16) will be sampled prior to removal to confirm they are not characteristically hazardous Following receipt of the data, all non-hazardous materials from the stockpiles will be placed and compacted in the consolidation area. Any pile containing characteristics of hazardous waste will be solidified and resampled to confirm the characteristics have been eliminated. The area exposed by removal of the iron oxide pile will be inspected for evidence of purifier waste as blue-tinted or stained soil. Blue-tinted or -stained soil will be excavated and managed like the pile materials. If no evidence of blue-staining is observed, the area will be sampled for cyanide. Any soil with cyanide above the industrial SCO will be excavated and placed in the consolidation cell.

The area under each Thaw Shed area pile will be sampled for VOCs and SVOCs. If any compound exceeds the rule of 20 for TCLP criterion, a TCLP Test will be completed. Materials exhibiting the characteristics of hazardous waste will be solidified and placed in the consolidation cell.

The EPA soil piles (Sheet S-16) were placed by the USEPA between 2018 and 2020. Absent documentation, Inventum sampled the piles in 2026. The piles will be placed in the consolidation cell. The materials will be inspected for free liquids, were suspected the materials will be tested using the paint filter test. Materials meeting the paint filter test criteria will be placed in the consolidation cell. Materials failing the paint filter test will be solidified with LKD or Portland cement and placed in the consolidation cell. The

areas exposed by each pile will be inspected for grossly contaminated materials. These areas will be excavated as part of the perimeter fill removal and no further sampling is required.

4.2.7 Excavation of the Ammonia Source Materials

The majority of the soils containing ammonia above the site-specific protection of groundwater SCO are within the solidified materials in the former production area (Sheet S-17).The fill along the north side of the solidified mass may have some additional soils exceeding the SCO. The soils shown on Sheet S-17 shall be excavated and placed and compacted in the consolidation area. Samples will be collected from the north face of the excavation at all locations with detectable ammonia odors, or at a minimum of 100-foot center to center spacing. It is important to note that the fill north of the identified ammonia source area will be excavated for the consolidation area so any additional soils presenting an ammonia odor will be identified, sampled, and treated. If after treatment sampling detects ammonia above the SCO it shall be placed in the consolidation area.

4.2.8 MW-BCP-13 and MW-BCP-19 Areas

Two locations outside the solidified areas on the BCP Site contain VOC impacted soil that have affected groundwater, the MW-BCP-13, and MW-BCP-19 areas (Sheet S-13). Preliminary testing in 2025 has identified the initial excavations as shown on Sheet S-13. The excavations will proceed as follows:

- Removal and stockpiling of the general site fill over the silty clay at each location. The source of the VOC impact was not detected in those materials, and they shall be used for general site grading.
- Excavate the silty clay at the MW-BCP-13 location to expose a 20-foot by 30-foot (minimum) rectangle at elevation 576-ft-msl. Sample base and sidewalls at the highest PiD reading location or 15-feet BGS to determine if the impacted soil was removed. If the protection of groundwater standards are exceeded at any sample location, remove an additional 2 feet of material, and repeat the sampling.
- Excavate the silty clay at the MW-BCP-19 location to expose a 20-foot by 30-foot (minimum) rectangle at elevation 586-ft-msl. Sample base and sidewalls at the highest PiD reading location or 15-feet BGS to determine if the impacted soil was removed.
- If the protection of groundwater standards are exceeded at any sample location, remove an additional 2 feet of material, and repeat the sampling.
- Backfill for the excavations will be compacted silty clay from the retention basin location that meets the protection of groundwater SCOs.

4.2.9 Excavation in the Elevated Measurement Level Areas – Sheet S-18

The BCP Site was screened for gamma activity by MJW. Based on the screening, MJW identified the three areas of elevated measurements and developed the TENORM Management Plan. The materials excavated within and 100 feet around the EMLs will be screened for CPM and suspected potential TENORM materials encountered outside the EMLs will be screened and managed in accordance with the following criteria as outline in the TENORM Management Plan.

- It is assumed that the majority of the material in each EML is not TENORM Fill or Waste.
- Background comparable TENORM $\leq$ 12,000 γ CPM will be segregated from materials with > 12,000 γ CPM and may be moved around the site freely without radiological restrictions.
- Material with gamma CPM >12,000 γ CPM and $\leq$ 17,000 γ CPM: designated as TENORM (Background-comparable), may be consolidated into the consolidation area or capped onsite under no less than 2 feet of cover.

- Material with gamma CPM >17,000: designated as TENORM Fill. A representative sample and/or meter-to-activity concentration correlation will be used to verify that the material does not exceed the 15 pCi/g threshold for TENORM Waste. Material that does not exceed the 15 pCi/g threshold for TENORM Waste may be consolidated in the consolidation area if the TENORM needs to be excavated.
- Any material greater than 15 pCi/g will be disposed of at an authorized out of state facility.

4.3 Field Modification Notifications

The NYSDEC PM, or their designated representative, will be notified via electronic mail and telephone if the following conditions occur:

- Field activities are delayed and/or rescheduled due to unsafe or unsuitable weather conditions and/or equipment malfunctions.
- Proposed monitoring well locations must be relocated more than 25-feet from the location shown in the RAWP due to surface or subsurface conditions preventing completion of the soil boring to the desired depth or unforeseen hazardous overhead conditions.

5 Sample Naming Nomenclature

All samples shall be labeled:

TYPE-LOCATION-DATE COLLECTED, for example:

CS-SS09- 01-06172025 – Would be the first confirmation sample from the SS09 excavation collected June 17, 2025.

Types:

CS	-	Confirmation Sample
GW	-	Ground Water
TCLP	-	Hazardous Waste Characterization Sample for TCLP Analysis
IM	-	Import Sample

Locations:

SS09	-	SS09 Area Excavation
SB02	-	Soil Boring SB-02-202 Area Excavation
BCP	-	Borrow Pit, 3875 River Road
TS#	-	Topsoil from Offsite Source #

6 Storage of Data

All incoming laboratory data shall be stored on the Inventum OneDrive at the location specified below. All Summary Reports (preliminary and final) and Electronic Data Deliverables (EDD) shall share a common laboratory project number.

- Google Drive Path: *Inventum/Laboratory/RITC/Laboratory/Month*
- Laboratory Project Number: RAMP

7 Electronic Data Deliverables

EDD's shall be in a format that can be uploaded to both the NYSDEC and Honeywell EQuIS data management systems.

Table

Table 3-3
Remedial Action Monitoring Plan Samples
Site #C915353
Town of Tonawanda, New York

Location	Rationale	Sample Type	Sample Depth	Soil Sample Analysis												Water Sample Analysis						
				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Surface Water - See SWPPP																						
Procurement																						
Topsoil (Offsite Source)	Import Testing (32,750 CY) - See Cover Placement	Grab	N.A.	See Cover Placement												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/RipRap	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Confirmation Sampling																						
Track 1 - Retention Basin	Confirm excavation meets unrestricted SCOs	Grab	N.A.	See Cover Placement												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Track 1 - Perimeter	Confirm excavation meets unrestricted SCOs (1/900 SF)	Silty Clay - Grab	Base of Excavation	44	44	0	0	44	0	44	9	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Solidified Materials Areas	Confirm no Haz-Mats	Grab	Basse of Excavtion	50	50	0	0	0	0	0	0	0	TBD	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Iron Oxide Pile	Confirm no residule cyanide (1/900 SF)	Grab	Base of Excavation	0	0	5	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Thaw Shed Area	Confirm no impact from piles	Grab	Base of Excavation	10	10	0	0	0	0	0	0	0	TBD	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Ammoia Impacted Areas	Confirm SCO Met (1/900 SF)	Grab	Base of Excavation	0	0	0	0	0	0	0	0	1	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
USEPA Pile Areas	Confirm piles removed	N.A.	N.A.	Inspect to veryify no GCM												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MW-BCP-13 and MW-BCP-19 Areas Confirmation Samples	Confirm clay around excavAtion meet protection of groundwater SCOs.	Silty Clay - Grab	15	16	0	0	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Mixing Pad	Sampling below base of former mixing pad	Grab	Below Base	6	6	6	6	6	0	0	0	0	6	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Exhauster Building Area Sump Excavations	Confirm clay around excavation meet protection of groundwater SCOs.	Grab	15	12	12	12	12	12	0	0	0	12	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Box Culvert	Sample stained concrete	Grab	N.A.	4	4	4	4	4	4	0	0	4	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

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				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Treatment																						
Residual Viscous Tar	Residual viscous tar encoutered during excavations will be solidified and the resulting mass will be tested for TCLP.	Solidified Fill	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Compressible Purifier Wastes	Purifier wastes that cannot be compacted to support the cap	Purifier and Iron Oxide Residuals	N.A.	Paint Filter and Field Unconfined Compression Testing												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
In-situ Solidification - Blue-stained Fill	The blue-stained soils along the south property line	Grab	N.A.	Paint Filter and Field Unconfined Compression Testing												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum Impacted Fill	Post-treatment sampling of Former Diesel Tank and Heavy Equipment Storage Area Fill	Composite	N.A.	1/100 Ton	1/100 Ton	1/100 Ton	0	1/100 Ton	0	0	0	1/100 Ton	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Construction Water	Pre-treated water will be pre-treated and discharged to the POTW in accordance with IWD Permit No. 331	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	Monthly Outfall Samples						
Consolidation																						
Iron Oxide Pile	Confirmation that cyanide greater than the protection of groundwater SCO have been removed	Grab	Surface	0	0	1/500 SF	0	0	0	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
EPA Piles (7)	Full TCLP Sampling to determine if treatment is required before placing in cell.	Grab	N.A.	0	0	0	0	0	0	0	0	0	7	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Groundwater Collection System Installation																						
Collection Systems	Grossly Contaminated Materials	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Conveyance/Utility Trench	Visual Confirmation all pile materials have been moved	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/Collection Trench Media	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve. Note: for collection media it must have less than 10% fine material or it will be rejected at the source.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Collection Trench Groundwater	Verify Consistent with GWTS Design	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	N.A.	11
Surface Water Management																						
Surface Water	Confirm Retention Basin Water suitable for discharge	Composite	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3

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				VOCs	SVOCs	Cyanide	PCBs	Metals	Mercury	Pesticides/Herbicides	PFAS/1,4-Dioxane	Ammonia	TCLP (SVOCs)	Total Organic Carbon	TENORM Analysis	VOCs	SVOCs	Cyanide	Metals	Mercury	Pesticides/ Herbicides	PFAS/1,4-Dioxane
Cover Placement																						
Erosion and Sediment Controls	Visual Confirmation the controls are in place and notify OSC if any controls are filled or damaged.	N.A.	N.A.	Weekly and following any precititation event of 1-inch or greater in a 24-hour period.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CAMP	Contiuous during all earth disturbing activities, see CAMP	N.A.	N.A.	See CAMP												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Grossly Contaminated Materials	Grab	N.A.	0	0	0	0	0	0	0	0	0	1/location/ 100 CY	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Perimeter Shallow Groundwater Barrier Excavation (1/900 SF)	Silty Clay - Grab	N.A.	44	44	44	44	0	0	44	9	0	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Grading	Potential TENORM if counts exceed 17,000 CPM	Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	Field Determination	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Unclassified Fill	Confirmation the Commercial SCOs are Met	Grab	N.A.	201	99	99	10	99	0	10	10	10	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Topsoil (Offsite Source)	Import Testing (32,750 CY)	Grab	N.A.	73	34	34	34	34	34	34	34	34	0	0	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/RipRap	Import Analysis	Grab	N.A.	Grain-size Analysis, >90% Retained on No. 80 Sieve												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Consolidation Cell																						
Unclassified Fill (within 24-inches of final ground surface)	Confirmation the Commercial SCOs are Met	Grab	N.A.	Included in the Cover System Total												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Topsoil (Offsite Source)	Import Testing	Grab	N.A.	Included in the Cover System Total												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Gravel/Base and Perimeter Trench Collection Media	Import Analysis	Grab	N.A.	Grain-size Anlaysis, >10% Retained on No. 80 Sieve. Note: for collection media it must have less than 10% fine material or it will be rejected at the source.												N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Groundwater Treatment System																						
Influent, process and effluent testing	Initial/Baseline Sampling	Composite and Grab	N.A.	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8
Long-term Monitoring																						
Monitoring Wells	Initial/Baseline Sampling	Low-flow	TBD	0	0	0	0	0	0	0	0	0	0	0	0	23	23	23	23	23	23	23
	Totals			460	303	204	110	199	38	132	62	61	13	0	0	45	45	45	45	45	34	45

INVENTUM ENGINEERING, PC

Quality Assurance Project Plan

Remedial Action Monitoring Plan

Riverview Innovation & Technology Campus

Brownfield Cleanup Program Site No. C915353

3875 River Road

Tonawanda, NY 14150

June 24, 2026

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Table of Contents

1 Introduction 1
2 Data Quality Objectives 3
2.1 QA Objectives for Chemical Data Management 3
2.1.1 Precision 3
2.1.2 Accuracy 3
2.1.3 Representativeness 3
2.1.4 Comparability 4
2.1.5 Completeness 4
3 Sampling Locations, Custody, Holding Times, and Analysis 4
4 Calibration Procedures and Frequency 4
4.1 Analytical Support Areas 4
4.2 Laboratory Instruments 5
5 Internal Quality Control Checks 5
5.1 Batch QC 6
5.2 Matrix-Specific QC 6
6 Calculation of Data Quality Indicators 7
6.1 Precision 7
6.2 Accuracy 7
6.3 Completeness 7
7 Corrective Actions 8
7.1 Incoming Samples 8
7.2 Sample Holding Times 8
7.3 Instrument Calibration 8
7.4 Reporting Limits 8
7.5 Method QC 8
7.6 Calculation Errors 9
8 Data Reduction 10
8.1 Data Reduction 10
8.2 Data Validation 10
9 References 11

1 Introduction

The purpose of this Quality Assurance Project Plan (QAPP) is to serve as a guidance document during implementation of the Remedial Action Monitoring Plan (RAMP) which is part of the Remedial Action Work Plan for the Riverview Innovation and Technology Campus Brownfield Cleanup Program Site (BCP Site) located at 3875 River Road in Tonawanda, Erie County, New York. The RAMP is being conducted in accordance with the BCP Agreement (Index No. C915353-02-20) between the New York Statement Department of Environmental Conservation (NYSDEC) and Riverview dated February 14, 2020. The BCP Site is listed as Site Number C915353.

This QAPP is designed to provide an overview of Quality Assurance/Quality Control (QA/QC) procedures. Specific methods and QA/QC procedure for chemical testing of environmental samples obtained from the site as part of the RAMP are defined.

An Inventum Engineering, P.C. (Inventum) Project Manager will be responsible for verifying that QA procedures are followed during the investigation and analysis. This will provide for the valid collection of representative samples. The Project Manager will be in direct contact with the analytical laboratory to ensure that holding times and other QA/QC requirements are met. The selected laboratory will be responsible for overseeing analytical QA/QC activities.

The estimated number of environmental samples and corresponding analytical parameters/methods are provided in Table 1 below. These sample quantities may vary depending on media availability and routine adjustments made during the field work.

Parameter(s)	EPA Method Reference	Soil Sample Quantity	Groundwater Sample Quantity	Surface Water Quantity
Volatile Organic Compounds	8260C	460	31	14
Semi Volatile Organic Compounds	8270D	303	31	14
Total Cyanide	SM 4500 CN E-2011	204	31	14
Polychlorinated Biphenyls (PCBs)	8082A	110	-	-
Metals	6010C	199	31	14
Mercury	7470A	38	31	14
Pesticides	8081B	132	31	3
Herbicides	8151A	132	31	3

Parameter(s)	EPA Method Reference			
Per- and Polyfluoroalkyl Substances	1633	62	31	8
1,4 – Dioxane	8270SIM	62	31	8
Ammonia	350.1	61	-	-
TCLP SVOCS	1311	13	-	-
TOC	9060a	0	-	-
Field Duplicates		1 per 20 Samples Collected		
Matrix Spike (MS)/Matrix Spike Duplicate (MSD)		1 per 20 Samples Collected		
Trip Blanks	8260C	One per Volatile Shipment		
Rinsate (Equipment) Blanks		10-percent of Total Sampling Program for Non-Disposable Equipment		
Waste Characterizations Samples (if needed)				
Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, and Metals	1311/1312	As Needed for Gross Contamination		
PCBs	8082A			
Flash Point (Ignitability)	1030			
pH	9045D			
Reactivity Cyanide	SW846			
Reactivity Sulfide	SW 846			

The analytical laboratory utilized will be a certified NYSDOH ELAP laboratory for the appropriate categories. The laboratory QA Manager will be responsible for performing project-specific audits and overseeing the quality control data generated.

2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of data required to support the investigation of the Site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing the definitive data category, as outlined in Guidance for the Data Quality Objectives Process, EPA QA/G-4 (September 1994). All samples will provide definitive data, which are generated using rigorous analytical methods, such as the reference methods approved by the United States Environmental Protection Agency (USEPA). The purpose of this RAMP is to serve as a guidance document during sampling activities during the Remedial Action Implementation for the BCP Site.

2.1 QA Objectives for Chemical Data Management

Laboratories will be instructed that completed Sample Preparation and Analysis Summary forms are to be submitted with the analytical data packages. The laboratory will also be instructed that matrix interferences must be cleaned up, to the extent practicable.

2.1.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in field and/or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate (for organics) and matrix duplicates (for inorganics), which not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision. RPD criteria must meet the method requirements identified in QAPP Section 6.1.

2.1.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. These data help to assess the potential concentration contribution from various outside sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the matrix spike/matrix spike duplicate and matrix spike blank samples. The spike and spike duplicate, which will give an indication of matrix effects that may be affecting target compounds is also a good gauge of method efficiency.

2.1.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or sub-sampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures have been selected with the goal of obtaining representative samples for the media of concern.

2.1.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. A DQO for this program is to produce data with the greatest practicable degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Complete field documentation will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, completeness, comparability), because only when precision and accuracy are known can data sets be compared with confidence. In order for data sets to be comparable, it is imperative that contract-required methods and procedures be explicitly followed.

2.1.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to verify that valid data are obtained in order to meet project needs.

3 Sampling Locations, Custody, Holding Times, and Analysis

Sample locations and procedures are discussed in the RAWP. Procedures for chain of custody, holding times and laboratory analyses shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. All holding times begin with validated time of sample receipt (VTSR) at the laboratory. The laboratory must meet the method required detection limits which are referenced within the EPA Methods (QAPP Table 1).

4 Calibration Procedures and Frequency

In order to obtain a high level of precision and accuracy during sample processing procedures laboratory instruments must be calibrated property. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following section describe the analytical support areas and laboratory instrument calibration procedures.

4.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered; these are detailed in the following paragraphs.

- Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished according to the methods referenced. All standards and standard solutions are to be formally documented (i.e., in a logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparers name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

- Balances - The analytical balances shall be calibrated and maintained in accordance with manufacturer specifications. Calibration is conducted with two Class AS" weights that bracket the

expected balance use range. The laboratory shall check the accuracy of the balances daily and they must be properly documented in permanently bound logbooks.

- Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised, and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (2 to 6°C for refrigerators) shall be clearly posted on each unit in service.

- Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

4.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet established quantitation limits. Each instrument for organic and inorganic analyses shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to specified methods.

In addition to the requirements stated within the analytical methods, the contract laboratory will be required to analyze an additional low-level standard at or near the detection limits. In general, standards will be used that bracket the expected concentration of the samples. This will require the use of different concentration levels, which are used to demonstrate the instrument's linear range of calibration.

Calibration of an instrument must be performed prior to the analysis of any samples and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still calibrated. If the contract laboratory cannot meet the method required calibration requirements, corrective action shall be taken as discussed in QAPP Section 7. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

5 Internal Quality Control Checks

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed and are described as batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the contract laboratory will be according to the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the referenced analytical methods.

QC results which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

5.1 Batch QC

Method Blanks - A method blank is defined as laboratory-distilled or deionized water that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - A matrix spike blank (MSB) sample is an aliquot of water spiked (fortified) with all the elements being analyzed for calculation of precision and accuracy to verify that the analysis that is being performed is in control. An MSB will be performed for each matrix and organic parameter only.

5.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) and matrix spike duplicate (MSD) are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent difference of the two spiked samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per 20 samples per matrix.

Field Duplicates - The field duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Collection of duplicate samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Obtaining duplicate samples from a soil matrix requires homogenization (except for volatile organic compounds) of the sample aliquot prior to filling sample containers, in order to best achieve representative samples. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible.

Rinsate (Equipment) Blanks - A rinsate blank is a sample of laboratory demonstrated analyte free water passed through and over the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from ambient air and from sample instruments used to collect and transfer samples. This water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks for nonaqueous matrices should be performed at a rate of 10-percent of the total number of samples collected throughout the sampling event. Rinse blanks will not be performed on samples (i.e., groundwater) where dedicated disposable equipment is used.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte free water. These samples then accompany the bottles that are prepared at the lab into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the lab with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organic parameters. Trip blanks must be included at a rate of one per volatile sample shipment.

6 Calculation of Data Quality Indicators

6.1 Precision

Precision is evaluated using analyses of a field duplicate and/or a laboratory MS/MSD which not only exhibit sampling and analytical precision but indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

$$RPD = \frac{(X1 - X2) \times 100\%}{[(X1 + X2)/2]}$$

Where:

X1= Measured value of sample or matrix spike

X2= Measured value of duplicate or matrix spike duplicate

Precision will be determined through the use of MS/MSD (for organics) and matrix duplicates (for inorganics) analyses.

6.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. It is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to organic fractions (i.e., volatiles, semi volatiles, PCB), and is calculated as follows:

$$\text{Accuracy (\%R)} = \frac{(Xs - Xu) \times 100\%}{K}$$

Where:

Xs- Measured value of the spike sample
Xu- Measured value of the unspiked sample
K - Known amount of spike in the sample

6.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$\text{Completeness (\%C)} = \frac{(Xv - Xn) \times 100\%}{N}$$

Where:

Xv- Number of valid measurements
Xn- Number of invalid measurements
N - Number of valid measurements expected to be obtained

7 Corrective Actions

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

7.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The Inventum Project Manager shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

7.2 Sample Holding Times

If any sample extraction and/or analyses exceed method holding time requirements, the Inventum Project Manager shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

7.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed and, if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

7.4 Reporting Limits

The laboratory must meet the method required detection limits listed in NYSDEC ASP, 10/95 criteria. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify Inventum personnel for problem resolution. In order to achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt to retain the project required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, the Project Manager will be immediately notified so that appropriate corrective actions can be initiated.

7.5 Method QC

All QC method-specified QC samples shall meet the method requirements referenced in the analytical methods. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed and/or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed and/or re-extracted/redigested, then reanalyzed. Inventum shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

7.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

8 Data Reduction

8.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either in a graphic or printed tabular format. Specific data generation procedures and calculations are found in each of the referenced. Analytical results must be reported consistently. Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Individuals experienced with a method particular analysis and knowledgeable of requirements will perform data reduction.

8.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use. All analytical samples collected will receive a limited data review. The data validation will be limited to a review of holding times, completeness of all required deliverables, review of QC results (surrogates, spikes, duplicates). In addition, a minimum of 10-percent of the samples will also receive third-party recalculations checks and review of actual instrument outputs (i.e. Stage 4 validation).

The methods as well as the general guidelines presented in the following documents will be used during the data review USEPA Contract Laboratory Program (CLP) Organic Data Review, SOP Nos. HW-6, Revision #11 and USEPA Evaluation of Metals Data for the Contract Laboratory Program based on 3/90, SOW, Revision XI. These documents will be used with the following exceptions:

- Organic calibration and QC criteria will be in accordance with NYSDEC ASP, 10/95 edition. Data will be qualified if it does not meet NYSDEC ASP, 10/95 criteria.

Where possible, discrepancies will be resolved by the project manager (i.e., no letters will be written to laboratories). A complete analytical data validation is not anticipated. However, if the initial limited data audit reveals significant deviations and problems with the analytical data, project personnel may recommend a complete variation of the data.

Category B deliverables will be provided for all samples collected to delineate the nature and extent of contamination. Inventum will submit all analytical data packages for third-party data validation review. A third-party Data Usability Summary Report (DUSR) will be prepared for each laboratory data package. Electronic Data Deliverables (EDDs) consistent with the most recent NYSDEC Environmental Information Management System (EIMS) format will be included with the deliverables and will be uploaded to the EIMS.

9 References

- Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy, Revision I, October 1989.
- National Enforcement Investigations Center of USEPA Office of Enforcement. NEIC Policies and Procedures. Washington: USEPA.

Appendix G – GHG Model Results

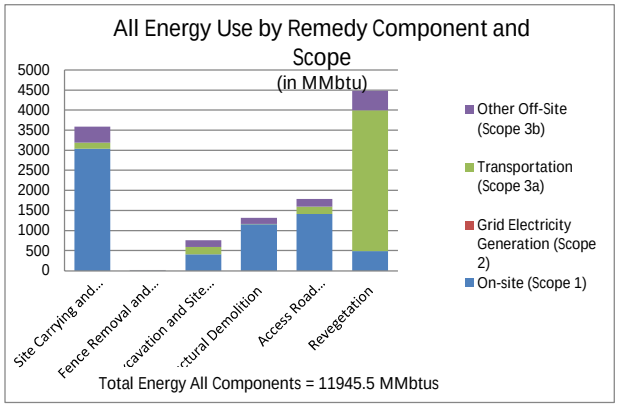
Environmental Footprint Summary

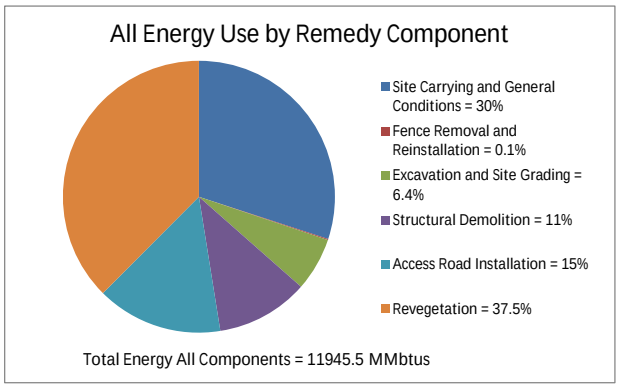
Core Element	Metric		Unit of Measure	Footprint						
				Site Carrying and General Conditions	Fence Removal and Reinstallation	Excavation and Site Grading	Structural Demolition	Access Road Installation	Revegetation	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.1	0.3	0.0	0.0	0.4
	M&W-2	% of refined materials from recycled or reused material	%			100.0%	0.0%		0.0%	24.1%
	M&W-3	Unrefined materials used on-site	Tons	1,000.027	60.000	2,600.005	0.000	2,800.020	28,390.000	34,850.1
	M&W-4	% of unrefined materials from recycled or reused material	%	0.0%	100.0%	0.0%		100.0%	39.6%	40.5%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	525.0	0.0	0.0	0.0	525.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%			0.0%				0.0%
Water (used on-site)	W-1	Public water use	MG	0.1	0.0	0.0	0.4	0.0	0.0	0.5
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	1.0	0.0	0.0	0.0	1.0
	W-5	Storm water use	MG	0.1	0.0	0.5	0.0	0.0	0.7	1.3
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	3,586.8	13.7	759.0	1,312.5	1,790.2	4,483.3	11,945.5
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.000	0.000	0.000	0.000	0.000	0.000	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	3,911.6	8.3	526.3	1,482.8	1,816.6	621.6	8,367.1
	A-2	On-site HAP emissions	Pounds	0.1	0.0	0.0	0.0	0.1	0.0	0.2
	A-3	Total NOx, SOx, and PM emissions	Pounds	4,325.8	15.6	1,169.7	1,609.7	2,179.8	5,486.5	14,787.2
	A-3A	Total NOx emissions	Pounds	3,943.7	14.2	824.4	1,461.4	1,989.1	5,007.7	13,240.6
	A-3B	Total SOx emissions	Pounds	263.6	1.0	92.6	99.2	132.2	332.3	921.0
	A-3C	Total PM emissions	Pounds	118.5	0.4	252.7	49.1	58.4	146.5	625.7
	A-4	Total HAP emissions	Pounds	29.1	0.1	5.6	9.8	13.6	32.9	91.2
	A-5	Total greenhouse gas emissions	Tons CO2e*	292.7	1.1	61.5	107.9	146.2	366.5	975.9
Land & Ecosystems	Qualitative Description									

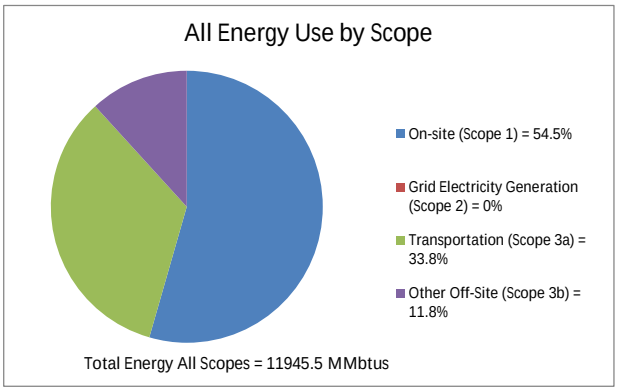
** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes:







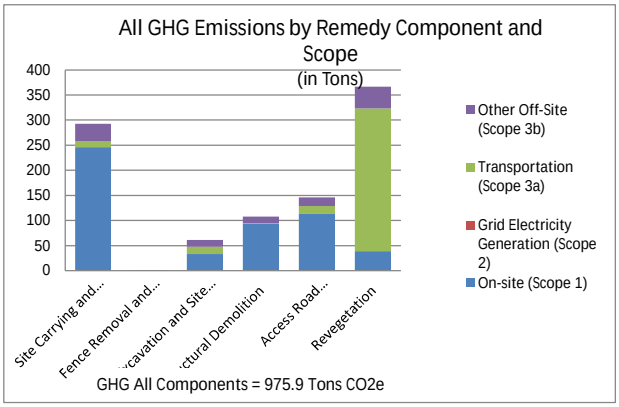
Total Energy MMbtus

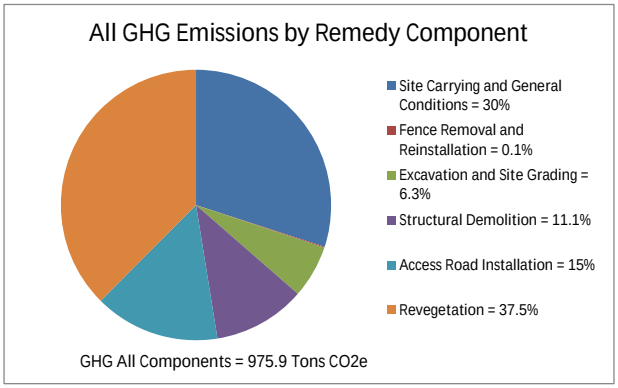
	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total	
On-site (Scope 1)	3,040.9	6.5	409.1	1,152.7	1,412.2	483.3	6,504.6	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	l Electricity
sportation (Scope 3a)	145.2	5.6	182.7	12.2	180.7	3,508.8	4,035.2	Tran
er Off-Site (Scope 3b)	400.7	1.6	167.2	147.6	197.3	491.3	1,405.7	Oth
Total	3,586.8	13.7	759.0	1,312.5	1,790.2	4,483.3	11,945.5	

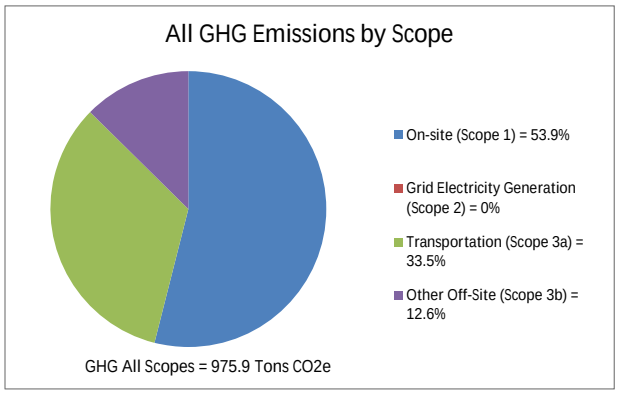
Site Carrying and General Conditions = 30%
Fence Removal and Reinstallation = 0.1%
Excavation and Site Grading = 6.4%
Structural Demolition = 11%
Access Road Installation = 15%
Revegetation = 37.5%

On-site (Scope 1) = 54.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 33.8%
Other Off-Site (Scope 3b) = 11.8%

Total Energy All Components = 11945.5 MMbtus
Total Energy All Scopes = 11945.5 MMbtus







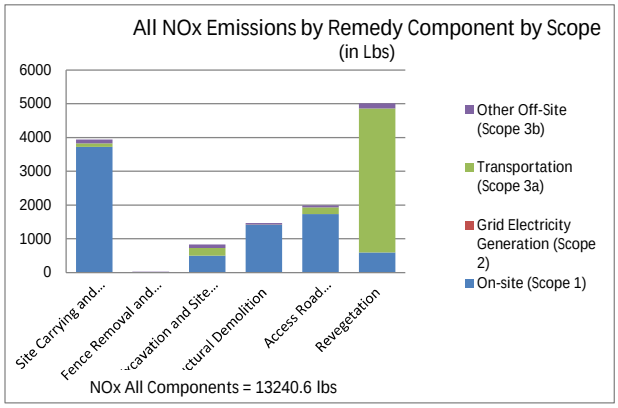
GHG
Tons CO2e

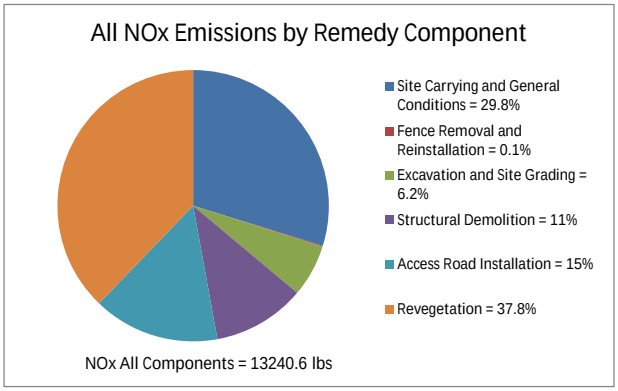
	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total	
On-site (Scope 1)	246.1	0.5	33.1	93.3	114.3	39.1	526.5	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	l Electricity
sportation (Scope 3a)	11.7	0.5	14.8	1.0	14.6	284.0	326.4	Tran
er Off-Site (Scope 3b)	34.9	0.1	13.6	13.7	17.3	43.4	123.0	Oth
Total	292.7	1.1	61.5	107.9	146.2	366.5	975.9	

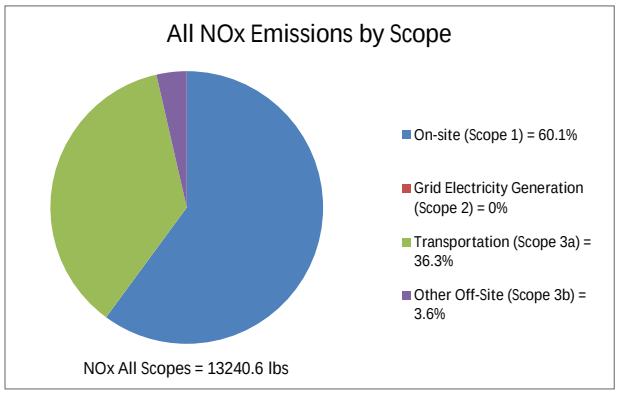
Site Carrying and General Conditions = 30%
Fence Removal and Reinstallation = 0.1%
Excavation and Site Grading = 6.3%
Structural Demolition = 11.1%
Access Road Installation = 15%
Revegetation = 37.5%

On-site (Scope 1) = 53.9%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 33.5%
Other Off-Site (Scope 3b) = 12.6%

GHG All Components = 975.9 Tons CO2e
GHG All Scopes = 975.9 Tons CO2e





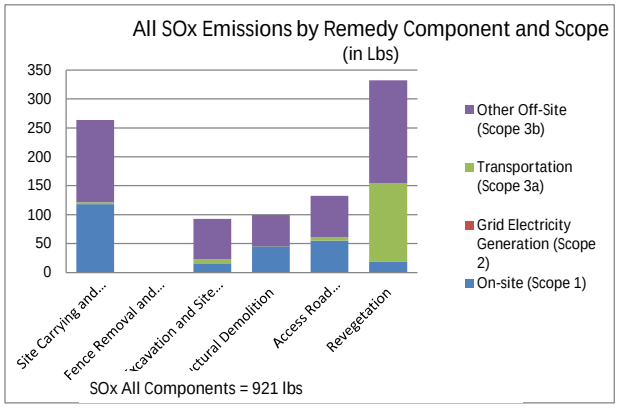


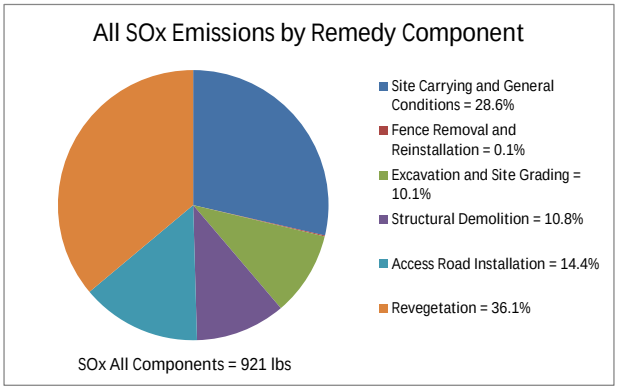
NOx lbs	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total	
On-site (Scope 1)	3,719.0	7.9	500.4	1,409.8	1,727.1	591.0	7,955.3	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Electricity
sportation (Scope 3a)	106.7	5.9	221.4	5.0	203.5	4,270.2	4,812.8	Tran
er Off-Site (Scope 3b)	117.9	0.4	102.6	46.6	58.5	146.5	472.5	Oth
Total	3,943.7	14.2	824.4	1,461.4	1,989.1	5,007.7	13,240.6	

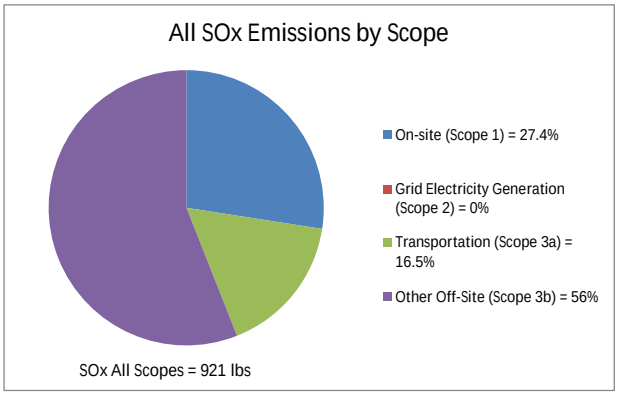
Site Carrying and General Conditions = 29.8%
Fence Removal and Reinstallation = 0.1%
Excavation and Site Grading = 6.2%
Structural Demolition = 11%
Access Road Installation = 15%
Revegetation = 37.8%

On-site (Scope 1) = 60.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 36.3%
Other Off-Site (Scope 3b) = 3.6%

NOx All Components = 13240.6 lbs
NOx All Scopes = 13240.6 lbs







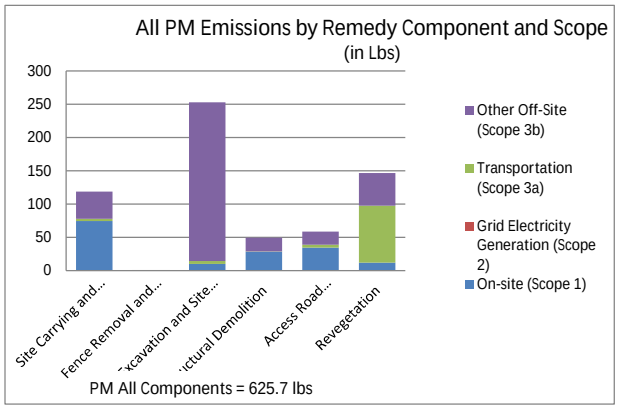
SOx lbs

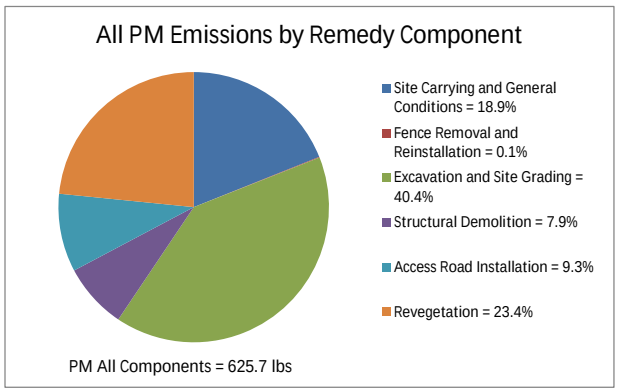
	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total	
On-site (Scope 1)	118.1	0.3	15.9	44.8	54.9	18.8	252.7	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Electricity
sportation (Scope 3a)	3.1	0.2	7.0	0.1	6.4	135.6	152.4	Tran
er Off-Site (Scope 3b)	142.4	0.5	69.7	54.3	71.0	178.0	515.9	Oth
Total	263.6	1.0	92.6	99.2	132.2	332.3	921.0	

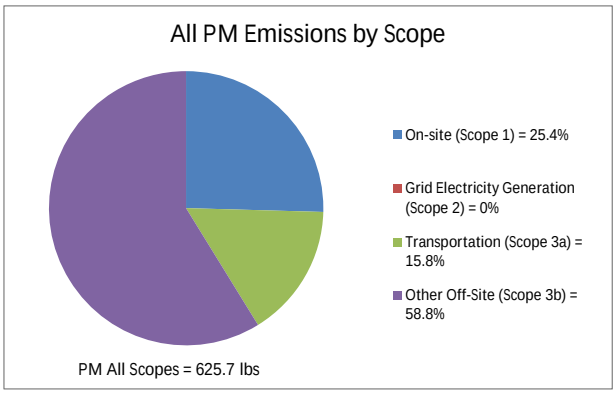
Site Carrying and General Conditions = 28.6%
Fence Removal and Reinstallation = 0.1%
Excavation and Site Grading = 10.1%
Structural Demolition = 10.8%
Access Road Installation = 14.4%
Revegetation = 36.1%

On-site (Scope 1) = 27.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 16.5%
Other Off-Site (Scope 3b) = 56%

SOx All Components = 921 lbs
SOx All Scopes = 921 lbs







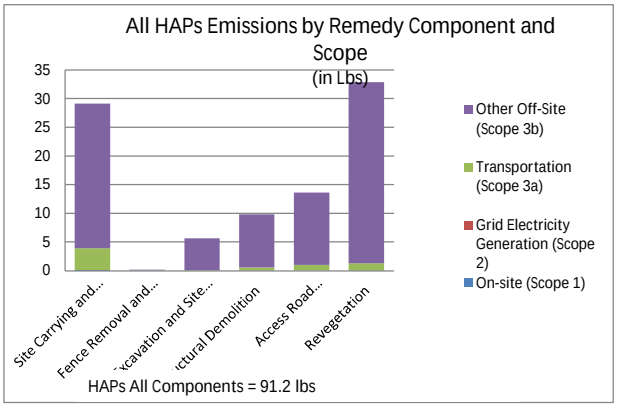
PM lbs

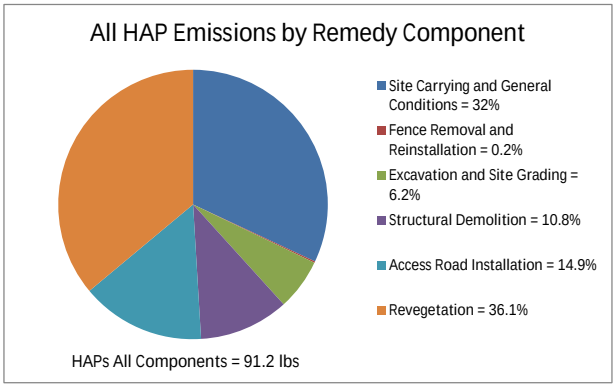
	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total	
On-site (Scope 1)	74.4	0.2	10.0	28.2	34.5	11.8	159.1	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Electricity
sportation (Scope 3a)	3.5	0.1	4.5	0.3	4.4	85.8	98.7	Tran
er Off-Site (Scope 3b)	40.6	0.1	238.2	20.6	19.5	48.8	367.9	Oth
Total	118.5	0.4	252.7	49.1	58.4	146.5	625.7	

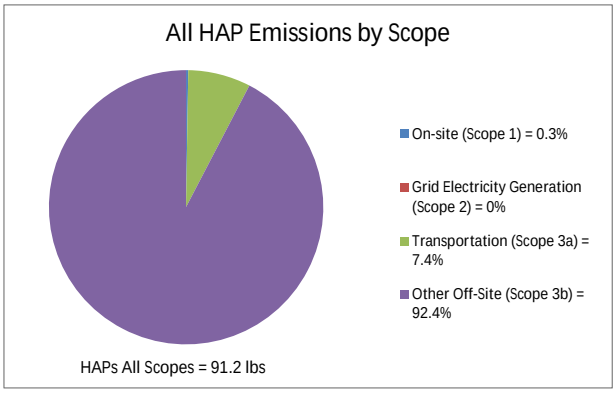
Site Carrying and General Conditions = 18.9
Fence Removal and Reinstallation = 0.1%
Excavation and Site Grading = 40.4%
Structural Demolition = 7.9%
Access Road Installation = 9.3%
Revegetation = 23.4%

On-site (Scope 1) = 25.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 15.8%
Other Off-Site (Scope 3b) = 58.8%

PM All Components = 625.7 lbs
PM All Scopes = 625.7 lbs







HAPs lbs	Site Carryi	Fence Rem	Excavation	Structural	Access Roa	Revegetati	Total
On-site (Scope 1)	0.1	0.0	0.0	0.0	0.1	0.0	0.2
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sportation (Scope 3a)	3.8	0.1	0.1	0.5	0.9	1.3	6.7
er Off-Site (Scope 3b)	25.2	0.1	5.5	9.2	12.6	31.6	84.2
Total	29.1	0.1	5.6	9.8	13.6	32.9	91.2

Site Carrying and General Conditions = 32%
Fence Removal and Reinstallation = 0.2%
Excavation and Site Grading = 6.2%
Structural Demolition = 10.8%
Access Road Installation = 14.9%
Revegetation = 36.1%

On-site (Scope 1) = 0.3%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 7.4%
Other Off-Site (Scope 3b) = 92.4%

HAPs All Components = 91.2 lbs
HAPs All Scopes = 91.2 lbs

Appendix H – Health and Safety Plans

Health and Safety Plan

Riverview Innovation & Technology Campus, Inc.

TONAWANDA COKE
Brownfield Remediation

TONAWANDA, NY

Submitted to:

Riverview Innovation & Technology Campus, Inc.
333 Ganson St.
Buffalo, NY 14203

Prepared by:

140 Lee Street, Floor 2
Buffalo, NY 14210

October 2019

Revised

September 2024

TABLE OF CONTENTS

CONFORMANCE SIGNATURES 4
EMERGENCY CONTACT LIST 5
INTRODUCTION 7
SITE/PROJECT BACKGROUND AND SCOPE 7
APPLICABILITY and REFERENCES 7
DEFINITIONS 8
SITE VISTIOR REQUIREMENTS 10
HEALTH AND SAFETY ORGANIZATION 11
PERSONNEL RESPONSIBILITIES 12
SITE SPECIFIC TRAINING 14
JOB SPECIFIC SPECIALIZED TRAINING & MEDICAL CLEARANCE 15
MEETINGS 15
SUBSTANCE ABUSE SCREENING 16
PROJECT OVERVIEW AND TASK RISK ANALYSIS 17
TASK/RISK ANALYSIS 17
CONTAMINATE/Chemical HAZARDS 18
GENERAL PHYSICAL HAZARDS AND STANDARD PROTECTIVE MEASURES 21
BIOLOGICAL HAZARDS 24
SITE SECURITY 26
SITE LAYOUT 26
BUDDY SYSTEM 26
SITE COMMUNICATIONS PLAN 26
PERSONAL PROTECTIVE EQUIPMENT (PPE) 27
MINIMUM LEVELS OF PROTECTION 27
SELECTION OF PROTECTION LEVELS 28
HEARING PROTECTION 29
RESPIRATORY PROTECTION 30
STANDARD OPERATING PROCEDURES (SOPS) 33
EXCAVATION SAFETY 34
EXTERIOR PRECAUTIONS 34
LOCKOUT/TAGOUT POLICY 35
ELECTRICAL 36
FALL PROTECTION 36
INCIDENT PREVENTION PROCEDURES 37
SAFETY TASK ANALYSIS CARD 37
FIRE PREVENTION and PROTECTION 37
SITE HOUSEKEEPING 38
MECHANICAL EQUIPMENT 38
HIGH PRESSURE WASHERS 38
VEHICLE and EQUIPMENT SAFETY 39
SANITATION 40

DAILY INSPECTIONS *40*
INCIDENT REPORTING *40*

MEDICAL SURVEILLANCE **43**

MEDICAL EXAMINATIONS *43*
AIR MONITORING *44*

CONFINED SPACE ENTRY PROCEDURES **44**

DEFINITIONS *44*
PERSONNEL RESPONSIBILITIES *45*
TRAINING *46*
PRCS ENTRY PROCEDURE *48*
RESCUE/EMERGENCY RESPONSE *49*

DECONTAMINATION PROCEDURES **50**

PERSONNEL HYGENE and DECONTAMINATION *50*
EQUIPMENT DECONTAMINATION *51*
HEAVY EQUIPMENT DECONTAMINATION *51*
TOOLS and SMALL EQUIPMENT DECONTAMINATION *51*
NON-DISPOSABLE SAMPLING EQUIPMENT *52*
DISPOSAL of DECONTAMINATION WASTES *52*

EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS **53**

MEDICAL EMERGENCY RESPONSE *(DETAIL PROVIDED UNDER SEPARATE COVER)* **54**

REPORTING AN EMERGENCY *54*
PRE-PLANNING *54*
EMERGENCY CHAIN OF COMMAND *54*
WEATHER *54*

SPILL CONTAINMENT PROCEDURES *(NOT ANTICIPATED FOR THIS PROJECT)* **55**

SPILL RESPONSE PROCEDURES *56*

HEAT/COLD STRESS **59**

LOGS, REPORTS AND RECORDKEEPING **61**

HOT WORK PERMIT PROCEDURES (WELDING, CUTTING, OPEN FLAME WORK & SPARKING) *(NOT ANTICIPATED FOR THIS PROJECT)* **61**

ATTACHMENT I: FORMS **63**

ATTACHMENT II: SITE-SPECIFIC ACTIVITY HAZARD ANALYSIS **95**

ATTACHMENT III: SAFETY DATA SHEETS **129**

ATTACHMENT IV RESERVED: SITE SAFETY AUDITS **176**

Authorization Signatures

This site Health and Safety Plan (HASP) has been reviewed and approved by the individuals below. The undersigned certify that to the best of their knowledge this HASP meets the safety requirements as defined by the project specifications and all known applicable governing regulatory requirements.

John Yensan — 9/4/2024
John Yensan, President — Date
OSC

Daniel Flanigan — 9/4/2024
Dan Flanigan, Project Manager — Date
OSC

Matt Reardon — 9/4/2024
Matt Reardon, Superintendent — Date
OSC

Paul Mulvey — 9/4/2024
Paul Mulvey, Corp. Dir. HSE — Date
OSC

Conformance Signatures

All Individuals working on this Project, including subcontractors must read and sign. Note: this does not apply to visitors who will not be doing work on the project.

The following personnel have read and fully understand the contents of this site Health and Safety Plan and further agree to all requirements contained herein.

Name	Affiliation	Date	Signature

Emergency Contact List

Tonawanda Coke

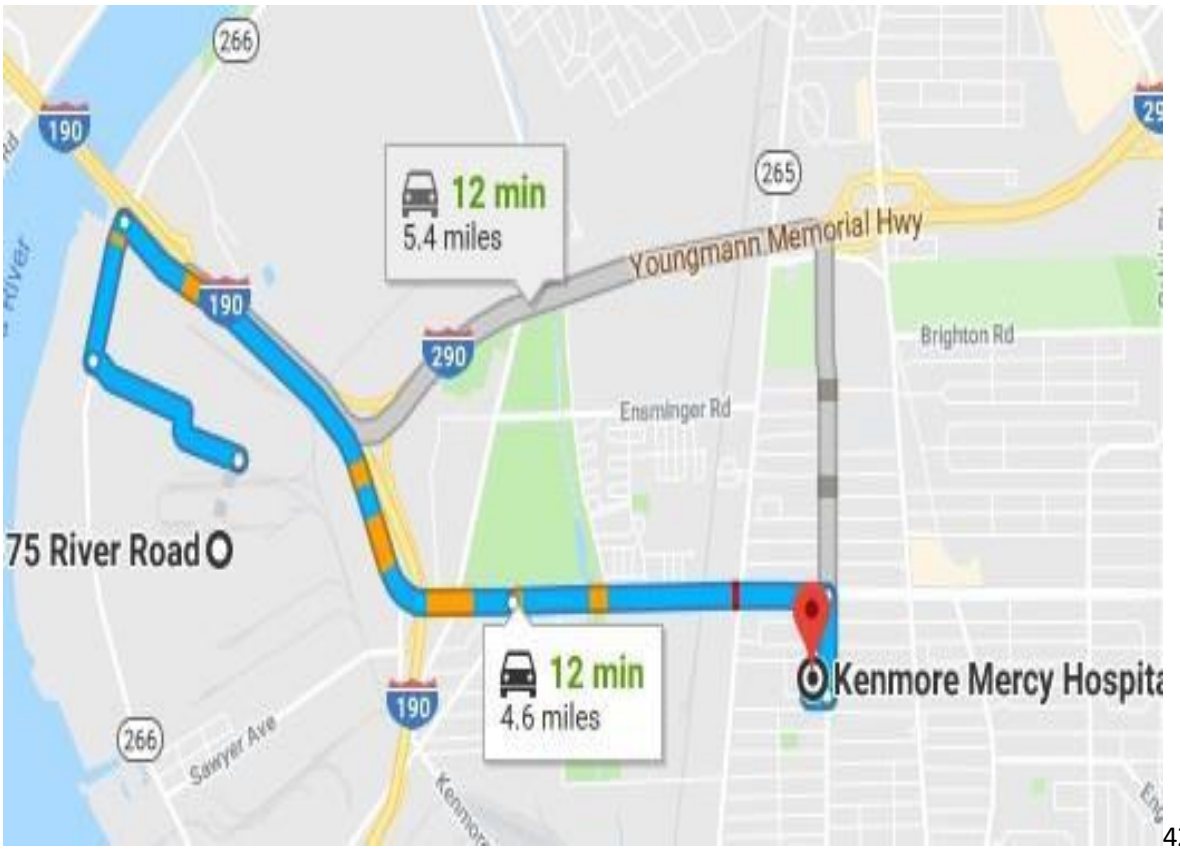
3875 River Road

Tonawanda, New York 14150

AGENCY	Contact	Phone Number
Owner's Representative	John Black Project Manager	571-217-6761
OSC	Matt Reardon Superintendent	716-570-0717
	Dan Flanigan Project Manager	716-560-3006
	John Yensan President	716-583-4400
	Paul Mulvey Director HS&E	716-856-3333 x 328
Kenmore Mercy Hospital	Medical Emergency	911 (direct) 716-447-6100
Fire, Police, Ambulance	Dispatch	911
Utilities	Water Gas Electric	911

AGENCY	Contact	Phone Number
Site Emergency	Police, Fire Dept., Ambulance	911
Fire Department		911
Police Department & Security		911
Ambulance		911
Poison Control	American Association of Poison Controls	1-800-222-1222
US EPA Release Report Number	National Response Center	1-800-424-8802
HAZARDOUS MATERIALS	CHEMTREC	1-800-424-9300

LOCAL MEDICAL: KENMORE MERCY HOSPITAL, 2950 ELMWOOD AVE 14127 (DIAL 911 FOR EMERGENCY) (716) 447-6100



4217

- Turn right onto River Road
- Turn right onto Grand Island Blvd (about 2 miles)
- Merge onto Sheridan Dr.
- Go about 1.5 miles and turn right onto Elmwood Ave.
- Make a sharp right and hospital is on left

OSC Medical Consultant:

Medcor, Inc.
4805 W. Prime Parkway
McHenry, Illinois 60050
800-775-5866

Non-medical Emergency:

Healthworks WNY
2075 Sheridan Drive
Tonawanda, NY 14223
(716) 712-0670

INTRODUCTION

SITE/PROJECT BACKGROUND AND SCOPE

Riverview Innovation & Technology Campus, Inc. (Riverview) has contracted OSC, Inc. for the overall remediation of the former Tonawanda Coke Corporation (TCC) property in Tonawanda, NY. Remediation will be per requirements of the New York State Brownfield Cleanup Program (NYSBCP) and the New York State Inactive Hazardous Waste Site Program (aka State Superfund). Inventum Engineering, PC is providing technical guidance for the project.

The work includes, but is not limited, to the following:

- Mobilization
- Installation of erosion and sediment controls
- Installation of site temporary features (waste/equipment decontamination pads, temporary access roads, and temporary utilities)
- Asbestos removal on structures, building materials, fittings and debris.
- Stabilization and removal of above & below ground tank contents
- Removal of hazardous process and product waste chemicals as well as universal waste
- Cleaning/decontamination of above ground structures deemed to remain on site.
- Demolition of buildings, structures, and tanks not to remain on site
- Treatment/neutralization of surface soils and water as reasonably feasible per NYSBCP
- Removal of “surface tar” and other grossly contaminated soil not otherwise treated/neutralized.
- Rail car cleaning and disassembly
- Tank cleaning and costing for scrap.
- Dewater
- Grading
- Restoration and seed stabilization
- Demobilization

APPLICABILITY AND REFERENCES

OSC has developed the following site Health and Safety Plan (HASP) in accordance with the project contract requirements and Federal, State and Local regulations. It is intended for individuals performing work at the site and not for those considered visitors doing observation only. All operations and equipment used in conjunction with this contract shall, at a minimum, comply with the following:

- New York State Brownfield Cleanup Program
- Project Health and Safety Plan (this HASP)
- OSC Technical Work Plan
- OSHA 29 CFR 1910: Occupational Safety and Health Standards – General Industry

- OSHA 29 CFR 1926: Safety and Health Regulations for Construction
- EPA 9285.1-03: Office of Emergency and Remedial Response – Standard Operating Safety Guides
- OSC Corporate Health, Safety and Environmental Program Manual
- Orientation and Training (Supervision, Laborers, Operators & Visitors)
- Activity Hazard Analysis (AHA)
- Standard Operating Procedures; Emergency Response, Reporting, Incident Investigation, Inspections, Audits, Work Procedures, Hazard Communication, Hot Work, Confined Space, Fire Prevention, Control of Hazardous Energy (Lockout, Tagout, Tryout), Excavations, Controlled Work Zones including decontamination, Ladders, Steps, Stairs, Scaffolding Contractor/Vendor Safety Checklist, Heavy Equipment Operation, Forklift Operation, Powered Aerial Platforms
- Substance Abuse Policy
- Receive site orientation training regarding the project requirements contained in this HASP. Site orientation will be conducted by OSC's Health and Safety Officer (HSO) named in Section 2.0 of this HASP.
- Acknowledge in writing, on page 4 of this HASP titled Conformance Signatures, that they have received the site-specific orientation and therefore, have been trained in and understand the contents of this HASP and the general site safety requirements.

The health and safety protocol that is established in this HASP is based upon the known site conditions and or conditions anticipated to be present from established site data. This HASP is a living document that shall be updated and or revised over the term of this contract as warranted by change in site conditions, scope of work, methods and improvement measures. A copy of this HASP shall be maintained at the project site.

DEFINITIONS

The Owner: Riverview Innovation & Technology Campus, Inc.

The Engineer: Inventum (Owner Representative)

The Contractor: OSC – Company retained by owner to conduct the project.

The Project: Brownfield Cleanup Program, 3875 River Road, Tonawanda, NY

The Project Site: The area designated as the Contractor work area.

Contractor Work Area: An area of the Project site which includes the support zones, access roads, staging areas, contamination reduction zones and exclusion zones.

Active Full Time Project Personnel: All personnel who are permanently assigned to the project and required to perform work. Does not include visitors or vendors visiting the site temporarily who are required to be escorted always by an authorized and trained project employee.

Qualified Person: A person with a recognized degree, or professional certificate, along with extensive knowledge and experience in the subject field who can do design, analysis, evaluation and specifications.

Competent Person: A person who can identify existing and predictable hazards in their surroundings/working conditions which are unsanitary, hazardous or dangerous to employees, and who has both knowledge and authorization to take prompt corrective measures to eliminate them.

Authorized Personnel: A person that is approved or assigned by OSC to perform a specific type of duty/duties, or to be at a specific location(s) at the project site.

Stop Work Authority: HS&E personnel, qualified and competent persons, owner representatives and *all project employees* shall have the authority to stop work in any situation deemed unsafe to those working on the project site, or in any situation that poses a risk to the environment. Work will remain stopped until the parties involved correct their impact or conditions as per the requirements of this HASP.

Contamination Reduction Zone (CRZ): The CRZ is the transitional area between the identified contaminated and clean areas. The CRZ will be provided for the transfer of equipment and materials to and from the exclusion zone; the decontamination of personnel and equipment existing in the exclusion zone; and the physical segregation of the clean and contaminated work areas.

Exclusion Zone (EZ): The exclusion zone encompasses the areas of contaminates of concern (COCs); as well as any areas being utilized for the temporary storage of salvaged materials [ex. valves] and spoils to be discarded as waste. The purpose of the EZ is to limit access to only qualified and necessary personnel and manage the potential spread of COCs.

SITE VISITOR REQUIREMENTS

A safe location, where all visitors can observe site activities of interest will be identified by the HSO. Anyone visiting the site will receive site-specific instructions from the HSO. All visitors shall be escorted by site trained personnel after signing in and completing orientation. Visitor training will include, at a minimum:

- OSC Project Safety Orientation and RIVERVIEW/Honeywell general site orientation
- Project Hazard Communication system
- Activity Hazard Analysis (AHA) review (as needed)
- Work Permit Process (as needed)
- Safety Meetings and Inspections
- PPE requirements
- Decontamination procedures (as needed)
- Emergency procedures, and
- Any other site-specific information that the HSO deems necessary.

Any visitor wishing to enter an established contamination reduction zone (CRZ) or exclusion zone will be required to provide the HSO with documentation of medical monitoring and training equivalent to the requirements of this HASP for that area. Only authorized visitors with written proof that they have been medically certified and trained in accordance with project requirements will be permitted to enter the CRZ and/or exclusion area.

The only exception to this rule is for emergency personnel who may enter the work area without fully complying with the requirements of this subsection. Emergency crews will be quickly briefed as to site conditions and hazards by the HSO.

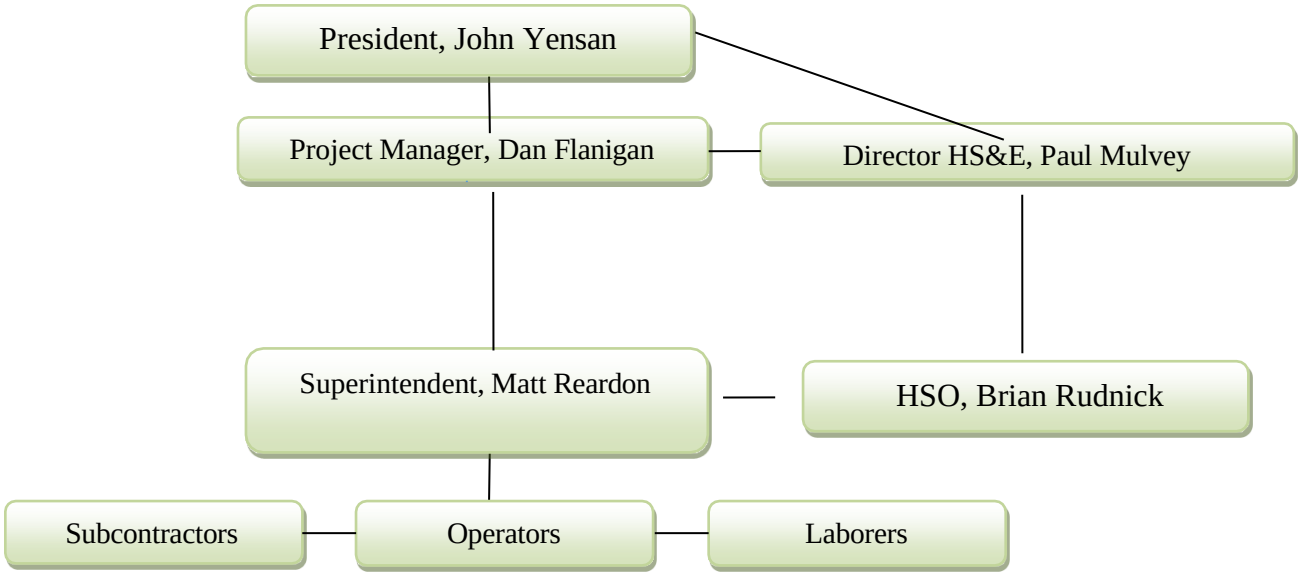
HEALTH and SAFETY ORGANIZATION

The following *OSC* management personnel will be assigned to this Project:

- **President – John Yensan**
- **Project Manager – Dan Flanigan**
- **Superintendent – Matt Reardon**
- **On Site Health & Safety Officer – Brian Rudnick**
- **Director HS&E – Paul Mulvey**

In addition to the above listed management, OSC will provide the appropriate number of operators and laborers, as well as the required subcontractors for this project.

ORGANIZATION CHART



PERSONNEL RESPONSIBILITIES

PROJECT MANAGERS AND SUPERINTENDENTS

The Project Manager will be responsible for the overall direction and completion of this contract. The Project Manager reports to the President and will be responsible for managing and coordinating all project related activities; as well as serving at OSC's primary contact with the Owner and/or Owner's Representative. The Site Superintendent will be responsible for overseeing contractor and subcontractor operations in the field. The Site Superintendent will report directly to the Project Manager.

Project Managers and Superintendents will be responsible for the following:

- Assure daily compliance with the Corporate HS&E Manual and this HASP during the project.
- Implement the procedures and guidelines outlined in this HASP throughout the project.
- Implement incident investigations. The Site Superintendent will notify INVENTUM management and the OSC Director HS&E immediately. Documentation will be maintained on OSC's Incident Report (see attachment I). The Incident Report will be submitted to RIVERVIEW/Honeywell by OSC. The HSO will conduct an investigation with support from the Superintendent and Director.
- Perform and support site safety audits and address all deficiencies.
- Provide incentive and motivation for safe work practices, as well as discipline for unsafe work practices.
- Ensuring a copy of this HASP is onsite always.
- Conduct initial site orientation meetings.

HEALTH AND SAFETY OFFICER (HSO)

The HSO will handle health and safety management on the project and will report to the Director HS&E. Specific duties of the HSO include:

- Overall implementation, enforcement and maintenance of this HASP.
- Act as a point of contact for all project site health and safety concerns.
- Conduct initial training on the contents of this HASP; as well periodic training for when rules/regulations change, new equipment or procedures are introduced, additional skills are needed, and new hazards are presented. Report observations in the daily safety meetings and update AHAs and training accordingly.
- Conduct daily meetings regarding health and safety.
- Supervising any additional HS&E requirements that are needed for this project.

The HSO will monitor the jobsite health and safety via inspection at the start and completion of each day's work; as well as monitoring the jobsite for this purpose throughout the day. The initial daily inspection will be recorded on OSC's inspection and audit form (Attachment I). Corrective actions and end-of-the-day inspection results will be recorded in the HSO's project safety logbook. Any deficiencies will be promptly corrected. All corrective and improvement measures will be

reviewed with project personnel at the morning daily safety briefing. Intentional violations of the site HS&E regulations will be grounds for disciplinary action, which could include temporary suspension or termination of personnel and/or expulsion of vendor and/or subcontractor personnel from the site.

HS&E TECHNICIANS (not anticipated for this project)

The HSO will assign qualified technicians (air monitoring, material sampling, equipment specific and job design professionals) to each work crew or task in hazardous areas as warranted.

OSC CORPORATE MEDICAL CONSULTANT AND NON-EMERGENCIES

The Medical Consultant will be available to provide call-in emergency medical consulting to OSC personnel on an around-the-clock basis. Medical emergencies occurring during normal work hours will be provided by the local hospital (see above). Non-emergency medical support and OSC's Medical Consultant are:

Medcor, Inc.
4805 W. Prime Parkway
McHenry, Illinois 60050
800-775-5866

HealthWorks WNY
2075 Sheridan Drive
Tonawanda, NY 14223
716-712-0670

SUBCONTRACTORS

All subcontractors shall be prequalified according to the OSC subcontractor/vendor prequalification requirements including Certificates of Insurance that meet or exceed the project contract requirements (See RIVERVIEW/Honeywell Project Subcontractor Insurance Requirements Under Separate Cover).

All subcontractor employees shall be required to attend a project safety orientation prior to starting work on site (See Training and Orientation Requirements of this HASP). Subcontractors are responsible for health and safety as it pertains to their operations at the project site and shall provide the required OSC HS&E supporting documentation. Documented proof of training shall be provided for all subcontractor employees. All subcontractors are responsible for providing their employees with the proper site-specific PPE required to perform their work as well as ensure that all tools and equipment are properly inspected and maintained. Subcontractors are responsible for ensuring that their employees conform to all HS&E project requirements and applicable government regulations.

TRAINING and ORIENTATION

Personnel, including subcontractors, shall be provided with the training required to comply with this HASP. Training documentation (training certificates, attendance rosters) will be filed and maintained onsite by the HSO and will be made available for inspection upon request. Training documentation will be kept in an organized manner for each individual worker.

Full time active project personnel working onsite must have received the following:

- Required safety training as defined by OSHA CFR 1926.21 for construction.
- OSHA 1926.65, Hazwoper (employees potentially exposed to hazardous chemicals)
- Medical clearance - fit for work, (includes medical surveillance for specific occupations and probable contaminants) negative drug screen, clearance for respirator use, fit test and training for the type of respirator required.

Supervisor Training – in addition to the above all designated supervisors shall have as a minimum received training that covers competent person training for the specific operation they are responsible for (i.e. excavation trenching and shoring, confined space, rigging, hot work, etc.), first aid and CPR, record keeping, incident investigation, employee substance abuse i.e., reasonable suspicion), HS&E documentation requirements.

SITE SPECIFIC TRAINING

Documentation of training, provided by a qualified safety professional, will be maintained as necessary for the following topics:

- OSC Site Specific Orientation
- Activity Hazard Analysis & Safe work procedures (AHA Review)
- Project Hazard Awareness training
- PPE requirements & possible decontamination procedures
- Heat/Cold Stress
- Fall Protection
- Heavy Equipment Operation (Authorized, Unauthorized)
- Powered Industrial Fork Truck Operation (Authorized, Unauthorized)
- Control of Hazardous Energy Lockout/Tagout and Air Gapping Requirements (1 ft visible air gap)
- Incident reporting
- Emergency response & available services (medical, fire, inclement weather, tornado, bomb threat, signals and procedures)
- Hoisting and Rigging
- Respirator use, maintenance, inspection, medical clearance and fit test
- Excavation hazards and protective measures
- Confined Space

- Dust, Erosion and sediment control
- Noise control measures
- OSC's STAC program
- Authority to stop work (all employees) and the buddy system "No One Works Alone".

JOB SPECIFIC SPECIALIZED TRAINING & MEDICAL CLEARANCE

OSC employees will all participate in the company's annual medical surveillance program which evaluates "fit for duty" condition. These evaluations will be provided by a licensed health care professional.

Employees that may be exposed to elevated levels of contaminates (to be determined) or that wish to use tight-fitting respirators on a voluntary basis will require a current medical evaluation and be respiratory qualified in compliance with OSHA 1910.134.

MEETINGS

Attendance at all HS&E meetings will be documented and filed onsite.

- Daily Morning Safety Brief prior to the start of work "Tool Box Talk".
- Prior to the beginning of each work task, all involved workers shall be required to attend a task-specific HS&E meeting to review task-specific health and safety requirements pertinent to the tasks (AHA review - job hazards and protective measures).

Weekly HS&E Meetings

All onsite Supervisory personnel shall be required to attend a weekly meeting, conducted by the owner representative, to review project and/or task specific procedures. Topics to be discussed at these weekly meetings include, but are not limited to:

- AHA – review for all definable features of work, hazards and controls.
- STAC - employee work observations and recommendations
- Audit/Inspection findings, and recommendations for improvement.
- Necessary training requirements and site work rules;
- Change in work practices and/or work conditions, incident reports.
- Precautions and work practices related to scheduled site activities.
- New or modified site wide procedures or requirements.
- Discussion of potential hazards or hazardous operations.
- Procedures on restricted areas.
- Equipment rules and requirements.
- Restrictions on the handling of materials.
- PPE requirements.
- Delegation of responsibility (emergency backup personnel, competent persons, etc.);

- Review of emergency response for anticipated situations (medical, fire, inclement weather, tornado, bomb threat, environmental release/spill) and communication methods (alarms, radio, voice, and hand signals).

HS&E Audits

The OSC Director, HSE will make project site visits to assure compliance with this HASP and aid as needed. Site audits will be made minimally on a quarterly basis using the company's audit criteria (see Appendix I Forms). An audit finding report will be submitted to the project manager and superintendent within 5 days of the site visit. Highlighted deficiencies must be corrected immediately if not done so during the site visit.

SUBSTANCE ABUSE SCREENING

OSC maintains a drug free workplace. The company prohibits the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol, and controlled substances on project sites.

OSC requires pre-employment, reasonable suspicion and random substance abuse testing (random testing for project-assigned personnel only as required by contractual agreement). Post injury screening may also be conducted in conjunction with reasonable suspicion. Employees as a minimum will undergo a NIDA 10 panel drug screen for illegal drugs before working on the project. Drug and alcohol screens shall be managed by OSC using laboratories certified by HHS under the National Laboratory Certification Program (NLCP).

Reasonable suspicion testing may be triggered by direct observations of employee behavior or drug-related paraphernalia. Site personnel who have been observed using alcohol or controlled substances on site or during breaks at off-site locations after which they will return to work will be requested to take an alcohol or drug test. Reasonable suspicion includes possession (on person or in vehicles) of alcohol or controlled substances on site as well as paraphernalia that suggest drug use. Site personnel who exhibit signs, symptoms, or behaviors of drug or alcohol use as interpreted by a reasonable person will also be requested to take a drug and/or alcohol test.

NOTE - Prescription drugs taken without an authorized prescription for use is considered an illegal drug. Also, in case of any injury, incident, or emergency, employees may be required to undergo a 10-panel screen for illegal drugs, alcohol (breath), or prescribed medication. Submission to substance abuse testing is a condition of employment. Failure or refusal to submit to substance abuse testing is treated the same as a positive result. All reports will be maintained at the main office. Any positive results will be referred to OSC Senior Management for further action.

PROJECT OVERVIEW AND TASK RISK ANALYSIS

TASK/RISK ANALYSIS

An Activity Hazard Analysis (AHA) shall be developed for significant features of work which break jobs down into individual tasks defining the potential hazard of that task and the proper protective and control measures that shall be taken to minimize the hazard. AHA's shall be submitted with any required daily work permit to the owner representative for their review. AHA's shall be modified as warranted by safe work observations, audit and incident investigation. Assessment of the work hazards associated with the scope of work for this project is provided in Table 1.0 below. PPE requirements for all work shall be primarily in level D; ANSI approved hard hat, safety glasses, hearing protection with elevated noise exposures (i.e., working with power tools or near sources of loud noises), abrasion resistant gloves, safety toed boots or safety toed rubber boots (dependent on hazard exposure), high visibility traffic vest or equivalent high visibility clothing, and/or disposable coveralls (modified D). Specific information relating to the potential chemical, physical, biological and radiological hazards is provided in Table 1.1.

TABLE 1.0 OVERALL JOB HAZARD EXPOSURE (See also attachment II (AHA's))	
	Potential Exposure
Mobilization and temporary facilities and controls; establishment of work zones: hazard warning signs, OSC designated work area signage including barricades and area delineation, address safe work surface needs, add lighting, traffic controls, dust, fire and erosion controls.	Low
Installation of erosion and sediment control	Moderate
Installation of site temporary features (waste/equipment decontamination pads, roads)	Moderate
Asbestos removal on structures, building materials, fittings and debris	Moderate/High
Stabilization and removal of above & below ground tank contents	Moderate/High
Removal of hazardous process and product waste chemicals & universal waste	Moderate/High
Cleaning/decontamination of above ground structures deemed to remain on site	Moderate/High
Tank cleaning	Moderate/High
Demolition of buildings, structures, and tanks not to remain on site	Moderate
Treatment/neutralization of surface soils and water as reasonably feasible per NYSBCP	Moderate/High
Removal of "surface tar" and other grossly contaminated soil not otherwise treated	Moderate/High
Restoration and seed stabilization	Low
Demobilization	Low

Low: Non-intrusive work – Minimal hazard/chance of exposure. Slight: Non-intrusive work / Possible HS&E hazards with tools. – Little chance of exposure. Moderate: Non-intrusive work / Possible HS&E hazards with powered tools, heavy equipment and/or working near or in water – Little chance of exposure to contaminants. Moderate/High: Intrusive work / Possible HS&E hazards with equipment – Exposure to contaminants is possible. High: Intrusive work / Possible HS&E hazards with equipment – Exposure to contaminants is probable.

CONTAMINATE/CHEMICAL HAZARDS

Existing Site Hazards

Based on information provided in the NYSBCP application and nature of the former facility (coke production and coal tar processing) there are several possible contaminates ranging from minimal to moderate hazardous exposure potential in the soil, groundwater, and surface water. Asbestos is likely to be contained in pipe/fitting/refractory insulation and other building structures.

Although several coal tar constituent chemicals of concern are volatile, the product has been standing open for an extended period time. Much of the volatile and semi-volatile fraction is expected to have been released to the atmosphere minimizing the air pathway (inhalation).

Of the remaining constituent chemicals of concern, the likely exposures are skin absorption/contact and ingestion. These exposure pathways will be controlled using PPE (barrier) and proper hygiene (decontamination).

The following table, taken from the NYSPCP application and originally developed from the GHD, 2018 Remedial Investigation/Feasibility Study Work Plan, lists the chemical constituents that maybe of concern.

Sample Matrix	Sample Date	Parameter	Parameter Concentration		Industrial Standard		Data Source	Table Page Location
Surface Soil	12/21/2005	Benzo(a)pyrene	4,100	ug/kg	1,100	ug/kg		Table 1a, 2 of 70
Subsurface Soil	8/24/2015	Benzo(b)fluorantene	2,000 to 4,600	ug/kg	1,100	ug/kg		Table 1b, 6 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(a)anthracene	13,000 to 20,000	ug/kg	11,000	ug/kg	GHD, 2018, Remedial Investigation/Feasibility Study Work Plan, Prepared for Tonawanda Coke Corporation, June.	Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(a)pyrene	6,000 to 21,000	ug/kg	1,100	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(b)fluoranthene	13,000 to 32,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Chrysene	12,000 to 21,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Dibenz(a,h)anthracene	1,300 to 1,700	ug/kg	1,110	ug/kg		Table 2, 11 of 70
Surface Soil	8/18/2005	Indeno(1,2,3-cd)pyrene	15,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Subsurface Soils	6/19/1989	Benzo(a)pyrene	2,400 to 11,000	ug/kg	1,100	ug/kg		Table 3, 16 of 70
Subsurface Soils	6/19/1989	Benzo(b)fluorantene	17,000	ug/kg	11,000	ug/kg		Table 3, 16 of 70
Subsurface Soils	6/19/1989	Dibenz(a,h)anthracene	2,200 to 11,000	ug/kg	1,100	ug/kg		Table 3, 16 of 70
Groundwater	10/18/1985 to 12/12/1989	Cyanide	0.22 to 2.75	mg/L	0.2	mg/L		Table 4, 37, 41, 45, 53, & 57 of 70
Groundwater	8/1/1986	1,4-Dichlorobenzene	29	ug/L	3	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985 to 12/19/1989	Benzene	2.08 to 84	ug/L	1	ug/L		Table 4, 38, 42, & 54 of 70
Groundwater	8/1/1986	Chlorobenzene	22	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985	Xylenes	19 to 36	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985 to 8/1/1986	Toluene	11 to 59	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	6/26/1989 to 7/16/1991	Iron	2.597 to 160	mg/L	0.3	mg/L		Table 4, 36, 40, 48, 52, & 56 of 70
Groundwater	6/26/1989 to 7/16/1991	Manganese	0.801 to 11.2	mg/L	0.3	mg/L		Table 4, 37, 41, 49, & 57 of 70
Groundwater	11/1/1985	Phenolics	0.050 to 0.06	mg/L	0.001	mg/L		Table 4, 37 & 41 of 70
Groundwater	6/28/1989 to 12/13/1989	1,1,1-Trichloroethane	7 to 12.2	ug/L	5	ug/L		Table 4, 38 & 42 of 70
Groundwater	12/13/1989 to 12/20/1989	Methylene chloride	5.15 to 6.96	ug/L	5	ug/L		Table 4, 42 & 54 of 70
Groundwater	6/26/1989	Selenium	0.0116	mg/L	0.01	mg/L		Table 4, 49 of 70
Groundwater	6/26/1989	Nickel	0.153	mg/L	0.1	mg/L		Table 4, 53 of 70
Groundwater	7/16/1991	Cadmium	0.19	mg/L	0.005	mg/L		Table 4, 56 of 70
Surface Water	11/1/1985 to 8/1/1986	Benzene	23 to 48	ug/L	1	ug/L		Table 5, 62 of 70
Surface Water	11/1/1985	Xylenes	7	ug/L	5	ug/L		Table 5, 62 of 70
Surface Water	10/19/1989 to 7/8/1992	Toluene	12 to 24	ug/L	5	ug/L		Table 5, 62 of 70
Surface Water	3/15/1990 to 7/8/1992	Iron	1.09 to 472	mg/L	0.3	mg/L		Table 5, 62 & 64 of 70
Surface Water	3/15/1990 to 7/8/1992	Manganese	0.47 to 3.91	mg/L	0.3	mg/L		Table 5, 62, 64, & 66 of 70
Surface Water	3/15/1990	Nickel	0.14 to 0.216	mg/L	0.1	mg/L	GHD, 2018, Remedial Investigation/Feasibility Study Work Plan, Prepared for Tonawanda Coke Corporation, June.	Table 5, 62 & 64 of 70
Surface Water	11/1/1985 to 8/1/1986	Phenolics	0.039 to 0.61	mg/L	0.001	mg/L		Table 5, 63 of 70
Surface Water	12/19/1989	Methylene Chloride	52	ug/L	5	ug/L		Table 5, 66 of 70
Surface Water	3/15/1990	Chromium Total	0.086	mg/L	0.05	mg/L		Table 5, 64 of 70
Surface Water	7/8/1992	Lead	0.025	mg/L	0.025	mg/L		Table 5, 66 of 70
Sediment	3/15/1990	Benzo(a)pyrene	4,530	ug/kg	1,100	ug/kg		Table 5, 69 of 70
Sediment	3/15/1990	Dibenz(a,h)anthracene	3,430	ug/kg	1,100	ug/kg		Table 5, 69 of 70

Notes:

1 The compounds and results are representative of the site conditions at the time the samples were collected. This does not represent all samples or compounds detected, but is considered representative of the data set available for the preparation of the BCP Application.

2 Abbreviations used:

ug/kg = micrograms per kilogram
mg/L = milligrams per liter
ug/L = micrograms per liter
ug/kg = micrograms per kilogram

Chemicals Brought Onsite

The use of chemical products onsite will follow the requirements set forth in OSHA 29 CFR 1910.1200 (OSHA's Hazard Communication Standard), applicable Federal, State and Local regulations and the project procedure provided in this HASP. The potential hazards associated with these products will be mitigated through site specific training, administrative controls (e.g. labeling and storage) and use of the prescribed PPE.

Safety Data Sheets (SDS) for all chemicals brought onsite will be available for review in OSC's field office at the project site. Chemical products shall be labeled which shall include, product name, manufacturer's name, hazard warning, identifier and hazard pictogram.

The following table provides exposure guidelines for common hazardous chemicals that may be brought to the site, if required, for use during this project. The HSO will be notified before any new chemicals (chemicals not listed on the table below) are brought onsite.

HAZARD SUMMARY FOR CHEMICALS BROUGHT ONSITE					
Substance	Route of Entry	Exposure Symptoms	Treatment	8 Hour TWA	STEL and IDLH
Diesel Fuel	• Skin contact • Eye contact • Inhalation • Ingestion	• Harmful if comes in contact with or is absorbed throughout the skin. • Contact may cause skin and eyes irritation. • Prolonged or repeated exposure may cause liver or blood forming organ damage. • May cause skin irritation or dermatitis.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	300 ppm	STEL: 500 ppm
Grease, Oil and Hydraulic Fluids	• Skin contact • Eye contact • Inhalation • Ingestion	• May be slightly irritating to skin and eyes. • Inhalation may cause headaches. • Ingestion could result in nausea and vomiting.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	N/A	N/A
Gasoline Petroleum Distillates	• Skin contact • Eye contact • Inhalation • Ingestion	• Acute: Central nervous system effects. Chemical pneumonitis if aspirated into the lungs. • Chronic: Benzene is a confirmed carcinogen. Long term exposure caused kidney and liver cancer in rats/Chemical.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	300ppm	500ppm STEL

GENERAL PHYSICAL HAZARDS AND STANDARD PROTECTIVE MEASURES

(See Attachment I, AHA for more specific details):

Activity: *All general work activities* (manual ground laboring, operating equipment, supervising, inspecting).
Potential Hazard: noise, slips, trips and falls, struck by, pinched, falling debris, shock, heat/cold stress.
Procedures to Mitigate Hazard: Minimum standard site required PPE (Level D ANSI rated hard hat, eye protection, safety boots, high visibility traffic vest or equivalent clothing, cut/abrasion resistant gloves. Hearing protection (when "you need to raise your voice to hear yourself talk") is required whenever using powered hand tools, when operating heavy equipment with no enclosed cab or near loud noise sources. Inspect work areas for hazards, overhead power lines, obstructions, slip, trip, fall hazards, uneven surfaces, and vermin. Manage work areas; flag, mark, delineate and cover, identify with appropriate hazard warning signs. Clearly label open pits, wells and other fall hazards (soft barricade 15 feet back, hard barricade 2 feet back). Practice extreme caution in all work areas including vegetation covered areas. Watch footing during equipment access/egress and when moving through the work area, walk with purpose, pick feet up and set up down, keep hands out of pockets, use handrails, stay on designated paths, and don't take short cuts through the site. Avoid stepping or standing on uneven or unsteady surfaces. In high heat situations stay well hydrated. Personnel will adhere to the heat and cold stress precautions provided in this HASP. All employees have stop work responsibility and authority for safety concerns.

Activity: *Manual Material Handling*
Potential Hazard: Strain, pinched, struck by, lacerations,
Procedures to Mitigate Hazard: Hands and feet clear of pinch points, standard site required PPE and gloves with hazard exposure (i.e. barrier gloves), Observe the OSC lifting program (50 lbs. maximum on this project). Use good body mechanics when lifting, lift objects with your legs and not your back, keep the back straight and object lifted the power zone. Do not twist, pick your feet up and turn. Utilize equipment whenever possible - a forklift, drum cart or other appropriate equipment. Seek assistance if it is needed.

Activity: *General traffic from operations* (heavy equipment, trucks, pedestrian, etc.)
Potential Hazard: Struck by, crush, fire, and burn.
Procedures to Mitigate Hazard: Standard site required PPE. Traffic barricades and directional signs provide ground spotters/flagman equipment traffic, with high visibility, traffic vests or equivalent clothing. Minimum 35 ft. clearance from heavy equipment operations, leveling, compacting, separating and loading out. Develop and implement a traffic control program when site activities occur adjacent to non-OSC vehicular traffic.

Activity: *Site maintenance, materials storage and housekeeping*
Potential Hazard: Slip, trip, fall, fire, burn, chemical hazards, eye, skin, struck by
Procedures to Mitigate Hazard: Personnel will properly store all equipment. Remove all scrap material from the work area and place it in designated storage/lay down areas for disposal. Delineate work areas and identify with appropriate Hazard Warning Signs. Handling of materials per products SDS and developed proper storage of all flammable and combustible materials; > 20 feet from ignition sources or protected with ½ hour fire barrier (indoors). Likewise, all flammable/combustible liquid will be segregated from the ignition source >20 ft. Store all hazardous materials in approved containers. Keep all solvent wastes, oily rags and liquids in fire resistant containers. One 20 lb. ABC Extinguisher should be provided in storage areas (within 75 ft. away no closer than 20 ft.).

Activity: *Operation of hand and/or power tools*
Potential Hazard: Eye, hand, face, foot injuries, electrocution, noise, fire, burn.
Procedures to Mitigate Hazard: Tool use per Mfg.'s guidelines. Inspect tools before use; verify that guards and safety devices are in place before, during and after operation. Only use a power tool that you have been trained. Use GFCI plugged in at source for all corded tools. Red tag and remove all defective tools from service. Maintain and inspect the tools per the manufacturer's recommendations. All personnel will utilize the proper eye protection and hearing protection.

Activity: *Operating Heavy Equipment* (Excavators, Compactors, Dozers, Skid Steers, Rough Terrain Fork Trucks, Powered Aerial Platforms and Trucks.
Potential Hazard: Struck by, caught between, crushed, rollover, fire, burn.
Procedures to Mitigate Hazard: Equipment operation only by trained and authorized operators. Before use, any machinery or mechanized equipment will be inspected by a competent person and certified to be in safe operating condition. OSC will designate competent persons to be responsible for the inspection of machinery and equipment, daily and during use, to ensure its safe operating condition. Any machinery found to be unsafe will be dead lined; its use will be prohibited until the unsafe conditions have been corrected. Inspection of the machine/equipment will be conducted at the beginning of each shift, during which the equipment may be used, to determine that the brakes and operating systems are in proper working condition. All inspections will be documented. Only designated personnel, with appropriate training and authorization, shall operate machinery and mechanized equipment. Any observed equipment deficiencies that will affect their safe operation, will be corrected before continuing operations. A controlled work zone shall be established for demolition, sorting and loading operations. Likewise, a trained ground spotter shall be provided to assure personnel stay clear when an operator's rear view is obstructed. Dust control measures (active water misting during intrusive activities with water hose or equivalent misting equipment). Utilize the appropriate warning signs and backup alarms. All site personnel working near heavy machinery will use reflective clothing (i.e. vests) to alert the operator of their whereabouts. See appropriate AHA for details (hoisting, heavy equipment operation, etc.).

Activity: *Excavating and Working in Excavations*:
Potential Hazard: Cave in, collapse, chemical exposure, struck by, entrapment.
Procedures to Mitigate Hazard: Per OSHA requirements, provide protective systems of trenches when deeper than 5 feet and entry is necessary. Inspect the excavations/trenches regularly for changing conditions. Ensure that the material from the excavations/trenches is being placed away from the edge, to prevent cave-ins and pit (instability (> 2 feet back). Backfill the excavations as required by the approved contract specifications, to minimize the number of open excavations and control zones.
All excavation work shall be supervised by a competent person who will determine what protective measures are required, what those controls will be and how they will be implemented (testing, monitoring, benching, sloping, shoring, means of egress, dewatering, etc.). The competent person will inspect the excavations and controls to ensure reinforced structures are barricaded or marked, with barricade tape or traffic cones, during active excavations. If an excavation must remain open prior to backfill, those excavations must be fenced or barricaded (> 6 ft. from edge). Compliance with OSHA 29 CFR 1926 Subpart P will be maintained.
Atmosphere monitoring will be conducted prior to entry and during work activities in excavations/trenches.

Activity: *Working around or near utilities* (Utilities hazards overhead and/or underground).
Potential Hazard: Stored Energy Hazards (electrical, gas, water, sewer, etc.).
Procedures to Mitigate Hazard: Request utility mark out, notify FPO utility authority a minimum of three days prior to performing any intrusive or demolition activities. Prior to work beginning, ensure that all utility lines are not energized. Stay a minimum of 10-feet away from energized lines.

Activity: *Servicing equipment*.
Potential Hazard: Uncontrolled release of hazardous energy (electrical, mechanical, kinetic, pressure, heat, chemical, any type of stored or potential energy).
Procedures to Mitigate Hazard: The lock-out/tag-out procedure provided in this HASP will be followed when working on machines and equipment in which the unexpected energizing / start-up of the machines or equipment, or release of stored energy could cause injury to employees.

Activity: *Working from elevated heights* (> 6 feet) with an open edge to the next lowest.
Potential Hazard: Fall
Procedures to Mitigate Hazard: All work from elevated heights shall be performed as supervised by a competent person. In all cases proper fall protection shall be utilized such as a personal fall restraint system. Maintain 100% tie-off.

BIOLOGICAL HAZARDS

Bites and Stings

Animal bites, such as from coyotes, or stings which are usually irritants that cause localized swelling, itching and minor pain and can be handled with first aid treatment. The bites of certain snakes, lizards and spiders can contain sufficient poison to warrant medical attention. Diseases that may require medical attention, can be transmitted from some animal bites. Examples are rabies (mainly from dogs, skunks, raccoons and foxes), Lyme disease (transmitted from ticks) and encephalitis (transmitted from mosquitoes).

Personnel with known allergic reactions to bee stings should carry the appropriate medication and must notify the Director HS&E and HSO of his/her condition prior to reporting for work at the site.

Ticks, Chiggers and Lyme disease

Ticks and chiggers may be present in vegetated areas during the spring, summer and fall seasons. Preventative measures include protective clothing that covers the entire body, tucking pant legs into boots or socks and tucking a long-sleeved shirt into pants; head/hair protection; and the use of insect repellant containing DEET on all exposed areas and coveralls. Project personnel should check their bodies thoroughly for ticks and should bathe soon after returning home. Remove any ticks carefully, using a gentle firm, tugging motion with fine tweezers. If site employees feel they have been bitten they should notify the HSO immediately.

Snakes

If project personnel encounter a potentially dangerous snake – stop work, remove yourself and other workers from the immediate area and notify the Superintendent. The supervisor will contact an appropriate site representative to request that the hazard be removed. Do not re-enter the work area until you have been cleared by the HSO to do so.

Toxic Plants

Poison Ivy, poison sumac and poison oak may be present during the spring, summer and fall seasons. Avoid contact with these plants. If a project worker has come in contact, the affected area should be washed thoroughly with soap and cool water. Notify the HSO immediately.

Bloodborne Pathogens

29 CFR 1910.1030 requires that all first aid responders who may come in contact with potentially infectious materials be trained and protected from exposure. Furthermore, there is a risk for any site employee to be exposed to discarded needles and/or contaminated sharps.

All employees on this project will:

- Avoid contact with any blood or potentially contaminated object
- Use caution when picking up or moving objects (stones, brush, debris, etc.)
- Wear leather gloves and not touch suspect objects; and

In addition to the above requirements, the following will apply:

- All personnel will be required to receive bloodborne pathogen awareness training.
- No eating, drinking, smoking, or applying lip balm will be permitted in the designated work, decontamination and first aid areas.
- All first aid kits will be equipped with the proper PPE (i.e. gloves, CPR shields and respirators).
- If a garment (gloves included) is contaminated by blood, or other potentially infectious materials, the garment(s) will be removed as soon as possible.
- After an exposure incident, a confidential medical evaluation and follow-up will be conducted and immediately available to the employee. The HSO will coordinate all medical arrangements.

Radiological Hazards

No radiological hazards are expected during this project.

SITE SECURITY

All onsite personnel and visitors will be required to sign-in and sign-out, at the guard shack and project support trailer, before entering designated work sites. OSC will maintain, onsite, all records of site access. Visitors will be required to be knowledgeable of and conform to this HASP, prior to accessing work zones. Vehicular traffic will be permitted in the designated parking area as permitted by the owner. Access to the controlled work and traffic zones is restricted to authorized vehicles only.

SITE LAYOUT

See project work plan prepared separately.

BUDDY SYSTEM

Working alone is prohibited. All field personnel will be assigned a co-worker who will watch for hazards or problems his/her co-worker might encounter. Communication between employees must be maintained always. Workers will pre-determine hand signals, or other means of emergency signals, for communication when respiratory protection or distance makes communication difficult. Visual contact must remain between the two co-workers; they must remain near each other in order to assist in case of an emergency.

SITE COMMUNICATIONS PLAN

Each work crew, operator and manager will be equipped with a two-way radio. In the event of an emergency, and two-way radio communication is not available, oral and visual safety signals have been established to protect project personnel. These signals will be presented to personnel for all phases of operation before conducting any task. These safety signals will ensure quick communication during adverse or emergency situations. Examples of established signals, and their meanings, are provided below.

Visual Signal	Indication
Hand gripping throat	Out of air, can't breathe
Wave hands over head from side to side	Attention: stand by for next signal
Swing hands from the direction of the person receiving the signal to directly overhead and through a circle	Come here
Pointed finger with extended arm	Look in that direction
Grip partner's wrist with one or both hands	Leave the area immediately
Hand on top of head	Need assistance
Thumbs up	Ok, I'm alright, I understand
Thumbs down	No, negative
Audio Signal	**Indication**
Short blast of air or vehicle horn	Caution look over here
Three long blasts of air or vehicle horn	Leave the area

PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE will be selected, used, maintained and stored in accordance with OSHA 29 CFR 1926 Subpart E, and applicable manufacturer recommendations. Engineering, administrative and/or work practice controls to minimize hazards will be implemented where feasible, followed by PPE.

MINIMUM LEVELS OF PROTECTION

Level D personal protective equipment that is to be worn always by project personnel at the site includes:

- ANSI approved safety glasses with side shields
- Leather safety boots (ANSI or ASTM)
- Rubber boots w/wet hazards or disposable booties
- Hardhat (ANSI Rated)
- High visibility vest or equivalent high visibility clothing
- Appropriate clothing (long sleeve shirts and pants) and Tyvek coveralls as required
- Gloves (leather always), nitrile as required
- Hearing protection (around powered equipment or using powered hand tools)
- Tick protection when working near water or when grubbing

Modified D PPE will be used when the possibility of dermal hazardous chemical contact, but not inhalation exposure exists and includes:

- The above minimum PPE
- Mono-goggles with face shield in chemical splash situations
- Impermeable chemical barrier gloves (i.e., nitrile) if handling contaminated material
- Coated disposable coveralls (Tyvek or equivalent) if exposure to hazardous chemicals exists
- Face shield and safety glasses with work where the potential for flying debris hazards is present (i.e., chipping, grinding, steel on steel impact activities)

Level C PPE will be used if there is the possibility of inhalation of hazardous concentrations (or unknown concentrations) of vapors or fumes at or above OSHA PELs. Level C PPE includes:

- Modified level D PPE
- Air purifying respirator (half-face)
- Appropriate filtering media (particulate, mercury, organic, or combination cartridge)

NOTE: OSC employees are given the option of using an air purifying respirator for voluntary use.

Level B is not anticipated for this project but may be made available if necessary.

Levels D and Modified Level D are the anticipated PPE during this project. These minimum levels of protection are considered preliminary and may change based upon initial exposure assessment and routine assessments as work progresses. No change to the specified level of protection will be made without the approval of the HSO and in agreement with the Director HS&E

SELECTION OF PROTECTION LEVELS

PPE will be used when project and support activities involve known, or suspected, contamination; when vapors, gases or particulates may be generated by site activities; or when direct contact with skin may occur. Respirators protect the lungs against airborne toxicants. Chemical resistant clothing protects skin from contact with harmful and absorbable chemicals.

Level D: Protection will be used when no airborne contaminant exposure is likely, and job functions do not require the use of respiratory equipment or chemical resistive clothing. The equipment for this level of protection is described above and is expected to be the minimum for the project.

Level D Modified: Protection will be modified when additional contact hazards have been identified such as splash hazards and contaminated or nuisance dust. See the description above.

Level C: Protection that will be provided when airborne contaminants have been identified, and which require the use of air purifying respiratory equipment to keep exposures below health-based limits. Examples of respiratory protection for this project are half or full-face air purifying respirators with appropriate cartridges (i.e. P-100 cartridges for lead particulate, Black Organic Vapor – VOC, Brown/Gold Acid Gas, etc.). Likewise, excavation work may require an approved P100/vapor combination cartridge.

Level B: Protection that will be provided when the highest level of respiratory protection is needed with partial body or skin protection. Equipment for this level of protection will include a minimum of the following:

- SCBA, PAPR or airline respirator depending on contaminate and situation
- Chemical resistant protective clothing for hazards identified.
- Hardhat or helmet for hazards identified.
- Chemical resistant gloves with liners for hazards identified.
- Chemical resistant safety shoes or boot covers for hazards identified.

Level B is not expected for this project.

HEARING PROTECTION

Project personnel will be provided hearing protection and required to use it whenever conducting tasks where exposures may exceed 90 dB as indicated in the following table:

	Sound Level at Operator		
Equipment	Average, dB	Range	TWA, dBA
Earth Moving:			
Front End Loader	88	85-91	
Backhoe	86.5	79-89	
Bulldozer	96	89-103	
Roller	90	79-93	
Scraper	96	84-102	
Excavator	86	83-92	89.6*
Truck	96	89-103	
Paver	101	100-102	
Power Units:			
Generators	<85		
Compressors	<85		
Impact:			
Pile Driver (diesel/pneum.)	98	82-105	
Pile Driver (gravity)	82.5	62-91	
Pneumatic Breaker	106	94-111	
Hydraulic Breaker	95.5	90-100	
Pneumatic Chipper	109		
Other Equipment			
Compactor/Vibrator	94.5	85-98	86.1
Compressed Air Blower	104		
Power Saw	88.5	78-95	
Electric Drill	102		

Noise Standards	Noise Level
OSHA (at worker's ear)	90 dB (A) TWA
Day Time Community (at property line)	65 dB (A)

*Open windows

OSC has monitored sound levels for various tasks and operations conducted during the project to both verify that the levels cited above are accurate and to serve as exposure indicators. Sound levels have been measured for each task or operation reasonably expected of having noise levels that could result in exposures above 90 dB as an 8-hr. TWA. Regardless of the results, however, OSC employees will be required to use hearing protection under pre-defined conditions.

Hearing protection will be required whenever an employee is either using a powered tool or working near loud noises (excavators, sheet driving, or working in heavy equipment with windows open). Hearing protection may be obtained from the HSO. Each employee is responsible for wearing hearing protection when required. Replacements may be obtained from the HSO, if necessary. Employees are encouraged to use hearing protection voluntarily if communications are not compromised.

RESPIRATORY PROTECTION

Project personnel may be required, to use respiratory protection to reduce their exposure to airborne hazardous substances. The standard requirements that determine the selection and use of respirators depend on the hazards present. Respirators will also be made available, at the project work area, for emergencies.

Only respirators that are approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupation Safety and Health (NIOSH) are allowed. Use must follow the regulatory requirements set forth by OSHA 29 CFR 1910.134 and OSHA 29 CFR 1926.103.

OSC employees may voluntarily use a filtering facepiece in conditions when respiratory protection is not mandatory. Employees that are medically cleared to use an APR may wear any type of respirator voluntarily.

Medical Clearance & Fit Testing

All personnel, which are assigned to tasks where a respirator is needed, must have prior medical clearance. Medical evaluations and fit testing are provided by OSC. Fit test records and all project personnel medical documentation will be filed and maintained onsite, by the HSO.

Medical limitations and restrictions will be strictly enforced. No employee will be permitted to use a respirator if he/she has any facial abnormality or facial hair that may affect the fit or seal of their respirator

Training

All personnel who are required to wear a respirator will receive training (in addition to required annual training) from the HSO on the use, maintenance, proper care and inspection of their respirators. Attendance at all training will be documented. Attendance records will be maintained onsite by the HSO and will be available for inspection upon request.

Inspection

All respirators to be used at the jobsite will be inspected for damage by the employee, prior to use. After they are trained, every employee will be responsible for inspection of their own respirator. The following elements will be inspected;

- Tightness of the connections
- Face piece
- Headbands
- Inhalation valve
- Cartridge or filter fittings
- Signs of deterioration

Any malformation, distortion, missing parts, cracks, etc. in the respirator will cause the equipment to be deemed useless until a qualified technician can properly repair the respirator. If necessary, a new respirator will be issued.

Respirator Type

The type of respirator, and who is required to wear them, will be identified on a task specific level by the HSO, in consultation with the Director HS&E, based on the type of work that will be performed and the potential for exposure to airborne contaminants.

Standard Procedure for Use

All personnel will adhere to the following standard operating procedure for respirator use;

- Carefully inspect the respirator prior to entering potentially contaminated work areas
- Conduct positive and negative pressure leak tests each time the respirator is to be used
- Do not remove the respirator in contaminated work areas
- Wear a respirator with straps inside disposable garment hood (if equipped)

Cleaning and disinfecting

Any reusable respirator must be cleaned after each use. The steps required to clean a respirator after use are;

- Remove the cartridge and headbands
- Disassemble all respirator parts
- Wash all parts, except for the cartridge and headband, in a cleaner-disinfectant solution or use soap and hot water
- Rinse all parts completely in clean, warm water
- Air dry in a clean, sanitary area
- Re-assemble the respirator
- Store the cleaned respirator in a sealed bag.

Storage

Respirators will be stored in a sealed bag to protect against dust, sunlight, extreme temperature, moisture and abrasives. Inhalation holes will be covered with duct tape immediately after leaving a contaminated area. The tape will be left on until the respirator is donned for the next entry into a contaminated area. This tape will prevent any contaminants from being dislodged from the cartridge. Respirators should be stored so that the face piece and exhalation valve will rest in a normal position and function will not be impaired by the elastic setting in an abnormal position. The respirator should not be hung to store or air dried by its straps.

STANDARD OPERATING PROCEDURES (SOPs)

General

- Ensure that all safety equipment and protective clothing is kept clean and well maintained.
- Ensure that all prescription eyeglasses are safety glasses and are compatible with respirators.
- Ensure that all disposable or reusable gloves are approved by the HSO
- Respirator filters will be changed daily.
- At the end of each day, decontaminate or dispose of all PPE used onsite. The HSO is responsible for ensuring decontamination before PPE reuse.
- Project personnel will have vision or corrected vision to at least 20/40 in one eye.
- Onsite personnel that are found to be disregarding any provision of this HASP will be barred, at the request of the HSO, from this project.
- Do not reuse disposable outerwear such as coveralls, gloves and boots. Used disposable outerwear will be removed upon leaving the exclusion zone and placed inside disposable containers that are provided for this sole purpose. The containers will be stored at the project site, at the designated staging area, and OSC will arrange for the proper disposal of these materials at the completion of the project.
- When working, immediately replace protective coveralls that have become torn or badly soiled.
- Eating, drinking, smoking, chewing gum and tobacco use shall be in designated areas.
- All personnel must thoroughly wash their hands, face and forearms prior to using the facilities, eating, drinking and smoking.
- NO alcohol, drugs (without prescriptions) or firearms will be allowed onsite at any time.

All personnel who are on medication with a safety-sensitive effect will report it to the HSO, prior to work start-up, The HSO will require a letter from the individual's personal physician stating what limitations, if any; the medication may impose on the individual.

EXCAVATION SAFETY

OSC maintains strict procedure for soil excavations. The safety of all employees during these operations depends on the soil structure and stability, contamination, weather conditions, buried utilities and structures and superimposed loads.

When excavating within a wet, sandy area, or if the area has been backfilled at any time, it is likely to be very unstable. All personnel working in these conditions must be cautious and provide extra sloping, if possible. A change in weather conditions, such as heavy rain or snow, can loosen the soil and increase the risk of collapse. If the area of excavation is prone to collapse precautions, such as covering the area, should be taken. Heavy equipment or materials should be kept as far away as possible from the excavation area because they can also increase the risk of collapse. All excavated soil should be removed from the rim of the area and contained if possible.

An excavation competent person must be on site anytime entry into an excavation is necessary. Any person entering an excavation must be trained in the hazards and safe work practices of excavations.

To eliminate the impact on buried pipelines or cables, before any excavation begins OSC personnel will notify all utility companies to locate their lines. If such a hazard exists, the lines will be carefully marked (potting, hand digging, etc.) prior to the start of the excavation activities.

When deeper than five feet, to prevent collapsing soil the excavation must be sloped, shored or somehow contained before any personnel may enter. A ladder will be provided for employees who are working in depths for more than four feet and spacing between will not exceed 25 feet. The ladder will not be removed until all employees have exited the excavation site.

All excavation sites will be inspected daily by an OSC designated competent person. All activity will cease if the competent person, site superintendent, and/or the HSO find the site hazardous. The competent person will make an inspection any time there is a change in conditions (i.e., weather, water, heavy equipment operation, etc.).

EXTERIOR PRECAUTIONS

OSC requires that all exterior structures (sidewalks, bridges, etc.) be protected and clear of excavated materials. Sidewalks will be shored to carry a load of at least 125 pounds/sf. Planks, which are being used for temporary walkways, will be laid parallel to the length of the walkway and will be fastened together. If possible, guard rails or fences will be erected to protect employees and vehicle traffic from the edge of excavation sites.

LOCKOUT/TAGOUT POLICY

For repairs or maintenance, equipment will be locked out. This procedure ensures the health and safety of all personnel by deactivating any movable, electrical or pressurized equipment. This policy applies to all machinery or equipment that can be moved either using electrical power, hydraulic power, compressed air, steam or energy stored in springs/suspension devices. Damaged tags will be placed on all movable equipment and machinery.

Only project personnel and supervisors are authorized to lockout machinery/equipment. Every employee is responsible for his/her own equipment and nobody else is permitted to remove a lock or tag except the authorized employee. Any violation of this policy is cause for strict disciplinary action.

Lockout Procedures

Lockout devices are used to prevent the accidental re-energizing of equipment.

De-energizing Circuits and Equipment: Disconnect the circuits and equipment, to be worked on, from all electrical sources and release stored energy that could accidentally re-energize equipment.

Application of Locks and Tags: Only authorized personnel are allowed to place a lock and tag on each disconnecting – means used to de-energize the circuits or equipment before the work begins. A lock prevents unauthorized personnel from re-energizing the equipment or circuits. A tag prohibits unauthorized operation of the disconnecting device.

Verification of De-energized Condition of Circuits/Equipment: Prior to work on equipment, OSC requires that a "qualified" employee verify that the equipment is de-energized and cannot be restarted. This is typically done by a visible break in the conductors (i.e. air gap) of one foot or more.

Re-energizing Circuits and Equipment: Before circuits or equipment are re-energized, the following steps must be taken in the following order:

- A "qualified" employee conducts tests and verified that all tools and devices have been removed.
- All exposed employees are warned to stay clear of the circuits and equipment.
- Authorized personnel will remove their own locks and tags.
- The HSO will conduct a visual inspection of the area to be sure all employees are clear of the circuits and equipment.

ELECTRICAL

Only qualified and authorized personnel may work on or around electrical equipment. OSC personnel are not permitted to work on energized lines or equipment. Live or hot work must be contracted to a qualified third party unless specific authorization is given by the OSC President or Director HS&E. The following shall be observed;

- The working space around all electrical equipment will be large enough to permit access to all parts of the equipment. The working space will never be used for the storage of other materials so that immediate access can be gained.
- Only NEC certified electrical tools may be used.
- A ground fault circuit interrupter (GFCI) shall be utilized with all portable electric tools; plugged in at the source and tested prior to use. All electrical equipment shall be properly grounded or guarded (double insulated tools, GFCI).
- Single phase electrical tools must be plugged into properly grounded receptacles.
- The use of extension cords is discouraged. If their use is necessary, extension cords must never be used in traffic areas where they may be a hazard, or where they may become unplugged. Extension cords will always be grounded.
- Any energized electrical equipment, operating at 50 volts or higher, must be protected by a cabinet or other approved enclosure with warning signs that are immediately visible.

FALL PROTECTION

All work from elevated heights > 6 ft. with an open edge to the next lowest level shall be performed as supervised by a competent person. In all cases proper fall protection systems shall be utilized as determined by the competent person for fall protection; restraint systems (PFRS, guard rails, and warning lines (restricted for unprotected edge work where traditional systems are not practical).

Whenever possible, fall restraint shall be used over fall arrest. OSC observes a policy of 100% tie-off at all times.

INCIDENT PREVENTION PROCEDURES

SAFETY TASK ANALYSIS CARD

The Safety Task Analysis Card (STAC) process is a required component of all OSC projects. The STAC is a pre-printed, bi-fold card that must be completed by each employee at least once per week. The card is used by the employee as a reference tool throughout their work shift. STAC card observations are used to address new work tasks and/or potential hazards.

STAC's are used in addition to safe work permits and/or approved work procedures. The STAC is designed to be an ongoing learning tool. By breaking jobs into small parts, workers can identify hazards and eliminate or control them. It is intended as a tool to help employees make observations and correct fellow employees at risk behaviors.

The STAC must be completed by each employee at least once per week. This is the minimum requirement. Project personnel found participating in or observing risky actions without submitting a properly completed STAC will be re-trained on the need to do so.

Project supervisors and/or the HSO will review submitted STACs with employees during tailgate safety meetings and identify corrective actions.

FIRE PREVENTION AND PROTECTION

Emergency response and contingency procedures provided this HASP will be in effect throughout all phases of work. Included are firefighting equipment, alarm systems, the location of the closest fire departments and procedures for handling fire emergencies. Firefighting equipment will be inspected on a regular basis, maintained in proper working condition and will be in an accessible place, at the site, at all times.

All heavy equipment will be equipped with a fire extinguisher.

Fire extinguishers will be immediately available when working with or near combustible or flammable items.

A fire extinguisher, rated 2A or greater, will be provided for every 3,000 sf of protected building area, or major fraction thereof, on every floor and they will be placed no more than 100 feet from any point within the building. Fire extinguishers will be placed adjacent to stairways in multi-story buildings. This condition is not expected on the project.

SITE HOUSEKEEPING

The following housekeeping guidelines apply at this site:

- All excess material and debris will be kept clear from all working areas.
- Combustible materials will be removed at regular intervals and all wastes will be properly disposed of at frequent intervals.
- Containers will be provided for the collection and separation of all discarded materials and refuse. Covers and identification will be provided for all containers used for flammable or harmful substances.

MECHANICAL EQUIPMENT

The following guidelines apply when dealing with the inspection and operation of all mechanical equipment;

- All vehicles and equipment used on the site, must be checked at the beginning of each shift to assure that all parts that affect safe operation are in proper working condition and are free from defects. An inspection form must be completed and filed with the HSO.
- Personnel will not be permitted to operate equipment when there is an obstructed view to the rear or sides, unless there is a spotter.
- Employees will not work or walk under or between any equipment that has parts which are suspended or held aloft unless/until the parts are substantially blocked to prevent falling and shifting.
- Hydraulic leaks must be addressed immediately by stopping the equipment, preventing further leaking and cleaning any hydraulic fluid spills/leaks. Notify the HSO immediately for proper corrective actions to be determined.

HIGH PRESSURE WASHERS

OSC requires that only trained and authorized personnel operate high pressure washers. This policy is intended to protect both *OSC* employees as well as any property where the equipment will be used. The following guidelines apply:

- The lance must always be pointed at the specific work area.
- Personnel will remain at least 25 feet away from the washer; and the item being washed.
- Care should be taken to ensure the proper footing of the operator.
- The operator will wear the following personal protective equipment: Hard hat with face shield, goggles, safety boots with metal foot and shin guards, hearing protection, PVC rain or chemical resistant suit and heavy gloves; as well as any additional equipment to protect against chemicals, as needed.
- OSC requires that all operators be trained in the emergency shutdown procedures and general equipment maintenance of high-pressure washers.
- Under no circumstances will an operator be allowed to make modifications to a power washer while on a job.

VEHICLE AND EQUIPMENT SAFETY

Only trained and qualified personnel may operate equipment and vehicles. This policy is intended to protect all employees and client properties. The guidelines for this policy are as follows;

- Each unit is to be inspected prior to its use on site and then inspected periodically depending on the equipment involved and the manufacturer's specifications.
- No repair work, or refueling, will be done while the vehicles or equipment are in operation. The engine is to be turned off and all buckets, blades, gates or booms must be lowered to the ground, or a substantial support.
- Equipment backup alarms must be operational and audible over the surrounding noise levels. If this is not the case, an assistant must be assigned to the operator, and he/she will be required to clear the way.
- Only authorized personnel are permitted to ride in company vehicles and equipment.
- Under no circumstances will an employee be permitted to get on or off a moving vehicle.
- Operators must wear the following PPE: Boots/sturdy work shoes, ear protection devices when the noise level is excessive (see hearing protection section), heavy work gloves. Hardhats and safety eyewear with side shields are required whenever outside of an enclosed cab. Safety glasses and hearing protection are required when the cab windows are open.
- The operator must always wear seatbelts .
- To ensure the proper visibility all windshields, side windows, mirrors and lights will be cleaned as often as necessary.

Trucks

The following guidelines apply to truck operators;

- A current driver's license must be carried always
- Drivers will check loaded material to ensure against loss or shifting during transit
- All DOT regulations will be followed
- When towing trailers, safety chains (grade 70) must be in used
- Non-OSC drivers must receive site-specific instructions upon arrival such as remaining in the truck, where to tarp loads, required PPE if allowed to exit truck, proper entry procedures, etc.

Heavy Equipment

OSC has the following requirements for operating front end loaders, excavators, dozers and tractors;

- Prior to their use onsite, the equipment's brakes, cables and hoses must be checked and in good working order.

- When the equipment is moving, all blades, buckets and bowls will be carried close to the ground but high enough to avoid any obstacles on the ground. If not in motion, they must be lowered to the ground or to a substantial support.
- No employees are permitted to ride on a boom, bucket, bowl or any other heavy equipment extension.
- All safety equipment must be properly installed, and in good working condition, before a piece of equipment will be used on this project.

SANITATION

Except for mobile crews having transportation readily available, all work sites will have toilets provided that adhere to the following requirements: One toilet for 20 or less employees; one toilet seat and one urinal per 40 employees; if there are 200+ employees, one toilet seat and one urinal per 50 workers.

Adequate washing/showering facilities will be provided on site where there are harmful substances, and they will be in close proximity to the site. An acceptable supply of potable water will be provided onsite, and it will be clearly marked as such. Portable water containers will have tightly sealed tops and a tap.

DAILY INSPECTIONS

The HSO will monitor jobsite hazard mitigation through inspections at the start and throughout each workday. Results of these daily inspections will be recorded on a daily safety log.

Any safety violations will be recorded and corrected by the Project Manager. All observed safety violations will be immediately corrected, explained to the person responsible, and reviewed at the next safety meeting. If an employee has excessive violations of the site safety rules, it will be grounds for disciplinary action which could lead to termination of OSC personnel or expulsion if an onsite subcontractor personnel.

INCIDENT REPORTING

OSC will prepare and maintain (on site) incident reports that include corrective actions. These reports will be provided to within 48 hours of the incident and as needed. Each incident report will be reviewed by the OSC Director HS&E. Verbal notification shall be within 2 hours.

Any occupational incident, which results in the death of one or more employees will be reported to OSHA within 8 hours. The inpatient hospitalization an employee and all amputations or loss of an eye will be reported within 24 hours. All such incidents will be reported by OSC to the nearest OSHA Area Director during normal business hours or at the National Hotline (800-321-OSHA (6742).

In addition to OSC's internal reporting requirements, RIVERVIEW/Honeywell requires all incidents (adverse events) to be investigated and based on the severity, requires notification of the incident within specified timelines. Adverse events are divided into three tiers: Tier 1 events are the most significant and serious events, followed by Tier 2, which are significant events but not as serious as Tier 1 events, and Tier 3 events are essentially all other events that do not meet the criteria for Tier 1 or Tier 2 events. Tier 1 events are to be reported within 2 hours, Tier 2 events are to be reported within 24 hours, and Tier 3 events are to be reported when possible.

Adverse events include the following:

Tier 1:

- A release to air, water or soil that has an actual or potential off-site adverse environmental impact.
- One or more on-site fatalities;
- Three or more employees, contractors or visitors admitted to a hospital;
- Any off-site fatalities, injuries, or harmful exposures resulting from RIVERVIEW/Honeywell products or operations;
- Any security incident that may be immediately dangerous to life or property, including fires, explosions, bomb threats, chemical release, radiation release, release of a biological or chemical agent (aerosolized or gaseous form);
- Suspicious materials, packages or letters that pose immediate risk to employees
- Government representatives alleging or suggesting criminal non-compliance of any kind
- Receipt or notice of any regulatory agency directive or other type of injunctive device designed to curtail or restrict operations; and,
- Community injuries or diagnoses of illnesses allegedly associated with a company-related incident, event or release to air, water or soil.

Tier 2:

- Employee or contractor lost workday injuries/illnesses.
- Employee, contractor or visitor recordable injuries/illnesses (Criteria: "RIVERVIEW/Honeywell Global Recordkeeping Requirements").
- An environmental excursion that does not also trigger Tier 1 reporting.
- A release to air, water or soil that only narrowly avoided an adverse environmental impact or had the potential to be an excursion.
- Discovery of potential or actual evidence of contaminated groundwater from current or former operations that does not otherwise meet the definition of a Tier 1 Event.
- Suspicious activities in or around RIVERVIEW/Honeywell facilities or processes that may present a potential security risk.
- Allegations of previously unknown health/safety/environmental effects caused by products, processes, emissions or discharges (Reference: Risk Management and Reporting (Pstew-3).
- Written notification from a governmental agency alleging non-compliance of any kind.

- Proposal or imposition of an HSER fine, penalty or corrective action.
- Receipt of a non-routine request for information from a governmental agency.
- A non-routine regulatory agency inspection.
- Audits (Peer review, Self-assessments, SBU, Third party findings and recommendations)
- Significant community activism or adverse media coverage not associated with an episodic event.
- A product recall imposed by a regulatory agency.
- Transportation-related event that results in Tier 2 impacts.
- Notice of an allegation from a third party or regulatory agency of environmental impacts from operations on current or formerly operated RIVERVIEW/Honeywell facilities.
- Demands, including voluntary agreements, to conduct a site investigation or remedial measures to respond to environmental impacts from operations on current or formerly operated RIVERVIEW/Honeywell facilities.

Tier 3:

The following Tier 3 events shall be entered into the event tracking system within seven (7) calendar days:

- On-site or off-site employee, contractor employee or visitor injuries/illnesses where first-aid treatment or evaluation is provided by a Medical or Para-Medical Professional.
- A regulatory agency inspection (which is not a Tier 1 or Tier 2 Event and may still be underway) with no notice of fine, penalty or corrective action.

Adverse events must be reported to the PM, the INVENTUM engineering manager, the RM, as soon as possible following the event. All Tier 1 and Tier 2 adverse events must be investigated, and a written investigation report must be prepared and submitted to the RIVERVIEW/Honeywell Event Reporting System.

MEDICAL SURVEILLANCE

MEDICAL EXAMINATIONS

OSC field personnel are provided with a thorough, initial medical examination to assess fitness for the project and to provide baseline health data for subsequent reference. Examinations are conducted by a qualified health care provider and repeated annually (unless abnormal test results, annual "questionnaire" answers or other problems dictate more frequent observation). A copy of the physician's statement certifying each employee's ability to work at task specific operations will be maintained in the project file by the HSO.

During the medical examination employees will be evaluated for their ability to wear respiratory protection. This evaluation will include, at a minimum, an examination of the cardiopulmonary system; including forced vital capacity (FVC) and forced expiratory volume C 1 second (FEV 1.0). When indicated by the physician, other tests of the respiratory and cardiovascular systems will be performed on the basis of an individual's past history, findings of the above below evaluation, and/or the type of equipment the individual may be required to use.

Following is an example of a baseline yearly medical examination:

Medical Monitoring Protocol				
Exam Components	**Baseline**	**Annual**	**Interim**	**Exit**
Vital Signs	Yes	Yes	Yes	Yes
Vision Screening (Includes Peripheral and Color)	Yes	Yes	Yes	Yes
Urine Drug Screen	Yes	Yes	As needed	As needed
DOT hearing	Yes	Yes	No	Yes
Spirometry	Yes	Yes	Yes	Yes
Chest X-Ray (asbestos/silica work only)	Yes	3	No	3
Review of History	Yes	Yes	Yes	Yes
Physical Exam	Yes	Yes	Yes	Yes
Notes: Only do an X-ray if not done within the last 12 months Only do an X-ray if not done within the last 3 years For medical indications only				

NOTE: Any employee who develops a lost time injury or illness during the period of this contract will be evaluated by the OSC medical consultant. The project supervisor will be provided with a written statement that indicated the employee's fitness and ability to return to work, signed by the medical consultant prior to allowing the employee to re-enter the work zone.

AIR MONITORING:

Lower Explosive Limit (LEL) monitoring will be conducted around any tank, vessel, or barrel containing coal tar prior to beginning work each day and when coal tar is being handled. Concentrations greater than 10% of the LEL will result in work stopping immediately for further evaluation. When LEL concentrations are zero, the HSO shall determine the need for additional monitoring.

Volatile Organic Compound monitoring (breathing zone) shall be performed when odors are detected. Monitoring will be conducted using a MultiRAE Lite with an 11.7 lamp. Work resulting in readings of 0.6 ppm or greater TWA after 15 minutes of measurement shall stop and the OSC Director, HSE contacted for further evaluation.

Any time a confined space or enclosed building area is entered initially the air shall be characterized using real-time monitors for oxygen content, LEL, and other potential hazards such as carbon monoxide or hydrogen sulfide exposure.

The need for additional air monitoring or exposure measurements will be determined as specific work tasks are developed. Air monitoring and sampling shall be specified in the relevant AHA as approved by the Director HS&E.

CONFINED SPACE ENTRY PROCEDURES

The following guidelines outline the minimum acceptable criteria that will be utilized by OSC and subcontractor personnel for all confined space entry operations.

All project specific confined space entries will be thoroughly reviewed by the designated HSO. Confined Space Permits shall be issued and approved in conjunction with the INVENTUM Project Manager. Personnel entering and working in confined spaces will be required to adhere to the OSHA Permit-Required Confined Space Standard 29 CFR 1926.1200 and the OSHA General Duty Clause. Affected project personnel are instructed in these OSHA regulations as part of the OSC employee training program.

The HSO will be responsible for reviewing the applicable entry protocol with the field team, prior to confined space entry.

DEFINITIONS

CONFINED SPACE: There are two types of confined spaces: permit required and non-permit required. OSHA's "PRCS Evaluation Procedures and Decision Flow Chart" will be used to evaluate the potential for permit require confined space.

PERMIT REQUIRED CONFINED SPACE (PRCS): The space contains, or has the potential to contain;

- A hazardous atmosphere. A hazardous atmosphere is defined as any space where the oxygen is below 19.5% or above 23.5%, combustible vapors are above 10% LEL, or high toxic concentrations are present which may cause death, incapacitation or an impaired ability to self-rescue.
- The space contains a material that may engulf an entrant.
- The space has an internal configuration that may trap or asphyxiate entrants.
- The space contains any other serious heal, safety or environmental hazard.

NON-PERMIT REQUIRED CONFINED SPACES: OSHA defined a non-permit required confined space as a PRCS in which all serious hazards have been eliminated. Non-permit required confined spaces will be re-evaluated by the HSO using the "PRCS Evaluation Procedure and Decision Flow Chart" (see attached) whenever they or their characteristics change in a way that could lead to reclassification as a PRCS.

PERSONNEL RESPONSIBILITIES

Entry Supervisors

OSC will designate an entry supervisor to oversee the confined space entry and ensure that personnel engaged in PRCS entry operations will comply with this procedure. Entry supervisors will:

- Verify that all tests specified by the permit, have been conducted and that all procedure and equipment specified by the permit are in place before endorsing the permit and allowing the entry to begin.
- Terminate the entry and cancel the permit when the entry operations covered by the entry permit have been completed, or whenever a condition that is not allowed under the entry permit arises in or near the PRCS.
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove all unauthorized individuals who enter, or attempt to enter, the PRCS during entry operations.
- Determine that the entry operations are consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

Attendants

The entry supervisor will designate a qualified attendant for each PRCS operation. To be qualified, an attendant must know the hazards that authorized entrants may encounter during an entry (including information on the mode, signs and symptoms, and consequences of exposure) and must be aware of the behavioral symptoms of hazard exposure. Attendants will;

- Remain outside the PRCS during entry operations until relieved by another attendant.

- Warn all unauthorized entrants that they must stay clear of the PRCS, or that they must immediately exit if they have entered the PRCS.
- Inform the entry supervisor, if unauthorized personnel have entered the PRCS.
- Continuously maintain an accurate count of entrants in the PRCS and ensure that the means used to identify authorized entrants accurately identifies the entrants.
- Communicate with authorized entrants, as necessary, to monitor entrant status and to alert entrants of the need to evacuate the PRCS.
- Monitor the activities both inside and outside the PRCS.
- Immediately order evacuation of the PRCS if a prohibited condition is detected, the behavioral effects of hazard exposure in an authorized entrant are observed, or a situation outside the PRCS is found that could endanger the authorized entrants; or if the attendant cannot effectively and safely perform his/her duties and responsibilities.
- Perform non-entry rescues, as specified by the Confined Space Entry Permit; summon rescue and other emergency services as soon as it is determined that authorized entrants may need assistance to escape from PRCS hazards.

Attendants will NOT, under any circumstances;

- Monitor more than one occupied PRCS at any given time;
- Perform any duty that might interfere with their primary duty to monitor and protect the authorized entrant; or
- Enter the PRCS for rescue purposes.

Entrants

Authorized PRCS entrants will be identified on each Confined Space Entry Permit. Authorized entrants will;

- Know the hazards, including information on the mode, signs or symptoms, and consequences of exposure.
- Properly use the PPE provided for the PRCS entry.
- Communicate with the attendant, as necessary, so the attendant can monitor entrant status and alert entrants of any need to evacuate the PRCS.
- Evacuate the PRCS and alert the attendant whenever they recognize any warning signs or symptoms of exposure to a dangerous situation; or they detect a prohibited condition; or whenever the attendant or entry supervisor orders the evacuation; or when an evacuation alarm is activated.

TRAINING

All project personnel will be instructed not to enter PRCSs without the proper permit and without following the procedure and practices outline in this SOP and in the Confined Space Entry Permit. Personnel, who are required to enter a PRCS, or act as an attendant or entry supervisor, will be

trained to acquire the understanding, knowledge and skills necessary for the safe performance of their assigned responsibilities and duties.

Entrants will receive training on;

- The means and methods used to communicate with attendants; as well as the means attendants will use to notify them of emergencies.
- The operation of any specialized equipment that is expected to be used, including monitoring and rescue equipment.
- Evacuation signals and procedures; as well as the need for entrants to notify the attendant and evacuate the PRCS if they detect any dangerous conditions.

Attendants will receive training on:

- The procedures for monitoring inside and outside the PRCS and recognizing the conditions that might be hazardous to entrants;
- Procedures for communicating with entrants;
- Procedures for evacuating entrants from the PRCS and when evacuation is required;
- Procedures for controlling access to the PRCS;
- Their responsibility to remain outside the PRCS during entry, unless they are relieved by another attendant, and
- Non-entry rescue procedures.

Entry Supervisors will receive training on;

- Verifying that the Confined Space Entry Permit has been completed properly;
- Procedures for verifying that all tests specified by the Permit have been conducted;
- Requirements for verifying that all the procedures and equipment specified by the Permit are in place before allowing entry to begin;
- Procedures for determining if conditions are acceptable for entry;
- Authorizing entry operations, and
- Terminating entry.

All training will be conducted:

- Before the employee is first assigned confined space duties (initial training);
- Before a change in assigned duties;
- Whenever there is a change in permit space operations that presents a hazard about which employee has not previously been trained, and
- Whenever project management, involved regulatory officials, or the project engineer have reason to believe that there are inadequacies in the knowledge or use of these procedures.

When complete, training will be certified by the instructor. The certification will list the names of the personnel presenting and receiving training and the dates of training. Training certification documentation will be maintained as part of the Project file kept at the site and in the individual's personnel files in the home office.

PRCS ENTRY PROCEDURE

Atmospheric Testing

Before an employee enters any confined space, the entry supervisor will test the internal atmosphere with a calibrated, direct reading instrument to determine if acceptable entry conditions exist for the following conditions, in the given order:

	Condition	Acceptable Parameter(s)
A.	Oxygen Content	Above 19.5% and Below 23.5%
B.	Flammable Gases and Vapors	Less than 10% LEL
C.	Potential Toxic Air Contaminants	Below Action Levels for PPE

Continuous systems which cannot be isolated (i.e. sewers) or activities which generate significant airborne contaminants (i.e. welding) will be continuously monitored during entry, unless forced mechanical ventilation is used and has been shown to maintain an acceptable atmosphere.

Entry

The HSO will use the "PRCS Evaluation Procedures and Decision Flow Chart" to verify the presence of a PRCS. If it is determined that a PRCS does exist, the HSO will review the confined space entry procedures with entry personnel; post OSHA required danger signs at the entrances to the PRCS and notify Project personnel of the PRCS location(s); notify offsite emergency response services of the PRCS; and prepare a Confined Space Entry Permit.

Confined Space Permit

The entry supervisor will be responsible for completing the Confined Space Entry Permit. All items on the Permit must be completed. The entry supervisor will verify that all entry personnel are aware of the specific hazards that are associated with the PRCS; that all necessary safety equipment and materials are in place; that all emergency response procedures are in place; and that the pre-entry air monitoring results indicate acceptable entry conditions, before signing the permit.

Pre-entry Briefing

The entry supervisor will conduct a pre-entry briefing with the attendants and authorized entrants to discuss the requirements of the Permit and to ensure that all involved personnel understand their responsibilities and the specific hazards associated with the PRCS. A pre-entry briefing will be conducted, for each attendant and entrant, prior to entry and whenever new hazards are identified.

Entry Authorization

The entry supervisor will sign the Confined Space Entry Permit after the Permit has been completed, all safety equipment is in place, air monitoring results are acceptable, the pre-entry briefing has been conducted, and the rescue procedures have been established. Once the permit has been signed:

- Entrants will wear all the necessary safety and rescue equipment;
- The Permit will be posted at , or near, the PRCS entrance, and
- Entry procedures will begin.

Permit Exit and Cancellation

Each Entry Permit will be valid for one shift only. Expired and canceled Permits will be returned to the Site Superintendent who will file them with the Project documents. Permits will be canceled if;

- A new hazard is identified or encountered;
- An entrant is seriously injured and requires evacuation and/or rescue; or if
- A change in the scope of work required new activities which may create previously unanticipated hazards that could cause serious death or injury.

RESCUE/EMERGENCY RESPONSE

Offsite Rescue and Emergency Services

Offsite rescue and emergency service personnel will be informed by the HSO of the hazards they may confront when called to the jobsite to perform services. These services will be identified and notified prior to any entry. Entry will not be performed if emergency rescue services are not available. The rescue/emergency service personnel will be provided access to all permit spaces from which the rescue may be necessary, so that the emergency responders can develop appropriate rescue plans and conduct rescue operations.

Non-entry Rescue

Non-entry rescues, retrieval systems or methods will be used whenever an authorized entrant enters a PRCS, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

Each authorized entrant will use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level or above the entrant's head. Retrieval lines will be attached to a mechanical device or a fixed point outside the Permit space, in such a manner that rescues can begin as soon as the rescuer becomes aware of the necessity. The mechanical device will be ready to retrieve personnel from vertical PRCSs more than five feet deep.

DECONTAMINATION PROCEDURES

Decontamination of equipment and personnel will be performed as necessary and as defined in the project scope. All equipment and personnel will be decontaminated before leaving the property.

Personnel and equipment decontamination procedures to be employed are summarized in the following subsections.

PERSONNEL HYGENE AND DECONTAMINATION

Personnel will be made aware of any personal habit that may allow contaminants into or onto their body. All personnel will check that regularly worn PPE (i.e. hardhats and liners, eye protection, etc.) is clean and in good condition. A storage area for decontaminated PPE will be provided and used outside the contaminated zone. Any products used for personal consumption are prohibited in any work area. Break areas will be limited to specific areas where eating, drinking, smoking, etc. and the storage of these materials will be allowed.

A typical personnel decontamination sequence is presented below.

- Step 1: Scrape the gross contamination from boots and outer gloves. Wash them using soap in a water solution and rinse with water into a designated container in the contamination reduction zone.
- Step 2: Remove the tape from and around boots and outer gloves and deposit in a collection drum (if disposable) or store on a rack (if reusable). Remove the over boots and outer gloves and place them in a collection drum (if disposable) or wash and place on a rack (if reusable).
- Step 3: Remove respirator cartridge and place in a collection drum.
- Step 4: Remove disposable coveralls and place them in a collection drum. Remove boots and store in an appropriate location. Remove disposable inner gloves and dispose of them in a collection drum.
- Step 5: Remove hardhat and safety glasses: Decontaminate as necessary (wash with sanitizing solution [MSA sanitizing solution or equivalent], rinse with potable water and allow to dry at the end of each day).
- Step 6: Remove respirator, if used, and deposit in a plastic liner. Avoid touching face with fingers. Respirators will be washed in a sanitizing solution (MSA sanitizer or equivalent), rinsed with portable water and allowed to air dry at the end of each day.
- Step 7: Thoroughly wash and rinse any exposed skin with water and biodegradable soap using bucket 1. Rinse in bucket 2. Re-rinse in bucket 3. Shower and launder all personal clothing as soon as possible upon completing daily activities.

Personnel hygiene, hand and face washing, and the following decontamination will take place in the project support area.

EQUIPMENT DECONTAMINATION

The HSO will be responsible for inspecting decontaminated vehicles, equipment and material contaminated work areas, to ensure proper decontamination. The users and HSO will verify that each piece of equipment utilized in the exclusion zone has been properly decontaminated.

Decontamination personnel will be required to use Modified Level D PPE as specified in this HASP. The standard operating procedure for the use of high-pressure washers, also provided, will be strictly followed to prevent injury.

HEAVY EQUIPMENT DECONTAMINATION

As a general practice, equipment, such as excavators, bulldozers, etc. will remain within the work zone for the duration of the excavation activities. This ensures the minimization of the potential migration of contaminants outside the project limits. In addition, the sequence of excavation has been designed to avoid the movement of machinery and personnel over areas within the work zones that have been excavated.

Generally heavy equipment, and large materials used in potentially contaminated areas equipment, will be decontaminated as outlined below;

- Conduct gross removal of solids at point use.
- Degrease as necessary.
- Move to the equipment decontamination pad for decontamination via pressure washing.
- Collect and handle resultant liquids/solids.

TOOLS AND SMALL EQUIPMENT DECONTAMINATION

Tools and smaller equipment that may have come in contact with potentially contaminated materials will be decontaminated using the procedures outlined below;

- Flush and wipe components to remove debris and other gross contamination.
- Clean with potable water and non-phosphate detergent (i.e. Alconox) using a brush or high-pressure washer, as necessary, to remove particulate matter and surface films.
- Rinse thoroughly with potable water.
- Allow to air dry for as long as possible.

NON-DISPOSABLE SAMPLING EQUIPMENT

Non-disposable sampling equipment that may have come into contact with potentially contaminated materials will be decontaminated prior to collecting each sample as follows;

- Clean with potable water and non-phosphate detergent using a brush, if necessary, to remove all visible foreign matter.
- Rinse thoroughly with potable water.
- Rinse thoroughly with de-ionized water.
- Visually inspect the openings and treads for solid materials.
- Allow to air dry as long as possible on a clean polyethylene sheet or aluminum foil.

DISPOSAL OF DECONTAMINATION WASTES

All equipment and solvents used for decontamination will be decontaminated or disposed of properly. All aqueous liquids generated in the personnel and equipment decontamination process will be collected, characterized and appropriately disposed of. All disposable PPR will be containerized in drums and properly disposed of.

EMERGENCY EQUIPMENT and FIRST AID REQUIREMENTS

Emergency and first aid equipment to be maintained onsite will include the following;

- Approved, portable, emergency eye wash units in accordance with ANSI Standard Z358.1
- At least one industrial first aid kit will be provided and maintained at an easily accessible, uncontaminated location chosen by the HSO. Additional first aid kits may be provided
- First aid and CPR kit locations will be specifically marked by the HSO and stocked with adequate water and other supplies to cleanse and decontaminate burns, wounds or lesions.
- 10#A: B: C type dry chemical fire extinguishers will be provided at all project site locations where flammable materials present a fire risk. Mobile equipment will be equipped with 2-pound extinguishers.

Agencies and medical facilities that need to be contacted in the event of an onsite emergency, as well as directions to the nearest hospital, are identified at the beginning of this HASP. The tables stating the emergency contact information and hospital location will be posted in a prominent location(s) onsite.

If a site worker becomes injured or ill, Red Cross/American Heart Association recommended first aid procedures shall be followed. First aid, or other appropriate initial reactions, will be provided by the certified first aid technician that is closest to the incident.

NOTE: When protective clothing has been grossly contaminated during an incident, contaminants may be transferred to the treatment personnel or the wearer and cause injuries. Unless severe medical problems have occurred simultaneously with splashes, protective clothing should be washed off as quickly as possible and removed. If the worker can be moved, he/she will be taken to the personnel decontamination station where decontamination procedures, additional first aid or preparation for transport to the hospital will be accomplished. In the event that the victim could not be decontaminated, the rescue service provider must be notified of the situation.

If the injury to the worker is of a chemical nature, the procedures listed below are to be followed;

Eye Exposure: If contaminated solids or liquids get into the eyes, wash eyes immediately using large amounts of water while lifting the lower and upper eyelids occasionally. Wash for at least 15 minutes. Obtain medical attention.
Skin Exposure: If contaminated solids or liquids get on the skin, promptly wash the contaminated skin using soap and water. Immediately obtain medical attention.
Respiratory Exposure: Immediately move the victim to fresh air. Obtain immediate medical attention.
Ingestion Exposure: Identify what contaminant was swallowed. Follow the appropriate procedure described in the SDS and obtain medical attention as soon as possible.

NOTE: Any person who is transported to the hospital for treatment related to an exposure injury will take with them the appropriate information (i.e. SDSs) on the chemical to which he/she has been exposed. SDSs for known or suspected chemicals to exist onsite will be stored in OSC's project field office and maintained by the HSO.

MEDICAL EMERGENCY RESPONSE

REPORTING AN EMERGENCY

The HSO will immediately notify the Site Superintendent stating the points that are listed under a minor injury. However, with a major emergency the HSO must state that this is a major emergency. Concurrently the HSO must direct that 911 be called if not already done so. The Site Superintendent will react as follows:

- Call OSC's Corporate Director HS&E
- Call the fire department (if necessary)
- Call police
- Call the Project Manager

PRE-PLANNING

Arrangements for emergency services will be made prior to initiating onsite operations. Emergency response procedures will be covered as part of the project training.

EMERGENCY CHAIN OF COMMAND

In the event of an emergency, personnel will immediately notify the HSO, using available communications. The HSO will assess the situation and take appropriate action which can include ceasing all work; ordering evacuation of the work zone; requesting emergency medical treatment; and/or administering first aid.

WEATHER

In the event of severe weather (lightning, high winds, etc.), the HSO will notify project personnel. As the storm approaches, all work will stop, loose objects will be secured, and site personnel will take shelter at a location pre-arranged by the HSO. After the severe weather has passed, and prior to work startup, the HSO will inspect the site for hazards.

Lightning – Any visual sighting of lightning will result in stopping outside work activities. Work will not commence until 30 minutes after the last observed strike.

High Winds – Winds higher than 30 mph will cause all exterior hoisting and lifting to cease. Crane operators have the authority to stop lifts at lower wind speeds based on their discretion.

Project Tornado Shelter (not anticipated for this project) - To be determined with initial hazard exposure assessments and site mobilization. All reasonable efforts should be made to access this

location in the event of a tornado. Recognizing imminent tornado signs includes seeing an unusually dark sky, possibly with some green or yellow clouds. You may hear a roaring or rumbling sound like a train, or a whistling sound like a jet. Large hail may also be falling. You may be able to see funnels, or they may be hidden by rain or hail.

Listen to the radio for tornado warnings during bad thunderstorms. If a tornado warning is issued, don't panic. Instead, listen and look. Quickly but calmly follow directions for getting to shelter. Take cover. Indoors you should go down into the basement and crouch down under the stairs, away from windows. Do not take an elevator. If you can't get to a basement, go into a closet or bathroom and pull a mattress over you or sit underneath a sturdy piece of furniture on the ground floor near the center of the building. Pull your knees up under you and protect your head with your hands. A bad place to be in a tornado is in a building with a regular freestanding roof such as a gymnasium, arena, auditorium, church or shopping mall. If you are caught in such a building, take cover under something sturdy. More than half of tornado deaths occur in mobile homes. If a tornado threatens, get out and go to a building with a good foundation, or lay down in a ditch away from vehicles and other objects.

If you are driving, get to a shelter, lie down in a ditch or seek cover up under the girders of an overpass or bridge. Stay as close to the ground as you can. Protect your head and duck flying debris. Stay away from metal and electrical equipment because lightning accompanies tornadoes.

If you have time before the tornado strikes, secure objects such as garbage cans and lawn furniture which can injure people. While most tornado damage is a result of the violent winds, most injuries and deaths actually result from flying debris.

SPILL CONTAINMENT PROCEDURES

The purpose of this section is two-fold; to prevent and control accidental discharge of polluting materials to surface soils and waterways (or groundwater); and to minimize and abate the hazards to human health and the environment from hazardous waste releases to air, soil or surface water. These procedures will be reviewed with project personnel prior to startup and thereafter as necessary during regular weekly HS&E meetings and daily briefings.

EMERGENCY NUMBERS

The names and phone numbers of emergency services and offices to be contacted in the event of a spill, or any other onsite emergency, is provided in the Contact Information portion located at the beginning of this HASP. These phone numbers will be posted by the HSO in prominent positions throughout the Project site.

DEFINITIONS

For the purposes of this plan, spoils are defined as any material that is accidentally or intentionally leaked, pumped, poured, dumped or emitted onto the ground, surface water, groundwater or air.

All spilled material will be considered hazardous; cleaned up following the established spill response procedures; and reported as required.

Spills will be categorized as: Priority 1 or Priority 2.

Priority 1 Spills: Result in a significant release of contamination into the air, or onto the ground, outside the exclusion zone.

Priority 2 Spills: Result in minor spill, less than five (5) gallons and not reportable, which can be easily cleaned up.

POTENTIAL SOURCES and PREVENTATIVE MEASURES

The contracted work has potential spill sources. These include, but are not limited to:

Potential Spill Source	Preventative Measure(S)
Transporting waste material to selected on and offsite disposal facilities	OSC will verify that all transportation vehicles used in support of this contract are equipped with the appropriate spill response equipment, and that the drivers have received the proper spill response training and maintain all their required federal and state licenses and certifications. Loads will be secured, tied down and covered, and transport vehicles will be checked prior to release from the site.
Re-fueling onsite equipment	OSC will prohibit the long term storing of diesel fuel. OSC will limit the amount of fuel kept onsite to only that required for weekly equipment usage.
General spill prevention requirements	Easily accessible spill response stations will be set up containing absorbent pillows, floor dry, shovels and brushes to be used in the event of a spill. The location will be known to all project personnel.

SPILL RESPONSE PROCEDURES

Initial Containment and Response

In the event of a spill, the following initial containment and response procedure must be implemented immediately.

- **Administer first aid to injured person(s).** Any employee that observes a spill will act immediately to remove and /or protect the injured person from a life-threatening situation. First aid and/or decontamination procedure will be implemented as appropriate.
- **Warn other persons and/or vehicles of the hazard.** Personnel will act to prevent any unsuspecting persons from coming in contact with the spilled materials by alerting nearby people and by obtaining assistance of other personnel who are familiar with spill control and clean up training.
- **Stop the spill at the source, if possible.** Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as up-righting a drum, closing a valve or temporarily sealing a hole with a plug. OSC personnel will not expend more than a brief effort, prior to notifying the HSO.

- **Notify the HSO**. Using available onsite communication systems, or other rapid communication procedures, the HSO will be notified of the spill, including information on the material spilled, quality, personnel injuries and immediate life-threatening hazards. The HSO will notify emergency contacts immediately (See Emergency Contact List).

NOTE: If a flammable liquid is involved in the spill, remove all ignition sources and monitor for explosive conditions with an LEL meter during cleanup. Also, remove any surrounding materials that might chemically react with the spill materials.

Spill Containment

The HSO will make a rapid assessment of any spill at the site; apply the appropriate HS&E considerations to the use of PPE in the spill release zone; and direct primary containment measures. Depending on the nature of the spill, primary containment measures may include, but are not limited to;

- Constructing a temporary containment berm to control the horizontal flow of the spill using absorbent pads, booms, sandbags, sand and/or other inert materials
- Placing drums under the leak to collect the spilling material before it flows onto the ground
- Digging a sump, installing a polyethylene liner and diverting the spilled material to the sump
- Transferring the material from its original container to another container

Spills that occur between the project site and the offsite disposal facility will be initially contained by the driver using on-board spill response equipment.

Spill Cleanup

The HSO and Project Manager will develop an incident-specific spill clean-up plan for Priority 1 spills that will take into consideration the associated hazards, quantity of spilled material, disposal methods and costs. The incident specific spill clean-up plan will be reviewed for acceptance by the owner representative and/or other Federal, State or Local oversight personnel. Once approved, the spill clean-up plan will be implemented under the direct supervision of the OSC site superintendent.

Generally, all visually detectable spills, leaks or releases of fuel oil will be collected and cleaned up using absorbent pads, booms, sandbags, sand and/or other inert materials as practicable using the response procedures outline below.

Spill Type	Response
Waste oil on the ground	Contain the spill and excavate the visually contaminated soils. Containerize, sample for classification purposes and dispose offsite.
Building/paved surfaces	Contain the spill. Power wash the contaminated are(s). Collect and containerize the resultant wastewater for onsite treatment.
Vehicle	Power wash the vehicle. Collect, contain and treat the resultant decontamination fluids.
Heavy Equipment hydraulic fluid leak	Stop equipment immediately. Clean up spill and/or leaking fluid. Contact HSO for repair approach.
Waste from truck spilled on roadway	Contain the spilled material. Collect, containerize and remove the spilled material. Sample for waste classification purposes. Dispose of material offsite.

Post-spill Inspection

The HSO, site superintendent and owner representative will jointly inspect the spill site to determine that the spill has been cleaned up to the satisfaction of all involved parties.

Reporting

In the event of a spill incident, the HSO will immediately contact the site superintendent and owner representative; initiate the emergency procedure steps that are provided in this HASP and complete a Spill Report for submittal to the owner representative.

OSC will be responsible for reporting any Priority 1 spills immediately following the incident. A written report will be submitted within seven days after the telephone call reporting the incident. The written report will include the item spilled, quantity, identification and manifest numbers, whether the amount spilled is EPA/State/District reportable, exact location of occurrence, containment procedures used, anticipated clean-up and disposal procedures and disposal of spill residue.

HEAT/COLD STRESS

HEAT

The HSO will visually monitor personnel for signs of heat overexposure. The HSO will be responsible for implementing the following program when the ambient air temperature exceeds 85°F (heat stress monitoring).

Symptoms

Weakness, dizziness, fainting, nausea, headaches, cool and clammy skin, profuse sweating, slurred speech, weak pulse and dilated pupils.

Procedure

Personnel who wear PPE allow their body heat to be accumulated with and elevation of the body temperature. Heat, heat exhaustion and heat stroke can be experienced which, if not remedied, can threaten health and life. A current edition of the American Red Cross Standard First Aid book or equivalent will be maintained onsite at all times so that the HSO and all personnel will be able to recognize the symptoms of heat emergency and be capable of controlling them.

When PPE is worn (especially level C) the suggested guidelines for ambient temperature and maximum wear time per excursion are as follows:

Ambient Temperature (°F)	Maximum Wear Time Per Excursion (Minutes)
Above 90	15
85 – 90	30
80 – 85	60
70 – 80	90
60 – 70	120
50 – 60	180

One method for measuring the effectiveness of employees' rest-recovery regime is by monitoring their heart as follows:

- During a 3-minute period, count the pulse rate for the last 30 seconds of the first minute, the last 30 seconds of the second minute and the last 30 seconds of the third minute.
- Double that count.
- If the recovery rate during the last 30 seconds of the first minute is at 110 beats per minute or less and the deceleration between the first, second and third minute is at least 10 beats/minute, the work recovery regime is acceptable. If the employee's rate is above the specified, longer rest period is required, and accompanied by and increased intake of fluids.

COLD

Whole body protection will be provided to personnel who will have prolonged exposure to cold air. The HSO will use the equivalent chill temperature when determining the combined cooling effect of wind and low temperatures on exposed skin or when determining the proper clothing insulation requirements. The following clothing will be used as deemed necessary by the HSO.

Appropriate underclothing (wool or other cloth)

Outer coats that repel wind and moisture

Face, head and ear coverings

Extra pairs of socks

Insulated safety boots

Wool glove liners or wind and water repellant gloves

Personnel who are working in continuous cold weather are required to warm themselves on a regular basis in the onsite trailer. Drinks will be provided to personnel to prevent dehydration. The HSO will follow the work practices and recommendations for cold stress threshold limit values as stated by the current edition of the Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices by the American Conference of Governmental Industrial Hygienists, or equivalent cold *stress prevention* methods.

LOGS, REPORTS and RECORDKEEPING

The following reports will be prepared and submitted as indicated below. Copies of the field logs, permits and forms required for this project are provided in Attachment 1.

Type	Frequency
AHA Pre-plan for High Risk Work	Prior to start of work
Employee Daily Safety Brief Site Log	Daily, minimum
Air Monitoring Reports	As necessary
Incident Report	As required, within 48 hours

The above logs and reports will be prepared by the HSO, or the designated representative, at the frequency noted above. Additionally, daily logs of all personnel working or visiting the site will be maintained. Completed logs and reports will be maintained stored on site in the project field office. Copies shall be provided to the Project Manager.

Hot Work Permit Procedures (Welding, Cutting, Open Flame Work & Sparking)

OSC will follow specific procedures to ensure all hot work activities, welding, burning, cutting, sparking and other ignition source work is completed safely without incident (no fires, injuries or property damage). All hot work shall require an approved hot work permit issued by the OSC HSO prior to commencing work. The hot work permit shall define the minimum acceptable procedures and precautions that shall be taken for all phases of the hot work; prior to start of work, as well as during and after hot work is completed. A permit shall be issued daily for each specific location, type of hot work, protective measures, date, time duration and completion time. Hot work permits will be available for review. Completed and signed permits shall be returned to the HSO at the end of the workday. Copies of completed permits shall be maintained in the OSC field office for review.

NOTE: Many of the piping, vessels and towers at the site contain flammable materials. The hot work permit procedure MUST be followed.

Authorization of Equipment Operators

All heavy equipment operators working on site will be approved competent either through OSC's in-house program or through local labor union process. Training requirements for approval are as follows;

Heavy Equipment Operators

- Formal classroom with written qualification, or
- On-the-job mentoring for 40-hour minimum under a competent person, and
- Determination of proficiency by an OSC certified supervisor

The formal classroom and mentoring may be adjusted based on an operator's previous experience. In addition, operators may need to obtain state-specific crane licenses/permits.

Crane Operators

- Formal classroom with written qualification
- Determination of proficiency by a certified operator
- On-the-job mentoring for 80-hour minimum under a competent person

The formal classroom and mentoring may be adjusted based on an operator's previous experience. In addition to the certification, operators may need to obtain state-specific licenses/permits.

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

1. General Information

Client Name: Riverview Innovation and Technology Campus, Inc.

Project #: RITC

Project Name: Brownfield Cleanup Program Remedial Action

Project Manager: John Black, PE

Street Address:

3875 River Road

Tonawanda, New York 14150

Prepared By: James Edwards **Date: December 19, 2024**

Approved By: John Black, P.E. **Date: December 20, 2024**

Proposed Date(s) of Work: Q4 2024 through 2025

Proposed Scope of Work:

Inventum Engineering, P.C. (Inventum) will be the owner's representative, investigation team and engineer supporting the site management and remedial actions through the New York State Brownfield Cleanup Program (BCP) for the Riverview Innovation and Technology Campus located on the former Tonawanda Coke Corporation Facility (BCP Site). The general scope of work is provided below, and tasks will be updated with additional details/specifications as the project progresses through the BCP.

Task 1 - Site Management and Oversight

Inventum will conduct site visits and provide full-time site management support, general management support, and general contractor and subcontractor oversight related to the remedial actions of the BCP Site. This task includes site work related to monitoring and support of the task outlined in the Remedial Action Work Plans, but specifically excludes Inventum personnel directly performing any intrusive site work or oversight of contractors/subcontractors performing intrusive site work. Direct intrusive site work and/or intrusive site work oversight is covered under Tasks 2 through 5 below.

Task 2 – Surficial Soil Sampling

Surficial (approximately 0 to 1 foot below ground surface [bgs] or from a stockpiles) soil samples will be collected from designated locations of the Remedial Action work areas. These shallow samples will be collected using a hand-auger, shovel, spoon or trowel and the material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including Semi-Volatile Organic Compounds (SVOCs), Volatile Organic Compounds (VOCs), and Ammonia.

Task 3 – Subsurface Soil Sampling

Subsurface (> 1 feet bgs) soils samples will be collected from locations outlined in Remedial Action Work Plans at the BCP Site to establish current conditions as needed. Depending on the depth of sample, subsurface samples may be collected using a hand-auger, shovel, trowel, light or heavy excavating equipment. Material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including SVOCs, VOCs, and Ammonia.

Task 4 – Test Pit Excavations

Test pits will be excavated using an excavator. Excavated material and soils will be temporarily stockpiled a minimum of 2-feet away from the edge of the pit. Excavated soils will be recovered and presented to Inventum for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including SVOCs, VOCs, and Ammonia.

Task 5 – Sampling of Residuals

Samples may be collected from various sumps, pits, or containers at the BCP Site to characterize contents as part of a Remedial Action. To the extent practicable, all samples will be collected from the surface or from equipment outside the accumulation point to avoid the need for confined space entry. Samples may be collected installed using a bailer, hand-auger, shovel, trowel, sludge sampler or other long reach equipment. Material will be recovered, and field screened with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, cyanide, mercury, hazardous characteristics, pH and water content.

Task 6 – Surface Water Sampling (Sediment Ponds)

Surface water samples will be collected from Sedimentation Pond 001. Surface water samples fwill be analyzed for VOCs, and SVOCs.

The samples will be collected as a grab sample and no personnel will enter the pond to collect samples.

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

Inventum Role(s) On Site:

- ☐ Inventum Staff Will Not Be On Site (HASP and Risk Analysis is for subcontractor information only)
- ☒ Resident Project Representative (*e.g.,* "Observe and Document")
- ☐ Construction Manager (*e.g.,* CM, Managing/General Contractor)
- ☒ Representative for Client (*e.g.,* "Agent for Owner")
- ☒ General On-site Consulting/Engineering Services
- ☒ Other

☒ Soil Sampling	☒ Solid Waste Sampling	☒ Liquid Waste Sampling
☒ Groundwater Sampling	☒ Surface Water Sampling	☒ Wastewater Sampling
☒ Sediment Sampling	☐ Surveying	☐ Confined Space Entry

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Major Project Tasks	Inventum Task	Subcontractor Task	Minimum PPE Level Required see HASP for details (suggested levels for Subcontractor work)
1. Site Management and Oversight	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
2. Surficial Soil Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
3. Subsurface Soil Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
4. Test Pit Excavation	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
5. Sampling of Residuals	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
6. Surface Water Sampling	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A

2. Contingency Planning

LOCAL EMERGENCY RESOURCES:	
Ambulance: 911	Emergency Room: 716.447.6100
Police: 911	Fire Department: 911
NYSDEC Contact: Ben McPherson, Project Manager, 716.851.7220	Poison Control Center: 1-800-222-1222 ☐ Specify:
Other (client services offered, etc.):	

SITE RESOURCES:			
Drinking Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Wash Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Telephone – Land Line		☐ Subcontractor	☒ Client
Telephone - Cellular	☒ Inventum	☒ Subcontractor	
First Aid Kit	☒ Inventum	☒ Subcontractor	
Fire Extinguisher	☐ Inventum	☒ Subcontractor	☒ Client
Emergency Shower **N/A**	☐ Inventum	☐ Subcontractor	☐ Client
Eye Wash **N/A**	☐ Inventum	☐ Subcontractor	☐ Client
Other: Confined space retrieval device **N/A**	☐ Inventum	☐ Subcontractor	☐ Client

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

EMERGENCY/SAFETY CONTACTS:	
Inventum Technical Contacts	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Project Manager (PM): John Black	571.217.6761
Inventum Office Safety Coordinator (OSC)	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Field Contact:	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048); Peter Zaffram (716.553.5129)
Contractor Contact (To Vary – Main Remedial Contractor provided):	Ontario Specialty Contracting; 716.856.3333
Client Contact:	Dan Flanigan (716.560.3006) John Yensan (716.856.3333)
Front Gate Guard Shack	716.783.5744

Emergency Route:

Hospitals or clinics identified for emergency medical care should be contacted, to verify that emergency care is provided at that location. Verify the exact location of the medical facility during this call. See directions and map of route to Kenmore Mercy Hospital on the following page:

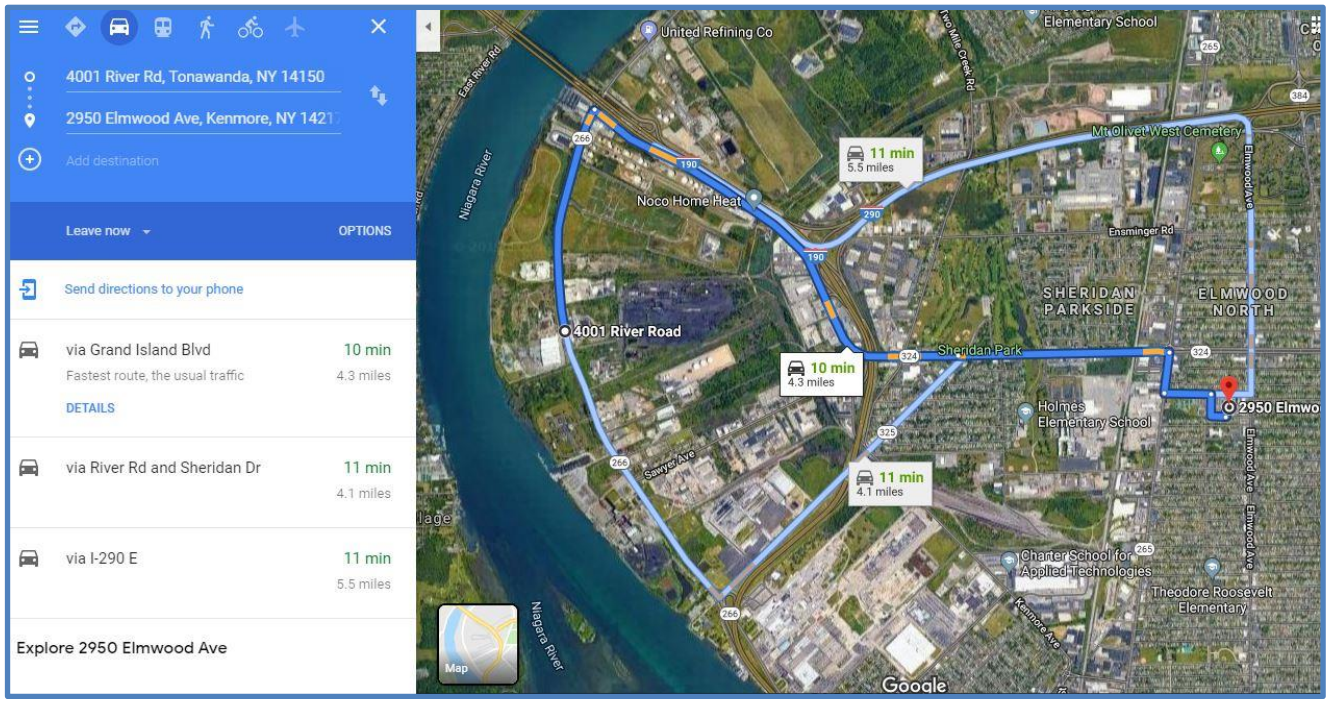
Hospital: **Kenmore Mercy Hospital**
2950 Elmwood Ave
Buffalo, NY 14127
716.447.6100

Other: NA

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Map to Hospital



Directions to Hospital:

- **Turn right onto River Road**
- **Turn right onto Grand Island Blvd (about 2 miles)**
- **Merge onto Sheridan Dr.**
- **Go about 1.5 miles and turn right onto Elmwood Avenue**
- **Make a sharp right and hospital is on left**

Emergency Procedures:

If an emergency develops at the site, the first responder should take the following course of action:

- Notify the proper emergency services for assistance.
- Notify other personnel at the site.
- As soon as possible, contact the Inventum Project Manager to inform them of the incident.
- Complete the Inventum Incident Report Form (see Appendices) within 24 hours of the incident and client notifications, as required.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Investigation of Near Miss Incident and Initial Report of Incident/Exposure:

Inventum employees are required to report any incident, near miss, or injury, as soon as possible, by contacting the following:

☒ Inventum Managing Partner ☒ Notify supervisor ☒ Notify project manager

☐ Notify Site Manager () ☐ Complete client report: as required

(name):
(phone number):

Emergency Equipment Required On Site:

☒ First Aid Kit

☐ Emergency Eye Wash

☐ Emergency Shower

☐ Fire Extinguisher

☐ Spill Control Media

☐ Tripod/Hoist/Harness for non-entry confined space rescue

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Site Classification

	Identification of Potential Hazards	YES	NO	SITE TYPE(1)
1.	Is the work a Phase I ESA (i.e., supervised plant walk-through, etc.)?	☐	☒	1
2.	Is the work being performed solely by a subcontractor (i.e., INVENTUM not on site)?	☐	☒	1
3.	Is the work just a supervised inspection for process evaluation, other inspections, meetings, records review, or a tour?	☐	☒	1
4.[1]	Is the work completely absent any chemical, physical, biological, or radiological hazards which would require a site-specific health and safety plan?	☐	☒	1
5.	Does the work include any mandatory client H&S requirements?	☒	☐	1, 2, or 3
6.	Does the project include on-site work other than office type areas?	☒	☐	2 or 3
7.	Does the proposed work scope involve any of the following:			
	Known and controlled chemical or biological hazards	☒	☐	2
	Unprotected work at elevation (fall protection required)	☐	☒	2
	Invasive activities (*i.e.,* Phase II ESA, UST Removal, sampling, etc.)	☒	☐	2 or 3
	Exposure to ionizing radiation (i.e., using nuclear gauges, etc.)	☐	☒	2 or 3
	Open excavations/trenches (Competent Person may be required on site)	☒	☐	2 or 3
	Confined space entry (permit may be required)	☐	☒	2 or 3
	The use of scaffolding (qualified inspections are required)	☐	☒	2 or 3
	Heavy equipment	☒	☐	2 or 3
	Facility maintenance (O&M, piping, electrical, lockout/tagout, etc.)	☐	☒	2 or 3
	Underground utilities may be encountered	☒	☐	2 or 3
	Overhead utilities may be encountered	☒	☐	2 or 3
	Stack testing	☐	☒	2 or 3
	Geotechnical drilling	☒	☐	2 or 3
	Demolition Activities with known or suspected contamination	☒	☐	2 or 3
	Unknown or uncontrolled chemical or biological hazards	☐	☒	3
	Known and uncontrolled chemical or biological hazards	☒	☐	3
	Waste sampling	☒	☐	3
	Construction activities with known or suspected contamination	☒	☐	3
	Remedial activities (RCRA, CERCLA, EnviroBlend®, Oxigent, etc.)	☒	☐	3
8.	Is the work regulated by 29 CFR 1910.120 (OSHA) or 30 CFR (MSHA)?	☒	☐	3
9.	Is the work regulated by NPL, CERCLA, RCRA, TSD, or SARA?	☒	☐	3

(1) Denotes typical site level (based on activities).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Site Type Designation:

☐ **Type 1** Known and controlled hazards associated with consulting/engineering services.

☐ **Type 2** Known and controlled hazards, but with invasive, hazardous activities and/or civil/mechanical construction related services, or sampling.

☒ **Type 3** Unknown and/or uncontrolled hazards associated with corrective action clean-up, and/or remediation of hazardous substances.

4. Site Characterization

Client Requirement(s)[1]:	☒ None	☐ Site Orientation	☐ H&S Orientation
	☐ Permits or Other Requirements (specify and attach, if available):		
Site Information:	☒ Map/Diagram (attach)	☐ Map/Diagram Unavailable	
	☐ Inactive Site	☒ Active Site (specify below)	
General Environmental Concerns:	☒ Contaminated Water	☒ Wastewater	☒ Dust
	☒ Contaminated Soil	☒ Solid Waste	☒ Noise
	☒ Contaminated Air	☒ Waterways	☒ Asbestos
Site Security/Access Control:	☐ None	☒ On Site	
	☐ Other (explain):		
Amenities Available for Work:	☐ None	☒ Waste Storage	☒ Restrooms
	☒ Tools/Equipment Storage	☒ Office/Trailer Space	☒ Supplies Storage
Utilities Available For Work:	☐ None	☒ As Listed: Water, electric	
Medical Services Available:	☐ None On Site	☒ As Listed: First aid	
Facility Alarms/Signals:	☒ None	☐ As Listed:	
Traffic/Parking/Railway Issues:	☐ None	☒ As Listed (On-Site/Off-Site): On-site parking	
☒ Permits Required (specify)[2]:	☐ Confined Space Entry	☒ Local: POTW	☐ State:
	☐ Federal:	☐ Other:	☒ N/A
☒ Utility Locate Service(s):	☒ On Site	☐ Client	☒ Other: Former Site employees contracted to client for daily site management
	☐ Off Site	☐	☒ One Call
		☐	☐ N/A

[1] If relying on the client for any specific hazard identification and control, implemented control and effectiveness should be documented prior to beginning any work activities. This is recommended for all field projects.

[2] Permit examples: Utilities (electrical, water, gas, etc.); Excavations; Explosives; Cranes; Burning; Fuel storage; Traffic control; Hoists; Cutting; Welding; Demolition; Confined space; Restricted access areas; etc.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

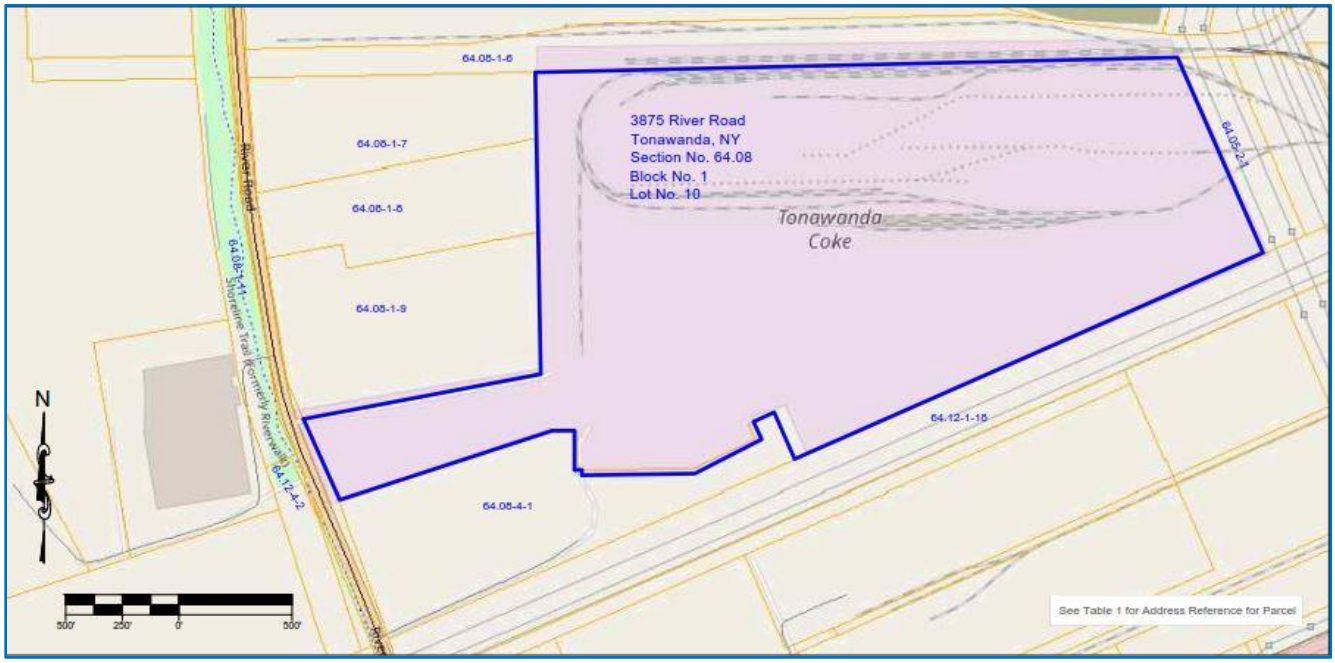
Detailed Physical Description of Site/Facility: ☒ **Map/Diagram Attached**

The Site is located at 3875 River Road, Town of Tonawanda, Erie County, New York. The BCP Site encompasses approximately 86.5 acres of land although Riverview Innovation Technology Campus, Inc (client) will control additional acreage outside the BCP program within the federal/state superfund programs. The Site is located approximately 0.25 miles west of I-90 on the east side of River Road. The surrounding properties are primarily industrial or vacant.

The former coke production facility is located in the northern center portion of the property which includes coke ovens, coke by-product plant, storage tanks, and railway line spurs. The southern portion of the property is mainly open with multiple former raw material coal and coke piles located throughout the area. The facility is no longer in operation; however, activities on site include surficial mining of remaining coal/coke storage areas and water management from secondary containment areas.

Historically, manufacturing processes used at the plant have included: by products coking, light oil distillation, ammonia recovery, and ethene, toluene, and xylene extraction. Historical investigations that were performed at the site have identified some conditions that previously required remediation.

Figure 1; Site Location



Site Activities/Current Operations: ☐ None ☒ As Specified

Other Concurrent Site Activities, Work, and/or Other Adjacent Hazards or Concerns:

☐ None

As Specified:

☐ Schools	☐ Daycare	☐ Hospital	☐ Airport
☐ Residential	☒ Offices	☐ Shopping	☒ Active parking lot in work space

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation

Complete (1) Substance Name (be specific)	Specific Applicable OSHA Standard (if any)	Physical State (2) (S, L, G, Aq, Vap, F, P)	Max. (3) Conc. Level Per Physical State	General (4) Control Measures (Eng., Admin., PPE)
Coal Tar	0.2 mg/m3	S	Coal Tar Product	Eng., PPE
Benzo(a)pyrene	0.2 mg/m3	S	4,100 ug/kg	Eng., PPE
Benzo(b)fluoranthene	N/A	S	4,600 ug/kg	Eng., PPE
Benzo(a)anthracene	N/A	S	20,000 ug/kg	Eng., PPE
Chrysene	0.2 mg/m3	S	21,000 ug/kg	Eng., PPE
Dibenz(a,h)anthracene	N/A	S	1,700 ug/kg	Eng., PPE
Indeno(1,2,3-cd)pyrene	N/A	S	15,000 ug/kg	Eng., PPE
Cyanide	N/A	L	2.75 mg/L	Eng., PPE
1,4-Dichlorobenzene	75 ppm	L	29 ug/L	Eng., PPE
Benzene	1 ppm	L	85 ug/L	Eng., PPE
Chlorobenzene	75 ppm	L	22 ug/L	Eng., PPE
Xylenes	100 ppm	L	36 ug/L	Eng., PPE
Toluene	200 ppm	L	59 ug/L	Eng., PPE
Iron	N/A	L	160 mg/L	Eng., PPE
Manganese	N/A	L	11.2 mg/L	Eng., PPE
Phenolics	5 ppm	L	0.61 mg/L	Eng., PPE
1,1,1-Trichloroethane	350 ppm	L	12.2 ug/L	Eng., PPE
Methylene chloride	25 ppm	L	52 ug/L	Eng., PPE
Selenium	0.2 mg/m3	L	0.0116 mg/L	Eng., PPE
Nickel	N/A	L	0.153 mg/L	Eng., PPE
Cadmium	0.005 mg/m3	L	0.19 mg/L	Eng., PPE
Chromium Total	1 mg/m3	L	0.086 mg/L	Eng., PPE
Lead	0.050 mg/m3	L	0.025 mg/L	Eng., PPE

(1) Use OSHA regulated name, not elemental forms. If available, attach SDS. Identify any sample preservative or O&M chemicals or subcontractor chemicals in this table also.

(2) S = Solids, L = Liquid, G = Gas, Aq = Aqueous, Vap = Vapor, F = Fume, P = Airborne Particulate.

(3) If available, attach laboratory results or summary tables.

(4) See the following sections for detailed control measures: personal protection equipment (PPE), Air Monitoring (Admin), or Site Control (Admin and Eng.).

(6) IP = Ionization Potential, VP = Vapor Pressure, LEL = Lower Explosive Limit, UEL = Upper Explosive Limit, N/A = Not Applicable, N.D. = Not Determined

(7) IDLH = Immediately Dangerous to Life and Health. NEVER enter IDLH conditions on site without proper respiratory protection.

(8) C = Ceiling Value, ST = Short-Term Exposure Limit, TWA = Time-Weighted Average, None Est. = None Established

(9) R = Respirable Limit, T = Total Limit

(10) Warning Properties: Good (G), Poor (P), None (N)

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation (continued)

Site-Specific Physical Hazards

HAZARD	SPECIFIC CONTROL MEASURE
Slip/Trip/Fall Injury	– Use roads or trails whenever possible. – Occasionally reassess route to avoid dangerous terrain. – Maintain good housekeeping and keep work area clear of loose materials and equipment. – Use portable steps to mount and dismount sampling vehicle.
Ingestion of or contact with impacted soil	– Wear safety glasses. – Wear nitrile and appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when performing tasks. – Wash hands and arms thoroughly when daily work is completed. – No eating, drinking, or smoking while conducting monitoring or sampling activities.
Pinched fingers or toes	– Where appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when the potential for hand injury exists. – Where steel-toed safety shoes with steel shanks while on site.
Strained muscles	– Use proper lifting posture, techniques, and equipment when handling heavy objects. – Use two people for loads >40 lbs. or awkward items. – Take rests as needed during and between carries.
Cutting activities	
Flying debris/eye injuries	– Wear ANSI-approved safety glasses when the potential for flying debris and eye injuries exists.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Animals (dogs, etc.)	Be aware of any animals on site or adjacent to the site. Appropriate care should be taken if any feral (wild) animals are encountered.
☐	Blasting/Explosives	INVENTUM personnel shall not handle any explosive devices or materials. INVENTUM personnel should understand the blasting procedures being used by the subcontractor, and all of the associated health & safety precautions. The subcontractor shall handle, store, and use the explosives in accordance with 29 CFR 1926.900, Subpart H and U.
☐	Boat or Barge	A boat or barge should be used that is adequately stable for the type of activity conducted. The boat or barge should have all of the appropriate and current licensing and registrations required by the applicable regulatory agencies. All applicable laws and regulations will be followed when launching the boat or barge, and when navigating to and from the work site. Personal floatation devices should always be worn while navigating the boat or barge. The boat must be equipped with the following approved United States Coast Guard (USCG) safety equipment: – A Type 1, 2, or 3 personal flotation device (PFD) for every person aboard (should be worn while navigating) The following equipment is recommended: – A Type 4 throwable PFD – Audible distress signal device (air horn, whistle) – Fire extinguisher (if engine-propelled) – Auxiliary propulsion (spare paddles, trolling motor) – Bow and stern lines – Anchor and anchor line – First aid kit – Visual distress signal device(s) (flares, dyes) – Additional PFDs Be familiar with local weather and tidal characteristics. Do not conduct sampling from a boat/barge when threatening weather is imminent, or poor visibility exists. Sampling from a boat is prohibited in water containing substances likely to cause injury upon short-term or prolonged contact. Sampling from a boat is prohibited when the temperature of the water is high or low enough to cause injury upon short-term or prolonged exposure. Avoid sampling from a boat when unsafe water turbulence (waves) exists. Avoid standing in a boat. Always use the buddy system when sampling from a boat or barge; one person should be on shore with visual contact of the barge and should be able to summon emergency assistance if needed. Be familiar with local weather and tidal characteristics. Work on a boat or barge will not be performed when threatening or severe weather is impending or present.
☒	Briars or Thistles	Be aware of any briars or thistles on site. Wear appropriate clothing and gloves. Avoid contact with briars or thistles whenever possible.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Business Traffic	Be aware of traffic patterns associated with local businesses near the work site. Allow traffic to enter and exit the businesses in such a manner to avoid creating traffic hazards, back-ups, delays, or potential accident situations.
☒	Cement and Fertilizer Dust	Stay clear of mixing operations and avoid contact with or breathing of the dust.
☐	Chain Saws	Stay clear of any chain saw operations. Subcontractor is responsible for the safe use of chain saws on site.
☒	Cleaning Agents	Use caution when applying cleaning agent to equipment. Use gloves, safety glasses, splash shields, and protective clothing as needed.
☒	Client Activities	Be aware of client activities at or adjacent to the site. Work activities should be coordinated with other site activities to avoid conflicts. Contact EDP offices prior to starting work.
☒	Cold Stress	Work schedules may be modified when temperatures are below 20° F as measured by the wind chill factor. Take frequent breaks to warm up. Drink plenty of fluids. Wear appropriate clothing, and monitor for cold stress symptoms (frostbite, hypothermia, etc.).
☒	Compressed Air or Gas Cylinders	Compressed air or gas cylinders should be clearly marked, and they should be stored, transported, and secured in an approved manner.
☒	Compressed Air/Gas or Pressurized Liquids Hoses, Lines & Fittings	Compressed air or gas, or pressurized liquid lines or hoses should be inspected at least daily, or in the event a leak develops, or if a line or hose is run over or crimped.
☐	Concrete/Masonry/ Foundations	No construction loads shall be placed on a concrete structure or portion of a concrete structure unless a person who is qualified in structural design has determined that the structure or portion of the structure is capable of supporting the loads. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement. No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position. To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets. A limited access zone shall be established whenever a masonry wall is being constructed. All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.
☐	Confined Spaces (tanks, vaults, vessels, trenches, manholes, some excavations, etc.)	The scope of this project does entail entry into confined spaces. Confined spaces will not be entered unless a confined space entry permit has been completed, signed, and approved, and all participating personnel are trained in confined space entry procedures, including safety, and rescue procedures. All potential hazards of confined space may not be addressed by this hazard assessment, and health and safety plan.
☒	Cutting Tools	Stay clear of contractors' cutting tools, especially saws and torches. Be aware that cutting operations could create other hazards, such as falling objects, or shifting materials, etc. Safety glasses should be worn while using cutting tools. Spark-proof tools should be used when working in areas of potential explosive or flammable conditions. Fixed-open blade knives are prohibited.
☒	Demolition Activities	Stay clear of walls, ceilings, roofs, etc., as they are being demolished.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Demolition Debris	Demolition material should only be handled by appropriate equipment because of sharp points, edges, etc. Demolition material may also pose a trip hazard, fall, or puncture hazard, so avoid walking or climbing on debris piles, etc.
☒	Drums	If drums are used on-site, they should be clearly labeled with the name of the contents and the appropriate label. Drums should only be handled with the appropriate equipment. Drums discovered during excavations, etc., shall not be opened or moved until appropriate identification can be performed. At a minimum, Level B protection is required for sampling any unlabeled drums discovered during remediation procedures.
☒	Dust/Particulates (Particulates Not Otherwise Regulated) (PNOR) (OSHA PEL = 15 mg./m^3, total) (OSHA PEL = 5 mg./m^3, respirable)	For general dust, work should be performed up-wind if possible. If conditions warrant it, monitoring should be done with a PM-10. Monitoring should occur at least 3 times per day, and every time re-entering the site. Readings should be taken downwind from the work area or inside the equipment as indicated by the conditions on site. If the OSHA PEL is exceeded, or is likely to be exceeded, engineering or administrative controls should be used, or a dust respirator must be worn. For hazardous dusts, a detailed air monitoring plan and a respiratory protection plan should be developed for the site activities.
☐	Elevated Work	For any construction work activities elevated 6 feet or more, or other non-construction activities elevated 4 feet or more, fall protection must be provided. Caution should be taken on catwalks and ladders because of potential slippery conditions, or the potential for footwear to catch on the surfaces.
☒	Energized Sources (electrical equipment or hookups, lines, etc.,) (Lockout/Tagout)	Contractors for all electrical activities, and any facility equipment with moving parts should follow proper lock-out/tag-out procedures, and only properly trained employees will perform the work. Employees will not perform any lock-out/tag-out activities unless personnel are properly trained in lockout/tagout procedures. Heed any caution signs or labels.
☒	Equipment Exhaust	Equipment exhaust should be ventilated away from the work area while drilling inside structures. Industrial fans can be used to move exhaust out of the area.
☒	Ergonomic Issues (job hazard analysis)	Ergonomic hazards will be addressed on a site-specific basis once mobilization to the field has occurred. Workstations will be evaluated on an individual basis.
☒	Evening Work	If work is performed during the evening hours, work shall be limited by the availability and the quality of artificial lighting. Care should also be taken to avoid slip, trip, and fall hazards that are not as easy to identify during low light conditions.
☒	Excavations	Stay clear of excavation walls. INVENTUM personnel will not enter an excavation, in accordance with 1926 Sub Part P. Subcontractor must provide a Competent Person on site, if one is required by the planned activities. Side cuts should conform to 1926 Subpart P requirements, or shoring should be used. All open excavations should be secured using traffic cones, barrier tape, or barricade signs stating "Do Not Enter Excavations", especially if left open overnight.
☐	Explosives	Be aware of potential explosive materials and how to identify them. No smoking is allowed on-site or near where potential explosive materials may be present.
☒	Facility Conveyors (product or waste lines)	Stay clear of facility conveyors, product process lines, and waste disposal lines. Be aware of any client-specific health and safety requirements to work in these areas.
☒	Facility Equipment/Machinery	Be aware of active and moving client equipment on site.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Facility Piping - aboveground	Stay clear of aboveground pipes. Client is responsible to identify all applicable aboveground facility pipes prior to any work activities in the area. Pipes can be overhead hazards, or trip hazards. Pipes can be hazardous because of the material flowing through them, such as steam, natural gas, toxic chemicals, etc. Some pipes are also coated with hazardous material such as asbestos.
☒	Facility Piping - belowground	Client is responsible to identify all applicable underground facility pipe locations prior to any subsurface activities.
☒	Fall Hazard	Proper tie-off, harnesses, railings, etc. should be used when performing work on ladders, scaffolding, man-lifts, or on the roof of buildings, etc. Stay clear of the edges of pits, trenches, quarries, etc.
☒	Falling Objects	Be aware of any potential falling objects or materials on site. Stay clear of any areas identified as potential falling object areas.
☒	Fences	Be aware of fences in disrepair that may be trip hazards or may have materials that could cause punctures or cuts. Use caution when crossing over or under fences.
☒	Field Equipment	If field equipment is heavy or awkward to carry, get assistance or use carts to help move around the site.
☒	Field Vehicle	Inventum personnel shall follow all applicable state and federal traffic laws while traveling to and from the site, and while working on the site. In particular, the following laws should be followed: speed limits, parking restrictions, use of wipers and lights during precipitation events, limiting cell phone use, etc. It is the responsibility of the driver to verify that all safety equipment on the vehicle is working properly before driving the vehicle. In particular, the following items should be checked: tire pressure, tire tread, windshield wipers, windshield washer, headlights, tail lights, brake lights, spare tire, fire extinguisher, first aid kit, etc.
☒	Fire Hazards	Eliminate sources of ignition in work areas that have ignitable materials. Provide an ABC fire extinguisher in close proximity to the support zone.
☒	Flooded Areas	Do not drive through flooded areas or standing water. Do not wade into moving water, or water deeper than 2 feet without adequate assistance.
☒	Flying Debris/ Eye Injuries	Be aware of any flying debris on site and wear protective eyewear when necessary.
☒	Fork Lifts	Be aware of forklift patterns and stay clear of those routes.
☒	Hand Tools	Use only the appropriate tool for the task at hand. Use the tool(s) as designed, described, and intended by the manufacturer.
☒	Heat Stress	The work schedule may be modified if the ambient temperature is more than 80° F. Take breaks as necessary, and drink plenty of fluids. If necessary, wear sunscreen and sunglasses on bright days. Monitor site personnel for signs of heat stress symptoms (heat rash, heat cramps, heat exhaustion, or heat stroke).
☒	Heavy Equipment	Contractor is responsible for safe operation of equipment. All mobile heavy equipment must have a functioning backup alarm, and operators must comply with equipment manufacturer's instructions. Maintain proper distance and remain in line of sight of operator and out of reach of equipment. Isolate equipment swings, if possible. Make eye contact with the equipment operator before approaching the equipment. Understand and review hand signals, and wear orange safety vest, if necessary.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Heavy Lifting	Use proper lifting procedures and equipment when handling heavy objects such as drums, manhole covers, tank covers, etc.
☒	High Pressure Gas Lines, etc.	Be aware of high-pressure gas lines and follow approved safety precautions when working with or around the lines.
☐	Highway Traffic	Traffic control within the right-of-way will be in accordance with the WDOT "Work Zone Safety – Guidelines for Construction, Maintenance, and Utility Operations" procedures. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times, and review planned activities with the WDOT, so that appropriate lane closures can be coordinated.
☒	Housekeeping	All field vehicles, job trailers, and field offices will be properly cleaned and organized to prevent cluttered work and storage areas.
☐	Hunters/Firing Range, etc.	Be aware of surrounding activities that may involve hunting, firearms, etc. that may not be in your immediate area, but could create an unsafe work environment.
☒	Ice (thin)	When project activities include either crossing ice or working directly on the ice, a detailed plan should be developed that will be used to continually evaluate the ice conditions, and to determine when work should be terminated due to unsafe conditions. All staff working on the ice will wear an appropriate and approved personal floatation device. Other emergency equipment such as ropes, a throwable floatation device, a means to warm a wet and cold worker, etc. must be available. A buddy system should also be used for this type of work, such that one person is always on shore or at least on previously determined safe ice.
☒	Insects (ticks, bees, spiders, etc.)	Site workers with known allergies to insect bites should carry their own medication. In case of emergencies, inform fellow workers of any severe allergies. Use insect repellant as necessary, and as specifically allowed on site. If possible, wear long-sleeved shirts and pants. If appropriate, check for ticks at the end of each day. Have other appropriate first aid supplies handy for bites.
☒	Stakeholders	Be aware of the potential for irate neighbors or outsiders that may interfere with work activities, or that may potentially damage equipment or on-site materials, etc.
☐	Ladders	Ladders should only be used if they are in good condition, conform to OSHA requirements, and if they will be used in an appropriate manner. Be especially cautious of slipping on ladders when the ladder or footwear is wet or dirty.
☐	Landfill Gas (Methane, CO2, Hydrogen Sulfide)	Avoid breathing gas, especially in low oxygen areas (simple asphyxiant). Potentially flammable and explosive, so keep ignition sources away from gas. Explosive conditions of LEL >5% in a work area should be ventilated as soon as possible, or the area should be evacuated.
☐	Leachate (Municipal Solid Waste (MSW))	MSW leachate may contain hazardous biological substances, so avoid physical contact with leachate and, if possible, stay up-wind. If contact is made with leachate, wash affected areas thoroughly with soap and water. If boots contact leachate, they should be thoroughly washed with soap and water also.
☒	Lead	Wear gloves when in contact with lead contaminated soil, etc. Thoroughly wash hands and arms when daily work is completed.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Long Hours/Fatigue	Long work hours can lead to fatigue, and fatigue can lead to the physical inability to perform the work in a safe manner, or travel to or from, a work site in a safe manner. If long work hours are scheduled, or if the scheduled work takes longer than planned, field staff should determine if fatigue is, or will be, an issue. Field staff should evaluate whether they are able to complete the work in a safe manner, or whether they are able to travel in a safe manner. If fatigue is an issue, appropriate breaks should be planned or taken, including overnight stays when necessary.
☒	Material Handling	Move containers and heavy material only with the proper equipment, and secure them to prevent dropping, falling, or loss of control during transport. Stay clear of material handling operations, especially near slopes. Do not stand down the slope from equipment, supplies or materials being moved above on the slope, or being deployed onto the slope.
☒	Material Storage	Stored material may be a falling hazard, or a crush hazard. Do not stand adjacent to materials stacked up, such as pipes, geosynthetic rolls, etc., or in the area of deployment.
☐	Methane Gas (Landfill Gas)	Explosive conditions (5% LEL) will be ventilated, if encountered, prior to working in an area. Methane is a simple asphyxiant.
☐	Mine or Quarry	No work shall be performed within 15 feet (or other designated client setback, whichever is greatest) of the mine or quarry walls. Be aware of the potential for falling rocks or slope failures.
☒	Municipal Solid Waste (MSW)	MSW may contain hazardous biological substances, so avoid physical contact, and if possible, stay up-wind. Wear appropriate PPE, such as gloves, safety shoes, and safety glasses. Wash hands, arms, and face after working near MSW. Reusable PPE and equipment should be thoroughly decontaminated after exposure to MSW. MSW may also contain sharp objects with the potential to puncture PPE.
☒	Natural Gas	Natural gas is flammable and explosive. Keep ignition sources away from gas sources. Use spark-proof tools when working with gas lines, etc.
☒	Noise	Hearing protection must be worn when noise levels exceed 85 dBA in the work area. If you need to raise your voice to be heard at the work site, then hearing protection should be worn. Hearing protection will be worn near drill rigs.
☒	Overhead Hazards	Pay attention to overhead equipment, piping, and structures. A hard hat must be worn at all times when overhead hazards are present on site including the operation of a drill rig.
☒	Pedestrian Traffic (public, client, workers)	Be aware of pedestrian traffic patterns and, route traffic around the exclusion zone(s), as necessary, to avoid distractions and the potential for exposures or accidents. Use appropriate barricades and caution tape to mark work areas.
☒	Poisonous Plants	Be able to identify any local poisonous plants and avoid them if possible or wear protective clothing as necessary. When removing potentially exposed clothing or PPE, the clothing or PPE should be carefully and thoroughly washed or decontaminated.
☒	Portable Heaters	Be aware of portable heater locations and stay a safe distance from them.
☒	Power Washing Equipment	Stay clear of the power washing nozzles and equipment.
☒	Propane Tanks	Be aware of propane tank locations, and any gas lines leading to or from the tanks.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Radiation (ionizing)	Exposure to ionizing radiation can be controlled by one of three methods: time, distance, or shielding. Limit your time near the radioactive source. Keep your distance from the radioactive source. Shield yourself from the radioactive source with appropriate shielding material. If the radioactive source(s) are from INVENTUM equipment, the INVENTUM employee using the equipment needs required training to use the equipment and must be monitored using a dosimeter badge.
☐	Rock Blasting	Contractor is responsible for following safe blasting protocol. Heed all contractor warnings at time of blasting and stay well clear until safe to return to area, as indicated by the contractor.
☒	Sample Preservative Chemicals:	Wear safety glasses and nitrile gloves when adding preservative chemicals to sample bottles or vials. Have clean wash water nearby.
☐	Scaffolding	Stay clear of scaffolding. Be aware of the OSHA safety requirements for using constructing and scaffolding.
☒	Severe Weather	Work may be suspended if dangerous weather conditions (lightning, tornadoes, high winds, heavy rain, freezing rain, etc.) occur. Be aware of changing weather conditions and be prepared to take shelter as necessary. Potential shelters should be identified prior to beginning work.
☒	Sharp Objects	Wear appropriate gloves when handling sharp objects or use appropriate equipment to move objects.
☒	Slippery Ground/Surfaces	Exercise caution, especially on slopes, field trailer floors and stairs, after a precipitation event. Use slip resistant boots or implement surface preparations to eliminate the slippery nature of the surface prior to accessing the area. Spill control measures and general housekeeping should be utilized to help prevent slipping on wet floors, wet pavement, and general work areas.
☒	Slips, Trips, and Falls:	Maintain clear walkways for work areas.
☒	Snakes	Be aware of the potential for snakes in the area and wear snake boots, snake chaps, gaiters, or leggings as needed.
☒	Steam Cleaning Equipment	Stay clear of the steam cleaning nozzles and equipment.
☐	Steel Erection	All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided. Employees engaged in steel erection activities on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.
☐	Steep Slopes or Banks	Pay attention to footing and walking. Stay a safe distance from unstable or extremely steep slopes. Wear appropriate footwear. Be aware of potential slope or bank failures. Heavy equipment should not be operated on or near unstable slopes or banks.
☒	Strong Nuisance Odors	Strong odors should be ventilated before entering a work area, or a respirator shall be worn as needed.
☒	Sunburn	For extended periods of time outdoors on sunny days, sunglasses, long-sleeved shirts and long pants should be worn to help prevent sunburn and eye problems. Wear sunscreen as appropriate for the project.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Surface Water	Working next to or on, bodies of water shall be done using the buddy system. Staff shall wear USCG-approved personal floatation devices when on or adjacent to bodies of water.
☒	Terrain	Uneven or steep terrain can cause hazardous conditions for walking and transporting equipment around the site. Site personnel should use caution when working on uneven surfaces, and they should avoid working down-slope from heavy equipment, or materials being moved or stored.
☒	Traffic (client, contractors, public, semi-trucks, forklifts, etc.)	Obey all posted speed limits. Park in designated areas only. Be aware of traffic patterns on site, and during access to the site. Use orange traffic cones and barrier warning tape, as needed, or if within 25 feet of the right-of-way. INVENTUM personnel must wear orange safety vests when working in or near traffic areas. Class 2 traffic vests are required with traffic speeds 25 mph or higher. Class 3 traffic vests are required with traffic speeds 50 mph or higher.
☐	Trains/Railroad Tracks	Be aware of any train activities on the site, entering or leaving the site, or immediately adjacent to the site. Do not walk between the rails or on the railroad ties. When driving, stop at all railroad crossings, even if they are unmarked, and look in both directions before proceeding across the tracks.
☒	Transporting Hazardous Materials	INVENTUM personnel who transport hazardous materials shall have the required DOT training prior to transporting materials, and will comply with all applicable DOT regulations and requirements for labeling, packaging, etc.
☐	Tree Cutting	Stay clear of tree cutting activities.
☒	Trenching	INVENTUM personnel will enter trenches in accordance with 1926 Sub Part P. Be aware that some trenching conditions may result in a confined space condition.
☒	Trip Hazards (wires, cords, hoses, debris, corn stubble, uneven surfaces, etc.)	Temporary wires, cords, hoses, etc., should be properly located, marked, and protected to help prevent tripping and disruption to work activities. Trip hazards are particularly a problem early in the morning, late in the day, or under other poor lighting conditions.
☒	Underground Storage Tanks (USTs) (Septic Tanks)	If any unknown USTs are encountered, drilling or excavations will be terminated in that location until a new scope of work, Risk Assessment and Health & Safety Plan can be developed.
☒	Uneven Surfaces	Be aware of uneven walking or driving surfaces and exercise caution when moving around the site.
☒	Utilities – Overhead (electrical, telephone, cable TV, etc.)	A subcontractor, the client, or INVENTUM will locate and identify all overhead utilities. The owner or client will be responsible for identifying all applicable overhead utilities, product lines, pipes, and aboveground tanks. A minimum clearance of 20 feet must be maintained between equipment and overhead utility lines.
☒	Utilities – Underground (electric, gas, telephone, water, storm sewer, sanitary sewer, cable TV, etc.)	A subcontractor, the client, or INVENTUM will call Digger's Hotline to locate all underground utilities. The owner or client will be responsible for marking all applicable on-site underground utilities, product lines, pipes, and tanks.
☒	Waterways	Exercise caution near, around, or in waterways. Harnesses should be worn when working in, or within 4 feet of, the waterway, especially when attempting to sample from shore or a boat or barge. All applicable laws and regulations will be followed when navigating a boat or barge to and from a work site.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Welding Tools	Stay clear of welding operations, and do not look directly at the welding process without appropriate eyewear and shield.
☐	Traffic Control	**Traffic Control**: Traffic control within the right-of-way will be in accordance with the local Public Right-of-Way Agency. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times and review planned activities with the local Public Right-of-Way Agency, so that appropriate lane closures can be coordinated.

Proposed Date(s) of Inventum Work: June 2020 through October 202

ON-SITE PROJECT TEAM MEMBER	ON-SITE PROJECT RESPONSIBILITIES
John Black	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
Todd Waldrop	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
James Edwards	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight

Any required construction/demolition activities: ☒ No ☐ Yes If Yes, complete Section 1

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

1. Construction Tasks: work tasks to be performed by Inventum staff or Inventum subcontractors

Civil

- ☐ Sewer (utility)
- ☐ Water (utility)
- ☐ Electric (utility)
- ☐ Communications (utility)
- ☐ Siding
- ☐ Roofing
- ☐ Drywall
- ☐ Flooring
- ☐ Ceilings
- ☐ Casework
- ☐ Masonry
- ☐ Escalator
- ☐ Steel (erection)
- ☐ Pre-cast (erection)
- ☐ Concrete (erection)
- ☐ Re-bar
- ☐ Elevator
- ☐ Fireproofing
- ☐ Windows
- ☐ Landscaping
- ☐ Painting
- ☐ Insulation
- ☐ Doors
- ☐ Finish Concrete

Mechanical

- ☐ Insulation
- ☐ Millwright
- ☐ Fire Protection
- ☐ Boiler
- ☐ Industrial Ventilation
- ☐ Steel Fabrication/Erection

Other

- ☐ Electrical
- ☐ Demolition (attach a detailed "**Demolition Plan**")

- ☐ Others
- ☐ Others
- ☐ Others

Estimated Direct-Hire Inventum Employees:

Home Office: ☐ Not Applicable ☐ Specify:

Craft Labor: ☐ Not Applicable ☐ Specify:

Craft	Quantity
Craft	Quantity

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

2. Applicable Safety Standards or Regulations:

☒ Federal OSHA ☐ State OSHA ☐ Owner/Client

Specific Standards:	29 CFR 1910 (OSHA)	29 CFR 1926 (Other Regulations)
☒ Medical Services and First Aid	1910.151	1926.50
☒ Hazard Communication (HAZCOM)	1910.1200	1926.59
☐ Lead Exposure	1910.1025	1926.62
☒ HAZWOPER	1910.120	1926.65
☒ Personal Protective Equipment (PPE)	1910.132-138	1926.95-107
☒ Respiratory Protection	1910.134	1926.103
☒ Ventilation	1910.94	1926.57
☒ Noise Exposure	1910.95	1926.52
☐ Illumination	N/A	1926.56
☐ Fire Protection	1910.157	1926.24 and 150-155
☐ Sanitation	1910.141	1926.51
☐ Materials Handling (rigging, etc.)	1910.176	1926.250-251
☐ Welding/Cutting	1910.251-255	1926.350-354
☐ Lockout/Tagout	1910.147	1926.417
☐ Electrical (flexible cords, etc.)	1910.305	1926.400-449
☐ Scaffolding	1910.28-29	1926.450-454
☐ Fall Protection (elevated work)	1910.23-29, 1910.66-68	1926.104-107; 500-503
☐ Ladders/Stairways	1910.25-27	1926.1050 and 1060
☐ Cranes, Derricks, Hoists, Elevators, etc.	1910.179-181	1926.550-555
☐ Aerial Lifts	1910.66-68	1926.556
☒ Earthmoving Equipment	N/A	1926.602
☐ Powered Industrial Trucks (forklifts)	1910.178	1926.602
☒ Excavations and Trenching	N/A	1926.650-652
☐ Concrete and Masonry	N/A	1926.700-706
☐ Steel Erection	N/A	1926.750-761
☐ Demolition	N/A	1926.850-860
☒ Asbestos	1910.1001	1926.1101
☐ Confined Space Entry	1910.146	1926.21

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

☐ Commercial Diving	1910.401-441	1926.1071-1092
☒ Compressed Gases	1910.101-105	N/A
☐ Ionizing Radiation	1910.1096	1926.53
☒ Benzene	1910.1028	1926.1128
☒ Cadmium	1910.1027	1926.1127
☒ Tools - Hand and Power	N/A	1926.300-307
☐ Blasting and Using Explosives	N/A	1926.900-914

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Training Required

(* required for all "Type 3" sites; but minimum recommended)

Check "A" if training required for everyone, and check "T" if training required for specific task.

A	T	SUBJECT	REFERENCE	
			29 CFR 1910	**29 CFR 1926 or Other**
☒	☐	HAZWOPER 40 hour*	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-Site*	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher*	1910.120	1926.65
☐	☐	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR*	1910.151	1926.23,.50
☐	☒	Respiratory Protection	1910.134	1926.103
☐	☐	Confined Space ☐ Permit attached	1910.146	1926.21
☐	☐	Mine Safety (MSHA)	N/A	30 CFR 48.8
☐	☐	Lockout/Tagout ☐ Permit attached	1910.147	1926.417
☒	☐	Bloodborne Pathogens	1910.1030	N/A
☒	☐	Noise Exposure	1910.95	1926.52
☐	☒	Competent Person	N/A	1926.32,.450,.650
☐	☐	Construction Health and Safety OSHA 10-Hour	N/A	1926.21
☐	☐	Demolition	N/A	1926.850
☐	☐	Excavations ☐ Permit attached	N/A	1926.650-652
☐	☐	Electrical Work	1910.332	1926.400-.449
☐	☐	Ladders/Stairways	N/A	1926.1050-1060
☐	☐	Scaffolding	1910.28	1926.450-454
☐	☐	Fall Protection	1910.23-29; 1910.66-68	1926.104,.501
☐	☐	Commercial Diving	1910.410	1926.1071-1092
☐	☐	Hot Work ☐ Permit attached	1910.251-255	1926.350
☐	☐	Lead Awareness	1910.1025	1926.62
☐	☐	Asbestos Awareness	1910.1001	1926.1101
☐	☐	Cadmium	1910.1027	1926.1127
☐	☐	Benzene	1910.1028	1926.1128
☐	☐	Ionizing Radiation	1910.1096	1926.53; 10 CFR 19.12
☐	☐	Troxler or NITON Gauge User	1910.1096	10 CFR 19.12
☐	☐	Radiation Safety Program	1910.1096	10 CFR 20.1101
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☒	DOT Hazardous Materials Shipping	1910.1201	49 CFR 172.704

Client-specific training: ☒ Not Applicable ☐ Specify

Site-specific orientation: ☒ Not Applicable ☐ Specify

Competent person: ☒ Not Applicable ☐ Specify

Direct-hire employee training/certification: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

4. Medical Surveillance

Surveillance Required: * required for all "Type 3" sites; baseline is minimum recommended
** Specify frequency below

	29 CFR 1910	29 CFR 1926 or Other
☒ HAZWOPER Physical - Baseline*	1910.120	1926.65
☒ HAZWOPER Physical – Annual	1910.120	1926.65
☐ HAZWOPER Physical - Biennial*	1910.120	1926.65
☒ OSHA Respiratory Protection Questionnaire	1910.134	1926.103
☐ Respiratory Certification Exam	1910.134	1926.103
☒ Arsenic (urine) ** **Annual**	1910.1018	N/A
☐ Asbestos **	1910.1001	1926.1101
☒ Cadmium (blood) ****Annual**	1910.1027	1926.1127
☒ Lead/ZPP (blood) ****Annual**	1910.1025	1926.62
☒ Mercury (blood) ****Annual**	N/A	N/A
☒ PCB ****Annual**	N/A	N/A
☐ Vinyl Chloride **	1910.1017	1926.117
☐ Hepatitis B Vaccine (series) **	1910.1030	N/A
☐ Tetanus/Diphtheria	N/A	Stay Current
☐ Stress Test	N/A	Only as requested
☒ Visual Acuity Test	N/A	Only as requested
☒ Hearing Test (Audiometry)	N/A	Only as requested
☒ Pulmonary Function	N/A	Only as requested

Client-specific drug testing: ☒ Not Applicable ☐ Specify

Client-specific medical monitoring[1]: ☒ Not Applicable ☐ Specify

Site-specific medical monitoring: ☒ Not Applicable ☐ Specify

**Frequency of medical monitoring: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Personal Protective Equipment (PPE)

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work tasks:

Specific Inventum Job Task or Function	Minimum Level of Protection
Task 1 – Site management and Oversight	☒ D
Level D: safety glasses (ANSI), safety shoes (ANSI); safety vest (ANSI)	
Task 2 and 3 – Surficial and Subsurface Soil Sampling	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI), nitrile gloves,	
Task 4 – Test Pit Excavations	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	
Task 5 – Sampling of Residuals	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	
Task 6 – Surface Water Sampling	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Criteria for changing protection levels are as follows:

EVACUATION[2] or PROTECTION LEVEL CHANGE[3] CRITERIA	APPROVALS REQUIRED [1] OSC
Site Evacuation Plan: ☒ Not Applicable ☐ Specify or Attach Plan:	
Change to Level D when: ☐ Not Applicable ☒	☒N/A All site work in Level D
Change to Level C when: ☒ Not Applicable ☐ dust levels exceed 2.5 mg/m^3 in the breathing zone continuously for 5 minutes.	☒ No work will be conducted in Level C. Site work will stop, controls reevaluated, and HASP updated as necessary
Change to Level B when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level B.
Change to Level A when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level A. ☒

[1] OSC: Office Safety Coordinator

[2] General Recommendations: Evacuate the area when LEL readings are >10% LEL in the atmosphere, or when PID readings are greater than the PEL in the breathing zone.

[3] General Recommendation: To Level C when PID readings are greater than the PEL in the breathing zone. To Level B or A only after detailed evaluation and planning.

Note: Changes to the level of protection shall be made only after the required approvals are obtained. All changes shall be recorded in the field log and reported to the Project Manager as soon as possible. Inventum's goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures, before PPE is required or considered.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

6. Air Monitoring [(1)]

The following monitoring instruments shall be used on site to measure airborne contaminant concentrations in either the breathing zone, or as part of the overall site **Air Monitoring Plan** (attach detailed plan):

MONITORING EQUIPMENT	LOCATION OF MONITORING	FREQUENCY OF MONITORING	ACTION LEVELS
☐ Combustible Gas Indicator	☐ N/A ☐ Monitoring Plan Attached ☐ Confined Space ☐ Manhole	☐ Continuously when potential combustible gases or lack of oxygen are suspected. ☐ Specify	5-10% LEL: continue with caution > 10 % LEL: evacuate the area ☐ Specify
☐ O2 Monitor ☐ CO Monitor ☐ H_2S Monitor	☐ N/A ☐ Confined Space ☐ Manhole – monitor oxygen, carbon monoxide, hydrogen sulfide , and lower explosive limit	☐ Continuously when excess oxygen (>22.5%) or lack of oxygen (<19.5%) are suspected. ☐ Test atmosphere prior to entry and continuous during confined space entry.	< 19.5% Oxygen: evacuate the area; supplied air may be needed. > 22.5% Oxygen: evacuate the area; potential fire hazard. ☐ Specify
☐ Colorimetric Tubes Type: Type: Type:	☐ N/A ☐ Specify ☐ Sample Container ☐ Confined Space ☐ Specify	☐ Periodically during sampling for analytical purposes only. ☐ Whenever noticeable odor is present. ☐ Specify	☐ Specify
☒ PID Lamp Needed: ☐ 9.8 eV ☒ 10.6 eV ☐ 11.7 eV Calibration Gas: Isobutylene Correction Factor:	☒ Personal Monitoring ☒ Sample Container ☐ Confined Space ☐ Specify	☒ Periodically during sampling for analytical purposes only. ☒ Continuously within the employee breathing zone. ☐ Specify ☐ Specify	☒ None. ☒ >5 ppm above background in breathing zone for 5+ min. Stop work and reevaluate potential sources and controls.
☐ FID	☐ N/A ☐ Specify	☐ Specify	☐ Specify
☒ Personal Dust Monitor	☐ N/A ☒ Personal Monitoring in Breathing Zone (Task 2 - 5 only)	☒ Continuously within the employee breathing zone	☒ >2.5 mg/m3 at work perimeter for 15 min sustained. Stop work and apply dust controls

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

☒Other: Perimeter Monitoring	☒ Perimeter Air Monitoring in accordance with the CAMP	☐ Specify	☐ Specify
☐Laboratory Supported ☐Personal ☐Area ☒Perimeter	☐ N/A ☐ Specify Employee breathing zone	☐ Specify continuous	☒ When visible dust is present apply dust control measures (water spray) until abated.

(1) Whenever air monitoring is required to be performed, a detailed **Air-Monitoring Plan** should be developed and attached to the HASP. The plan should include **Monitoring Locations, Frequency of Readings**, and any **Action Levels** being used to control the work site.

Air Monitoring Plan

Field monitoring of dust production is anticipated only during subsurface soil sampling (Task 3) and test pit excavations (Task 4). A visual assessment of dust levels will be used continuously during the work along with personal employee monitoring and perimeter air monitoring in accordance with an approved CAMP.

Dust production during monitoring well abandoned, monitoring well installation, and surficial soil sampling is not anticipated due to the typical moisture content of the soil.

This level of nuisance dust is visually observable. If dust is observable continuously in the breathing zone for 5 minutes, dust control methods will be used (*e.g.*, water spray will be applied) until dust is abated. Work will be temporarily discontinued until dust is reduced to acceptable levels within the breathing zone. Should particulate levels above the action level be a continual problem, relevant field personnel will reassess the situation with the project manager.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

7. Site Controls and Work Zones (describe in detail)

Facility Alarms or Signals: ☒ Not Applicable ☐ Specify

Work Permits Required: ☒ Not Applicable ☐ Specify

Work Traffic Issues: ☒ Not Applicable ☐ Specify

Parking Issues: ☒ Not Applicable ☐ Specify

Railway Traffic Issues: ☒ Not Applicable ☐

Support Zone(s):

☒ Field vehicle ☒ Job Trailer On Site ☐ Other:

Contamination Reduction Zone(s):

☒ Field vehicle ☐ Facility restroom/utility room ☐ Other:

Exclusion Zone(s):

☒ Area immediately surrounding work area ☐ Other:

Site Entry Procedures:

☒ **Notify Site Safety Contact Representative.**

☒ **Read HASP Plan and sign Acknowledgment Statement.**

☒ **Check in with the facility contact person.** ☒ **Check in with owners full time site representatives.**

☒ **Check in with facility security guard.** ☒ **All visitors must check in and sign visitor logbook in guard house.**

☒ **Wear proper personal protective equipment.**

☐ Attend facility orientation. ☐

☒ **Conduct daily safety meeting (document).**

☐ Other: Confined space – do not enter the confined space if LEL >10%, oxygen <21% or >23.5%, carbon monoxide >35 ppm, or hydrogen sulfide >7 ppm. Exit the confined space if the atmospheric conditions become hazards as noted.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Decontamination Procedures:

Personnel: (specify)	Work will be performed in Level D or Modified Level D, and minimal contamination is expected. Follow standard decontamination procedures, and good personal hygiene. Disposable PPE should be removed, contained, and disposed in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Site workers should plan and stage for wash water and soap at the site, prior to beginning the work. Site workers should wash hands and any exposed skin extremely well with soap and water, prior to leaving the contamination reduction zone, eating, drinking, driving, or leaving the site. Any soiled or contaminated clothing should be removed and handled appropriately, by either washing as soon as possible, or if necessary, disposing. Soiled or contaminated clothing should be carefully bagged prior to disposal or washing, to reduce potential exposure.
Equipment: (specify)	Site workers should plan and stage for the appropriate decontamination method at the site prior to beginning the work. Any contaminated single-use disposable equipment or PPE should be appropriately containerized and disposed as soon as possible in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Contaminated equipment or PPE that will be re-used should be handled and cleaned while wearing the appropriate PPE. Typically, equipment is decontaminated using Alconox soap and deionized water.

Disposal of Investigation-derived Material:

☒ Leave on site for disposal. Location TBD ☐ Other:

Work Limitations (time of day, buddy system, etc.):

☒ Buddy system required for some tasks.

☒ Work will be performed during daylight hours only.

☐ Work will be performed using artificial light.

Describe or attach a lighting plan: A lighting plan is attached.

☒ No eating, drinking, or smoking in contamination reduction zone(s) or exclusion zone(s).

☒ When temperatures are either above 80°F or below 20°F, work schedules may be modified.

☒ Other site-specific limitations: Do not enter battery building. Do not enter any former process buildings unaccompanied.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Radiation Safety:

- ☒ Radiation information is not applicable to this project.
- ☐ Notify RSO.
- ☐ Wear dosimeter badge when handling gauge.
- ☐ Post applicable radiation signs and documents.
- ☐ Post emergency numbers.
- ☐ Provide at least two lock systems for overnight storage.
- ☐ Maintain storage at least 15 feet from full-time workstations.
- ☐ Block, brace, and securely lock the gauge during "all" transportation.
- ☐ Limit "public" exposure to gauge while in use.
- ☐ Provide sketch of gauge storage to RSO.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Acknowledgment Statement:

As an employee of Inventum, I have reviewed the Hazard Assessment (HA)/Health & Safety Plan (HASP). I hereby acknowledge that I have received the **required level of training and medical surveillance as necessary**, that I am knowledgeable about the contents of this site-specific RA/HSP, and that I will use personal protective equipment (PPE) and follow procedures specified in the HASP.

Signatures of Inventum Site Personnel:

	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Location/Project Name: _____	**Date:** _____
Observer Name: _____	
Observee Name: _____	**Time:** _____
Task Observed	
Description of Task Observed and Background Information	
Positive Comments	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

At-Risk Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

At-Risk Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (PM/Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

PERSONAL PROTECTIVE EQUIPMENT	Safe	At-Risk	Comments
1. Hearing Protection (e.g., Ear Plugs)			
2. Head Protection (e.g., Hard Hat)			
3. ANSI Rated Eye Protection (e.g., Safety Glasses)			
4. Hand Protection (e.g., Kevlar Gloves)			
5. Foot Protection (e.g., Safety Shoes)			
6. Respiratory Protection			
7. Fall Protection Inspected (e.g., Harness)			
8. ANSI Rated Reflective Vest/High Visibility Clothing			
9. Other (Specify)			
BODY USE AND POSITIONING	**Safe**	**At-Risk**	**Comments**
10. Correct Body Use and Positioning When Lifting/Pushing/Pulling			
11. Pinch Points/Moving Equipment - Hands/Body Clear			
12. Mounts/Dismounts Using 3-Points of Contact			
13. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

WORK ENVIRONMENT	Safe	At-Risk	Comments
14. Work/Walk Surface Free of Obstructions (e.g., Tripping Hazards)			
15. Housekeeping/Storage			
16. Defined and Secured (e.g., warning devices, barricades, cones, flags)			
17. Suspended Load, Swing Radius & Lift Area is Barricaded			
18. Safety Shutdown Devices			
19. Proper Storage & Labeling /Disposal of Sample & Waste Materials			
20. Cylinders Stored Upright, Secured, & Caps in Place			
21. Manhole/vault Inspected for Hazards			
22. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

OPERATING PROCEDURES	Safe	At-Risk	Comments
23. Job Planning (HASP reviewed, JSAs, etc.)			
24. Fire Extinguishers Accessible and Inspections Current			
25. Work Permit/Authorization to Work (Hot, Cold, LOTO, Confined Space)			
26. JSA Reviewed & Followed			
27. Hazard Assessment - Hazard Hunt			
28. Interfaces with Other Functions (awareness with other personnel on site)			
29. Operators Looking Behind Prior to Backing Up			
30. Operators Wearing Seat Belts While Operating Equipment			
31. Subsurface Structures Identified			
32. Proper Trench Protective Equipment in Place			
33. Adequate Egress Is Available for Excavation & Trench (within 25 ft. if depth is <4 ft.)			
34. All Materials Set Back at Least 2 Feet From Edge of Trench/Excavation			
35. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

TOOLS/EQUIPMENT	Safe	At-Risk	Comments
36. Hand Tools (Proper Equipment Selection, Condition, and Use)			
37. Power Tools (Proper Equipment Selection, Condition, and Use)			
38. Equipment, Including Heavy (Proper Equipment Selection, Condition, and Use)			
39. Hoses Inspected			
40. Required Monitoring Equipment Calibrated & Used			
41. Ladders Set up Correctly & Inspected			
42. Right Tools for the Job are Available and in Good Condition - No Fixed Open Blade Knives (FOBKs)			
43. Other (Specify)			
Total #	0	0	

Daily Hazard Review Topic and Sign-In:

Daily Review Topic	Date

Acknowledgment Statement:

As an affected employee of Inventum Engineering, I hereby acknowledge that I have reviewed the contents of this site-specific HSP and the **daily safety meeting topic**, and that I will use the applicable personal protective equipment (PPE) and follow the procedures specified in the HASP.

Signatures of all onsite Inventum Personnel, including Direct-Hires (Required):

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Appendix I – TENORM Management Plan

TENORM MANAGMENT PLAN

Riverview Innovation & Technology Campus

Brownfield Cleanup Program Site No. C915353

3875 River Road
Tonawanda, New York 14150

Prepared for:

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

Prepared by:

By:

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS

15 Hazelwood Dr., Suite 112
Amherst, NY, 14228

MJW Job No. 25.1007.3

April 22, 2026

1.0 Introduction

1.1 General

This TENORM Management Plan has been prepared to address the radiological monitoring and safety activities required during the brownfield cleanup program (BCP) site remediation to evaluate the presence of potential (Technically Enhanced Naturally Occurring Radioactive Material [TENORM]). Slag was encountered during the Remedial Investigation of the Riverview Innovation & Technology Campus (RITC) Brownfield Cleanup Program (BCP) Site located at 3875 River Road, Town of Tonawanda, New York (the Site). In accordance with the approved Remedial Investigation Work Plan (RIWP), the slag was screened by MJW and submitted for radiological analysis. The results of the analyses conducted by MJW were included in the Draft RI Report and comments from the New York State Department of Environmental Conservation (NYSDEC) triggered the need for additional testing to define the procedure required for the completion of the Remedial Action Work Plan (RAWP). The management of potential TENORM may be triggered by earthmoving during implementation of the RAWP or during redevelopment as defined in a site-specific Site Management Plan.

This TENORM Management Plan is prepared specially for the Riverview Innovation & Technology Campus, Inc. Brownfield Cleanup Program Site (#C915353). The BCP Site is a portion of the former Tonawanda Coke Corporation (TCC) facility location at 3875 River Road in the Town of Tonawanda, New York. Figure 1 shows the location of the site with respect to River Road, surrounding industrial properties, background data locations, and the Niagara River further west of River Road.

This TENORM Management Plan is required by the NYSDEC to provide specific work details, the areal and vertical extent of the Site that may contain potential TENORM and provides all existing data available from the project area for development of radiological work precautions. Information concerning the environmental history of the site as well as prior investigations and approved Work Plans are available on the NYSDEC Infolocator: (https://extapps.dec.ny.gov/data/DecDocs/C915353/)

This plan includes the applicable components of the new policy document DMM-5 issued by NYSDEC regarding the management of TENORM (Attachment 8) and guidance is provided for appropriate management of potential TENORM encountered during remediation, construction or other earthwork projects, such as clearing, grading, excavation, filling, or stockpiling.

The MJW Corporation has been performing radiological work in Western New York, New York State and several other states in the US since 1991. MJW has been involved in the characterization and remediation of sites with potential radiological issues across a wide spectrum of nuclides and quantities. Consequently, MJW has developed procedures to perform the tasks necessary to characterize the BCP Site and also to provide the expert radiological management and trained technicians to ensure work done on the BCP Site is done safely when potential TENORM or radioactive source management is required. No radioactive sources are suspected on the BCP Site.

1.2 Previous Site Investigative Work

MJW has conducted TENORM-specific remedial investigations since 2020 at the RITC BCP Site. In addition, initial potential TENORM-specific investigations (soil sampling and analysis) are included in the report *Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY* dated February 10, 2021 (Attachment 1)

for work done on the RITC superfund site. In 2023, an overland gamma survey was conducted over all accessible areas of the site to evaluate for possible TENORM Slag. Associated samples were collected for screening and submitted for radiological analysis. Subsequent focused investigations and sampling activities occurred in 2024 (Attachment 1).

Local area background measurements were collected at the Tonawanda Water Treatment Plant (218 Aqua Lane, Tonawanda Town, NY 14150) and Sheridan Park (901 NY-324, Tonawanda, NY 14150) (23.2029, Attachment 1), results are summarized in Table 1 below.

Table 1. Local Area Background Sample Results		
Method	901.1 Gamma Spec[2]	
Sample Number[1]	[Ra-226], pCi/g	Uncertainty (± pCi/g)
01122024-TWT1	0.822	0.151
01122024-SB1	0.734	0.135
01122024-TWT1(DUP)	0.673	0.178
Average (Non-Zero Results)	0.743	0.155
1.Sample Nomenclature - MMDDYYYY-Location (TWT-Tonawanda Water Treatment, SB-Sheridan Park) 2. All samples analyzed via EPA Method 901.1 with a 21-day ingrowth for Ra-226.		

Figure 1.

Background Sample Locations in Relation to RITC (3875 River Road)

1.3 GPS-Enhanced Gamma Walkover Survey of the Site

The GPS-enhanced gamma walkover surveys consisted of a MJW field crew with a Bluetooth-enabled Ludlum model 3000 Ratemeter paired with a 44-10 (2" x 2") NaI gamma detector walking pre-planned transects running east-west and north-south within and along the site boundaries. The instrumentation was mounted on a wheeled cart to ensure consistent geometry, except when prevented by field conditions, in which case the instrumentation was secured to a field technician.

The initial survey covered the entire 86.5-acre site to the extent possible and identified those locations with elevated count rates. While the survey identified locations with elevated count rates, the survey was inconclusive as to the radiological nature of the potentially elevated material, and a secondary follow-up survey and sampling investigation was performed. Background gamma-scan data for this survey were collected at the nearby Erie County Water Authority, 3750 River Road, Tonawanda, NY 14150, and is Summarized in Table 2. The full report can be found as part of Attachment 1, titled *Gamma Walkover Survey Report 20.1023)*

Table 2. Erie County Water Authority Background Gamma Data[1]

Data Points (#)	Average[2]	Standard Deviation[2]
614	8392	400

1. All data analyzed with QGIS.
2. In Counts per Minute (CPM)

Following the NYSDEC approval of the Radiological Work Plan on April 30, 2024 (Attachment 1) MJW conducted a focused GPS-Enhanced Gamma Walkover survey in June and July 2024 to provide additional characterization of the site west of the Thaw Shed. The focused survey noted a reduction in counts above the 1.5x ABKG (Area Background) level and refined Elevated Measurement Locations (EMLs) to enable biased sampling to the areas of interest. There was no visual identification of soil/fill difference in the surface layer at the EMLs.

1.4 Sample Collection and Analysis

In accordance with the NYSDEC-approved RWP (Attachment 1), MJW Certified Health Physicist's (CHPs) reviewed the 2024 GPS-Enhanced Gamma Walkover Survey data to identify EMLs. Twenty (20) biased to elevated count rate locations and twelve (12) unbiased samples were collected in and around the identified EMLs. Thirty-seven (37) samples were collected and analyzed by gamma spectroscopy, with 15 samples analyzed by confirmatory alpha spectroscopy for Uranium and Thorium Isotopes. Twelve (12) sample results indicated material potentially above the DMM-5 criteria for TENORM (Background-Comparable) material, no sample results were above the criteria for TENORM waste. All of the samples with results indicating TENORM Fill material were collected within the previously identified calculated EMLs.

2.0 Site History

Prior to the TCC bankruptcy in 2018, the property to become the RITC BCP Site was an operating coke making and by-products facility for more than 100-years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company merged into Allied Chemical Corporation, which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility from 1978 through October 2018. TCC filed for bankruptcy in 2018 and all manufacturing on the property was permanently idled. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the remaining TCC properties to RITC was approved by the U.S. Bankruptcy Court. The purchase of the properties was completed October 10, 2019. Management of the properties was transitioned from the USEPA to RITC between September 2019 and June 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a). The volunteer status is a recognition that RITC had never conducted coking or by-product production operations on the BCP Site, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the BCP Site, and has exercised all appropriate care since acquisition. Additionally, in recognition of the focus of this Work Plan, RITC did not import any slag materials to the BCP Site. Based on the results of the Remedial Investigation, the slag was used for construction of the rail lines on the property, presumably starting on or about 1917.

Following approval of the BCP Agreement, RITC has conducted extensive site management and cleanup activities in accordance with a series of NYSDEC and NYSDOH approved IRM work plans, has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period, conducted a remedial investigation of the BCP Site, and drafted an alternatives analysis.

Manufacturing processes used at the plant included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating the coal in the absence of oxygen. The resulting carbon material “coke” was used, among other things, in foundries and for the production of steel.

The extracted coke oven gas (COG) was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel. When operating efficiently, coke batteries typically produce twice the volume of COG that is required to operate the facility and fire the battery.

The liquids and tar by-products produced on the property BCP Site were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials by TCC was the source of the majority of releases to the ground surface. While there was a steel manufacturing facility west of the site and a coal-fired power plant southwest of the site, slag was not produced by the coke making process. The presence of TENORM appears to be associated slag that was imported for use as base and ballast materials under railroad tracks on the BCP Site. Slag was not produced in any significant quantity at the TCC facility.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of rapid deterioration as there was no party responsible for maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC implemented a series of IRMs and associated activities to improve the safety, eliminated potential sources of releases, and improved control of the remaining infrastructure, both within and outside the requirements of the BCP Program. The implemented and ongoing IRMs are eliminating potential exposures and safety hazards on the BCP Site. Descriptions of the RI and IRM scope of work completed under the BCP are provided in the work plans and reports posted on the NYSDEC InfoLocator. Work completed prior to and during the RI that has dramatically improved conditions on the BCP Site include, but are not limited to:

- Surface Materials and Site Management – The conditions at the site were allowed to deteriorate for years if not decades under previous ownership. Full time management of the site has been funded by RITC to control and improve the BCP Site.
- Surface Water Management – Surface water management has been the focus of the most IRMs at the site since the USEPA transferred responsibility for surface water to RITC. The IRMs have addressed conditions across the entire BCP Site including elimination of poorly constructed impoundments, regrading areas to eliminate erosion, dredging ponds and ditches, cleaning and repairs to sewers and drains, and cleaning of the surface to manage debris that concentrated runoff.
- Asbestos Containing Materials (ACM) Survey – A comprehensive assessment of ACM was completed on the BCP Site in 2019 and 2020.
- Asbestos Abatement – Multiple phases of asbestos abatement were completed and are ongoing at the BCP Site including the abatement of ACM in the three stacks, abatement of ACM on and in the former process buildings on the BCP Site, abatement of ACM on pipes and external equipment, abatement of ACM in buildings, and controlled demolition of ACM containing buildings that are not suitable for occupancy. ACM abatement is conducted in accordance with New York State Department of Labor (NYSDOL) requirements.
- Process Equipment Removal Interim Remedial Measures Work Plan – removal of the remaining outdoor vertical process vessels including characterization of the contents, demolition of the vessels, and proper offsite disposal of the contents.
- Building Demolition – buildings across the BCP Site were demolished to allow access to the BCP Site for IRMs and the RI. The condition of the buildings, many over 100 years old, had deteriorated to the point where they were posing a safety concern. Four had deteriorated to a condition that required them to be condemned because they could no longer be safely occupied.
- Aboveground Storage Tank (ASTs) – decommission AST and disposal of the tank contents in accordance with the approved IRM.
- Soil Stabilization to treat material and soils impacted by previous TCC site operations.

3.0 Work Plan Roles and Responsibilities

The project team for the implementation of this radiological work plan includes:

Project Manager – The project manager overseeing this work plan is the president of MJW, David A. Dooley, Ph.D., CHP. Dr. Dooley brings 40 years of experience to this work.

Radiation Safety Officer – Alex Bartels is MJW's Radiation Safety Officer (RSO) for our New York State Department of Health (NYSDOH) radioactive materials license and oversees all of the radiation protection technicians we employee.

Radiation Protection Technicians – MJW's radiation protection technicians are trained according to MJW's Radiological Control Manual and all of the associated implementing procedures. They are also required to have current Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

MJW is not managing other site-specific work or remediation on the property and will comply with the relevant OSC site-specific Health and Safety Plans (HASPs). MJW will coordinate all onsite activities with the specified OSC contacts. The TENORM Management Plan will be utilized with the RITC BCP Site's RAWP and Site Management Plan.

4.0 Field Screening Survey Protocols

4.1 Determination of Field Screening Criteria

As part of the Gamma Walkover Survey and associated Sampling Report (Doc. No. 24.1007.3) (Attachment 1), associations between sample results and in-field gamma counts were determined. Samples having Ra-226 concentrations in excess of 5.0 pCi/g, the DMM-5 limit for TENORM (Background-Comparable), were associated with in-field gamma counts of greater than 2x the area background mean (16,784 gamma (γ) CPM rounded to 17,000). Sampled material below the 2x area background level was qualified as TENORM (Background-comparable).

- The site-specific criteria for further evaluation of excavated/disturbed material will be set at greater than the 2x area background level or 17,000 γ CPM.
- The materials in the EMLs greater than the 2x area background level or 17000 γ CPM will be managed in accordance with this Work Plan.
- Material exceeding the area-background level but not exceeding the 17,000 γ CPM criteria will be designated as TENORM (Background-comparable). "Scanned material not in the EMLs above the area-background level, but below the screening level (17,000 γ CPM) will be designated as TENORM (Background-Comparable) and managed in accordance with the RAWP as fill."

4.2 Field Screening Survey Procedure

MJW representatives will field screen material outside of the EMLs where slag is identified during work activities. MJW will conduct field screening by verifying either in-situ material or removed material prior to internment or final placement. A minimum of ten (10) counts will be taken for every 500 cubic yards of each material to be excavated. A MJW technician will take five (5) static 1-minute counts on both the in-situ material and five (5) static 1-minute counts on exposed or removed material.

Suspected potential TENORM materials encountered outside the EMLs will be screened. Potential TENORM that is screened above 1.5x area background that is located outside of the Elevated Measurement Locations (EMLs) will be managed according to the following criteria:

1) Background comparable TENORM ≤ 12,000 γ CPM may be moved around the site freely without radiological restrictions.
2) Background comparable TENORM between 12,000 γ CPM and 17,000 γ CPM must be placed below appropriate site cover in a defined manner per this TMP.
3) For material greater than 17,000 γ CPM: designated as TENORM Fill, a representative sample shall be collected to verify the Ra-226 concentration and then shall be placed inside the TENORM Consolidation Cell area; provided that the activity is greater than 5.0 pCi/g threshold for TENORM Fill and below the 15 pCi/g threshold for TENORM Waste.
4) The proposed Consolidation Cell is shown in Figure 3 in Section 7.0.

Material that exceeds the screening criteria of 17,000 γ CPM will be stockpiled in accordance with the RAWP and this TMP, with administrative and engineering controls to prevent access (e.g., worker notification, postings, fencing, etc.) until the results of the sample activity analysis become available. The materials will be managed in accordance with the sample results as described above. Based on the results, the correlation of screening to laboratory analytical results may be revised.

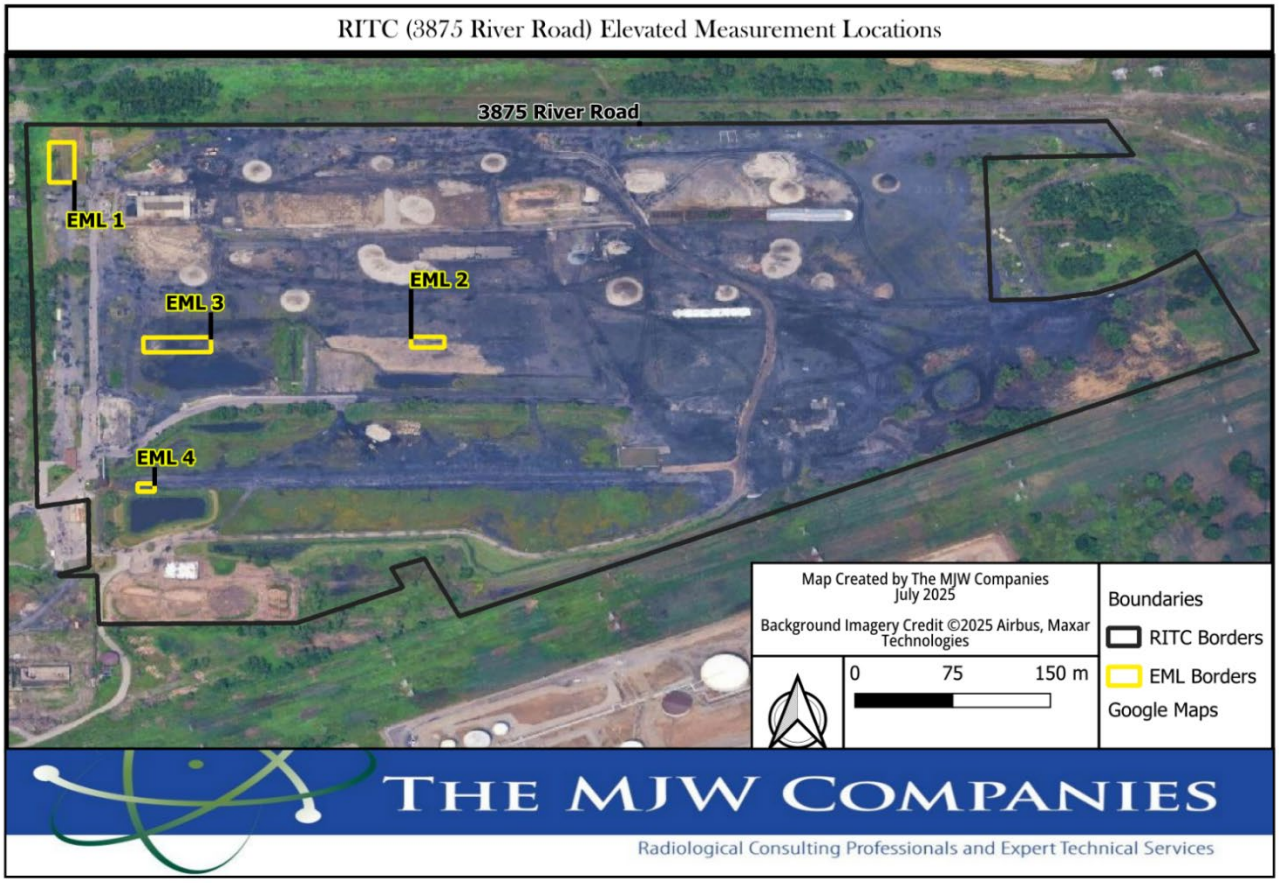
4.3 Known Elevated Measurement Areas

Previous site investigations provided characterization of the site. These investigations established four (4) elevated measurement locations where TENORM Fill is present. These locations are shown in Figure 2 and described below:

- Northwest Corner – Parking Lot EML 1 – Last property purchased from Wickwire Spencer Steel Company. An area of approximately 20 by 35 meters with an estimated volume of 960 cubic meters (estimated 2,300 tons). See Table 3 samples S1.B2, S1.B4, S1.B5 and S1U4.
- Coke Yard EML 2 south of former coke wharf, northeast of former shower building, estimated volume: 310 cubic meters (estimated 740 tons). See Table 3 samples S3.B2 and S3.U1.
- Coke Yard EML 3 south of former coke wharf, south of former coal breaker building, estimated volume: 420 cubic meters (estimated 980 tons). See Table 3 samples S2.B3 and S2.U4.
- Water Treatment EML 4 - North side of stormwater retention basin, estimated volume: 160 cubic meters (estimated 380 tons). See Table 3 sample S4.B2 (DUP).

The estimated volumes assume both the TCC fill and slag are potential TENORM. It is assumed that only the slag will be TENORM, and the volume moved to the TENORM Consolidation Cell area will likely be 25-percent or less of the total volume.

Figure 2.



Potential TENORM at the site inside of the Elevated Measurement Locations (EMLs) will be managed according to the following criteria:

1) Background comparable TENORM ≤ 12,000 γ CPM may be moved around the site freely without radiological restrictions.
2) Material with gamma CPM >12,000 γ CPM and ≤ 17,000 γ CPM: designated as TENORM (Background-comparable), may be consolidated into the proposed Consolidation Cell or capped onsite under no less than 2 feet of cover.
3) Material with gamma CPM >17,000: designated as TENORM Fill. A representative sample and/or meter-to-activity concentration correlation will be used to verify that the material does not exceed the 15 pCi/g threshold for TENORM Waste. Material that does not exceed the 15 pCi/g threshold for TENORM Waste may be consolidated in the TENORM Consolidation Area if the TENORM needs to be excavated.
4) Any material greater than 15 pCi/g will be disposed of at an authorized out of state facility.

If the background comparable TENORM that is screened above 12,000 γ CPM and below 17,000 γ CPM is left in place it must be below at least 2 feet of soil cover (or equivalent). Any material screened above 17,000 γ CPM that is tested and shown to have activity greater than 15 pCi/g will be disposed of at an authorized out of State facility.

5.0 Soil Sample Collection and Analysis

In the event that any soil sampling is required, all soil sample collection will be performed in accordance with MJWRCP-66 Soil Sampling Protocols Rev. 2 dated October 14, 2023. This procedure is shown in Attachment 3 which includes the Soil Sample Data Sheet used to catalog all field data used for the location selection including sample type, radiation readings at various distances, analyses requested, etc. All samples will be analyzed via EPA method 901.1 with a 21-day ingrowth for Ra-226.

6.0 Laboratory Analysis of Samples

Collected samples will be placed in appropriate containers and shipped to an accredited laboratory for radiological analysis. MJW routinely uses GEL Labs in Charleston, SC, which is the laboratory proposed for the sample analysis for this work plan.

For more information about GEL's radiochemistry services see the following link: https://www.gel.com/laboratories/services/radiochemistry-analysis GEL's chain of custody (COC) form is shown in Attachment 4.

7.0 On-Site Disposition of TENORM Material

TENORM (Background-comparable) disposal restrictions within DMM-5 are under the purview of the assigned NYSDEC ERS. Field screened material that does not exceed the site-specific criterion of 17,000 γ CPM will be managed in accordance with the RAWP and this TMP, as on-site fill. Use of materials above 12,000 γ CPM and below 17,000 γ CPM as on-site fill will include demarcation layers and will be capped with a minimum of two (2) feet of acceptable soil cover, or a combination of asphalt and/or concrete equivalent. Materials that exceed the site-specific criterion of 17,000 γ CPM will be managed in accordance with the RAWP will be placed within the TENORM Consolidation Cell area (Attachment 2). The TENORM Consolidation Cell area incorporates industry standard engineering controls, constructed on low permeability native silty clay, demarcation layers, and capped with a minimum of two (2) feet of acceptable soil cover or the equivalent of paving with asphalt or concrete. This cover will only be placed over the Consolidation Cell with contents meeting the NYSDEC DMM-5 requirements for TENORM fill.

Interim storage of materials may take place during the construction of the TENORM Consolidation Cell area and during sampling prior to material placement in the TENORM Consolidation Cell area. The interim storage areas will include administrative controls to prevent access (e.g., worker notification, postings), engineering controls to prevent access (e.g. construction fencing), and regular monitoring by MJW technicians as material is added or removed. Monthly grid surveys of the TENORM Consolidation Cell area will be conducted by MJW technicians utilizing a Ludlum 2241-2 ratemeter paired with a Ludlum 44-10 NaI "2x2" and Bicron Microrem Dose Rate meter, or equivalent. Monthly surveys will be conducted in accordance with Sectio 8.0 and reported to the NYSDEC. A grid survey will be conducted when construction is complete, both before and after a cover system is installed on the Consolidation Cell.

Material exceeding field counts of 17,000 CPM, TENORM Fill, will be segregated with appropriate administrative and engineering controls. Following the identification and characterization of material as TENORM fill, internment in the TENORM Consolidation Cell area in accordance with this TMP. MJW technicians will conduct regular monitoring to ensure that the administrative and engineering controls are sufficient and provide oversight as material is added or removed.

Any material exceeding 15 pCi/g for Ra-226 will be disposed of in accordance with appropriate regulatory requirements at an authorized and permitted out-of-state disposal facility (DMM-5, Attachment 8).

Figure 3.

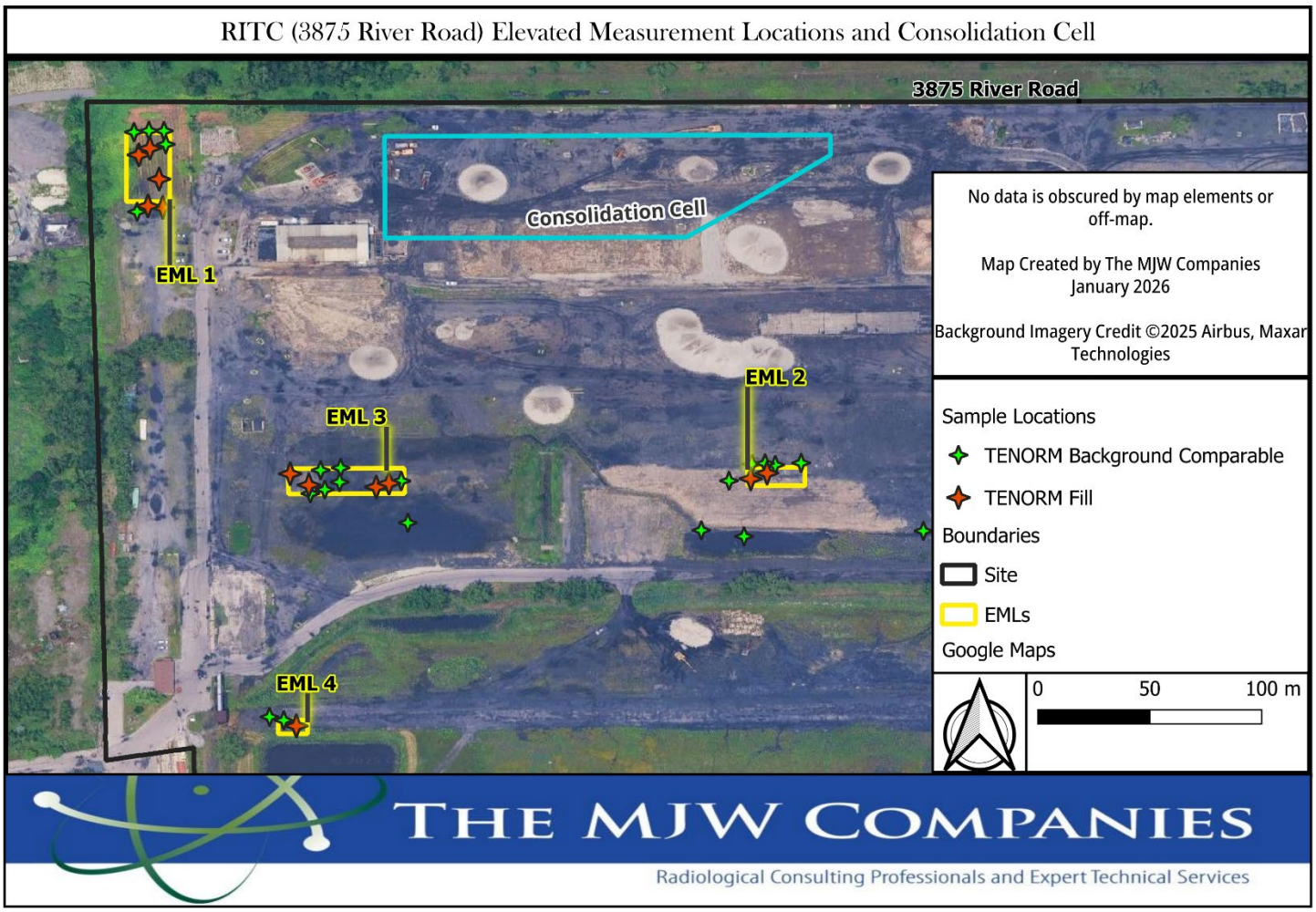


Table 3.

Sample_No	Lab_Id	Lab_Result	Uncertainty	MDL/MDA	Units	In EML	Nearest EML
S2.B1	674299001	3.51	0.33	0.183	PCI/G	2	N/A
S2.B2	674299002	4.93	0.42	0.217	PCI/G	2	N/A
S2.B3	674299003	6.32	0.408	0.174	PCI/G	2	N/A
S2.B4	674299004	3.42	0.341	0.23	PCI/G	2	N/A
S2.B5	674299005	3.79	0.373	0.2	PCI/G	2	N/A
S2.B6	674299006	0.326	0.14	0.0959	PCI/G	2	N/A
S2.U1	674299007	0.875	0.193	0.123	PCI/G	2	N/A
S2.U2	674299008	0.32	0.11	0.102	PCI/G	NO	2
S2.U3	674299009	11	0.525	0.225	PCI/G	2	N/A
S2.U4	674299010	10.2	0.57	0.257	PCI/G	2	N/A
S2.U2.D	674299011	0.51	0.17	0.108	PCI/G	2	N/A
S3.B1	674299012	1.21	0.234	0.141	PCI/G	NO	3
S3.B2	674299013	9.17	0.472	0.197	PCI/G	3	N/A
S3.B3	674299014	0.529	0.155	0.152	PCI/G	NO	3
S3.B4	674299015	0.598	0.193	0.148	PCI/G	NO	3
S3.U1	674299016	10.7	0.474	0.178	PCI/G	3	N/A
S3.U2	674299017	2.23	0.284	0.2	PCI/G	NO	3
S3.U3	674299018	0.552	0.146	0.101	PCI/G	NO	3
S3.B4.D	674299019	0.348	0.137	0.138	PCI/G	NO	3
S4.B1	674299020	1.56	0.297	0.14	PCI/G	NO	4
S4.B2	674299021	5.77	0.377	0.187	PCI/G	4	N/A
S4.U1	674299022	1.24	0.258	0.171	PCI/G	4	N/A
S1.B1	674299023	1.12	0.302	0.189	PCI/G	NO	1
S1.B2	674299024	10.6	0.62	0.25	PCI/G	1	N/A
S1.B3	674299025	1.56	0.228	0.152	PCI/G	1	N/A
S1.B4	674299026	12.6	0.595	0.229	PCI/G	1	N/A
S1.B5	674299027	8.49	0.516	0.237	PCI/G	NO	1
S1.B6	674299028	1.94	0.279	0.165	PCI/G	NO	1
S1.U1	674299029	0.667	0.275	0.184	PCI/G	NO	1
S1.U2	674299030	4.73	0.364	0.196	PCI/G	1	N/A
S1.U3	674299031	1.94	0.219	0.109	PCI/G	NO	1
S1.U4	674299032	10.5	0.529	0.207	PCI/G	NO	1
S1.B1.D	674299033	1.25	0.197	0.132	PCI/G	1	N/A
F1	674299034	0.762	0.163	0.122	PCI/G	NO	3
F2	674299035	0.637	0.189	0.134	PCI/G	NO	2
Control 1	674299036	0.41	0.177	0.144	PCI/G	NO	2
Control 2	674299037	0.503	0.17	0.112	PCI/G	NO	2
S2.B1(674299001DUP)	1205781344	3.7	0.35	0.192	PCI/G	2	2
S4.B2(674299021DUP)	1205781347	6.1	0.406	0.191	PCI/G	4	4

8.0 Radiological Controls and Workplace Safety

Radiological monitoring and related actions are required for all activities that may be impacted by TENORM materials at the site to protect public and worker health and safety and to control the potential release of materials off-site (i.e., fugitive dust emissions, runoff, etc.) to levels as low as reasonably achievable (ALARA). Attachment 5 is MJWRCP-03, Field Investigation Survey Procedure, dated September 15, 2015.

Radiation Protection Technicians/radiological control technicians (RCT) and radiological control supervisory personnel (RCS) will provide radiological coverage to ensure the radiological safety of MJW and site workers during work activities required for any surface and subsurface survey and sampling work.

8.1 Radiological Monitoring Documentation

The RCT and/or RCS will complete daily field notes when onsite to identify work activities performed, site conditions, notable events, and radiological findings. The notes will include a site work area map and locations of data collected. MJW Corporation "*Survey Data Form*" (Attachment 6) will be completed for all walk-over or investigative surveys performed in response to significantly elevated instrument readings or off-normal events (i.e., instrument count rates > 3 times background or personnel contamination. A COC form (Attachment 4) will be initiated in the field for all samples collected.

9.0 Personal Protective Equipment (PPE) and Radiological Hygiene

Workers will follow all requirements for PPE and hygiene actions based on radiological, chemical, and physical hazards as established by MJW safety manuals and procedures and the Health and Safety Plans for the site. The minimum requirements based upon anticipated radiological and physical conditions will include:

9.1 Required PPE

The required PPE will be worn at all times on the site outside the parking lot or office building.

- Safety glasses or shield,
- Hard hat,
- Ear plugs,
- Hard-toe work boots,
- Work gloves, and
- Safety (high visibility) vest or similar.

More stringent controls may be required if higher levels of radioactivity are encountered.

9.2 Hygiene and Contamination Monitoring

The following precautions shall be observed to promote workplace safety and in accordance with the site HASP (Attachment 7):

- No eating, drinking, smoking, or chewing within any active work area,
- Hand washing is required upon exit from any active work area,
- Hand and foot radiological survey meter "frisk" when exiting areas where elevated radioactivity has been detected. Personnel frisks will be performed using the Ludlum 44-9, GM probe and/or the Ludlum 44-89, alpha/beta probe or equivalent instrument combinations.
- Excavator buckets and tires/tracks to be frisked before release to non-restricted use.

When release surveys using field instruments exceed 2 times the instrument background count rate, the RCT and RCS will take measures to confirm results using longer count times or by moving more slowly over the area. If an elevated count rate is confirmed, the RCT may wipe or wash the area, remove debris or soil material and resurvey the area until readings indicate ALARA. Materials or personnel exceeding 3 times instrument backgrounds should not be released without further decontamination efforts and count rates indicate ALARA. This information will be documented on forms similar to Attachment 6 MJWRCP-04. Rad Contamination Survey Map and Data Sheet.

Materials and equipment released for unrestricted use will not exceed NYS and NRC limits as stated in NYSDOH Radiation Guide 10.10, Table 1 (Attachment 9). It is the responsibility of the RCS to evaluate field instrument counts per minute (CPM) against Table 1 release limits in disintegrations per minute (DPM) using instrument calibration factors for the radionuclides of interest.

9.3 Control of Fugitive Dusts

MJW, supported by Inventum and site contractors, will take reasonable steps to suppress potentially contaminated fugitive dust in accordance with the site erosion and sediment controls plans and the community air monitoring plan, such as misting with water or curtailing intrusive activities.

10.0 Reports

MJW will prepare a report detailing the activities and the results of the additional GPS overland gamma survey performed and the activities and analytical results for all surface and subsurface soils collected. The report and data will be in a form that will allow Inventum to incorporate the requirements into the Site Management plans for the site.

11.0 Attachment List

1. Previous Site Investigations
2. TENORM Consolidation Map
3. MJWRCP-66 Soil Sampling Protocols and Data Sheet
4. GEL Chain of Custody
5. MJWRCP-03 Field Investigation Survey Procedure
6. MJWRCP-04 Field Investigation Survey Procedure
7. Site HASP
8. DMM-5 NYSDEC Policy
9. NYSDOH Radiation Guide 10.10

Attachment 1 - Previous Site Investigations

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

THE MJW COMPANIES
Radiological Consulting Professionals and Expert Technical Services

Memorandum

February 10, 2021

To: Mr. James Edwards
Inventum Engineering, PC
481 Carlisle Dr. Suite 202
Herndon, Virginia 20170

From: Martin Willett
Director of Health Physics and Remediation Services
MJW Corporation

Subject: Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

Introduction

A quality assurance and quality control (QA/QC) review of the Laboratory Analytical Data received from Eurofins TestAmerica, St. Louis, Laboratory Job ID: 160-40621-1 and released on 1/11/2021 was performed for Inventum Engineering LLC by MJW Corporation. The laboratory data report contained results for six (6) soil samples collected during a Tonawanda Coke facility investigation conducted between October and November 2020.

Summary of Laboratory Sample Receipt Condition:

- Standard analytical laboratory protocols were followed during the analysis of the samples and no problems were encountered or anomalies observed, laboratory quality control samples were within established control limits.
- Analytical methods and test results met NELAP requirements for parameters for which accreditation is required or available.
- Samples were received on 11/30/2020 in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

Laboratory Notes Related to Analytical Methods and Results:

Radium-226 By Gamma Spec (21 Day Ingrowth)

- Samples were analyzed for Radium-226 by gamma spec after a 21-day ingrowth period in accordance with EPA method 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020. As a result, samples met the 21day ingrowth requirement prior to analysis for Ra-226.

- Samples results for *Pb-210 by gamma spec (method 901.1) were estimated*.

- *Insufficient sample was provided for a sample to fill the geometry calibrated for Ra-226 analysis by gamma spectroscopy*. The samples contained large pieces of rock.

- Results for several requested isotopes have no or low abundance gamma peaks. *Quantification of the analyte was inferred under the assumption of equilibrium with decay chain progeny or parent isotopes. This assumption was added by the laboratory and was not based on process knowledge*.

Gross Alpha and Gross Beta Radioactivity

- Sample analysis was performed on 12/23/.2020 following method SW-846 Method 9310. No analytical or quality issues were noted.

Isotopic Thorium and Uranium (Alpha Spectrometry)

- Sample analysis was performed on 01/04/2021 and 01/07/21 following method DOE A01R_Th and U. For Thorium analysis, *a correction to data results to account for interference observed in the blank sample was applied.*
- Quality issues were not observed for U isotopic analysis.

Sample Analytical Results

Samples Analyzed

Lab ID	Client Sample ID	Collected Date / Time	Received
160-40621-1	TP-BCP-34-A	10/30/20 11:15	11/30/20 13:47
160-40621-2	TP-BCP-34-B	10/30/20 11:15	11/30/20 13:47
160-40621-3	TP-BCP-32-W45	11/09/20 01:00	11/30/20 13:47
160-40621-4	TP-BCP-44-A	11/13/20 11:50	11/30/20 13:47
160-40621-5	TP-BCP-44-B	11/13/20 11:50	11/30/20 13:47
160-40621-6	TP-BCP-47	11/18/20 09:20	11/30/20 13:47

Table 1: Laboratory Sample Results

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-3	TH-232	Alpha Spec A-01-R	1.58		0.270	0.0487
160-40621-3	U-238	Alpha Spec A-01-R	0.474		0.131	0.0598
160-40621-3	AC- 228	Gamma 901.1	0.735		0.237	0.258
160-40621-3	BI-214	Gamma 901.1	0.515		0.178	0.168
160-40621-3	RA-226	Gamma 901.1	0.515		0.178	0.168
160-40621-3	TH -232	Gamma 901.1	0.735		0.237	0.258
160-40621-3	U-238	Gamma 901.1	0.851		0.591	0.810
160-40621-1	TH-232	Alpha Spec A-01-R	1.36		0.253	0.0521
160-40621-1	U-238	Alpha Spec A-01-R	3.12		0.419	0.0527
160-40621-1	AC- 228	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	BI-214	Gamma 901.1	4.46		0.785	0.415
160-40621-1	RA-226	Gamma 901.1	4.46		0.785	0.415
160-40621-1	TH -232	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	U-238	Gamma 901.1	5.04		2.24	2.92
160-40621-2	TH-232	Alpha Spec A-01-R	0.737		0.182	0.0554
160-40621-2	U-238	Alpha Spec A-01-R	4.06		0.499	0.0612
160-40621-2	AC- 228	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	BI-214	Gamma 901.1	3.70		0.841	0.597
160-40621-2	RA-226	Gamma 901.1	3.70		0.841	0.597
160-40621-2	TH -232	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	U-238	Gamma 901.1	2.73		1.38	2.53
160-40621-4	TH-232	Alpha Spec A-01-R	0.322		0.107	0.0402
160-40621-4	U-238	Alpha Spec A-01-R	2.31		0.344	0.0490
160-40621-4	AC- 228	Gamma 901.1	1.07		0.355	0.312
160-40621-4	BI-214	Gamma 901.1	2.99		0.467	0.205
160-40621-4	RA-226	Gamma 901.1	2.99		0.467	0.205

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-4	TH -232	Gamma 901.1	1.07		0.355	0.312
160-40621-4	U-238	Gamma 901.1	2.42		0.947	1.45
160-40621-5	TH-232	Alpha Spec A-01-R	0.783		0.177	0.0258
160-40621-5	U-238	Alpha Spec A-01-R	4.35		0.534	0.0583
160-40621-5	AC- 228	Gamma 901.1	1.22		0.536	0.681
160-40621-5	BI-214	Gamma 901.1	3.26		0.575	0.380
160-40621-5	RA-226	Gamma 901.1	3.26		0.575	0.380
160-40621-5	TH -232	Gamma 901.1	1.22		0.536	0.681
160-40621-5	U-238	Gamma 901.1	3.50		1.16	1.59
160-40621-6	TH-232	Alpha Spec A-01-R	1.95		0.319	0.0464
160-40621-6	U-238	Alpha Spec A-01-R	3.29		0.451	0.0539
160-40621-6	AC- 228	Gamma 901.1	2.58		0.440	0.294
160-40621-6	BI-214	Gamma 901.1	3.79		0.495	0.214
160-40621-6	RA-226	Gamma 901.1	3.79		0.495	0.214
160-40621-6	TH -232	Gamma 901.1	2.58		0.440	0.294
160-40621-6	U-238	Gamma 901.1	1.59		0.915	1.43

1. U Result is less than the sample detection limit.

QA/QC Summary:

There were no laboratory quality assurance sample result exceptions noted. Results for LCS, Blanks and Duplicate samples were within acceptance criteria and all duplicate Relative Error Ration (RER) results were in RER limit of 1. Based on QC sample results, the data are determined usable and no upward or down bias in sample results is evidenced.

The laboratory narrative identified a deficiency in sample volume for one sample however, the sample was not identified and analytical results for all samples were reported without exceptions noted.

In general, the sample results for U-238 and Th-232 are slightly above the range of concentrations that are inferred for average background soils (.5 to 1.5 pCi/g) but not outside the range of concentrations that can be encountered. Based on the gamma spectroscopy result for U-238, Ra-226 and Th-232 progeny nuclides appear to be in equilibrium with parents and alpha spectroscopy results generally confirm the gamma spec results. The samples do not appear to indicate any enhancement of one isotope or the other and concentration ranges are likely due to soil types from the area.

Gamma Walkover Survey Report

For

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

Prepared for:

By:

15 Hazelwood Dr., Suite 112
Amherst, NY, 14228

MJW Project No. 20.1023

1.0 Introduction

In June of 2023 MJW was contracted to perform surface radiological scans of the Riverview Innovation and Technology Campus, henceforth referred to as The Site. The Site is located at 3875 River Road, Tonawanda, New York 14150 and was a storage location and railroad junction for the former Tonawanda Coke Company during the majority of the twentieth century.

The Site consisted largely of various types of fill, with little to no native soil being left within two (2) feet of the surface. In addition to the fill there was a variety of slag document on The Site. Type of fill and slag was not uniform or patterned as determined from visual observations in-field. Much of The Site has become overgrown and vegetation dominated large parts.

Under the directive of Inventum Engineering, MJW was instructed to provide a GPS based gamma scan "walkover" of The Site to assess surface and near-surface radiological conditions. MJW performed these activities over three days, June 30th, July 3rd, and July 5th.

This analysis was performed in addition to sampling and test pits completed in October and November of 2020. A QA/QC of the soil sampling results was performed by MJW Health Physicists in February of 2021 and is included as Attachment 1.

2.0 Methodology

Instrumentation utilized for the survey consisted of a Bluetooth enabled Ludlum 2221r and a Ludlum 44-10 that was coupled with a sub-meter GPS unit to allow for the collection of data points. MJW mounted the equipment to a specially modified cart to enable consist geometry of the detector. The detector was mounted at exactly ten (10) centimeters from the ground with the GPS unit directly overhead.

A transect plan was created to provide guidance in-field for optimal survey coverage. Transects were spaced twelve (12) meters apart to provide a high probability of discovering any anomalies and accurately assessing the site for future remediation or construction activities. The Site covers approximately 86.5 acres and there are active remediation and demolition activities taking place. The activities taking place along with the inability to access sections of the site due to pits, overgrown vegetation, fencing, flooding, and other factors prevented the exact following of transects. Transects were walked wherever possible but in-field adjustments were made, as well as extended surveying of possible anomalies in an attempt to delineate any anomalies.

Background gamma count data was collected at the nearby Erie County Water Authority located at 3750 River Road, Tonawanda, NY 14150. Data was collected over impervious and pervious surfaces. It was anticipated that The Site would have large amounts of impervious surfaces from previous indications, in actuality The Site was almost entirely pervious and as such only that background data will be considered. Figure 1 displays the location of both the background study area and The Site.

3.0 Data Analysis

Background data was statistically analyzed using Visual Sample Plan (VSP). VSP determined that there were no outliers in the upper and lower 5% but that the data could not be determined to be normally distributed. The Quantile-Quantile plot is attached as Figure 2. The data was deemed acceptable for use due to the lack of outliers and the near-normality showed. 614 data points were analyzed with a mean of 8392.9 counts per minute (cpm). The data is symbolized along its standard deviations in Figure 3.

28884 data points were collected at The Site over the three days. Statistical analysis was performed using VSP. There were no outliers in the upper and lower 5% of the data. The data is not normally distributed and the histogram indicates a unimodal right skewed representation. A Quantile-Quantile plot and the histogram are attached as Figure 4. The data mean was 7900.8 cpm.

4.0 Results

The data as symbolized in Figure 5 along the < Background, 1-1.5x Background, 1.5-2x Background, and >2x Background indicates the clear presence of radiological impacts in the surface and near-surface soils. Multiple large area locations indicate areas where counts exceeded twice background, as well as greater than 1.5 times background counts being populated through much of the site. The radiological impacts are non-uniform. There was no visual identification of discrepancies in soil status in elevated areas.

The areas where counts exceeded twice background are consistently in the middle of The Site (north-south). The other radiological impacts do not appear to follow any pattern. More extensive analysis and surveys are required to denote the exact nature of the radiological impacts and delineate them.

Figures

Figure 1:

The Site
Background
Location of The Site and the Background Location in Comparison to Western Tonawanda
Locations
Google Earth
0
1,000
2,000 m
Created by the MJW Companies
July 2023
Basemap Credit to Google

Figure 2:

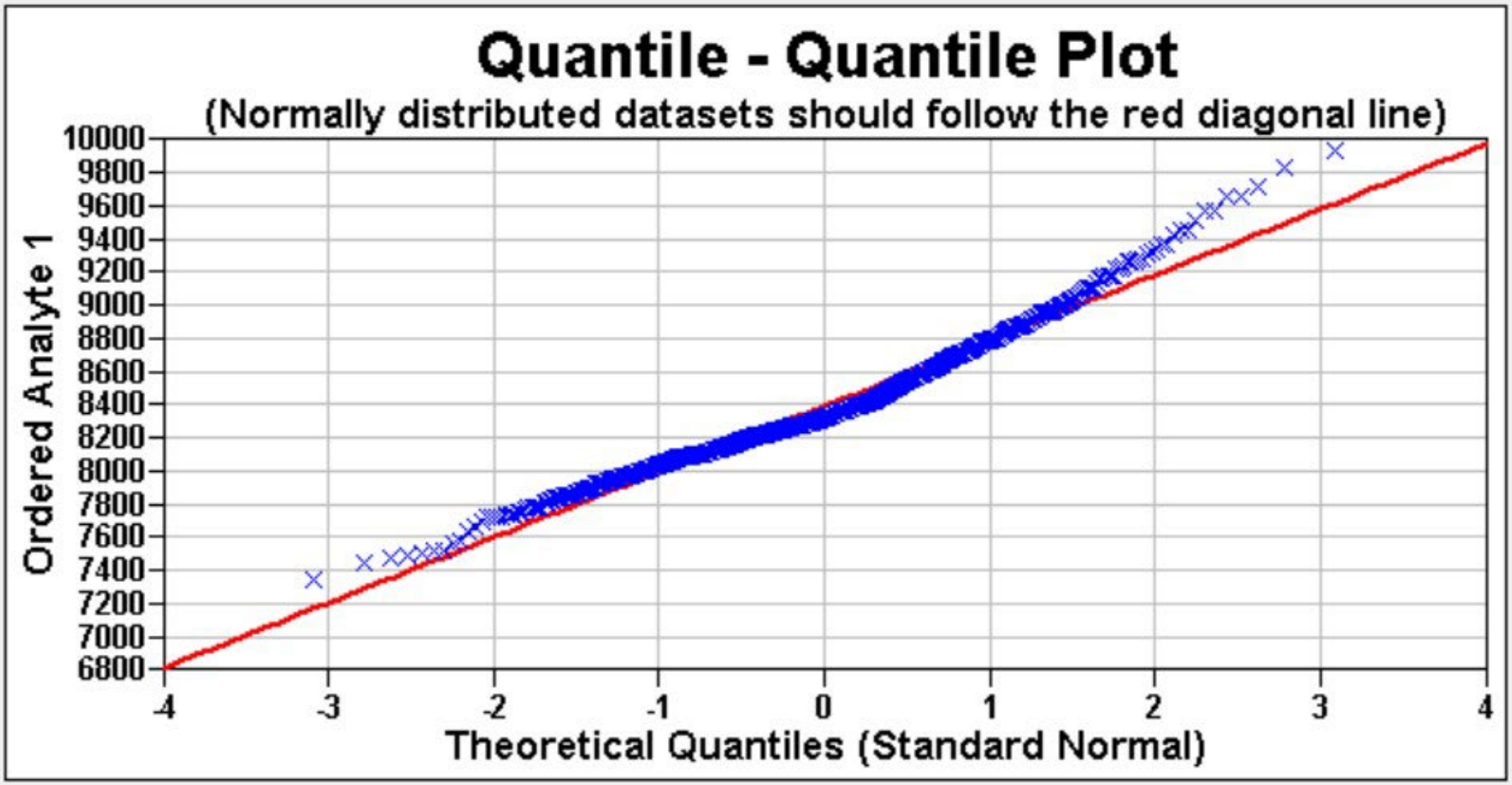

Quantile - Quantile Plot
(Normally distributed datasets should follow the red diagonal line)
Ordered Analyte 1
10000
9800
9600
9400
9200
9000
8800
8600
8400
8200
8000
7800
7600
7400
7200
7000
6800
-4
-3
-2
-1
0
1
2
3
4
Theoretical Quantiles (Standard Normal)

Figure 3:

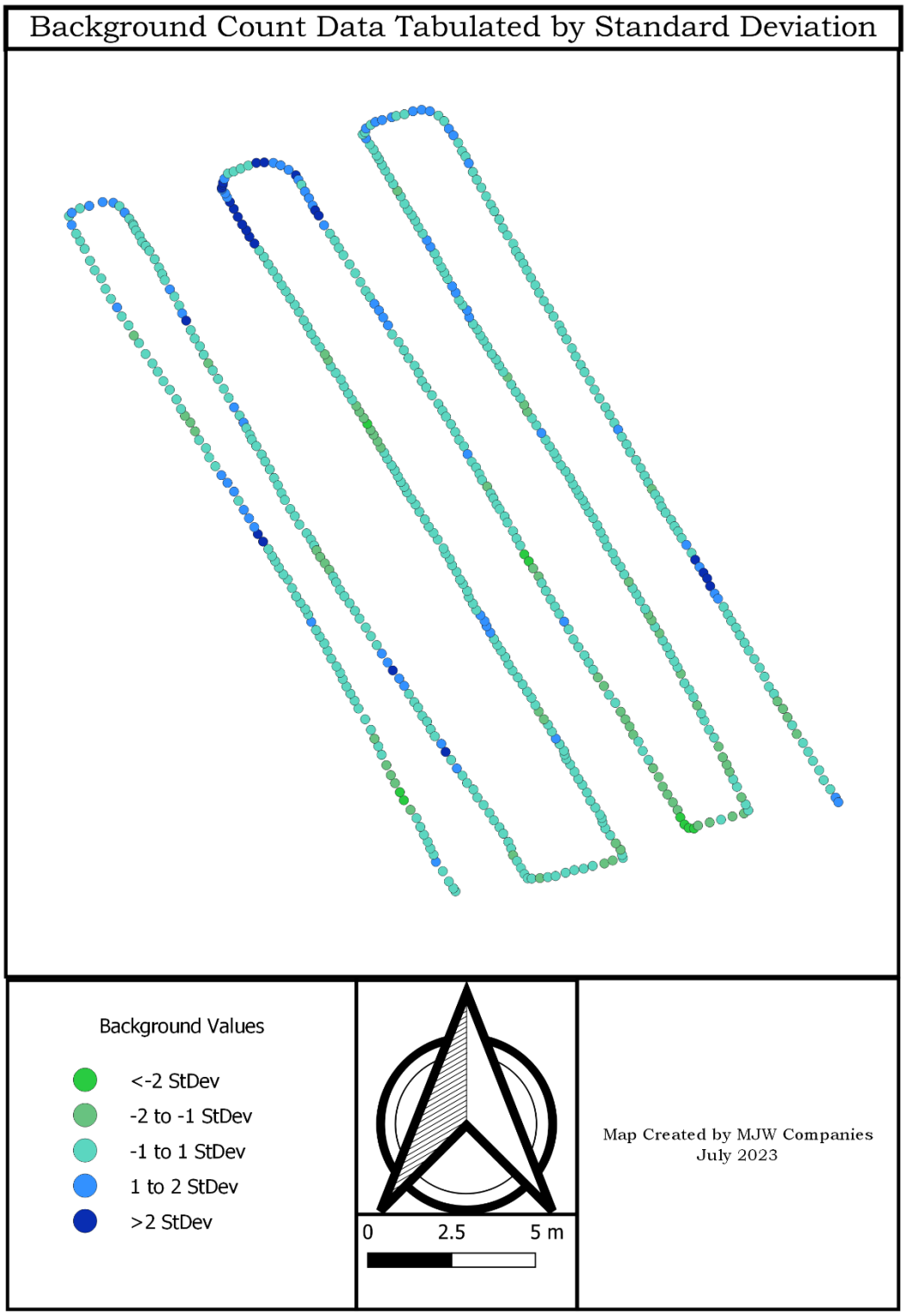

Background Count Data Tabulated by Standard Deviation
Background Values
<-2 StDev
-2 to -1 StDev
-1 to 1 StDev
1 to 2 StDev
>2 StDev
0
2.5
5 m
Map Created by MJW Companies
July 2023

Figure 4:

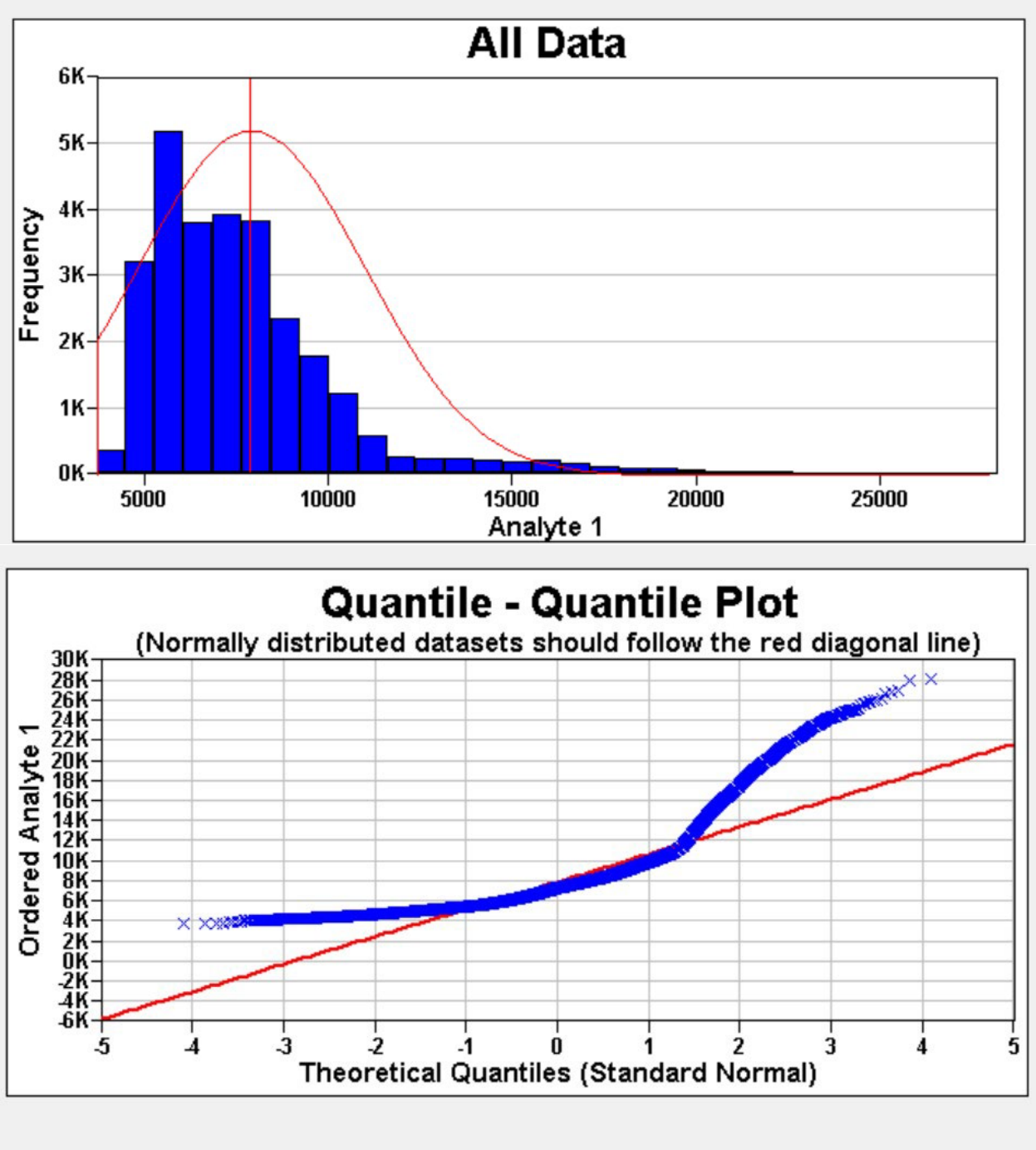
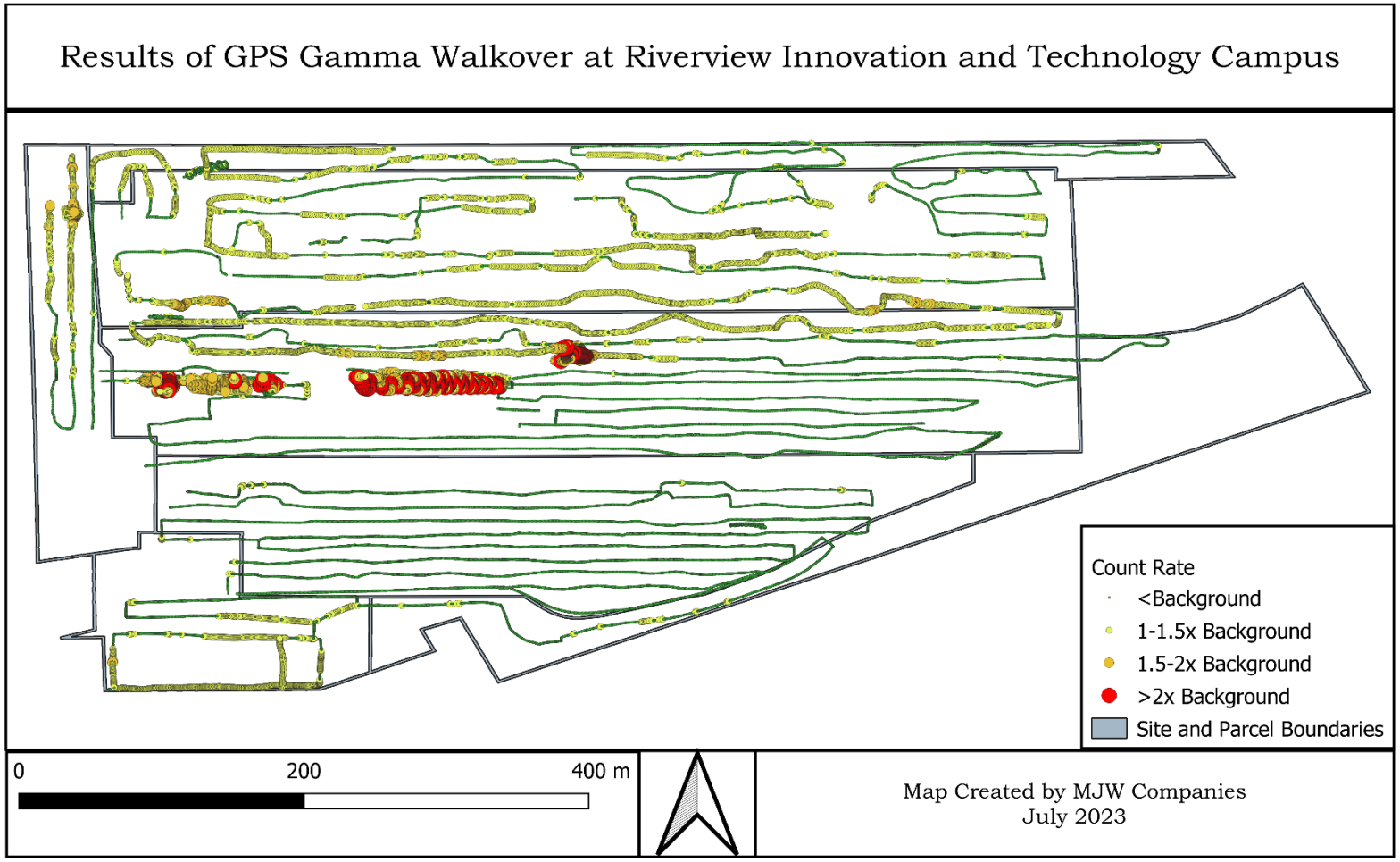

All Data
Frequency
6K
5K
4K
3K
2K
1K
0K
5000
10000
15000
20000
25000
Analyte 1
Quantile - Quantile Plot
(Normally distributed datasets should follow the red diagonal line)
Ordered Analyte 1
30K
28K
26K
24K
22K
20K
18K
16K
14K
12K
10K
8K
6K
4K
2K
0K
-2K
-4K
-6K
-5
-4
-3
-2
-1
0
1
2
3
4
5
Theoretical Quantiles (Standard Normal)

Figure 5:


Results of GPS Gamma Walkover at Riverview Innovation and Technology Campus
Count Rate
<Background
1-1.5x Background
1.5-2x Background
>2x Background
Site and Parcel Boundaries
0
200
400 m
Map Created by MJW Companies
July 2023

Gamma Walkover Survey And Associated Sampling Report

For

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

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Amherst, NY, 14228

September 17, 2024
Revised: March 31, 2025

MJW Project No. 24.1007.3

1.0 Introduction

Following the New York State Department of Environmental Conservation (NYSDEC) approval of the Radiological Work Plan (RWP) on April 30, 2024 (Attachment A) MJW was contracted to perform additional investigation activities in accordance with the approve RWP at the Riverview Innovation and Technology Campus, henceforth referred to as the Site. The Brownfield Cleanup Program (BCP) Site is located at 3875 River Road, Tonawanda, New York 14150 and was a storage location and railroad junction for the former Tonawanda Coke Company during the majority of the twentieth century. MJW mobilized to the site in June 2024 and conducted a GPS-enabled Gamma Walkover Survey, followed by associated sampling events. In accordance with the April 30, 2024, approval letter, NYSDEC was notified 5-days in advance of the start of field activities and attended portions of the sampling effort.

The Site consists largely of various types of fill with little to no native soil being left within two (2) feet of the surface. In addition to the fill there was a variety of slag documented on the Site. The type of fill and slag was not uniform or patterned as determined from visual observations in-field. Much of the Site has become overgrown and vegetation dominates large areas including the former coal and coke yards.

The presence of documented slag was observed to have been used on-site as base and ballast materials predominately under the former railroad tracks on the BCP site.

Under the directive of Inventum Engineering and in compliance with the NYSDEC approved RWP, MJW was instructed to provide a GPS-based gamma scan "walkover" of the Site to assess surface and near-surface radiological conditions. MJW performed these activities over two days, on June 18 and June 19, 2024. Immediately following the tabulation of walkover results, sampling activities were conducted on June 26, 2024.

This laboratory analysis was performed in addition to previous site investigation work, documented in the RWP.

2.0 Methodology

Instrumentation utilized for the survey consisted of a Bluetooth enabled Ludlum 2221r and a Ludlum 44-10 that was coupled with a sub-meter GPS unit to allow for the collection of data points. MJW mounted the equipment to a specially modified cart to enable consist geometry of the detector. The detector was mounted at exactly ten (10) centimeters from the ground with the GPS unit directly overhead.

A transect plan was created to provide guidance in-field for optimal survey coverage. Transects were spaced five (5) meters apart to provide in-depth data supporting the preliminary walkover which contained 12 (twelve) meter transects. The Site covers approximately 86.5 acres and there are active remediation and demolition activities taking place. The GPS walkover covered only the western portion of the Site, beginning west of the Thaw Shed and moving North-South. This is in comparison to the preliminary walkover which traversed The Site in a West-East direction and covered the entire site. The activities taking place along with the inability to access sections of the site due to pits, overgrown vegetation, fencing, flooding, and other factors prevented the exact following of transects. Transects were walked wherever possible, but in-field adjustments were made as necessary due to obstructions, surface accumulations of water, and piles of concrete.

Extreme heat warnings were issued in western New York on the days this survey was performed, so to protect the health and safety of MJW radiological control technicians, other field operatives, and meet project requirements, transects were skipped at regular intervals if no counts above background had been documented on the prior transect. In areas where elevated readings were found or had the potential to be found, these skipped transects were scanned to fully delineate the elevated area. Extended surveying of previously documented and newly discovered potentially elevated measurement locations (EMLs) took place, irrespective of other conditions.

Background gamma count data was collected at the nearby Erie County Water Authority located at 3750 River Road, Tonawanda, NY 14150. Data was collected over impervious and pervious surfaces. The background data had been previously collected for the preliminary walkover and was utilized for consistency and standardization of data.

Twenty (20) biased and twelve (12) unbiased soil samples (Figure 3) were collected utilizing the data from the gamma walkover. EMLs were identified according to the outer bounds of elevated data points, and with respect to each area size, a proportion of biased and unbiased samples were assigned. Two (2) biased samples were reserved for areas that had been previously inaccessible for sampling by flooding. The flooded areas were still partially inaccessible for gamma surveying, and an excavator was used to pull surficial and sub-surface material out for sampling activities. Two (2) additional unbiased samples were collected as MJW field operatives traversed the site and were totally random.

Samples were collected from test pits. Prior to ground-breaking, the area would be scanned with a 1-minute scaler count using a Ludlum 44-10 paired with a Ludlum 2241-2. Following the scan, the test pit would be excavated from between 1-4 feet, depending on subsurface conditions. Following the removal of soil and subsurface materials, a 500-gram sample was pulled and placed within a sample jar. The sample jar was then scanned by placing the Ludlum 44-10 on top of the jar, no cover, and a scaler 1-minute count was recorded. All of this information is recorded in Attachment 1, Field Sample Log Sheets. The sheets record the sample ID (pre-determined), time at which the sample was placed in the jar, the relevant sample information for consistency with Attachment 5 (the lab Chain-of-Custody), the gross surface reading (1-min on ground scaler count) and then the notes section provides a more in-depth description of the sample material and the on-jar scaler count.

All 37 collected samples were analyzed with gamma-spectroscopy (DOE HASL 300, 4.5.2.3/Ga-01-R) 10% of samples were collected with sufficient volume to analyze field duplicates. Three (3) field duplicates were collected; three (3) lab duplicates were also analyzed. Fifteen (15) samples were analyzed by alpha-spectroscopy for isotopic Uranium and Thorium (DOE EML HASL-300, U-02-RC Modified, DOE EML HASL-300, Th-01-RC Modified). This additional analysis provides confirmatory results for the broader gamma-spectroscopy performed on all samples. All samples were sent to GEL Labs facilities in Charleston, North Carolina, under a valid Chain of Custody (COC).

3.0 Data Analysis

3.1 Gamma Walkover

Background data was statistically analyzed using Visual Sample Plan (VSP). 614 data points were analyzed with a mean of 8,392.9 counts per minute (cpm).

A total of 20,164 data points were collected at the Site over the two days. Statistical analysis was performed using QGIS. There were no outliers in the upper and lower 5% of the data. Compared to the 2023 Walkover, there were fewer data points (numerically and percentage-wise) that exceeded the area background value, and 1.5x, 2x and 2.5x the area background value (Table 1).

Table 1.

Comparison of 2023 vs 2024 Gamma Walkover Data (8392 cpm Area Background)								
	Total Data Points	# > ABKG*	# > 1.5x ABKG	#> 2x ABKG	#>2.5x ABKG	% > 1.5x ABKG	%> 2x ABKG	%>2.5x ABKG
2024 Walkover	20164	4293	512	158	24	2.54%	0.78%	0.12%
2023 Walkover	28884	8679	2048	809	222	7.09%	2.80%	0.77%
*Area Background								

3.2 Samples:

Thirty-seven (37) collected samples were sent to GEL Labs for analysis. One (1) target sample and one (1) QA/QC sample were recounted due to peak shift. There are no other recounts. In total, 1,895 sample results were reported, of which 325 did not have an attached U (not detected above MDA) or UI (Considered a false positive) qualifier. All of the collected samples returned at least three (3) non-qualified values, with the maximum being fifteen (15); reported for samples S3.B3 and S3.U1, respectively.

4.0 Results

4.1 Gamma Walkover Results

The data as depicted in Figure 2 along the < Area Background, Area Background to 1.5x Area Background, 1.5-2x Area Background and >2.5 times Area Background. >2x and >2.5 times Area Background indicates the clear presence of radiological impacts in the surface and near-surface soils. There was no visual identification of discrepancies in soil status in elevated areas.

The areas where counts exceeded twice background are consistent with previously identified EMLs: in the middle of the Site (east-west) and the upper northwest and southwest corners. Other radiological impacts were not identified.

4.2 Sample Results

Table 2 below summarizes relevant information from the sample results. The average concentrations for Ra-226 in all samples is below the 5.0 pCi/g limit identified within DMM-5 for TENORM (Background-comparable) material. Twelve (12) samples exceeded or have the potential to exceed the 5.0 pCi/g DMM-5 limit for TENORM Background-Comparable; five (5) from Area 1, four (4) from Area 2, two (2) from Area 3, and one (1) from Area 4. This is consistent with the EML sizes, with Area 1 being the largest and Area 4 being the smallest. The maximum reported Ra-226 concentration is 12.6 pCi/g, no samples met the criteria within DMM-5 for TENORM Waste (greater than 15.0 pCi/g of Ra-226).

Table 2.

Nuclide Information Table										
↓Sample ID[1]							GS[3]		AS[3]	
Sample Concentration (pCi/g) →	[Ac-228]	UNC[2]	[K-40]	UNC	[Ra-226]	UNC	[U-238]	UNC	[U-238]	UNC
S2.B1	0.465	0.298	U	U	3.51	0.33	3.26	2.97	N/A	N/A
S2.B2	U	U	2.62	1.36	4.93	0.42	U	U	N/A	N/A
S2.B3	U	U	4.74	1.36	6.32	0.408	U	U	N/A	N/A
S2.B4	0	0.338	7.27	1.47	3.42	0.341	U	U	N/A	N/A
S2.B5	U	U	11	1.7	3.79	0.373	U	U	N/A	N/A
S2.B6	U	U	9.61	1.25	0.326	0.14	U	U	U	U
S2.U1	U	U	1.61	0.708	0.875	0.193	U	U	N/A	N/A
S2.U2	0.246	0.241	2.04	1.02	0.32	0.11	U	U	N/A	N/A
S2.U3	1.16	0.34	4.03	1.16	11	0.525	U	U	N/A	N/A
S2.U4	1.29	0.519	1.86	1.94	10.2	0.57	8.11	5.51	5.39	1.05
S2.U2.D	0.335	0.222	5.09	0.995	0.51	0.17	1.56	1.53	U	U
S3.B1	0.663	0.466	17.1	2.17	1.21	0.234	U	U	0.426	0.366
S3.B2	U	U	4.64	1.08	9.17	0.472	7.48	5.04	7.84	1.38
S3.B3	U	U	U	U	0.529	0.155	U	U	N/A	N/A
S3.B4	0.304	0.314	2.65	0.958	0.598	0.193	U	U	N/A	N/A
S3.U1	U	U	4.68	1.57	10.7	0.474	8.53	2.04	6.33	1.14
S3.U2	U	U	1.66	1.34	2.23	0.284	U	U	N/A	N/A
S3.U3	U	U	1.23	0.541	0.552	0.146	1.97	1.28	N/A	N/A
S3.B4.D	0.214	0.16	1.38	0.984	0.348	0.137	U	U	0.351	0.302
S4.B1	1.19	0.378	8.43	1.48	1.56	0.297	U	U	U	U
S4.B2	0.887	0.342	2.73	0.981	5.77	0.377	U	U	N/A	N/A
S4.U1	0.982	0.379	7.22	1.5	1.24	0.258	U	U	0.581	0.449
S1.B1	0.908	0.463	21.3	2.4	1.12	0.302	U	U	N/A	N/A
S1.B2	1.73	0.555	4.42	1.64	10.6	0.62	10.4	8.19	N/A	N/A
S1.B3	0.94	0.409	18.2	2.3	1.56	0.228	U	U	N/A	N/A
S1.B4	U	U	8.56	2.03	12.6	0.595	5.74	5.9	N/A	N/A
S1.B5	0	0.447	6.58	1.43	8.49	0.516	U	U	5.46	1.02
S1.B6	U	U	17.8	2.25	1.94	0.279	U	U	N/A	N/A
S1.U1	0	0.294	20.4	2.09	0.667	0.275	U	U	N/A	N/A
S1.U2	U	U	13.8	1.94	4.73	0.364	4.74	3.37	3.18	0.835
S1.U3	0	0.264	13.4	1.44	1.94	0.219	3.59	3.72	0.803	0.42
S1.U4	1.32	0.425	10.9	1.78	10.5	0.529	8.21	4.32	N/A	N/A
S1.B1.D	1.44	0.331	18.9	1.85	1.25	0.197	U	U	U	U
F1	U	U	6.6	1.6	0.762	0.163	U	U	0.457	0.346
F2	0.343	0.182	2.16	0.732	0.637	0.189	U	U	N/A	N/A
Control 1	U	U	2.92	0.904	0.41	0.177	U	U	N/A	N/A
Control 2	U	U	2.64	0.957	0.503	0.17	U	U	0.571	0.359
S2.B1(674299001DUP)	U	U	1.94	1.07	3.7	0.35	U	U	N/A	N/A
S4.B2(674299021DUP)	0.873	0.412	3.68	1.13	6.1	0.406	4.2	3.91	N/A	N/A
S2.U2.D(674299011DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.443	0.366
S2.B6(674299006DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	U	U
Average Concentrations	**0.695**	**0.368**	**7.454**	**1.513**	**3.759**	**0.343**	**5.649**	**4.414**	**2.653**	**0.765**

1. Sample ID - S(Sample Area Number)#.U/B (Unbiased or Biased)#.D(Field Duplicate)
2. UNC - Counting Uncertainty
3. GS - γ Spec, AS - α Spec
4. U - Unidentified
5. N/A - Not Analyzed

4.3 Sample and Gamma Count Association

All samples that returned values with the potential for excess of 5.0 pCi/g of Ra-226 were associated with locations producing elevated counts. One sample (S4.B2) was associated with GPS counts that did not exceed 2x background levels but that exceeded 1.5x background levels.

Seven of the "elevated" samples were directly (within 5 meters) associated with counts in excess of 2x background; six (6) of which had the highest Ra-226 concentration of any other onsite samples.

Sampling results, when associated with Gamma Count readings, indicate that 2x Background is a confident indication of elevated activity. Sampling results also indicated that NORM isotopes (K-40) have high variability across the site and include the potential for false positive identification of TENORM with field screening.

Historical site conditions and previous radiological investigations support the results of these surveys and sampling events; there exist small pockets of potential TENORM and radiologically impacted material on western areas of the site. These pockets exist due to the historical usage of slag on site and can be clearly delineated utilizing field instrumentation.

5.0 Material Disposition and Future Use

Radiologically unimpacted material has no restrictions on future use. Four (4) locations are associated with elevated activity:

- Northwest Corner – Parking Lot AOI 1 – Last property purchased from Wickwire Spencer Steel Company. An area of approximately 20 by 35 meters with an estimated volume of 960 cubic meters (estimated 2,300 tons). See Table 2 samples S1.B2, S1.B4, S1.B5 and S1U4.
- Coke Yard AOI 2 south of former coke wharf, northeast of former shower building, estimated volume: 310 cubic meters (estimated 740 tons). See Table 2 samples S3.B2 and S3.U1.
- Coke Yard AOI 3 south of former coke wharf, south of former coal breaker building, estimated volume: 420 cubic meters (estimated 980 tons). See Table 2 samples S2.B3 and S2.U4.
- Water Treatment AOI 4 - North side of stormwater retention basin, estimated volume: 160 cubic meters (estimated 380 tons). See Table 2 sample S4.B2 (DUP).

The estimated volume for these four areas with elevated activities assumed an excavation depth below ground surface of approximately 54-inches which is consistent with native clay soil layer across the site. This material with elevated concentration that must be disturbed will be managed under the Remedial Action Work Plan and an approved TENORM Management Plan.

EMLs are not generally determined by nuclide concentrations alone. They also must include the presence of gamma counts in excess of 1.5 times to 2 times area background. When combined with soil sample results above the DEC (DMM-5) concentration of 5.0 pCi/g above background for Ra-226 is proposed as a determination of an EML for purposes of the TENORM Management Plan.

Management of material in excess of the approved EMLs that must be disturbed to implement the Remedial Action Work Plan (RAWP) shall be governed by a DEC-approved TENORM Management Plan. For material identified as TENORM Fill (5.0-15 pCi/g) above area background to remain on-site, a variance application will be submitted in conjunction with the TENORM Management Plan. Overall disposition and usage of material is subject to NYSDEC approval.

6.0 List of Attachments

Attachment 1. Field Sample Log Sheets
Attachment 2. Instrument Calibration Sheets
Attachment 3. MJWRCP-40 Performing a GPS Enhanced Gamma Radiation Survey, Rev. 4
Attachment 4. MJWRCP-66 Soil Sampling Protocols, Rev 0
Attachment 5. GEL Chain of Custody Form
Attachment 6. GEL Lab Report SDG674299

Figures

Figure 1:

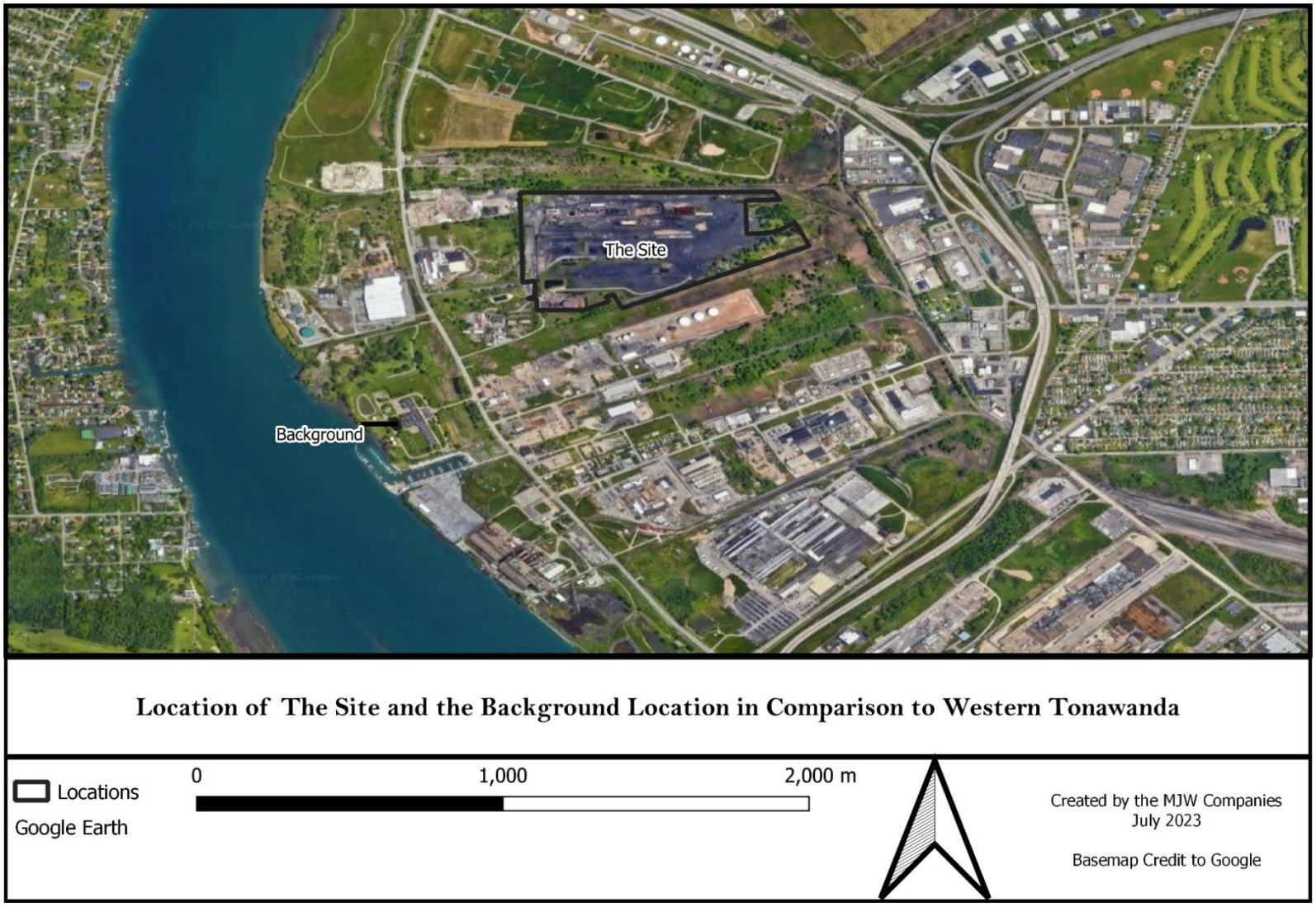
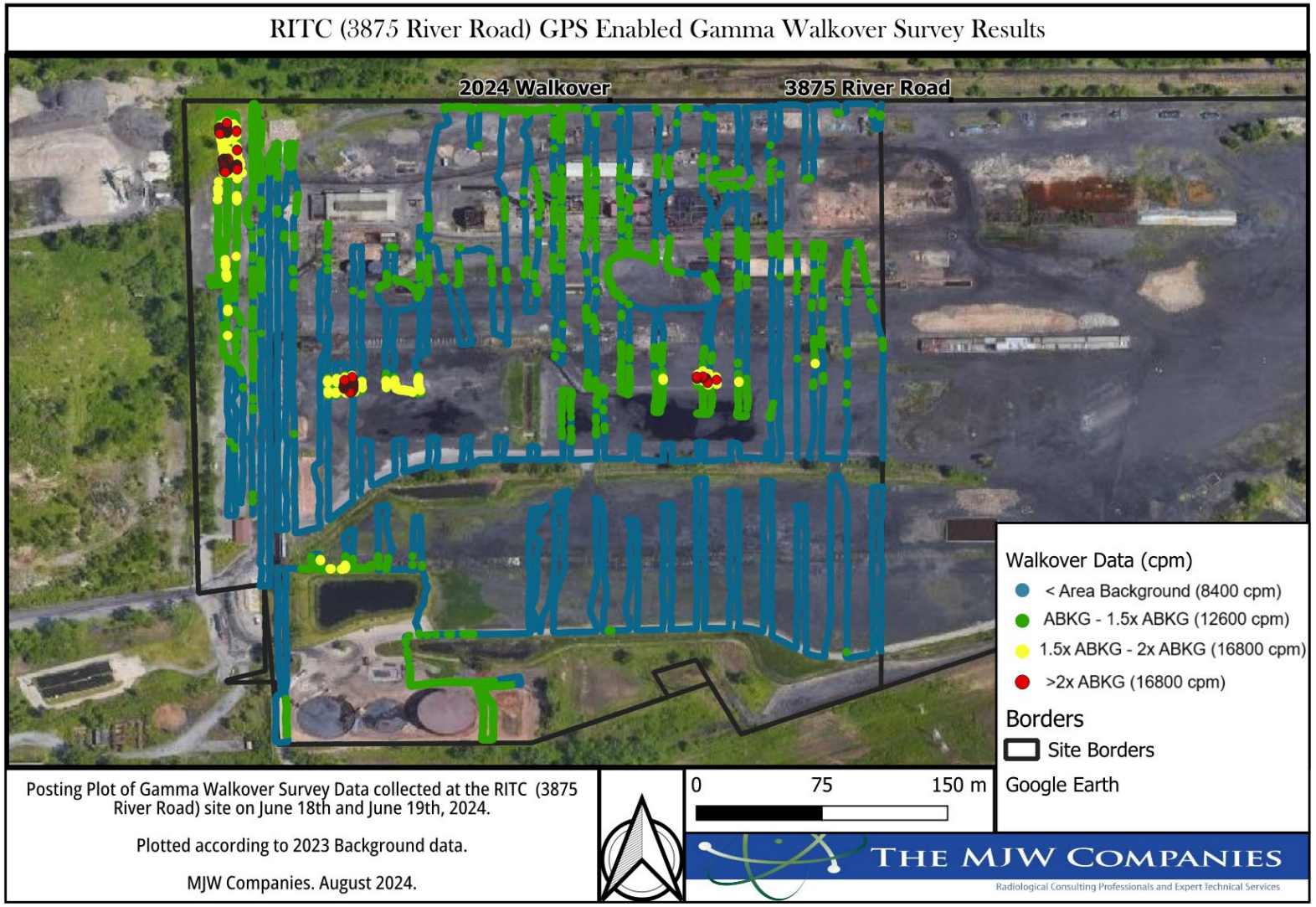
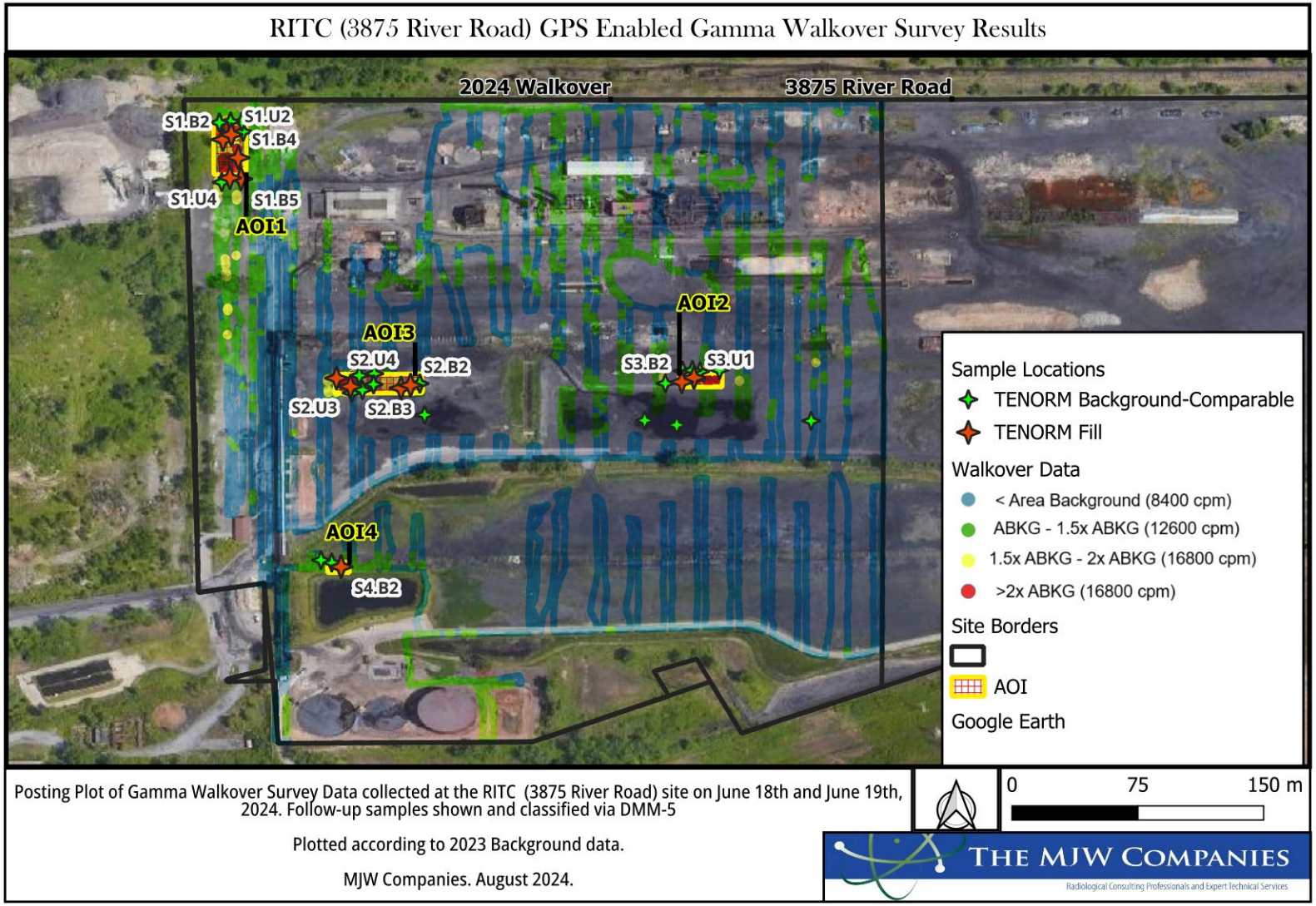

The Site
Background
Location of The Site and the Background Location in Comparison to Western Tonawanda
Locations
Google Earth
0
1,000
2,000 m
Created by the MJW Companies
July 2023
Basemap Credit to Google

Figure 2:



(Dark blue areas on satellite imagery represent water retention ponds and areas of regular flooding)

Figure 3.



(Dark blue areas on satellite imagery represent water retention ponds and areas of regular flooding)

RADIOLOGICAL WORK PLAN RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS 3875 RIVER ROAD TOWN OF TONAWANDA, NEW YORK NYSDEC SITE #C915353

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April 15, 2024

MJW Job No. 23.2029

1.0 Introduction

1.1 General

This radiological work plan has been prepared to address the radiological monitoring and safety activities required during site investigation to determine the presence of potential (Technically Enhanced Naturally Occurring Radioactive Material (TENORM). Slag was encountered during the Remedial Investigation of the Riverview Innovation & Technology Campus (RITC) Brownfield Cleanup Program Site located at 3875 River Road, Town of Tonawanda, New York (BCP Site). In accordance with the approved Remedial Investigation Work Plan (RIWP), the slag was screened by MJW and submitted for radiological analysis. The results of the analyses conducted by MJW were included in the Draft RI Report and comments from the New York State Department of Environmental Conservation (NYSDEC) triggered the need for additional testing to define the procedure required for the development of the Remedial Action Work Plan (RAWP). Remediation of TENORM is not a requirement of the BCP, a component of the alternatives analysis process, or a criteria for selection of the remedial actions at the BCP Site. The management of TENORM is a RAWP and Site Management Plan criteria.

The BCP Site is the Riverview Innovation & Technology Campus, Inc. (RTIC) Brownfield Cleanup Program (BCP) Site (#C915353). The property was a portion of the former Tonawanda Coke facility location at 3875 River Road in the Town of Tonawanda, New York. Figure 1 shows the location of the site with respect to River Road. Industrial properties and the Niagara River further west of River Road. In addition to the work described herein, MJW has conducted work and is preparing work plans for three properties around the BCP Site. For clarity, the following site names are used by MJW:

- BCP Site – That portion of the 3875 River Road property RITC entered into the BCP.
- Site 108 – 3800 River Road, a portion of the Tonawanda Coke Corporation (TCC) State Superfund Site, NYSDEC #915055. The work on Site 108 was conducted for Parsons Engineering.
- 4111 River Road Site – Property previously owned by the Erie County Industrial Development Agency (ECIDA), now owned by the Town of Tonawanda. The 4111 Site is north of the BCP Site, separated by a railroad right of way. Work on this Site was conducted for the ECIDA.

This Work Plan is required to provide specific work details, the areal and vertical extent of the BCP Site that may contain TENORM, and provides a existing data available from the project area for development of radiological work precautions. The Draft Remedial Investigation Report (RIR)[1] is available on the NYSDEC Infolocator: (https://extapps.dec.ny.gov/data/DecDocs/C915353/)

This plan includes the components of the new policy document DMM-5 issued by NYSDEC regarding management of TENORM (Reference 1). Guidance is provided for how to appropriately handle TENORM encountered during construction or earthwork projects, such as clearing, grading, excavation, filling, demolition, or stockpiling.

The MJW Corporation has been performing radiological work in Western New York, New York State and several other sites in the US since 1991. The company has been involved in the characterization and remediation of sites with potential radiological issues across a wide spectrum of nuclides and quantities.

[1] https://extapps.dec.ny.gov/data/DecDocs/C915353/Report.BCP.C915353.2023-08-18.Volume%20%231%20-%20DRAFT%20RI%20REPORT%20-%20Text%20and%20Tables%20.pdf

Consequently, MJW has developed procedures to perform all of the tasks necessary to characterize the BCP Site and also to provide the expert radiological management and trained technicians to ensure work done on the BCP Site is done safely when TENORM or radioactive source management is required.

1.2 Previous Site Investigative Work

The BCP Site has been the subject of detailed remedial investigation activities since the fourth quarter of 2020. At the time the Remedial Investigation Work Plan (RIWP) was prepared, the potential for slag materials was addressed but there was no direct evidence of the presence of materials until they were subsequently encountered during the field investigations. Inventum Engineering and the NYSDEC observed possible TENORM slag and samples were collected for screening and subsequently submitted for radiological analysis. MJW performed a GPS-enhanced overland gamma survey in response to comments on the Draft RIR and to provide data for the preparation of this work plan. MJW has completed soil sampling on the BCP Site, Site 108 and the 4111 Site beginning in late 2020.

Samples collected on the BCP Site are included in the report *Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY* dated February 10, 2021 (Attachment 1). The samples described in that report were collected between October 30, 2020, and November 18, 2020. The samples were submitted to Eurofins TestAmerica in St. Louis, MO with gamma spectroscopy and alpha spectroscopy analyses performed for U-238 and Th-232. A summary of the radiological analytical results is shown in Table 1 below.

Table 1. BCP Site (3875 River Road) Test Pit Soil Analysis (Samples Collected 10/30 to 11/18/2020

Method→	901.1, Gamma Spec	901.1, Gamma Spec	Alpha Spec	901.1, Gamma Spec	Alpha Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[U-238], pCi/g**	**[Th-232], pCi/g**	**[Th-232], pCi/g**
TP-BCP-34-A	4.46	5.04	3.12	0.858	1.36
TP-BCP-34-B	3.7	2.73	4.06	0.561	0.737
TP-BCP-32-W45	0.515	0.851	0.474	0.735	1.58
TP-BCP-44A	2.99	2.42	2.31	1.07	0.322
TP-BCP-44B	3.26	3.5	4.35	1.22	0.783
TP-BCP-47	3.79	1.59	3.29	2.58	1.95
Averages:	**3.12**	**2.67**	**2.93**	**1.17**	**1.12**

The gamma spectroscopy analyses for Ra-226 and gamma and alpha spectroscopy analysis for U-238 show that all samples analyzed are in equilibrium, and thus were classified as naturally occurring radioactive material (NORM). Th-232 results show an average of about 1.12 picocuries per gram (pCi/g) which is very near a Th-232 background concentration of 1 pCi/g. The sample locations are shown in Attachment 1.

The BCP Site was serviced by numerous rail lines to deliver coal and transport coke, tar and other by products of the TCC coking process. The tracks, including those of a central coal stacker reclaimer, were constructed over ballast composed primarily of various types of slag. The samples listed in Table 1 represent the different slag materials encountered during the RI. Although the origin of the slag is

unknown, it would have likely been purchased starting in 1917, there was a fully integrated steel mill adjacent to the TCC Site that was known to have produced both blast furnace and open-hearth furnace slags. The steelmaking process may have slightly increased the NORM in their raw materials but as previously mentioned the slag tested during the Remedial Investigation were tested and the Ra-226 concentrations averaged about 3 pCi/g.

1.3 Discussion of Tonawanda Regional Radiological Background in Soils

The background sample for the RITC BCP site was collected from the 4111 River Road site adjacent to and just north of the RITC BCP site. It should be noted that this property lies between a railroad right of way, has former rail lines and is adjacent to a large fly ash landfill (the NRG landfill for the former Huntley station is immediately north of 4111 River Road. Unfortunately, the 4111 River Road background sample analysis did not produce a usable U-238 value as alpha spectroscopy analysis was not requested, only gamma spectroscopy. The Ra-226, Ra-228 and Th-232 values for the 4111 River Road Site sample were usable and indicated general area background levels of Radium (Ra-226) of 2.06 Ci/g, Ra-228 of 1.38 pCi/g and Th-232 of 1.38 pCi/g, respectively. Due to this unusable result for U-238, MJW decided to collect two additional area background samples for analysis. One from the Tonawanda Treatment Plant property near Aqua Lane (GPS coordinates 42°57'54.6"N 78°55'22.3"W) and one in Sheridan Park just north of Sheridan Drive (GPS coordinates 42°58'54.2"N 78°54'04.0"W). These additional sample data are shown in Table 2 below and sample locations in relation to the RITC are shown on Figure 1 below.

Table 2. Results of Additional Background Sampling for The RITC Site (Samples Collected 12/24/2023)

Method→	901.1, Gamma Spec	901.1, Gamma Spec	901.1, Gamma Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[Ra-228], pCi/g**
01122024-TWT1	0.822	1.02	0.986
01122024-SB1	0.734	1.48	0
01122024-TWT1(DUP)	0.673	0	1.25
Average (Non-Zero Results)	**0.74**	**1.25**	**1.12**

The sample collected at the Tonawanda Water Treatment Plant (TWT1) is located 1.24 miles south of the RITC site. The Sheridan Park sample (SB1) is located 1.36 miles east of the RITC site. The average concentration results are in the same range as the other background sample results discussed above. The location of these additional samples in relation to the RITC are shown in Figure 1 below.

Figure 1. Location of Additional Background Samples Collected in Relation to the RITC Site (Blue Dots)

It should be noted that in Oak Ridge National Laboratory (ORNL) report number ORNL/TM-7343 (11/1981) titled "State Background Radiation Levels: Results of Measurements Taken During 1975-1979", six surface soil samples were collected in New York State, three collected in the Tonawanda area as follows:

- *NY-1 City of Tonawanda at the city limit on River Rd. across from Consolidated Freightways Terminal (about 1.5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 0.97±0.08 pCi/g; Th-232, 0.65±0.06 pCi/g, and U-238, 0.99 pCi/g.*

- *NY-3 West side of River Rd. across from the Allied Chemical Corp. (5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 1.2±0.04 pCi/g; Th-232, 0.88±0.06 pCi/g, and U-238, 1.2 pCi/g.*

- *NY-4 Intersection of Tonawanda Creek Rd. and Niagara Falls Blvd. in North Tonawanda (5.6 mi northeast of RITC). Measured soil nuclide concentrations were: Ra-226, 0.69±0.04 pCi/g; Th-232, 0.40±0.12 pCi/g, and U-238, 0.76 pCi/g.*

The three other New York sites that were sampled were all in Lockport, NY (approximately 18 miles directly northeast of the RITC site) and reported similar background values to those above. The three U-238 values were: NY-2, 0.97; NY-5, 0.85, and NY-6, 0.96 pCi/g. The average of all reported U-238 soil

samples analyzed is 0.96 pCi/g, for Ra-226 the average is 0.85 pCi/g and for Th-232 the average is 0.71 pCi/g. All reported counting errors were 2 Sigma.

1.4 GPS-Enhanced Gamma Walkover Survey of the RITC Site

A review of the information in Table 1 shows that for the RITC BCP Site, six slag samples were taken in February of 2021 during the remedial investigation. As a result of the preliminary remedial investigation sample results and comments from the NYSDEC, a gamma walkover survey was then conducted to provide information to prepare this work plan. Attachment 2 is titled *Gamma Walkover Survey Report for the Riverview Innovation & Technology Campus, Inc. 3875 River Road, Tonawanda, New York 14150. BCP SITE No. C915353*. The results of the gamma walkover survey performed in June of 2023 show an elevated area of gamma activity in the central/western portion of the site approximately 20 meters (m) wide by 200 m long. The focus of this work plan is to expand upon this preliminary GPS overland gamma information by:

1. Performing additional gamma walkover survey(s) beginning just east of the elevated activity areas and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas.
2. Following this additional walkover survey, MJW technical staff will collect 20 biased soil samples and 12 unbiased surface and subsurface samples in and around areas of elevated activity.

Radiological monitoring and related actions are required for all activities that may be impacted by TENORM materials at the RITC to protect public and worker health and safety and to control potential release of materials off-site (i.e., fugitive dust emissions, runoff, etc.) to levels as low as reasonably achievable (ALARA). Attachment 3 is MJWRCP-03, Field Investigation Survey Procedure, dated September 15, 2015. The BCP Site has an ongoing NYSDEC and New York State Department of Health (NYSDOH) approved Community Air Monitoring Program (CAMP) that will be operating throughout all sampling activities.

SITE DESCRIPTION

2.0 Site History

Prior to the TCC bankruptcy, the BCP Site was an operating coke making and by-products facility for more than 100-years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company merged into Allied Chemical Corporation, which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility from 1978 through October 2018. TCC filed for bankruptcy in 2018 and all manufacturing on the property BCP Site was permanently idled. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the remaining TCC properties to RITC was approved by the U.S. Bankruptcy Court. The purchase of the properties was completed October 10, 2019. Management of the properties was transitioned from the USEPA to RITC between September 2019 and June 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a). The volunteer status is a recognition that RITC had never conducted coking or by-product production operations on the BCP Site, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the BCP Site, and has exercised all appropriate care since acquisition. Additionally, in recognition of the focus of this Work Plan, RITC did not import any slag materials to the BCP Site. Based on the results of the Remedial Investigation, the slag was used for construction of the rail lines on the property, presumably starting in or about 1917.

Following approval of the BCP Agreement, RITC has conducted extensive site management and cleanup activities in accordance with a series of NYSDEC and NYSDOH approved IRM work plans, has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period, conducted a remedial investigation of the BCP Site, and drafted an alternatives analysis.

Manufacturing processes used at the plant included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating the coal in the absence of oxygen. The resulting carbon material “coke” was used, among other things, in foundries and for the production of steel.

The extracted coke oven gas (COG) was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel. When operating efficiently, coke batteries typically produce twice the volume of COG that is required to operate the facility and fire the battery.

The liquids and tar by-products produced on the property BCP Site were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials by TCC was the source of the majority of releases to the ground surface. While there was a steel manufacturing facility west of the site and a coal-fired power plant southwest of the site, slag was not produced by the coke making process. The presence of TENORM appears to be associated slag that was used as base and ballast materials under railroad tracks on the BCP Site.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of rapidly deteriorating condition as there was no party responsible for maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC implemented a series of IRMs and associated activities to improve the safety, eliminated potential sources of releases, and improved control of the remaining infrastructure, both within and outside the requirements of the BCP Program. The implemented and ongoing IRMs are eliminating potential exposures and safety hazards on the BCP Site. Descriptions of the RI and IRM scope of work completed under the BCP are provided in the work plans and reports posted on the NYSDEC InfoLocator. Work completed prior to and during the RI that has dramatically improved conditions on the BCP Site include, but are not limited to:

- Surface Materials and Site Management – The conditions at the site were allowed to deteriorate for years if not decades under previous ownership. Full time management of the site has been funded by RITC to control and improve the BCP Site.
- Surface Water Management – Surface water management has been the focus of the most IRMs at the site since the USEPA transferred responsibility for surface water to RITC. The IRMs have addressed conditions across the entire BCP Site including elimination of poorly constructed impoundments, regrading areas to eliminate erosion, dredging ponds and ditches, cleaning and

repairs to sewers and drains, and cleaning of the surface to manage debris that concentrated runoff.

- Asbestos Containing Materials (ACM) Survey – A comprehensive assessment of ACM was completed on the BCP Site in 2019 and 2020.
- Asbestos Abatement – Multiple phases of asbestos abatement were completed and are ongoing at the BCP Site including the abatement of ACM in the three stacks, abatement of ACM on and in the former process buildings on the BCP Site, abatement of ACM on pipes and external equipment, abatement of ACM in buildings, and controlled demolition of ACM containing buildings that are not suitable for occupancy. ACM abatement is conducted in accordance with New York State Department of Labor (NYSDOL) requirements.
- Process Equipment Removal Interim Remedial Measures Work Plan – removal of the remaining outdoor vertical process vessels including characterization of the contents, demolition of the vessels, and proper offsite disposal of the contents.
- Building Demolition – buildings across the BCP Site were demolished to allow access to the BCP Site for IRMs and the RI. The condition of the buildings, many over 100 years old, had deteriorated to the point where they were posing a safety concern. Four had deteriorated to a condition that required they be condemned because they could no longer be safely occupied.

During the period between the TCC bankruptcy and RITC's purchase of the RITC Campus Properties, the USEPA Emergency Response Team (ERT) managed responsibility for identifying and stabilizing conditions that were deemed necessary for the protection of human health and the environment. The USEPA were not responsible, or likely funded, for general site condition maintenance. USEPA undertook several response actions and investigations while on the RITC Campus Properties in accordance with a series of Action Memorandums granted by the Acting Director of the Region 2 Superfund and Emergency Management Division. RITC worked with both the USEPA and NYSDEC prior to and after the change of ownership to identify those conditions requiring short-, medium- and long-term action. As soon as the sale was approved, RITC, NYSDEC and USEPA began the transfer of responsibility for care, custody, and control of the RITC Campus Properties which was completed in June 2020 after the NYSDEC approval of the Stormwater Pollution Prevention Plan.

3.0 Work Plan Roles and Responsibilities

The project team for the implementation of this radiological work plan include:

Project Manager – The project manager overseeing this work plan is the president of MJW, David A. Dooley, Ph.D., CHP. Dr. Dooley brings 40 years of experience for this work.

Radiation Safety Officer – Alex Bartells is MJW's RSO for our NYSDOH radioactive materials license and he oversees all of the radiation protection technicians we employee.

Radiation Protection Technicians – MJW's radiation protection technicians are trained according to MJW's Radiological Control Manual and all of the associated implementing procedures. They are also required to have current Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

MJW is not managing the ongoing IRMs on the property and will comply with the OSC Health and Safety Plan (HASP) and CAMP. MJW will coordinate all onsite activities with Dan Flanigan and Matt Reardon of Ontario Specialty Contracting (OSC).

4.0 Overland GPS Gamma Survey Protocols

As described, MJW will perform additional gamma walkover survey(s) beginning just east of the elevated activity areas (Center of the coke yard just west of the Thaw Shed) and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas. All overland gamma GPS assisted property surveys shall be performed in accordance with MJW Radiological Control Procedure No. 40., Performing a GPS Enhanced Radiation Survey and Data Assessment, Rev.4, dated October 29, 2021. MJWRCP 40 is attached to this work plan as Attachment 4.

5.0 Soil Sample Collection and Analysis

Following the additional walkover survey, MJW technical staff will collect 20 biased surface and subsurface soil samples and 12 unbiased surface and subsurface samples in and around the areas of elevated activity areas. The sample locations will be marked in the field with pin flags noting the associated sample numbers. OSC will document the location and elevation using the onsite GPS equipment.

All soil sample collection will be performed in accordance with MJWRCP-66 Soil Sampling Protocols Rev. 0 dated December 4, 2020. This procedure is shown in Attachment 5. Attachment 6 is the Soil Sample Data Sheet which catalogs all of the field data used for the selection of the location including sample type, radiation readings at various distances, analyses requested, etc.

6.0 Laboratory Analysis of Samples

Collected samples will be placed in appropriate containers and shipped to an accredited laboratory for radiological analysis. MJW routinely uses GEL Labs located in Charleston, SC and that is the laboratory proposed for the sampling of this work plan.
For more information about GEL's radiochemistry services see the following link:
https://www.gel.com/laboratories/services/radiochemistry-analysis GEL's chain of custody (COC) form is shown in Attachment 7.

7.0 Disposition of On-Site Background-Comparable Material

During the investigation, MJW would seek to return the material from the test pits to the excavation area. In accordance with DMM-5 policy Section B: "TENORM (Background-comparable) (below 5 pCi/g of radium-226), the NYSDEC may either grant a variance to allow the excavated TENORM (Background-comparable) to be returned to the excavation or Area of Concern (AOC), or the assigned ERS determines, and approves, that the proposed use and handling in the AOC is acceptable. For purposes of this investigation phase, it is assumed the materials are "background comparable" as all sample data, with one exception at 5.04 pCi/g have been below the DMM-5 policy value of 5 pCi/g. The range of sample data concentrations collected to date will not significantly increase radiological risk to anyone working on or near the site if it is re-interred. The long-term plan for the site is industrial/commercial

allowing any remaining materials to be interred under a building slab or a parking lot as was the case for the 310 Ship Canal site per Part C “Management Plan Requirements for TENORM Fill”.

In MJW’s experience with this material, Ra-226 concentrations for overland gamma surveys have to typically be at least 2-3 times background levels to be considered statistically significant. Lastly, DMM-5 policy Attachment A, Sections 3 and 4 discuss survey levels at 1.5 times background as a level above background that should be investigated.

8.0 Radiological Controls and Workplace Safety

Radiation Protection Technicians/radiological control technicians (RCT) and radiological control supervisory personnel (RCS) will provide radiological coverage to ensure the radiological safety of MJW, OSC and Inventum Engineering workers during work activities required for any surface and subsurface survey and sampling work.

8.1 Radiological Monitoring Documentation

The RCT and/or RCS will complete daily field notes to identify work activities performed, site conditions, notable events, and radiological findings. The notes will include a site work area map and samples collected. MJW Corporation “*Survey Data Form*” (Attachment 8) will be completed for all walk-over or investigative surveys performed in response to significantly elevated instrument readings or off-normal events (i.e., instrument count rates > 2 times background or personnel contamination. A COC form (Attachment 7) will be initiated in the field for all samples collected.

9.0 Personal Protective Equipment (PPE) and Radiological Hygiene

Workers will follow all requirements for PPE and hygiene actions based on radiological, chemical, and physical hazards as established by MJW safety manuals and procedures and the OSC Health and Safety Plan for the BCP Site. The minimum requirements based upon anticipated radiological and physical conditions will include:

9.1 Required PPE

The required PPE will be worn at all times on the site outside the parking lot or office building.

- Safety glasses or shield,
- Hard hat,
- Ear plugs,
- Hard-toe work boots,
- Work gloves, and
- Safety (high visibility) vest or similar.

More stringent controls may be required if higher levels of radioactivity are encountered.

9.2 Hygiene and Contamination Monitoring

The following precautions shall be observed to promote work-place safety and in accordance with the BCP Site HASP (Appendix C of the RIWP):

- No eating, drinking, smoking, or chewing within any active work area,
- Hand washing required upon exit from any active work area,
- Hand and foot radiological survey meter "frisk" when exiting areas where elevated radioactivity has been detected. Personnel frisks will be performed using the Ludlum 44-10, 2"x2" NaI probe, the Ludlum 44-9, GM probe and/or the Ludlum 44-89, Alpha/beta probe or equivalent instrument combinations.
- Excavator buckets and tires/tracks to be frisked before release to non-restricted use.

When release surveys using field instruments exceed 2 times the instrument background count rate, the RCT and RCS will take measures to confirm results using longer count times or by moving more slowly over the area. If an elevated count rate is confirmed, the RCT may wipe or wash the area, remove debris or soil material and resurvey the area until readings indicate ALARA. Materials or personnel exceeding 3 times instrument backgrounds should not be released without further decontamination efforts and count rates indicate ALARA. This information will be documented on forms such as those similar to Attachment 8, MJWRCP-04. Rad Contamination Survey Map and Data Sheet.

Materials and equipment released for unrestricted use will not exceed NYS and NRC limits as stated in NYSDOH Radiation Guide 10.10, Table 1 (Attachment 9), see Reference 2. It is the responsibility of the RCS to evaluate field instrument counts per minute (CPM) against Table 1 release limits in disintegrations per minute (DPM) using instrument calibration factors for the radionuclides of interest.

9.3 Control of Fugitive Dusts

MJW supported by OSC will take reasonable steps shall be taken to suppress potentially contaminated fugitive dusts such as by misting with water or curtailing intrusive activities. Dust monitoring shall be conducted in accordance with the BCP Site CAMP (Appendix D of the RIWP) by Inventum Engineering. In addition to the perimeter monitoring conducted for the CAMP a potable air monitoring station will be located no more than 50 feet downwind of the subsurface sample locations that involve the use of heavy construction equipment.

10.0 Reports

MJW will prepare a report detailing the activities and the results of the additional GPS overland gamma survey performed and the activities and analytical results for all surface and subsurface soils collected. The report and data will be in a form that will allow Inventum Engineering to incorporate the requirements into the RAWP and the Site Management plans for the BCP Site.

11.0 References

11.1 NYSDEC, Radioactive Materials Management Section, 2023, DMM-5, Management of Soils Contaminated with Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), October.

11.2 NYSDOH Radiation Guide 10.10, 1986, Guide for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Radioactive Materials.

11.3 Inventum, October 20, 2023, Remedial Investigation Work Plan, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

11.4 Inventum, August 18, 2023, Draft, Remedial Investigation Report, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

THE MJW COMPANIES
Radiological Consulting Professionals and Expert Technical Services

Memorandum

February 10, 2021

To: Mr. James Edwards
Inventum Engineering, PC
481 Carlisle Dr. Suite 202
Herndon, Virginia 20170

From: Martin Willett
Director of Health Physics and Remediation Services
MJW Corporation

Subject: Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

Introduction

A quality assurance and quality control (QA/QC) review of the Laboratory Analytical Data received from Eurofins TestAmerica, St. Louis, Laboratory Job ID: 160-40621-1 and released on 1/11/2021 was performed for Inventum Engineering LLC by MJW Corporation. The laboratory data report contained results for six (6) soil samples collected during a Tonawanda Coke facility investigation conducted between October and November 2020.

Summary of Laboratory Sample Receipt Condition:

- Standard analytical laboratory protocols were followed during the analysis of the samples and no problems were encountered or anomalies observed, laboratory quality control samples were within established control limits.
- Analytical methods and test results met NELAP requirements for parameters for which accreditation is required or available.
- Samples were received on 11/30/2020 in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

Laboratory Notes Related to Analytical Methods and Results:

Radium-226 By Gamma Spec (21 Day Ingrowth)

- Samples were analyzed for Radium-226 by gamma spec after a 21-day ingrowth period in accordance with EPA method 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020. As a result, samples met the 21day ingrowth requirement prior to analysis for Ra-226.

- Samples results for *Pb-210 by gamma spec (method 901.1) were estimated*.

- *Insufficient sample was provided for a sample to fill the geometry calibrated for Ra-226 analysis by gamma spectroscopy*. The samples contained large pieces of rock.

- Results for several requested isotopes have no or low abundance gamma peaks. *Quantification of the analyte was inferred under the assumption of equilibrium with decay chain progeny or parent isotopes. This assumption was added by the laboratory and was not based on process knowledge*.

Gross Alpha and Gross Beta Radioactivity

- Sample analysis was performed on 12/23/.2020 following method SW-846 Method 9310. No analytical or quality issues were noted.

Isotopic Thorium and Uranium (Alpha Spectrometry)

- Sample analysis was performed on 01/04/2021 and 01/07/21 following method DOE A01R_Th and U. For Thorium analysis, *a correction to data results to account for interference observed in the blank sample was applied.*
- Quality issues were not observed for U isotopic analysis.

Sample Analytical Results

Samples Analyzed

Lab ID	Client Sample ID	Collected Date / Time	Received
160-40621-1	TP-BCP-34-A	10/30/20 11:15	11/30/20 13:47
160-40621-2	TP-BCP-34-B	10/30/20 11:15	11/30/20 13:47
160-40621-3	TP-BCP-32-W45	11/09/20 01:00	11/30/20 13:47
160-40621-4	TP-BCP-44-A	11/13/20 11:50	11/30/20 13:47
160-40621-5	TP-BCP-44-B	11/13/20 11:50	11/30/20 13:47
160-40621-6	TP-BCP-47	11/18/20 09:20	11/30/20 13:47

Table 1: Laboratory Sample Results

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-3	TH-232	Alpha Spec A-01-R	1.58		0.270	0.0487
160-40621-3	U-238	Alpha Spec A-01-R	0.474		0.131	0.0598
160-40621-3	AC- 228	Gamma 901.1	0.735		0.237	0.258
160-40621-3	BI-214	Gamma 901.1	0.515		0.178	0.168
160-40621-3	RA-226	Gamma 901.1	0.515		0.178	0.168
160-40621-3	TH -232	Gamma 901.1	0.735		0.237	0.258
160-40621-3	U-238	Gamma 901.1	0.851		0.591	0.810
160-40621-1	TH-232	Alpha Spec A-01-R	1.36		0.253	0.0521
160-40621-1	U-238	Alpha Spec A-01-R	3.12		0.419	0.0527
160-40621-1	AC- 228	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	BI-214	Gamma 901.1	4.46		0.785	0.415
160-40621-1	RA-226	Gamma 901.1	4.46		0.785	0.415
160-40621-1	TH -232	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	U-238	Gamma 901.1	5.04		2.24	2.92
160-40621-2	TH-232	Alpha Spec A-01-R	0.737		0.182	0.0554
160-40621-2	U-238	Alpha Spec A-01-R	4.06		0.499	0.0612
160-40621-2	AC- 228	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	BI-214	Gamma 901.1	3.70		0.841	0.597
160-40621-2	RA-226	Gamma 901.1	3.70		0.841	0.597
160-40621-2	TH -232	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	U-238	Gamma 901.1	2.73		1.38	2.53
160-40621-4	TH-232	Alpha Spec A-01-R	0.322		0.107	0.0402
160-40621-4	U-238	Alpha Spec A-01-R	2.31		0.344	0.0490
160-40621-4	AC- 228	Gamma 901.1	1.07		0.355	0.312
160-40621-4	BI-214	Gamma 901.1	2.99		0.467	0.205
160-40621-4	RA-226	Gamma 901.1	2.99		0.467	0.205

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-4	TH -232	Gamma 901.1	1.07		0.355	0.312
160-40621-4	U-238	Gamma 901.1	2.42		0.947	1.45
160-40621-5	TH-232	Alpha Spec A-01-R	0.783		0.177	0.0258
160-40621-5	U-238	Alpha Spec A-01-R	4.35		0.534	0.0583
160-40621-5	AC- 228	Gamma 901.1	1.22		0.536	0.681
160-40621-5	BI-214	Gamma 901.1	3.26		0.575	0.380
160-40621-5	RA-226	Gamma 901.1	3.26		0.575	0.380
160-40621-5	TH -232	Gamma 901.1	1.22		0.536	0.681
160-40621-5	U-238	Gamma 901.1	3.50		1.16	1.59
160-40621-6	TH-232	Alpha Spec A-01-R	1.95		0.319	0.0464
160-40621-6	U-238	Alpha Spec A-01-R	3.29		0.451	0.0539
160-40621-6	AC- 228	Gamma 901.1	2.58		0.440	0.294
160-40621-6	BI-214	Gamma 901.1	3.79		0.495	0.214
160-40621-6	RA-226	Gamma 901.1	3.79		0.495	0.214
160-40621-6	TH -232	Gamma 901.1	2.58		0.440	0.294
160-40621-6	U-238	Gamma 901.1	1.59		0.915	1.43

1. U Result is less than the sample detection limit.

QA/QC Summary:

There were no laboratory quality assurance sample result exceptions noted. Results for LCS, Blanks and Duplicate samples were within acceptance criteria and all duplicate Relative Error Ration (RER) results were in RER limit of 1. Based on QC sample results, the data are determined usable and no upward or down bias in sample results is evidenced.

The laboratory narrative identified a deficiency in sample volume for one sample however, the sample was not identified and analytical results for all samples were reported without exceptions noted.

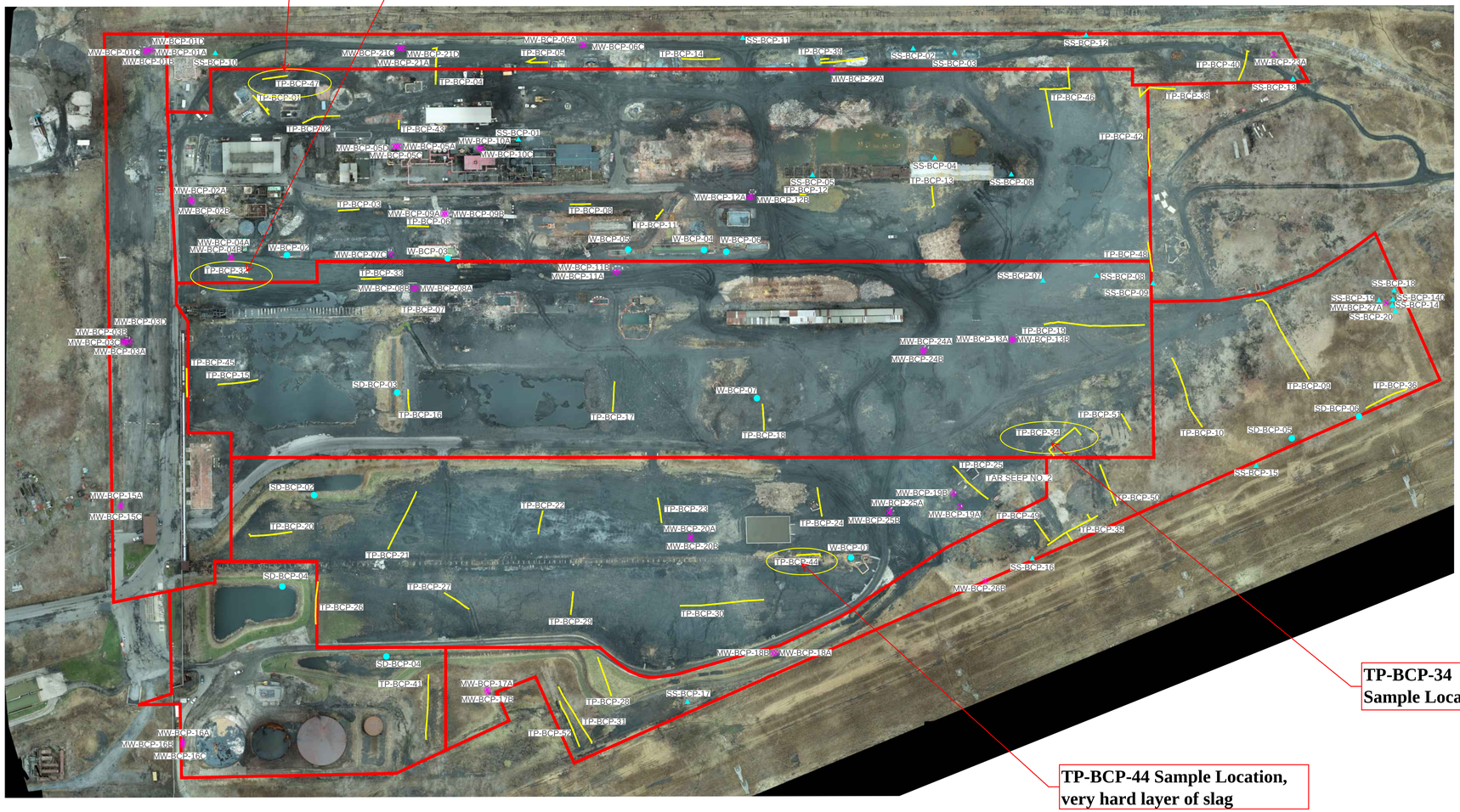
In general, the sample results for U-238 and Th-232 are slightly above the range of concentrations that are inferred for average background soils (.5 to 1.5 pCi/g) but not outside the range of concentrations that can be encountered. Based on the gamma spectroscopy result for U-238, Ra-226 and Th-232 progeny nuclides appear to be in equilibrium with parents and alpha spectroscopy results generally confirm the gamma spec results. The samples do not appear to indicate any enhancement of one isotope or the other and concentration ranges are likely due to soil types from the area.

Figure 1. November 2020 Test Pitting Locations Radiological Monitoring at RITC Site

Shoreline Trail, built along Former Steel Mill and Over the Back-filled Erie Canal.

TP-BCP-47 NORM Sample

TP-BCP-32-W45 Sample Location



TP-BCP-34 Sample Location

TP-BCP-44 Sample Location, very hard layer of slag

Note: Test Pit Rad Soil Analysis (Samples Collected 10/30 to 11/18/2020) are circled in yellow.

N

150 0 75 150 300 600

1 INCH =150 FEET (22X34)

D

DRAWING BY	RB
CHECKED	
APPROVED	

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SAMPLE LOCATIONS
RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

Figure 1

DRAWING NUMBER

SAMPLE LOCATIONS

Attachment 2. Tonawanda Coke GPS Report for Inventum Engineering

THE MJW COMPANIES

Radiological Consulting Professionals and Expert Technical Services

Gamma Walkover Survey Report

For

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
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Prepared for:

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1.0 Introduction

During June of 2023, MJW was requested by Inventum Engineering to perform a GPS enabled gamma walkover survey (GWS) of the 86.5-acre Riverview Innovation and Technology Campus, located at 3875 River Road, Tonawanda, New York 14150 (Site). The Site was previously used as a Coke plant storage location and railroad junction for the former Tonawanda Coke Company during the majority of the twentieth century. The Site location is shown in Figure 1.

The Site is becoming largely vegetated and soils appear to consist of various types of fill materials originating from plant and railroad operations. The observable fill in soils at the Site contained coke, coal, brick, concrete, slag, wood and other materials, with little to no native soil identifiable in the upper two (2) feet of the surface. The composition of the fill materials, including the slag material, was not uniform based on visual observations in-field.

The GWS was requested to identify surface gamma radiation levels resulting from surface and near-surface soils and fill materials. During the GWS, surface gamma radiation readings in counts-per-minute (cpm), were logged together with GPS coordinates, at 1-second intervals. The data were then used in determining the location and potential for Technically Enhanced Natural Occurring Radioactive Materials (TENORM) at the Site. MJW performed these activities over a three-day period beginning on June 30th, and including July 3rd, and July 5th.

Previous Site characterization activities involving soil sampling and test pits excavation were completed in October and November of 2020.

2.0 Methodology

Instrumentation utilized for the survey consisted of a GPS enabled Ludlum 2221 ratemeter coupled with a Ludlum 44-10 2”x2” NaI detector. MJW mounted the equipment to a specially modified cart to enable consistent detector geometry at ten (10) centimeters above the ground surface. The integrated GPS unit logged gamma and location data at 1-sec intervals during the GWS.

A transect plan was created to provide guidance in-field for optimal survey coverage. Transects were spaced twelve (12) meters apart to provide a high probability of discovering locations exhibiting elevated gamma readings or trends in near surface soils. The Site covers approximately 86.5 acres and there are active remediation and demolition activities taking place. Preplanned survey transects were followed to the extent possible with deviations required to avoid locations where activities were on-going and topography or site conditions such as pits, overgrown vegetation, fencing, and flooding prevented access. Transects were walked wherever possible but in-field adjustments were made to avoid obstructions and to delineate elevated gamma reading locations when observed.

Background gamma count rate data were collected at the nearby Erie County Water Authority property located at 3750 River Road in Tonawanda, NY. The background scan location is west of the Site adjacent to the Niagara River and has similar soils and geology with no known radiological impacts. Data was collected over impervious (paved) and pervious soil surfaces. The soil/vegetation surface cover average from count rate data collected in the background area was used to evaluate site GWS due to the similarity in surface cover over the majority of the Site survey area. Site Locations with hard cover such as concrete will be evaluated separately using the appropriate background average count rate. Figure 1 displays the location of both the background study area and the Site.

3.0 Data Analysis

The Site and background GWS data were statistically analyzed using Visual Sample Plan (VSP). The data collected were evaluated using indicators such as outliers tests, data distribution, and sample population statistical values to determine usability. Based on the 614 data points collected in the background location over soil covered areas, a mean gamma count rate for near surface soils was determined to be 8392.9 ± 400.08 counts per minute (cpm) with a near normal distribution. The background location and data are shown in Figure 2.

The Site GWS resulted in 28,884 data points over the three days the survey was conducted. Based on a statistical evaluation of the data, the data mean, and standard deviation were determined to be 7900.8 ± 3065.9 cpm indicating that much of the survey area is at or near background gamma levels. A histogram of Site GWS data showing the data distribution is provided in Figure 3. The histogram shows that count rate data above the study area mean (to the right of the red vertical line in Figure 3) were observed in approximately one third of the data with the more elevated data results falling outside what might be expected if the data were normally distributed near tale and right of the curved red line in Figure 3). The locations associated with this data have a greater potential for the presence of TENORM. Figure 4 shows the GWS data located on the Site.

4.0 Results

Site GWS data binned using the Jenks Natural Breaks algorithm along the gamma readings is shown in Figure 4. Although the potential for radiological impacts below the upper 1-ft of soil or hardcover material cannot be dismissed with GWS results alone, the potential for near-surface and deeper impacts is much greater in areas with GWS data above 1.5x background or in locations indicating an increasing trend in the near surface gamma readings. As observed in Figure 4, the majority of the northern half of the Site is characterized by increasing count rate data exceeding 1.5x the average background reading with several locations exceeding twice the background mean count rate. To a lesser extent, the southwestern area of the Site also showed increasing trends in readings at or above 1.5x the background mean. Based on these results, the presence of TENORM in the northern half and southern perimeter areas of the site are most likely. Because the elevated reading locations do not appear to be consistent over the Site, other than the most elevated locations which are located in the central area of the Site, it is probable that fill materials containing elevated levels of Naturally Occurring Radioactive Materials (NORM) or TENORM were used as fill during periodic filling or railroad operations when the facility was operating. To determine the nature and extent of the NORM or TENORM impacts for use in evaluating potential management or disposal options and costs during future Site development or management activities, additional investigations including sampling and analysis would be required.

Figures

Figure 1:

Location of The Site and the Background Location in Comparison to Western Tonawanda

Locations
Google Earth

0 1,000 2,000 m

Created by the MJW Companies
July 2023

Basemap Credit to Google

Figure 2:
Background Gamma Walkover Survey Data Collected at
Erie County Water Authority Property Adjacent to Riverview Site

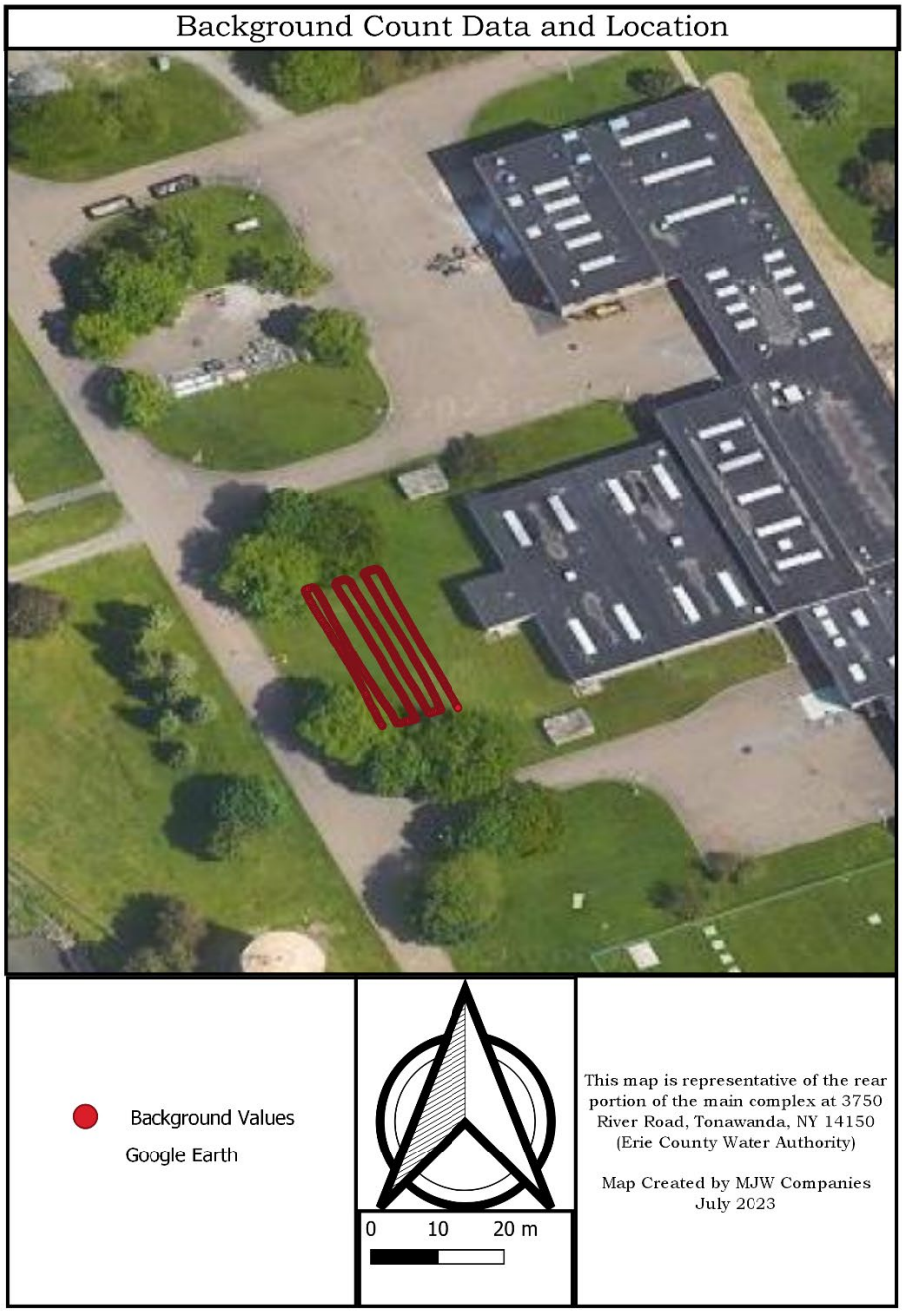


Figure 3: Histogram of Riverview Technology Center Gamma Walkover Data Distribution

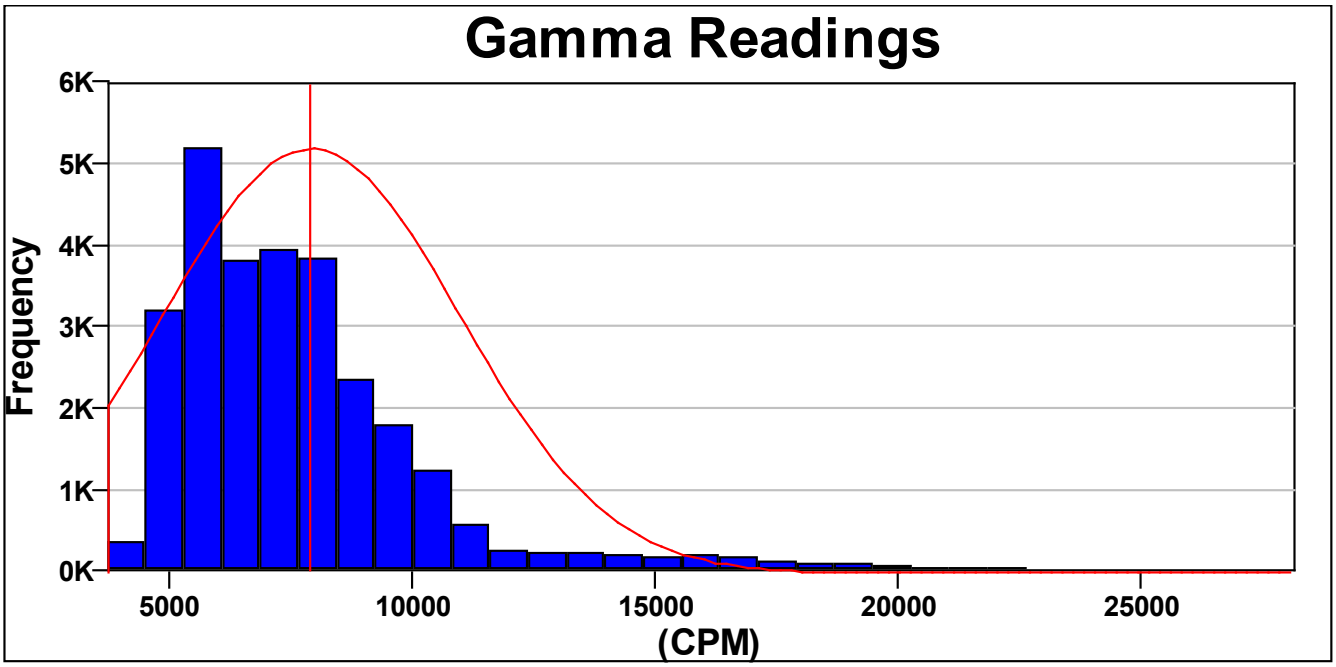
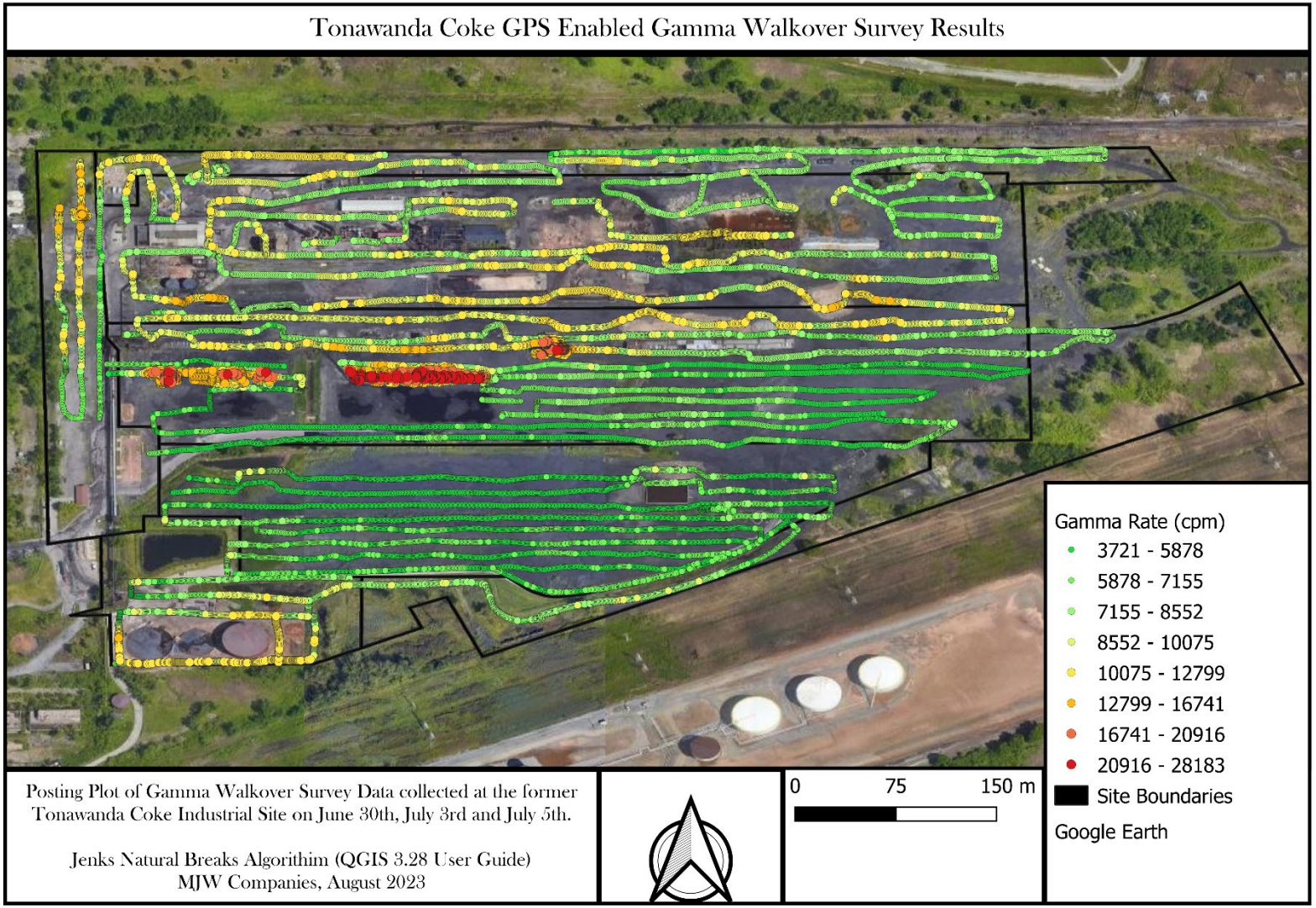


Figure 4:


Tonawanda Coke GPS Enabled Gamma Walkover Survey Results
Gamma Rate (cpm)
3721 - 5878
5878 - 7155
7155 - 8552
8552 - 10075
10075 - 12799
12799 - 16741
16741 - 20916
20916 - 28183
Site Boundaries
Google Earth
0
75
150 m
Posting Plot of Gamma Walkover Survey Data collected at the former Tonawanda Coke Industrial Site on June 30th, July 3rd and July 5th.
Jenks Natural Breaks Algorithim (QGIS 3.28 User Guide)
MJW Companies, August 2023

Attachment 3. MJWRCP-03 Field Investigation Survey Procedure_09_15_2015

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS

General Radiological Survey Procedure for Radiological Site Investigations

1.0 PURPOSE

The objective of this procedure is to detail the required methods and actions to be taken for collecting radiological survey data of sufficient quality and quantity to meet regulatory guidance outlined in MARSSIM and other relevant or referenced documentation.

This procedure will outline standardized techniques to ensure comparability and reproducibility of the survey data.

2.0 RESPOSIBILITIES

2.1 Radiological Control Supervisor (RSC)

The radiological control supervisor (RCS) is responsible for review of the survey plan and all supporting documentation to ensure that the survey Data Quality Objectives (DQOs) are understood and can be related to field staff conducting the survey. The RCS will ensure that complete documentation is collected for survey points and samples, that field audits are performed during data collection, and that audit findings and data are reviewed and properly logged and narrated in the project file.

2.2 Radiological Control Technician (RCT)

The RCT is responsible for reading, understanding, and executing the protocol and techniques described in this procedure including the operation of instrumentation and completing the required documentation described or referenced in this procedure.

3.0 PREREQUISITES/REQUIREMENTS

The RSC and RCTs must be trained and competent in the techniques and instrumentation described, understand work site hazards and safe work protocol required to perform the work described in this procedure.

4.0 PROCEDURE

Survey details and techniques, including calculations and instrument requirements, will be fully described and specified in specific project or task documentation. The following sections outline the general requirements necessary for performing surveys of the type identified:

4.1 Fixed Survey/Sample Point Location

Every fixed sample location must be spatially located within a Survey Unit. Survey Units (SU) can be comprised of small or large surface areas, a single room or several rooms in a building, grouped together according to their contamination potential (i.e., Class 1, 2 or 3, etc.). Prior to entering the field to conduct a survey:

- SUs with their respective origin points must be identified on a site map
- The number of samples required for each SU should be calculated or approximated and located on the survey map
- The location of each sample location should be identified with local x and y coordinates, measured from the SU referenced origin point.

Sample locations will be identified through a diagram on survey data sheets to ensure proper location identification during the survey in each unit. Survey points can be moved for various reasons as long as the new location is accurately identified with local coordinate's measured from the identified SU origin point.

4.2 Gamma Survey Grid Layout

When areas are required to be surveyed with a specified coverage percentage, survey grids are typically established over the area and a scan survey is conducted. The scan survey follows a predetermined grid laid out over the SU in a density pattern sufficient to measure radiation levels at specified intervals to meet the coverage requirement. Survey grid markers are often used and set up as reference points to assist the surveyor in tracking survey locations and grid lines over large areas.

To establish a survey grid in a building space such as a room, hallway etc., or in outdoor areas, the grid spacing must first be established. Grid spacing will be determined and documented in the Survey Work Plan during survey planning. Grid layout and spacing is based upon the required coverage obtained by factoring in survey meter window area, the instrument type being used, measurement interval, rate of distance traveled between measurements, and the instrument height above the ground surface.

The percent coverage of the survey must be known prior to the field investigation and is a critical DQO for setting up and planning any gamma or instrument scan during a site investigation. Once the survey DQOs are identified and an appropriate Investigation Work Plan has been prepared to identify the variables necessary to determine grid size and spacing, the following steps will be performed:

Laying out the Grid:

- Inspect the area to be delineated and when possible, remove unnecessary objects or vegetation to provide as clear and unobstructed view as possible.
- Identify the area/room origin or reference point
- Using paint, tape, stakes, flags or other appropriate marking devise, measure the required X axis grid distance from the origin point and mark the surface at the required spacing interval. Always include a North arrow and scale on the site drawing and include dominate features to be sure that the grid can be recreated after the survey is completed.
- Repeat the same process along the Y axis from the origin.

- When wall surveys are required, mark a Z axis from the origin up the wall. Z coordinate locations will have the X and Y coordinates respective to their position along the floor/surface grid.
- Draw the area indicating the location of the origin; X and Y axis, and any dominate features (doorways, tables, landscape features, etc.)

4.3 Instrument Surveys

4.3.1 Identifying and Preparing Instruments for Use

An appropriate and calibrated ratemeter/scaler match (i.e., Ludlum 43-68 probe/and 43-60 ratemeter, Model 239-1F floor monitor, Ludlum 43-10 and 2241-2, or equivalent), must be tested for sensitivity and the detection of the investigation contaminates of concern (COC). The instrument sensitivity must be below the COC investigation action level (AL), preferably under 50% of the AL. Once the instrument has been determined to be sensitive enough to use, it can be deployed to perform direct alpha/beta counts to verify the presence of contamination at investigation levels.

When using gas proportional counters (Ludlum 43-68 probe or the Model 239-1F floor monitor), instrument purging using P-10 gas is required prior to operational use. The RCT must be familiar with instrument operation and care prior to field use. Always refer to the operational procedure or the manufacturers' manual for complete instructions if there is uncertainty concerning the use of a particular instrument.

4.3.1.1 Instrument Operational Checks

Prior to performing any measurements, the following Operational Checks must be performed:

- Select the "Battery Check" indicator to verify batteries are fully charged. Replace batteries if necessary. Record reading on field work sheet.
- Select High Voltage (HV) setting and compare reading to the required setting used during calibration for detection of general or specific isotopes as necessary to perform the survey. Record reading on field work sheet.
- Set ratemeter detection setting, if present, to the appropriate setting required by the survey work plan for detection of contaminates of interest (e.g. alpha/beta, alpha, beta, etc.). Record setting on field work sheet.
- Set ratemeter time setting, if present to "one minute" unless otherwise stated in survey work plan.
- If gas proportional counters are being used, purge the instruments with P-10 gas and set the gas flow to the required flow rate prior to use.
- Perform a minimum of 5 background readings in a non-impacted location and record readings. Calculate the average background count rate and check that it is within normal expected range for the area background.
- Perform a minimum of 5 source checks in a non-impacted location and record readings. Calculate the average source count rate. Check to be sure that the average source reading is within 20% of the calibration reading for the source(s) being used.

Use the Field Data Survey Sheet specifically designed for the survey being performed or when appropriate, a more generic survey data sheet can be used to record the operational data collected.

Note: Survey data cannot be collected without instrument operational data recorded and reviewed prior to field measurements.

4.3.1.2 Survey Data Collection

Scaler or Fixed Position Readings:
Scaler readings are the total integrated counts observed at a particular location by the survey probe for the time interval selected on the meter.

- Using a properly calibrated and field checked instrument, hold or place the instrument probe over the area of interest at the specified height for the duration of the time setting (e.g., one minute, .5 minute, etc.) as indicated by the ratemeter/scaler window freezing or an indicator displayed in the window.
- With the instrument probe in-place over the location to be investigated, set the instrument to the "scaler" setting and activate the scaler count using the appropriate switch or toggle on the ratemeter.
- Record the activity observed, instrument used, time constant, and surveyor on the field data sheet. If a fraction of one minute (i.e., 0.5, etc) is selected, record the meter reading on the data sheet with the time constant used.

Scanning/Ratemeter Surveys:
In ratemeter mode, the ratemeter continuously evaluates data from the survey probe. The ratemeter display is updated every 2 seconds and the surveyor must continuously observe the meter readout and the survey progresses. The following steps are used to perform a survey in ratemeter mode:

- Using a properly calibrated and field checked instrument set the ratemeter/scaler on the appropriate scale for the survey area. Use the lowest scale available. If the meter goes off scale, step back and reset the scale to the next higher setting.
- To better monitor the relative intensity of the contamination present, activate the audio on the ratemeter.
- Slowly (approx. 2ft/sec) move the probe over the area being surveyed and observe or listen to the count rate.
- Record survey data for a given distance or transect line as the estimated average count rate over the distance. Note an associated range (high and low readings) as the area is covered.
- Hot Spot Investigation: If an elevated count rate is indicated (generally 3x the area background readings or at the survey AL), stop and resurvey the area by holding the probe over the location long enough to determine the actual count rate as indicated by a steady reading or performing a scaler reading. Record the reading and note the location based on grid location and/or location features on the survey data sheet and survey plan layout drawing.
- If elevated counts are identified, continue to survey the area until the "hot spot" perimeter is delineated and the activity levels are determined by one or more one

minute scaler readings. Delineate the area using measuring tape, perimeter GPS coordinates or by marking the area and documenting the findings on the site drawings and survey data sheets.

- To conclude the survey, perform an operational check of the instrument by taking a background and source count. Record the data on the Daily Calibration Worksheet.
- Review the field data sheets to check for completeness, erroneous data points and/or trends. In addition, check instrument stability by comparing operational check data for background and efficiency before and after the survey. Data should be within 20%.
- Complete survey documentation including data sheets, field notes, unusual conditions and survey descriptions.

4.4 Removable Contamination Survey

Removable contamination will be evaluated through the use of swipe samples. Swipes will be collected using 4.7 cm diameter filter papers (or equivalent) passed over an area of approximately 100 cm^2 (4"x 4") using moderate pressure. To collect swipe samples, the following steps will be taken:

- Don gloves and other protective clothing as required by the task specific work plan or Radiation Work Plan prior to collecting swipes.
- Label swipe samples (e.g.., consecutive numbers, object names, etc.) prior to use to ensure correct identification. Be sure field documentation reflects the same nomenclature and description of each swipe. Swipes collected for alpha or beta analyses can be labeled on the back (smooth side) of the filter paper. Swipes that will be counted in vials (i.e, counted in Liquid Scintillation Counters (LSC)) must be labeled on the envelop container and/or the vial top (**Not** on the swipe itself or the side of the LSC vial).
- Swipe samples must be labeled with unique identifiers and the sample location logged to identify exactly where they were collected, by whom and when.
- On rough surfaces, care must be taken to avoid damaging the filter paper as it is passed over the surface.
- Care will be taken to avoid excess loading of the swipe with dirt or water in heavily soiled areas tis may require swiping a smaller area which must be recorded in the swipe documentation
- Place used swipes in small envelopes or other sleeves to segregate and protect the swipe samples. Swipes placed in counting vials (H-3, C-14, etc.) must be placed with dirty side facing the outside of the vial.
- Swipe sample Chain of Custody (COC) forms must be completed before delivery to the laboratory for analyses.
- When counting swipes in the field for gross alpha or beta contamination, a suitable calibrated counter of know efficiency and background, will be used (Ludlum 2929 or equiv.)
- Swipes counted in the field will be placed in a counting planchet. The filter should be laid flat to avoid counting errors due to geometry and the planchet changed or cleaned between samples.
- Record all required data, including sample counts, instrument serial number and model and counting instrument background and efficiency on the appropriate sample data sheets.

4.4.1 Tritium and Carbon-14 Swipe Sampling

Swipes for low energy beta emissions (H-3, C-14 etc.) will be collected in the same manner as described in section 4.4 above using moistened swipes. Swipes should be moistened with a small amount of clean (Deionized water preferred) water prior to collection. After collection, place the filter directly into the counting vial, dirty side out, or a separate coin envelope pending analysis by the laboratory. Label the container with the sample identification.

Note: Low energy beta swipes cannot be evaluated with a field counter (i.e., Ludlum 2929 etc.)

5.0 RECORDS

5.1 Each type of survey described above will require the generation of specific data records and survey narrative. The records that are expected to be generated as a result of implementation of this procedure include:

- Daily instrument field operability and calibration sheets. (Attachment 1)
- Complete Alpha/Beta or beta/gamma survey data sheets and maps (Attachment 2)
- Removable contamination survey data and location map (Attachment 2)
- Scanning survey results describing pre and post operational data, background levels, survey unit averages and range, the locations of elevated or anomalous readings, and survey description with a map of the area
- Sample Chain of Custody forms
- Calculations for instrument MDCs, scan MDCR, and sample numbers if appropriate
- Project survey log including daily activities and issues
- Data assessment and evaluation work sheets

All the records generated as a result of implementation of this procedure will be maintained as part of the MJW Corporation project file that will include the associated Project Work Plan.

Attachment 4. MJWRCP-40 Performing a GPS Enhanced Gamma Radiation Survey, Rev. 4

THE MJW COMPANIES Radiological Consulting Professionals and Expert Technical Services		MJWRCP RCP-40 Rev. 4
Performing a GPS Enhanced Gamma Radiation Survey and Data Assessment		**FIELD PROCEDURE**
Effective Date: 10/29/21	Approved By: *M.J. Willett*	

1.0 PURPOSE/DISSCUSSION

The purpose of this procedure is to establish protocols and data collection requirements necessary to perform reproducible low-level radiation overland gamma surveys.

Overland gamma radiation surveys are often enhanced with the coupling of radiation and satellite geographical location measurements collected from global positioning and radiation instrumentation and software. The use of both instruments simultaneously allows rapidly recorded radiation readings to be precisely located across varied terrain and large areas. MJW uses the ERG 105G handheld GPS surveying system and accompanying software.

The 105G is a simple to use GPS mapping system for performing outdoor gamma radiological scans. It consists of an interface tablet containing all necessary software to acquire position correlated radiological scan data from a gamma detector and export the data for processing using a variety of applications, such as Microsoft Excel, or ESRI ArcGIS. The handheld logger comes installed with two applications necessary for collecting data and exporting to a removable disk drive. The ERG RadScout is used to collect gamma data and couple it to a GPS position. The RadSync software is also included on the handheld computer and is used to export all field data to a single removable disk. Using the ERG RadScene software, the data can be managed, analyzed, and merged from a single processing computer.

The 105G uses off-the-shelf Ludlum equipment for radiological detection. The system uses the Ludlum model 2221 meter. An optional setup uses a 2221 with Bluetooth radio incorporated to allow a completely wireless interface between the data logger, 2221, and sub-meter GPS receiver. If the survey is performed in a location where projection information is not available, then the user will be required to apply the spatial correction during data evaluation and download.

2.0 SCOPE

This procedure is applicable for general or discrete radiation surveys intended to measure direct radiation and/or contamination levels of areas expected to be at or near background levels. It is also applicable for sites where radiological contamination may be extensive.

Gamma or alpha/beta survey procedures, including grid layout, coverage and instrument use and data DQOs will be detailed in job specific work plans. Standard or typical survey methodology is described in MJW Corporation instrument and survey procedures.

3.0 RESPONSIBILITIES

3.1 All survey instruments used to determine direct radiation levels or contamination levels shall have been calibrated within twelve months prior to performing the survey.

3.2 Surveys shall be performed in accordance with all applicable standards as listed in Section 8.0 (references).

3.3 Persons performing the survey shall be responsible for proper instrument checks and operation, properly recorded measurements, and map per Section 4.0 of this procedure.

4.0 PROCEDURE

4.1 Equipment List

- Surveying and staking materials (subcontract to licensed surveyor)
- Bicron microRem LE (or equivalent)
- Ludlum Model 2241 survey meter (or equivalent) with Ludlum 44-10 2"x2" NaI detector (or equivalent)
- Area maps as appropriate (topographic, street, quadrangle, etc.)
- Mason's line marked at designated intervals (for detailed area surveys)
- Ludlum 44-10 Lead Collimator (Optional)
- Ludlum 1000/2200 with 43-10 and 44-40 smear counters
- Miscellaneous marking and recording equipment
- 100-foot tape measure
- Protective clothing as appropriate
- Smears (1 box)

4.2 MEASUREMENT PROTOCOLS

4.2.1 Perform a battery check, source check and calibration data check prior to use of survey instrument per the requirements of Section 3.1.

4.2.2 At a minimum of three (3) separate locations known to be free of contamination, make several background measurements, recording data, time, survey instrument serial number, surveyor and general survey area location noting any significant landmarks. Record data on Form RCP 40-1.

4.2.3 In consultation with a licensed surveyor establish the primary reference point for the survey and any second reference points required to adequately describe the site and allow for creation and recreation of the survey grid. The reference point shall be designated as point 0, 0 or equivalent with magnetic north indicated clearly in reference to point 0,0. Compass points shall be used such as ON, OE, OS, OW, etc. depending upon the reference point location.

4.2.4 From the primary and any secondary reference points, establish area survey points using stakes, flags and/or marked string lines at the predetermined survey interval. All other grid locations will be designed in alphanumeric sequence from the reference point (i.e., 5 feet due east of reference point ON, OE would be designated as ON, 5E; 5 feet north and 5 feet east as 5N, 5E etc.). Use Form RCP 40-2 to show survey grid, detailing the primary reference point, any secondary points, landmarks and grid spacing. Use accurate area maps or any available CAD drawing to lay out grids.

NOTE: Grid pattern spacing should be no more than ten (10) meters apart for complete coverage for sites with a known or suspected radiological history. Grid spacing may be increased up to 100 meters for large sites where no radiological involvement is expected.

Minimum detectable activity will be dependent upon background levels and instrument efficiencies. Decreasing the grid spacing will give higher detection probability for low activity or diffuse sources.

For a uniformly distributed Co-60 source the predicted exposure rate at one meter above the surface is 5.79 E-04 Sv/yr per Bg/cm^2 (NUJREG/CR-1918). This translates to ~ 43 microR/hr per uCi/m^2.

4.2.5 Measure the gamma radiation level at the reference location at a distance of one meter (approximately waist height) and at ten centimeters from the ground surface.

CAUTION: Survey instruments must not come into contact with any potentially contaminated surfaces. Precautions must be taken such as bagging the instrument should such potential exist.

4.2.6 Record measurements from designated survey locations on Forms RCP 40-3 and 3A, including alphanumeric survey locations, gamma radiation readings at 1 meter and 10 cm and any remarks for the location. Complete the top of each form with the following data: job number, date, surveyor and relevant instrument data (model, serial number, etc.) as discussed in section 4.2.4.

4.2.7 Proceed at a slow pace (approximately 0.5 m per second) to the next survey point, continually checking the instrument readout for any strong fluctuations.

4.2.8 Once four grid points forming a square have been measured perform an intragrid survey of the square with the meter at a distance of 10cm from the surface. Begin in one corner of the grid and using a zig-zag or cross-crossing pattern at 1m (~ 3') intervals survey the grid on the diagonal at a slow pace ~ 0.5 m per second.

4.2.9 If during the intragrid survey a significant survey meter response is encountered, take readings from a distance of one centimeter to define the area of the increased activity. Use spray paint, flags, string or another method to mark the area(s) of elevated activity. Also mark the location of this/these intragrid area(s) on Form RCP 40-2. The point of the most elevated reading as well as the apparent boundaries of any area(s) of elevated activity should be thoroughly marked and described.

4.2.10 After all initial survey points have been recorded, return to any areas of elevated readings. Perform a detailed survey to define the areas and note the upper limits of the measurements using one of the following methods: (document all results on Forms RCP 40-4 and 4A).

- Using concentric circles, define the center and then the radius of contamination and record this on the survey form, or

- Using a small-spaced grid pattern of 1 meter or less, find the center and general outline of the area of contamination and record this information on the survey form, RCP 40-4 or 4A as appropriate.

NOTE: Per step 4.2.8 use spray paint, string or other suitable medium to define the physical limits of the contamination/radiation. Use standard precautions to avoid personal or equipment contamination during the survey.

4.2.11 Check the survey map for complete coverage. Notify the appropriate client personnel if immediate posting or cleanup actions may be required.

4.2.12 Remove all nonpermanent markers and stakes only after all data has been checked and verified. Grid markers should be maintained if further action is required or if additional surveys are to be performed by regulatory agencies, etc. Monitor all personnel and materials for potential radioactive contamination before they leave any areas of suspected or confirmed contamination.

4.3 INSTRUMENT CALIBATION

4.3.1 All instruments shall be calibrated annually and shall have a valid calibration sticker at the time of sue. Survey instruments used for overland gamma surveys shall be calibrated within six months of the actual survey date.

4.3.2 Instruments will be tagged "out of service" for:

- Failure to properly respond to check sources, or
- Instrument damage, or
- Suspect operation of the instrument

Any instrument tagged "out of service" shall be repaired or replaced and shall be calibrated before use.

4.3.3 All instruments will be operationally checked in the field at the beginning of each workday and each time the meter is turned on.

5.0 PRE-SURVEY PREPARATION

5.1 Instruments and Equipment

5.1.1 GPS instrument case –ERG Model 105G, serial cables, external antenna cable, USB cable.
5.1.2 Wheeled cart and/or backpack mounting equipment and measuring tape. (Carts are stored on shelves in storage garage)
5.1.3 GPS antenna and cable
5.1.4 Stakes, flagging, markers, field notebooks, etc.

5.2 Check List Items

5.2.1 Check to be sure GPS and radiation instruments, check source, log book, cables, carrier equipment, antenna, tremble software and batteries are available, charged and in good condition and calibrated (green light on battery charger indicates batteries are fully charged) . ***Note: Batteries take 24 hours to fully charge***.

5.2.2 Determine Survey sensitivity and geological coordinate system requirements (i.e.. WGS83, State Plane, NAD83, etc.)

5.2.3 Review terrain conditions from proposal, client contact or via Google Earth or maps to identify accessibility and survey method (cart vs walking/backpack mount)

5.2.4 Identify survey grid coverage and spacing.

5.2.5 Prepare grid marking or line-of sight aids (e.g. cones, paint, rope, etc.) to facilitate walkover coverage and maintain speed.

5.2.6 Prepare map of survey area.

5.3 Preparing the Instruments to Begin GPS Enhanced Gamma Survey

5.3.1 Setting up the Field Equipment

5.3.1.1 Power on the Rad Scout by pressing the power button once, located on the bottom right-hand corner of the front of the device. To unlock the device and reveal the homes screen, slide a finger upwards on the display. Open the Rad Scout program by tapping on its icon on the desktop.

5.3.1.2 The typical radiological instruments used with the system are the Ludlum Model 2221 Counter with a gamma detector (44-10).

5.3.1.3 Source check the instrument and record background and source check count rate data in the daily source check logbook located in the instrument case. Evaluate the source count rate to ensure instrument sensitivity is within the required range (dpm/cpm =+/- 20% of source calibration dpm count rate).

5.3.2 Connecting the Meter to Tablet

5.3.2.1 When using the wireless 2221 option, the meter incorporates a Bluetooth device that syncs with the RadScout. To connect to a specific meter, ensure the meter you wish to connect to is turned on and that the Bluetooth modem has a flashing blue light. In the RadScout software tap the Program Settings option from the File menu, and select the button next to the METER SOURCE drop down box as shown in Figure 1. Note that for this option to be available, the meter must be disconnected. Connect and disconnect the meter from the Settings menu in the main form. The window, as shown in Figure 2 will appear with all discovered Bluetooth devices. Click on the serial name that matches the Bluetooth device of the 2221 you want to connect to and click SELECT. If the pairing is successful, the device name will show up in the drop down box. Save the project settings and connect to the meter through the settings menu in the main form by clicking on , METER – OPEN. If the meter is opened successfully, the values will be displayed next to the trifoil symbol in the bottom left-hand corner of the screen. A red error icon indicates there is no connection.

5.3.2.2 Once the Bluetooth device is paired and selected in the drop down box, the device will be connected on every startup of the software.

5.3.3 Connecting to Goede GPS

5.3.3.1 The internal GPS is adequate for most surveying needs, but if sub-meter accuracy is desired, the external Geode sub-meter receiver may be used as the GPS source. To connect the Geode receiver,

press the power button on the receiver to turn the unit on. From the File menu, tap Program Settings and select Geode from menu labeled GPS SOURCE as shown in Figure 3. Note that this option is only available when the GPS is disconnected. The GPS may be connected and disconnected through the settings menu . If the Geode being used is different than the one in the drop down menu, the new Geode must be paired by clicking on the button to the right of the drop down box and selecting the proper device. The Geode serial number may be found on the bottom of the receiver as a six-digit number. Once selected, click on the Settings menu, and tap GPS, then CONNECT to connect the new device. The internal tablet GPS may also be used as the primary GPS source to reduce hardware. To select the internal GPS open the Program Settings window and select the Internal Mesa GPS in the drop down menu. Note that the GPS must be disconnected for this option to be available.

5.3.3.1.1.1 Note that once a successful connection is established, the software will reconnect the last device used upon starting the software.

5.3.4 Refer to ERG User Guide for further reference

6.0 PERFORMING A SURVEY

6.1 The Rad Scout software is used to view, collect, and analyze spatially correlated radiological data with superior accuracy and data quality. Using the position of the GPS receiver, or internal tablet GPS, collected radiological data are viewed in real-time. In addition, the program provides the ability to apply a legend to background and survey data to provide real-time mapping of the gamma levels.

6.2 ***Defining a Coordinate System***

6.2.1 By default, the software will use the WGS84 longitude latitude geographical system for all mapping and log file collection. There are times, however, where it is necessary or practical to define a projected coordinate system. For instance, when adding a geotagged world image file, it is necessary to set the coordinate system to the same system as defined in the image. The coordinate system will also be beneficial when collecting point features, which will be discussed in more detail below.

6.2.2 To define a coordinate system, click on FILE, then COORDINATE SYSTEM. Select the desired System and Zone, then click Save to set the project coordinate system. Once set, the saved coordinate system will be applied every time the software is opened.

6.3 ***Defining a Legend***

6.3.1 The legend can be used to define specific colors to ranges of count rate data. Although the 2221 records both ratemeter and one-second scalar data, only the ratemeter will be evaluated and displayed using the legend. To apply a legend, tap Legend in the Settings menu. To add a new legend break, tap the Add button. Enter the new threshold, desired point size, and the color, then tap Save. The threshold is defined as the count rate at which the data will be colored if it is equal to, or exceeds.

6.3.2 To edit an existing break, tap on the break you wish to edit, and tap the edit button , or simply double tap on the break to bring up the legend properties. Make the necessary changes to the threshold, point size, or color and tap the Save button to apply changes. Note that the default map point will be defined by the ≥ 0 cpm break. The color and size of the point may be modified, but the threshold must be zero, and the break may not be deleted. Up to 10 breaks may be added to the legend. Once the legend is defined, tap the Save button to apply changes.

6.3.3 The legend will be applied to both the background layers and the real time data. When adding background layers, the legend breaks will be ordered from smallest to largest values when being drawn on the map. This allows the larger, and typically more important values, to be more visible when viewing the data that are on top of each other spatially.

6.3.4 If multiple legends are being used, use the menu in the legend editor to save and recall legends.

6.4 *Creating a Survey File and Collecting Data*

6.4.1 Prior to collecting survey data, a file must be created that will store all the records. To create a file, tap on the Create File tool from the File menu. The filename will be automatically created using the date, time, and the system ID of the Rad Scout. The system ID is provided as an integer to distinguish files easily when multiple data loggers are used for a single survey. The system ID for each data logger is predefined and may not be modified. If desired, add additional information to the beginning of the filename string, however it is highly recommended that the numerical fields are not modified. If necessary, enter additional information in the following textboxes, such as the survey unit, the technician, and any additional comments. Tap the Create button to create the file. Once a survey file has been created, survey data may be collected. Tap the Collect tool to start collecting data. Logged data will appear on the map in real time as individual points and the tablet will produce an audible beep when a new data point has been logged. Volume can be adjusted using the P1 and P2 hardware buttons on the front of the tablet. The total number of records logged to the file is also shown in the status bar. To pause the data collection, press the Stop tool. When surveying is complete, close the file by tapping the Close tool in the File menu. Once a file is closed, it may not be reopened to append data, however all collected filles may be opened as background layers.

6.5 *Data Features*

6.5.1 The Data Feature function is useful for displaying points that are used for navigational or informational purposes. For instance, it might be necessary to navigate to previously defined sample locations as a shapefile. To open a feature file, select Data Feature from the file menu, then tap Open Feature File. A list of available shape files will appear. To add custom shapefiles to the menu, the file must be copied into the RadScout folder in the My Documents directory. Select a file, then tap Open. The points will be displayed on the map as shown in Figure 10. Unlike the background files, the data features allow user interaction through the map interface.

6.5.2 Click on the feature to bring up the sample window. From the menu,

select one of the three options as described

6.5.2.1 The Edit tool may be used to edit information about a previously added data feature point.

6.5.2.1.1 Thise option only available for points added manually.

6.5.2.2 The Select tool may be used to select a specific data feature. Once selected, the data feature can be navigated to by clicking FILE, DATA FEATURE, NAVIGATE TO.

6.5.2.3 The Visibility tool may be used to turn individual samples on and off. This feature is useful to determine when tasks at specific locations have been completed.

7.0 DOWNLOADING, ANALYZING AND EDITING THE SURVEY DATA

Following the collection of data, it is often necessary to transfer all field data to a central computer used for processing and reporting. This section discusses the process for transferring field data from multiple field tablets to a single removable disk.

7.1 Synchronizing Data

7.2 The Mesa tablet includes the ERG RadSync software which greatly simplifies the data exporting process and ensures no data are overwritten or deleted.

7.3 To export field data, place a removable disk in the USB slot on the bottom of the Mesa tablet and open the RadSync application. The application will display the gsf survey files and data feature shapefiles that will be transferred to the removable drive. The application will only display and attempt to transfer files that do not already exist on the removable drive. If the data feature shapefiles on the tablet are determined to be larger than the files on the disk (for instance, if features were added since the last transfer) then the shapefiles will be replaced with the newer file. All original files will always be maintained on the field tablet.

7.4 The application also provides an easy method of getting data onto the field computer to be used as background files or data files. To synchronize import data, place the desired files (.gsf, .jpg, .tif, or .shp) on the removable drive in the directory "<Drive>:\RadScout\". The software will copy these files to the field computer if they do not already exist.

7.4.1 Note that when this approach is used for synchronizing world image files, only the name will be used to determine if the file already exists

7.5 Editing and Reviewing the Data

7.5.1 Projects

7.5.1.1 The Radscene software utilizes projects which will keep files organized and retain project settings, such as coordinate systems.

7.5.2 Creating a New Project

7.5.2.1 To create a new project, click File, Project, Create. A New Project window will be displayed. Choose the project name and a directory and click the Create button. The software will create a folder in the directory matching the project folder along with all sub folders used to store data.

7.5.3 Opening and Modifying Existing Projects

7.5.3.1 To open or delete an existing project, click File, Project, Open/Modify to show the Open Project window. The drop-down box will contain all projects created on the computer. To open an existing project, select the desired project and click the Open button. To delete an existing project, select the project in the front down box and click the Delete button. Note that when a project is deleted the project is removed from the project list, but all folders and survey data are retained in the original file path. If a project has been deleted but it becomes necessary to reopen the project, open the Create New Project window and enter the old project name in the Project Name textbox. The software will ask if you would like to associate the file data to the project. Click yes to reopen the project

7.5.4 Defining a Coordinate System

7.5.4.1 To define a coordinate system, click the Setting tool and select the SYSTEM AND Zone. The coordinate system will be saved with the project and is primarily used for exporting data to a specific system.

7.6 Importing Data

7.6.1 Once a project is defined, field data may be imported. Insert the removable drive used to store field data from the RadExport software and click the Import Data tool to load the Import Data window as. If data is discovered on the drive, the computer names of all data loggers used to export data will be shown in the window. Click the Import button to copy all survey files and feature data from the USB drive to the project directory. The application will only copy files that do not already exist in the project directory. If the Data Features on the USB drive are determined to contain more data than the data feature files currently in the project folder, a message box will be displayed asking whether to replace the existing file or not.

7.6.1.1 Note that if you choose to replace the existing file, the file in the project directory will be overwritten.

7.7 Data Analysis

7.7.1 Once data has been imported, it will become available to be added to the map. Click the Add or Filter Add tool to add survey data to the map. Refer to the RadScene Interface section for information on viewing survey file details, tables, and defining legends.

7.7.2 Click the Analysis tool to bring a histogram and statistics of all data displayed in the map window as. Note that the Scalar data tab will only be available if a scaler enabled 2221 was used to collect data. Click and hold

on the blue cursor to drag in either direction. The corresponding cursor location value will be displayed in the blue text above the cursor.

7.8 Exporting Data

7.8.1 Click the Export Data tool to export all survey files currently loaded into the map. The Files to Export text box will display all files that are being exported. Click whether to use the project coordinate system or the WGS system (longitude/latitude). Also choose the time zone that the survey was performed in to correctly offset the time of each file record. The Use UTC time check box can also be used if it is preferable to keep data in UTC GPS time. Finally, choose the output file type as either a comma separated file (.csv) or ESRI shapefile (.shp) and select the directory. By default, the exported file will be named using a date string. When all parameters have been selected, click the Export button to export all survey files.

7.8.2 Unlike the survey files, which are collected in binary format, the data feature files are already created as shapefiles and therefore do not require exporting. After importing the survey data, the feature data files will exist as shapefiles in the [project directory]/[project name]/Features folder.

7.8.2.1 Note that if any manipulation is performed on the feature data shapefiles, it is recommended that the files be copied to a new directory. This will prevent the import process from overwriting data which is recognized as different than the USB data.

7.9 Data Tools

7.9.1 Merging and exporting gsfm files

7.9.1.1 Commonly, it is necessary to display the survey progress on a data logger to prevent resurveying an area that is already complete. This is particularly important when there are multiple surveyors for a single area. Review ERGModel 105G procedures for further information.

7.9.2 Repairing a Corrupt File

7.9.2.1 In very rare scenarios, a log file (.gsf) may become corrupt, preventing it from being able to be exported as a shapefile. This most commonly occurs if the data logger shuts down unexpectedly or freezes while a record is being written to the file. To repair a corrupted file, click the Tools – Repair GSF File. Select the file from the open file dialog. If errors are detected, the repair form will be displayed. Click the Repair button to repair the file. The tool will create a backup of the original file, which will have the suffix ‘backup’, and will be copied to the same folder location as the original

8.0 REFERENCES

8.1 National Council on Radiation Protection and Measurements, NCRP Report No. 50, "Environmental Radiation Measurements", December 1976.

8.2 National Council on Radiation Protection and Measurements, NCRP Report No. 58, "A Handbook of Radioactivity Measurements Procedures", 2nd Ed., 1985.

8.3 Kocher, D.C., 19;79, "Dose-Rate Conversion Factors for External Exposure to Photons and Electrons", NUREG/CR-1918.

9.0 ATTACHMENTS

Attachment 1 – ERG Setup and Operation of the ERG Model 105G

Attachment 5. MJWRCP-66 Soil Sampling Protocols, Rev 0

THE MJW COMPANIES Radiological Consulting Professionals and Expert Technical Services		MJWRCP-66 Rev. 0
PROCEDURE FOR SOIL SAMPLING FOR RADIOACTIVE MATERIAL		**FIELD PROCEDURE**
Effective Date: 12/16/20	Approved By: *M.J. Willett*	

1.0 PURPOSE

This procedure describes the general and specific procedures, methods and considerations to be used and observed when collecting soil samples for field screening and/or laboratory analysis.

2.0 SCOPE

The procedures described in this document are to be used by qualified field personnel when collecting and handling soil samples in the field. If MJW field personnel determine if any of the procedural steps may be inappropriate, they will contact their field supervisor immediately to discuss and resolve the issue. Any and all such issues will be recorded in the field logbook.

3.0 SAFETY PRECAUTIONS

Proper safety precautions must be observed when collecting soil samples. Field personnel must refer to the RECON Project Health & Safety Plan Rev 1 for guidelines on safety precautions to be followed for this type of field work.

4.0 PROCEDURAL PRECAUTIONS

Special care must be taken not to contaminate collected samples. This includes but it not limited to storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody sealed during long-term storage or shipment. Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party. If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.

5.0 FIELD OPERATIONS

5.1 General

These sampling methods are used primarily to collect surface and shallow subsurface soil samples. Surface soils are generally classified as soils between the ground surface and 6 to 12 inches below ground surface (BGS). The most common interval is 0 to 6

inches BGS, however, the data quality objectives of the investigation may dictate another interval, i.e., 0-3 inches BGS, for risk assessment purposes. The shallow subsurface interval may be considered to extend from approximately 12 inches BGS to a site-specific depth at which sample collection using manual collection methods becomes impractical.

5.2 Soil Collection Using Spoons

Stainless steel spoons may be used for surface soil sampling to depths of approximately 6 inches BGS where conditions are generally soft and non-indurated and there is no problematic vegetative layer to penetrate. If the soil being sampled is cohesive and crumbles when removed from the ground surface, consider using a hand auger to collect the sample.

When compositing a sample, make sure each composite location consists of equal volumes, i.e., same number of equal spoonfuls. If a thick matted root zone is present at or near the surface, it should be removed before the sample is collected.

5.3 Soil Collection Using Hand Augers

Hand augers may be used to advance boreholes and collect soil samples in the surface and shallow subsurface intervals. Typically, 4-inch stainless steel auger buckets with cutting heads are used. The bucket is advanced by simultaneously pushing and turning using an attached handle. Auger buckets may be used with a handle alone or with a handle and extensions. The bucket is advanced to the appropriate depth and the contents are transferred to the homogenization container for processing.

The practical depth of investigation using a hand auger depends on the soil properties and depth of investigation. For example, sandy soil may flow out or collapse at depth. Conversely, tight clays and cemented sands may offer too much resistance to sampling and powered equipment may need to be used.

Because of the tendency for the auger bucket to scrap material from the sides of the auger hole while being extracted, the top several inches of soil in the auger bucket should be discarded prior to placing the bucket contents in the homogenization container for processing. The hand auger assembly must be decontaminated between each borehole that is advanced per Section 5.5.

5.4 Sample Collection, Identification and Documentation

A nominal 500-gram (1.1 lb) sample will be collected and placed into a double-lined plastic bag or sealable laboratory containers. When necessary, additional borings will be placed adjacent to the original location to obtain adequate sample volume for laboratory testing. When multiple borings and core samples are required to obtain adequate sample volume, a composite sample from similar materials and at approximately equal depths of the cores used, will be collected for analysis.

All samples will be labeled to include:

- Location ID
- Depth
- Date/time
- Sampler
- Sample number
- Radiation readings (Gross CPM)
- Analyses required

Sample bags or containers will be transported in totes, coolers, or similar to the radiological storage area pending completion of GEL laboratories Chain-of-Custody (COC) forms (Attachment 1), and shipment for analysis. COC forms will be completed as required and will reflect laboratory analysis for gamma spectroscopy using method 901.1 (HASL 300) and/or alpha spectroscopy for U and Th isotopic. All samples will be submitted via contract carrier.

Sample IDs will consist of an alpha-numeric code including the location, boring ID, sample matrix, sample type, sample depth, and an identifier for composite sample.

- Location: This will be site coordinate and map location
- Sample ID: A sample designation starting with SU1 or BRA (survey unit designation) followed by dash and a two-digit number separated by dash for sample ID, followed by depth designation (A =0-6, B=6-12, C=0-12, D=12-18, as appropriate)
- Sample Matrix: So (soil), Con (concrete) or other.
- If the sample is a composite sample, the sample ID will have the letter C at the end.

Example #1: SU1-2-1ASoC. A soil sample (So) collected at soil sampling location (2-1), from 0.0 to 6 inches bgs (A), composite (C).

Samples will be analyzed by a ELAP certified laboratory. Sample custody will be documented, and analysis requirements communicated using laboratory provided Chain of Custody Forms

5.5 Step for Sampling Equipment Decontamination

Decontamination efforts will follow a four-step approach for hand tools and equipment used to collect samples. The four-step approach for sampling equipment decontamination is as follows:

- A detergent and water wash to remove all visible particulate matter and residual oils and grease.

- Tap water rinse.
- Distilled and deionized water rinse (for samples requiring chemical analyses)
- Scan equipment between each use using on-site surface radiation equipment.

Attachment 1. GEL Laboratories Chain of Custody Form

Page: _____ of _____
Project #:
GEL Quote #: _____
COC Number (1): _____
PO Number:

GEL Chain of Custody and Analytical Request
See www.gel.com for GEL's Sample Acceptance SOP
GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: | Phone #:
Project/Site Name: | Fax #:
Address:
Collected by: | Send Results To:

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive	Should this sample be considered: TSCA Regulated	Number of containers	<-- Preservative Type (6)	Comments
										Note: extra sample is required for sample specific QC

TAT Requested: Normal: _____ Rush: _____ Specify: _____ (Subject to Surcharge) | Fax Results: Yes / No | Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other _____
Mountain

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1			1		
2			2		
3			3		

Sample Shipping and Delivery Details
GEL PM:
Method of Shipment: | Date Shipped:
Airbill #:
Airbill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite
3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.
4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=N
5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B/7470A* - **1**).
6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

For Lab Receiving Use Only
Custody Seal Intact? *YES* *NO*
Cooler Temp: _____ C

WHITE = LABORATORY **YELLOW = FILE** **PINK = CLIENT**

Attachment 6. Soil Sample Data Sheet

MJW TECHNICAL SERVICES, INC.

Date: _____ Project: _____ Project No.: _____

RCT Name: _____

1. Sample ID: _____
2. Sample Type: Composite/Grab Sample Vol.: _____ grams
3. Laboratory Analyses Requested: (circle) Gamma Spec Alpha Spec Isotropic-:_____
4. Sample Location:
   Description/Coord: _____
   Land Marks: _____ Depth _____ Location ID: _____
5. Visual Characteristics of Sampled Material
   Texture: _____ Color: _____ Grain Size: _____
   Other: _____
6. Background 2x2 NaI (CPM) and Bicron (uRem/hr):
7. Sample Radiation Readings:

Identifier	2x2 NaI (CPM)			Bicron (uRem/hr)		Notes
Sample No.	Count time (min)	1 cm	1 m	1cm	1m	

8. Sample Information
   a. Sample containers (bags) [all samples will be labeled per PDIWP] Label will include: Location ID, Depth, Type, Date/Time, Sampler, Sample No., Radiation Readings
   b. Sample ID Format

Sample No.	Depth Interval (cm)	Soil Type (slag, soil, etc.)	Sample ID	Comments

Sample Recorded on Laboratory COC form and Container Labeled: (Y) (N)

Attachment 7. GEL Chain of Custody Form

Page: _____ of _____
Project # _____
GEL Quote #: _____
COC Number [1]: _____
PO Number:

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: ***GEL Project Manager:***

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Phone #
Project/Site Name: Fax #
Address:
Collected By: Send Results To:

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID ** For composites - indicate start and stop date/time*	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	Should this sample be considered: (7) Known or possible Hazards	Total number of containers										<-- Preservative Type (6)
																		Comments Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1			1		
2			2		
3			3		

TAT Requested: Normal: _____ Rush: _____ Specify: _____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** _____ *°C*

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, SS=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B/7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) **KNOWN OR POSSIBLE HAZARDS**

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Misc. RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Attachment 8. MJWRCP-04_Rad Contamination Survey Map and Data Sheet

MJW Corporation Inc.

Radiation / Contamination Survey Map and Data Sheet

MJW Job #:	Surveyor:	Date:	Time:

Survey Map (Indicate North)

Survey Location (Description)	Instrument Number	Radiation Levels CPM or mR/hr	Physical Form	Remarks

*Note: All Radiation Readings will be made in the same units noted for the instrument, unless noted otherwise in the remarks column.

RCP No. 4 Revision: 0	Date: 05/24/91	Attachment 3

Attachment 9. NYSDOH BERP Radiation Guide 10.10_1986

August 1986

New York State Department of Health
Bureau of Environmental Radiation Protection

RADIATION GUIDE 10.10

GUIDE FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR RADIOACTIVE MATERIALS

INTRODUCTION

A. Purpose of Guide

The instructions in this guide, in conjunction with Table 1, specify the radioactivity and radiation exposure rate limits which should be used in accomplishing the decontamination and survey of surfaces of premises and equipment prior to abandonment or release for unrestricted use. However, no decontamination procedures shall be used which may generate air-borne radioactive material without specific authorization from the New York State Department of Health to do so. The Department may be consulted as to the appropriate equipment performance characteristics to be used in determining that the levels specified in Table 1 are met. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control will be considered on a case-by-case basis.

B. Applicable Regulations

The regulations pertaining to this use of radioactive material are found in Title 10, Chapter 1, Part 16, New York Code of Rules and Regulations (10 NYCRR 16). Chapter 1 is entitled, "State Sanitary Code" and Part 16 is entitled, "Ionizing Radiation." The statutory authority for the rules and regulations is found in the New York State Public Health Law, Section 225.

PROCEDURES

A. Contamination

The licensee shall make a reasonable effort to eliminate residual contamination.

Radioactivity on equipment or surfaces shall not be covered by paint, plating or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

The radioactivity on the interior surfaces of pipes, drain lines, or duct-work shall be determined by making measurements at all traps and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or duct-work. Surfaces of premises, equipment or scrap which are likely to be contaminated, but are of such size, construction or location as to make the surface inaccessible for purposes of measurement, shall be presumed to be contaminated in excess of the limits.

B. Relinquishing Control Above Limits

Upon request, the Department may authorize a licensee to relinquish possession or control of premises, equipment or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

1. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent and degree of residual surface contamination.

2. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations, such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

C. Reporting

Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the New York State Department of Health, Bureau of Environmental Radiation Protection, 2 University Place, Room 325, Albany, New York 12203, no less than 30 days prior to the planned date of abandonment. A copy of the survey report shall also be provided to the landlord or subsequent tenant, pursuant to Section 16.10 (b), New York State Sanitary Code (10 NYCRR 16).

The survey report shall:

1. Identify the premises and indicate the date of the survey.

2. Show that reasonable effort has been made to eliminate residual contamination.

3. Specify the manufacturer and model number of the survey instrument and the procedures used to calibrate the instrument, and include the last calibration date.

4. Describe the scope of the survey and general procedures followed.

5. State the findings of the survey in units specified in Table 1.

6. Confirm that the radiation levels shown in the survey will not be increased as a result of activities following the performance of the survey.

Following review of the report, the Department will consider visiting the facility to confirm the survey.

Table 1

Radioactive Surface Contamination Limits
(see notes below)

Application	Alpha (dpm/100 cm^2)		Beta/Gamma	
	Total	Removable	Total (mR/hr)	Removable (dpm/100 cm^2)
Controlled Area				
Basic Guide	15,000 max. 5,000 avg.	500	1.0	5,000
Clean Area	1,000	100	0.5	1,000
Non-controlled Area				
Skin, Personal Clothing	500	N.D.	0.1	N.D.
Release of Material or Facilities	2,500 max. 500 avg.	100	0.2	1,000

Notes to be used when using Table 1:

a. Where surface contamination by both alpha- and beta-emitting nuclides exists, the limits established for alpha- and beta-emitting nuclides should apply independently.

b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency and geometric factors associated with the instrumentation.

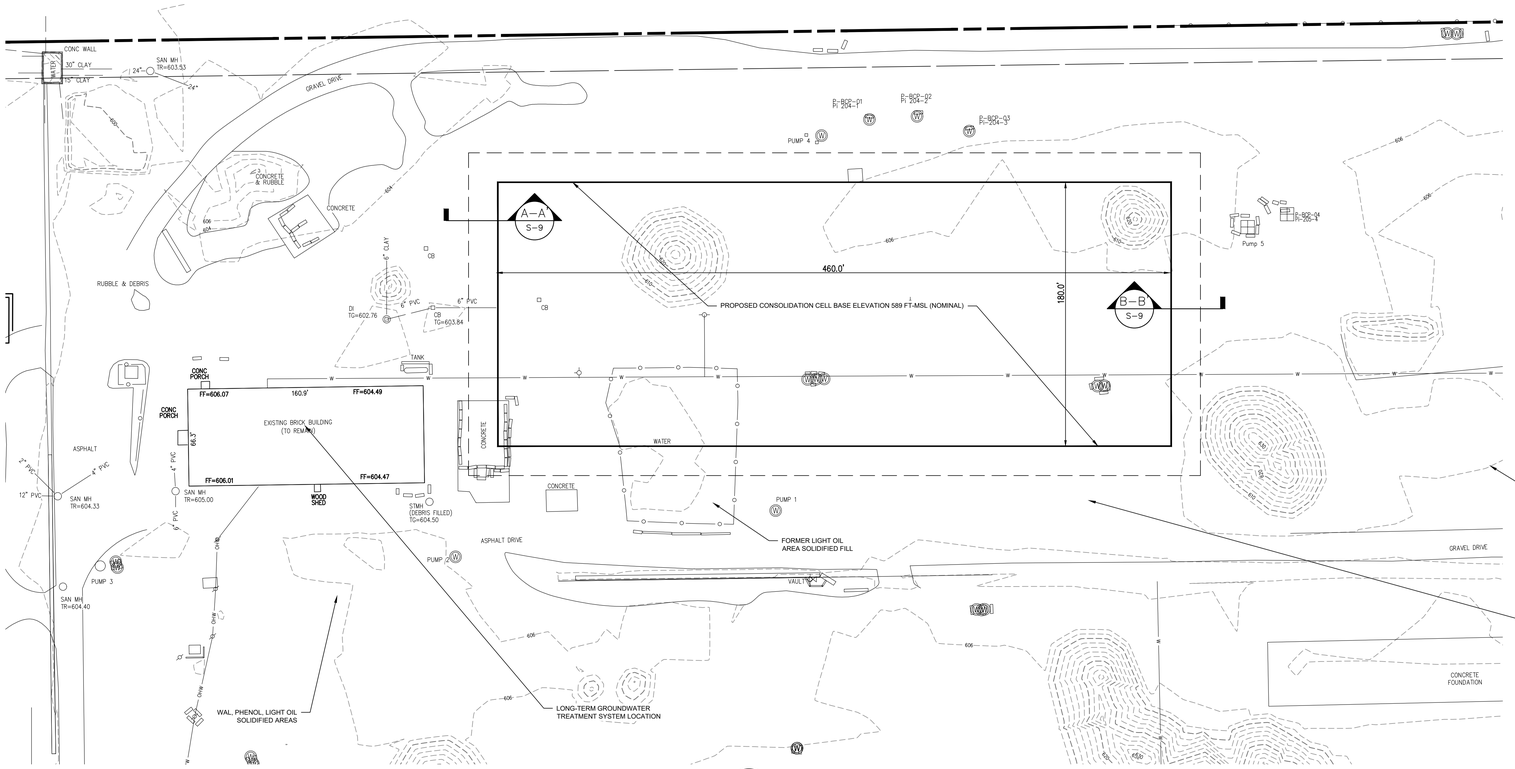
c. Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.

d. The maximum contamination level applies to an area of not more than 100 cm^2.

e. The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

f. N.D. means non-detectable.

Attachment 2 - TENORM Consolidation Map



S-9 PLAN
SCALE: 1"=40'

GRAPHIC SCALE
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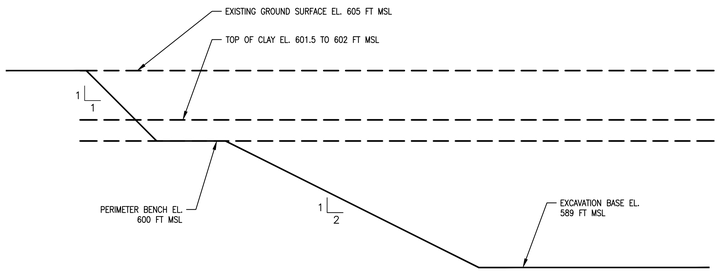
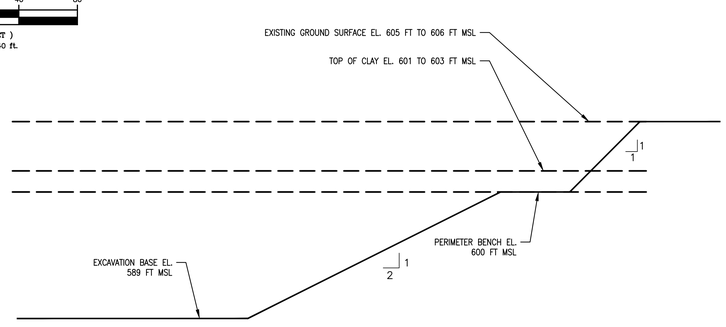
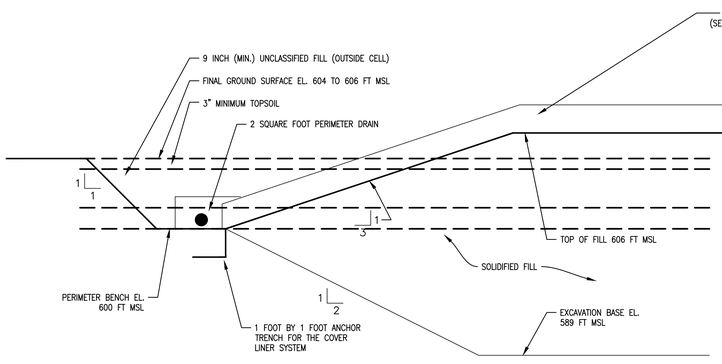
(IN FEET)
1 inch = 40 ft.



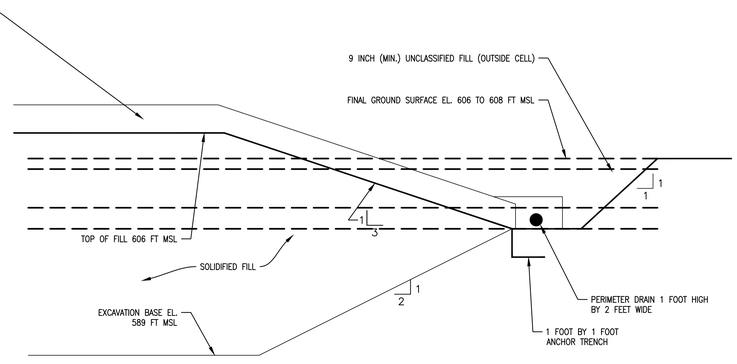
1 S-9 SECTION A-A'
SCALE: N.T.S



2 S-9 SECTION B-B'
SCALE: N.T.S



3 S-9 SECTION A-A' DETAIL
SCALE: N.T.S



4 S-9 SECTION B-B' DETAIL
SCALE: N.T.S

NOTES:

1. THE CONCRETE STOCKPILES SHALL BE REMOVED AND PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-21 AND S-22).
2. THE CONSOLIDATION AREA SHALL BE CONSTRUCTED IN THE NORTHWEST AREA OF THE BCP SITE. BECAUSE THE VOLUMES OF TARGET MATERIALS ARE KNOWN, A SINGLE CONSOLIDATION CELL WILL BE BUILT, MINIMIZING THE QUANTITY OF CONSTRUCTION MATERIALS REQUIRED CONSISTENT WITH THE GREEN REMEDIATION INITIATIVE.
3. THE SHALLOW FILL WITHIN THE LIMITS OF THE LINER FOR THE CONSOLIDATION AREA SHALL BE REMOVED IN INCREMENTS FROM THE WEST TO THE EAST. GENERAL SHALLOW FILL SHALL BE PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-17 AND S-18).
4. SOLIDIFED FILL IN THE INITIAL CONSOLIDATION CELL FOOTPRINT SHALL BE STOCKPILED ON THE SOLIDIFIED MATERIALS EAST OF THE EXCAVATION.
5. FOLLOWING REMOVAL OF THE FILL, ALL STAINED SILTY CLAY SHALL BE REMOVED FROM THE FILL/SILTY CLAY INTERFACE. THE STAINED SILTY CLAY SHALL BE PLACED ON THE BCP SITE IN ACCORDANCE WITH THE SUBGRADE PREPARATION PLANS (SHEETS S-21 AND S-22).
6. THE CLAY SHALL BE EXCAVATED TO THE EXCAVATION BASE AND STOCKPILED FOR USE IN THE SOLID WASTE CAP AND SOIL COVER. THE SILTY CLAY HAS BEEN SAMPLED FOR IMPORT PARAMETERS. AND HAS BEEN SHOWN TO MEET COMMERCIAL SCOS.
7. FOLLOWING EXCAVATION TO GRADE, THE SIDE SLOPES AND BASE SHALL BE COMPACTED TO 90-PERCENT OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
8. THE CONSOLIDATION CELL WILL BE EXCAVATED IN SECTIONS TO MORE EFFICIENTLY MANAGE THE FILL.

LEGEND

BOUNDARY LINE
EXISTING WATERMAIN, HYDRANT, AND VALVE
EXISTING STORM SEWER, MANHOLE, AND INLET
EXISTING SANITARY SEWER AND MANHOLE
EXISTING TREE LINE
PROPERTY MARKER FOUND
EXISTING CONTOUR W/ ELEVATION
EXISTING SPOT ELEVATION
EXISTING GAS MAIN
EXISTING UNDERGROUND ELECTRIC/CONDUIT
EDGE OF WATER

ALL EXISTING PROPERTY SURVEY INFORMATION, INCLUDING BUT NOT LIMITED TO BOUNDARY, TOPOGRAPHY, UTILITIES, EASEMENTS, ETC. WERE PROVIDED BY NIAGARA BOUNDARY AND MAPPING SERVICES ON 'MAP SHOWING TOPOGRAPHIC SURVEY OF PROPERTY OWNED BY RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS INC (SHEETS 01-04), DATED JULY, 2024

N

DRAWING BY: RS BME CAD OPERATOR
CHECKED: J. BLACK
APPROVED: XXX

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SELECTED PLAN, REMEDIAL ALTERNATIVE
RITC BCP SITE #C915353
3875 RIVER ROAD
TONAWANDA, NY 14150

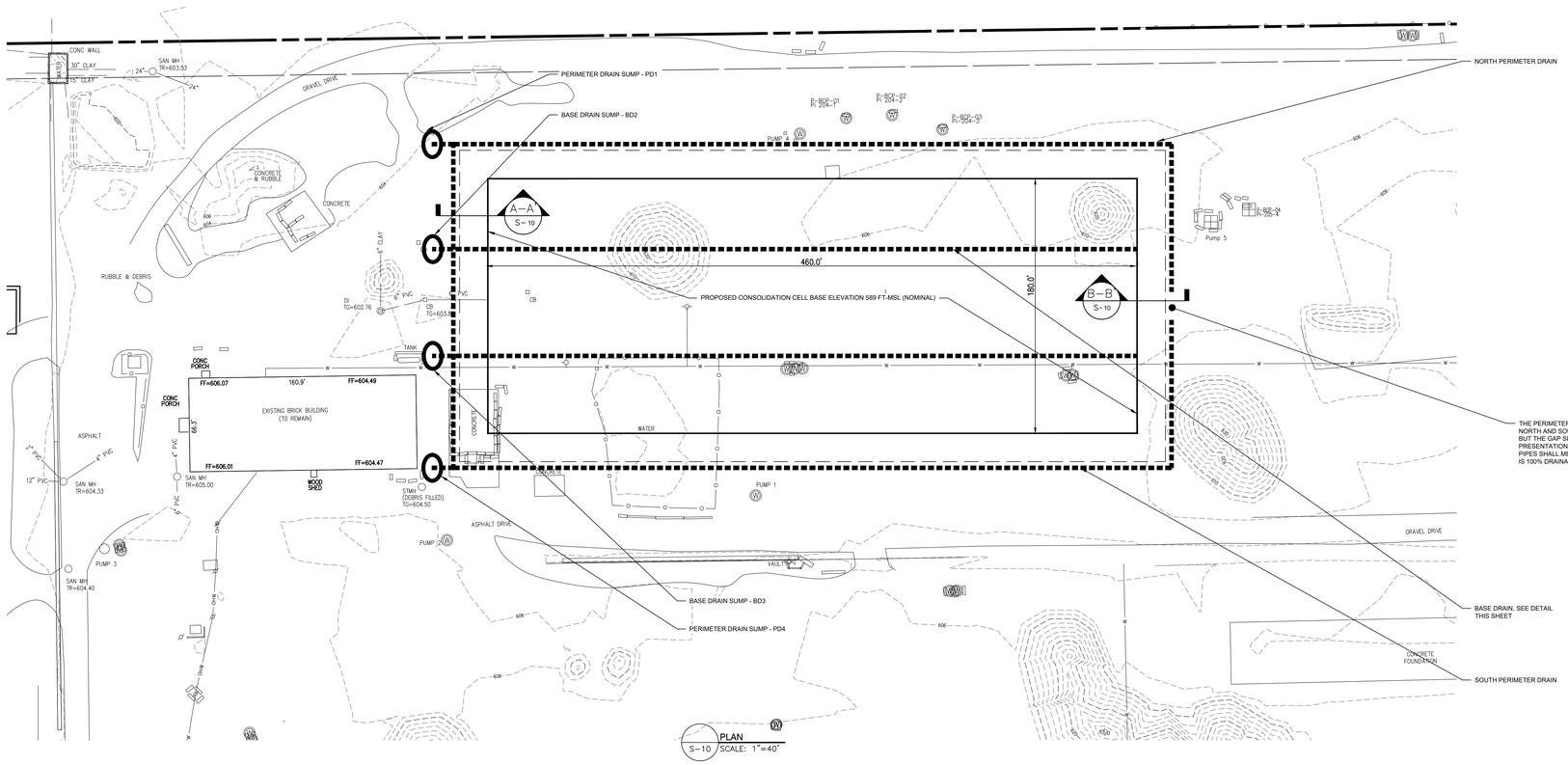
INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 3-1

DRAWING NUMBER
S-9

E

P:\2968\Drawings\Final\2968 Design Base.dwg

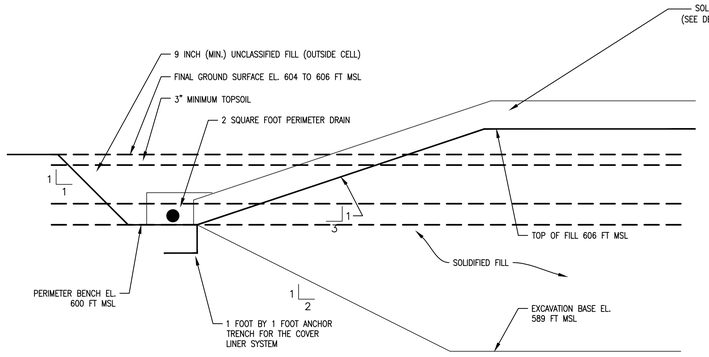


PLAN
S-10 SCALE: 1"=40'

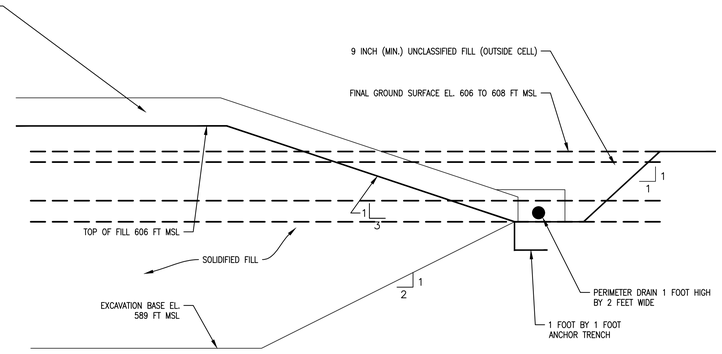
GRAPHIC SCALE

40 0 20 40 80

(IN FEET)
1 inch = 40 ft.



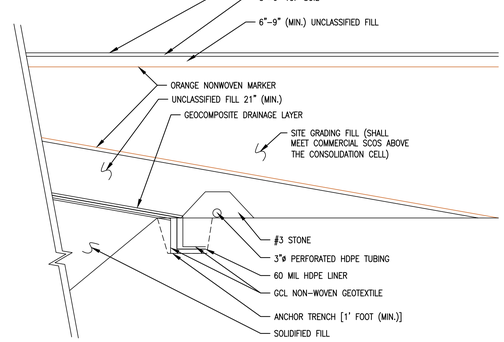
3 SECTION A-A' DETAIL
S-10 SCALE: 1"=8'



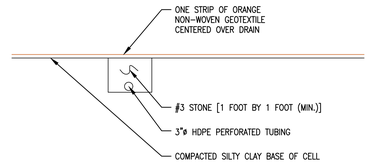
4 SECTION B-B' DETAIL
S-10 SCALE: 1"=8'

NOTES:

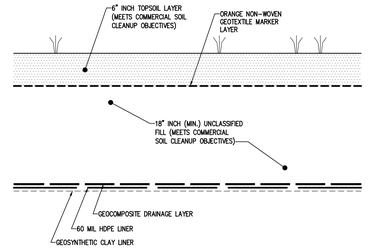
1. FOLLOWING PREPARATION OF THE BASE, TWO BASE DRAINS WILL BE INSTALLED. THE BASE DRAINS WILL COLLECT ANY WATER THAT MIGRATES THROUGH THE CONSOLIDATION CELL DUE TO MOISTURE THAT COLLECTS DURING PLACEMENT.
2. THE TARGET MATERIALS SHALL BE PLACED AND COMPACTED IN LIFTS OF NO MORE THAN 12–INCH LOOSE/INITIAL THICKNESS. THE MATERIALS PLACED IN THE CONSOLIDATION CELL SHALL BE COMPACTED BY NO LESS THAN 3–PASSES OF A 20,000 (MIN) POUND SMOOTH DRUM ROLLER.
3. THE TOP/TOE OF THE COMPACTED FILL IN THE CONSOLIDATION CELL SHALL NOT EXCEED TO TOP OF CLAY ELEVATION AT THE PERIMETER.
4. AFTER ALL TARGET MATERIALS ARE IN THE CONSOLIDATION CELL, THE FINAL SURFACE SHALL BE COMPACTED WITH NO LESS THAN THREE PASSES OF THE SMOOTH DRUM ROLLER.
5. THE FINAL SURFACE SHALL BE SURVEYED AND THE SOLID WASTE CAP SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS.
6. THE CAPPING SYSTEM WILL CONSIST OF THE FOLLOWING LAYERS FROM BOTTOM TO TOP; (A) ONE LAYER OF GEOSYNTHETIC CLAY LINEAR (GCL), (B) ONE LAYER OF WELDED 60–MIL HIGH DENSITY POLYETHYLENE (HDPE) LINER, (C) ONE LAYER OF GEOCOMPOSITE DRAINAGE LAYER, (D) 18–INCHES (MIN.) OF UNCLASSIFIED FILL MEETING THE NYSDEC COMMERCIAL SCOS, (E) ONE LAYER OF ORANGE NON–WOVEN GEOTEXTILE TO DELINEATE THE LIMITS OF THE CONSOLIDATION CELL, (F) 6–INCHES OF TOPSOIL MEETING THE NYSDEC COMMERCIAL SCOS, AND (G) VEGETATION TO CONTROL EROSION OF THE SURFACE.
7. THE GCL AND HDPE LINERS SHALL BE ANCHORED AROUND THE PERIMETER IN A 1–FOOT BY 1–FOOT (MIN.) ANCHORED TRENCH BACKFILLED WITH UNCLASSIFIED FILL MEETING THE NYSDEC COMMERCIAL SCOS.
8. THE GEOCOMPOSITE DRAINAGE LAYER SHALL BE ANCHORED AND ULTIMATELY DRAIN INTO A PERIMETER DRAINAGE COLLECTION SYSTEM CONSISTING OF A 3–INCH DIAMETER HDPE PERFORATED TUBING SURROUNDED BY NYSDOT #3 CLEAN GRAVEL.
9. THE CONSOLIDATION AREA CAPPING SYSTEM SHALL BE ANCHORED INTO THE SILT CLAY. AS A RESULT, THE OUTER SLOPES OF THE UNCLASSIFIED FILL WILL BE LOWER THAN THE SURROUNDING FINAL GRADES FOR THE SITE. THE SUBGRADE OVER THE SLOPES WILL BE FILLED WITH COMPACTED UNCLASSIFIED FILL TO 6–INCHES BELOW THE FINAL GRADE WITHIN THE LIMITS OF THE PERIMETER DRAINS. A LAYER OF ORANGE NON–WOVEN GEOTEXTILE WILL BE PLACES AND COVERED WITH 6–INCHES OF TOPSOIL. OUTSIDE THE LIMITS OF THE PERIMETER DRAIN, THE SITE FILL WILL REMAIN AND THE STANDARD 12–INCH COVER WILL BE INSTALLED.
10. THE FINAL GRADE OF THE CONSOLIDATED MATERIALS, THE UNCLASSIFIED FILL COMPONENT OF THE CAP, AND THE FINAL SURFACE SHALL BE SURVEYED BY A PROFESSIONAL LAND SURVEYOR LICENSED IN NEW YORK.



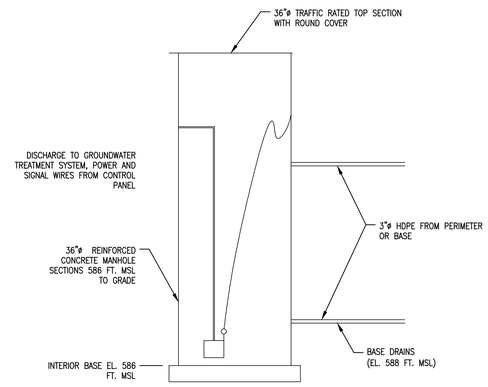
5 ANCHOR TRENCH & PERIMETER DRAIN DETAIL
S-10 SCALE: 1"=8'



6 BASE DRAIN DETAIL
S-10 SCALE: 1"=8'

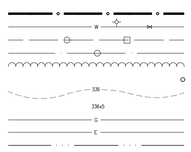


7 CONSOLIDATION CELL CAPPING SYSTEM DETAIL
S-10 SCALE: 1"=8'



8 COLLECTION SUMPS DETAIL
S-10 SCALE: 1"=8'

LEGEND



BOUNDARY LINE
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EXISTING STORM SEWER, MANHOLE, AND INLET
EXISTING SANITARY SEWER AND MANHOLE
EXISTING TREE LINE
PROPERTY MARKER FOUND
EXISTING CONTOUR W/ ELEVATION
EXISTING SPOT ELEVATION
EXISTING GAS MAIN
EXISTING UNDERGROUND ELECTRIC/CONDUIT
EDGE OF WATER

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CHECKED: J. BLACK
APPROVED: XXX

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DETAILS
CONSOLIDATION CELL

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS #C915353
3875 RIVER ROAD
TOWN OF TONAWANDA, NEW YORK

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE

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S-10

E

Attachment 3 - MJWRCP-66 Soil Sampling Protocols and Data Sheet

THE MJW COMPANIES Radiological Consulting Professionals and Expert Technical Services		MJWRCP-66 Rev. 2
PROCEDURE FOR SOIL SAMPLING FOR RADIOACTIVE MATERIAL		**FIELD PROCEDURE**
Effective Date: 10/14/2023	Approved By: D. A. Dooley	

1.0 PURPOSE

This procedure describes the general and specific procedures, methods and considerations to be used and observed when collecting soil samples for field screening and/or laboratory analysis.

2.0 SCOPE

The procedures described in this document are to be used by qualified field personnel when collecting and handling soil samples in the field. If MJW field personnel determine if any of the procedural steps may be inappropriate, they will contact their field supervisor immediately to discuss and resolve the issue. Any and all such issues will be recorded in the field logbook.

3.0 SAFETY PRECAUTIONS

Proper safety precautions must be observed when collecting soil samples. Field personnel must refer to the RECON Project Health & Safety Plan Rev 1 for guidelines on safety precautions to be followed for this type of field work.

4.0 PROCEDURAL PRECAUTIONS

Special care must be taken not to contaminate collected samples. This includes but it not limited to storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody sealed during long-term storage or shipment. Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party. If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.

5.0 FIELD OPERATIONS

5.1 General

These sampling methods are used primarily to collect surface and shallow subsurface soil samples. Surface soils are generally classified as soils between the ground surface and 6 to 12 inches below ground surface (BGS). The most common interval is 0 to 6

inches BGS, however, the data quality objectives of the investigation may dictate another interval, i.e., 0-3 inches BGS, for risk assessment purposes. The shallow subsurface interval may be considered to extend from approximately 12 inches BGS to a site-specific depth at which sample collection using manual collection methods becomes impractical.

5.2 Soil Collection Using Spoons

Stainless steel spoons may be used for surface soil sampling to depths of approximately 6 inches BGS where conditions are generally soft and non-indurated and there is no problematic vegetative layer to penetrate. If the soil being sampled is cohesive and crumbles when removed from the ground surface, consider using a hand auger to collect the sample.

When compositing a sample, make sure each composite location consists of equal volumes, i.e., same number of equal spoonfuls. If a thick matted root zone is present at or near the surface, it should be removed before the sample is collected.

When spoons are utilized on a push driver rig the following procedure will be followed:

MJW will survey samples as they are brought up, the drilling contractor will transport the closed split spoon to a designated space for radiological surveying. When conducting a survey of samples, ensure Soil Boring Survey Log is properly filled out before work commences. Allow the drilling contractor to open the split spoon for radiological surveying. The split spoon will be analyzed by passing a GM and a 2x2 NaI detector across the surface at a slow rate to identify any elevated sections. If elevated sections are detected they will be segregated and sampled according to section 5.5 for radiological analysis.

5.3 Soil Collection Using Hand Augers

Hand augers may be used to advance boreholes and collect soil samples in the surface and shallow subsurface intervals. Typically, 4-inch stainless steel auger buckets with cutting heads are used. The bucket is advanced by simultaneously pushing and turning using an attached handle. Auger buckets may be used with a handle alone or with a handle and extensions. The bucket is advanced to the appropriate depth and the contents are transferred to the homogenization container for processing.

The practical depth of investigation using a hand auger depends on the soil properties and depth of investigation. For example, sandy soil may flow out or collapse at depth. Conversely, tight clays and cemented sands may offer too much resistance to sampling and powered equipment may need to be used.

Because of the tendency for the auger bucket to scrap material from the sides of the auger hole while being extracted, the top several inches of soil in the auger bucket should be discarded prior to placing the bucket contents in the homogenization

container for processing. The hand auger assembly must be decontaminated between each borehole that is advanced per Section 5.6.

5.4 Standing Water Grab Sample

Using a 500 mL polypropylene sample container, gently submerge the open container to collect water. Take care to avoid disturbing the water and collecting particulate matter. Once the container is full, close the container and rinse the exterior of the container off with DI water. Dry the container with a paper towel and place label. Then place the labeled sample container in a plastic bag.

5.5 Sample Collection, Identification and Documentation

A nominal 500-gram (1.1 lb) sample will be collected and placed into a double-lined plastic bag or sealable laboratory containers. When necessary, additional borings will be placed adjacent to the original location to obtain adequate sample volume for laboratory testing. When multiple borings and core samples are required to obtain adequate sample volume, a composite sample from similar materials and at approximately equal depths of the cores used, will be collected for analysis.

All samples will be labeled to include:

- Location ID
- Depth
- Date/time
- Sampler
- Sample number
- Radiation readings (Gross CPM)
- Analyses required

Sample bags or containers will be transported in totes, coolers, or similar to the radiological storage area pending completion of GEL laboratories Chain-of-Custody (COC) forms (Attachment 1), and shipment for analysis. COC forms will be completed as required and will reflect laboratory analysis for gamma spectroscopy using method 901.1 (HASL 300) and/or alpha spectroscopy for U and Th isotopic. All samples will be submitted via contract carrier.

Sample IDs will consist of an alpha-numeric code including the location, boring ID, sample matrix, sample type, sample depth, and an identifier for composite sample.

- Location: This will be site coordinate and map location
- Sample ID: A sample designation starting with SU1 or BRA (survey unit designation) followed by dash and a two-digit number separated by dash for sample ID, followed by depth designation (A =0-6, B=6-12, C=0-12, D=12-18, as appropriate)
- Sample Matrix: So (soil), Con (concrete) or other.
- If the sample is a composite sample, the sample ID will have the letter C at the end.

Example #1: SU1-2-1ASoC. A soil sample (So) collected at soil sampling location (2-1), from 0.0 to 6 inches bgs (A), composite (C).

Samples will be analyzed by a ELAP certified laboratory. Sample custody will be documented, and analysis requirements communicated using laboratory provided Chain of Custody Forms

5.6 Step for Sampling Equipment Decontamination

Decontamination efforts will follow a four-step approach for hand tools and equipment used to collect samples. The four-step approach for sampling equipment decontamination is as follows:

- A detergent and water wash to remove all visible particulate matter and residual oils and grease.

- Tap water rinse.
- Distilled and deionized water rinse (for samples requiring chemical analyses)
- Scan equipment between each use using on-site surface radiation equipment.

Attachment 1. GEL Laboratories Chain of Custody Form

Page: _____ of _____
Project #:
GEL Quote #: _____
COC Number (1): _____
PO Number:

GEL Chain of Custody and Analytical Request
See www.gel.com for GEL's Sample Acceptance SOP
GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: | Phone #:
Project/Site Name: | Fax #:
Address:
Collected by: | Send Results To:

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive	Should this sample be considered: TSCA Regulated	Number of	<-- Preservative Type (6)	Comments
										Note: extra sample is required for sample specific QC

TAT Requested: Normal: _____ Rush: _____ Specify: _____ (Subject to Surcharge) | Fax Results: Yes / No | Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other _____
Mountain

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1			1		
2			2		
3			3		

Sample Shipping and Delivery Details
GEL PM:
Method of Shipment: | Date Shipped:
Airbill #:
Airbill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite
3.) Field Filtered: For liquid matrices, indicate with a - **Y** - for yes the sample was field filtered or - **N** - for sample was not field filtered.
4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=
5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B/7470A* - **1**).
6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

For Lab Receiving Use Only
Custody Seal Intact? *YES* *NO*
Cooler Temp: _____ *C*

WHITE = LABORATORY **YELLOW = FILE** **PINK = CLIENT**

Surface and Shallow Subsurface Soil Sampling Check List

Conduct Tailgate Safety Review…… _____

(date) (date) (date) (date)

Review sampling parameters ……..…….._____ _____ _____ _____

(date) (date) (date) (date)

Determine required tools based upon sampling desire (hand augurs or spoons etc.) ……. _____ _____ _____ _____

(date) (date) (date) (date)

Verify all required tools, supplies, and equipment available …… _____

(date) (date) (date) (date)

Prepare radiological instruments for use and perform operability checks…….._____ _____ _____ _____

(date) (date) (date) (date)

Collect Digital image(s) including location sign…….._____ _____ _____ _____

(date) (date) (date) (date)

Document relevant terrain, location, and other relevant physical features…… _____

(date) (date) (date) (date)

Collect and ID samples in accordance with procedure and sampling parameters …….._____ _____ _____ _____

(date) (date) (date) (date)

Document relevant sample features such as clay, sandy, different colors etc. ……_____ _____ _____ _____

(date) (date) (date) (date)

Verify all required samples have been collected and documentation is complete_____ _____ _____ _____

(date) (date) (date) (date)

Pack samples and equipment for transport back to vehicle(s)…… _____ _____ _____ _____

(date) (date) (date) (date)

Transport samples and equipment to Storage facility……_____ _____ _____ _____

(date) (date) (date) (date)

Decontaminate the tools ..... _____ _____ _____ _____

(date) (date) (date) (date)

Fill out appropriate paperwork for sample chain of custody ….…….._____ _____ _____ _____

(date) (date) (date) (date)

Attachment 4 - GEL Chain of Custody

Page: _____ of _____
Project # _____
GEL Quote #: _____
COC Number [1]: _____
PO Number:

GEL Laboratories LLC
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: ***GEL Project Manager:***

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Phone #

Project/Site Name: Fax #

Address:

Collected By: Send Results To:

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID ** For composites - indicate start and stop date/time*	*Date Collected **(mm-dd-yy)**	*Time Collected **(Military) (hhmm)**	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	**Should this sample be considered:** **Radioactive** *Please supply isotopic info.*	(7) **Known or possible hazards**	**Total number of containers**										<-- Preservative Type (6) **Comments** Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1			1		
2			2		
3			3		

TAT Requested: Normal: _____ Rush: _____ Specify: _____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp: _____°C***

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: _____

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B**, **6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B/7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic **Hg**= Mercury
Ba = Barium **Se**= Selenium
Cd = Cadmium **Ag**= Silver
Cr = Chromium **MR**= Miscellaneous
Pb = Lead RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

Attachment 5 - MJWRCP-03 Field Investigation Survey Procedure

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS

General Radiological Survey Procedure for Radiological Site Investigations

1.0 PURPOSE

The objective of this procedure is to detail the required methods and actions to be taken for collecting radiological survey data of sufficient quality and quantity to meet regulatory guidance outlined in MARSSIM and other relevant or referenced documentation.

This procedure will outline standardized techniques to ensure comparability and reproducibility of the survey data.

2.0 RESPOSIBILITIES

2.1 Radiological Control Supervisor (RSC)

The radiological control supervisor (RCS) is responsible for review of the survey plan and all supporting documentation to ensure that the survey Data Quality Objectives (DQOs) are understood and can be related to field staff conducting the survey. The RCS will ensure that complete documentation is collected for survey points and samples, that field audits are performed during data collection, and that audit findings and data are reviewed and properly logged and narrated in the project file.

2.2 Radiological Control Technician (RCT)

The RCT is responsible for reading, understanding, and executing the protocol and techniques described in this procedure including the operation of instrumentation and completing the required documentation described or referenced in this procedure.

3.0 PREREQUISITES/REQUIREMENTS

The RSC and RCTs must be trained and competent in the techniques and instrumentation described, understand work site hazards and safe work protocol required to perform the work described in this procedure.

4.0 PROCEDURE

Survey details and techniques, including calculations and instrument requirements, will be fully described and specified in specific project or task documentation. The following sections outline the general requirements necessary for performing surveys of the type identified:

4.1 Fixed Survey/Sample Point Location

Every fixed sample location must be spatially located within a Survey Unit. Survey Units (SU) can be comprised of small or large surface areas, a single room or several rooms in a building, grouped together according to their contamination potential (i.e., Class 1, 2 or 3, etc.). Prior to entering the field to conduct a survey:

- SUs with their respective origin points must be identified on a site map
- The number of samples required for each SU should be calculated or approximated and located on the survey map
- The location of each sample location should be identified with local x and y coordinates, measured from the SU referenced origin point.

Sample locations will be identified through a diagram on survey data sheets to ensure proper location identification during the survey in each unit. Survey points can be moved for various reasons as long as the new location is accurately identified with local coordinate's measured from the identified SU origin point.

4.2 Gamma Survey Grid Layout

When areas are required to be surveyed with a specified coverage percentage, survey grids are typically established over the area and a scan survey is conducted. The scan survey follows a predetermined grid laid out over the SU in a density pattern sufficient to measure radiation levels at specified intervals to meet the coverage requirement. Survey grid markers are often used and set up as reference points to assist the surveyor in tracking survey locations and grid lines over large areas.

To establish a survey grid in a building space such as a room, hallway etc., or in outdoor areas, the grid spacing must first be established. Grid spacing will be determined and documented in the Survey Work Plan during survey planning. Grid layout and spacing is based upon the required coverage obtained by factoring in survey meter window area, the instrument type being used, measurement interval, rate of distance traveled between measurements, and the instrument height above the ground surface.

The percent coverage of the survey must be known prior to the field investigation and is a critical DQO for setting up and planning any gamma or instrument scan during a site investigation. Once the survey DQOs are identified and an appropriate Investigation Work Plan has been prepared to identify the variables necessary to determine grid size and spacing, the following steps will be performed:

Laying out the Grid:

- Inspect the area to be delineated and when possible, remove unnecessary objects or vegetation to provide as clear and unobstructed view as possible.
- Identify the area/room origin or reference point
- Using paint, tape, stakes, flags or other appropriate marking devise, measure the required X axis grid distance from the origin point and mark the surface at the required spacing interval. Always include a North arrow and scale on the site drawing and include dominate features to be sure that the grid can be recreated after the survey is completed.
- Repeat the same process along the Y axis from the origin.

- When wall surveys are required, mark a Z axis from the origin up the wall. Z coordinate locations will have the X and Y coordinates respective to their position along the floor/surface grid.
- Draw the area indicating the location of the origin; X and Y axis, and any dominate features (doorways, tables, landscape features, etc.)

4.3 Instrument Surveys

4.3.1 Identifying and Preparing Instruments for Use

An appropriate and calibrated ratemeter/scaler match (i.e., Ludlum 43-68 probe/and 43-60 ratemeter, Model 239-1F floor monitor, Ludlum 43-10 and 2241-2, or equivalent), must be tested for sensitivity and the detection of the investigation contaminates of concern (COC). The instrument sensitivity must be below the COC investigation action level (AL), preferably under 50% of the AL. Once the instrument has been determined to be sensitive enough to use, it can be deployed to perform direct alpha/beta counts to verify the presence of contamination at investigation levels.

When using gas proportional counters (Ludlum 43-68 probe or the Model 239-1F floor monitor), instrument purging using P-10 gas is required prior to operational use. The RCT must be familiar with instrument operation and care prior to field use. Always refer to the operational procedure or the manufacturers' manual for complete instructions if there is uncertainty concerning the use of a particular instrument.

4.3.1.1 Instrument Operational Checks

Prior to performing any measurements, the following Operational Checks must be performed:

- Select the "Battery Check" indicator to verify batteries are fully charged. Replace batteries if necessary. Record reading on field work sheet.
- Select High Voltage (HV) setting and compare reading to the required setting used during calibration for detection of general or specific isotopes as necessary to perform the survey. Record reading on field work sheet.
- Set ratemeter detection setting, if present, to the appropriate setting required by the survey work plan for detection of contaminates of interest (e.g. alpha/beta, alpha, beta, etc.). Record setting on field work sheet.
- Set ratemeter time setting, if present to "one minute" unless otherwise stated in survey work plan.
- If gas proportional counters are being used, purge the instruments with P-10 gas and set the gas flow to the required flow rate prior to use.
- Perform a minimum of 5 background readings in a non-impacted location and record readings. Calculate the average background count rate and check that it is within normal expected range for the area background.
- Perform a minimum of 5 source checks in a non-impacted location and record readings. Calculate the average source count rate. Check to be sure that the average source reading is within 20% of the calibration reading for the source(s) being used.

Use the Field Data Survey Sheet specifically designed for the survey being performed or when appropriate, a more generic survey data sheet can be used to record the operational data collected.

Note: Survey data cannot be collected without instrument operational data recorded and reviewed prior to field measurements.

4.3.1.2 Survey Data Collection

Scaler or Fixed Position Readings:
Scaler readings are the total integrated counts observed at a particular location by the survey probe for the time interval selected on the meter.

- Using a properly calibrated and field checked instrument, hold or place the instrument probe over the area of interest at the specified height for the duration of the time setting (e.g., one minute, .5 minute, etc.) as indicated by the ratemeter/scaler window freezing or an indicator displayed in the window.
- With the instrument probe in-place over the location to be investigated, set the instrument to the "scaler" setting and activate the scaler count using the appropriate switch or toggle on the ratemeter.
- Record the activity observed, instrument used, time constant, and surveyor on the field data sheet. If a fraction of one minute (i.e., 0.5, etc) is selected, record the meter reading on the data sheet with the time constant used.

Scanning/Ratemeter Surveys:
In ratemeter mode, the ratemeter continuously evaluates data from the survey probe. The ratemeter display is updated every 2 seconds and the surveyor must continuously observe the meter readout and the survey progresses. The following steps are used to perform a survey in ratemeter mode:

- Using a properly calibrated and field checked instrument set the ratemeter/scaler on the appropriate scale for the survey area. Use the lowest scale available. If the meter goes off scale, step back and reset the scale to the next higher setting.
- To better monitor the relative intensity of the contamination present, activate the audio on the ratemeter.
- Slowly (approx. 2ft/sec) move the probe over the area being surveyed and observe or listen to the count rate.
- Record survey data for a given distance or transect line as the estimated average count rate over the distance. Note an associated range (high and low readings) as the area is covered.
- Hot Spot Investigation: If an elevated count rate is indicated (generally 3x the area background readings or at the survey AL), stop and resurvey the area by holding the probe over the location long enough to determine the actual count rate as indicated by a steady reading or performing a scaler reading. Record the reading and note the location based on grid location and/or location features on the survey data sheet and survey plan layout drawing.
- If elevated counts are identified, continue to survey the area until the "hot spot" perimeter is delineated and the activity levels are determined by one or more one

minute scaler readings. Delineate the area using measuring tape, perimeter GPS coordinates or by marking the area and documenting the findings on the site drawings and survey data sheets.

- To conclude the survey, perform an operational check of the instrument by taking a background and source count. Record the data on the Daily Calibration Worksheet.
- Review the field data sheets to check for completeness, erroneous data points and/or trends. In addition, check instrument stability by comparing operational check data for background and efficiency before and after the survey. Data should be within 20%.
- Complete survey documentation including data sheets, field notes, unusual conditions and survey descriptions.

4.4 Removable Contamination Survey

Removable contamination will be evaluated through the use of swipe samples. Swipes will be collected using 4.7 cm diameter filter papers (or equivalent) passed over an area of approximately 100 cm^2 (4"x 4") using moderate pressure. To collect swipe samples, the following steps will be taken:

- Don gloves and other protective clothing as required by the task specific work plan or Radiation Work Plan prior to collecting swipes.
- Label swipe samples (e.g.., consecutive numbers, object names, etc.) prior to use to ensure correct identification. Be sure field documentation reflects the same nomenclature and description of each swipe. Swipes collected for alpha or beta analyses can be labeled on the back (smooth side) of the filter paper. Swipes that will be counted in vials (i.e, counted in Liquid Scintillation Counters (LSC)) must be labeled on the envelop container and/or the vial top (**Not** on the swipe itself or the side of the LSC vial).
- Swipe samples must be labeled with unique identifiers and the sample location logged to identify exactly where they were collected, by whom and when.
- On rough surfaces, care must be taken to avoid damaging the filter paper as it is passed over the surface.
- Care will be taken to avoid excess loading of the swipe with dirt or water in heavily soiled areas tis may require swiping a smaller area which must be recorded in the swipe documentation
- Place used swipes in small envelopes or other sleeves to segregate and protect the swipe samples. Swipes placed in counting vials (H-3, C-14, etc.) must be placed with dirty side facing the outside of the vial.
- Swipe sample Chain of Custody (COC) forms must be completed before delivery to the laboratory for analyses.
- When counting swipes in the field for gross alpha or beta contamination, a suitable calibrated counter of know efficiency and background, will be used (Ludlum 2929 or equiv.)
- Swipes counted in the field will be placed in a counting planchet. The filter should be laid flat to avoid counting errors due to geometry and the planchet changed or cleaned between samples.
- Record all required data, including sample counts, instrument serial number and model and counting instrument background and efficiency on the appropriate sample data sheets.

4.4.1 Tritium and Carbon-14 Swipe Sampling

Swipes for low energy beta emissions (H-3, C-14 etc.) will be collected in the same manner as described in section 4.4 above using moistened swipes. Swipes should be moistened with a small amount of clean (Deionized water preferred) water prior to collection. After collection, place the filter directly into the counting vial, dirty side out, or a separate coin envelope pending analysis by the laboratory. Label the container with the sample identification.

Note: Low energy beta swipes cannot be evaluated with a field counter (i.e., Ludlum 2929 etc.)

5.0 RECORDS

5.1 Each type of survey described above will require the generation of specific data records and survey narrative. The records that are expected to be generated as a result of implementation of this procedure include:

- Daily instrument field operability and calibration sheets. (Attachment 1)
- Complete Alpha/Beta or beta/gamma survey data sheets and maps (Attachment 2)
- Removable contamination survey data and location map (Attachment 2)
- Scanning survey results describing pre and post operational data, background levels, survey unit averages and range, the locations of elevated or anomalous readings, and survey description with a map of the area
- Sample Chain of Custody forms
- Calculations for instrument MDCs, scan MDCR, and sample numbers if appropriate
- Project survey log including daily activities and issues
- Data assessment and evaluation work sheets

All the records generated as a result of implementation of this procedure will be maintained as part of the MJW Corporation project file that will include the associated Project Work Plan.

Attachment 6 - MJWRCP-04 Field Investigation Survey Procedure

MJW Corporation Inc.

Radiation / Contamination Survey Map and Data Sheet

MJW Job #:	Surveyor:	Date:	Time:

Survey Map (Indicate North)

Survey Location (Description)	Instrument Number	Radiation Levels CPM or mR/hr	Physical Form	Remarks

*Note: All Radiation Readings will be made in the same units noted for the instrument, unless noted otherwise in the Remarks column.

Attachment 7 - Site HASPs

Health and Safety Plan

Riverview Innovation & Technology Campus, Inc.

TONAWANDA COKE
Brownfield Remediation

TONAWANDA, NY

Submitted to:

Riverview Innovation & Technology Campus, Inc.
333 Ganson St.
Buffalo, NY 14203

Prepared by:

140 Lee Street, Floor 2
Buffalo, NY 14210

October 2019

Revised

September 2024

TABLE OF CONTENTS

CONFORMANCE SIGNATURES 4
EMERGENCY CONTACT LIST 5
INTRODUCTION 7
SITE/PROJECT BACKGROUND AND SCOPE 7
APPLICABILITY and REFERENCES 7
DEFINITIONS 8
SITE VISTIOR REQUIREMENTS 10
HEALTH AND SAFETY ORGANIZATION 11
PERSONNEL RESPONSIBILITIES 12
SITE SPECIFIC TRAINING 14
JOB SPECIFIC SPECIALIZED TRAINING & MEDICAL CLEARANCE 15
MEETINGS 15
SUBSTANCE ABUSE SCREENING 16
PROJECT OVERVIEW AND TASK RISK ANALYSIS 17
TASK/RISK ANALYSIS 17
CONTAMINATE/Chemical HAZARDS 18
GENERAL PHYSICAL HAZARDS AND STANDARD PROTECTIVE MEASURES 21
BIOLOGICAL HAZARDS 24
SITE SECURITY 26
SITE LAYOUT 26
BUDDY SYSTEM 26
SITE COMMUNICATIONS PLAN 26
PERSONAL PROTECTIVE EQUIPMENT (PPE) 27
MINIMUM LEVELS OF PROTECTION 27
SELECTION OF PROTECTION LEVELS 28
HEARING PROTECTION 29
RESPIRATORY PROTECTION 30
STANDARD OPERATING PROCEDURES (SOPS) 33
EXCAVATION SAFETY 34
EXTERIOR PRECAUTIONS 34
LOCKOUT/TAGOUT POLICY 35
ELECTRICAL 36
FALL PROTECTION 36
INCIDENT PREVENTION PROCEDURES 37
SAFETY TASK ANALYSIS CARD 37
FIRE PREVENTION and PROTECTION 37
SITE HOUSEKEEPING 38
MECHANICAL EQUIPMENT 38
HIGH PRESSURE WASHERS 38
VEHICLE and EQUIPMENT SAFETY 39
SANITATION 40

DAILY INSPECTIONS *40*
INCIDENT REPORTING *40*

MEDICAL SURVEILLANCE **43**

MEDICAL EXAMINATIONS *43*
AIR MONITORING *44*

CONFINED SPACE ENTRY PROCEDURES **44**

DEFINITIONS *44*
PERSONNEL RESPONSIBILITIES *45*
TRAINING *46*
PRCS ENTRY PROCEDURE *48*
RESCUE/EMERGENCY RESPONSE *49*

DECONTAMINATION PROCEDURES **50**

PERSONNEL HYGENE and DECONTAMINATION *50*
EQUIPMENT DECONTAMINATION *51*
HEAVY EQUIPMENT DECONTAMINATION *51*
TOOLS and SMALL EQUIPMENT DECONTAMINATION *51*
NON-DISPOSABLE SAMPLING EQUIPMENT *52*
DISPOSAL of DECONTAMINATION WASTES *52*

EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS **53**

MEDICAL EMERGENCY RESPONSE *(DETAIL PROVIDED UNDER SEPARATE COVER)* **54**

REPORTING AN EMERGENCY *54*
PRE-PLANNING *54*
EMERGENCY CHAIN OF COMMAND *54*
WEATHER *54*

SPILL CONTAINMENT PROCEDURES *(NOT ANTICIPATED FOR THIS PROJECT)* **55**

SPILL RESPONSE PROCEDURES *56*

HEAT/COLD STRESS **59**

LOGS, REPORTS AND RECORDKEEPING **61**

HOT WORK PERMIT PROCEDURES (WELDING, CUTTING, OPEN FLAME WORK & SPARKING) *(NOT ANTICIPATED FOR THIS PROJECT)* **61**

ATTACHMENT I: FORMS **63**

ATTACHMENT II: SITE-SPECIFIC ACTIVITY HAZARD ANALYSIS **95**

ATTACHMENT III: SAFETY DATA SHEETS **129**

ATTACHMENT IV RESERVED: SITE SAFETY AUDITS **176**

Authorization Signatures

This site Health and Safety Plan (HASP) has been reviewed and approved by the individuals below. The undersigned certify that to the best of their knowledge this HASP meets the safety requirements as defined by the project specifications and all known applicable governing regulatory requirements.

John Yensan — 9/4/2024
John Yensan, President — Date
OSC

Daniel Flanigan — 9/4/2024
Dan Flanigan, Project Manager — Date
OSC

Matt Reardon — 9/4/2024
Matt Reardon, Superintendent — Date
OSC

Paul Mulvey — 9/4/2024
Paul Mulvey, Corp. Dir. HSE — Date
OSC

Conformance Signatures

All Individuals working on this Project, including subcontractors must read and sign. Note: this does not apply to visitors who will not be doing work on the project.

The following personnel have read and fully understand the contents of this site Health and Safety Plan and further agree to all requirements contained herein.

Name	Affiliation	Date	Signature

Emergency Contact List

Tonawanda Coke

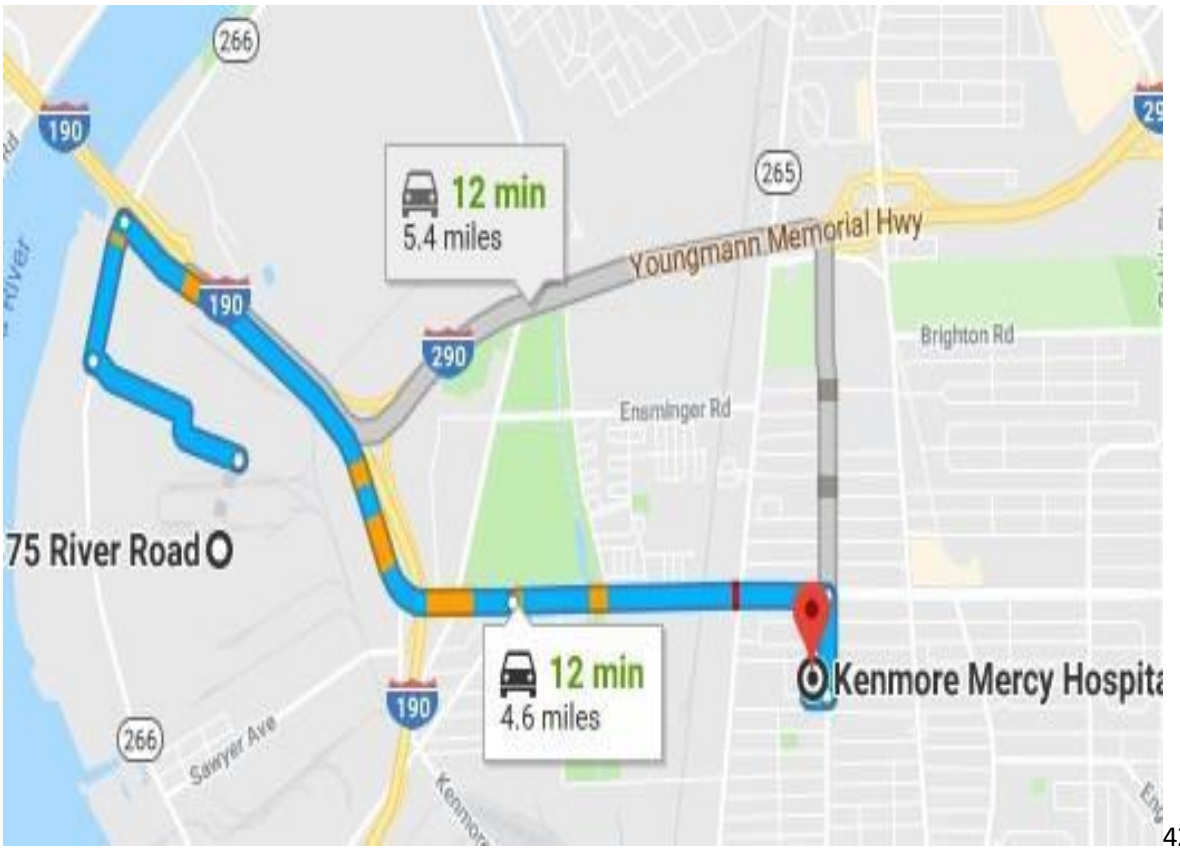
3875 River Road

Tonawanda, New York 14150

AGENCY	Contact	Phone Number
Owner's Representative	John Black Project Manager	571-217-6761
OSC	Matt Reardon Superintendent	716-570-0717
	Dan Flanigan Project Manager	716-560-3006
	John Yensan President	716-583-4400
	Paul Mulvey Director HS&E	716-856-3333 x 328
Kenmore Mercy Hospital	Medical Emergency	911 (direct) 716-447-6100
Fire, Police, Ambulance	Dispatch	911
Utilities	Water Gas Electric	911

AGENCY	Contact	Phone Number
Site Emergency	Police, Fire Dept., Ambulance	911
Fire Department		911
Police Department & Security		911
Ambulance		911
Poison Control	American Association of Poison Controls	1-800-222-1222
US EPA Release Report Number	National Response Center	1-800-424-8802
HAZARDOUS MATERIALS	CHEMTREC	1-800-424-9300

LOCAL MEDICAL: KENMORE MERCY HOSPITAL, 2950 ELMWOOD AVE 14127 (DIAL 911 FOR EMERGENCY) (716) 447-6100



4217

- Turn right onto River Road
- Turn right onto Grand Island Blvd (about 2 miles)
- Merge onto Sheridan Dr.
- Go about 1.5 miles and turn right onto Elmwood Ave.
- Make a sharp right and hospital is on left

OSC Medical Consultant:

Medcor, Inc.
4805 W. Prime Parkway
McHenry, Illinois 60050
800-775-5866

Non-medical Emergency:

Healthworks WNY
2075 Sheridan Drive
Tonawanda, NY 14223
(716) 712-0670

INTRODUCTION

SITE/PROJECT BACKGROUND AND SCOPE

Riverview Innovation & Technology Campus, Inc. (Riverview) has contracted OSC, Inc. for the overall remediation of the former Tonawanda Coke Corporation (TCC) property in Tonawanda, NY. Remediation will be per requirements of the New York State Brownfield Cleanup Program (NYSBCP) and the New York State Inactive Hazardous Waste Site Program (aka State Superfund). Inventum Engineering, PC is providing technical guidance for the project.

The work includes, but is not limited, to the following:

- Mobilization
- Installation of erosion and sediment controls
- Installation of site temporary features (waste/equipment decontamination pads, temporary access roads, and temporary utilities)
- Asbestos removal on structures, building materials, fittings and debris.
- Stabilization and removal of above & below ground tank contents
- Removal of hazardous process and product waste chemicals as well as universal waste
- Cleaning/decontamination of above ground structures deemed to remain on site.
- Demolition of buildings, structures, and tanks not to remain on site
- Treatment/neutralization of surface soils and water as reasonably feasible per NYSBCP
- Removal of “surface tar” and other grossly contaminated soil not otherwise treated/neutralized.
- Rail car cleaning and disassembly
- Tank cleaning and costing for scrap.
- Dewater
- Grading
- Restoration and seed stabilization
- Demobilization

APPLICABILITY AND REFERENCES

OSC has developed the following site Health and Safety Plan (HASP) in accordance with the project contract requirements and Federal, State and Local regulations. It is intended for individuals performing work at the site and not for those considered visitors doing observation only. All operations and equipment used in conjunction with this contract shall, at a minimum, comply with the following:

- New York State Brownfield Cleanup Program
- Project Health and Safety Plan (this HASP)
- OSC Technical Work Plan
- OSHA 29 CFR 1910: Occupational Safety and Health Standards – General Industry

- OSHA 29 CFR 1926: Safety and Health Regulations for Construction
- EPA 9285.1-03: Office of Emergency and Remedial Response – Standard Operating Safety Guides
- OSC Corporate Health, Safety and Environmental Program Manual
- Orientation and Training (Supervision, Laborers, Operators & Visitors)
- Activity Hazard Analysis (AHA)
- Standard Operating Procedures; Emergency Response, Reporting, Incident Investigation, Inspections, Audits, Work Procedures, Hazard Communication, Hot Work, Confined Space, Fire Prevention, Control of Hazardous Energy (Lockout, Tagout, Tryout), Excavations, Controlled Work Zones including decontamination, Ladders, Steps, Stairs, Scaffolding Contractor/Vendor Safety Checklist, Heavy Equipment Operation, Forklift Operation, Powered Aerial Platforms
- Substance Abuse Policy
- Receive site orientation training regarding the project requirements contained in this HASP. Site orientation will be conducted by OSC's Health and Safety Officer (HSO) named in Section 2.0 of this HASP.
- Acknowledge in writing, on page 4 of this HASP titled Conformance Signatures, that they have received the site-specific orientation and therefore, have been trained in and understand the contents of this HASP and the general site safety requirements.

The health and safety protocol that is established in this HASP is based upon the known site conditions and or conditions anticipated to be present from established site data. This HASP is a living document that shall be updated and or revised over the term of this contract as warranted by change in site conditions, scope of work, methods and improvement measures. A copy of this HASP shall be maintained at the project site.

DEFINITIONS

The Owner: Riverview Innovation & Technology Campus, Inc.

The Engineer: Inventum (Owner Representative)

The Contractor: OSC – Company retained by owner to conduct the project.

The Project: Brownfield Cleanup Program, 3875 River Road, Tonawanda, NY

The Project Site: The area designated as the Contractor work area.

Contractor Work Area: An area of the Project site which includes the support zones, access roads, staging areas, contamination reduction zones and exclusion zones.

Active Full Time Project Personnel: All personnel who are permanently assigned to the project and required to perform work. Does not include visitors or vendors visiting the site temporarily who are required to be escorted always by an authorized and trained project employee.

Qualified Person: A person with a recognized degree, or professional certificate, along with extensive knowledge and experience in the subject field who can do design, analysis, evaluation and specifications.

Competent Person: A person who can identify existing and predictable hazards in their surroundings/working conditions which are unsanitary, hazardous or dangerous to employees, and who has both knowledge and authorization to take prompt corrective measures to eliminate them.

Authorized Personnel: A person that is approved or assigned by OSC to perform a specific type of duty/duties, or to be at a specific location(s) at the project site.

Stop Work Authority: HS&E personnel, qualified and competent persons, owner representatives and *all project employees* shall have the authority to stop work in any situation deemed unsafe to those working on the project site, or in any situation that poses a risk to the environment. Work will remain stopped until the parties involved correct their impact or conditions as per the requirements of this HASP.

Contamination Reduction Zone (CRZ): The CRZ is the transitional area between the identified contaminated and clean areas. The CRZ will be provided for the transfer of equipment and materials to and from the exclusion zone; the decontamination of personnel and equipment existing in the exclusion zone; and the physical segregation of the clean and contaminated work areas.

Exclusion Zone (EZ): The exclusion zone encompasses the areas of contaminates of concern (COCs); as well as any areas being utilized for the temporary storage of salvaged materials [ex. valves] and spoils to be discarded as waste. The purpose of the EZ is to limit access to only qualified and necessary personnel and manage the potential spread of COCs.

SITE VISITOR REQUIREMENTS

A safe location, where all visitors can observe site activities of interest will be identified by the HSO. Anyone visiting the site will receive site-specific instructions from the HSO. All visitors shall be escorted by site trained personnel after signing in and completing orientation. Visitor training will include, at a minimum:

- OSC Project Safety Orientation and RIVERVIEW/Honeywell general site orientation
- Project Hazard Communication system
- Activity Hazard Analysis (AHA) review (as needed)
- Work Permit Process (as needed)
- Safety Meetings and Inspections
- PPE requirements
- Decontamination procedures (as needed)
- Emergency procedures, and
- Any other site-specific information that the HSO deems necessary.

Any visitor wishing to enter an established contamination reduction zone (CRZ) or exclusion zone will be required to provide the HSO with documentation of medical monitoring and training equivalent to the requirements of this HASP for that area. Only authorized visitors with written proof that they have been medically certified and trained in accordance with project requirements will be permitted to enter the CRZ and/or exclusion area.

The only exception to this rule is for emergency personnel who may enter the work area without fully complying with the requirements of this subsection. Emergency crews will be quickly briefed as to site conditions and hazards by the HSO.

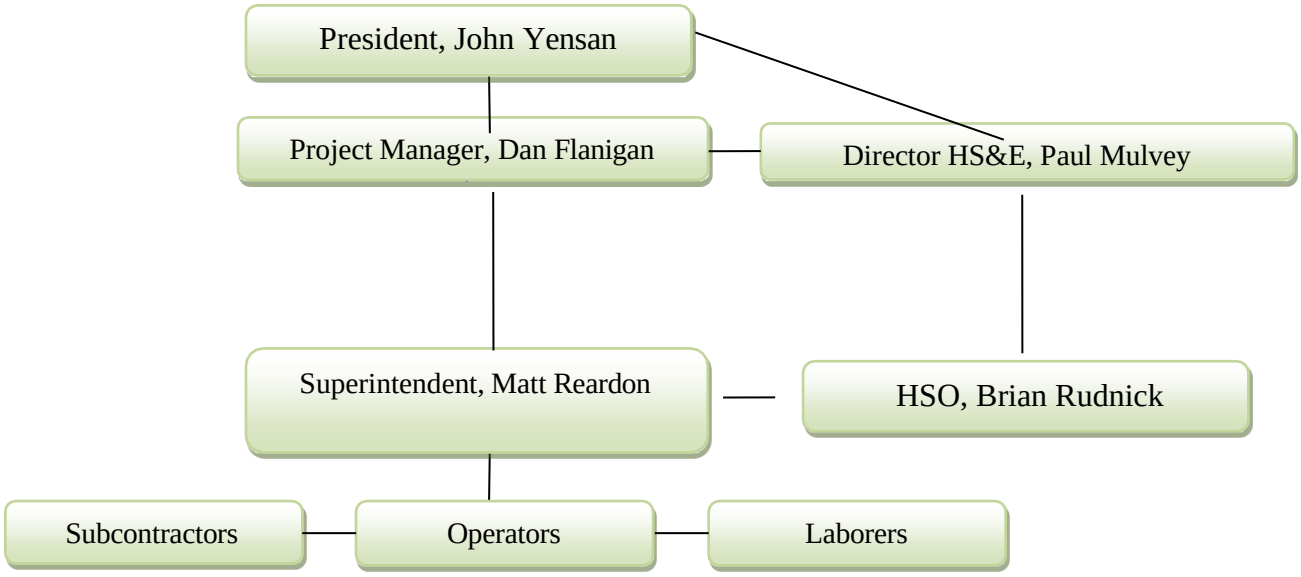
HEALTH and SAFETY ORGANIZATION

The following *OSC* management personnel will be assigned to this Project:

- **President – John Yensan**
- **Project Manager – Dan Flanigan**
- **Superintendent – Matt Reardon**
- **On Site Health & Safety Officer – Brian Rudnick**
- **Director HS&E – Paul Mulvey**

In addition to the above listed management, OSC will provide the appropriate number of operators and laborers, as well as the required subcontractors for this project.

ORGANIZATION CHART



PERSONNEL RESPONSIBILITIES

PROJECT MANAGERS AND SUPERINTENDENTS

The Project Manager will be responsible for the overall direction and completion of this contract. The Project Manager reports to the President and will be responsible for managing and coordinating all project related activities; as well as serving at OSC's primary contact with the Owner and/or Owner's Representative. The Site Superintendent will be responsible for overseeing contractor and subcontractor operations in the field. The Site Superintendent will report directly to the Project Manager.

Project Managers and Superintendents will be responsible for the following:

- Assure daily compliance with the Corporate HS&E Manual and this HASP during the project.
- Implement the procedures and guidelines outlined in this HASP throughout the project.
- Implement incident investigations. The Site Superintendent will notify INVENTUM management and the OSC Director HS&E immediately. Documentation will be maintained on OSC's Incident Report (see attachment I). The Incident Report will be submitted to RIVERVIEW/Honeywell by OSC. The HSO will conduct an investigation with support from the Superintendent and Director.
- Perform and support site safety audits and address all deficiencies.
- Provide incentive and motivation for safe work practices, as well as discipline for unsafe work practices.
- Ensuring a copy of this HASP is onsite always.
- Conduct initial site orientation meetings.

HEALTH AND SAFETY OFFICER (HSO)

The HSO will handle health and safety management on the project and will report to the Director HS&E. Specific duties of the HSO include:

- Overall implementation, enforcement and maintenance of this HASP.
- Act as a point of contact for all project site health and safety concerns.
- Conduct initial training on the contents of this HASP; as well periodic training for when rules/regulations change, new equipment or procedures are introduced, additional skills are needed, and new hazards are presented. Report observations in the daily safety meetings and update AHAs and training accordingly.
- Conduct daily meetings regarding health and safety.
- Supervising any additional HS&E requirements that are needed for this project.

The HSO will monitor the jobsite health and safety via inspection at the start and completion of each day's work; as well as monitoring the jobsite for this purpose throughout the day. The initial daily inspection will be recorded on OSC's inspection and audit form (Attachment I). Corrective actions and end-of-the-day inspection results will be recorded in the HSO's project safety logbook. Any deficiencies will be promptly corrected. All corrective and improvement measures will be

reviewed with project personnel at the morning daily safety briefing. Intentional violations of the site HS&E regulations will be grounds for disciplinary action, which could include temporary suspension or termination of personnel and/or expulsion of vendor and/or subcontractor personnel from the site.

HS&E TECHNICIANS (not anticipated for this project)

The HSO will assign qualified technicians (air monitoring, material sampling, equipment specific and job design professionals) to each work crew or task in hazardous areas as warranted.

OSC CORPORATE MEDICAL CONSULTANT AND NON-EMERGENCIES

The Medical Consultant will be available to provide call-in emergency medical consulting to OSC personnel on an around-the-clock basis. Medical emergencies occurring during normal work hours will be provided by the local hospital (see above). Non-emergency medical support and OSC's Medical Consultant are:

Medcor, Inc.
4805 W. Prime Parkway
McHenry, Illinois 60050
800-775-5866

HealthWorks WNY
2075 Sheridan Drive
Tonawanda, NY 14223
716-712-0670

SUBCONTRACTORS

All subcontractors shall be prequalified according to the OSC subcontractor/vendor prequalification requirements including Certificates of Insurance that meet or exceed the project contract requirements (See RIVERVIEW/Honeywell Project Subcontractor Insurance Requirements Under Separate Cover).

All subcontractor employees shall be required to attend a project safety orientation prior to starting work on site (See Training and Orientation Requirements of this HASP). Subcontractors are responsible for health and safety as it pertains to their operations at the project site and shall provide the required OSC HS&E supporting documentation. Documented proof of training shall be provided for all subcontractor employees. All subcontractors are responsible for providing their employees with the proper site-specific PPE required to perform their work as well as ensure that all tools and equipment are properly inspected and maintained. Subcontractors are responsible for ensuring that their employees conform to all HS&E project requirements and applicable government regulations.

TRAINING and ORIENTATION

Personnel, including subcontractors, shall be provided with the training required to comply with this HASP. Training documentation (training certificates, attendance rosters) will be filed and maintained onsite by the HSO and will be made available for inspection upon request. Training documentation will be kept in an organized manner for each individual worker.

Full time active project personnel working onsite must have received the following:

- Required safety training as defined by OSHA CFR 1926.21 for construction.
- OSHA 1926.65, Hazwoper (employees potentially exposed to hazardous chemicals)
- Medical clearance - fit for work, (includes medical surveillance for specific occupations and probable contaminants) negative drug screen, clearance for respirator use, fit test and training for the type of respirator required.

Supervisor Training – in addition to the above all designated supervisors shall have as a minimum received training that covers competent person training for the specific operation they are responsible for (i.e. excavation trenching and shoring, confined space, rigging, hot work, etc.), first aid and CPR, record keeping, incident investigation, employee substance abuse i.e., reasonable suspicion), HS&E documentation requirements.

SITE SPECIFIC TRAINING

Documentation of training, provided by a qualified safety professional, will be maintained as necessary for the following topics:

- OSC Site Specific Orientation
- Activity Hazard Analysis & Safe work procedures (AHA Review)
- Project Hazard Awareness training
- PPE requirements & possible decontamination procedures
- Heat/Cold Stress
- Fall Protection
- Heavy Equipment Operation (Authorized, Unauthorized)
- Powered Industrial Fork Truck Operation (Authorized, Unauthorized)
- Control of Hazardous Energy Lockout/Tagout and Air Gapping Requirements (1 ft visible air gap)
- Incident reporting
- Emergency response & available services (medical, fire, inclement weather, tornado, bomb threat, signals and procedures)
- Hoisting and Rigging
- Respirator use, maintenance, inspection, medical clearance and fit test
- Excavation hazards and protective measures
- Confined Space

- Dust, Erosion and sediment control
- Noise control measures
- OSC's STAC program
- Authority to stop work (all employees) and the buddy system "No One Works Alone".

JOB SPECIFIC SPECIALIZED TRAINING & MEDICAL CLEARANCE

OSC employees will all participate in the company's annual medical surveillance program which evaluates "fit for duty" condition. These evaluations will be provided by a licensed health care professional.

Employees that may be exposed to elevated levels of contaminates (to be determined) or that wish to use tight-fitting respirators on a voluntary basis will require a current medical evaluation and be respiratory qualified in compliance with OSHA 1910.134.

MEETINGS

Attendance at all HS&E meetings will be documented and filed onsite.

- Daily Morning Safety Brief prior to the start of work "Tool Box Talk".
- Prior to the beginning of each work task, all involved workers shall be required to attend a task-specific HS&E meeting to review task-specific health and safety requirements pertinent to the tasks (AHA review - job hazards and protective measures).

Weekly HS&E Meetings

All onsite Supervisory personnel shall be required to attend a weekly meeting, conducted by the owner representative, to review project and/or task specific procedures. Topics to be discussed at these weekly meetings include, but are not limited to:

- AHA – review for all definable features of work, hazards and controls.
- STAC - employee work observations and recommendations
- Audit/Inspection findings, and recommendations for improvement.
- Necessary training requirements and site work rules;
- Change in work practices and/or work conditions, incident reports.
- Precautions and work practices related to scheduled site activities.
- New or modified site wide procedures or requirements.
- Discussion of potential hazards or hazardous operations.
- Procedures on restricted areas.
- Equipment rules and requirements.
- Restrictions on the handling of materials.
- PPE requirements.
- Delegation of responsibility (emergency backup personnel, competent persons, etc.);

- Review of emergency response for anticipated situations (medical, fire, inclement weather, tornado, bomb threat, environmental release/spill) and communication methods (alarms, radio, voice, and hand signals).

HS&E Audits

The OSC Director, HSE will make project site visits to assure compliance with this HASP and aid as needed. Site audits will be made minimally on a quarterly basis using the company's audit criteria (see Appendix I Forms). An audit finding report will be submitted to the project manager and superintendent within 5 days of the site visit. Highlighted deficiencies must be corrected immediately if not done so during the site visit.

SUBSTANCE ABUSE SCREENING

OSC maintains a drug free workplace. The company prohibits the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol, and controlled substances on project sites.

OSC requires pre-employment, reasonable suspicion and random substance abuse testing (random testing for project-assigned personnel only as required by contractual agreement). Post injury screening may also be conducted in conjunction with reasonable suspicion. Employees as a minimum will undergo a NIDA 10 panel drug screen for illegal drugs before working on the project. Drug and alcohol screens shall be managed by OSC using laboratories certified by HHS under the National Laboratory Certification Program (NLCP).

Reasonable suspicion testing may be triggered by direct observations of employee behavior or drug-related paraphernalia. Site personnel who have been observed using alcohol or controlled substances on site or during breaks at off-site locations after which they will return to work will be requested to take an alcohol or drug test. Reasonable suspicion includes possession (on person or in vehicles) of alcohol or controlled substances on site as well as paraphernalia that suggest drug use. Site personnel who exhibit signs, symptoms, or behaviors of drug or alcohol use as interpreted by a reasonable person will also be requested to take a drug and/or alcohol test.

NOTE - Prescription drugs taken without an authorized prescription for use is considered an illegal drug. Also, in case of any injury, incident, or emergency, employees may be required to undergo a 10-panel screen for illegal drugs, alcohol (breath), or prescribed medication. Submission to substance abuse testing is a condition of employment. Failure or refusal to submit to substance abuse testing is treated the same as a positive result. All reports will be maintained at the main office. Any positive results will be referred to OSC Senior Management for further action.

PROJECT OVERVIEW AND TASK RISK ANALYSIS

TASK/RISK ANALYSIS

An Activity Hazard Analysis (AHA) shall be developed for significant features of work which break jobs down into individual tasks defining the potential hazard of that task and the proper protective and control measures that shall be taken to minimize the hazard. AHA's shall be submitted with any required daily work permit to the owner representative for their review. AHA's shall be modified as warranted by safe work observations, audit and incident investigation. Assessment of the work hazards associated with the scope of work for this project is provided in Table 1.0 below. PPE requirements for all work shall be primarily in level D; ANSI approved hard hat, safety glasses, hearing protection with elevated noise exposures (i.e., working with power tools or near sources of loud noises), abrasion resistant gloves, safety toed boots or safety toed rubber boots (dependent on hazard exposure), high visibility traffic vest or equivalent high visibility clothing, and/or disposable coveralls (modified D). Specific information relating to the potential chemical, physical, biological and radiological hazards is provided in Table 1.1.

TABLE 1.0 OVERALL JOB HAZARD EXPOSURE (See also attachment II (AHA's))	
	Potential Exposure
Mobilization and temporary facilities and controls; establishment of work zones: hazard warning signs, OSC designated work area signage including barricades and area delineation, address safe work surface needs, add lighting, traffic controls, dust, fire and erosion controls.	Low
Installation of erosion and sediment control	Moderate
Installation of site temporary features (waste/equipment decontamination pads, roads)	Moderate
Asbestos removal on structures, building materials, fittings and debris	Moderate/High
Stabilization and removal of above & below ground tank contents	Moderate/High
Removal of hazardous process and product waste chemicals & universal waste	Moderate/High
Cleaning/decontamination of above ground structures deemed to remain on site	Moderate/High
Tank cleaning	Moderate/High
Demolition of buildings, structures, and tanks not to remain on site	Moderate
Treatment/neutralization of surface soils and water as reasonably feasible per NYSBCP	Moderate/High
Removal of "surface tar" and other grossly contaminated soil not otherwise treated	Moderate/High
Restoration and seed stabilization	Low
Demobilization	Low

Low: Non-intrusive work – Minimal hazard/chance of exposure. Slight: Non-intrusive work / Possible HS&E hazards with tools. – Little chance of exposure. Moderate: Non-intrusive work / Possible HS&E hazards with powered tools, heavy equipment and/or working near or in water – Little chance of exposure to contaminants. Moderate/High: Intrusive work / Possible HS&E hazards with equipment – Exposure to contaminants is possible. High: Intrusive work / Possible HS&E hazards with equipment – Exposure to contaminants is probable.

CONTAMINATE/CHEMICAL HAZARDS

Existing Site Hazards

Based on information provided in the NYSBCP application and nature of the former facility (coke production and coal tar processing) there are several possible contaminates ranging from minimal to moderate hazardous exposure potential in the soil, groundwater, and surface water. Asbestos is likely to be contained in pipe/fitting/refractory insulation and other building structures.

Although several coal tar constituent chemicals of concern are volatile, the product has been standing open for an extended period time. Much of the volatile and semi-volatile fraction is expected to have been released to the atmosphere minimizing the air pathway (inhalation).

Of the remaining constituent chemicals of concern, the likely exposures are skin absorption/contact and ingestion. These exposure pathways will be controlled using PPE (barrier) and proper hygiene (decontamination).

The following table, taken from the NYSPCP application and originally developed from the GHD, 2018 Remedial Investigation/Feasibility Study Work Plan, lists the chemical constituents that maybe of concern.

Sample Matrix	Sample Date	Parameter	Parameter Concentration		Industrial Standard		Data Source	Table Page Location
Surface Soil	12/21/2005	Benzo(a)pyrene	4,100	ug/kg	1,100	ug/kg		Table 1a, 2 of 70
Subsurface Soil	8/24/2015	Benzo(b)fluorantene	2,000 to 4,600	ug/kg	1,100	ug/kg		Table 1b, 6 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(a)anthracene	13,000 to 20,000	ug/kg	11,000	ug/kg	GHD, 2018, Remedial Investigation/Feasibility Study Work Plan, Prepared for Tonawanda Coke Corporation, June.	Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(a)pyrene	6,000 to 21,000	ug/kg	1,100	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Benzo(b)fluoranthene	13,000 to 32,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Chrysene	12,000 to 21,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Surface Soil	8/17/2005 to 8/18/2005	Dibenz(a,h)anthracene	1,300 to 1,700	ug/kg	1,110	ug/kg		Table 2, 11 of 70
Surface Soil	8/18/2005	Indeno(1,2,3-cd)pyrene	15,000	ug/kg	11,000	ug/kg		Table 2, 11 of 70
Subsurface Soils	6/19/1989	Benzo(a)pyrene	2,400 to 11,000	ug/kg	1,100	ug/kg		Table 3, 16 of 70
Subsurface Soils	6/19/1989	Benzo(b)fluorantene	17,000	ug/kg	11,000	ug/kg		Table 3, 16 of 70
Subsurface Soils	6/19/1989	Dibenz(a,h)anthracene	2,200 to 11,000	ug/kg	1,100	ug/kg		Table 3, 16 of 70
Groundwater	10/18/1985 to 12/12/1989	Cyanide	0.22 to 2.75	mg/L	0.2	mg/L		Table 4, 37, 41, 45, 53, & 57 of 70
Groundwater	8/1/1986	1,4-Dichlorobenzene	29	ug/L	3	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985 to 12/19/1989	Benzene	2.08 to 84	ug/L	1	ug/L		Table 4, 38, 42, & 54 of 70
Groundwater	8/1/1986	Chlorobenzene	22	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985	Xylenes	19 to 36	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	11/1/1985 to 8/1/1986	Toluene	11 to 59	ug/L	5	ug/L		Table 4, 38 of 70
Groundwater	6/26/1989 to 7/16/1991	Iron	2.597 to 160	mg/L	0.3	mg/L		Table 4, 36, 40, 48, 52, & 56 of 70
Groundwater	6/26/1989 to 7/16/1991	Manganese	0.801 to 11.2	mg/L	0.3	mg/L		Table 4, 37, 41, 49, & 57 of 70
Groundwater	11/1/1985	Phenolics	0.050 to 0.06	mg/L	0.001	mg/L		Table 4, 37 & 41 of 70
Groundwater	6/28/1989 to 12/13/1989	1,1,1-Trichloroethane	7 to 12.2	ug/L	5	ug/L		Table 4, 38 & 42 of 70
Groundwater	12/13/1989 to 12/20/1989	Methylene chloride	5.15 to 6.96	ug/L	5	ug/L		Table 4, 42 & 54 of 70
Groundwater	6/26/1989	Selenium	0.0116	mg/L	0.01	mg/L		Table 4, 49 of 70
Groundwater	6/26/1989	Nickel	0.153	mg/L	0.1	mg/L		Table 4, 53 of 70
Groundwater	7/16/1991	Cadmium	0.19	mg/L	0.005	mg/L		Table 4, 56 of 70
Surface Water	11/1/1985 to 8/1/1986	Benzene	23 to 48	ug/L	1	ug/L		Table 5, 62 of 70
Surface Water	11/1/1985	Xylenes	7	ug/L	5	ug/L		Table 5, 62 of 70
Surface Water	10/19/1989 to 7/8/1992	Toluene	12 to 24	ug/L	5	ug/L		Table 5, 62 of 70
Surface Water	3/15/1990 to 7/8/1992	Iron	1.09 to 472	mg/L	0.3	mg/L		Table 5, 62 & 64 of 70
Surface Water	3/15/1990 to 7/8/1992	Manganese	0.47 to 3.91	mg/L	0.3	mg/L		Table 5, 62, 64, & 66 of 70
Surface Water	3/15/1990	Nickel	0.14 to 0.216	mg/L	0.1	mg/L	GHD, 2018, Remedial Investigation/Feasibility Study Work Plan, Prepared for Tonawanda Coke Corporation, June.	Table 5, 62 & 64 of 70
Surface Water	11/1/1985 to 8/1/1986	Phenolics	0.039 to 0.61	mg/L	0.001	mg/L		Table 5, 63 of 70
Surface Water	12/19/1989	Methylene Chloride	52	ug/L	5	ug/L		Table 5, 66 of 70
Surface Water	3/15/1990	Chromium Total	0.086	mg/L	0.05	mg/L		Table 5, 64 of 70
Surface Water	7/8/1992	Lead	0.025	mg/L	0.025	mg/L		Table 5, 66 of 70
Sediment	3/15/1990	Benzo(a)pyrene	4,530	ug/kg	1,100	ug/kg		Table 5, 69 of 70
Sediment	3/15/1990	Dibenz(a,h)anthracene	3,430	ug/kg	1,100	ug/kg		Table 5, 69 of 70

Notes:

1 The compounds and results are representative of the site conditions at the time the samples were collected. This does not represent all samples or compounds detected, but is considered representative of the data set available for the preparation of the BCP Application.

2 Abbreviations used:

ug/kg = micrograms per kilogram
mg/L = milligrams per liter
ug/L = micrograms per liter
ug/kg = micrograms per kilogram

Chemicals Brought Onsite

The use of chemical products onsite will follow the requirements set forth in OSHA 29 CFR 1910.1200 (OSHA's Hazard Communication Standard), applicable Federal, State and Local regulations and the project procedure provided in this HASP. The potential hazards associated with these products will be mitigated through site specific training, administrative controls (e.g. labeling and storage) and use of the prescribed PPE.

Safety Data Sheets (SDS) for all chemicals brought onsite will be available for review in OSC's field office at the project site. Chemical products shall be labeled which shall include, product name, manufacturer's name, hazard warning, identifier and hazard pictogram.

The following table provides exposure guidelines for common hazardous chemicals that may be brought to the site, if required, for use during this project. The HSO will be notified before any new chemicals (chemicals not listed on the table below) are brought onsite.

HAZARD SUMMARY FOR CHEMICALS BROUGHT ONSITE					
Substance	Route of Entry	Exposure Symptoms	Treatment	8 Hour TWA	STEL and IDLH
Diesel Fuel	• Skin contact • Eye contact • Inhalation • Ingestion	• Harmful if comes in contact with or is absorbed throughout the skin. • Contact may cause skin and eyes irritation. • Prolonged or repeated exposure may cause liver or blood forming organ damage. • May cause skin irritation or dermatitis.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	300 ppm	STEL: 500 ppm
Grease, Oil and Hydraulic Fluids	• Skin contact • Eye contact • Inhalation • Ingestion	• May be slightly irritating to skin and eyes. • Inhalation may cause headaches. • Ingestion could result in nausea and vomiting.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	N/A	N/A
Gasoline Petroleum Distillates	• Skin contact • Eye contact • Inhalation • Ingestion	• Acute: Central nervous system effects. Chemical pneumonitis if aspirated into the lungs. • Chronic: Benzene is a confirmed carcinogen. Long term exposure caused kidney and liver cancer in rats/Chemical.	• Eyes: Irrigate immediately. • Skin: Flush with soap and water. • Inhalation: Remove victim to fresh air and provide respiratory support if needed. • Ingestion: Seek medical attention.	300ppm	500ppm STEL

GENERAL PHYSICAL HAZARDS AND STANDARD PROTECTIVE MEASURES

(See Attachment I, AHA for more specific details):

Activity: *All general work activities* (manual ground laboring, operating equipment, supervising, inspecting).
Potential Hazard: noise, slips, trips and falls, struck by, pinched, falling debris, shock, heat/cold stress.
Procedures to Mitigate Hazard: Minimum standard site required PPE (Level D ANSI rated hard hat, eye protection, safety boots, high visibility traffic vest or equivalent clothing, cut/abrasion resistant gloves. Hearing protection (when "you need to raise your voice to hear yourself talk") is required whenever using powered hand tools, when operating heavy equipment with no enclosed cab or near loud noise sources. Inspect work areas for hazards, overhead power lines, obstructions, slip, trip, fall hazards, uneven surfaces, and vermin. Manage work areas; flag, mark, delineate and cover, identify with appropriate hazard warning signs. Clearly label open pits, wells and other fall hazards (soft barricade 15 feet back, hard barricade 2 feet back). Practice extreme caution in all work areas including vegetation covered areas. Watch footing during equipment access/egress and when moving through the work area, walk with purpose, pick feet up and set up down, keep hands out of pockets, use handrails, stay on designated paths, and don't take short cuts through the site. Avoid stepping or standing on uneven or unsteady surfaces. In high heat situations stay well hydrated. Personnel will adhere to the heat and cold stress precautions provided in this HASP. All employees have stop work responsibility and authority for safety concerns.

Activity: *Manual Material Handling*
Potential Hazard: Strain, pinched, struck by, lacerations,
Procedures to Mitigate Hazard: Hands and feet clear of pinch points, standard site required PPE and gloves with hazard exposure (i.e. barrier gloves), Observe the OSC lifting program (50 lbs. maximum on this project). Use good body mechanics when lifting, lift objects with your legs and not your back, keep the back straight and object lifted the power zone. Do not twist, pick your feet up and turn. Utilize equipment whenever possible - a forklift, drum cart or other appropriate equipment. Seek assistance if it is needed.

Activity: *General traffic from operations* (heavy equipment, trucks, pedestrian, etc.)
Potential Hazard: Struck by, crush, fire, and burn.
Procedures to Mitigate Hazard: Standard site required PPE. Traffic barricades and directional signs provide ground spotters/flagman equipment traffic, with high visibility, traffic vests or equivalent clothing. Minimum 35 ft. clearance from heavy equipment operations, leveling, compacting, separating and loading out. Develop and implement a traffic control program when site activities occur adjacent to non-OSC vehicular traffic.

Activity: *Site maintenance, materials storage and housekeeping*
Potential Hazard: Slip, trip, fall, fire, burn, chemical hazards, eye, skin, struck by
Procedures to Mitigate Hazard: Personnel will properly store all equipment. Remove all scrap material from the work area and place it in designated storage/lay down areas for disposal. Delineate work areas and identify with appropriate Hazard Warning Signs. Handling of materials per products SDS and developed proper storage of all flammable and combustible materials; > 20 feet from ignition sources or protected with ½ hour fire barrier (indoors). Likewise, all flammable/combustible liquid will be segregated from the ignition source >20 ft. Store all hazardous materials in approved containers. Keep all solvent wastes, oily rags and liquids in fire resistant containers. One 20 lb. ABC Extinguisher should be provided in storage areas (within 75 ft. away no closer than 20 ft.).

Activity: *Operation of hand and/or power tools*
Potential Hazard: Eye, hand, face, foot injuries, electrocution, noise, fire, burn.
Procedures to Mitigate Hazard: Tool use per Mfg.'s guidelines. Inspect tools before use; verify that guards and safety devices are in place before, during and after operation. Only use a power tool that you have been trained. Use GFCI plugged in at source for all corded tools. Red tag and remove all defective tools from service. Maintain and inspect the tools per the manufacturer's recommendations. All personnel will utilize the proper eye protection and hearing protection.

Activity: *Operating Heavy Equipment* (Excavators, Compactors, Dozers, Skid Steers, Rough Terrain Fork Trucks, Powered Aerial Platforms and Trucks.
Potential Hazard: Struck by, caught between, crushed, rollover, fire, burn.
Procedures to Mitigate Hazard: Equipment operation only by trained and authorized operators. Before use, any machinery or mechanized equipment will be inspected by a competent person and certified to be in safe operating condition. OSC will designate competent persons to be responsible for the inspection of machinery and equipment, daily and during use, to ensure its safe operating condition. Any machinery found to be unsafe will be dead lined; its use will be prohibited until the unsafe conditions have been corrected. Inspection of the machine/equipment will be conducted at the beginning of each shift, during which the equipment may be used, to determine that the brakes and operating systems are in proper working condition. All inspections will be documented. Only designated personnel, with appropriate training and authorization, shall operate machinery and mechanized equipment. Any observed equipment deficiencies that will affect their safe operation, will be corrected before continuing operations. A controlled work zone shall be established for demolition, sorting and loading operations. Likewise, a trained ground spotter shall be provided to assure personnel stay clear when an operator's rear view is obstructed. Dust control measures (active water misting during intrusive activities with water hose or equivalent misting equipment). Utilize the appropriate warning signs and backup alarms. All site personnel working near heavy machinery will use reflective clothing (i.e. vests) to alert the operator of their whereabouts. See appropriate AHA for details (hoisting, heavy equipment operation, etc.).

Activity: *Excavating and Working in Excavations*:
Potential Hazard: Cave in, collapse, chemical exposure, struck by, entrapment.
Procedures to Mitigate Hazard: Per OSHA requirements, provide protective systems of trenches when deeper than 5 feet and entry is necessary. Inspect the excavations/trenches regularly for changing conditions. Ensure that the material from the excavations/trenches is being placed away from the edge, to prevent cave-ins and pit (instability (> 2 feet back). Backfill the excavations as required by the approved contract specifications, to minimize the number of open excavations and control zones.
All excavation work shall be supervised by a competent person who will determine what protective measures are required, what those controls will be and how they will be implemented (testing, monitoring, benching, sloping, shoring, means of egress, dewatering, etc.). The competent person will inspect the excavations and controls to ensure reinforced structures are barricaded or marked, with barricade tape or traffic cones, during active excavations. If an excavation must remain open prior to backfill, those excavations must be fenced or barricaded (> 6 ft. from edge). Compliance with OSHA 29 CFR 1926 Subpart P will be maintained.
Atmosphere monitoring will be conducted prior to entry and during work activities in excavations/trenches.

Activity: *Working around or near utilities* (Utilities hazards overhead and/or underground).
Potential Hazard: Stored Energy Hazards (electrical, gas, water, sewer, etc.).
Procedures to Mitigate Hazard: Request utility mark out, notify FPO utility authority a minimum of three days prior to performing any intrusive or demolition activities. Prior to work beginning, ensure that all utility lines are not energized. Stay a minimum of 10-feet away from energized lines.

Activity: *Servicing equipment*.
Potential Hazard: Uncontrolled release of hazardous energy (electrical, mechanical, kinetic, pressure, heat, chemical, any type of stored or potential energy).
Procedures to Mitigate Hazard: The lock-out/tag-out procedure provided in this HASP will be followed when working on machines and equipment in which the unexpected energizing / start-up of the machines or equipment, or release of stored energy could cause injury to employees.

Activity: *Working from elevated heights* (> 6 feet) with an open edge to the next lowest.
Potential Hazard: Fall
Procedures to Mitigate Hazard: All work from elevated heights shall be performed as supervised by a competent person. In all cases proper fall protection shall be utilized such as a personal fall restraint system. Maintain 100% tie-off.

BIOLOGICAL HAZARDS

Bites and Stings

Animal bites, such as from coyotes, or stings which are usually irritants that cause localized swelling, itching and minor pain and can be handled with first aid treatment. The bites of certain snakes, lizards and spiders can contain sufficient poison to warrant medical attention. Diseases that may require medical attention, can be transmitted from some animal bites. Examples are rabies (mainly from dogs, skunks, raccoons and foxes), Lyme disease (transmitted from ticks) and encephalitis (transmitted from mosquitoes).

Personnel with known allergic reactions to bee stings should carry the appropriate medication and must notify the Director HS&E and HSO of his/her condition prior to reporting for work at the site.

Ticks, Chiggers and Lyme disease

Ticks and chiggers may be present in vegetated areas during the spring, summer and fall seasons. Preventative measures include protective clothing that covers the entire body, tucking pant legs into boots or socks and tucking a long-sleeved shirt into pants; head/hair protection; and the use of insect repellant containing DEET on all exposed areas and coveralls. Project personnel should check their bodies thoroughly for ticks and should bathe soon after returning home. Remove any ticks carefully, using a gentle firm, tugging motion with fine tweezers. If site employees feel they have been bitten they should notify the HSO immediately.

Snakes

If project personnel encounter a potentially dangerous snake – stop work, remove yourself and other workers from the immediate area and notify the Superintendent. The supervisor will contact an appropriate site representative to request that the hazard be removed. Do not re-enter the work area until you have been cleared by the HSO to do so.

Toxic Plants

Poison Ivy, poison sumac and poison oak may be present during the spring, summer and fall seasons. Avoid contact with these plants. If a project worker has come in contact, the affected area should be washed thoroughly with soap and cool water. Notify the HSO immediately.

Bloodborne Pathogens

29 CFR 1910.1030 requires that all first aid responders who may come in contact with potentially infectious materials be trained and protected from exposure. Furthermore, there is a risk for any site employee to be exposed to discarded needles and/or contaminated sharps.

All employees on this project will:

- Avoid contact with any blood or potentially contaminated object
- Use caution when picking up or moving objects (stones, brush, debris, etc.)
- Wear leather gloves and not touch suspect objects; and

In addition to the above requirements, the following will apply:

- All personnel will be required to receive bloodborne pathogen awareness training.
- No eating, drinking, smoking, or applying lip balm will be permitted in the designated work, decontamination and first aid areas.
- All first aid kits will be equipped with the proper PPE (i.e. gloves, CPR shields and respirators).
- If a garment (gloves included) is contaminated by blood, or other potentially infectious materials, the garment(s) will be removed as soon as possible.
- After an exposure incident, a confidential medical evaluation and follow-up will be conducted and immediately available to the employee. The HSO will coordinate all medical arrangements.

Radiological Hazards

No radiological hazards are expected during this project.

SITE SECURITY

All onsite personnel and visitors will be required to sign-in and sign-out, at the guard shack and project support trailer, before entering designated work sites. OSC will maintain, onsite, all records of site access. Visitors will be required to be knowledgeable of and conform to this HASP, prior to accessing work zones. Vehicular traffic will be permitted in the designated parking area as permitted by the owner. Access to the controlled work and traffic zones is restricted to authorized vehicles only.

SITE LAYOUT

See project work plan prepared separately.

BUDDY SYSTEM

Working alone is prohibited. All field personnel will be assigned a co-worker who will watch for hazards or problems his/her co-worker might encounter. Communication between employees must be maintained always. Workers will pre-determine hand signals, or other means of emergency signals, for communication when respiratory protection or distance makes communication difficult. Visual contact must remain between the two co-workers; they must remain near each other in order to assist in case of an emergency.

SITE COMMUNICATIONS PLAN

Each work crew, operator and manager will be equipped with a two-way radio. In the event of an emergency, and two-way radio communication is not available, oral and visual safety signals have been established to protect project personnel. These signals will be presented to personnel for all phases of operation before conducting any task. These safety signals will ensure quick communication during adverse or emergency situations. Examples of established signals, and their meanings, are provided below.

Visual Signal	Indication
Hand gripping throat	Out of air, can't breathe
Wave hands over head from side to side	Attention: stand by for next signal
Swing hands from the direction of the person receiving the signal to directly overhead and through a circle	Come here
Pointed finger with extended arm	Look in that direction
Grip partner's wrist with one or both hands	Leave the area immediately
Hand on top of head	Need assistance
Thumbs up	Ok, I'm alright, I understand
Thumbs down	No, negative
Audio Signal	**Indication**
Short blast of air or vehicle horn	Caution look over here
Three long blasts of air or vehicle horn	Leave the area

PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE will be selected, used, maintained and stored in accordance with OSHA 29 CFR 1926 Subpart E, and applicable manufacturer recommendations. Engineering, administrative and/or work practice controls to minimize hazards will be implemented where feasible, followed by PPE.

MINIMUM LEVELS OF PROTECTION

Level D personal protective equipment that is to be worn always by project personnel at the site includes:

- ANSI approved safety glasses with side shields
- Leather safety boots (ANSI or ASTM)
- Rubber boots w/wet hazards or disposable booties
- Hardhat (ANSI Rated)
- High visibility vest or equivalent high visibility clothing
- Appropriate clothing (long sleeve shirts and pants) and Tyvek coveralls as required
- Gloves (leather always), nitrile as required
- Hearing protection (around powered equipment or using powered hand tools)
- Tick protection when working near water or when grubbing

Modified D PPE will be used when the possibility of dermal hazardous chemical contact, but not inhalation exposure exists and includes:

- The above minimum PPE
- Mono-goggles with face shield in chemical splash situations
- Impermeable chemical barrier gloves (i.e., nitrile) if handling contaminated material
- Coated disposable coveralls (Tyvek or equivalent) if exposure to hazardous chemicals exists
- Face shield and safety glasses with work where the potential for flying debris hazards is present (i.e., chipping, grinding, steel on steel impact activities)

Level C PPE will be used if there is the possibility of inhalation of hazardous concentrations (or unknown concentrations) of vapors or fumes at or above OSHA PELs. Level C PPE includes:

- Modified level D PPE
- Air purifying respirator (half-face)
- Appropriate filtering media (particulate, mercury, organic, or combination cartridge)

NOTE: OSC employees are given the option of using an air purifying respirator for voluntary use.

Level B is not anticipated for this project but may be made available if necessary.

Levels D and Modified Level D are the anticipated PPE during this project. These minimum levels of protection are considered preliminary and may change based upon initial exposure assessment and routine assessments as work progresses. No change to the specified level of protection will be made without the approval of the HSO and in agreement with the Director HS&E

SELECTION OF PROTECTION LEVELS

PPE will be used when project and support activities involve known, or suspected, contamination; when vapors, gases or particulates may be generated by site activities; or when direct contact with skin may occur. Respirators protect the lungs against airborne toxicants. Chemical resistant clothing protects skin from contact with harmful and absorbable chemicals.

Level D: Protection will be used when no airborne contaminant exposure is likely, and job functions do not require the use of respiratory equipment or chemical resistive clothing. The equipment for this level of protection is described above and is expected to be the minimum for the project.

Level D Modified: Protection will be modified when additional contact hazards have been identified such as splash hazards and contaminated or nuisance dust. See the description above.

Level C: Protection that will be provided when airborne contaminants have been identified, and which require the use of air purifying respiratory equipment to keep exposures below health-based limits. Examples of respiratory protection for this project are half or full-face air purifying respirators with appropriate cartridges (i.e. P-100 cartridges for lead particulate, Black Organic Vapor – VOC, Brown/Gold Acid Gas, etc.). Likewise, excavation work may require an approved P100/vapor combination cartridge.

Level B: Protection that will be provided when the highest level of respiratory protection is needed with partial body or skin protection. Equipment for this level of protection will include a minimum of the following:

- SCBA, PAPR or airline respirator depending on contaminate and situation
- Chemical resistant protective clothing for hazards identified.
- Hardhat or helmet for hazards identified.
- Chemical resistant gloves with liners for hazards identified.
- Chemical resistant safety shoes or boot covers for hazards identified.

Level B is not expected for this project.

HEARING PROTECTION

Project personnel will be provided hearing protection and required to use it whenever conducting tasks where exposures may exceed 90 dB as indicated in the following table:

	Sound Level at Operator		
Equipment	Average, dB	Range	TWA, dBA
Earth Moving:			
Front End Loader	88	85-91	
Backhoe	86.5	79-89	
Bulldozer	96	89-103	
Roller	90	79-93	
Scraper	96	84-102	
Excavator	86	83-92	89.6*
Truck	96	89-103	
Paver	101	100-102	
Power Units:			
Generators	<85		
Compressors	<85		
Impact:			
Pile Driver (diesel/pneum.)	98	82-105	
Pile Driver (gravity)	82.5	62-91	
Pneumatic Breaker	106	94-111	
Hydraulic Breaker	95.5	90-100	
Pneumatic Chipper	109		
Other Equipment			
Compactor/Vibrator	94.5	85-98	86.1
Compressed Air Blower	104		
Power Saw	88.5	78-95	
Electric Drill	102		

Noise Standards	Noise Level
OSHA (at worker's ear)	90 dB (A) TWA
Day Time Community (at property line)	65 dB (A)

*Open windows

OSC has monitored sound levels for various tasks and operations conducted during the project to both verify that the levels cited above are accurate and to serve as exposure indicators. Sound levels have been measured for each task or operation reasonably expected of having noise levels that could result in exposures above 90 dB as an 8-hr. TWA. Regardless of the results, however, OSC employees will be required to use hearing protection under pre-defined conditions.

Hearing protection will be required whenever an employee is either using a powered tool or working near loud noises (excavators, sheet driving, or working in heavy equipment with windows open). Hearing protection may be obtained from the HSO. Each employee is responsible for wearing hearing protection when required. Replacements may be obtained from the HSO, if necessary. Employees are encouraged to use hearing protection voluntarily if communications are not compromised.

RESPIRATORY PROTECTION

Project personnel may be required, to use respiratory protection to reduce their exposure to airborne hazardous substances. The standard requirements that determine the selection and use of respirators depend on the hazards present. Respirators will also be made available, at the project work area, for emergencies.

Only respirators that are approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupation Safety and Health (NIOSH) are allowed. Use must follow the regulatory requirements set forth by OSHA 29 CFR 1910.134 and OSHA 29 CFR 1926.103.

OSC employees may voluntarily use a filtering facepiece in conditions when respiratory protection is not mandatory. Employees that are medically cleared to use an APR may wear any type of respirator voluntarily.

Medical Clearance & Fit Testing

All personnel, which are assigned to tasks where a respirator is needed, must have prior medical clearance. Medical evaluations and fit testing are provided by OSC. Fit test records and all project personnel medical documentation will be filed and maintained onsite, by the HSO.

Medical limitations and restrictions will be strictly enforced. No employee will be permitted to use a respirator if he/she has any facial abnormality or facial hair that may affect the fit or seal of their respirator

Training

All personnel who are required to wear a respirator will receive training (in addition to required annual training) from the HSO on the use, maintenance, proper care and inspection of their respirators. Attendance at all training will be documented. Attendance records will be maintained onsite by the HSO and will be available for inspection upon request.

Inspection

All respirators to be used at the jobsite will be inspected for damage by the employee, prior to use. After they are trained, every employee will be responsible for inspection of their own respirator. The following elements will be inspected;

- Tightness of the connections
- Face piece
- Headbands
- Inhalation valve
- Cartridge or filter fittings
- Signs of deterioration

Any malformation, distortion, missing parts, cracks, etc. in the respirator will cause the equipment to be deemed useless until a qualified technician can properly repair the respirator. If necessary, a new respirator will be issued.

Respirator Type

The type of respirator, and who is required to wear them, will be identified on a task specific level by the HSO, in consultation with the Director HS&E, based on the type of work that will be performed and the potential for exposure to airborne contaminants.

Standard Procedure for Use

All personnel will adhere to the following standard operating procedure for respirator use;

- Carefully inspect the respirator prior to entering potentially contaminated work areas
- Conduct positive and negative pressure leak tests each time the respirator is to be used
- Do not remove the respirator in contaminated work areas
- Wear a respirator with straps inside disposable garment hood (if equipped)

Cleaning and disinfecting

Any reusable respirator must be cleaned after each use. The steps required to clean a respirator after use are;

- Remove the cartridge and headbands
- Disassemble all respirator parts
- Wash all parts, except for the cartridge and headband, in a cleaner-disinfectant solution or use soap and hot water
- Rinse all parts completely in clean, warm water
- Air dry in a clean, sanitary area
- Re-assemble the respirator
- Store the cleaned respirator in a sealed bag.

Storage

Respirators will be stored in a sealed bag to protect against dust, sunlight, extreme temperature, moisture and abrasives. Inhalation holes will be covered with duct tape immediately after leaving a contaminated area. The tape will be left on until the respirator is donned for the next entry into a contaminated area. This tape will prevent any contaminants from being dislodged from the cartridge. Respirators should be stored so that the face piece and exhalation valve will rest in a normal position and function will not be impaired by the elastic setting in an abnormal position. The respirator should not be hung to store or air dried by its straps.

STANDARD OPERATING PROCEDURES (SOPs)

General

- Ensure that all safety equipment and protective clothing is kept clean and well maintained.
- Ensure that all prescription eyeglasses are safety glasses and are compatible with respirators.
- Ensure that all disposable or reusable gloves are approved by the HSO
- Respirator filters will be changed daily.
- At the end of each day, decontaminate or dispose of all PPE used onsite. The HSO is responsible for ensuring decontamination before PPE reuse.
- Project personnel will have vision or corrected vision to at least 20/40 in one eye.
- Onsite personnel that are found to be disregarding any provision of this HASP will be barred, at the request of the HSO, from this project.
- Do not reuse disposable outerwear such as coveralls, gloves and boots. Used disposable outerwear will be removed upon leaving the exclusion zone and placed inside disposable containers that are provided for this sole purpose. The containers will be stored at the project site, at the designated staging area, and OSC will arrange for the proper disposal of these materials at the completion of the project.
- When working, immediately replace protective coveralls that have become torn or badly soiled.
- Eating, drinking, smoking, chewing gum and tobacco use shall be in designated areas.
- All personnel must thoroughly wash their hands, face and forearms prior to using the facilities, eating, drinking and smoking.
- NO alcohol, drugs (without prescriptions) or firearms will be allowed onsite at any time.

All personnel who are on medication with a safety-sensitive effect will report it to the HSO, prior to work start-up, The HSO will require a letter from the individual's personal physician stating what limitations, if any; the medication may impose on the individual.

EXCAVATION SAFETY

OSC maintains strict procedure for soil excavations. The safety of all employees during these operations depends on the soil structure and stability, contamination, weather conditions, buried utilities and structures and superimposed loads.

When excavating within a wet, sandy area, or if the area has been backfilled at any time, it is likely to be very unstable. All personnel working in these conditions must be cautious and provide extra sloping, if possible. A change in weather conditions, such as heavy rain or snow, can loosen the soil and increase the risk of collapse. If the area of excavation is prone to collapse precautions, such as covering the area, should be taken. Heavy equipment or materials should be kept as far away as possible from the excavation area because they can also increase the risk of collapse. All excavated soil should be removed from the rim of the area and contained if possible.

An excavation competent person must be on site anytime entry into an excavation is necessary. Any person entering an excavation must be trained in the hazards and safe work practices of excavations.

To eliminate the impact on buried pipelines or cables, before any excavation begins OSC personnel will notify all utility companies to locate their lines. If such a hazard exists, the lines will be carefully marked (potting, hand digging, etc.) prior to the start of the excavation activities.

When deeper than five feet, to prevent collapsing soil the excavation must be sloped, shored or somehow contained before any personnel may enter. A ladder will be provided for employees who are working in depths for more than four feet and spacing between will not exceed 25 feet. The ladder will not be removed until all employees have exited the excavation site.

All excavation sites will be inspected daily by an OSC designated competent person. All activity will cease if the competent person, site superintendent, and/or the HSO find the site hazardous. The competent person will make an inspection any time there is a change in conditions (i.e., weather, water, heavy equipment operation, etc.).

EXTERIOR PRECAUTIONS

OSC requires that all exterior structures (sidewalks, bridges, etc.) be protected and clear of excavated materials. Sidewalks will be shored to carry a load of at least 125 pounds/sf. Planks, which are being used for temporary walkways, will be laid parallel to the length of the walkway and will be fastened together. If possible, guard rails or fences will be erected to protect employees and vehicle traffic from the edge of excavation sites.

LOCKOUT/TAGOUT POLICY

For repairs or maintenance, equipment will be locked out. This procedure ensures the health and safety of all personnel by deactivating any movable, electrical or pressurized equipment. This policy applies to all machinery or equipment that can be moved either using electrical power, hydraulic power, compressed air, steam or energy stored in springs/suspension devices. Damaged tags will be placed on all movable equipment and machinery.

Only project personnel and supervisors are authorized to lockout machinery/equipment. Every employee is responsible for his/her own equipment and nobody else is permitted to remove a lock or tag except the authorized employee. Any violation of this policy is cause for strict disciplinary action.

Lockout Procedures

Lockout devices are used to prevent the accidental re-energizing of equipment.

De-energizing Circuits and Equipment: Disconnect the circuits and equipment, to be worked on, from all electrical sources and release stored energy that could accidentally re-energize equipment.

Application of Locks and Tags: Only authorized personnel are allowed to place a lock and tag on each disconnecting – means used to de-energize the circuits or equipment before the work begins. A lock prevents unauthorized personnel from re-energizing the equipment or circuits. A tag prohibits unauthorized operation of the disconnecting device.

Verification of De-energized Condition of Circuits/Equipment: Prior to work on equipment, OSC requires that a "qualified" employee verify that the equipment is de-energized and cannot be restarted. This is typically done by a visible break in the conductors (i.e. air gap) of one foot or more.

Re-energizing Circuits and Equipment: Before circuits or equipment are re-energized, the following steps must be taken in the following order:

- A "qualified" employee conducts tests and verified that all tools and devices have been removed.
- All exposed employees are warned to stay clear of the circuits and equipment.
- Authorized personnel will remove their own locks and tags.
- The HSO will conduct a visual inspection of the area to be sure all employees are clear of the circuits and equipment.

ELECTRICAL

Only qualified and authorized personnel may work on or around electrical equipment. OSC personnel are not permitted to work on energized lines or equipment. Live or hot work must be contracted to a qualified third party unless specific authorization is given by the OSC President or Director HS&E. The following shall be observed;

- The working space around all electrical equipment will be large enough to permit access to all parts of the equipment. The working space will never be used for the storage of other materials so that immediate access can be gained.
- Only NEC certified electrical tools may be used.
- A ground fault circuit interrupter (GFCI) shall be utilized with all portable electric tools; plugged in at the source and tested prior to use. All electrical equipment shall be properly grounded or guarded (double insulated tools, GFCI).
- Single phase electrical tools must be plugged into properly grounded receptacles.
- The use of extension cords is discouraged. If their use is necessary, extension cords must never be used in traffic areas where they may be a hazard, or where they may become unplugged. Extension cords will always be grounded.
- Any energized electrical equipment, operating at 50 volts or higher, must be protected by a cabinet or other approved enclosure with warning signs that are immediately visible.

FALL PROTECTION

All work from elevated heights > 6 ft. with an open edge to the next lowest level shall be performed as supervised by a competent person. In all cases proper fall protection systems shall be utilized as determined by the competent person for fall protection; restraint systems (PFRS, guard rails, and warning lines (restricted for unprotected edge work where traditional systems are not practical).

Whenever possible, fall restraint shall be used over fall arrest. OSC observes a policy of 100% tie-off at all times.

INCIDENT PREVENTION PROCEDURES

SAFETY TASK ANALYSIS CARD

The Safety Task Analysis Card (STAC) process is a required component of all OSC projects. The STAC is a pre-printed, bi-fold card that must be completed by each employee at least once per week. The card is used by the employee as a reference tool throughout their work shift. STAC card observations are used to address new work tasks and/or potential hazards.

STAC's are used in addition to safe work permits and/or approved work procedures. The STAC is designed to be an ongoing learning tool. By breaking jobs into small parts, workers can identify hazards and eliminate or control them. It is intended as a tool to help employees make observations and correct fellow employees at risk behaviors.

The STAC must be completed by each employee at least once per week. This is the minimum requirement. Project personnel found participating in or observing risky actions without submitting a properly completed STAC will be re-trained on the need to do so.

Project supervisors and/or the HSO will review submitted STACs with employees during tailgate safety meetings and identify corrective actions.

FIRE PREVENTION AND PROTECTION

Emergency response and contingency procedures provided this HASP will be in effect throughout all phases of work. Included are firefighting equipment, alarm systems, the location of the closest fire departments and procedures for handling fire emergencies. Firefighting equipment will be inspected on a regular basis, maintained in proper working condition and will be in an accessible place, at the site, at all times.

All heavy equipment will be equipped with a fire extinguisher.

Fire extinguishers will be immediately available when working with or near combustible or flammable items.

A fire extinguisher, rated 2A or greater, will be provided for every 3,000 sf of protected building area, or major fraction thereof, on every floor and they will be placed no more than 100 feet from any point within the building. Fire extinguishers will be placed adjacent to stairways in multi-story buildings. This condition is not expected on the project.

SITE HOUSEKEEPING

The following housekeeping guidelines apply at this site:

- All excess material and debris will be kept clear from all working areas.
- Combustible materials will be removed at regular intervals and all wastes will be properly disposed of at frequent intervals.
- Containers will be provided for the collection and separation of all discarded materials and refuse. Covers and identification will be provided for all containers used for flammable or harmful substances.

MECHANICAL EQUIPMENT

The following guidelines apply when dealing with the inspection and operation of all mechanical equipment;

- All vehicles and equipment used on the site, must be checked at the beginning of each shift to assure that all parts that affect safe operation are in proper working condition and are free from defects. An inspection form must be completed and filed with the HSO.
- Personnel will not be permitted to operate equipment when there is an obstructed view to the rear or sides, unless there is a spotter.
- Employees will not work or walk under or between any equipment that has parts which are suspended or held aloft unless/until the parts are substantially blocked to prevent falling and shifting.
- Hydraulic leaks must be addressed immediately by stopping the equipment, preventing further leaking and cleaning any hydraulic fluid spills/leaks. Notify the HSO immediately for proper corrective actions to be determined.

HIGH PRESSURE WASHERS

OSC requires that only trained and authorized personnel operate high pressure washers. This policy is intended to protect both *OSC* employees as well as any property where the equipment will be used. The following guidelines apply:

- The lance must always be pointed at the specific work area.
- Personnel will remain at least 25 feet away from the washer; and the item being washed.
- Care should be taken to ensure the proper footing of the operator.
- The operator will wear the following personal protective equipment: Hard hat with face shield, goggles, safety boots with metal foot and shin guards, hearing protection, PVC rain or chemical resistant suit and heavy gloves; as well as any additional equipment to protect against chemicals, as needed.
- OSC requires that all operators be trained in the emergency shutdown procedures and general equipment maintenance of high-pressure washers.
- Under no circumstances will an operator be allowed to make modifications to a power washer while on a job.

VEHICLE AND EQUIPMENT SAFETY

Only trained and qualified personnel may operate equipment and vehicles. This policy is intended to protect all employees and client properties. The guidelines for this policy are as follows;

- Each unit is to be inspected prior to its use on site and then inspected periodically depending on the equipment involved and the manufacturer's specifications.
- No repair work, or refueling, will be done while the vehicles or equipment are in operation. The engine is to be turned off and all buckets, blades, gates or booms must be lowered to the ground, or a substantial support.
- Equipment backup alarms must be operational and audible over the surrounding noise levels. If this is not the case, an assistant must be assigned to the operator, and he/she will be required to clear the way.
- Only authorized personnel are permitted to ride in company vehicles and equipment.
- Under no circumstances will an employee be permitted to get on or off a moving vehicle.
- Operators must wear the following PPE: Boots/sturdy work shoes, ear protection devices when the noise level is excessive (see hearing protection section), heavy work gloves. Hardhats and safety eyewear with side shields are required whenever outside of an enclosed cab. Safety glasses and hearing protection are required when the cab windows are open.
- The operator must always wear seatbelts .
- To ensure the proper visibility all windshields, side windows, mirrors and lights will be cleaned as often as necessary.

Trucks

The following guidelines apply to truck operators;

- A current driver's license must be carried always
- Drivers will check loaded material to ensure against loss or shifting during transit
- All DOT regulations will be followed
- When towing trailers, safety chains (grade 70) must be in used
- Non-OSC drivers must receive site-specific instructions upon arrival such as remaining in the truck, where to tarp loads, required PPE if allowed to exit truck, proper entry procedures, etc.

Heavy Equipment

OSC has the following requirements for operating front end loaders, excavators, dozers and tractors;

- Prior to their use onsite, the equipment's brakes, cables and hoses must be checked and in good working order.

- When the equipment is moving, all blades, buckets and bowls will be carried close to the ground but high enough to avoid any obstacles on the ground. If not in motion, they must be lowered to the ground or to a substantial support.
- No employees are permitted to ride on a boom, bucket, bowl or any other heavy equipment extension.
- All safety equipment must be properly installed, and in good working condition, before a piece of equipment will be used on this project.

SANITATION

Except for mobile crews having transportation readily available, all work sites will have toilets provided that adhere to the following requirements: One toilet for 20 or less employees; one toilet seat and one urinal per 40 employees; if there are 200+ employees, one toilet seat and one urinal per 50 workers.

Adequate washing/showering facilities will be provided on site where there are harmful substances, and they will be in close proximity to the site. An acceptable supply of potable water will be provided onsite, and it will be clearly marked as such. Portable water containers will have tightly sealed tops and a tap.

DAILY INSPECTIONS

The HSO will monitor jobsite hazard mitigation through inspections at the start and throughout each workday. Results of these daily inspections will be recorded on a daily safety log.

Any safety violations will be recorded and corrected by the Project Manager. All observed safety violations will be immediately corrected, explained to the person responsible, and reviewed at the next safety meeting. If an employee has excessive violations of the site safety rules, it will be grounds for disciplinary action which could lead to termination of OSC personnel or expulsion if an onsite subcontractor personnel.

INCIDENT REPORTING

OSC will prepare and maintain (on site) incident reports that include corrective actions. These reports will be provided to within 48 hours of the incident and as needed. Each incident report will be reviewed by the OSC Director HS&E. Verbal notification shall be within 2 hours.

Any occupational incident, which results in the death of one or more employees will be reported to OSHA within 8 hours. The inpatient hospitalization an employee and all amputations or loss of an eye will be reported within 24 hours. All such incidents will be reported by OSC to the nearest OSHA Area Director during normal business hours or at the National Hotline (800-321-OSHA (6742).

In addition to OSC's internal reporting requirements, RIVERVIEW/Honeywell requires all incidents (adverse events) to be investigated and based on the severity, requires notification of the incident within specified timelines. Adverse events are divided into three tiers: Tier 1 events are the most significant and serious events, followed by Tier 2, which are significant events but not as serious as Tier 1 events, and Tier 3 events are essentially all other events that do not meet the criteria for Tier 1 or Tier 2 events. Tier 1 events are to be reported within 2 hours, Tier 2 events are to be reported within 24 hours, and Tier 3 events are to be reported when possible.

Adverse events include the following:

Tier 1:

- A release to air, water or soil that has an actual or potential off-site adverse environmental impact.
- One or more on-site fatalities;
- Three or more employees, contractors or visitors admitted to a hospital;
- Any off-site fatalities, injuries, or harmful exposures resulting from RIVERVIEW/Honeywell products or operations;
- Any security incident that may be immediately dangerous to life or property, including fires, explosions, bomb threats, chemical release, radiation release, release of a biological or chemical agent (aerosolized or gaseous form);
- Suspicious materials, packages or letters that pose immediate risk to employees
- Government representatives alleging or suggesting criminal non-compliance of any kind
- Receipt or notice of any regulatory agency directive or other type of injunctive device designed to curtail or restrict operations; and,
- Community injuries or diagnoses of illnesses allegedly associated with a company-related incident, event or release to air, water or soil.

Tier 2:

- Employee or contractor lost workday injuries/illnesses.
- Employee, contractor or visitor recordable injuries/illnesses (Criteria: "RIVERVIEW/Honeywell Global Recordkeeping Requirements").
- An environmental excursion that does not also trigger Tier 1 reporting.
- A release to air, water or soil that only narrowly avoided an adverse environmental impact or had the potential to be an excursion.
- Discovery of potential or actual evidence of contaminated groundwater from current or former operations that does not otherwise meet the definition of a Tier 1 Event.
- Suspicious activities in or around RIVERVIEW/Honeywell facilities or processes that may present a potential security risk.
- Allegations of previously unknown health/safety/environmental effects caused by products, processes, emissions or discharges (Reference: Risk Management and Reporting (Pstew-3).
- Written notification from a governmental agency alleging non-compliance of any kind.

- Proposal or imposition of an HSER fine, penalty or corrective action.
- Receipt of a non-routine request for information from a governmental agency.
- A non-routine regulatory agency inspection.
- Audits (Peer review, Self-assessments, SBU, Third party findings and recommendations)
- Significant community activism or adverse media coverage not associated with an episodic event.
- A product recall imposed by a regulatory agency.
- Transportation-related event that results in Tier 2 impacts.
- Notice of an allegation from a third party or regulatory agency of environmental impacts from operations on current or formerly operated RIVERVIEW/Honeywell facilities.
- Demands, including voluntary agreements, to conduct a site investigation or remedial measures to respond to environmental impacts from operations on current or formerly operated RIVERVIEW/Honeywell facilities.

Tier 3:

The following Tier 3 events shall be entered into the event tracking system within seven (7) calendar days:

- On-site or off-site employee, contractor employee or visitor injuries/illnesses where first-aid treatment or evaluation is provided by a Medical or Para-Medical Professional.
- A regulatory agency inspection (which is not a Tier 1 or Tier 2 Event and may still be underway) with no notice of fine, penalty or corrective action.

Adverse events must be reported to the PM, the INVENTUM engineering manager, the RM, as soon as possible following the event. All Tier 1 and Tier 2 adverse events must be investigated, and a written investigation report must be prepared and submitted to the RIVERVIEW/Honeywell Event Reporting System.

MEDICAL SURVEILLANCE

MEDICAL EXAMINATIONS

OSC field personnel are provided with a thorough, initial medical examination to assess fitness for the project and to provide baseline health data for subsequent reference. Examinations are conducted by a qualified health care provider and repeated annually (unless abnormal test results, annual "questionnaire" answers or other problems dictate more frequent observation). A copy of the physician's statement certifying each employee's ability to work at task specific operations will be maintained in the project file by the HSO.

During the medical examination employees will be evaluated for their ability to wear respiratory protection. This evaluation will include, at a minimum, an examination of the cardiopulmonary system; including forced vital capacity (FVC) and forced expiratory volume C 1 second (FEV 1.0). When indicated by the physician, other tests of the respiratory and cardiovascular systems will be performed on the basis of an individual's past history, findings of the above below evaluation, and/or the type of equipment the individual may be required to use.

Following is an example of a baseline yearly medical examination:

Medical Monitoring Protocol				
Exam Components	**Baseline**	**Annual**	**Interim**	**Exit**
Vital Signs	Yes	Yes	Yes	Yes
Vision Screening (Includes Peripheral and Color)	Yes	Yes	Yes	Yes
Urine Drug Screen	Yes	Yes	As needed	As needed
DOT hearing	Yes	Yes	No	Yes
Spirometry	Yes	Yes	Yes	Yes
Chest X-Ray (asbestos/silica work only)	Yes	3	No	3
Review of History	Yes	Yes	Yes	Yes
Physical Exam	Yes	Yes	Yes	Yes
Notes: Only do an X-ray if not done within the last 12 months Only do an X-ray if not done within the last 3 years For medical indications only				

NOTE: Any employee who develops a lost time injury or illness during the period of this contract will be evaluated by the OSC medical consultant. The project supervisor will be provided with a written statement that indicated the employee's fitness and ability to return to work, signed by the medical consultant prior to allowing the employee to re-enter the work zone.

AIR MONITORING:

Lower Explosive Limit (LEL) monitoring will be conducted around any tank, vessel, or barrel containing coal tar prior to beginning work each day and when coal tar is being handled. Concentrations greater than 10% of the LEL will result in work stopping immediately for further evaluation. When LEL concentrations are zero, the HSO shall determine the need for additional monitoring.

Volatile Organic Compound monitoring (breathing zone) shall be performed when odors are detected. Monitoring will be conducted using a MultiRAE Lite with an 11.7 lamp. Work resulting in readings of 0.6 ppm or greater TWA after 15 minutes of measurement shall stop and the OSC Director, HSE contacted for further evaluation.

Any time a confined space or enclosed building area is entered initially the air shall be characterized using real-time monitors for oxygen content, LEL, and other potential hazards such as carbon monoxide or hydrogen sulfide exposure.

The need for additional air monitoring or exposure measurements will be determined as specific work tasks are developed. Air monitoring and sampling shall be specified in the relevant AHA as approved by the Director HS&E.

CONFINED SPACE ENTRY PROCEDURES

The following guidelines outline the minimum acceptable criteria that will be utilized by OSC and subcontractor personnel for all confined space entry operations.

All project specific confined space entries will be thoroughly reviewed by the designated HSO. Confined Space Permits shall be issued and approved in conjunction with the INVENTUM Project Manager. Personnel entering and working in confined spaces will be required to adhere to the OSHA Permit-Required Confined Space Standard 29 CFR 1926.1200 and the OSHA General Duty Clause. Affected project personnel are instructed in these OSHA regulations as part of the OSC employee training program.

The HSO will be responsible for reviewing the applicable entry protocol with the field team, prior to confined space entry.

DEFINITIONS

CONFINED SPACE: There are two types of confined spaces: permit required and non-permit required. OSHA's "PRCS Evaluation Procedures and Decision Flow Chart" will be used to evaluate the potential for permit require confined space.

PERMIT REQUIRED CONFINED SPACE (PRCS): The space contains, or has the potential to contain;

- A hazardous atmosphere. A hazardous atmosphere is defined as any space where the oxygen is below 19.5% or above 23.5%, combustible vapors are above 10% LEL, or high toxic concentrations are present which may cause death, incapacitation or an impaired ability to self-rescue.
- The space contains a material that may engulf an entrant.
- The space has an internal configuration that may trap or asphyxiate entrants.
- The space contains any other serious heal, safety or environmental hazard.

NON-PERMIT REQUIRED CONFINED SPACES: OSHA defined a non-permit required confined space as a PRCS in which all serious hazards have been eliminated. Non-permit required confined spaces will be re-evaluated by the HSO using the "PRCS Evaluation Procedure and Decision Flow Chart" (see attached) whenever they or their characteristics change in a way that could lead to reclassification as a PRCS.

PERSONNEL RESPONSIBILITIES

Entry Supervisors

OSC will designate an entry supervisor to oversee the confined space entry and ensure that personnel engaged in PRCS entry operations will comply with this procedure. Entry supervisors will:

- Verify that all tests specified by the permit, have been conducted and that all procedure and equipment specified by the permit are in place before endorsing the permit and allowing the entry to begin.
- Terminate the entry and cancel the permit when the entry operations covered by the entry permit have been completed, or whenever a condition that is not allowed under the entry permit arises in or near the PRCS.
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove all unauthorized individuals who enter, or attempt to enter, the PRCS during entry operations.
- Determine that the entry operations are consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

Attendants

The entry supervisor will designate a qualified attendant for each PRCS operation. To be qualified, an attendant must know the hazards that authorized entrants may encounter during an entry (including information on the mode, signs and symptoms, and consequences of exposure) and must be aware of the behavioral symptoms of hazard exposure. Attendants will;

- Remain outside the PRCS during entry operations until relieved by another attendant.

- Warn all unauthorized entrants that they must stay clear of the PRCS, or that they must immediately exit if they have entered the PRCS.
- Inform the entry supervisor, if unauthorized personnel have entered the PRCS.
- Continuously maintain an accurate count of entrants in the PRCS and ensure that the means used to identify authorized entrants accurately identifies the entrants.
- Communicate with authorized entrants, as necessary, to monitor entrant status and to alert entrants of the need to evacuate the PRCS.
- Monitor the activities both inside and outside the PRCS.
- Immediately order evacuation of the PRCS if a prohibited condition is detected, the behavioral effects of hazard exposure in an authorized entrant are observed, or a situation outside the PRCS is found that could endanger the authorized entrants; or if the attendant cannot effectively and safely perform his/her duties and responsibilities.
- Perform non-entry rescues, as specified by the Confined Space Entry Permit; summon rescue and other emergency services as soon as it is determined that authorized entrants may need assistance to escape from PRCS hazards.

Attendants will NOT, under any circumstances;

- Monitor more than one occupied PRCS at any given time;
- Perform any duty that might interfere with their primary duty to monitor and protect the authorized entrant; or
- Enter the PRCS for rescue purposes.

Entrants

Authorized PRCS entrants will be identified on each Confined Space Entry Permit. Authorized entrants will;

- Know the hazards, including information on the mode, signs or symptoms, and consequences of exposure.
- Properly use the PPE provided for the PRCS entry.
- Communicate with the attendant, as necessary, so the attendant can monitor entrant status and alert entrants of any need to evacuate the PRCS.
- Evacuate the PRCS and alert the attendant whenever they recognize any warning signs or symptoms of exposure to a dangerous situation; or they detect a prohibited condition; or whenever the attendant or entry supervisor orders the evacuation; or when an evacuation alarm is activated.

TRAINING

All project personnel will be instructed not to enter PRCSs without the proper permit and without following the procedure and practices outline in this SOP and in the Confined Space Entry Permit. Personnel, who are required to enter a PRCS, or act as an attendant or entry supervisor, will be

trained to acquire the understanding, knowledge and skills necessary for the safe performance of their assigned responsibilities and duties.

Entrants will receive training on;

- The means and methods used to communicate with attendants; as well as the means attendants will use to notify them of emergencies.
- The operation of any specialized equipment that is expected to be used, including monitoring and rescue equipment.
- Evacuation signals and procedures; as well as the need for entrants to notify the attendant and evacuate the PRCS if they detect any dangerous conditions.

Attendants will receive training on:

- The procedures for monitoring inside and outside the PRCS and recognizing the conditions that might be hazardous to entrants;
- Procedures for communicating with entrants;
- Procedures for evacuating entrants from the PRCS and when evacuation is required;
- Procedures for controlling access to the PRCS;
- Their responsibility to remain outside the PRCS during entry, unless they are relieved by another attendant, and
- Non-entry rescue procedures.

Entry Supervisors will receive training on;

- Verifying that the Confined Space Entry Permit has been completed properly;
- Procedures for verifying that all tests specified by the Permit have been conducted;
- Requirements for verifying that all the procedures and equipment specified by the Permit are in place before allowing entry to begin;
- Procedures for determining if conditions are acceptable for entry;
- Authorizing entry operations, and
- Terminating entry.

All training will be conducted:

- Before the employee is first assigned confined space duties (initial training);
- Before a change in assigned duties;
- Whenever there is a change in permit space operations that presents a hazard about which employee has not previously been trained, and
- Whenever project management, involved regulatory officials, or the project engineer have reason to believe that there are inadequacies in the knowledge or use of these procedures.

When complete, training will be certified by the instructor. The certification will list the names of the personnel presenting and receiving training and the dates of training. Training certification documentation will be maintained as part of the Project file kept at the site and in the individual's personnel files in the home office.

PRCS ENTRY PROCEDURE

Atmospheric Testing

Before an employee enters any confined space, the entry supervisor will test the internal atmosphere with a calibrated, direct reading instrument to determine if acceptable entry conditions exist for the following conditions, in the given order:

	Condition	Acceptable Parameter(s)
A.	Oxygen Content	Above 19.5% and Below 23.5%
B.	Flammable Gases and Vapors	Less than 10% LEL
C.	Potential Toxic Air Contaminants	Below Action Levels for PPE

Continuous systems which cannot be isolated (i.e. sewers) or activities which generate significant airborne contaminants (i.e. welding) will be continuously monitored during entry, unless forced mechanical ventilation is used and has been shown to maintain an acceptable atmosphere.

Entry

The HSO will use the "PRCS Evaluation Procedures and Decision Flow Chart" to verify the presence of a PRCS. If it is determined that a PRCS does exist, the HSO will review the confined space entry procedures with entry personnel; post OSHA required danger signs at the entrances to the PRCS and notify Project personnel of the PRCS location(s); notify offsite emergency response services of the PRCS; and prepare a Confined Space Entry Permit.

Confined Space Permit

The entry supervisor will be responsible for completing the Confined Space Entry Permit. All items on the Permit must be completed. The entry supervisor will verify that all entry personnel are aware of the specific hazards that are associated with the PRCS; that all necessary safety equipment and materials are in place; that all emergency response procedures are in place; and that the pre-entry air monitoring results indicate acceptable entry conditions, before signing the permit.

Pre-entry Briefing

The entry supervisor will conduct a pre-entry briefing with the attendants and authorized entrants to discuss the requirements of the Permit and to ensure that all involved personnel understand their responsibilities and the specific hazards associated with the PRCS. A pre-entry briefing will be conducted, for each attendant and entrant, prior to entry and whenever new hazards are identified.

Entry Authorization

The entry supervisor will sign the Confined Space Entry Permit after the Permit has been completed, all safety equipment is in place, air monitoring results are acceptable, the pre-entry briefing has been conducted, and the rescue procedures have been established. Once the permit has been signed:

- Entrants will wear all the necessary safety and rescue equipment;
- The Permit will be posted at , or near, the PRCS entrance, and
- Entry procedures will begin.

Permit Exit and Cancellation

Each Entry Permit will be valid for one shift only. Expired and canceled Permits will be returned to the Site Superintendent who will file them with the Project documents. Permits will be canceled if;

- A new hazard is identified or encountered;
- An entrant is seriously injured and requires evacuation and/or rescue; or if
- A change in the scope of work required new activities which may create previously unanticipated hazards that could cause serious death or injury.

RESCUE/EMERGENCY RESPONSE

Offsite Rescue and Emergency Services

Offsite rescue and emergency service personnel will be informed by the HSO of the hazards they may confront when called to the jobsite to perform services. These services will be identified and notified prior to any entry. Entry will not be performed if emergency rescue services are not available. The rescue/emergency service personnel will be provided access to all permit spaces from which the rescue may be necessary, so that the emergency responders can develop appropriate rescue plans and conduct rescue operations.

Non-entry Rescue

Non-entry rescues, retrieval systems or methods will be used whenever an authorized entrant enters a PRCS, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

Each authorized entrant will use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level or above the entrant's head. Retrieval lines will be attached to a mechanical device or a fixed point outside the Permit space, in such a manner that rescues can begin as soon as the rescuer becomes aware of the necessity. The mechanical device will be ready to retrieve personnel from vertical PRCSs more than five feet deep.

DECONTAMINATION PROCEDURES

Decontamination of equipment and personnel will be performed as necessary and as defined in the project scope. All equipment and personnel will be decontaminated before leaving the property.

Personnel and equipment decontamination procedures to be employed are summarized in the following subsections.

PERSONNEL HYGENE AND DECONTAMINATION

Personnel will be made aware of any personal habit that may allow contaminants into or onto their body. All personnel will check that regularly worn PPE (i.e. hardhats and liners, eye protection, etc.) is clean and in good condition. A storage area for decontaminated PPE will be provided and used outside the contaminated zone. Any products used for personal consumption are prohibited in any work area. Break areas will be limited to specific areas where eating, drinking, smoking, etc. and the storage of these materials will be allowed.

A typical personnel decontamination sequence is presented below.

- Step 1: Scrape the gross contamination from boots and outer gloves. Wash them using soap in a water solution and rinse with water into a designated container in the contamination reduction zone.
- Step 2: Remove the tape from and around boots and outer gloves and deposit in a collection drum (if disposable) or store on a rack (if reusable). Remove the over boots and outer gloves and place them in a collection drum (if disposable) or wash and place on a rack (if reusable).
- Step 3: Remove respirator cartridge and place in a collection drum.
- Step 4: Remove disposable coveralls and place them in a collection drum. Remove boots and store in an appropriate location. Remove disposable inner gloves and dispose of them in a collection drum.
- Step 5: Remove hardhat and safety glasses: Decontaminate as necessary (wash with sanitizing solution [MSA sanitizing solution or equivalent], rinse with potable water and allow to dry at the end of each day).
- Step 6: Remove respirator, if used, and deposit in a plastic liner. Avoid touching face with fingers. Respirators will be washed in a sanitizing solution (MSA sanitizer or equivalent), rinsed with portable water and allowed to air dry at the end of each day.
- Step 7: Thoroughly wash and rinse any exposed skin with water and biodegradable soap using bucket 1. Rinse in bucket 2. Re-rinse in bucket 3. Shower and launder all personal clothing as soon as possible upon completing daily activities.

Personnel hygiene, hand and face washing, and the following decontamination will take place in the project support area.

EQUIPMENT DECONTAMINATION

The HSO will be responsible for inspecting decontaminated vehicles, equipment and material contaminated work areas, to ensure proper decontamination. The users and HSO will verify that each piece of equipment utilized in the exclusion zone has been properly decontaminated.

Decontamination personnel will be required to use Modified Level D PPE as specified in this HASP. The standard operating procedure for the use of high-pressure washers, also provided, will be strictly followed to prevent injury.

HEAVY EQUIPMENT DECONTAMINATION

As a general practice, equipment, such as excavators, bulldozers, etc. will remain within the work zone for the duration of the excavation activities. This ensures the minimization of the potential migration of contaminants outside the project limits. In addition, the sequence of excavation has been designed to avoid the movement of machinery and personnel over areas within the work zones that have been excavated.

Generally heavy equipment, and large materials used in potentially contaminated areas equipment, will be decontaminated as outlined below;

- Conduct gross removal of solids at point use.
- Degrease as necessary.
- Move to the equipment decontamination pad for decontamination via pressure washing.
- Collect and handle resultant liquids/solids.

TOOLS AND SMALL EQUIPMENT DECONTAMINATION

Tools and smaller equipment that may have come in contact with potentially contaminated materials will be decontaminated using the procedures outlined below;

- Flush and wipe components to remove debris and other gross contamination.
- Clean with potable water and non-phosphate detergent (i.e. Alconox) using a brush or high-pressure washer, as necessary, to remove particulate matter and surface films.
- Rinse thoroughly with potable water.
- Allow to air dry for as long as possible.

NON-DISPOSABLE SAMPLING EQUIPMENT

Non-disposable sampling equipment that may have come into contact with potentially contaminated materials will be decontaminated prior to collecting each sample as follows;

- Clean with potable water and non-phosphate detergent using a brush, if necessary, to remove all visible foreign matter.
- Rinse thoroughly with potable water.
- Rinse thoroughly with de-ionized water.
- Visually inspect the openings and treads for solid materials.
- Allow to air dry as long as possible on a clean polyethylene sheet or aluminum foil.

DISPOSAL OF DECONTAMINATION WASTES

All equipment and solvents used for decontamination will be decontaminated or disposed of properly. All aqueous liquids generated in the personnel and equipment decontamination process will be collected, characterized and appropriately disposed of. All disposable PPR will be containerized in drums and properly disposed of.

EMERGENCY EQUIPMENT and FIRST AID REQUIREMENTS

Emergency and first aid equipment to be maintained onsite will include the following;

- Approved, portable, emergency eye wash units in accordance with ANSI Standard Z358.1
- At least one industrial first aid kit will be provided and maintained at an easily accessible, uncontaminated location chosen by the HSO. Additional first aid kits may be provided
- First aid and CPR kit locations will be specifically marked by the HSO and stocked with adequate water and other supplies to cleanse and decontaminate burns, wounds or lesions.
- 10#A: B: C type dry chemical fire extinguishers will be provided at all project site locations where flammable materials present a fire risk. Mobile equipment will be equipped with 2-pound extinguishers.

Agencies and medical facilities that need to be contacted in the event of an onsite emergency, as well as directions to the nearest hospital, are identified at the beginning of this HASP. The tables stating the emergency contact information and hospital location will be posted in a prominent location(s) onsite.

If a site worker becomes injured or ill, Red Cross/American Heart Association recommended first aid procedures shall be followed. First aid, or other appropriate initial reactions, will be provided by the certified first aid technician that is closest to the incident.

NOTE: When protective clothing has been grossly contaminated during an incident, contaminants may be transferred to the treatment personnel or the wearer and cause injuries. Unless severe medical problems have occurred simultaneously with splashes, protective clothing should be washed off as quickly as possible and removed. If the worker can be moved, he/she will be taken to the personnel decontamination station where decontamination procedures, additional first aid or preparation for transport to the hospital will be accomplished. In the event that the victim could not be decontaminated, the rescue service provider must be notified of the situation.

If the injury to the worker is of a chemical nature, the procedures listed below are to be followed;

Eye Exposure: If contaminated solids or liquids get into the eyes, wash eyes immediately using large amounts of water while lifting the lower and upper eyelids occasionally. Wash for at least 15 minutes. Obtain medical attention.
Skin Exposure: If contaminated solids or liquids get on the skin, promptly wash the contaminated skin using soap and water. Immediately obtain medical attention.
Respiratory Exposure: Immediately move the victim to fresh air. Obtain immediate medical attention.
Ingestion Exposure: Identify what contaminant was swallowed. Follow the appropriate procedure described in the SDS and obtain medical attention as soon as possible.

NOTE: Any person who is transported to the hospital for treatment related to an exposure injury will take with them the appropriate information (i.e. SDSs) on the chemical to which he/she has been exposed. SDSs for known or suspected chemicals to exist onsite will be stored in OSC's project field office and maintained by the HSO.

MEDICAL EMERGENCY RESPONSE

REPORTING AN EMERGENCY

The HSO will immediately notify the Site Superintendent stating the points that are listed under a minor injury. However, with a major emergency the HSO must state that this is a major emergency. Concurrently the HSO must direct that 911 be called if not already done so. The Site Superintendent will react as follows:

- Call OSC's Corporate Director HS&E
- Call the fire department (if necessary)
- Call police
- Call the Project Manager

PRE-PLANNING

Arrangements for emergency services will be made prior to initiating onsite operations. Emergency response procedures will be covered as part of the project training.

EMERGENCY CHAIN OF COMMAND

In the event of an emergency, personnel will immediately notify the HSO, using available communications. The HSO will assess the situation and take appropriate action which can include ceasing all work; ordering evacuation of the work zone; requesting emergency medical treatment; and/or administering first aid.

WEATHER

In the event of severe weather (lightning, high winds, etc.), the HSO will notify project personnel. As the storm approaches, all work will stop, loose objects will be secured, and site personnel will take shelter at a location pre-arranged by the HSO. After the severe weather has passed, and prior to work startup, the HSO will inspect the site for hazards.

Lightning – Any visual sighting of lightning will result in stopping outside work activities. Work will not commence until 30 minutes after the last observed strike.

High Winds – Winds higher than 30 mph will cause all exterior hoisting and lifting to cease. Crane operators have the authority to stop lifts at lower wind speeds based on their discretion.

Project Tornado Shelter (not anticipated for this project) - To be determined with initial hazard exposure assessments and site mobilization. All reasonable efforts should be made to access this

location in the event of a tornado. Recognizing imminent tornado signs includes seeing an unusually dark sky, possibly with some green or yellow clouds. You may hear a roaring or rumbling sound like a train, or a whistling sound like a jet. Large hail may also be falling. You may be able to see funnels, or they may be hidden by rain or hail.

Listen to the radio for tornado warnings during bad thunderstorms. If a tornado warning is issued, don't panic. Instead, listen and look. Quickly but calmly follow directions for getting to shelter. Take cover. Indoors you should go down into the basement and crouch down under the stairs, away from windows. Do not take an elevator. If you can't get to a basement, go into a closet or bathroom and pull a mattress over you or sit underneath a sturdy piece of furniture on the ground floor near the center of the building. Pull your knees up under you and protect your head with your hands. A bad place to be in a tornado is in a building with a regular freestanding roof such as a gymnasium, arena, auditorium, church or shopping mall. If you are caught in such a building, take cover under something sturdy. More than half of tornado deaths occur in mobile homes. If a tornado threatens, get out and go to a building with a good foundation, or lay down in a ditch away from vehicles and other objects.

If you are driving, get to a shelter, lie down in a ditch or seek cover up under the girders of an overpass or bridge. Stay as close to the ground as you can. Protect your head and duck flying debris. Stay away from metal and electrical equipment because lightning accompanies tornadoes.

If you have time before the tornado strikes, secure objects such as garbage cans and lawn furniture which can injure people. While most tornado damage is a result of the violent winds, most injuries and deaths actually result from flying debris.

SPILL CONTAINMENT PROCEDURES

The purpose of this section is two-fold; to prevent and control accidental discharge of polluting materials to surface soils and waterways (or groundwater); and to minimize and abate the hazards to human health and the environment from hazardous waste releases to air, soil or surface water. These procedures will be reviewed with project personnel prior to startup and thereafter as necessary during regular weekly HS&E meetings and daily briefings.

EMERGENCY NUMBERS

The names and phone numbers of emergency services and offices to be contacted in the event of a spill, or any other onsite emergency, is provided in the Contact Information portion located at the beginning of this HASP. These phone numbers will be posted by the HSO in prominent positions throughout the Project site.

DEFINITIONS

For the purposes of this plan, spoils are defined as any material that is accidentally or intentionally leaked, pumped, poured, dumped or emitted onto the ground, surface water, groundwater or air.

All spilled material will be considered hazardous; cleaned up following the established spill response procedures; and reported as required.

Spills will be categorized as: Priority 1 or Priority 2.

Priority 1 Spills: Result in a significant release of contamination into the air, or onto the ground, outside the exclusion zone.

Priority 2 Spills: Result in minor spill, less than five (5) gallons and not reportable, which can be easily cleaned up.

POTENTIAL SOURCES and PREVENTATIVE MEASURES

The contracted work has potential spill sources. These include, but are not limited to:

Potential Spill Source	Preventative Measure(S)
Transporting waste material to selected on and offsite disposal facilities	OSC will verify that all transportation vehicles used in support of this contract are equipped with the appropriate spill response equipment, and that the drivers have received the proper spill response training and maintain all their required federal and state licenses and certifications. Loads will be secured, tied down and covered, and transport vehicles will be checked prior to release from the site.
Re-fueling onsite equipment	OSC will prohibit the long term storing of diesel fuel. OSC will limit the amount of fuel kept onsite to only that required for weekly equipment usage.
General spill prevention requirements	Easily accessible spill response stations will be set up containing absorbent pillows, floor dry, shovels and brushes to be used in the event of a spill. The location will be known to all project personnel.

SPILL RESPONSE PROCEDURES

Initial Containment and Response

In the event of a spill, the following initial containment and response procedure must be implemented immediately.

- **Administer first aid to injured person(s).** Any employee that observes a spill will act immediately to remove and /or protect the injured person from a life-threatening situation. First aid and/or decontamination procedure will be implemented as appropriate.
- **Warn other persons and/or vehicles of the hazard.** Personnel will act to prevent any unsuspecting persons from coming in contact with the spilled materials by alerting nearby people and by obtaining assistance of other personnel who are familiar with spill control and clean up training.
- **Stop the spill at the source, if possible.** Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as up-righting a drum, closing a valve or temporarily sealing a hole with a plug. OSC personnel will not expend more than a brief effort, prior to notifying the HSO.

- **Notify the HSO**. Using available onsite communication systems, or other rapid communication procedures, the HSO will be notified of the spill, including information on the material spilled, quality, personnel injuries and immediate life-threatening hazards. The HSO will notify emergency contacts immediately (See Emergency Contact List).

NOTE: If a flammable liquid is involved in the spill, remove all ignition sources and monitor for explosive conditions with an LEL meter during cleanup. Also, remove any surrounding materials that might chemically react with the spill materials.

Spill Containment

The HSO will make a rapid assessment of any spill at the site; apply the appropriate HS&E considerations to the use of PPE in the spill release zone; and direct primary containment measures. Depending on the nature of the spill, primary containment measures may include, but are not limited to;

- Constructing a temporary containment berm to control the horizontal flow of the spill using absorbent pads, booms, sandbags, sand and/or other inert materials
- Placing drums under the leak to collect the spilling material before it flows onto the ground
- Digging a sump, installing a polyethylene liner and diverting the spilled material to the sump
- Transferring the material from its original container to another container

Spills that occur between the project site and the offsite disposal facility will be initially contained by the driver using on-board spill response equipment.

Spill Cleanup

The HSO and Project Manager will develop an incident-specific spill clean-up plan for Priority 1 spills that will take into consideration the associated hazards, quantity of spilled material, disposal methods and costs. The incident specific spill clean-up plan will be reviewed for acceptance by the owner representative and/or other Federal, State or Local oversight personnel. Once approved, the spill clean-up plan will be implemented under the direct supervision of the OSC site superintendent.

Generally, all visually detectable spills, leaks or releases of fuel oil will be collected and cleaned up using absorbent pads, booms, sandbags, sand and/or other inert materials as practicable using the response procedures outline below.

Spill Type	Response
Waste oil on the ground	Contain the spill and excavate the visually contaminated soils. Containerize, sample for classification purposes and dispose offsite.
Building/paved surfaces	Contain the spill. Power wash the contaminated are(s). Collect and containerize the resultant wastewater for onsite treatment.
Vehicle	Power wash the vehicle. Collect, contain and treat the resultant decontamination fluids.
Heavy Equipment hydraulic fluid leak	Stop equipment immediately. Clean up spill and/or leaking fluid. Contact HSO for repair approach.
Waste from truck spilled on roadway	Contain the spilled material. Collect, containerize and remove the spilled material. Sample for waste classification purposes. Dispose of material offsite.

Post-spill Inspection

The HSO, site superintendent and owner representative will jointly inspect the spill site to determine that the spill has been cleaned up to the satisfaction of all involved parties.

Reporting

In the event of a spill incident, the HSO will immediately contact the site superintendent and owner representative; initiate the emergency procedure steps that are provided in this HASP and complete a Spill Report for submittal to the owner representative.

OSC will be responsible for reporting any Priority 1 spills immediately following the incident. A written report will be submitted within seven days after the telephone call reporting the incident. The written report will include the item spilled, quantity, identification and manifest numbers, whether the amount spilled is EPA/State/District reportable, exact location of occurrence, containment procedures used, anticipated clean-up and disposal procedures and disposal of spill residue.

HEAT/COLD STRESS

HEAT

The HSO will visually monitor personnel for signs of heat overexposure. The HSO will be responsible for implementing the following program when the ambient air temperature exceeds 85°F (heat stress monitoring).

Symptoms

Weakness, dizziness, fainting, nausea, headaches, cool and clammy skin, profuse sweating, slurred speech, weak pulse and dilated pupils.

Procedure

Personnel who wear PPE allow their body heat to be accumulated with and elevation of the body temperature. Heat, heat exhaustion and heat stroke can be experienced which, if not remedied, can threaten health and life. A current edition of the American Red Cross Standard First Aid book or equivalent will be maintained onsite at all times so that the HSO and all personnel will be able to recognize the symptoms of heat emergency and be capable of controlling them.

When PPE is worn (especially level C) the suggested guidelines for ambient temperature and maximum wear time per excursion are as follows:

Ambient Temperature (°F)	Maximum Wear Time Per Excursion (Minutes)
Above 90	15
85 – 90	30
80 – 85	60
70 – 80	90
60 – 70	120
50 – 60	180

One method for measuring the effectiveness of employees' rest-recovery regime is by monitoring their heart as follows:

- During a 3-minute period, count the pulse rate for the last 30 seconds of the first minute, the last 30 seconds of the second minute and the last 30 seconds of the third minute.
- Double that count.
- If the recovery rate during the last 30 seconds of the first minute is at 110 beats per minute or less and the deceleration between the first, second and third minute is at least 10 beats/minute, the work recovery regime is acceptable. If the employee's rate is above the specified, longer rest period is required, and accompanied by and increased intake of fluids.

COLD

Whole body protection will be provided to personnel who will have prolonged exposure to cold air. The HSO will use the equivalent chill temperature when determining the combined cooling effect of wind and low temperatures on exposed skin or when determining the proper clothing insulation requirements. The following clothing will be used as deemed necessary by the HSO.

Appropriate underclothing (wool or other cloth)

Outer coats that repel wind and moisture

Face, head and ear coverings

Extra pairs of socks

Insulated safety boots

Wool glove liners or wind and water repellant gloves

Personnel who are working in continuous cold weather are required to warm themselves on a regular basis in the onsite trailer. Drinks will be provided to personnel to prevent dehydration. The HSO will follow the work practices and recommendations for cold stress threshold limit values as stated by the current edition of the Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices by the American Conference of Governmental Industrial Hygienists, or equivalent cold *stress prevention* methods.

LOGS, REPORTS and RECORDKEEPING

The following reports will be prepared and submitted as indicated below. Copies of the field logs, permits and forms required for this project are provided in Attachment 1.

Type	Frequency
AHA Pre-plan for High Risk Work	Prior to start of work
Employee Daily Safety Brief Site Log	Daily, minimum
Air Monitoring Reports	As necessary
Incident Report	As required, within 48 hours

The above logs and reports will be prepared by the HSO, or the designated representative, at the frequency noted above. Additionally, daily logs of all personnel working or visiting the site will be maintained. Completed logs and reports will be maintained stored on site in the project field office. Copies shall be provided to the Project Manager.

Hot Work Permit Procedures (Welding, Cutting, Open Flame Work & Sparking)

OSC will follow specific procedures to ensure all hot work activities, welding, burning, cutting, sparking and other ignition source work is completed safely without incident (no fires, injuries or property damage). All hot work shall require an approved hot work permit issued by the OSC HSO prior to commencing work. The hot work permit shall define the minimum acceptable procedures and precautions that shall be taken for all phases of the hot work; prior to start of work, as well as during and after hot work is completed. A permit shall be issued daily for each specific location, type of hot work, protective measures, date, time duration and completion time. Hot work permits will be available for review. Completed and signed permits shall be returned to the HSO at the end of the workday. Copies of completed permits shall be maintained in the OSC field office for review.

NOTE: Many of the piping, vessels and towers at the site contain flammable materials. The hot work permit procedure MUST be followed.

Authorization of Equipment Operators

All heavy equipment operators working on site will be approved competent either through OSC's in-house program or through local labor union process. Training requirements for approval are as follows;

Heavy Equipment Operators

- Formal classroom with written qualification, or
- On-the-job mentoring for 40-hour minimum under a competent person, and
- Determination of proficiency by an OSC certified supervisor

The formal classroom and mentoring may be adjusted based on an operator's previous experience. In addition, operators may need to obtain state-specific crane licenses/permits.

Crane Operators

- Formal classroom with written qualification
- Determination of proficiency by a certified operator
- On-the-job mentoring for 80-hour minimum under a competent person

The formal classroom and mentoring may be adjusted based on an operator's previous experience. In addition to the certification, operators may need to obtain state-specific licenses/permits.

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

1. General Information

Client Name: Riverview Innovation and Technology Campus, Inc.

Project #: RITC

Project Name: Brownfield Cleanup Program Remedial Action

Project Manager: John Black, PE

Street Address:
3875 River Road
Tonawanda, New York 14150

Prepared By: James Edwards **Date: May 15, 2025**

Approved By: John Black, P.E. **Date: May 16, 2025**

Proposed Date(s) of Work: Q2 2025 through Q3 2025

Proposed Scope of Work:

Inventum Engineering, P.C. (Inventum) will be the owner's representative, investigation team and engineer supporting the site management and sampling actions through the New York State Brownfield Cleanup Program (BCP) for the Riverview Innovation and Technology Campus located on the former Tonawanda Coke Corporation Facility (BCP Site). The general scope of work is provided below, and tasks will be updated with additional details/specifications as the project progresses through the BCP.

Task 1 - Site Management and Oversight

Inventum will conduct site visits and provide full-time site management support, general management support, CAMP air monitoring, and general contractor and subcontractor oversight related to the sampling actions of the Consolidation Area at the BCP Site. This task includes site work related to monitoring and support of the task outlined in the Sampling and Analysis Work Plan for the Consolidation Area, but specifically excludes Inventum personnel directly performing any intrusive site work or oversight of contractors/subcontractors performing intrusive site work. Direct intrusive site work and/or intrusive site work oversight is covered under Tasks 2 through 4 below.

Task 2 – Geoprobe (direct push) Soil Sampling

Subsurface (> 1 feet bgs) soils samples will be collected from disposable sleeves of the direct push macro-core to samples subsurface soils. Material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including SVOCs, VOCs, metals, cyanide, PCBs, herbicides, pesticides, 1,4-Dioxane and PFAS.

Task 3 – Test Pit Excavations

Test pits will be excavated using an excavator. Excavated material and soils will be temporarily stockpiled a minimum of 2-feet away from the edge of the pit. Excavated soils will be recovered and presented to Inventum for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including SVOCs, VOCs, metals, cyanide, PCBs, herbicides, pesticides, 1,4-Dioxane and PFAS.

Task 4 – Sampling of Gross Contamination

Samples may be collected from gross contamination that could potential be observed during the soil sampling of the Consolidation Area at the BCP Site to characterize silty call material for reuse onsite. To the extent practicable, all samples will be collected from the surface or from equipment outside the accumulation point to avoid the need for confined space entry. Samples may be collected using a hand-auger, shovel, or trowel. Material will be recovered, and field screened with a PID equipped with a 10.6 eV lamp. All observations and measurements of quantities will be logged in the field notebook. Samples may be collected for various constituents including TCLP VOCs, SVOCs, and Metals, PCBs, flash point (ignitability) pH and reactivity cyanide and sulfide.

Inventum Role(s) On Site:

- ☐ Inventum Staff Will Not Be On Site (HASP and Risk Analysis is for subcontractor information only)
- ☒ Resident Project Representative (*e.g.,* "Observe and Document")
- ☐ Construction Manager (*e.g.,* CM, Managing/General Contractor)
- ☒ Representative for Client (*e.g.,* "Agent for Owner")
- ☒ General On-site Consulting/Engineering Services
- ☒ Other

☒ Soil Sampling	☒ Solid Waste Sampling	☐ Liquid Waste Sampling
☐ Groundwater Sampling	☐ Surface Water Sampling	☐ Wastewater Sampling
☐ Sediment Sampling	☐ Surveying	☐ Confined Space Entry

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Major Project Tasks	Inventum Task	Subcontractor Task	Minimum PPE Level Required see HASP for details (suggested levels for Subcontractor work)
1. Site Management and Oversight	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
2. Geoprobe (direct push) Soil Sampling	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
3. Test Pit Soil Sampling	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
4. Gross Contamination Sampling	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A

2. Contingency Planning

LOCAL EMERGENCY RESOURCES:	
Ambulance: 911	Emergency Room: 716.447.6100
Police: 911	Fire Department: 911
NYSDEC Contact: Ben McPherson, Project Manager, 716.851.7220	Poison Control Center: 1-800-222-1222 ☐ Specify:
Other (client services offered, etc.):	

SITE RESOURCES:			
Drinking Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Wash Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Telephone – Land Line		☐ Subcontractor	☒ Client
Telephone - Cellular	☒ Inventum	☒ Subcontractor	
First Aid Kit	☒ Inventum	☒ Subcontractor	
Fire Extinguisher	☐ Inventum	☒ Subcontractor	☒ Client
Emergency Shower **N/A**	☐ Inventum	☐ Subcontractor	☐ Client
Eye Wash **N/A**	☐ Inventum	☐ Subcontractor	☐ Client
Other: Confined space retrieval device **N/A**	☐ Inventum	☐ Subcontractor	☐ Client

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

EMERGENCY/SAFETY CONTACTS:	
Inventum Technical Contacts	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Project Manager (PM): John Black	571.217.6761
Inventum Office Safety Coordinator (OSC)	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Field Contact:	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048); Peter Zaffram (716.553.5129)
Contractor Contact (To Vary – Main Remedial Contractor provided):	Ontario Specialty Contracting; 716.856.3333
Client Contact:	Dan Flanigan (716.560.3006) John Yensan (716.856.3333)
Front Gate Guard Shack	716.783.5744

Emergency Route:

Hospitals or clinics identified for emergency medical care should be contacted, to verify that emergency care is provided at that location. Verify the exact location of the medical facility during this call. See directions and map of route to Kenmore Mercy Hospital on the following page:

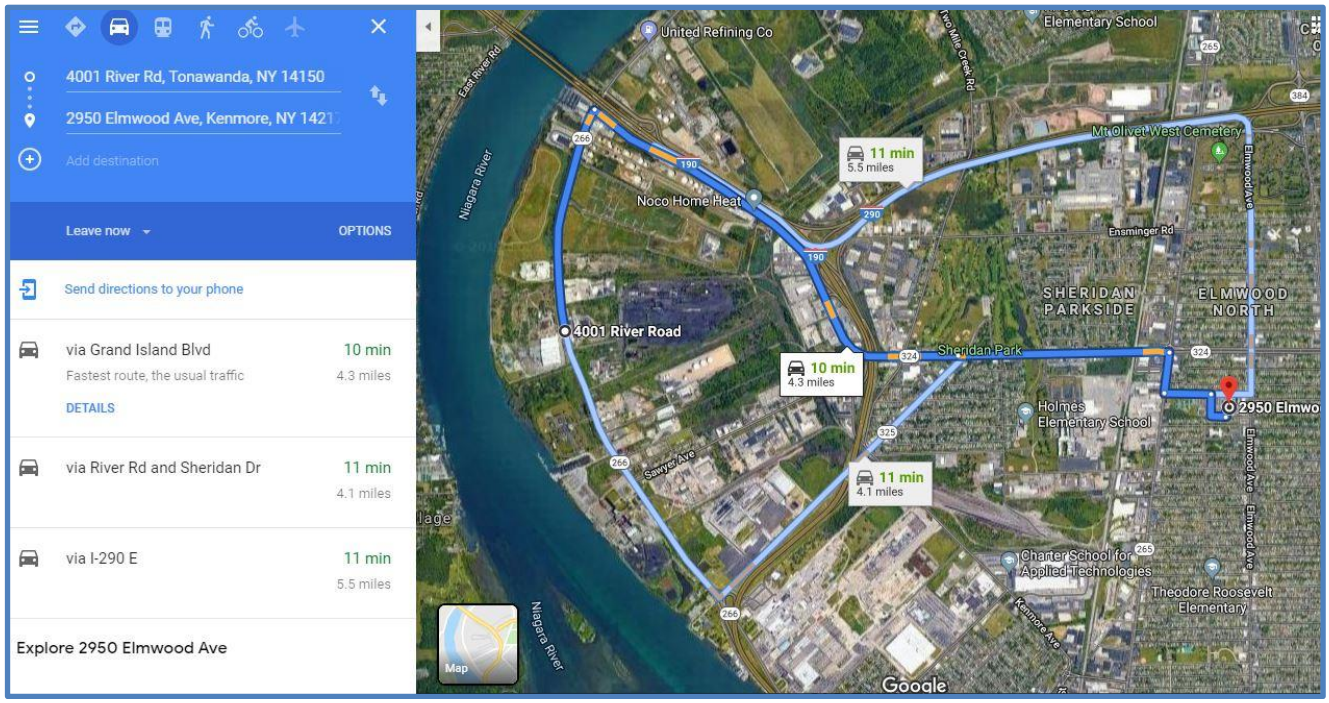
Hospital: **Kenmore Mercy Hospital**
2950 Elmwood Ave
Buffalo, NY 14127
716.447.6100

Other: NA

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Map to Hospital



Directions to Hospital:

- **Turn right onto River Road**
- **Turn right onto Grand Island Blvd (about 2 miles)**
- **Merge onto Sheridan Dr.**
- **Go about 1.5 miles and turn right onto Elmwood Avenue**
- **Make a sharp right and hospital is on left**

Emergency Procedures:

If an emergency develops at the site, the first responder should take the following course of action:

- Notify the proper emergency services for assistance.
- Notify other personnel at the site.
- As soon as possible, contact the Inventum Project Manager to inform them of the incident.
- Complete the Inventum Incident Report Form (see Appendices) within 24 hours of the incident and client notifications, as required.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Investigation of Near Miss Incident and Initial Report of Incident/Exposure:

Inventum employees are required to report any incident, near miss, or injury, as soon as possible, by contacting the following:

☒ Inventum Managing Partner ☒ Notify supervisor ☒ Notify project manager

☐ Notify Site Manager () ☐ Complete client report: as required

(name):

(phone number):

Emergency Equipment Required On Site:

☒ First Aid Kit

☐ Emergency Eye Wash

☐ Emergency Shower

☐ Fire Extinguisher

☐ Spill Control Media

☐ Tripod/Hoist/Harness for non-entry confined space rescue

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Site Classification

Identification of Potential Hazards		YES	NO	SITE TYPE[1]
1.	Is the work a Phase I ESA (i.e., supervised plant walk-through, etc.)?	☐	☒	1
2.	Is the work being performed solely by a subcontractor (i.e., INVENTUM not on site)?	☐	☒	1
3.	Is the work just a supervised inspection for process evaluation, other inspections, meetings, records review, or a tour?	☐	☒	1
4.[1]	Is the work completely absent any chemical, physical, biological, or radiological hazards which would require a site-specific health and safety plan?	☐	☒	1
5.	Does the work include any mandatory client H&S requirements?	☒	☐	1, 2, or 3
6.	Does the project include on-site work other than office type areas?	☒	☐	2 or 3
7.	Does the proposed work scope involve any of the following:			
	Known and controlled chemical or biological hazards	☒	☐	2
	Unprotected work at elevation (fall protection required)	☐	☒	2
	Invasive activities (*i.e.,* Phase II ESA, UST Removal, sampling, etc.)	☒	☐	2 or 3
	Exposure to ionizing radiation (i.e., using nuclear gauges, etc.)	☐	☒	2 or 3
	Open excavations/trenches (Competent Person may be required on site)	☒	☐	2 or 3
	Confined space entry (permit may be required)	☐	☒	2 or 3
	The use of scaffolding (qualified inspections are required)	☐	☒	2 or 3
	Heavy equipment	☒	☐	2 or 3
	Facility maintenance (O&M, piping, electrical, lockout/tagout, etc.)	☐	☒	2 or 3
	Underground utilities may be encountered	☒	☐	2 or 3
	Overhead utilities may be encountered	☒	☐	2 or 3
	Stack testing	☐	☒	2 or 3
	Geotechnical drilling (Direct Push)	☒	☐	2 or 3
	Demolition Activities with known or suspected contamination	☐	☐	2 or 3
	Unknown or uncontrolled chemical or biological hazards	☐	☒	3
	Known and uncontrolled chemical or biological hazards	☒	☐	3
	Waste sampling	☒	☐	3
	Construction activities with known or suspected contamination	☒	☐	3
	Remedial activities (RCRA, CERCLA, EnviroBlend®, Oxigent, etc.)	☐	☐	3
8.	Is the work regulated by 29 CFR 1910.120 (OSHA) or 30 CFR (MSHA)?	☒	☐	3
9.	Is the work regulated by NPL, CERCLA, RCRA, TSD, or SARA?	☐	☐	3

[1] Denotes typical site level (based on activities).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Site Type Designation:

☐ **Type 1** Known and controlled hazards associated with consulting/engineering services.

☐ **Type 2** Known and controlled hazards, but with invasive, hazardous activities and/or civil/mechanical construction related services, or sampling.

☒ **Type 3** Unknown and/or uncontrolled hazards associated with corrective action clean-up, and/or remediation of hazardous substances.

4. Site Characterization

Client Requirement(s)[1]:	☒ None	☐ Site Orientation	☐ H&S Orientation
	☐ Permits or Other Requirements (specify and attach, if available):		
Site Information:	☒ Map/Diagram (attach)	☐ Map/Diagram Unavailable	
	☐ Inactive Site	☒ Active Site (specify below)	
General Environmental Concerns:	☒ Contaminated Water	☒ Wastewater	☒ Dust
	☒ Contaminated Soil	☒ Solid Waste	☒ Noise
	☒ Contaminated Air	☒ Waterways	☒ Asbestos
Site Security/Access Control:	☐ None	☒ On Site	
	☐ Other (explain):		
Amenities Available for Work:	☐ None	☒ Waste Storage	☒ Restrooms
	☒ Tools/Equipment Storage	☒ Office/Trailer Space	☒ Supplies Storage
Utilities Available For Work:	☐ None	☒ As Listed: Water, electric	
Medical Services Available:	☐ None On Site	☒ As Listed: First aid	
Facility Alarms/Signals:	☒ None	☐ As Listed:	
Traffic/Parking/Railway Issues:	☐ None	☒ As Listed (On-Site/Off-Site): On-site parking	
☒ Permits Required (specify)[2]:	☐ Confined Space Entry	☒ Local: POTW	☐ State:
	☐ Federal:	☐ Other:	☒ N/A
☒ Utility Locate Service(s):	☒ On Site	☐ Client	☒ Other: Former Site employees contracted to client for daily site management
	☐ Off Site	☐	☒ One Call
		☐	☐ N/A

[1] If relying on the client for any specific hazard identification and control, implemented control and effectiveness should be documented prior to beginning any work activities. This is recommended for all field projects.

[2] Permit examples: Utilities (electrical, water, gas, etc.); Excavations; Explosives; Cranes; Burning; Fuel storage; Traffic control; Hoists; Cutting; Welding; Demolition; Confined space; Restricted access areas; etc.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

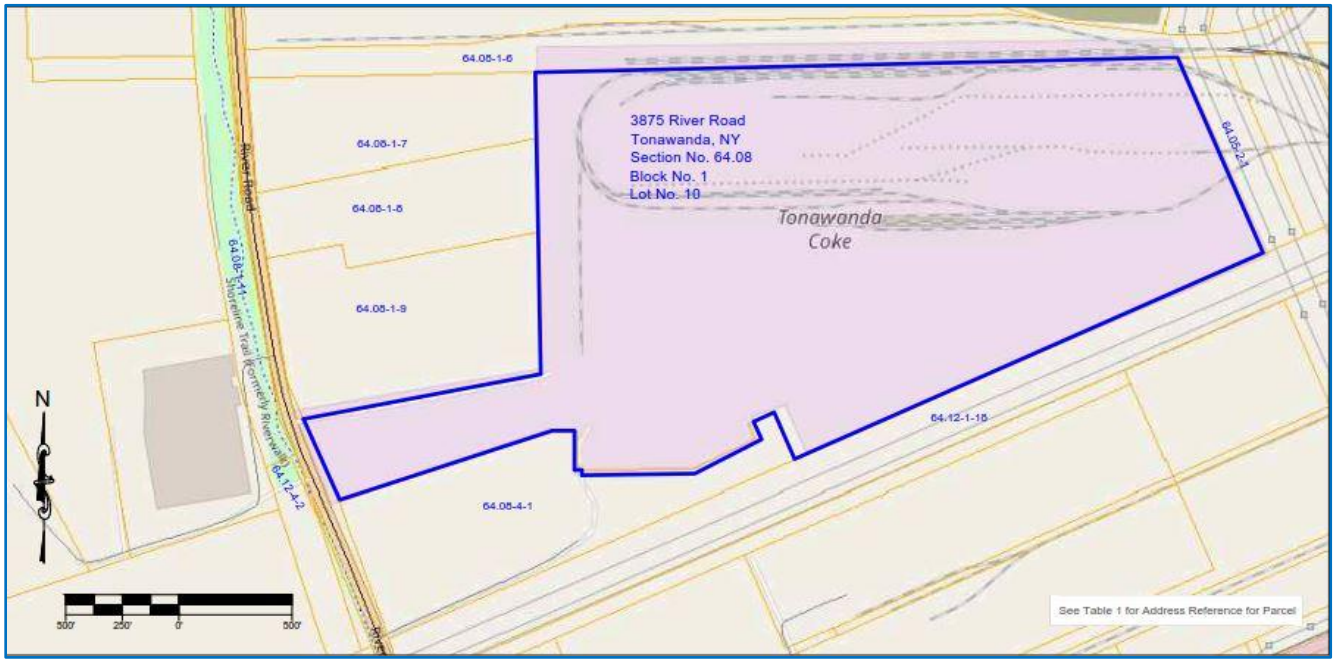
Detailed Physical Description of Site/Facility: ☒ **Map/Diagram Attached**

The Site is located at 3875 River Road, Town of Tonawanda, Erie County, New York. The BCP Site encompasses approximately 86.5 acres of land although Riverview Innovation Technology Campus, Inc (client) will control additional acreage outside the BCP program within the federal/state superfund programs. The Site is located approximately 0.25 miles west of I-90 on the east side of River Road. The surrounding properties are primarily industrial or vacant.

The former coke production facility is located in the northern center portion of the property which includes coke ovens, coke by-product plant, storage tanks, and railway line spurs. The southern portion of the property is mainly open with multiple former raw material coal and coke piles located throughout the area. The facility is no longer in operation; however, activities on site include surficial mining of remaining coal/coke storage areas and water management from secondary containment areas.

Historically, manufacturing processes used at the plant have included: by products coking, light oil distillation, ammonia recovery, and ethene, toluene, and xylene extraction. Historical investigations that were performed at the site have identified some conditions that previously required remediation.

Figure 1; Site Location



Site Activities/Current Operations: ☐ None ☒ As Specified

Other Concurrent Site Activities, Work, and/or Other Adjacent Hazards or Concerns:

☐ None

As Specified:

☐ Schools	☐ Daycare	☐ Hospital	☐ Airport
☐ Residential	☒ Offices	☐ Shopping	☒ Active parking lot in work space

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation

Complete (1) Substance Name (be specific)	Specific Applicable OSHA Standard (if any)	Physical State (2) (S, L, G, Aq, Vap, F, P)	Max. (3) Conc. Level Per Physical State	General (4) Control Measures (Eng., Admin., PPE)
Coal Tar	0.2 mg/m3	S	Coal Tar Product	Eng., PPE
Benzo(a)pyrene	0.2 mg/m3	S	4,100 ug/kg	Eng., PPE
Benzo(b)fluoranthene	N/A	S	4,600 ug/kg	Eng., PPE
Benzo(a)anthracene	N/A	S	20,000 ug/kg	Eng., PPE
Chrysene	0.2 mg/m3	S	21,000 ug/kg	Eng., PPE
Dibenz(a,h)anthracene	N/A	S	1,700 ug/kg	Eng., PPE
Indeno(1,2,3-cd)pyrene	N/A	S	15,000 ug/kg	Eng., PPE
Cyanide	N/A	L	2.75 mg/L	Eng., PPE
1,4-Dichlorobenzene	75 ppm	L	29 ug/L	Eng., PPE
Benzene	1 ppm	L	85 ug/L	Eng., PPE
Chlorobenzene	75 ppm	L	22 ug/L	Eng., PPE
Xylenes	100 ppm	L	36 ug/L	Eng., PPE
Toluene	200 ppm	L	59 ug/L	Eng., PPE
Iron	N/A	L	160 mg/L	Eng., PPE
Manganese	N/A	L	11.2 mg/L	Eng., PPE
Phenolics	5 ppm	L	0.61 mg/L	Eng., PPE
1,1,1-Trichloroethane	350 ppm	L	12.2 ug/L	Eng., PPE
Methylene chloride	25 ppm	L	52 ug/L	Eng., PPE
Selenium	0.2 mg/m3	L	0.0116 mg/L	Eng., PPE
Nickel	N/A	L	0.153 mg/L	Eng., PPE
Cadmium	0.005 mg/m3	L	0.19 mg/L	Eng., PPE
Chromium Total	1 mg/m3	L	0.086 mg/L	Eng., PPE
Lead	0.050 mg/m3	L	0.025 mg/L	Eng., PPE

(1) Use OSHA regulated name, not elemental forms. If available, attach SDS. Identify any sample preservative or O&M chemicals or subcontractor chemicals in this table also.

(2) S = Solids, L = Liquid, G = Gas, Aq = Aqueous, Vap = Vapor, F = Fume, P = Airborne Particulate.

(3) If available, attach laboratory results or summary tables.

(4) See the following sections for detailed control measures: personal protection equipment (PPE), Air Monitoring (Admin), or Site Control (Admin and Eng.).

(6) IP = Ionization Potential, VP = Vapor Pressure, LEL = Lower Explosive Limit, UEL = Upper Explosive Limit, N/A = Not Applicable, N.D. = Not Determined

(7) IDLH = Immediately Dangerous to Life and Health. NEVER enter IDLH conditions on site without proper respiratory protection.

(8) C = Ceiling Value, ST = Short-Term Exposure Limit, TWA = Time-Weighted Average, None Est. = None Established

(9) R = Respirable Limit, T = Total Limit

(10) Warning Properties: Good (G), Poor (P), None (N)

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation (continued)

Site-Specific Physical Hazards

HAZARD	SPECIFIC CONTROL MEASURE
Slip/Trip/Fall Injury	– Use roads or trails whenever possible. – Occasionally reassess route to avoid dangerous terrain. – Maintain good housekeeping and keep work area clear of loose materials and equipment. – Use portable steps to mount and dismount sampling vehicle.
Ingestion of or contact with impacted soil	– Wear safety glasses. – Wear nitrile and appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when performing tasks. – Wash hands and arms thoroughly when daily work is completed. – No eating, drinking, or smoking while conducting monitoring or sampling activities.
Pinched fingers or toes	– Where appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when the potential for hand injury exists. – Where steel-toed safety shoes with steel shanks while on site.
Strained muscles	– Use proper lifting posture, techniques, and equipment when handling heavy objects. – Use two people for loads >40 lbs. or awkward items. – Take rests as needed during and between carries.
Cutting activities	
Flying debris/eye injuries	– Wear ANSI-approved safety glasses when the potential for flying debris and eye injuries exists.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Animals (dogs, etc.)	Be aware of any animals on site or adjacent to the site. Appropriate care should be taken if any feral (wild) animals are encountered.
☐	Blasting/Explosives	INVENTUM personnel shall not handle any explosive devices or materials. INVENTUM personnel should understand the blasting procedures being used by the subcontractor, and all of the associated health & safety precautions. The subcontractor shall handle, store, and use the explosives in accordance with 29 CFR 1926.900, Subpart H and U.
☐	Boat or Barge	A boat or barge should be used that is adequately stable for the type of activity conducted. The boat or barge should have all of the appropriate and current licensing and registrations required by the applicable regulatory agencies. All applicable laws and regulations will be followed when launching the boat or barge, and when navigating to and from the work site. Personal floatation devices should always be worn while navigating the boat or barge. The boat must be equipped with the following approved United States Coast Guard (USCG) safety equipment: – A Type 1, 2, or 3 personal flotation device (PFD) for every person aboard (should be worn while navigating) The following equipment is recommended: – A Type 4 throwable PFD – Audible distress signal device (air horn, whistle) – Fire extinguisher (if engine-propelled) – Auxiliary propulsion (spare paddles, trolling motor) – Bow and stern lines – Anchor and anchor line – First aid kit – Visual distress signal device(s) (flares, dyes) – Additional PFDs Be familiar with local weather and tidal characteristics. Do not conduct sampling from a boat/barge when threatening weather is imminent, or poor visibility exists. Sampling from a boat is prohibited in water containing substances likely to cause injury upon short-term or prolonged contact. Sampling from a boat is prohibited when the temperature of the water is high or low enough to cause injury upon short-term or prolonged exposure. Avoid sampling from a boat when unsafe water turbulence (waves) exists. Avoid standing in a boat. Always use the buddy system when sampling from a boat or barge; one person should be on shore with visual contact of the barge and should be able to summon emergency assistance if needed. Be familiar with local weather and tidal characteristics. Work on a boat or barge will not be performed when threatening or severe weather is impending or present.
☒	Briars or Thistles	Be aware of any briars or thistles on site. Wear appropriate clothing and gloves. Avoid contact with briars or thistles whenever possible.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Business Traffic	Be aware of traffic patterns associated with local businesses near the work site. Allow traffic to enter and exit the businesses in such a manner to avoid creating traffic hazards, back-ups, delays, or potential accident situations.
☒	Cement and Fertilizer Dust	Stay clear of mixing operations and avoid contact with or breathing of the dust.
☐	Chain Saws	Stay clear of any chain saw operations. Subcontractor is responsible for the safe use of chain saws on site.
☒	Cleaning Agents	Use caution when applying cleaning agent to equipment. Use gloves, safety glasses, splash shields, and protective clothing as needed.
☒	Client Activities	Be aware of client activities at or adjacent to the site. Work activities should be coordinated with other site activities to avoid conflicts. Contact EDP offices prior to starting work.
☒	Cold Stress	Work schedules may be modified when temperatures are below 20° F as measured by the wind chill factor. Take frequent breaks to warm up. Drink plenty of fluids. Wear appropriate clothing, and monitor for cold stress symptoms (frostbite, hypothermia, etc.).
☒	Compressed Air or Gas Cylinders	Compressed air or gas cylinders should be clearly marked, and they should be stored, transported, and secured in an approved manner.
☒	Compressed Air/Gas or Pressurized Liquids Hoses, Lines & Fittings	Compressed air or gas, or pressurized liquid lines or hoses should be inspected at least daily, or in the event a leak develops, or if a line or hose is run over or crimped.
☐	Concrete/Masonry/ Foundations	No construction loads shall be placed on a concrete structure or portion of a concrete structure unless a person who is qualified in structural design has determined that the structure or portion of the structure is capable of supporting the loads. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement. No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position. To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets. A limited access zone shall be established whenever a masonry wall is being constructed. All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.
☐	Confined Spaces (tanks, vaults, vessels, trenches, manholes, some excavations, etc.)	The scope of this project does entail entry into confined spaces. Confined spaces will not be entered unless a confined space entry permit has been completed, signed, and approved, and all participating personnel are trained in confined space entry procedures, including safety, and rescue procedures. All potential hazards of confined space may not be addressed by this hazard assessment, and health and safety plan.
☐	Cutting Tools	Stay clear of contractors' cutting tools, especially saws and torches. Be aware that cutting operations could create other hazards, such as falling objects, or shifting materials, etc. Safety glasses should be worn while using cutting tools. Spark-proof tools should be used when working in areas of potential explosive or flammable conditions. Fixed-open blade knives are prohibited.
☐	Demolition Activities	Stay clear of walls, ceilings, roofs, etc., as they are being demolished.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Demolition Debris	Demolition material should only be handled by appropriate equipment because of sharp points, edges, etc. Demolition material may also pose a trip hazard, fall, or puncture hazard, so avoid walking or climbing on debris piles, etc.
☒	Drums	If drums are used on-site, they should be clearly labeled with the name of the contents and the appropriate label. Drums should only be handled with the appropriate equipment. Drums discovered during excavations, etc., shall not be opened or moved until appropriate identification can be performed. At a minimum, Level B protection is required for sampling any unlabeled drums discovered during remediation procedures.
☒	Dust/Particulates (Particulates Not Otherwise Regulated) (PNOR) (OSHA PEL = 15 mg./m^3, total) (OSHA PEL = 5 mg./m^3, respirable)	For general dust, work should be performed up-wind if possible. If conditions warrant it, monitoring should be done with a PM-10. Monitoring should occur at least 3 times per day, and every time re-entering the site. Readings should be taken downwind from the work area or inside the equipment as indicated by the conditions on site. If the OSHA PEL is exceeded, or is likely to be exceeded, engineering or administrative controls should be used, or a dust respirator must be worn. For hazardous dusts, a detailed air monitoring plan and a respiratory protection plan should be developed for the site activities.
☐	Elevated Work	For any construction work activities elevated 6 feet or more, or other non-construction activities elevated 4 feet or more, fall protection must be provided. Caution should be taken on catwalks and ladders because of potential slippery conditions, or the potential for footwear to catch on the surfaces.
☒	Energized Sources (electrical equipment or hookups, lines, etc.,) (Lockout/Tagout)	Contractors for all electrical activities, and any facility equipment with moving parts should follow proper lock-out/tag-out procedures, and only properly trained employees will perform the work. Employees will not perform any lock-out/tag-out activities unless personnel are properly trained in lockout/tagout procedures. Heed any caution signs or labels.
☒	Equipment Exhaust	Equipment exhaust should be ventilated away from the work area while drilling inside structures. Industrial fans can be used to move exhaust out of the area.
☒	Ergonomic Issues (job hazard analysis)	Ergonomic hazards will be addressed on a site-specific basis once mobilization to the field has occurred. Workstations will be evaluated on an individual basis.
☒	Evening Work	If work is performed during the evening hours, work shall be limited by the availability and the quality of artificial lighting. Care should also be taken to avoid slip, trip, and fall hazards that are not as easy to identify during low light conditions.
☒	Excavations	Stay clear of excavation walls. INVENTUM personnel will not enter an excavation, in accordance with 1926 Sub Part P. Subcontractor must provide a Competent Person on site, if one is required by the planned activities. Side cuts should conform to 1926 Subpart P requirements, or shoring should be used. All open excavations should be secured using traffic cones, barrier tape, or barricade signs stating "Do Not Enter Excavations", especially if left open overnight.
☐	Explosives	Be aware of potential explosive materials and how to identify them. No smoking is allowed on-site or near where potential explosive materials may be present.
☒	Facility Conveyors (product or waste lines)	Stay clear of facility conveyors, product process lines, and waste disposal lines. Be aware of any client-specific health and safety requirements to work in these areas.
☒	Facility Equipment/Machinery	Be aware of active and moving client equipment on site.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Facility Piping - aboveground	Stay clear of aboveground pipes. Client is responsible to identify all applicable aboveground facility pipes prior to any work activities in the area. Pipes can be overhead hazards, or trip hazards. Pipes can be hazardous because of the material flowing through them, such as steam, natural gas, toxic chemicals, etc. Some pipes are also coated with hazardous material such as asbestos.
☐	Facility Piping - belowground	Client is responsible to identify all applicable underground facility pipe locations prior to any subsurface activities.
☒	Fall Hazard	Proper tie-off, harnesses, railings, etc. should be used when performing work on ladders, scaffolding, man-lifts, or on the roof of buildings, etc. Stay clear of the edges of pits, trenches, quarries, etc.
☒	Falling Objects	Be aware of any potential falling objects or materials on site. Stay clear of any areas identified as potential falling object areas.
☒	Fences	Be aware of fences in disrepair that may be trip hazards or may have materials that could cause punctures or cuts. Use caution when crossing over or under fences.
☒	Field Equipment	If field equipment is heavy or awkward to carry, get assistance or use carts to help move around the site.
☒	Field Vehicle	Inventum personnel shall follow all applicable state and federal traffic laws while traveling to and from the site, and while working on the site. In particular, the following laws should be followed: speed limits, parking restrictions, use of wipers and lights during precipitation events, limiting cell phone use, etc. It is the responsibility of the driver to verify that all safety equipment on the vehicle is working properly before driving the vehicle. In particular, the following items should be checked: tire pressure, tire tread, windshield wipers, windshield washer, headlights, tail lights, brake lights, spare tire, fire extinguisher, first aid kit, etc.
☒	Fire Hazards	Eliminate sources of ignition in work areas that have ignitable materials. Provide an ABC fire extinguisher in close proximity to the support zone.
☒	Flooded Areas	Do not drive through flooded areas or standing water. Do not wade into moving water, or water deeper than 2 feet without adequate assistance.
☒	Flying Debris/ Eye Injuries	Be aware of any flying debris on site and wear protective eyewear when necessary.
☒	Fork Lifts	Be aware of forklift patterns and stay clear of those routes.
☒	Hand Tools	Use only the appropriate tool for the task at hand. Use the tool(s) as designed, described, and intended by the manufacturer.
☒	Heat Stress	The work schedule may be modified if the ambient temperature is more than 80° F. Take breaks as necessary, and drink plenty of fluids. If necessary, wear sunscreen and sunglasses on bright days. Monitor site personnel for signs of heat stress symptoms (heat rash, heat cramps, heat exhaustion, or heat stroke).
☒	Heavy Equipment	Contractor is responsible for safe operation of equipment. All mobile heavy equipment must have a functioning backup alarm, and operators must comply with equipment manufacturer's instructions. Maintain proper distance and remain in line of sight of operator and out of reach of equipment. Isolate equipment swings, if possible. Make eye contact with the equipment operator before approaching the equipment. Understand and review hand signals, and wear orange safety vest, if necessary.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Heavy Lifting	Use proper lifting procedures and equipment when handling heavy objects such as drums, manhole covers, tank covers, etc.
☒	High Pressure Gas Lines, etc.	Be aware of high-pressure gas lines and follow approved safety precautions when working with or around the lines.
☐	Highway Traffic	Traffic control within the right-of-way will be in accordance with the WDOT "Work Zone Safety – Guidelines for Construction, Maintenance, and Utility Operations" procedures. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times, and review planned activities with the WDOT, so that appropriate lane closures can be coordinated.
☒	Housekeeping	All field vehicles, job trailers, and field offices will be properly cleaned and organized to prevent cluttered work and storage areas.
☐	Hunters/Firing Range, etc.	Be aware of surrounding activities that may involve hunting, firearms, etc. that may not be in your immediate area, but could create an unsafe work environment.
☐	Ice (thin)	When project activities include either crossing ice or working directly on the ice, a detailed plan should be developed that will be used to continually evaluate the ice conditions, and to determine when work should be terminated due to unsafe conditions. All staff working on the ice will wear an appropriate and approved personal floatation device. Other emergency equipment such as ropes, a throwable floatation device, a means to warm a wet and cold worker, etc. must be available. A buddy system should also be used for this type of work, such that one person is always on shore or at least on previously determined safe ice.
☒	Insects (ticks, bees, spiders, etc.)	Site workers with known allergies to insect bites should carry their own medication. In case of emergencies, inform fellow workers of any severe allergies. Use insect repellant as necessary, and as specifically allowed on site. If possible, wear long-sleeved shirts and pants. If appropriate, check for ticks at the end of each day. Have other appropriate first aid supplies handy for bites.
☒	Stakeholders	Be aware of the potential for irate neighbors or outsiders that may interfere with work activities, or that may potentially damage equipment or on-site materials, etc.
☐	Ladders	Ladders should only be used if they are in good condition, conform to OSHA requirements, and if they will be used in an appropriate manner. Be especially cautious of slipping on ladders when the ladder or footwear is wet or dirty.
☐	Landfill Gas (Methane, CO2, Hydrogen Sulfide)	Avoid breathing gas, especially in low oxygen areas (simple asphyxiant). Potentially flammable and explosive, so keep ignition sources away from gas. Explosive conditions of LEL >5% in a work area should be ventilated as soon as possible, or the area should be evacuated.
☐	Leachate (Municipal Solid Waste (MSW))	MSW leachate may contain hazardous biological substances, so avoid physical contact with leachate and, if possible, stay up-wind. If contact is made with leachate, wash affected areas thoroughly with soap and water. If boots contact leachate, they should be thoroughly washed with soap and water also.
☒	Lead	Wear gloves when in contact with lead contaminated soil, etc. Thoroughly wash hands and arms when daily work is completed.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Long Hours/Fatigue	Long work hours can lead to fatigue, and fatigue can lead to the physical inability to perform the work in a safe manner, or travel to or from, a work site in a safe manner. If long work hours are scheduled, or if the scheduled work takes longer than planned, field staff should determine if fatigue is, or will be, an issue. Field staff should evaluate whether they are able to complete the work in a safe manner, or whether they are able to travel in a safe manner. If fatigue is an issue, appropriate breaks should be planned or taken, including overnight stays when necessary.
☒	Material Handling	Move containers and heavy material only with the proper equipment, and secure them to prevent dropping, falling, or loss of control during transport. Stay clear of material handling operations, especially near slopes. Do not stand down the slope from equipment, supplies or materials being moved above on the slope, or being deployed onto the slope.
☒	Material Storage	Stored material may be a falling hazard, or a crush hazard. Do not stand adjacent to materials stacked up, such as pipes, geosynthetic rolls, etc., or in the area of deployment.
☐	Methane Gas (Landfill Gas)	Explosive conditions (5% LEL) will be ventilated, if encountered, prior to working in an area. Methane is a simple asphyxiant.
☐	Mine or Quarry	No work shall be performed within 15 feet (or other designated client setback, whichever is greatest) of the mine or quarry walls. Be aware of the potential for falling rocks or slope failures.
☐	Municipal Solid Waste (MSW)	MSW may contain hazardous biological substances, so avoid physical contact, and if possible, stay up-wind. Wear appropriate PPE, such as gloves, safety shoes, and safety glasses. Wash hands, arms, and face after working near MSW. Reusable PPE and equipment should be thoroughly decontaminated after exposure to MSW. MSW may also contain sharp objects with the potential to puncture PPE.
☒	Natural Gas	Natural gas is flammable and explosive. Keep ignition sources away from gas sources. Use spark-proof tools when working with gas lines, etc.
☒	Noise	Hearing protection must be worn when noise levels exceed 85 dBA in the work area. If you need to raise your voice to be heard at the work site, then hearing protection should be worn. Hearing protection will be worn near drill rigs.
☒	Overhead Hazards	Pay attention to overhead equipment, piping, and structures. A hard hat must be worn at all times when overhead hazards are present on site including the operation of a drill rig.
☒	Pedestrian Traffic (public, client, workers)	Be aware of pedestrian traffic patterns and, route traffic around the exclusion zone(s), as necessary, to avoid distractions and the potential for exposures or accidents. Use appropriate barricades and caution tape to mark work areas.
☒	Poisonous Plants	Be able to identify any local poisonous plants and avoid them if possible or wear protective clothing as necessary. When removing potentially exposed clothing or PPE, the clothing or PPE should be carefully and thoroughly washed or decontaminated.
☐	Portable Heaters	Be aware of portable heater locations and stay a safe distance from them.
☐	Power Washing Equipment	Stay clear of the power washing nozzles and equipment.
☒	Propane Tanks	Be aware of propane tank locations, and any gas lines leading to or from the tanks.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Radiation (ionizing)	Exposure to ionizing radiation can be controlled by one of three methods: time, distance, or shielding. Limit your time near the radioactive source. Keep your distance from the radioactive source. Shield yourself from the radioactive source with appropriate shielding material. If the radioactive source(s) are from INVENTUM equipment, the INVENTUM employee using the equipment needs required training to use the equipment and must be monitored using a dosimeter badge.
☐	Rock Blasting	Contractor is responsible for following safe blasting protocol. Heed all contractor warnings at time of blasting and stay well clear until safe to return to area, as indicated by the contractor.
☒	Sample Preservative Chemicals:	Wear safety glasses and nitrile gloves when adding preservative chemicals to sample bottles or vials. Have clean wash water nearby.
☐	Scaffolding	Stay clear of scaffolding. Be aware of the OSHA safety requirements for using constructing and scaffolding.
☒	Severe Weather	Work may be suspended if dangerous weather conditions (lightning, tornadoes, high winds, heavy rain, freezing rain, etc.) occur. Be aware of changing weather conditions and be prepared to take shelter as necessary. Potential shelters should be identified prior to beginning work.
☒	Sharp Objects	Wear appropriate gloves when handling sharp objects or use appropriate equipment to move objects.
☒	Slippery Ground/Surfaces	Exercise caution, especially on slopes, field trailer floors and stairs, after a precipitation event. Use slip resistant boots or implement surface preparations to eliminate the slippery nature of the surface prior to accessing the area. Spill control measures and general housekeeping should be utilized to help prevent slipping on wet floors, wet pavement, and general work areas.
☒	Slips, Trips, and Falls:	Maintain clear walkways for work areas.
☒	Snakes	Be aware of the potential for snakes in the area and wear snake boots, snake chaps, gaiters, or leggings as needed.
☒	Steam Cleaning Equipment	Stay clear of the steam cleaning nozzles and equipment.
☐	Steel Erection	All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided. Employees engaged in steel erection activities on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.
☐	Steep Slopes or Banks	Pay attention to footing and walking. Stay a safe distance from unstable or extremely steep slopes. Wear appropriate footwear. Be aware of potential slope or bank failures. Heavy equipment should not be operated on or near unstable slopes or banks.
☒	Strong Nuisance Odors	Strong odors should be ventilated before entering a work area, or a respirator shall be worn as needed.
☒	Sunburn	For extended periods of time outdoors on sunny days, sunglasses, long-sleeved shirts and long pants should be worn to help prevent sunburn and eye problems. Wear sunscreen as appropriate for the project.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Surface Water	Working next to or on, bodies of water shall be done using the buddy system. Staff shall wear USCG-approved personal floatation devices when on or adjacent to bodies of water.
☒	Terrain	Uneven or steep terrain can cause hazardous conditions for walking and transporting equipment around the site. Site personnel should use caution when working on uneven surfaces, and they should avoid working down-slope from heavy equipment, or materials being moved or stored.
☒	Traffic (client, contractors, public, semi-trucks, forklifts, etc.)	Obey all posted speed limits. Park in designated areas only. Be aware of traffic patterns on site, and during access to the site. Use orange traffic cones and barrier warning tape, as needed, or if within 25 feet of the right-of-way. INVENTUM personnel must wear orange safety vests when working in or near traffic areas. Class 2 traffic vests are required with traffic speeds 25 mph or higher. Class 3 traffic vests are required with traffic speeds 50 mph or higher.
☐	Trains/Railroad Tracks	Be aware of any train activities on the site, entering or leaving the site, or immediately adjacent to the site. Do not walk between the rails or on the railroad ties. When driving, stop at all railroad crossings, even if they are unmarked, and look in both directions before proceeding across the tracks.
☒	Transporting Hazardous Materials	INVENTUM personnel who transport hazardous materials shall have the required DOT training prior to transporting materials, and will comply with all applicable DOT regulations and requirements for labeling, packaging, etc.
☐	Tree Cutting	Stay clear of tree cutting activities.
☒	Trenching	INVENTUM personnel will enter trenches in accordance with 1926 Sub Part P. Be aware that some trenching conditions may result in a confined space condition.
☒	Trip Hazards (wires, cords, hoses, debris, corn stubble, uneven surfaces, etc.)	Temporary wires, cords, hoses, etc., should be properly located, marked, and protected to help prevent tripping and disruption to work activities. Trip hazards are particularly a problem early in the morning, late in the day, or under other poor lighting conditions.
☒	Underground Storage Tanks (USTs) (Septic Tanks)	If any unknown USTs are encountered, drilling or excavations will be terminated in that location until a new scope of work, Risk Assessment and Health & Safety Plan can be developed.
☒	Uneven Surfaces	Be aware of uneven walking or driving surfaces and exercise caution when moving around the site.
☒	Utilities – Overhead (electrical, telephone, cable TV, etc.)	A subcontractor, the client, or INVENTUM will locate and identify all overhead utilities. The owner or client will be responsible for identifying all applicable overhead utilities, product lines, pipes, and aboveground tanks. A minimum clearance of 20 feet must be maintained between equipment and overhead utility lines.
☒	Utilities – Underground (electric, gas, telephone, water, storm sewer, sanitary sewer, cable TV, etc.)	A subcontractor, the client, or INVENTUM will call Digger's Hotline to locate all underground utilities. The owner or client will be responsible for marking all applicable on-site underground utilities, product lines, pipes, and tanks.
☐	Waterways	Exercise caution near, around, or in waterways. Harnesses should be worn when working in, or within 4 feet of, the waterway, especially when attempting to sample from shore or a boat or barge. All applicable laws and regulations will be followed when navigating a boat or barge to and from a work site.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Welding Tools	Stay clear of welding operations, and do not look directly at the welding process without appropriate eyewear and shield.
☐	Traffic Control	**Traffic Control**: Traffic control within the right-of-way will be in accordance with the local Public Right-of-Way Agency. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times and review planned activities with the local Public Right-of-Way Agency, so that appropriate lane closures can be coordinated.

Proposed Date(s) of Inventum Work: May 2025 through June 2025

ON-SITE PROJECT TEAM MEMBER	ON-SITE PROJECT RESPONSIBILITIES
John Black	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
Todd Waldrop	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
James Edwards	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight

Any required construction/demolition activities: ☒ No ☐ Yes If Yes, complete Section 1

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

1. Construction Tasks: work tasks to be performed by Inventum staff or Inventum subcontractors

Civil

- ☐ Sewer (utility)
- ☐ Water (utility)
- ☐ Electric (utility)
- ☐ Communications (utility)
- ☐ Siding
- ☐ Roofing
- ☐ Drywall
- ☐ Flooring
- ☐ Ceilings
- ☐ Casework
- ☐ Masonry
- ☐ Escalator
- ☐ Steel (erection)
- ☐ Pre-cast (erection)
- ☐ Concrete (erection)
- ☐ Re-bar
- ☐ Elevator
- ☐ Fireproofing
- ☐ Windows
- ☐ Landscaping
- ☐ Painting
- ☐ Insulation
- ☐ Doors
- ☐ Finish Concrete

Mechanical

- ☐ Insulation
- ☐ Millwright
- ☐ Fire Protection
- ☐ Boiler
- ☐ Industrial Ventilation
- ☐ Steel Fabrication/Erection

Other

- ☐ Electrical
- ☐ Demolition (attach a detailed "**Demolition Plan**")

- ☐ Others
- ☐ Others
- ☐ Others

Estimated Direct-Hire Inventum Employees:

Home Office: ☐ Not Applicable ☐ Specify:

Craft Labor: ☐ Not Applicable ☐ Specify:

Craft	Quantity
Craft	Quantity

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

2. Applicable Safety Standards or Regulations:

☒ Federal OSHA ☐ State OSHA ☐ Owner/Client

Specific Standards:	29 CFR 1910 (OSHA)	29 CFR 1926 (Other Regulations)
☒ Medical Services and First Aid	1910.151	1926.50
☒ Hazard Communication (HAZCOM)	1910.1200	1926.59
☐ Lead Exposure	1910.1025	1926.62
☒ HAZWOPER	1910.120	1926.65
☒ Personal Protective Equipment (PPE)	1910.132-138	1926.95-107
☒ Respiratory Protection	1910.134	1926.103
☒ Ventilation	1910.94	1926.57
☒ Noise Exposure	1910.95	1926.52
☐ Illumination	N/A	1926.56
☐ Fire Protection	1910.157	1926.24 and 150-155
☐ Sanitation	1910.141	1926.51
☐ Materials Handling (rigging, etc.)	1910.176	1926.250-251
☐ Welding/Cutting	1910.251-255	1926.350-354
☐ Lockout/Tagout	1910.147	1926.417
☐ Electrical (flexible cords, etc.)	1910.305	1926.400-449
☐ Scaffolding	1910.28-29	1926.450-454
☐ Fall Protection (elevated work)	1910.23-29, 1910.66-68	1926.104-107; 500-503
☐ Ladders/Stairways	1910.25-27	1926.1050 and 1060
☐ Cranes, Derricks, Hoists, Elevators, etc.	1910.179-181	1926.550-555
☐ Aerial Lifts	1910.66-68	1926.556
☒ Earthmoving Equipment	N/A	1926.602
☐ Powered Industrial Trucks (forklifts)	1910.178	1926.602
☒ Excavations and Trenching	N/A	1926.650-652
☐ Concrete and Masonry	N/A	1926.700-706
☐ Steel Erection	N/A	1926.750-761
☐ Demolition	N/A	1926.850-860
☒ Asbestos	1910.1001	1926.1101
☐ Confined Space Entry	1910.146	1926.21

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

☐ Commercial Diving	1910.401-441	1926.1071-1092
☒ Compressed Gases	1910.101-105	N/A
☐ Ionizing Radiation	1910.1096	1926.53
☒ Benzene	1910.1028	1926.1128
☒ Cadmium	1910.1027	1926.1127
☒ Tools - Hand and Power	N/A	1926.300-307
☐ Blasting and Using Explosives	N/A	1926.900-914

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Training Required

(* required for all "Type 3" sites; but minimum recommended)

Check "A" if training required for everyone, and check "T" if training required for specific task.

A	T	SUBJECT	REFERENCE	
			29 CFR 1910	**29 CFR 1926 or Other**
☒	☐	HAZWOPER 40 hour*	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-Site*	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher*	1910.120	1926.65
☐	☐	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR*	1910.151	1926.23,.50
☐	☒	Respiratory Protection	1910.134	1926.103
☐	☐	Confined Space ☐ Permit attached	1910.146	1926.21
☐	☐	Mine Safety (MSHA)	N/A	30 CFR 48.8
☐	☐	Lockout/Tagout ☐ Permit attached	1910.147	1926.417
☒	☐	Bloodborne Pathogens	1910.1030	N/A
☒	☐	Noise Exposure	1910.95	1926.52
☐	☒	Competent Person	N/A	1926.32,.450,.650
☐	☐	Construction Health and Safety OSHA 10-Hour	N/A	1926.21
☐	☐	Demolition	N/A	1926.850
☐	☐	Excavations ☐ Permit attached	N/A	1926.650-652
☐	☐	Electrical Work	1910.332	1926.400-.449
☐	☐	Ladders/Stairways	N/A	1926.1050-1060
☐	☐	Scaffolding	1910.28	1926.450-454
☐	☐	Fall Protection	1910.23-29; 1910.66-68	1926.104,.501
☐	☐	Commercial Diving	1910.410	1926.1071-1092
☐	☐	Hot Work ☐ Permit attached	1910.251-255	1926.350
☐	☐	Lead Awareness	1910.1025	1926.62
☐	☐	Asbestos Awareness	1910.1001	1926.1101
☐	☐	Cadmium	1910.1027	1926.1127
☐	☐	Benzene	1910.1028	1926.1128
☐	☐	Ionizing Radiation	1910.1096	1926.53; 10 CFR 19.12
☐	☐	Troxler or NITON Gauge User	1910.1096	10 CFR 19.12
☐	☐	Radiation Safety Program	1910.1096	10 CFR 20.1101
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☒	DOT Hazardous Materials Shipping	1910.1201	49 CFR 172.704

Client-specific training: ☒ Not Applicable ☐ Specify

Site-specific orientation: ☒ Not Applicable ☐ Specify

Competent person: ☒ Not Applicable ☐ Specify

Direct-hire employee training/certification: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

4. Medical Surveillance

Surveillance Required: * required for all "Type 3" sites; baseline is minimum recommended
** Specify frequency below

	29 CFR 1910	29 CFR 1926 or Other
☒ HAZWOPER Physical - Baseline*	1910.120	1926.65
☒ HAZWOPER Physical – Annual	1910.120	1926.65
☐ HAZWOPER Physical - Biennial*	1910.120	1926.65
☒ OSHA Respiratory Protection Questionnaire	1910.134	1926.103
☐ Respiratory Certification Exam	1910.134	1926.103
☒ Arsenic (urine) ** **Annual**	1910.1018	N/A
☐ Asbestos **	1910.1001	1926.1101
☒ Cadmium (blood) ****Annual**	1910.1027	1926.1127
☒ Lead/ZPP (blood) ****Annual**	1910.1025	1926.62
☒ Mercury (blood) ****Annual**	N/A	N/A
☒ PCB ****Annual**	N/A	N/A
☐ Vinyl Chloride **	1910.1017	1926.117
☐ Hepatitis B Vaccine (series) **	1910.1030	N/A
☐ Tetanus/Diphtheria	N/A	Stay Current
☐ Stress Test	N/A	Only as requested
☒ Visual Acuity Test	N/A	Only as requested
☒ Hearing Test (Audiometry)	N/A	Only as requested
☒ Pulmonary Function	N/A	Only as requested

Client-specific drug testing: ☒ Not Applicable ☐ Specify

Client-specific medical monitoring[1]: ☒ Not Applicable ☐ Specify

Site-specific medical monitoring: ☒ Not Applicable ☐ Specify

**Frequency of medical monitoring: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Personal Protective Equipment (PPE)

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work tasks:

Specific Inventum Job Task or Function	Minimum Level of Protection
Task 1 – Site Management and Oversight	☒ D
Level D: safety glasses (ANSI), safety shoes (ANSI); safety vest (ANSI)	
Task 2 - 4 – Subsurface Soil Sampling	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI), nitrile gloves,	

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Criteria for changing protection levels are as follows:

EVACUATION[2] or PROTECTION LEVEL CHANGE[3] CRITERIA	APPROVALS REQUIRED [1] OSC
Site Evacuation Plan: ☒ Not Applicable ☐ Specify or Attach Plan:	
Change to Level D when: ☐ Not Applicable ☒	☒N/A All site work in Level D
Change to Level C when: ☒ Not Applicable ☐ dust levels exceed 2.5 mg/m^3 in the breathing zone continuously for 5 minutes.	☒ No work will be conducted in Level C. Site work will stop, controls reevaluated, and HASP updated as necessary
Change to Level B when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level B.
Change to Level A when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level A. ☒

[1] OSC: Office Safety Coordinator

[2] General Recommendations: Evacuate the area when LEL readings are >10% LEL in the atmosphere, or when PID readings are greater than the PEL in the breathing zone.

[3] General Recommendation: To Level C when PID readings are greater than the PEL in the breathing zone. To Level B or A only after detailed evaluation and planning.

Note: Changes to the level of protection shall be made only after the required approvals are obtained. All changes shall be recorded in the field log and reported to the Project Manager as soon as possible. Inventum's goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures, before PPE is required or considered.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

6. Air Monitoring [(1)]

The following monitoring instruments shall be used on site to measure airborne contaminant concentrations in either the breathing zone, or as part of the overall site **Air Monitoring Plan** (attach detailed plan):

MONITORING EQUIPMENT	LOCATION OF MONITORING	FREQUENCY OF MONITORING	ACTION LEVELS
☐ Combustible Gas Indicator	☐ N/A ☐ Monitoring Plan Attached ☐ Confined Space ☐ Manhole	☐ Continuously when potential combustible gases or lack of oxygen are suspected. ☐ Specify	5-10% LEL: continue with caution > 10 % LEL: evacuate the area ☐ Specify
☐ O2 Monitor ☐ CO Monitor ☐ H_2S Monitor	☐ N/A ☐ Confined Space ☐ Manhole – monitor oxygen, carbon monoxide, hydrogen sulfide , and lower explosive limit	☐ Continuously when excess oxygen (>22.5%) or lack of oxygen (<19.5%) are suspected. ☐ Test atmosphere prior to entry and continuous during confined space entry.	< 19.5% Oxygen: evacuate the area; supplied air may be needed. > 22.5% Oxygen: evacuate the area; potential fire hazard. ☐ Specify
☐ Colorimetric Tubes Type: Type: Type:	☐ N/A ☐ Specify ☐ Sample Container ☐ Confined Space ☐ Specify	☐ Periodically during sampling for analytical purposes only. ☐ Whenever noticeable odor is present. ☐ Specify	☐ Specify
☒ PID Lamp Needed: ☐ 9.8 eV ☒ 10.6 eV ☐ 11.7 eV Calibration Gas: Isobutylene Correction Factor:	☒ Personal Monitoring ☒ Sample Container ☐ Confined Space ☐ Specify	☒ Periodically during sampling for analytical purposes only. ☒ Continuously within the employee breathing zone. ☐ Specify ☐ Specify	☒ None. ☒ >5 ppm above background in breathing zone for 5+ min. Stop work and reevaluate potential sources and controls.
☐ FID	☐ N/A ☐ Specify	☐ Specify	☐ Specify
☒ Personal Dust Monitor	☐ N/A ☒ Personal Monitoring in Breathing Zone (Task 2 - 5 only)	☒ Continuously within the employee breathing zone	☒ >2.5 mg/m3 at work perimeter for 15 min sustained. Stop work and apply dust controls

☒Other: Perimeter Monitoring	☒ Perimeter Air Monitoring in accordance with the CAMP	☐ Specify	☐ Specify
☐Laboratory Supported ☐Personal ☐Area ☒Perimeter	☐ N/A ☐ Specify Employee breathing zone	☐ Specify continuous	☒ When visible dust is present apply dust control measures (water spray) until abated.

(1) Whenever air monitoring is required to be performed, a detailed **Air-Monitoring Plan** should be developed and attached to the HASP. The plan should include **Monitoring Locations, Frequency of Readings**, and any **Action Levels** being used to control the work site.

Air Monitoring Plan

Field monitoring of dust production is anticipated only during subsurface soil sampling (Task 2-4). A visual assessment of dust levels will be used continuously during the work along with personal employee monitoring and perimeter air monitoring in accordance with an approved CAMP.

Dust production during monitoring well abandoned, monitoring well installation, and surficial soil sampling is not anticipated due to the typical moisture content of the soil.

This level of nuisance dust is visually observable. If dust is observable continuously in the breathing zone for 5 minutes, dust control methods will be used (*e.g.*, water spray will be applied) until dust is abated. Work will be temporarily discontinued until dust is reduced to acceptable levels within the breathing zone. Should particulate levels above the action level be a continual problem, relevant field personnel will reassess the situation with the project manager.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

7. Site Controls and Work Zones (describe in detail)

Facility Alarms or Signals: ☒ Not Applicable ☐ Specify

Work Permits Required: ☒ Not Applicable ☐ Specify

Work Traffic Issues: ☒ Not Applicable ☐ Specify

Parking Issues: ☒ Not Applicable ☐ Specify

Railway Traffic Issues: ☒ Not Applicable ☐

Support Zone(s):

☒ Field vehicle ☒ Job Trailer On Site ☐ Other:

Contamination Reduction Zone(s):

☒ Field vehicle ☐ Facility restroom/utility room ☐ Other:

Exclusion Zone(s):

☒ Area immediately surrounding work area ☐ Other:

Site Entry Procedures:

☒ **Notify Site Safety Contact Representative.**

☒ **Read HASP Plan and sign Acknowledgment Statement.**

☒ **Check in with the facility contact person.** ☒ **Check in with owners full time site representatives.**

☒ **Check in with facility security guard.** ☒ **All visitors must check in and sign visitor logbook in guard house.**

☒ **Wear proper personal protective equipment.**

☐ Attend facility orientation. ☐

☒ **Conduct daily safety meeting (document).**

☐ Other: Confined space – do not enter the confined space if LEL >10%, oxygen <21% or >23.5%, carbon monoxide >35 ppm, or hydrogen sulfide >7 ppm. Exit the confined space if the atmospheric conditions become hazards as noted.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Decontamination Procedures:

Personnel: (specify)	Work will be performed in Level D or Modified Level D, and minimal contamination is expected. Follow standard decontamination procedures, and good personal hygiene. Disposable PPE should be removed, contained, and disposed in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Site workers should plan and stage for wash water and soap at the site, prior to beginning the work. Site workers should wash hands and any exposed skin extremely well with soap and water, prior to leaving the contamination reduction zone, eating, drinking, driving, or leaving the site. Any soiled or contaminated clothing should be removed and handled appropriately, by either washing as soon as possible, or if necessary, disposing. Soiled or contaminated clothing should be carefully bagged prior to disposal or washing, to reduce potential exposure.
Equipment: (specify)	Site workers should plan and stage for the appropriate decontamination method at the site prior to beginning the work. Any contaminated single-use disposable equipment or PPE should be appropriately containerized and disposed as soon as possible in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Contaminated equipment or PPE that will be re-used should be handled and cleaned while wearing the appropriate PPE. Typically, equipment is decontaminated using Alconox soap and deionized water.

Disposal of Investigation-derived Material:

☒ Leave on site for disposal. Location TBD ☐ Other:

Work Limitations (time of day, buddy system, etc.):

☒ Buddy system required for some tasks.

☒ Work will be performed during daylight hours only.

☐ Work will be performed using artificial light.

Describe or attach a lighting plan: A lighting plan is attached.

☒ No eating, drinking, or smoking in contamination reduction zone(s) or exclusion zone(s).

☒ When temperatures are either above 80°F or below 20°F, work schedules may be modified.

☒ Other site-specific limitations: Do not enter battery building. Do not enter any former process buildings unaccompanied.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Radiation Safety:

- ☒ Radiation information is not applicable to this project.
- ☐ Notify RSO.
- ☐ Wear dosimeter badge when handling gauge.
- ☐ Post applicable radiation signs and documents.
- ☐ Post emergency numbers.
- ☐ Provide at least two lock systems for overnight storage.
- ☐ Maintain storage at least 15 feet from full-time workstations.
- ☐ Block, brace, and securely lock the gauge during "all" transportation.
- ☐ Limit "public" exposure to gauge while in use.
- ☐ Provide sketch of gauge storage to RSO.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Acknowledgment Statement:

As an employee of Inventum, I have reviewed the Hazard Assessment (HA)/Health & Safety Plan (HASP). I hereby acknowledge that I have received the **required level of training and medical surveillance as necessary**, that I am knowledgeable about the contents of this site-specific RA/HSP, and that I will use personal protective equipment (PPE) and follow procedures specified in the HASP.

Signatures of Inventum Site Personnel:

	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Location/Project Name:		**Date:**	
Observer Name:			
Observee Name:		**Time:**	

Task Observed

Description of Task Observed and Background Information

Positive Comments

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

At-Risk Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

At-Risk Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (PM/Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

PERSONAL PROTECTIVE EQUIPMENT	Safe	At-Risk	Comments
1. Hearing Protection (e.g., Ear Plugs)			
2. Head Protection (e.g., Hard Hat)			
3. ANSI Rated Eye Protection (e.g., Safety Glasses)			
4. Hand Protection (e.g., Kevlar Gloves)			
5. Foot Protection (e.g., Safety Shoes)			
6. Respiratory Protection			
7. Fall Protection Inspected (e.g., Harness)			
8. ANSI Rated Reflective Vest/High Visibility Clothing			
9. Other (Specify)			
BODY USE AND POSITIONING	**Safe**	**At-Risk**	**Comments**
10. Correct Body Use and Positioning When Lifting/Pushing/Pulling			
11. Pinch Points/Moving Equipment - Hands/Body Clear			
12. Mounts/Dismounts Using 3-Points of Contact			
13. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

WORK ENVIRONMENT	Safe	At-Risk	Comments
14. Work/Walk Surface Free of Obstructions (e.g., Tripping Hazards)			
15. Housekeeping/Storage			
16. Defined and Secured (e.g., warning devices, barricades, cones, flags)			
17. Suspended Load, Swing Radius & Lift Area is Barricaded			
18. Safety Shutdown Devices			
19. Proper Storage & Labeling /Disposal of Sample & Waste Materials			
20. Cylinders Stored Upright, Secured, & Caps in Place			
21. Manhole/vault Inspected for Hazards			
22. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

OPERATING PROCEDURES	Safe	At-Risk	Comments
23. Job Planning (HASP reviewed, JSAs, etc.)			
24. Fire Extinguishers Accessible and Inspections Current			
25. Work Permit/Authorization to Work (Hot, Cold, LOTO, Confined Space)			
26. JSA Reviewed & Followed			
27. Hazard Assessment - Hazard Hunt			
28. Interfaces with Other Functions (awareness with other personnel on site)			
29. Operators Looking Behind Prior to Backing Up			
30. Operators Wearing Seat Belts While Operating Equipment			
31. Subsurface Structures Identified			
32. Proper Trench Protective Equipment in Place			
33. Adequate Egress Is Available for Excavation & Trench (within 25 ft. if depth is <4 ft.)			
34. All Materials Set Back at Least 2 Feet From Edge of Trench/Excavation			
35. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

TOOLS/EQUIPMENT	Safe	At-Risk	Comments
36. Hand Tools (Proper Equipment Selection, Condition, and Use)			
37. Power Tools (Proper Equipment Selection, Condition, and Use)			
38. Equipment, Including Heavy (Proper Equipment Selection, Condition, and Use)			
39. Hoses Inspected			
40. Required Monitoring Equipment Calibrated & Used			
41. Ladders Set up Correctly & Inspected			
42. Right Tools for the Job are Available and in Good Condition - No Fixed Open Blade Knives (FOBKs)			
43. Other (Specify)			
Total #	0	0	

Daily Hazard Review Topic and Sign-In:

Daily Review Topic	Date

Acknowledgment Statement:

As an affected employee of Inventum Engineering, I hereby acknowledge that I have reviewed the contents of this site-specific HSP and the **daily safety meeting topic**, and that I will use the applicable personal protective equipment (PPE) and follow the procedures specified in the HASP.

Signatures of all onsite Inventum Personnel, including Direct-Hires (Required):

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Attachment 8 - DMM-5 NYSDEC Policy

DMM-5 / Management of Soils Contaminated with Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)	
New York State Department of Environmental Conservation **DEC Program Policy**	
Issuing Authority: David Vitale 	**Title:** Acting Deputy Commissioner, Office of Remediation and Materials Management
Date Issued: 10/27/2023	**Latest Date Revised: NEW POLICY**

I. Summary:

This policy explains the process and requirements for obtaining a variance under 6 NYCRR 380-3.5 for the management of processed and concentrated naturally occurring radioactive material, also commonly referred to as technologically enhanced naturally occurring radioactive material (TENORM). Additionally, this policy identifies the process and criteria to be used to evaluate TENORM and provides guidelines to Department of Environmental Conservation ("Department") program staff, and property owners, project sponsors, and the public who may be seeking variances, on how to appropriately handle TENORM encountered during construction or earthwork projects, such as clearing, grading, excavation, filling, demolition, or stockpiling. This policy also applies to any project site where the intrusive work conducted has or will likely disturb identified or suspected TENORM. This policy does not apply to activities that disturb naturally occurring radioactive materials.

Part 380 applies to any person who disposes of or releases TENORM. This policy is applicable where a variance application has been submitted pursuant to 6 NYCRR 380-3.5 for on-site management of TENORM fill that was generated, disposed of, or released prior to the implementation of 6 NYCRR Part 380, which was March 24, 1994, and which has been excavated for a project. Once TENORM has been excavated, it is considered radioactive material and may be subject to DEC's regulatory authority as noted in 6 NYCRR 380-1.2(e) and as defined in 6 NYCRR 380-2.1(a)(20). Placing the TENORM back into the area in which it was excavated constitutes deposition or injection into the environment and thus disposal. This policy provides guidance on the variance application that may be submitted pursuant to 6 NYCRR 380-3.5 to allow on-site management of excavated TENORM.

Implementation

This policy is to be implemented at any site, location, or work area where anthropogenic (i.e., "man- made" or "man-modified") material or fill (frequently observed to be "slag") has been noted or discovered and is suspected or known to have a potential or definitive TENORM characteristic, (see definition below).

Definitions

As Low As Reasonably Achievable (ALARA) – Means every reasonable effort is made to maintain exposures to radiation as far below the dose limits (or for purposes of this Policy concentration values) in Part 380 as is practical consistent, with the purpose for which the action is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of radioactive materials in the public interest.

Area of Contamination (AOC) – Means a discrete area of generally dispersed contamination.

Excavation – Means any man-made cut, cavity, trench, or depression in the earth surface formed by the removal of soil and rock, or any activity that causes or contributes to the creation of any such cut, cavity, trench, or depression.

Disposal – Means the act of discarding regulated radioactive material. Depositing or injecting radioactive material in the environment is disposal unless the radioactive material is being used in the environment, as authorized by a permit issued under 6 NYCRR 380-3.1.

TENORM Fill – Means slag or other material containing TENORM used as fill, without regard to its radiological content, placed on its present site before March 24, 1994, when 6 NYCRR Part 380 became effective. Such historically placed fill is not a regulated waste if it remains as it was placed at that time.

Licensed Decontamination & Decommissioning (D&D) Contractor – Means a person or company who possesses a radioactive materials license that authorizes them to perform decontamination and decommissioning of radiologically contaminated sites. D&D Contractors must possess a license issued by the New York State Department of Health (DOH). Companies licensed by the US Nuclear Regulatory Commission (NRC), or another state may work under reciprocity with the DOH.

Naturally-Occurring Radioactive Material (NORM) –Means any of the primordial radionuclides (those present since the formation of the earth – Uranium, Thorium, Potassium) or radioactive elements as they occur in nature, and their radioactive decay products, such as radium and radon, that are not concentrated as a result of human activity. (*Note*: NORM produced through interaction of cosmic rays with certain gasses in the upper atmosphere (cosmogenic NORM) such as tritium or carbon-14 are not addressed in this policy.)

Person – Means:

(i) any individual; public, private, or government corporation; joint stock company; industry; partnership; co-partnership; firm; association; trust; estate; public or private institution; agency, department, or bureau of the State, or group, political subdivision of the State, any other State or political subdivision thereof; Federal government agencies other than the U.S. Nuclear Regulatory Commission or Department of Energy; any foreign government or nation or any political subdivision of any such government or nation; and

(ii) any legal subsidiary, successor, representative, agent, or agency of the foregoing, or any other legal entity whatsoever.

Slag – Means a waste product from the pyrometallurgical processing of various ore, both ferrous (e.g., steel and blast furnace Fe) and non-ferrous (e.g., P, Ag, Cu, Ni, Pb, Sn, Zn).

Technologically-enhanced naturally occurring radioactive material (TENORM) – Means naturally occurring radioactive material whose radionuclide concentrations are increased by or as a result of past or present human practices, such as manufacturing or water processing.

TENORM (Background-comparable) – Means TENORM fill that has been disturbed by excavation or other methods and is below 5 pCi/g of radium-226.

TENORM Waste – Means TENORM fill that has been disturbed by excavation or other methods and exceeds 15 pCi/g of radium-226.

TENORM Disposal Plan – Means a TENORM disposal plan must cover management and disposal of TENORM waste (>15 pCi/g of Ra-226) generated for disposal to ensure handling in a manner adequate to protect human health and the environment until such time as it is shipped for disposal.

TENORM Management Plan – Means a plan to appropriately manage in an AOC and/or dispose of TENORM fill containing a concentration of radium-226 between 5 pCi/g and 15pCi/g that must be submitted with an application for a variance to be approved by the Department. (*Note*: for TENORM (Background-comparable), the procedure(s) utilized in determining compliance with the <5 pCi/g criteria will constitute a “Management Plan” for purposes of meeting the management requirements in Section IV.B. of this policy.)

II. Policy

The Department will allow excavated TENORM to be returned to the excavation area on a project site if the concentration of radium-226 meets certain thresholds (discussed throughout) and the TENORM is handled in accordance with this policy and pursuant to a variance issued under 6 NYCRR 380-3.5. The Department’s position is that handling excavated TENORM in accordance with this policy and a Department-approved TENORM Management Plan will have no significant adverse impact on public health and safety, and the environment. (*Note*: A variance application to allow excavated TENORM below 15 pCi/g of Ra-226 to be returned to the area of excavation on a project site does not need to include the demonstrations required under 6 NYCRR 380-3.5(b)(4) and (5).) This policy utilizes the EPA Uranium Mill Tailings Radiation Control Act standards of 5 and 15 pCi/g of Ra-226, but conservatively applies them only to the excavated TENORM.

Purpose and Background

The purpose of this policy is to address intrusive work on sites containing TENORM fill. A number of industrial processes generated byproducts that contained processed and concentrated NORM, also known as TENORM. Slag and other TENORM-containing byproducts from ore refining were used as backfill beneath roadways and other construction projects. This was done due to their low cost and beneficial physical properties, but without consideration of their inherent radioactivity.

This policy applies to sites containing TENORM that was placed on its present site before March 24, 1994, when 6 NYCRR Part 380 was updated to address the radiological content of TENORM. Since that time, this type of waste is not allowed to be used as fill or disposed of at any site unless the site has regulatory approval to accept it. As of the effective date of this policy, there are no sites approved for the disposal of newly generated TENORM waste in New York. Therefore, such waste must be disposed of in an authorized disposal facility.

When the presence of TENORM at sites first came to light, the New York State Department of Health commissioned a group of outside experts to assess the potential public health risks of the sites. These experts determined that the sites did not pose significant public health or environmental concerns if the TENORM is left in place. If TENORM is disturbed, it must be appropriately handled and the potential impacts to public health and the environment must be taken into consideration.

III. Responsibility

Responsibility for the interpretation and implementation of this policy resides with the Department's assigned Environmental Radiation Specialist (ERS) in coordination with any Department project manager (or other involved Department staff), to ensure that an adequate radiological screening is performed. Additional consultation may occur as determined to be necessary with the Department's Radioactive Materials Management Section (RMMS) staff, in the Bureau of Hazardous Waste and Radiation Management in the Division of Materials Management.

Responsibility for updating of this policy resides with the RMMS in consultation with regional management and staff (e.g., ERS) responsible for implementation of this policy.

IV. Procedure

The first step is to verify whether anything exhibiting elevated radioactivity is present in the materials being handled. This includes a preliminary screening radiation survey to determine if TENORM is present. Prior to conducting the survey, a survey plan must be developed and submitted for Department approval.

Second, if the survey results demonstrate that TENORM is present, then a proper TENORM management plan must be developed and submitted for Department approval. The third step is the TENORM must be managed in accordance with the approved TENORM management plan and if necessary, a variance. Further details of each step are provided below.

A. Radiological Screening

6 NYCRR 380-1.5(c)(1) requires that a variance application include a description of the waste containing radioactive material to be disposed of, including the physical and chemical properties relevant to the risk evaluation. Radiological screening, as described below, may be used to satisfy this requirement.

At sites known or reasonably suspected of being contaminated with TENORM where any development activity or other ground-disturbing activity or excavation is planned, a licensed D&D contractor must be utilized to perform an initial radiological screening survey (the "survey") to identify the presence and concentration of radium-226, as described in Attachment A. If appropriate, the survey may be submitted with the necessary proposed TENORM Management Plan (see Section VI.C. of this policy). For sites where TENORM was not initially known or suspected, but during work the presence of slag fill or other indicators raise a concern for the possible presence of TENORM, a health physics technician or appropriately trained person (as approved by the Department) may perform a preliminary radiological screening survey. Project sponsors must submit a draft of the survey plan to the Department in advance to ensure that the survey will meet the Department's data needs. The Department will review and approve the survey plan prior to implementation.

After the survey plan is approved and an initial survey is conducted, the project sponsor, site owner, or other appropriate person must submit the initial survey results to the assigned ERS (and DEC project manager for sites in a DEC remedial program) for review. The initial radiological screening survey results will assist the ERS in determining the necessity, and scope, of a TENORM Management Plan. Additionally, the initial radiological screening survey results provide the description of the waste containing radioactive material, which includes the physical and chemical properties relevant to risk evaluation, that is a requirement for a variance application under 6 NYCRR 380-3.5(c)(1).

If any radiological screening survey conducted indicates the presence of radium-226 or other NORM isotopes, in potentially elevated concentrations, the site will be deemed to contain potential TENORM. If any material is determined to be TENORM, it must be handled in accordance with the management requirements in Section IV.B of this policy.

B. Management Requirements

This policy utilizes the EPA Uranium Mill Tailings Radiation Control Act standards of 5 and 15 pCi/g of Ra- 226, but conservatively applies them only to the management of the excavated TENORM. This standard is widely used as a remedial goal at sites across the country, and in New York, which contain Ra-226 contamination. The original purpose of these values was to minimize the radiation dose received via radon emanation from Ra-226 and, as such, represents a comparable risk and exposure scenario. The following are the management requirements for the different types of TENORM that could be discovered on a particular site:

> **TENORM (Background-comparable)** (below 5 pCi/g of radium-226) – the Department may either grant a variance to allow the excavated TENORM (Background-comparable) to be returned to the excavation/AOC, or the assigned ERS determines, and approves, that the proposed use and handling in the AOC is acceptable. The Department will also require that appropriate and approved institutional control(s) be put in place (e.g., deed restriction, environmental easement) for each AOC.

TENORM fill (between 5 pCi/g and 15 pCi/g of radium-226) – the Department may grant a variance to allow excavated TENORM fill to be returned to the excavation/AOC if the following conditions are met:

1) the site where the TENORM fill is found contains undisturbed TENORM fill;

2) all excavated TENORM fill is handled in conformance with the submitted and approved TENORM Management plan;

3) an appropriate and approved institutional control(s) is put in place (e.g., deed restriction, environmental easement) for each AOC; and

4) the TENORM fill does not exceed 15 pCi/g of radium-226.

TENORM Waste (above 15 pCi/g of radium-226) – TENORM waste is considered a regulated waste per 6 NYCRR Part 380 and must be disposed of in accordance with appropriate regulatory requirements at an authorized disposal facility.

C. Management Plan Requirements for TENORM fill

Once TENORM fill has been identified on a property where it is being or will be disturbed, a TENORM Management Plan must be submitted to the Department for approval. As discussed previously, the radiological screening survey plan can be incorporated into the TENORM Management Plan. The TENORM Management Plan describes the proposed manner and conditions of waste disposal and the procedures to ensure that doses are maintained ALARA, which are both requirements for a variance application under 6 NYCRR 380-3.5(c)(1), (4). The TENORM Management Plan must demonstrate the following:

1) the site is conducive to the implementation of long-term site controls;

2) a well-defined and documented consolidation location within the AOC (if proposed) will be established;

3) a minimum of two feet of acceptable soil cover material or the equivalent of paving with asphalt or concrete will be placed over the consolidation area;

4) whether substantial TENORM will remain on the site at the completion of any site work;

5) the size of the consolidation area will be based on the known extent of area containing undisturbed TENORM remaining on-site; and will be determined and approved on a case-by- case basis by the Department; and

6) that it is implemented in a manner consistent with the ALARA

concept. For more details on the TENORM Management Plan, see

Attachment B of this policy.

D. Variance Application Requirements

For TENORM to remain onsite per a proposed management plan, an application for a variance must be submitted and approved. The application must comply with the requirements of 6 NYCRR 380-3.5.

However, as previously indicated, the application does not need to include the demonstrations required under 6 NYCRR 380-3.5(b)(4) and (5).

To meet the requirements of 6 NYCRR 380-3.5, the application for a variance for TENORM fill must include the following:

1) an explanation as to why the applicant believes the property contains TENORM;

2) the initial radiological survey results showing the concentration of radium-226 and other NORM isotopes found in the TENORM;

3) a TENORM Management Plan;

4) institutional controls as previously discussed, as determined by the Department to be necessary; and

5) any additional information deemed necessary by the Department.

The application for a variance will be reviewed by the assigned ERS, with recommendations made to appropriate Department management and programmatic areas for determination of approval or rejection (preference is for determination to be made in a regionalized program office, whenever possible).

Any denial of a variance application may result in the applicant or responsible person being required to take further action, including, but not limited to, additional characterization, site definition, and potentially removal and disposal off site of the material in question. Additionally, when a variance application is denied, the Department will issue a notice of denial and the applicant may request a hearing in accordance with the procedures in 6 NYCRR Part 621 as a variance from Part 380 qualifies as a permit.

Additional Requirements and Recommendations

This policy does not address the transportation of TENORM or other radioactive materials.

Regardless of the concentration of radium-226 and other NORM isotopes determined to exist at a site, any new structures built at said location are recommended to utilize radon resistant construction.

V. Related References

49 CFR Part 173 Subpart I Class 7 Radioactive

Materials 10 NYCRR Part 16 Ionizing Radiation

6 NYCRR Part 380 Prevention and Control of Environmental Pollution by Radioactive

Materials 6 NYCRR Part 381 Transporters of Low-Level Radioactive Material

17 NYCRR Part 154 Special Hauling Permits

Attachment A Radiological

Screening Survey Criteria

If a radiological screening survey is needed to verify the presence of TENORM, the following process must be followed:

1) Establish an appropriate background(s) representative for the area(s) to be surveyed, as approved by the Department. It is intended for the background area to be distinct from the area of contamination (AOC), yet representative of background conditions in the vicinity of the AOC. Natural radiological background is preferred, however, in some instances, such as urban areas, background representative of non-natural conditions not impacted by TENORM may be acceptable.

2) At a minimum, survey the portion of the site to be disturbed.

3) If survey readings exceed 1.5 x background, collect a minimum of three representative composite samples of the TENORM (to be analyzed by a DOH Environmental Laboratory Approval Program (ELAP) certified laboratory) including from the area of highest survey readings. Perform fixed one-minute meter readings at each sampling location prior to collection of a sample.

   a) In consultation with the assigned ERS, develop a correlation between meter readings and soil concentrations to guide future survey efforts. Where feasible, the use of a meter reading-to-concentration correlation (backed-up by limited sample analyses) can reduce costs and time delays during site characterization and waste monitoring rather than relying solely on analytical results.

   b) As long as survey results indicate radium-226 levels below 5 pCi/g, no separation of soil and TENORM is required.

4) If no readings in excess of 1.5 times background are noted, no further monitoring during excavation activities is necessary, except as noted below.

   a) In most cases, no other radiological monitoring will be required.

   b) However, certain factors may necessitate limited additional monitoring of excavated materials. Those factors can include:

      i) Whether there are known areas of TENORM in the region or on nearby properties;

      ii) Whether there is evidence that slag is present on-site and if so whether it contains TENORM; or

      ii) If major changes in types of TENORM encountered occur during excavation.

   c) If Department staff or a site consultant see possible TENORM at or from a depth greater than was evaluated by the original survey, it is strongly recommended that a plan to perform limited radiological screening of excavated materials be developed. The goal is to ensure that contaminated materials are

not inadvertently redistributed on the site or moved off site. If such a circumstance arises, ERS staff will work with the consultant to establish an appropriate limited screening plan.

Attachment B

TENORM Management Plan

The TENORM Management Plan must include the following:

1) TENORM Sorting Process:

a) Unless an alternate plan is approved by the Department as part of previously discussed process regarding granting a Part 380 variance, material removed from the excavation area must be sorted as part of the excavation process and placed into stockpiles using average soil concentrations, based upon waste management needs. Stockpiles should be managed to minimize erosion and the generation of dust.

b) These stockpiles may include:

i) A pile for TENORM (Background-comparable) clearly below 5 pCi/g of radium- 226

ii) A pile for TENORM Waste clearly exceeding 15 pCi/g of radium- 226 for off-site disposal.

iii) An optional intermediate pile for TENORM fill that cannot readily be identified during excavation as fitting into one of the above categories based on meter readings alone. (below 5 pCi/g or above 15pCi/g for Ra-226.)

1) If an intermediate concentration pile is proposed by the TENORM Management Plan, the TENORM Management Plan must describe how the fate of this TENORM fill will be resolved, or

2) If an intermediate concentration pile is not proposed by the TENORM Management Plan, all TENORM fill exceeding 5 pCi/g of radium-226 must be placed in the pile for off-site disposal.

c) If a correlation between meter readings and soil concentrations to guide future survey efforts has not already been completed and approved by the assigned Department ERS, it must be included as part of this TENORM Management Plan.

2) Survey Process for Soil/TENORM Sorting

a) In larger excavations, the preferred method is to excavate in six-inch (6”) lifts and perform walkover surveys using the established meter reading-to-concentration correlation to separate out contaminated material. If site characteristics or other restrictions do not allow for this, surveying bucket by bucket, visual screening, or another process may be submitted for consideration as part of the TENORM Management Plan.

b) In tight areas such as trenches where normal surveying is impractical or dangerous, bucket loads of excavated material should be surveyed as they are removed from the excavation. Due to the change in geometry from a flat plane to a bucket of soil, a separate meter reading-to-concentration ratio would be required

for this survey option. Alternatives to surveying buckets of excavated material during excavation may be submitted to the Department for consideration as part of the TENORM Management Plan.

3) TENORM Management

The following contains information on the management requirements for the different types of TENORM:

a) TENORM Waste (i.e., material with survey levels exceeding 15 pCi/g of radium-226) must be disposed of off-site at facilities permitted to accept such wastes. Representative sampling must be performed following the waste acceptance criteria of the selected disposal site.

b) TENORM (Background-comparable) (i.e., material with survey levels below 5 pCi/g of radium-226) are generally not restricted for radiological purposes and may be reused on-site, dependent upon development of a variance and/or approval by the assigned ERS, and a commitment to utilize radon-resistant construction for any structures built on the property in the future, along with an appropriate land use control.

c) TENORM fill less than 15 pCi/g of radium-226 may be able to be placed back into the excavation area consistent with the criteria in this policy. Reuse of TENORM fill concentrations between 5 pCi/g and 15 pCi/g:

i) TENORM fill must be placed a minimum of two feet below grade.

ii) Appropriate land use controls, as previously discussed, must record the presence of TENORM fill and the known, or suspected, extent of its existence at the site.

4) Undisturbed TENORM

a) TENORM that does not have to be disturbed for site development or for remediation of other contaminants is not required to be remediated as long as the undisturbed TENORM poses no significant risk to public health or the environment in its present state.

b) Radon-resistant construction is strongly encouraged to be utilized for any future buildings.

Attachment 9 - NYSDOH Radiation Guide 10.10

New York State Department of Health
Bureau of Environmental Radiation Protection

RADIATION GUIDE 10.10

GUIDE FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR RADIOACTIVE MATERIALS

INTRODUCTION

A. Purpose of Guide

The instructions in this guide, in conjunction with Table 1, specify the radioactivity and radiation exposure rate limits which should be used in accomplishing the decontamination and survey of surfaces of premises and equipment prior to abandonment or release for unrestricted use. However, no decontamination procedures shall be used which may generate air-borne radioactive material without specific authorization from the New York State Department of Health to do so. The Department may be consulted as to the appropriate equipment performance characteristics to be used in determining that the levels specified in Table 1 are met. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control will be considered on a case-by-case basis.

B. Applicable Regulations

The regulations pertaining to this use of radioactive material are found in Title 10, Chapter 1, Part 16, New York Code of Rules and Regulations (10 NYCRR 16). Chapter 1 is entitled, "State Sanitary Code" and Part 16 is entitled, "Ionizing Radiation." The statutory authority for the rules and regulations is found in the New York State Public Health Law, Section 225.

PROCEDURES

A. Contamination

The licensee shall make a reasonable effort to eliminate residual contamination.

Radioactivity on equipment or surfaces shall not be covered by paint, plating or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

The radioactivity on the interior surfaces of pipes, drain lines, or duct-work shall be determined by making measurements at all traps and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or duct-work. Surfaces of premises, equipment or scrap which are likely to be contaminated, but are of such size, construction or location as to make the surface inaccessible for purposes of measurement, shall be presumed to be contaminated in excess of the limits.

B. Relinquishing Control Above Limits

Upon request, the Department may authorize a licensee to relinquish possession or control of premises, equipment or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

1. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent and degree of residual surface contamination.

2. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations, such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

C. Reporting

Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the New York State Department of Health, Bureau of Environmental Radiation Protection, 2 University Place, Room 325, Albany, New York 12203, no less than 30 days prior to the planned date of abandonment. A copy of the survey report shall also be provided to the landlord or subsequent tenant, pursuant to Section 16.10 (b), New York State Sanitary Code (10 NYCRR 16).

The survey report shall:

1. Identify the premises and indicate the date of the survey.

2. Show that reasonable effort has been made to eliminate residual contamination.

3. Specify the manufacturer and model number of the survey instrument and the procedures used to calibrate the instrument, and include the last calibration date.

4. Describe the scope of the survey and general procedures followed.

5. State the findings of the survey in units specified in Table 1.

6. Confirm that the radiation levels shown in the survey will not be increased as a result of activities following the performance of the survey.

Following review of the report, the Department will consider visiting the facility to confirm the survey.

Table 1

Radioactive Surface Contamination Limits
(see notes below)

Application	Alpha (dpm/100 cm^2)		Beta/Gamma	
	Total	Removable	Total (mR/hr)	Removable (dpm/100 cm^2)
Controlled Area				
Basic Guide	15,000 max. 5,000 avg.	500	1.0	5,000
Clean Area	1,000	100	0.5	1,000
Non-controlled Area				
Skin, Personal Clothing	500	N.D.	0.1	N.D.
Release of Material or Facilities	2,500 max. 500 avg.	100	0.2	1,000

Notes to be used when using Table 1:

a. Where surface contamination by both alpha- and beta-emitting nuclides exists, the limits established for alpha- and beta-emitting nuclides should apply independently.

b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency and geometric factors associated with the instrumentation.

c. Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.

d. The maximum contamination level applies to an area of not more than 100 cm^2.

e. The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

f. N.D. means non-detectable.

VARIANCE REQUEST
for the
Riverview Innovation & Technology Campus
NYSDEC BCP SITE No. C915353
3875 River Road
Tonawanda, NY 14150

Prepared for:

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Prepared by:

MJW CORPORATION
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June 16, 2026

MJW Job Number: 26.1015.3

Table of Contents

Executive Summary 5

1.0 Site Description 7
1.1 Location..... 7
1.2 Site Features..... 8
1.3 Current Zoning and Land Use..... 8
1.4 Past Use of The Site 9
1.5 Site Geology and Hydrology..... 11
1.6 Site Use History..... 12
1.7 Radiological Characterization..... 13
1.8 GPS-Enhanced Gamma Walkover Survey of the Site..... 15
2.0 Sample Collection Analysis..... 16

3.0 Site Development Approach 19
3.1 Identified Elevated Measurement Locations..... 20
3.2 Soil Sample Collection and Analysis..... 22
3.3 Laboratory Analysis of Samples..... 22
3.4 On-Site Disposition of TENORM Material..... 22

4.0 Proposed Site Use..... 26

5.0 Exposure Impacts from Management of Site TENORM Materials 28
5.1 Residential Farmer Exposure Assessment..... 32
5.2 Comparative Dose Criteria..... 34

6.0 Purpose and Scope 35
6.1 Profect Organization and Responsibilities..... 36
6.2.1 Project Coordination/Kickoff Construction Meeting..... 36
6.2.2 Quality Assurance Requirements..... 37

7.0 Air Monitoring 37

8.0 Radiation Safety Monitoring..... 38
8.1 Personnel Monitoring..... 38
8.2 Personnel Protection Equipment..... 38

9.0 Equipment Monitoring..... 38

10.0 Documentation and Reporting..... 39
10.1 Construction Monitoring..... 39
10.2 Progress Reports..... 40
10.3 Construction Completion Report..... 40
11.0 Site Management Plan..... 40
11.1 Corrective Measures Plan..... 41
11.2 Project Schedule..... 41

12.0 References..... 41

LIST OF FIGURES AND TABLES

Figure 1 Site Location in Relation to Western Town of Tonawanda NY and the Niagara River

Figure 2 Local Area Background Soil Sample Locations

Figure 3/3a Location of EMLs on the RITC Site

Figure 4 Engineering Drawing Showing the Location and Dimensions of the Consolidation Cell

Figure 5 Engineering Drawing Showing the Consolidation Cell Details

Figure 6 The Full Extent of the Riverview Innovation & Technology Campus Including Sites 108, 109 and 110

Figure 7 RITC, 3875 River Road, Site 109 and 110, Conceptual Layout Plan

Table 1 RITC 3875 River Road Area Background Sample Results (Ra-226)

Table 2 Erie County Water Authority Background Gamma Data

Table 3 Results of Site Soil Sample Radiological Analysis in 2023 and 2024

Table 4 Sample Analysis Results for EMLs and Other Areas of the RITC Site

Table 5 Average Test Pit Soil Sample Concentrations Used in RESRAD Modelling

Table 6 Summary of RESRAD Receptor Dose for Site-Specific Scenarios

APPENDICES

Appendix A Off-Site Disposal Cost Estimate for Excavated TENORM Material

Appendix B Eurofins Environment Testing America Test Pit Analytical Results

Appendix C Summary of Test Pit Sample Analysis Results

Appendix D RESRAD Dose Assessment Modeling Reports

Appendix E GEL Laboratory Sample Reports

Appendix F Existing and Proposed Site Layout and Landcover

ATTACHMENTS

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY dated February 10, 2021.

Attachment 2. Gamma Walkover Survey and Associated Sampling Report, 9/2024, Revised 3/2025.

Attachment 3. NYSDEC-Approved Radiological Work Plan, 2026, Riverview Innovation & Technology Campus Brownfield Cleanup Program Site No. C915353,3875 River Road, Tonawanda, New York 14150, February.

Attachment 4. MJWRCP-66 Soil Sampling Protocols Rev. 2 dated October 14, 2023.

Attachment 5. GEL's Chain of Custody (COC) Form

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CC	Cubic Centimeter
COC	Chain of Custody
CPM	Counts per minute
DEC	Department of Environmental Conservation
DOL	Department of Labor
EE	Environmental Easement
ELAP	Environmental Laboratory Approval Program
EML	Elevated Measurement Location
ERS	Environmental Radiation Specialist
FBGS	Feet Below Ground Surface
GSR	Green and Sustainable Remediation
GHG	Greenhouse Gas
ISOCS	In-Situ Object Counting System
LDR	Land Disposal Restriction
MREM	Millirem
NORM	Naturally Occurring Radioactive Material
NaI	Sodium Iodide
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSRML	New York State Radioactive Materials License
PE	Professional Engineer
PM-10	Particulate Matter (10 micrometers)
PPC	Personal Protective Clothing
PPE	Personal Protective Equipment
pCi/g	Picocuries per gram
RCC	Radioactive Contamination Criteria
RCRA	Resource Conservation and Recovery Act
RCS	Radiological Control Supervisor
RCT	Radiological Control Technician
RESRAD	RESidual RADioactive Material Model V7.2
RPM	Radiological Project Manager
RITC	Riverview Innovation & Technology Campus, Inc.
TBD	To Be Determined
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
TMP	TENORM Management Plan
TCC	Tonawanda Coke Corporation
TSD	Transport Storage and Disposal
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency

Executive Summary

This DEC Variance Request (DECVR) was prepared on behalf of Inventum Engineering, PC for the Riverview Innovation and Technology Campus (RITC), Brownfield Cleanup Program (BCP) Site #915353, as part of required documentation for requesting a variance from the authorized disposal methods described in 6 NYCRR Part 380-4.1 for excavation spoils containing Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) with radium-226 concentrations less than 15 picocuries per gram (pCi/g) in accordance with New York State Department of Environmental Conservation (NYSDEC) requirements. The TENORM on the site will be used as general fill over portions of the NYSDEC Brownfield Cleanup Program (BCP) Site No. C915353, located at the 3875 River Road Site, Tonawanda, New York 14150 (Site). Further, the plan is to move TENORM from EMLs that are excavated as needed to the consolidation cell if concentrations are below 15 pCi/g Ra-226 and only as needed to complete the RAWP. This variance request is being made to incorporate the New York State Department of Environmental Conservation Green Remediation (DER-31) Program Policy and to alleviate the unanticipated economic burden and financial hardship to Site developers imposed by the authorized disposal methods described in 6 NYCRR Part 380-4.1 and requiring off-site disposal of the TENORM excavation spoils. The current out-of-state requirement would require approximately 250,000 truck miles to transport the materials to Michigan. Based on recent quoted rates of $220-$250/ton for transportation and disposal, and an estimated 7,000 tons of TENORM material, on-site management of TENORM will avoid costs ranging between $1.54 to $1.75 million dollars if the variance is approved.

The current market value of the property is estimated at $200,000 per acre for a current overall value of $17,300,000. With the estimated cost of authorized off-site disposal of the TENORM fill at less than $2 million, this money is far better spent on property improvements and redevelopment given a safe alternative for onsite storage is provided herein. This variance request has been developed to advance redevelopment efforts through the safe and cost-effective on-site management of TENORM fill excavation spoils.

The Site is currently vacant land that is slated for redevelopment for commercial and/or industrial use. Previous site characterization efforts identified historic fill exhibiting elevated radiological levels (primarily iron/steel slag with various mixtures of slag, sands, silts, clay) with observed thicknesses ranging up to 10 feet below grade. Laboratory analytical results from samples collected in October of 2023 during an overland

gamma survey were performed and identified 4 elevated measurement locations (EMLs). Focused soil sampling was completed in 2024 with a maximum Ra-226 concentration detected in the soil fill material of 12.6 pCi/g, which is approximately 17 times the local area average background concentration of 0.743 pCi/g. Analytical results for the 4 EML test pit samples are provided in Appendix B. Appendix C presents a summary of the test pit sample analysis.

To demonstrate that the existing onsite soils materials will meet dose criteria and have no significant impacts on public or worker health, an assessment of potential radiation exposure to near-term on-site workers, future commercial and residential occupants, an inadvertent intruders was performed using the RESidual RADioactive (RESRAD) Material Model developed at Argonne National Laboratory (Ref. 5). The dose assessment scenarios, model parameters, and results are described in Section 5.0 and RESRAD results for all scenarios are provided in Appendix D. The estimated exposures calculated were compared to the public dose limit prescribed by New York State and Federal regulatory agencies of 100 mrem/year for scenarios with no controls in place and an Applicable or Relevant and Appropriate Requirement (ARAR) as identified in Section 1.5.2 as United States Environmental Protection Agency (EPA) 10 CFR 40, I, Criterion 6(6) equivalent to 12 mrem/year with institutional and engineering controls in place, soil cover, site deed restrictions, etc. RESRAD results for site use scenarios with controls in-place and the all-controls-fail/residential farmer scenario were below required and applicable dose standards. RESRAD dose assessment modeling reports are provided in Appendix D.

Movement and replacement of TENORM contaminated soils derived from grading and excavations required for site development, will be performed in strict compliance with this document and the TENORM Management Plan (TMP), the NYSDEC BCP requirements for Site No. 915353, and all other provisions outlined by NYSDEC in approving this variance request, including those described in the New York State Environmental Conservation Laws and 6 NYCRR Part 380. Figure 6 shows a preliminary site layout plan.

This variance request presents the necessary management requirements for the safe movement and distribution of site soils containing TENORM slag with concentrations of radium-226 (Ra-226) below 15 picocuries per gram (pCi/g) generally dispersed across the site located at the RITC located at 3875 River Road, Tonawanda, New York. The parcel (Site) is approximately 86.5 acres in size and is included in the New York State (NYS) BCP with designated Site No. 915353.

As required by NYSDEC, this 6 NYCRR Part 380 Variance Request has been prepared and submitted to NYSDEC together with the TMP, and as discussed in the Variance Request and the TMP, there are locations at the Site that fill placement may be required to bring the Site to design grade. As a result, and to alleviate significant financial hardship (see Appendix A) without adding any significant environmental or public health and safety risk, RITC would like to use low-level TENORM material at the Site with soil concentrations less than 15 picocuries per gram (pCi/g) Ra-226 to properly grade the site prior to the addition of 2 feet of soil or equivalent concrete/macadam or other clean fill as site cover material.

1.0 Site Description

1.1 Location

The RITC site at 3875 River Road, Town of Tonawanda, NY is an approximately 86.5-acre site located in an area zoned General Industrial on the west side of Town of Tonawanda New York in Erie County. It is midway between the 190 expressway and the Niagara River and bounded by roadways River Road to the west, Grand Island Blvd. to the east and north and Sawyer Ave. to the south, although there are industrial properties between the site and all but River Road. The nearest residential area is River View located on the east side of the 190 expressway and 0.2 miles southeast of the north end of the RITC site. Figure 1 shows the RITC site and the nearest residential area (River View) to the southeast.

Figure 1. Map of RITC Location, 3875 River Road, Town of Tonawanda, NY 14150

1.2 Site Features

The Site is currently vacant with areas of vegetation growing through exposed gravel, slag, concrete, and brick fill. A few gravel drives transect the Site from east to west and north to south. The site is generally covered with coke breeze from the previous processing operation with a few small structures (repurposed offices and groundwater treatment building with storage) and a retention pond is present. Also areas where excavations have been conducted with piles of debris and fill are located throughout the Site.

1.3 Current Zoning and Land Use

The site is zoned (GI) - General Industrial and is located within an industrial business area of the Town of Tonawanda referred to as the Tonawanda Opportunity Area, an area of approximate 2,362 acres in the Town's River Road Corridor between the City of Tonawanda and the former Huntley Power Plant along the Niagara River. The nearest residential area (River View) is approximately 0.2 miles southeast of the site, and just east of the Interstate route 190.

1.4 Past Use of The Site

Prior to the Tonawanda Coke Corporation (TCC) (previous site owner and operator) bankruptcy in 2018, the property to become the RITC BCP Site was an operating coke making and by-products facility for more than 100 years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company merged into Allied Chemical Corporation, which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility from 1978 through October 2018. TCC filed for bankruptcy in 2018 and all manufacturing on the property was permanently idled. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the remaining TCC properties to RITC was approved by the U.S. Bankruptcy Court. The purchase of the properties was completed October 10, 2019. Management of the properties was transitioned from the USEPA to RITC between September 2019 and June 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a). The volunteer status is a recognition that RITC had never conducted coking or by-product production operations on the BCP Site, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the BCP Site, and has exercised all appropriate care since acquisition. Additionally, in recognition of the focus of this Work Plan, RITC did not import any slag materials to the BCP Site. Based on the results of the Remedial Investigation, the slag was used for construction of the rail lines on the property, presumably starting on or about 1917.

Following approval of the BCP Agreement, RITC has conducted a remedial investigation of the BCP Site, conducted extensive site management and cleanup activities in accordance with a series of NYSDEC and NYSDOH approved IRM work plans, has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period, , complete the alternatives analysis and drafted a Remedial Action Work Plan that is under final review by the NYDEC and NYSDOH.

Manufacturing processes used at the plant included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating the coal in the absence of oxygen. The resulting carbon material “coke” was used, among other things, in foundries and for the production of steel.

The extracted coke oven gas (COG) was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel. When operating efficiently, coke batteries typically produce twice the volume of COG that is required to operate the facility and fire the battery.

The liquids and tar by-products produced on the property BCP Site were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials by TCC was the source of the majority of releases to the ground surface. While there was a steel manufacturing facility west of the site and a coal-fired power plant southwest of the site, slag was not produced by the coke making process. The presence of TENORM appears to be associated slag that was imported for use as base and ballast materials under railroad tracks on the BCP Site. Slag was not produced in any significant quantity at the TCC facility.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of rapid deterioration as there was no party responsible for maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC implemented a series of IRMs and associated remedial action activities to improve safety, eliminated potential sources of releases, and improved control of the remaining infrastructure, both within and outside the requirements of the BCP Program. The implemented IRMs and ongoing remedial actions are eliminating potential exposures and safety hazards on the BCP Site. Descriptions of the RI, IRM scopes of work that were completed, and remedial actions under the BCP are provided in the work plans and reports posted on the NYSDEC InfoLocator. Work completed prior to and during the RI that has dramatically improved conditions on the BCP Site include, but are not limited to:

- Surface Materials and Site Management – The conditions at the site were allowed to deteriorate for years if not decades under previous ownership. Full time management of the site has been funded by RITC to control and improve the BCP Site.
- Surface Water Management – Surface water management has been the focus of the most IRMs at the site since the USEPA transferred responsibility for surface water to RITC. The IRMs have addressed conditions across the entire BCP Site including elimination of poorly constructed impoundments, regarading areas to eliminate erosion, dredging ponds and ditches, cleaning and repairs to sewers and drains, and cleaning of the surface to manage debris that concentrated runoff.
- Asbestos Containing Materials (ACM) Survey – A comprehensive assessment of ACM was completed on the BCP Site in 2019 and 2020.

- Asbestos Abatement – Multiple phases of asbestos abatement were completed and are ongoing at the BCP Site including the abatement of ACM in the three stacks, abatement of ACM on and in the former process buildings on the BCP Site, abatement of ACM on pipes and external equipment, abatement of ACM in buildings, and controlled demolition of ACM containing buildings that are not suitable for occupancy. ACM abatement is conducted in accordance with New York State Department of Labor (NYSDOL) requirements.
- Process Equipment Removal Interim Remedial Measures Work Plan – removal of the remaining outdoor vertical process vessels including characterization of the contents, demolition of the vessels, and proper offsite disposal of the contents.
- Building Demolition – buildings across the BCP Site were demolished to allow access to the BCP Site for IRMs and the RI. The condition of the buildings, many over 100 years old, had deteriorated to the point where they were posing a safety concern. Four had deteriorated to a condition that required them to be condemned because they could no longer be safely occupied.
- Aboveground Storage Tank (ASTs) – decommission AST and disposal of the tank contents in accordance with the approved IRM.
- Soil Stabilization to treat material and soils impacted by previous TCC site operations.

1.5 Site Geology and Hydrology

Fill material is encountered across the entire surface of the site to depths ranging from 9.5 to 13 feet below ground surface (fbgs). The fill material occurs in three distinct layers as described below:

Layer A

This layer contained discernable slag material inter-mixed with sand and gravel; was encountered at the surface or within approximately 2 feet of the ground surface to a maximum depth of up to 10 feet below the ground surface; and had an average thickness of approximately 3.3 feet.

Layer B

This layer was characterized as fill material consisting of white, gray and tan sand to gravel sized particles of fill originating from industrial activities. No discernable slag was observed in this layer, which was encountered at depths of 1-5.5 fbgs to a maximum depth of 13 fbgs, and had an average thickness of 4.3 feet.

Layer C

This layer was characterized as fill material consisting of blue-green, white, gray and tan sand to gravel sized particles of fill originating from industrial activities. No discernable slag was observed in this layer, which was encountered at depths of 2-10 fbgs to a maximum depth of 13 fbgs, and had an average

thickness of 4 feet.

Beneath the fill, native soil consists of a one- to two-foot-thick layer of brown silt and peat. The silt and peat layer was encountered at depths ranging from approximately 9.5 to 13 feet below ground surface (fbgs). The top one to two inches of the silt and peat layer was saturated and observed to have an apparent organic sheen. The remainder of the silt and peat layer was observed to be moist to wet. Beneath the peat layer, native overburden was generally encountered at depths of 11 to 13 feet below ground surface and consisted of dense, gray silty clay. Soil borings and test pits completed on-site to depths of approximately 15 feet did not encounter bedrock. The depth to groundwater ranges from approximately 6 to 9 fbgs, though the groundwater surface was relatively flat, varying less than 1.5 feet in elevation across the site. Soil boring and monitoring well installation completed during the RI identified bedrock at approximately 55 feet bgs beneath the site. The groundwater flows generally westward, toward the Niagara River. For a more detailed discussion of site geology and hydrology, the reader is referred to the site Remedial Investigation Report (Ref. 1).

1.6 Site Use History

The Riverview Innovation & Technology Campus (RITC) will be constructed on the former Tonawanda Coke Corporation property, 3875 River Road and 3800 River Road[1], Tonawanda, in Erie County. Comprised of approximately 140 acres, the site was home to an operating coke facility for more than 100 years prior to closing in October 2018.

Today, the site is being remediated by RITC. RITC completed his acquisition of the property on October 10, 2019, with a long-term vision for the cleanup and redevelopment, putting the site back into productive use. The investment and job-creation opportunity, in a long-term view, is very achievable."

The Tonawanda Community Working Group produced a progress report in December 2022 which is **posted here** (www.riverviewtechcampus.com/citizen-plans-updates/) and on the Town's website: **https://www.tonawanda.ny.us/development/tonawanda-community-working-group.html**

RITC is responsible for investigation, management, and remediation of the 86+ acre BCP site. Honeywell is responsible for three State Superfund portions which consist of Operable Unit (OU)1, OU2 and OU3 portions of the

[1] The 3800 River Road property is not included with the 3875 River Road property as part of the BCP.

property. On February 14, 2020, RITC's **application** (www.riverviewtechcampus.com/_resources/documents/Application.BCP.C915353.2019-11-14.BCP%20Application.pdf) to conduct the site remediation and restoration under the NYSDEC Brownfield Cleanup Program was **accepted** (www.riverviewtechcampus.com/_resources/documents/Agreement.BCP.C915353.2020-02-14.Executed%20BCA.pdf) by the agency.

NYSDEC also announced a new **Consent Order** (www.riverviewtechcampus.com/_resources/documents/Consent%20Order.HW.915055.2020-02-14.Executed%20Consent%20Order.pdf) under the State Superfund program with Honeywell for three separate sections of the property identified as OU1, OU2, and OU3. A Honeywell predecessor company owned the site prior to 1978.

1.7 Radiological Characterization

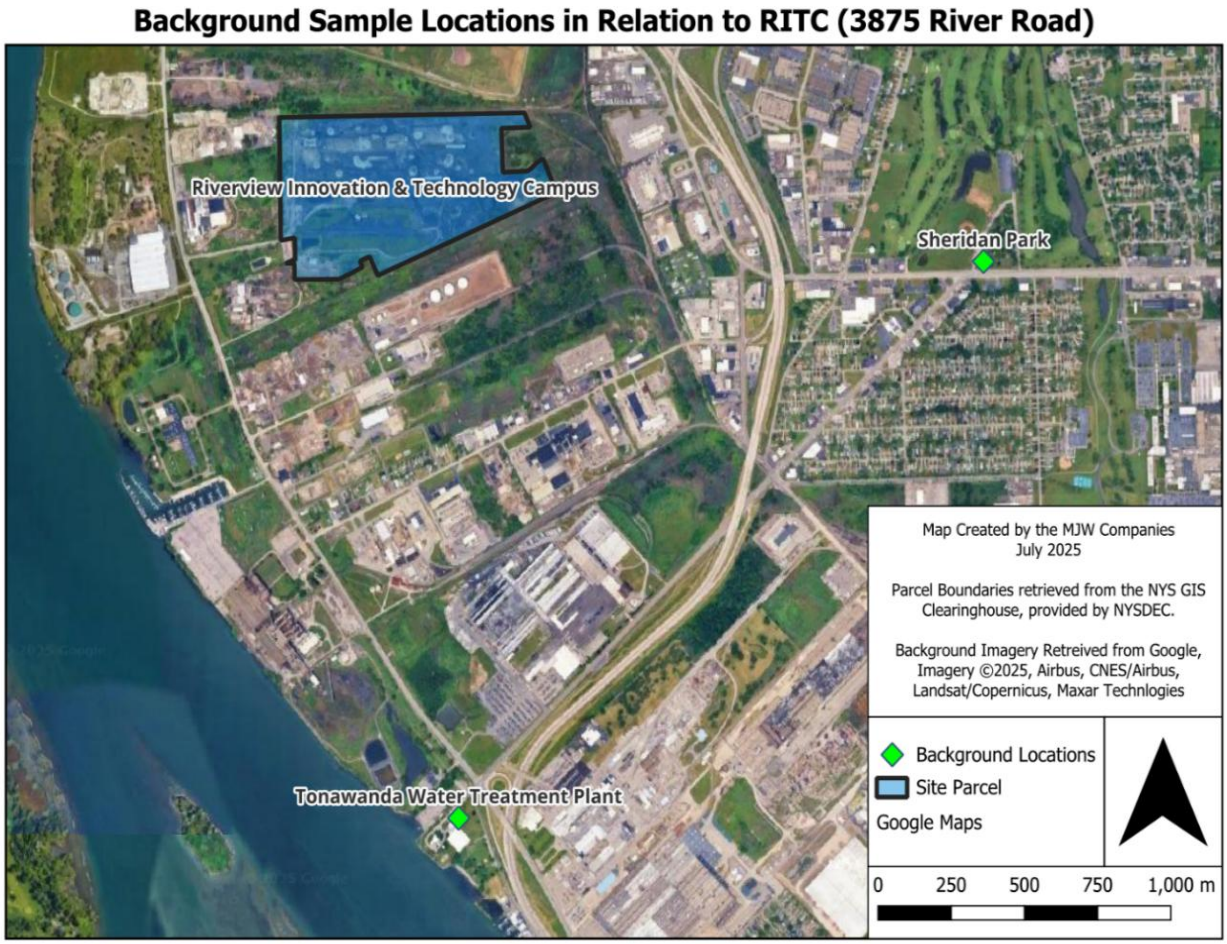
MJW has conducted TENORM-specific remedial investigations since 2020 at the RITC BCP Site. In addition, initial potential TENORM-specific investigations (soil sampling and analysis) are included in the report *Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY* dated February 10, 2021 (Attachment 1) for work done on the RITC superfund site. In 2023, an overland gamma survey was conducted over all accessible areas of the site to evaluate for possible TENORM slag. Associated samples were collected for screening and submitted for radiological analysis. Subsequent focused investigations and sampling activities occurred in 2024 (Attachment 2).

Local area background measurements were collected at the Tonawanda Water Treatment Plant (218 Aqua Lane, Tonawanda Town, NY 14150) and Sheridan Park (901 NY-324, Tonawanda, NY 14150), results are summarized in Table 1 below. A map of these background sample locations is shown in Figure 2 below (green triangles).

Table 1: RITC (3875 River Road) Area Background Sample Results (pCi/g) *

Table 1. Local Area Background Sample Results		
Method	901.1 Gamma Spec[2]	
Sample Number[1]	[Ra-226], pCi/g	Uncertainty (± pCi/g)
01122024-TWT1	0.822	0.151
01122024-SB1	0.734	0.135
01122024-TWT1(DUP)	0.673	0.178
Average (Non-Zero Results)	0.743	0.155
1.Sample Nomenclature - MMDDYYYY-Location (TWT-Tonawanda Water Treatment, SB-Sheridan Park) 2. All samples analyzed via EPA Method 901.1 with a 21-day ingrowth for Ra-226.		

Figure 2. Local Area Background Sample Locations for the RITC Site (3875 River Road)



1.8 GPS-Enhanced Gamma Walkover Survey of the Site

The GPS-enhanced gamma walkover surveys consisted of a MJW field crew with a Bluetooth-enabled Ludlum model 3000 Ratemeter paired with a 44-10 (2" x 2") NaI gamma detector walking pre-planned transects running east-west and north-south within and along the site boundaries. The instrumentation was mounted on a wheeled cart to ensure consistent geometry, except when prevented by field conditions, in which case the instrumentation was secured to a field technician.

The initial survey covered the entire 86.5-acre BCP site to the extent possible and identified those locations with

elevated count rates. While the survey identified locations with elevated count rates, the survey was inconclusive as to the radiological nature of the potentially elevated material, and a secondary follow-up survey and sampling investigation was performed. Background gamma-scan data for this survey were collected at the nearby Erie County Water Authority, 3750 River Road, Tonawanda, NY 14150, and is Summarized in Table 2. The full report can be found as part of Attachment 2, titled *Gamma Walkover Survey Report 20.1023).*

Table 2. Erie County Water Authority Background Gamma Data[1]		
No. of Data Points	Average[2]	Standard Deviation[2]
614	8392	400
[1] All data analyzed with QGIS. [2] Counts per Minute (CPM)		

Following the NYSDEC approval of the Radiological Work Plan on April 30, 2024 (Attachment 3) MJW conducted a focused GPS-Enhanced Gamma Walkover survey in June and July 2024 to provide additional characterization of the site west of the Thaw Shed. The focused survey noted a reduction in counts above the 1.5x ABKG (Area Background) level and refined EMLs to enable biased sampling to the areas of interest. There was no visual identification of soil/fill difference in the surface layer at the EMLs.

At each background location, five (5) 1-minute gamma counts were collected using both a shielded and an unshielded Ludlum 44-10, 2"x2" NaI detector coupled to a Ludlum 2241 ratemeter. The average count rate for shield and unshielded readings at each of the background locations were: 2633/7541 CPM for location BkgOn1; 2556/7523 CPM at location BkgOff1, 2488/7474 CPM at location BkgOff2, respectively. On-site material segregation scan rates were set at 1.5x the daily instrument background levels for shielded detector readings collected at background location C. However, scan readings above 1200 CPM were generally representative of 1.5x daily instrument background levels and were approximately equal to 1.5x the average background readings from all three locations.

2.0 Sample Collection and Analysis

An original sampling event (August 2023, SDG634158) analyzed the soil samples for uranium and thorium via Alpha Spec. In June of 2024 soil sample SDG 674299 was analyzed by Alpha Spec for uranium and thorium. Results are shown on Table 3. The Th-232 concentration, per the analysis of Ac-228 concentration, averaged

0.695 pCi/g. U-238 concentration averaged 5.65 by gamma spec and 2.65 pCi/g via alpha spec. We averaged these two values at 4.15, given alpha spec has been shown to be the more accurate analytical method for uranium concentrations for all sample types. The average K-40 concentration was 7.45 pCi/g.

In accordance with the NYSDEC-approved RWP (Attachment 3), MJW Certified Health Physicist's (CHPs) reviewed the 2024 GPS-Enhanced Gamma Walkover Survey data to identify Elevated Measurement Locations or EMLs. Twenty (20) biased to elevated count rate locations and twelve (12) unbiased samples were collected in and around the identified EMLs. Thirty-seven (37) samples were collected and analyzed by gamma spectroscopy, with 15 samples analyzed by confirmatory alpha spectroscopy for Uranium and Thorium Isotopes. Twelve (12) sample results indicated material potentially above the DMM-5 criteria for TENORM (Background-Comparable) material, no sample results were above the criteria for TENORM waste. All of the samples with results indicating TENORM Fill material were collected within the previously identified calculated EMLs. Site sample analysis results from 2024 are reported in Table 4 below.

Table 3. Results of Site Soil Sample Radiological Analysis in 2023 and 2024

Nuclide Information Table										
↓Sample ID[1]							GS[3]		AS[3]	
Sample Concentration (pCi/g) →	[Ac-228]	UNC[2]	[K-40]	UNC	[Ra-226]	UNC	[U-238]	UNC	[U-238]	UNC
S2.B1	0.465	0.298	U	U	3.51	0.33	3.26	2.97	N/A	N/A
S2.B2	U	U	2.62	1.36	4.93	0.42	U	U	N/A	N/A
S2.B3	U	U	4.74	1.36	6.32	0.408	U	U	N/A	N/A
S2.B4	0	0.338	7.27	1.47	3.42	0.341	U	U	N/A	N/A
S2.B5	U	U	11	1.7	3.79	0.373	U	U	N/A	N/A
S2.B6	U	U	9.61	1.25	0.326	0.14	U	U	U	U
S2.U1	U	U	1.61	0.708	0.875	0.193	U	U	N/A	N/A
S2.U2	0.246	0.241	2.04	1.02	0.32	0.11	U	U	N/A	N/A
S2.U3	1.16	0.34	4.03	1.16	11	0.525	U	U	N/A	N/A
S2.U4	1.29	0.519	1.86	1.94	10.2	0.57	8.11	5.51	5.39	1.05
S2.U2.D	0.335	0.222	5.09	0.995	0.51	0.17	1.56	1.53	U	U
S3.B1	0.663	0.466	17.1	2.17	1.21	0.234	U	U	0.426	0.366
S3.B2	U	U	4.64	1.08	9.17	0.472	7.48	5.04	7.84	1.38
S3.B3	U	U	U	U	0.529	0.155	U	U	N/A	N/A
S3.B4	0.304	0.314	2.65	0.958	0.598	0.193	U	U	N/A	N/A
S3.U1	U	U	4.68	1.57	10.7	0.474	8.53	2.04	6.33	1.14
S3.U2	U	U	1.66	1.34	2.23	0.284	U	U	N/A	N/A
S3.U3	U	U	1.23	0.541	0.552	0.146	1.97	1.28	N/A	N/A
S3.B4.D	0.214	0.16	1.38	0.984	0.348	0.137	U	U	0.351	0.302
S4.B1	1.19	0.378	8.43	1.48	1.56	0.297	U	U	U	U
S4.B2	0.887	0.342	2.73	0.981	5.77	0.377	U	U	N/A	N/A
S4.U1	0.982	0.379	7.22	1.5	1.24	0.258	U	U	0.581	0.449
S1.B1	0.908	0.463	21.3	2.4	1.12	0.302	U	U	N/A	N/A
S1.B2	1.73	0.555	4.42	1.64	10.6	0.62	10.4	8.19	N/A	N/A
S1.B3	0.94	0.409	18.2	2.3	1.56	0.228	U	U	N/A	N/A
S1.B4	U	U	8.56	2.03	12.6	0.595	5.74	5.9	N/A	N/A
S1.B5	0	0.447	6.58	1.43	8.49	0.516	U	U	5.46	1.02
S1.B6	U	U	17.8	2.25	1.94	0.279	U	U	N/A	N/A
S1.U1	0	0.294	20.4	2.09	0.667	0.275	U	U	N/A	N/A
S1.U2	U	U	13.8	1.94	4.73	0.364	4.74	3.37	3.18	0.835
S1.U3	0	0.264	13.4	1.44	1.94	0.219	3.59	3.72	0.803	0.42
S1.U4	1.32	0.425	10.9	1.78	10.5	0.529	8.21	4.32	N/A	N/A
S1.B1.D	1.44	0.331	18.9	1.85	1.25	0.197	U	U	U	U
F1	U	U	6.6	1.6	0.762	0.163	U	U	0.457	0.346
F2	0.343	0.182	2.16	0.732	0.637	0.189	U	U	N/A	N/A
Control 1	U	U	2.92	0.904	0.41	0.177	U	U	N/A	N/A
Control 2	U	U	2.64	0.957	0.503	0.17	U	U	0.571	0.359
S2.B1(674299001DUP)	U	U	1.94	1.07	3.7	0.35	U	U	N/A	N/A
S4.B2(674299021DUP)	0.873	0.412	3.68	1.13	6.1	0.406	4.2	3.91	N/A	N/A
S2.U2.D(674299011DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.443	0.366
S2.B6(674299006DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	U	U
Average Concentrations	**0.695**	**0.368**	**7.454**	**1.513**	**3.759**	**0.343**	**5.649**	**4.414**	**2.653**	**0.765**

1. Sample ID - S(Sample Area Number)#.U/B (Unbiased or Biased)#.D(Field Duplicate)
2. UNC - Counting Uncertainty
3. GS - γ Spec, AS - α Spec
4. U - Unidentified
5. N/A - Not Analyzed

Table 4. Sample Radiological Analysis Results for EMLs and Other Areas of the RITC Site.

Sample_No	Lab_Id	Lab_Result	Uncertainty	MDL/MDA	Units	In EML	Nearest EML
S2.B1	674299001	3.51	0.33	0.183	PCI/G	2	N/A
S2.B2	674299002	4.93	0.42	0.217	PCI/G	2	N/A
S2.B3	674299003	6.32	0.408	0.174	PCI/G	2	N/A
S2.B4	674299004	3.42	0.341	0.23	PCI/G	2	N/A
S2.B5	674299005	3.79	0.373	0.2	PCI/G	2	N/A
S2.B6	674299006	0.326	0.14	0.0959	PCI/G	2	N/A
S2.U1	674299007	0.875	0.193	0.123	PCI/G	2	N/A
S2.U2	674299008	0.32	0.11	0.102	PCI/G	NO	2
S2.U3	674299009	11	0.525	0.225	PCI/G	2	N/A
S2.U4	674299010	10.2	0.57	0.257	PCI/G	2	N/A
S2.U2.D	674299011	0.51	0.17	0.108	PCI/G	2	N/A
S3.B1	674299012	1.21	0.234	0.141	PCI/G	NO	3
S3.B2	674299013	9.17	0.472	0.197	PCI/G	3	N/A
S3.B3	674299014	0.529	0.155	0.152	PCI/G	NO	3
S3.B4	674299015	0.598	0.193	0.148	PCI/G	NO	3
S3.U1	674299016	10.7	0.474	0.178	PCI/G	3	N/A
S3.U2	674299017	2.23	0.284	0.2	PCI/G	NO	3
S3.U3	674299018	0.552	0.146	0.101	PCI/G	NO	3
S3.B4.D	674299019	0.348	0.137	0.138	PCI/G	NO	3
S4.B1	674299020	1.56	0.297	0.14	PCI/G	NO	4
S4.B2	674299021	5.77	0.377	0.187	PCI/G	4	N/A
S4.U1	674299022	1.24	0.258	0.171	PCI/G	4	N/A
S1.B1	674299023	1.12	0.302	0.189	PCI/G	NO	1
S1.B2	674299024	10.6	0.62	0.25	PCI/G	1	N/A
S1.B3	674299025	1.56	0.228	0.152	PCI/G	1	N/A
S1.B4	674299026	12.6	0.595	0.229	PCI/G	1	N/A
S1.B5	674299027	8.49	0.516	0.237	PCI/G	NO	1
S1.B6	674299028	1.94	0.279	0.165	PCI/G	NO	1
S1.U1	674299029	0.667	0.275	0.184	PCI/G	NO	1
S1.U2	674299030	4.73	0.364	0.196	PCI/G	1	N/A
S1.U3	674299031	1.94	0.219	0.109	PCI/G	NO	1
S1.U4	674299032	10.5	0.529	0.207	PCI/G	NO	1
S1.B1.D	674299033	1.25	0.197	0.132	PCI/G	1	N/A
F1	674299034	0.762	0.163	0.122	PCI/G	NO	3
F2	674299035	0.637	0.189	0.134	PCI/G	NO	2
Control 1	674299036	0.41	0.177	0.144	PCI/G	NO	2
Control 2	674299037	0.503	0.17	0.112	PCI/G	NO	2
S2.B1(674299001DUP)	1205781344	3.7	0.35	0.192	PCI/G	2	2
S4.B2(674299021DUP)	1205781347	6.1	0.406	0.191	PCI/G	4	4

3.0 Site Development Approach

The site is slated for redevelopment for commercial or industrial purposes with grading and on-site management of TENORM fill (Layer A) under an engineered cover system. Movement and redistribution of TENORM materials present on the site during site redevelopment activities will be subject to the requirements of a NYSDEC-approved TENORM Management Plan (TMP). During development activities, various materials (topsoil, soil/fill, and slag) will be generated and managed in accordance with the TENORM Management Plan (Ref. 3), which identifies provisions for proper storage, handling, and on-

site management of site TENORM materials and clean fill. All TENORM materials will be managed in accordance with DMM-5 requirements.

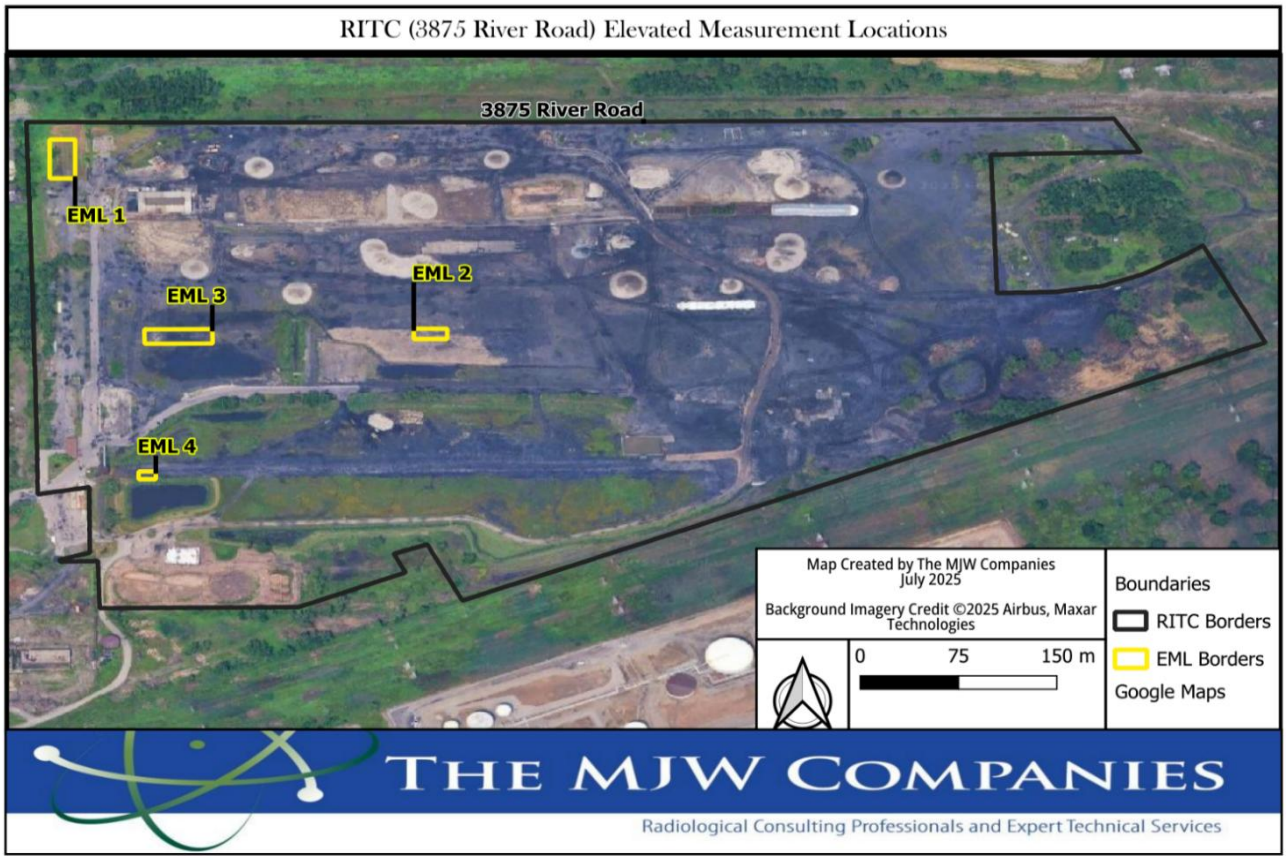
3.1 Identified Elevated Measurement Locations

Previous site investigations provided characterization of the site. These investigations established four (4) elevated measurement locations where TENORM Fill is present. These locations are shown in Figure 2 and described below:

- Northwest Corner – Parking Lot EML 1 – Last property purchased from Wickwire Spencer Steel Company. An area of approximately 20 by 35 meters with an estimated volume of 960 cubic meters (estimated 2,300 tons). See Table 3 samples S1.B2, S1.B4, S1.B5 and S1U4.
- Coke Yard EML 2 south of former coke wharf, northeast of former shower building, estimated volume: 310 cubic meters (estimated 740 tons). See Table 3 samples S3.B2 and S3.U1.
- Coke Yard EML 3 south of former coke wharf, south of former coal breaker building, estimated volume: 420 cubic meters (estimated 980 tons). See Table 3 samples S2.B3 and S2.U4.
- Water Treatment EML 4 - North side of stormwater retention basin, estimated volume: 160 cubic meters (estimated 380 tons). See Table 3 sample S4.B2 (DUP).

The estimated volumes assume both the TCC fill and slag are potential TENORM. It is assumed that only the slag will be TENORM, and the volume moved to the TENORM Consolidation Cell area ~3,800 cubic yards, will likely be near the total TENORM volume placed in the consolidation cell.

Figure 3. Location of EMLs on the RITC 3875 River Road Site



Potential TENORM at the site inside of the Elevated Measurement Locations (EMLs) will be managed according to the following criteria:

1) Background comparable TENORM ≤ 12,000 γ CPM may be moved around the site freely without radiological restrictions.
2) Material with gamma CPM between >12,000 γ CPM and ≤ 17,000 γ CPM: designated as TENORM (Background-comparable), may be consolidated into the proposed Consolidation Cell or capped onsite under no less than 2 feet of cover.
3) Material with gamma CPM >17,000: designated as TENORM fill. A representative sample and/or meter-to-activity concentration correlation will be used to verify that the material does not exceed the 15 pCi/g threshold for TENORM Waste. Material that does not exceed the 15 pCi/g threshold for TENORM Waste may be consolidated in the TENORM Consolidation Area if the TENORM needs to be excavated.
4) Any material greater than 15 pCi/g will be disposed of at an authorized out of state facility.

If the background comparable TENORM that is screened above 12,000 γ CPM and below 17,000 γ CPM is left in place it must be below at least 2 feet of soil cover (or equivalent). Any material screened above 17,000 γ CPM that is tested and shown to have activity greater than 15 pCi/g will be disposed of at an authorized out of State facility.

3.2 Soil Sample Collection and Analysis

In the event that any soil sampling is required, as outlined in the TMP, all soil sample collection will be performed in accordance with MJWRCP-66 Soil Sampling Protocols Rev. 2 dated October 14, 2023. This procedure is shown in Attachment 4 which includes the Soil Sample Data Sheet used to catalog all field data used for the location selection including sample type, radiation readings at various distances, analyses requested, etc. All samples will be analyzed via EPA method 901.1 with a 21-day ingrowth for Ra-226.

3.3 Laboratory Analysis of Samples

Collected samples will be placed in appropriate containers and shipped to an accredited laboratory for radiological analysis. MJW routinely uses GEL Labs in Charleston, SC, which is the laboratory proposed for the sample analysis for this work plan. For more information about GEL's radiochemistry services see the following link: https://www.gel.com/laboratories/services/radiochemistry-analysis GEL's chain of custody (COC) form is shown in Attachment 5.

3.4 On-Site Disposition of TENORM Material

TENORM (Background-comparable) disposal restrictions within DMM-5 are under the purview of the assigned NYSDEC Environmental Radiation Specialist (ERS). Field screened material that does not exceed the site-specific criterion of 17,000 γ CPM will be managed in accordance with the RAWP and this TMP, as on-site fill. Use of materials above 12,000 γ CPM and below 17,000 γ CPM as on-site fill will include demarcation layers and will be capped with a minimum of two (2) feet of acceptable soil cover, or a combination of asphalt and/or concrete equivalent. Materials that exceed the site-specific criterion of 17,000 γ CPM will be managed in accordance with the RAWP and will be placed within the TENORM Consolidation Cell area (See Figures 4 and 6). The TENORM Consolidation Cell area incorporates industry standard engineering controls, constructed on low permeability native silty clay, demarcation layers, and capped with a minimum of two (2) feet of acceptable

soil cover or the equivalent of paving with asphalt or concrete. The cell will have a footprint of approximately 10,752 ft^2. This cover will only be placed over the Consolidation Cell with contents meeting the NYSDEC DMM-5 requirements for TENORM fill. Interim storage of materials may take place during the construction of the TENORM Consolidation Cell area and during sampling prior to material placement in the TENORM Consolidation Cell area. The interim storage areas will include administrative controls to prevent access (e.g., worker notification, postings), engineering controls to prevent access (e.g. construction fencing), and regular monitoring by MJW technicians as material is added or removed. Monthly grid surveys of the TENORM Consolidation Cell area will be conducted by MJW technicians utilizing a Ludlum 2241-2 ratemeter paired with a Ludlum 44-10 NaI "2x2" and Bicron Microrem dose rate meter, or equivalent. Monthly surveys will be conducted in accordance with Section 8.0 and reported to NYSDEC. A grid survey will be conducted when construction is complete, both before and after a cover system is installed on the Consolidation Cell.

Material exceeding field counts of 17,000 CPM, TENORM fill, will be segregated with appropriate administrative and engineering controls. Following the identification and characterization of material as TENORM fill, internment in the TENORM Consolidation Cell area will take place in accordance with the TMP. MJW technicians will conduct regular monitoring to ensure that the administrative and engineering controls are sufficient and provide oversight as material is added or removed. Any material demonstrated to exceed 15 pCi/g for Ra-226 will be disposed of in accordance with appropriate regulatory requirements at an authorized and permitted out-of-state disposal facility (DMM-5, Attachment 8). See Figure 3a below.

Figure 3a. Location of TENORM Consolidation Cell Relative to Identified EML Locations

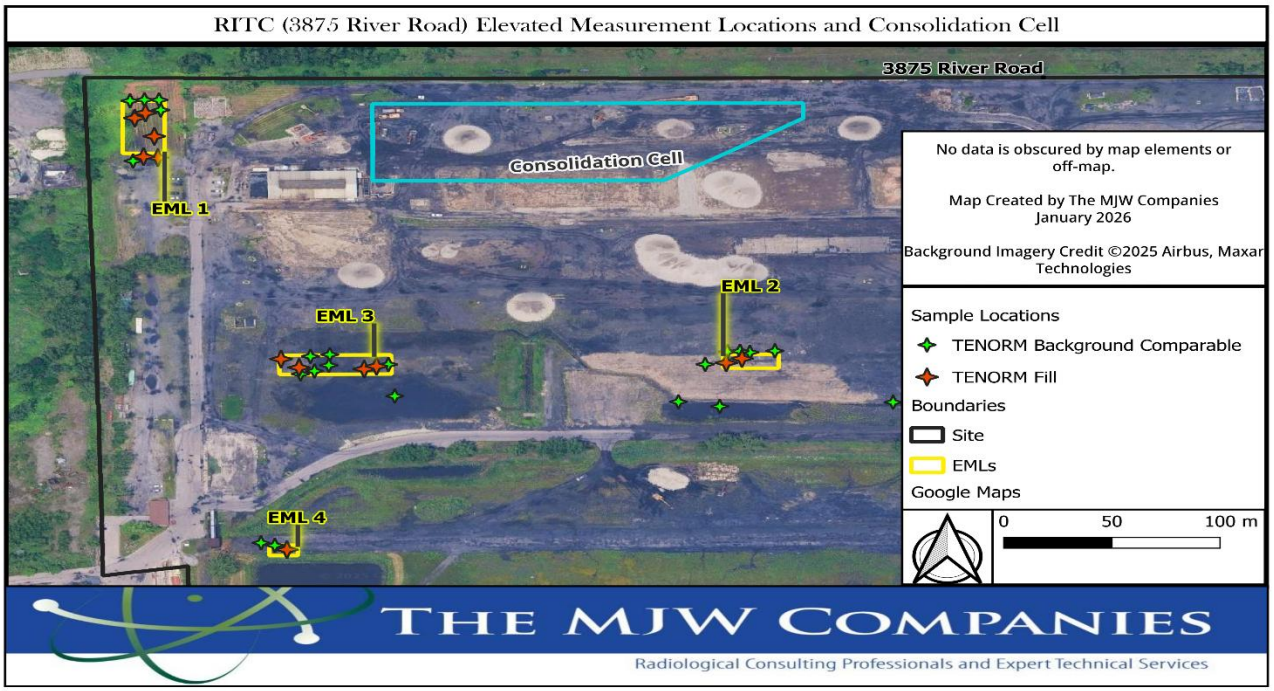


Figure 4. Selected Plan, Remedial Alternative for the Consolidation Cell

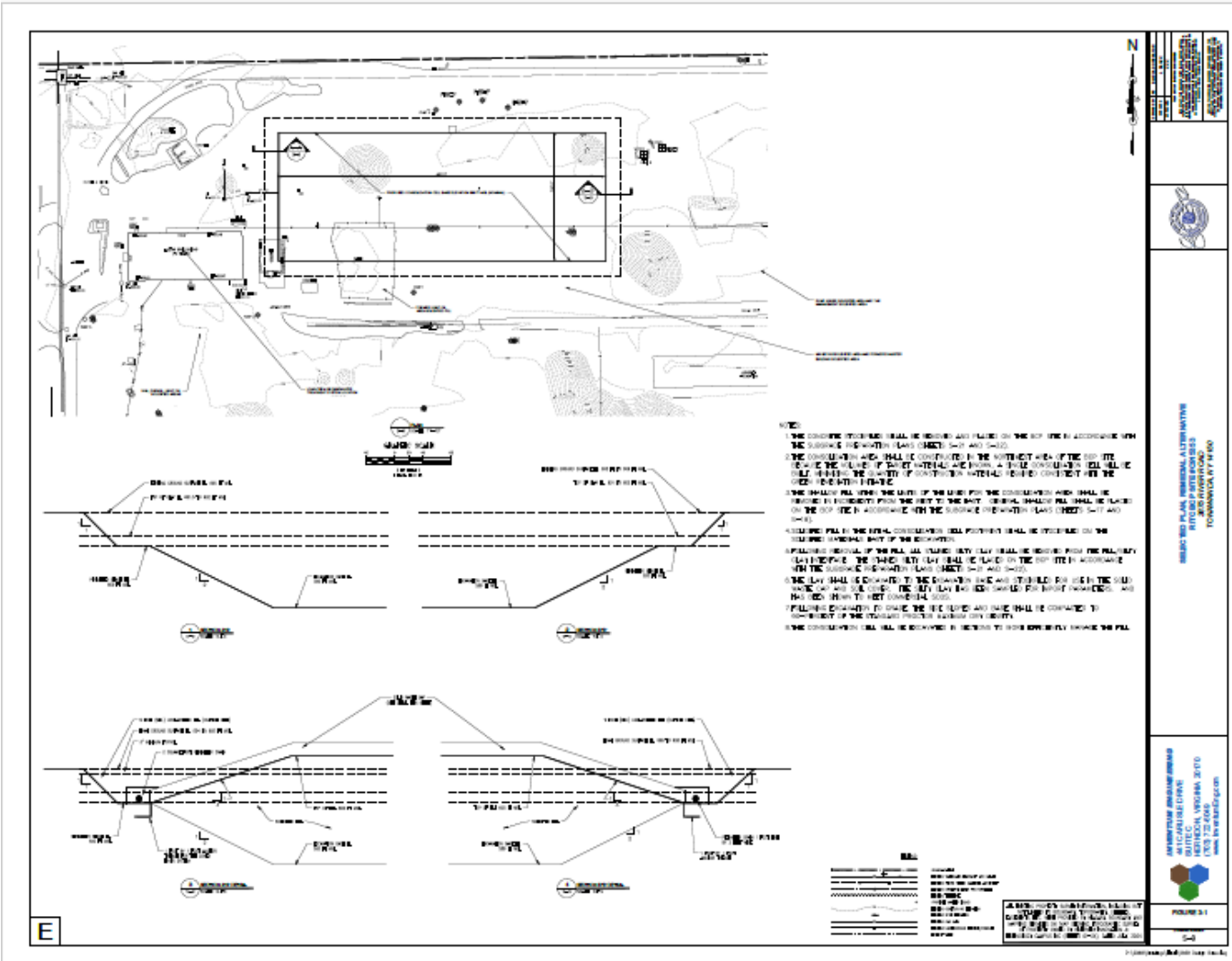
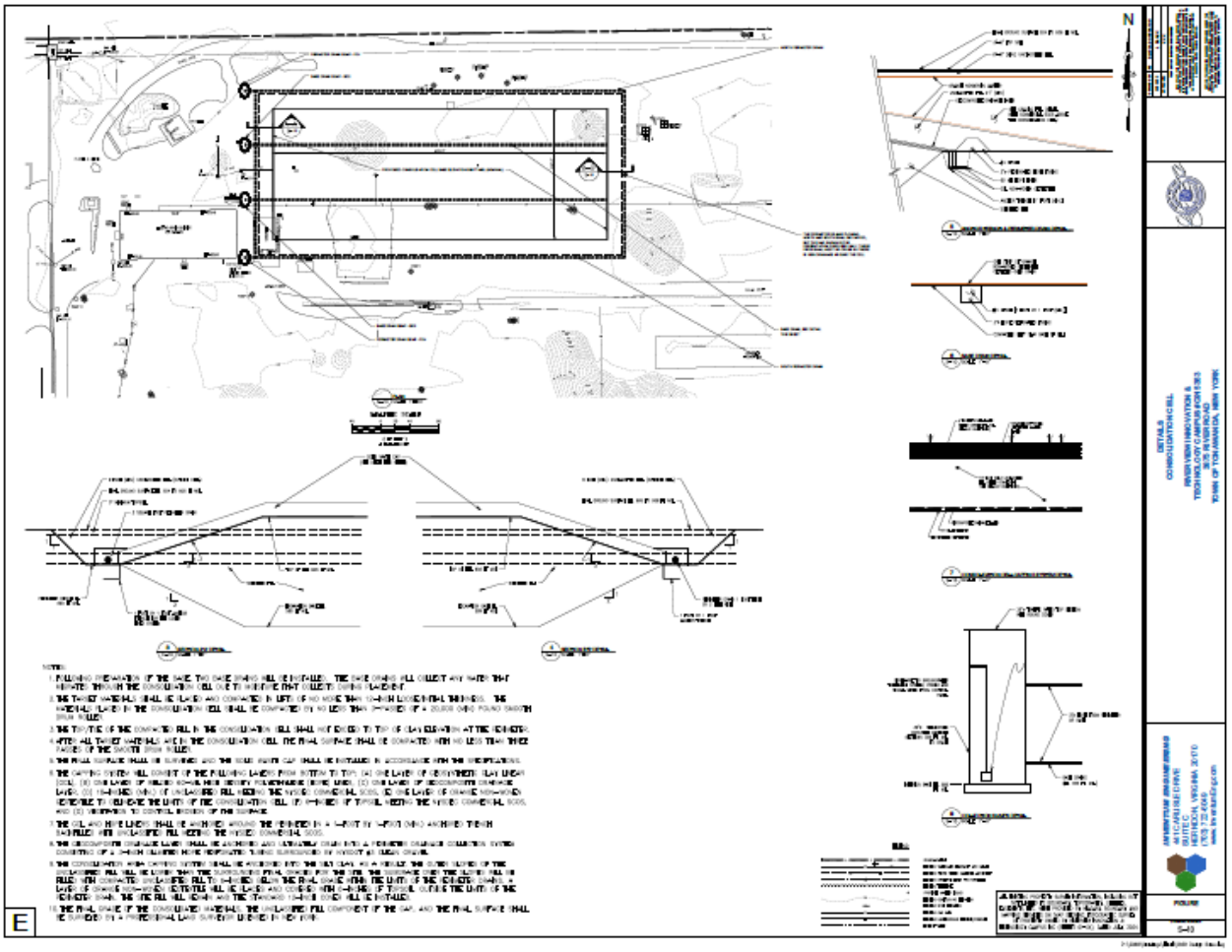


Figure 5. Consolidation Cell Details



4.0 Proposed Site Use

Although this variance only addresses the 3875 River Road portion of the site, Figure 6 shows the full extent of the Riverview Innovation & Technology Campus including Sites 108 (OU1), 109 (OU2) and 110 (OU3). Figure 7 shows a conceptual rendering of the completed campus including Sites 109 & 110. Appendix F contains the existing the proposed Site Layout and Landcover.

Figure 6. The Full Extent of the Riverview Innovation & Technology Campus Including Sites 108, 109 and 110.

Figure 7. RITC, 3875 River Road, Site 109 and 110, Conceptual Layout Plan

5.0 Exposure Impacts from Management of Site TENORM Materials

As part of the variance request for the movement and use of TENORM materials on the site, NYSDEC requires that a dose assessment be performed to quantify the potential radiation dose to site use individuals that may occur due to the material movement and potential cover options under likely site use scenarios. In compliance with this requirement, an exposure assessment has been performed using the RESidual RADioactive (RESRAD) Material Model V7.2 (2016) developed at Argonne National Laboratory to analyze potential radiation exposures to individuals on site from the residual radiological content of existing on site TENORM materials. RESRAD uses a pathway analysis method in which the relationship between radionuclide concentrations in soil and the dose to a member of a critical population group is expressed as the sum of the products of "pathway factors." Pathways are determined by the specified exposure scenarios. RESRAD can evaluate nine (9) of the principal radiation exposure pathways used to determine potential radiation dose from on-site radiation sources. The nine exposure pathways include: External gamma; Inhalation (without radon); Plant Ingestion; Meat Ingestion; Milk Ingestion; Aquatic Foods;

Drinking Water; Soil Ingestion; and Radon.

However, because plausible or likely current and future use scenarios at the Site do not involve groundwater or agricultural uses, not all nine of the potential exposure pathways are applicable or relevant. At this site, plant, milk, meat, and aquatic food ingestion, and groundwater use as a drinking water source or irrigation source are not plausible and were not used by the RESRAD modeling to determine dose to an on-site individual.

Existing site TENORM materials are initially assumed to be distributed to a design depth of 3 feet and a maximum depth of 4 feet with 2 feet of soil and/or equivalent hard cover materials placed over the compacted fill. A two-foot thickness is the minimum soil cover requirement for commercial/industrial site development required by the Brownfield Cleanup Program (BCP), 6 NYCRR Part 375. TENORM has been shown to be present in the 4 identified EML areas. TENORM from these areas will be removed and placed into a consolidation cell located in the northwest corner of the site (see Figure 4). The material placed in the consolidation cell will be covered with a minimum of 2 feet of clean soil and or macadam/concrete equivalent fill across the area of the cell when completed in accordance with the approved Remedial Action Work Plan.

The radionuclide concentrations used to evaluate potential exposures from the resident onsite TENORM are the average laboratory analytical concentrations identified in the test pit samples collected from several site locations in 2024. The RESRAD radionuclide and average concentration values used are shown in Table 5 on page 26 below. Laboratory analytical reports are provided in Appendix B for all samples collected. As shown in the sample results, the primary enhanced NORM isotope identified is Radium-226 whereas the concentrations of Th-232, Ra-228 and other decay progeny co-located with the Ra- 226 are at or near concentrations typically observed in background soils (see the analytical results summary in Appendix C). The average Ra-226 concentration for the EML soil sampling was 4.12 pCi/g while the soil sample analysis for the 2023 and 2024 soil analysis was 3.76 pCi/g. The higher Ra-226 average is used in this analysis. Site U-238 analysis was performed by gamma spectroscopy as well as alpha spectroscopy. For these calculations we have averaged the two analyses with a result of 4.15 pCi/g.

RESRAD v7.2 (2016) was used to evaluate the following five (5) potential exposure scenarios:

1. Industrial Worker: No Building Occupancy. This scenario assumes a site worker would spend an

hour between lunch breaks and traversing a nearby parking area for 250 days/year or 250 hours/year.

2. Groundskeeper: This person would be present maintaining outside facilities on the 86.5-acre site for 40 hours per week, 8 months of the year or 1,280 hours per year with an additional 320 hours/yr for snow removal resulting in a total of 1,600 hours/year on the site.
3. Recreational User: Assumes a neighbor/trespasser spends 6 hours/week for 26 weeks of the year playing on and around the 86.5-acre site for a total of 156 hours/year.
4. Future Industrial Worker: This scenario assumes that a future industrial worker is in a building which has been constructed on the site over a TENORM source. Given the site TENORM will be placed in a consolidation cell will be sited a significant distance away from any buildings, this scenario will only address the potential for radon exposure for the groundskeeper and workers who are infrequently near the consolidation cell or 100 hours per year.

   Following the preparation of the site and prior to installation of the soil cap, radon emanation rates can be measured to determine the potential need for a radon abatement system for any structures that may be placed on the site. The importance of the presence of radon is demonstrated by the final two RESRAD exposure scenarios where radon is the major contributor to dose. Current industry construction guidelines mandate a minimum of 8 air changes per hour to ensure safe working conditions for the construction of an anticipated large building industrial building. This scenario takes no credit for the presence of a sub-slab radon abatement system.

5. Future Construction Worker and Inadvertent Intruder: Both scenarios are evaluated by assuming either a construction worker or inadvertent intruder removes the 2 feet of site soil cover atop the consolidation cell for foundation construction or subgrade work and are directly exposed to the TENORM beneath the cover. The estimated duration required to construct a foundation and building was estimated to be 500 hours (about 3 weeks) i.e., 8 hours/day for 63 days (about 2 months), during which time the individual would be exposed to the uncovered TENORM materials. The construction worker will not be on the site following his work on the building. The inadvertent intruder could possibly spend as much as 3-4 months at 8 hours/day, but this activity would be restricted to only the accessible areas of the site and not to any buildings. This is obviously a very unlikely worst-case scenario

In each exposure scenario, individual radiation dose is evaluated for the on-site receptor while on an area of the site without a paved parking area or inside any proposed commercial building (see Figure 7 above) except for scenario 4 for the future industrial worker which has been modified to reflect a more realistic scenario. For exposure scenarios 1, 2 and 3, the primary exposure pathway is direct exposure from the radiological material in the ground and for scenarios 4 and 5 the cap is assumed to have been removed. Again, due to the nature of the consolidation cell and the likely safeguards it will have, these scenarios are highly unlikely. Although radon and inhalation of resuspended particulates also contribute dose primarily during future use scenarios following cover removal, the direct exposure pathway is the principal source of radiation (approximately 90% of the total dose) to on-site receptors in all scenarios evaluated except scenarios 5 and 6. Table 6 below identifies the maximum potential dose estimated by RESRAD and the year the dose was determined to occur.

Table 5: Average Test Pit/EML Soil Sample Concentrations Used in RESRAD Modelling*

Isotope*	Concentration (pCi/g) **
U-238	4.15
U-234	4.15
Ra-226	4.12
Ra-228	0.7

* RESRAD assumes ingrowth and equilibrium for progeny unless progeny concentrations at time zero indicated otherwise.
** Results shown are the average concentrations reported for EML test pit soil sample results.

Wherever appropriate, RESRAD default values were used to perform the site-specific dose assessments. However, to adjust default parameters for site specific and scenario specific conditions, default parameters were revised as described below:

- Time (indoors and outdoors on-site): RESRAD default values are 0.25 and 0.50 of a year, which corresponds to 2,191.5 hours (about 3 months) and 4,383 hours (about 6 months), respectively. The number of hours used for the site-specific scenarios are described in Section 1.5.1 above and were used to calculate the fractional duration spent indoors and outdoors on-site in a year. For example, the 500 hours estimated for the on-site receptor in scenario 5 (Future Construction Worker) becomes 500 divided by the number of hours in a year (i.e., 8766 equaling 0.057 or 5.7% of a year).
- Contamination layer thickness: RESRAD uses a default layer thickness of 2.0 meters whereas for the scenarios evaluated a site-specific thickness layer of 1 meter (3.3 ft) was used.

- Contamination Area: RESRAD default is 10,000 square meters. For all the site-specific scenarios, the contaminated zone or area is identified as being 43,560 ft^2 (1 acre) in a circular shape ~235 feet (71.6 m) in diameter.
- Soil Density: RESRAD default for soils is 1.5 grams/cubic centimeter(cc), however, because the materials being reused are made up of primarily slag materials, a density of 2.2 g/cc was used.
- Cover Depth: RESRAD assumes that the contaminated layer is not covered. In the scenarios evaluated and as required by NYSDEC, a soil cover depth of 2 feet or 0.6096 meters is used.
- Building Air Exchange Rate: A RESRAD default for this parameter is 0.5 or 1 change/hour and assumes residential structures. In future use scenarios where a building on the site is used, the buildings are assumed to be commercial data centers or office buildings. Because such buildings are well constructed, an air turnover rate of 8 air changes per hour was used given it is an industry standard minimum for air exchanges per hour in a large building.
- Foundation Radon Coefficient: The RESRAD default for this parameter is 3E-07 m^2/s. However, as suggested by NUREG 0706, a default value of 6E-09 m^2/s was used and a contaminated zone radon coefficient of 3E-07 m^2/s was used. The RESRAD default value for the radon coefficient is based on sandy or loamy soils which are much more porous than slag materials and the default value used is 2E-06 m^2/s.
- Foundation Depth: The RESRAD default value is 1-meter bgs whereas the building construction scenarios used estimated a foundation depth of 0.5 meters (1.64-ft) to reflect the type of industrial building being constructed.

Appendix D shows the RESRAD input parameters and exposure results for each scenario and a graph showing radionuclide ingrowth and the year of maximum dose. Important information for the results has been highlighted for convenience.

5.1 Residential Farmer Exposure Assessment

Finally, RESRAD was used to evaluate the potential exposure received by a residential farmer residing in a slab-on-grade home built on the site and assumes an area of 1626 m^2 using likely and potential exposures pathways results in a maximum potential dose of 33.3 mrem in year one. Institutional controls (i.e., deed restrictions, the public water source, etc.) and planned future uses (30-100 years) are assumed for drinking water, however, given the presence of the TENORM material across the site, the radon pathways must still be considered

and not assumed to be mitigated regardless of potential institutional controls. Performing the RESRAD calculations for this scenario shows that the radon parameters are extremely sensitive. Only 2 parameters were modified for this assessment, namely, the building air changes per hour were doubled to 2/hour and the foundation depth was increased to one foot from 6 inches. The remaining pathways: meat and milk ingestion, and aquatic foods, are not viable due to the planned site use and controls. Based on these assumptions the exposure to an on-site resident farmer in the near-term (i.e., <100 years, with institutional controls (IC) in place) using the maximum radionuclide concentrations observed in the site slag/soil, and the site-specific parameters shown in the table below, receptor dose was determined for 30 years. It should be noted that this scenario is an "all-controls-fail" thus no institutional controls are considered to be in place.

Contaminated Zone Dimensions	Initial Soil Concentrations (pCi/g)
Area: 1000 square meters	Ra-226: 4.15
Thickness: 1.0 meters	Ra-228: 0.7
Cover Depth: 0.6096 meters	U-234: 4.15
	U-238: 4.15

RESRAD Site Specific parameters and Soil Concentrations used for the Resident Farmer Scenario (see Appendix D)

Table.6: Summary of RESRAD Receptor Dose for Site Specific Scenarios

Scenario	Maximum Annual Dose (mrem/yr)	Maximum Dose Year	Critical Pathway
Industrial Worker	1.9e-04	0	External
Groundskeeper	2.5e-04	0	External
Recreational User	0.15	609	External
Future Industrial Worker (30 yr)*	8.35	0	External 88%, Radon 12%
Future Construction Worker/Intruder (30 yr)**	42.5	0	Radon 85% External 15%
Resident Farmer All-Controls-Fail Scenario***	33.3	0	Radon 64% External 36%

* Maximum dose of 8.3 mrem/yr in first year assumes no cover immediately following placement which is not plausible under EE and cover requirements. With no cover after year 30 dose is 6.4 mrem/yr.
** Maximum dose of 42.5 mrem/yr with no cover during first year and after year 30 dose drops to 34 mrem/yr.
*** Scenario assumes the farmer does not eat any plants that are grown on the farm. If plants are eaten annual exposure slightly exceeds 100 mrem/yr.

The maximum total dose to the on-site residential farmer under the All-Controls-Fail Scenario was determined by RESRAD as occurring in year 0 with a dose of 33.3 mrem. If it is assumed the farmer eats

the plants he grows, the annual dose is slightly higher than 100 mrem/yr (~109 mrem.) Regardless of the future site intuitional controls, the primary exposure pathway is radon exposure whether it is from indoor or outdoor exposures. The dose at year 30 for this scenario is 27 mrem. The RESRAD estimated maximum dose is conservatively estimated to be well below the recommended 100 mrem/yr dose limit identified by Nuclear Regulatory Commission (NRC), NYSDEC and NYSDOH for radiation exposure to the general public. It should be noted that a residential farmer being allowed to build a home and farm on the property is most likely contrary to any and all institutional controls that will be in place long before the farmer might occupy a small area of the site.

5.1 Comparative Dose Criteria

Two (2) applicable comparative criteria were identified and used to compare the results of the RESRAD models:

- United State NRC 10 CFR 20.1402- Radiological Criteria for Unrestricted Use of Formally Utilized Sites.
- United States Environmental Protection Agency (EPA) 10 CFR 40, I, Criterion 6(6) as implemented per Directive No. 9200.4-35P April 2000.

The NRC 10 CFR Part 20 is the Standard for Protection Against Radiation. Part 20.1402 is the Radiological Criteria for Unrestricted Use, which states that a formally utilized site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 25 millirem (mrem) per year, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). The 25 mrem per year could be considered as an applicable or relevant and appropriate requirement (ARAR).

10 CFR 40, I, Criterion 6(6) requires that if a dose assessment is conducted at a site with contaminates of concern that include: Ra-226, Ra-228, Th-230, Th-232, U-234 and/or U-238 in soils, then 12 millirem per year (mrem/yr) effective dose equivalent should be the maximum dose limit for the maximally exposed individual (MEI) using exposure parameters consistent with the selected land use for the site.

Compliance with Criterion 6(6) rule achieves an equivalent remediation risk level to that determined for

soil concentration of 5 pCi/g for Ra-226 in soil which was recommended as a maximum concentration for surface soils in 40 CFR Part 192. Therefore, the use of the 6(6) criterion is more conservative as the dose from other radionuclides present is also considered. Compliance with the rule is considered protective and equivalent to the exposure limit in other governmental actions, particularly regulations and guidance developed by EPA.

Both criteria can be considered ARARs (Applicable or Relevant and Appropriate Requirement) and "to-be-considered" comparative value (TBC) for evaluation of the RESRAD model outputs in the absence of TENORM regulatory criteria or guidance in New York State.

Based on the RESRAD models, the maximum potential dose to on-site receptors occurs for future use scenarios that assume loss of the required cover material (i.e., soil/hard cover), and that occur in the 30 years following completion of site redevelopment. The conservative dose estimates determined for the hypothetical future uses of the site shown in Table 3 varies from 0.36 to 54.25 mrem/year for the presumed future resident farmer scenario. In the case of the residential farmer all-controls-fail scenario is in place, the maximum allowable dose limit identified by NRC, NYSDOH and NYSDEC of 100 mrem/year, excluding the radon pathway, for members of the public is used as the maximum permissible dose. In this case the radon pathway is active and results in a maximum annual dose of 54.25 mrem/yr which is well below the 100 mrem/year limit. RESRAD modeling assessment reports for all scenarios are provided in Appendix D.

Therefore, allowing the low-level TENORM material to remain in place on the site would not present any significant adverse impact to the public health and safety or the environment as has been demonstrated by the results of the conservative site use scenarios modeled. Specifically, on site existing low-level TENORM with concentrations of Ra-226 of less than 15 pCi/g , which will be covered with a minimum of a 2-foot of approved cover system and/or hardscape (i.e., asphalt, concrete, etc.), will not result in exposures exceeding those recommended by regulatory agencies (applicable ARARs) under plausible or likely current or future site use scenarios.

6.0 Purpose and Scope

Once approved by NYSDEC and NYSDOH, this Variance Request, along with the TENORM Management Plan, provides the scope of work and planned approach for the site TENORM management which includes

the placement methods used for the proposed grading plan and installation of a cover system.

6.1 Project Organization and Responsibilities

A qualified environmental professional and an appropriately licensed radiological contractor and will provide oversight and field screening of work areas and equipment during TENORM management activities. An appropriately licensed radiological contractor and qualified environmental professional will maintain field notes and documentation of the TENORM management, locations and activities. An appropriately licensed radiological contractor and qualified environmental professional will oversee the site construction contractor who will be under the supervision and direction of the site project manager and will be responsible for any TENORM management and the cover system. This same contractor will be responsible for arranging any required off-site disposal of TENORM with concentrations above 15 pCi/g at an approved out-of-state facility.

6.2 TENORM Construction Overview

6.2.1 Project Coordination/Kickoff Construction Meeting

A project coordination/kickoff meeting will be held with key representatives of the Project Team before site activities begin. Attendees at the meeting will include a representative from the construction contractor(s) and a licensed radiological contractor. The NYSDEC Project Manager will be notified of the meeting date and time and requested to invite individuals from the Department they would like to have present at the meeting or via teleconference. Agenda items will include:

- Project schedule
- Work sequencing
- Designation of responsibilities, contact personnel, and phone numbers.
- Remedial Action Work Plan (RAWP) and TMP review.
- Project documentation requirements
- Import Materials/Cover System Installation
- Health and safety requirements
- Temporary controls (dust suppression, storm water management) as described in the site-specific Stormwater Pollution Prevention Plan (SWPP, Ref.2) and in sections 7.9 and 7.10 of

the site Remedial Investigation / Alternatives Analysis / Remedial Work Plan (RI/AA/RAWP).

A qualified environmental professional manager, with support from MJW, will prepare meeting minutes for distribution to attendees following the meeting. Progress meetings or calls will be conducted, as necessary, throughout the site work activities.

6.2.2 Quality Assurance Requirements

Based on current Site requirements, the Site will have a 2-foot soil cover or equivalent hardcover system as part of the final cover system design. As a requirement, all imported soil sources, including general backfill soil and topsoil, will be subject to third-party testing to verify that they meet all of the quality assurance requirements specified in the AA/RAWP. The required specified number of samples will be submitted to an independent NYSDOH ELAP-certified laboratory for analysis. Inventum Engineering will be notified of the sampling and provided an opportunity to observe the sample collection work. An Import Request which may include analytical testing will be submitted to the NYSDEC and approved prior to delivery of any imported material onsite.

All analyses will be in accordance with USEPA SW-846 methodology, and the required laboratory data package level (Level A or as otherwise requested) will be made available to NYSDEC on request.

Institutional Control(s) will be imposed in the form of an Environmental Easement (EE) described and required by the NYSDEC and recorded with the Erie County Clerk for the Site. The EE will require compliance with the SMP, the IC/ECs placed on the Site, identify use restrictions (e.g., commercial and/or industrial) and restrict the use of groundwater as a source of potable and/or process water without New York State Department of Health approval.

7.0 Air Monitoring

The TENORM Management Plan (TMP) identifies the circumstances requiring air monitoring and provides provisions for Community Air and Fugitive Dust monitoring. MJW, supported by Inventum and site contractors, will take reasonable steps to suppress potentially contaminated fugitive dust in accordance with the site erosion and sediment controls plans and the community air monitoring plan, such as misting with

water or curtailing intrusive activities.

8.0 Radiation Safety Monitoring

Radiological monitoring and related actions are required for all activities that may be impacted by TENORM materials at the site to protect public and workers' health and safety and to control the potential release of materials off-site (i.e., fugitive dust emissions, runoff, etc.) to levels as low as reasonably achievable (ALARA).

Radiation Protection Technicians/radiological control technicians (RCT) and radiological control supervisory personnel (RCS) will provide radiological coverage to ensure the radiological safety of MJW and site workers during work activities required for any surface and subsurface survey and sampling work. Finally, radiation safety monitoring will be performed in accordance with a NYSDEC approved TMP during all site TENORM activities including activities involving excavation, grading, field screening, and cover system installation.

8.1 Personnel Monitoring

The dose rates and total dose from exposure to radiation and radioactive materials will be significantly less than 100 mrem. As a result, no individual personnel monitoring (either external or internal) will be required. Personnel monitoring is required under NYCRR Code 16 when radiation doses are expected to exceed 500 mrem in a year.

8.2 Personal Protection Equipment

No specific personal protection equipment (PPE) will be required for radiological protection as part of this site redevelopment project. PPE for construction safety purposes will be worn in accordance with the Site HASPs included as an attachment of the TMP.

9.0 Equipment Monitoring

As described in the TMP, surface measurements will be collected from construction equipment and personnel during the day to ensure TENORM levels are acceptable. Surface measurements from equipment used in handling TENORM impacted materials that will require decontamination are as

follows (listed in of NYSDOH Code 16):

- Alpha 20 dpm/100 cm^2 removable
- Alpha 500/100 cm^2 total
- Beta 1,000 dpm/100 cm^2 removable
- Beta 5,000 dpm/100 cm^2 total

10.0 Documentation and Reporting

A qualified environmental professional and an appropriately licensed radiological contractor and will document site activities. Documentation will include construction activity reports, results from required air or dust monitoring, gamma radiation measurements, equipment and personnel surveys, decontamination activities, and photographs and sketches, as necessary.

10.1 Construction Monitoring

A qualified environmental professional will implement standard reporting procedures for Site activities that will include preparation of a field activity report and, when appropriate, problem identification and corrective measures reports. Information that may be included on the field activity report form includes:

- Activities and locations of construction work under way.
- Equipment and personnel working in the area, including subcontractors.

The NYSDEC will be notified of problems requiring modifications to this variance request or completion of construction requirements or specifications. Problem identification and corrective measures reports will be provided to NYSDEC whenever major field problems are encountered. Discussions regarding appropriate and recommended corrective measures for major issues or problems will be related to NYSDEC for agreement and will be included as part of the Construction Completion Report (CCR). Changes or additions to this variance request or to the TMP will also be noted in the CCR.

Photographic documentation of site EML TENORM movement activities will be prepared by either Inventum Engineering or MJW throughout the duration of the project to convey work activity progress and significant changes in conditions or circumstances that may arise. Photographs will be provided in digital format.

10.2 Progress Reports

A qualified environmental professional and MJW will prepare and submit to NYSDEC a monthly progress report that includes:

- Activities performed during reporting period.
- Results of tests or other pertinent data.
- Work scheduled for the upcoming reporting period.
- Percentage of completion, delays encountered or anticipated that may affect the schedule, and a description of efforts made to mitigate those delays or anticipated delays.
- Other actions/information pertinent to the project.

10.3 Construction Completion Report

A Construction Completion Report (CCR) will be prepared and submitted to NYSDEC to document TENORM activities. The report will be submitted within 90 days of completion of the work and will also be required to be submitted with the Periodic Review Report (PRR) which documents Site activities. The CCR will document activities that were completed in accordance with the variance request and are consistent with the requirements of Section 5.8 of DER- 10 that include:

- Text describing the TENORM movement and cover system installation activities performed.
- A description of any problems encountered, deviations from the variance request or the TMP, and associated corrective measures taken; and other pertinent information necessary to document that the Site activities were carried out in accordance with the TMP.
- A Site map showing the extent of grading plan as left for any TENORM movements and type of cover system installed.
- Field Screening and laboratory analytical data, as required.
- Copies of field activity reports and, if applicable, problem identification and corrective measure reports.
- A certification by a licensed NYS Professional Engineer in accordance with Section 1.5 of DER-10 (Ref. 5).

11.0 Site Management Plan

A Site Management Plan (SMP) will be prepared for the Site following completion of the remedial actions described in the AA/RAWP. It will be developed using the most recent NYSDEC SMP template

to provide protocols and procedures to address soil/fill that may be excavated at the Site during future redevelopment and the maintenance of the cover system. The SMP will be in effect until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36.

11.1 Corrective Measures Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or an engineering control, a Corrective Measures Plan will be submitted to the NYSDEC for approval. This Plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Plan until it is approved by the NYSDEC.

11.2 Project Schedule

A project schedule will be submitted to NYSDEC 30 days in advance of the commencement of remedial construction and redevelopment site work. The NYSDEC Project Manager will be notified seven (7) days in advance of the start of field activities that are included in the RAWP and TMP for BCP Site's` redevelopment activities.

12.0 References

1. Inventum Engineering, PC, DPC, 2023, Draft Remedial Investigation Report, 3875 River Road, Tonawanda, NY. Riverview Innovation & Technology Campus Brownfield Cleanup Program Site No. C915353, August.

2. New York State Department of Environmental Conservation, 2011, Brownfield Cleanup Program, Site #915353, Citizen Participation Plan for the 3875 River Road Site.

3. Inventum Engineering, PC, DPC, 2025, TENORM Management Plan, Riverview Innovation & Technology Campus Brownfield Cleanup Program Site No. C915353, February.

4. RESRAD-Onsite 7.2, 2016, Argonne National Laboratory, RESidual RADioactive Material Model.

5. NYSDEC DER-10 / Technical Guidance for Site Investigation and Remediation, 2010, May.

Appendix A

Estimated Offsite TENORM Disposal Costs

Estimated Offsite TENORM Disposal Costs

Attached herein please find a quote for TENORM disposal associated with the Riverview Innovation and Technology Campus, Inc. (RITC) site located at 3875 River Road Tonawanda, NY. Inventum has estimated that approximately 7,000 tons of TENORM material may be required to be disposed. The attached quote pricing for TENORM waste with a concentration of less than 6.99 pCi/g total Ra-226 and Ra-228 at $218/ton. This would make the estimated cost for the TENORM disposal of $1,536,000, which includes mobilization to the site and demobilization costs ($10,000).

Approval of this variance request will allow RITC to wisely invest this money into continuing to improve the site and the TENORM material to be placed in a consolidation area on site will maintain and enhance site safety standards at the completion of the project.

PSH, LLC
Radiological Services

PSH, LLC
Radiological Services
633 Buckingham Street
Oakville, CT 06779

Alexander Bartels
Corporate Radiation Safety Officer
The MJW Companies
15 Hazelwood Drive Suite 112
Amherst, NY 14228
Office: (716) 631-8291
Cell: (716) 248-4732

March 23, 2026

SUBJECT: Price Quote for On-Site Waste Characterization, Transportation, and Disposal (T&D) of TENORM Contaminated Waste

PSH, LLC (PSH) is pleased to submit the following pricing for the on-site characterization, transportation and disposal (T&D) of an estimated 7,000 tons of low level TENORM contaminated waste currently located in Western New York.

PSH will utilize the CANBERRA In-Situ Object Counting System (ISOCS) to determine the activity of the TENORM waste supporting the final disposal. This method is approved by the Ohio Dept. of Health as listed on PSH, LLC's State of Ohio "Radioactive Material License." #03219 990015. To date, Pat Horkman/PSH, LLC has supported the T&D of more than 70,000 tons of TENORM waste generated from remedial projects within upstate NY into Ohio landfills utilizing the ISOCS method.

If it is determined that the activity of the waste is <6.99 pCi/g total radium 226 and 228 (State of Ohio's total radium limit for disposal into an Ohio landfill) the waste will be transported via tractor/end dump trailers, and disposed of into Republic Services' Carbon Limestone landfill, located in Lowellville, OH and or Waste Management's Mahoning landfill, located in New Springfield, OH

PRICING

*Trans and Disposal of TENORM Waste <6.99 pCi/g Total Ra-226 and Ra-228	$218.00/ton
Mobilization	$5,000.00/ea
De-De-Mobilization	$5,000.00/ea

*** There will be a 21-ton minimum per truckload charged if there is less than a full load (=/> 21 ton) on the last truckload.**

Pricing to include the following:

- Project personnel travel, meals, and lodging
- (1) Site Manager/Certified Waste Shipper
- (1) ISOCs/Radiological Technician
- End dump trailers/tri-axle trucks/day
- (1) ISOCS Gamma Spec. System (waste analysis)
- (1) Office/Lab Trailer
- (1) Sky Trac/extended reach forklift
- (1) 45 kw diesel generator
- (1) Bicron uR Dose Rate Meter
- (1) Ludlum 2221 w/44-10 2x2 Detector

PSH, LLC's scope of work:

- Generate and get approval - "Waste Profile" (Republic Services' Carbon Limestone Lowellville, Ohio Landfill Facility and or WM's Mahoning New Springfield, OH Landfill Facility)
- Perform ISOCS radiological analysis of each conveyance (loaded end dump trailer)
- Provide all required DOT shipping paperwork
- If the waste in the conveyance has been determined to be <6.99 pCi/g total Ra-226 and 228, PSH will;
    - Provide all transportation of waste utilizing end dump tractor trailers from the project site, located in Western New York to Republic Services' Carbon Limestone landfill, located in Lowellville, OH and or Waste Management's Mahoning landfill, located in New Springfield, OH
    - Provide the disposal of TENORM waste into to Republic Services' Carbon Limestone landfill, located in Lowellville, OH and or Waste Management's Mahoning landfill, located in New Springfield, OH
    - Provide the waste generator with a "Certificate of Disposal" certifying the total tonnage of waste disposed of
- Provide the generator with a copy of the signed waste manifest (stating landfill acceptance/disposal) and landfill/disposal facility scale tickets

PAYMENT TERMS: Net 30 Days

Please feel free to call me with any questions or comments at 860-324-6599.

Sincerely,

Patrick Horkman

Pat Horkman
President/Owner
PSH, LLC
633 Buckingham Street
Oakville, CT 06779
Mobile: 860-324-6599

Appendix B

Analytical Results for Test Pit Samples

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-40621-1
Client Project/Site: Tonawanda Radiological Analysis

For:
Inventum Engineering LLC
481 Carlisle Dr
Suite 202
Herndon, Virginia 20170

Attn: James Edwards

Rhonda Ridenhower

Authorized for release by:
1/11/2021 11:01:39 AM
Rhonda Ridenhower, Client Service Manager
Rhonda.Ridenhower@Eurofinset.com

Designee for

Ivan Vania, Project Manager II
(314)298-8566
Ivan.Vania@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at:
www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Chain of Custody 6
Receipt Checklists 7
Definitions/Glossary 8
Method Summary 9
Sample Summary 10
Client Sample Results 11
QC Sample Results 18
QC Association Summary 22
Tracer Carrier Summary 24

Job ID: 160-40621-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Inventum Engineering LLC

Project: Tonawanda Radiological Analysis

Report Number: 160-40621-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 11/30/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Job ID: 160-40621-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Samples TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2), TP-BCP-32-W45 (160-40621-3), TP-BCP-44-A (160-40621-4), TP-BCP-44-B (160-40621-5) and TP-BCP-47 (160-40621-6) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020.

The following samples, analyzed by gamma spectroscopy, have lead-210 as a requested analyte. Lead-210, energy 46.54 keV, is out of calibration range for water and Density-equals-one geometries. The results are estimated. The data have been reported with this narrative. TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2) and TP-BCP-44-B (160-40621-5).

Insufficient sample was provided for the following sample to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy. The samples contained large pieces of rock. The use of a different geometry could potentially bias the results low due to the loss of radon into the headspace of the container.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2), TP-BCP-32-W45 (160-40621-3), TP-BCP-44-A (160-40621-4), TP-BCP-44-B (160-40621-5) and TP-BCP-47 (160-40621-6) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with SW-846 Method 9310. The samples were dried on 12/04/2020, prepared on 12/21/2020 and analyzed on 12/23/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2), TP-BCP-32-W45 (160-40621-3), TP-BCP-44-A (160-40621-4), TP-BCP-44-B (160-40621-5) and TP-BCP-47 (160-40621-6) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 12/04/2020, prepared on 12/21/2020 and analyzed on 01/04/2021.

A blank population correction was applied to account for contributions to the analyte count rate from sources other than the sample itself. Interferences may include, but are not limited to, impurities in reagents, tracers, or glassware, or effects due to the measurement process (such as tailing or crosstalk).TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2), TP-BCP-32-W45 (160-40621-3), TP-BCP-44-A

Job ID: 160-40621-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

(160-40621-4), TP-BCP-44-B (160-40621-5), TP-BCP-47 (160-40621-6), (LCS 160-492632/1-A), (MB 160-492632/23-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples TP-BCP-34-A (160-40621-1), TP-BCP-34-B (160-40621-2), TP-BCP-32-W45 (160-40621-3), TP-BCP-44-A (160-40621-4), TP-BCP-44-B (160-40621-5) and TP-BCP-47 (160-40621-6) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 12/04/2020, prepared on 12/21/2020 and analyzed on 01/07/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Eurofins TestAmerica, St. Louis
13715 Rider Trail North

Earth City, MO 63045-1205
phone 314.298.8566 fax 314.298.8757

Chain of Custody Record

160-40621 Chain of Custody

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other: NYSDEC Brownfield Test

Client Contact	Project Manager: Todd Waldrop	Site Contact: John Black	Date: 11/19/2020	COC No: RITC 001
Inventum Engineering	Email: Todd.Waldrop@inventumeng.com	Lab Contact: Ivan Vania	Carrier: FeDex	1 of 1 COCs
481 Carlisle Drive, Suite 202	Tel: 571 217 3627			Sampler: J. Black
Herndon, Virginia 20170	Analysis Turnaround Time			For Lab Use Only:
571 217 3627	☐ CALENDAR DAYS ☑ WORKING DAYS			Walk-in Client:
(xxx) xxx-xxxx FAX	TAT if different from Below 20 Days			Lab Sampling:
Project Name: RITC RI	☐ 2 weeks			
Site: Riverview	☐ 1 week			Job / SDG No.:
P O #	☐ 2 days ☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Method 901.1 Gamma Spectroscopy N	Method 9310 Gross Alpha/Beta (GFPC	A-01-R Isotopic Thorium (Alpha Spect	A-01-R Isotopic Uranium (Alpha Spec	Sample Specific Notes:
TP-BCP-34-A	10.30	11:15	G	Slag				X	X	X	X	Please prepare samples as needed
TP-BCP-34-B	10.30	11:15	G	Slag				X	X	X	X	
TP-BCP-32-W45	11.9	1:00	G	Slag				X	X	X	X	
TP-BCP-44-A	11.13	11:50	G	Slag				X	X	X	X	
TP-BCP-44-B	11.13	11:50	G	Slag				X	X	X	X	
TP-BCP-47	11.18	9:20	G	Slag				X	X	X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other None

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? **No** Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. **None**

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Electronic data deliverable for NYSDEC Equis and Honeywell.

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.: 001, 002		Cooler Temp. (°C): Obs'd _____ Corr'd _____		Therm ID No.: _____
Relinquished by: James Edwards	Company: Inventum	Date/Time: 11.19 / 1730	Received by: FE	Company:	Date/Time:
Relinquished by: FE	Company:	Date/Time:	Received by:	Company: ETA STL	Date/Time: 11/30/2020 1347
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.23, dated 4/16/2019

1/11/2021

Login Sample Receipt Checklist

Client: Inventum Engineering LLC

Job Number: 160-40621-1

Login Number: 40621
List Number: 1
Creator: Greer, Diane A

List Source: Eurofins TestAmerica, St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Inventum Engineering LLC
Project/Site: Tonawanda Radiological Analysis

Job ID: 160-40621-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Inventum Engineering LLC
Project/Site: Tonawanda Radiological Analysis

Job ID: 160-40621-1

Method	Method Description	Protocol	Laboratory
901.1	Radium-226 & Other Gamma Emitters (GS)	EPA	TAL SL
9310	Gross Alpha / Beta (GFPC)	SW846	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL
Thin_Layer	Preparation, Thin Layer Technique	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Inventum Engineering LLC
Project/Site: Tonawanda Radiological Analysis

Job ID: 160-40621-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40621-1	TP-BCP-34-A	Solid	10/30/20 11:15	11/30/20 13:47	
160-40621-2	TP-BCP-34-B	Solid	10/30/20 11:15	11/30/20 13:47	
160-40621-3	TP-BCP-32-W45	Solid	11/09/20 01:00	11/30/20 13:47	
160-40621-4	TP-BCP-44-A	Solid	11/13/20 11:50	11/30/20 13:47	
160-40621-5	TP-BCP-44-B	Solid	11/13/20 11:50	11/30/20 13:47	
160-40621-6	TP-BCP-47	Solid	11/18/20 09:20	11/30/20 13:47	

Client: Inventum Engineering LLC
Project/Site: Tonawanda Radiological Analysis

Job ID: 160-40621-1

Client Sample ID: TP-BCP-34-A
Date Collected: 10/30/20 11:15
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-1
Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.590	U	2.58	2.58		2.95	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Actinium-228	0.858	U	1.07	1.07		1.51	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Bismuth-212	-1.07	U	4.42	4.42		7.53	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Bismuth-214	**4.46**		0.654	0.785		0.415	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Lead-210	**5.42**		2.96	3.04		3.27	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Lead-212	**1.48**		0.374	0.407		0.489	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Lead-214	**4.08**		0.729	0.829		0.601	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Potassium-40	4.00	U	3.01	3.03		4.16	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Protactinium-231	0.000	U	1.86	1.86		18.7	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Radium-226	**4.46**		0.654	0.785	1.00	0.415	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Radium-228	0.858	U	1.07	1.07		1.51	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Thallium-208	**0.386**		0.265	0.268		0.283	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Thorium-232	0.858	U	1.07	1.07		1.51	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Thorium-234	**5.04**		2.17	2.24		2.92	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Uranium-235	0.391	U	0.742	0.743		3.04	pCi/g	12/10/20 10:53	12/31/20 17:38	1
Uranium-238	**5.04**		2.17	2.24		2.92	pCi/g	12/10/20 10:53	12/31/20 17:38	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/10/20 10:53*	*12/31/20 17:38*	*1*

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	**50.9**		7.91	9.81	10.0	5.60	pCi/g	12/21/20 18:42	12/23/20 06:08	1
Gross Beta	**16.7**		2.98	3.42	10.0	3.08	pCi/g	12/21/20 18:42	12/23/20 06:08	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.91**		0.269	0.314	1.00	0.0796	pCi/g	12/21/20 11:42	01/04/21 10:38	1
Thorium-230	**4.22**		0.398	0.533	1.00	0.0453	pCi/g	12/21/20 11:42	01/04/21 10:38	1
Thorium-232	**1.36**		0.226	0.253	1.00	0.0521	pCi/g	12/21/20 11:42	01/04/21 10:38	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.0*		*30 - 110*	*12/21/20 11:42*	*01/04/21 10:38*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	**3.12**		0.327	0.420	1.00	0.0641	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-235	**0.0904**		0.0642	0.0647	1.00	0.0595	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-238	**3.12**		0.327	0.419	1.00	0.0527	pCi/g	12/21/20 14:05	01/07/21 12:47	1

Client Sample ID: TP-BCP-34-A

Lab Sample ID: 160-40621-1

Date Collected: 10/30/20 11:15

Matrix: Solid

Date Received: 11/30/20 13:47

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	81.8		30 - 110	12/21/20 14:05	01/07/21 12:47	1

Client Sample ID: TP-BCP-34-B

Lab Sample ID: 160-40621-2

Date Collected: 10/30/20 11:15

Matrix: Solid

Date Received: 11/30/20 13:47

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0884	U	0.217	0.217		2.72	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Actinium-228	0.561	U	0.955	0.957		1.10	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Bismuth-212	-2.66	U	3.79	3.80		6.29	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Bismuth-214	**3.70**		0.760	0.841		0.597	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Lead-210	**4.06**		3.03	3.07		3.28	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Lead-212	**1.28**		0.351	0.377		0.477	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Lead-214	**3.79**		0.504	0.624		0.563	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Potassium-40	-2.00	U	4.68	4.68		5.65	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Protactinium-231	-0.00000102	U	10.0	10.0		16.9	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Radium-226	**3.70**		0.760	0.841	1.00	0.597	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Radium-228	0.561	U	0.955	0.957		1.10	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Thallium-208	**0.561**		0.430	0.433		0.337	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Thorium-232	0.561	U	0.955	0.957		1.10	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Thorium-234	**2.73**		1.35	1.38		2.53	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Uranium-235	0.368	U	0.692	0.693		2.24	pCi/g	12/10/20 10:53	12/31/20 21:09	1
Uranium-238	**2.73**		1.35	1.38		2.53	pCi/g	12/10/20 10:53	12/31/20 21:09	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	12/10/20 10:53	12/31/20 21:09	1

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	**54.9**		9.21	11.1	10.0	7.56	pCi/g	12/21/20 18:42	12/23/20 06:08	1
Gross Beta	**24.3**		4.00	4.68	10.0	4.11	pCi/g	12/21/20 18:42	12/23/20 06:08	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.681**		0.170	0.179	1.00	0.0982	pCi/g	12/21/20 11:42	01/04/21 10:38	1
Thorium-230	**2.25**		0.300	0.355	1.00	0.0746	pCi/g	12/21/20 11:42	01/04/21 10:38	1
Thorium-232	**0.737**		0.171	0.182	1.00	0.0554	pCi/g	12/21/20 11:42	01/04/21 10:38	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	72.1		30 - 110	12/21/20 11:42	01/04/21 10:38	1

Client Sample ID: TP-BCP-34-B

Date Collected: 10/30/20 11:15
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-2
Matrix: Solid

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	4.00		0.362	0.494	1.00	0.0643	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-235	0.196		0.0914	0.0929	1.00	0.0629	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-238	4.06		0.365	0.499	1.00	0.0612	pCi/g	12/21/20 14:05	01/07/21 12:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*82.0*		*30 - 110*	*12/21/20 14:05*	*01/07/21 12:47*	*1*

Client Sample ID: TP-BCP-32-W45

Date Collected: 11/09/20 01:00
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-3
Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.130	U	0.351	0.352		0.802	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Actinium-228	0.735		0.225	0.237		0.258	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Bismuth-212	-0.232	U	1.07	1.07		1.86	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Bismuth-214	0.515		0.170	0.178		0.168	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Lead-210	0.0732	U	1.11	1.11		1.48	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Lead-212	0.409		0.0932	0.103		0.107	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Lead-214	0.481		0.130	0.139		0.130	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Potassium-40	3.62		1.22	1.28		1.09	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Protactinium-231	0.000	U	0.276	0.276		4.94	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Radium-226	0.515		0.170	0.178	1.00	0.168	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Radium-228	0.735		0.225	0.237		0.258	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Thallium-208	0.198		0.0584	0.0618		0.0389	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Thorium-232	0.735		0.225	0.237		0.258	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Thorium-234	0.851		0.584	0.591		0.810	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Uranium-235	-0.224	U	0.328	0.328		0.852	pCi/g	12/10/20 10:53	12/31/20 16:11	1
Uranium-238	0.851		0.584	0.591		0.810	pCi/g	12/10/20 10:53	12/31/20 16:11	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/10/20 10:53*	*12/31/20 16:11*	*1*

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	7.73		4.28	4.37	10.0	5.90	pCi/g	12/21/20 18:42	12/23/20 06:08	1
Gross Beta	6.48		2.32	2.41	10.0	3.10	pCi/g	12/21/20 18:42	12/23/20 06:08	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	2.40		0.295	0.357	1.00	0.121	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Client Sample ID: TP-BCP-32-W45

Date Collected: 11/09/20 01:00
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-3
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-230	5.09		0.424	0.602	1.00	0.0925	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-232	1.58		0.235	0.270	1.00	0.0487	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.4*		*30 - 110*	*12/21/20 11:42*	*01/04/21 16:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.593		0.139	0.147	1.00	0.0494	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-235	0.0323	U	0.0407	0.0408	1.00	0.0615	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-238	0.474		0.125	0.131	1.00	0.0598	pCi/g	12/21/20 14:05	01/07/21 12:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*87.6*		*30 - 110*	*12/21/20 14:05*	*01/07/21 12:46*	*1*

Client Sample ID: TP-BCP-44-A

Date Collected: 11/13/20 11:50
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-4
Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.769	U	1.18	1.19		1.85	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Actinium-228	1.07		0.338	0.355		0.312	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Bismuth-212	-0.534	U	1.79	1.79		2.88	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Bismuth-214	2.99		0.349	0.467		0.205	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Lead-210	3.16		1.38	1.43		1.92	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Lead-212	0.815		0.179	0.208		0.228	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Lead-214	2.62		0.309	0.412		0.293	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Potassium-40	2.89		1.51	1.54		2.00	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Protactinium-231	-1.66	U	6.46	6.47		10.8	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Radium-226	2.99		0.349	0.467	1.00	0.205	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Radium-228	1.07		0.338	0.355		0.312	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Thallium-208	0.336		0.126	0.130		0.138	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Thorium-232	1.07		0.338	0.355		0.312	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Thorium-234	2.42		0.908	0.947		1.45	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Uranium-235	-0.299	U	0.747	0.748		1.25	pCi/g	12/10/20 10:53	12/31/20 16:15	1
Uranium-238	2.42		0.908	0.947		1.45	pCi/g	12/10/20 10:53	12/31/20 16:15	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/10/20 10:53*	*12/31/20 16:15*	*1*

Client Sample ID: TP-BCP-44-A

Date Collected: 11/13/20 11:50
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-4

Matrix: Solid

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	23.3		5.57	6.18	10.0	5.17	pCi/g	12/21/20 18:42	12/23/20 06:08	1
Gross Beta	9.51		2.17	2.37	10.0	2.41	pCi/g	12/21/20 18:42	12/23/20 06:08	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.323		0.111	0.114	1.00	0.0882	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-230	0.471		0.126	0.132	1.00	0.0467	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-232	0.322		0.104	0.107	1.00	0.0402	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.3*		*30 - 110*	*12/21/20 11:42*	*01/04/21 16:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	2.34		0.288	0.349	1.00	0.0690	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-235	0.106		0.0693	0.0698	1.00	0.0528	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-238	2.31		0.285	0.344	1.00	0.0490	pCi/g	12/21/20 14:05	01/07/21 12:46	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*77.7*		*30 - 110*	*12/21/20 14:05*	*01/07/21 12:46*	*1*

Client Sample ID: TP-BCP-44-B

Date Collected: 11/13/20 11:50
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-5

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.241	U	0.694	0.694		1.57	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Actinium-228	1.22		0.522	0.536		0.681	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Bismuth-212	0.822	U	1.84	1.84		3.13	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Bismuth-214	3.26		0.479	0.575		0.380	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Lead-210	2.40		1.41	1.44		1.80	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Lead-212	0.961		0.200	0.225		0.237	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Lead-214	3.29		0.353	0.475		0.342	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Potassium-40	2.28		1.76	1.78		2.07	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Protactinium-231	0.000	U	1.51	1.51		10.8	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Radium-226	3.26		0.479	0.575	1.00	0.380	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Radium-228	1.22		0.522	0.536		0.681	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Thallium-208	0.330		0.135	0.139		0.139	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Thorium-232	1.22		0.522	0.536		0.681	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Thorium-234	3.50		1.10	1.16		1.59	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Uranium-235	-0.358	U	0.493	0.494		1.29	pCi/g	12/10/20 10:53	12/31/20 14:42	1
Uranium-238	3.50		1.10	1.16		1.59	pCi/g	12/10/20 10:53	12/31/20 14:42	1

Client Sample ID: TP-BCP-44-B

Date Collected: 11/13/20 11:50
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-5
Matrix: Solid

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None						pCi/g	12/10/20 10:53	12/31/20 14:42	1

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	26.3		6.84	7.47	10.0	6.90	pCi/g	12/21/20 18:42	12/23/20 06:08	1
Gross Beta	10.2		3.25	3.41	10.0	4.11	pCi/g	12/21/20 18:42	12/23/20 06:08	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.892		0.180	0.195	1.00	0.0875	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-230	3.69		0.357	0.473	1.00	0.0418	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-232	0.783		0.164	0.177	1.00	0.0258	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.1		30 - 110	12/21/20 11:42	01/04/21 16:06	1

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	4.49		0.397	0.548	1.00	0.0718	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-235	0.297		0.116	0.118	1.00	0.0673	pCi/g	12/21/20 14:05	01/07/21 12:46	1
Uranium-238	4.35		0.390	0.534	1.00	0.0583	pCi/g	12/21/20 14:05	01/07/21 12:46	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Uranium-232	80.7		30 - 110	12/21/20 14:05	01/07/21 12:46	1

Client Sample ID: TP-BCP-47

Date Collected: 11/18/20 09:20
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-6
Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.509	U	0.914	0.915		1.29	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Actinium-228	2.58		0.354	0.440		0.294	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Bismuth-212	3.90		1.07	1.14		0.897	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Bismuth-214	3.79		0.310	0.495		0.214	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Lead-210	2.73		0.940	1.00		1.20	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Lead-212	2.77		0.194	0.348		0.156	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Lead-214	3.63		0.249	0.444		0.245	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Potassium-40	14.1		1.72	2.24		1.05	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Protactinium-231	-1.36	U	5.31	5.31		8.84	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Radium-226	3.79		0.310	0.495	1.00	0.214	pCi/g	12/10/20 10:53	12/31/20 14:46	1

Client Sample ID: TP-BCP-47

Date Collected: 11/18/20 09:20
Date Received: 11/30/20 13:47

Lab Sample ID: 160-40621-6

Matrix: Solid

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	2.58		0.354	0.440		0.294	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Thallium-208	1.00		0.154	0.185		0.121	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Thorium-232	2.58		0.354	0.440		0.294	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Thorium-234	1.59		0.898	0.915		1.43	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Uranium-235	-0.331	U	0.915	0.916		1.52	pCi/g	12/10/20 10:53	12/31/20 14:46	1
Uranium-238	1.59		0.898	0.915		1.43	pCi/g	12/10/20 10:53	12/31/20 14:46	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/10/20 10:53*	*12/31/20 14:46*	*1*

Method: 9310 - Gross Alpha / Beta (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	44.3		8.18	9.61	10.0	7.36	pCi/g	12/21/20 18:42	12/23/20 06:09	1
Gross Beta	24.7		3.67	4.43	10.0	3.56	pCi/g	12/21/20 18:42	12/23/20 06:09	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	2.03		0.283	0.331	1.00	0.102	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-230	3.09		0.345	0.432	1.00	0.0289	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-232	1.95		0.274	0.319	1.00	0.0464	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*73.5*		*30 - 110*	*12/21/20 11:42*	*01/04/21 16:06*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	3.41		0.364	0.463	1.00	0.0849	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-235	0.246		0.110	0.112	1.00	0.0672	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-238	3.29		0.356	0.451	1.00	0.0539	pCi/g	12/21/20 14:05	01/07/21 12:47	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*81.6*		*30 - 110*	*12/21/20 14:05*	*01/07/21 12:47*	*1*

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-491399/1-A
Matrix: Solid
Analysis Batch: 493539

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 491399

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.07698	U	0.217	0.218		0.693	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Actinium-228	0.1249	U	0.240	0.241		0.299	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Bismuth-212	-0.005821	U	0.936	0.936		1.70	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Bismuth-214	-0.1124	U	0.207	0.208		0.386	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Lead-210	-0.4430	U	1.30	1.30		2.14	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Lead-212	-0.02495	U	0.0772	0.0772		0.193	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Lead-214	-0.09030	U	0.128	0.128		0.249	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Potassium-40	-0.3954	U	0.674	0.675		1.52	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Protactinium-231	0.0000	U	0.376	0.376		4.16	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Radium-226	-0.1124	U	0.207	0.208	1.00	0.386	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Radium-228	0.1249	U	0.240	0.241		0.299	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Thallium-208	-0.03121	U	0.0442	0.0443		0.0988	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Thorium-232	0.1249	U	0.240	0.241		0.299	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Thorium-234	-0.5387	U	0.533	0.537		1.37	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Uranium-235	0.07392	U	0.223	0.223		0.475	pCi/g	12/10/20 10:53	12/31/20 11:26	1
Uranium-238	-0.5387	U	0.533	0.537		1.37	pCi/g	12/10/20 10:53	12/31/20 11:26	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/10/20 10:53*	*12/31/20 11:26*	*1*

Lab Sample ID: LCS 160-491399/2-A
Matrix: Solid
Analysis Batch: 493542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 491399

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	96.4	97.49		10.2		1.16	pCi/g	101	87 - 116
Cesium-137	26.7	26.17		2.79		0.182	pCi/g	98	87 - 120
Cobalt-60	9.41	9.574		1.06		0.113	pCi/g	102	87 - 115

Lab Sample ID: 160-40613-A-1-D DU
Matrix: Solid
Analysis Batch: 493539

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 491399

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	-0.639	U	0.1994	U	0.817		1.18	pCi/g	0.41	1
Actinium-228	1.46		1.125		0.344		0.255	pCi/g	0.49	1
Bismuth-212	1.99		1.003	U	1.85		3.10	pCi/g	0.35	1
Bismuth-214	2.26		2.259		0.415		0.260	pCi/g	0	1
Lead-210	-2.44	U	1.366	U	2.46		3.53	pCi/g	0.76	1
Lead-212	1.22		1.041		0.220		0.172	pCi/g	0.39	1
Lead-214	2.36		2.128		0.365		0.222	pCi/g	0.29	1
Potassium-40	11.1		13.32		2.64		0.970	pCi/g	0.44	1
Protactinium-231	0.000	U	0.0000	U	1.36		8.88	pCi/g	0	1
Radium-226	2.26		2.259		0.415	1.00	0.260	pCi/g	0	1

Method: 901.1 - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-40613-A-1-D DU
Matrix: Solid
Analysis Batch: 493539

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 491399

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-228	1.46		1.125		0.344		0.255	pCi/g	0.49	1
Thallium-208	0.338		0.3731		0.111		0.0778	pCi/g	0.16	1
Thorium-232	1.46		1.125		0.344		0.255	pCi/g	0.49	1
Thorium-234	3.19		3.783		1.00		1.51	pCi/g	0.28	1
Uranium-235	0.380	U	0.05857	U	0.504		1.03	pCi/g	0.37	1
Uranium-238	3.19		3.783		1.00		1.51	pCi/g	0.28	1

Other Detected Radionuclides	*Sample Result*	*Sample Qual*	*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*RER*	*RER Limit*
Other Detected Radionuclide	*None*		*None*					*pCi/g*		

Method: 9310 - Gross Alpha / Beta (GFPC)

Lab Sample ID: MB 160-492676/1-A
Matrix: Solid
Analysis Batch: 492906

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 492676

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	4.593	U	3.89	3.92	10.0	6.05	pCi/g	12/21/20 18:42	12/23/20 06:05	1
Gross Beta	-0.6239	U	1.33	1.33	10.0	2.39	pCi/g	12/21/20 18:42	12/23/20 06:05	1

Lab Sample ID: LCS 160-492676/2-A
Matrix: Solid
Analysis Batch: 492906

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 492676

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	27.2	27.89		7.03	10.0	5.05	pCi/g	103	75 - 125
Gross Beta	26.9	21.82		3.60	10.0	2.49	pCi/g	81	75 - 125

Lab Sample ID: 180-114273-A-1-V DU
Matrix: Solid
Analysis Batch: 492906

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 492676

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Gross Alpha	8.83		16.10		5.69	10.0	6.50	pCi/g	0.74	1
Gross Beta	16.5		21.50		4.09	10.0	3.72	pCi/g	0.66	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-492632/23-A
Matrix: Solid
Analysis Batch: 494066

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 492632

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.004159	U	0.0176	0.0177	1.00	0.0466	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-230	0.06451		0.0473	0.0476	1.00	0.0403	pCi/g	12/21/20 11:42	01/04/21 16:06	1
Thorium-232	0.008282	U	0.0166	0.0166	1.00	0.0248	pCi/g	12/21/20 11:42	01/04/21 16:06	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.6*		*30 - 110*	*12/21/20 11:42*	*01/04/21 16:06*	*1*

Lab Sample ID: LCS 160-492632/1-A
Matrix: Solid
Analysis Batch: 494061

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 492632

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	22.28		2.20	1.00	0.0986	pCi/g	91	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*93.5*		*30 - 110*

Lab Sample ID: 460-222314-E-1-H DU
Matrix: Solid
Analysis Batch: 494065

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 492632

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	0.501		0.5027		0.142	1.00	0.0970	pCi/g	0.01	1
Thorium-230	0.618		0.4332		0.126	1.00	0.0584	pCi/g	0.67	1
Thorium-232	0.528		0.5474		0.141	1.00	0.0245	pCi/g	0.07	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*84.3*		*30 - 110*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-492653/23-A
Matrix: Solid
Analysis Batch: 494342

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 492653

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-234	0.07153		0.0508	0.0512	1.00	0.0471	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-235	0.0000	U	0.00524	0.00524	1.00	0.0314	pCi/g	12/21/20 14:05	01/07/21 12:47	1
Uranium-238	0.008399	U	0.0168	0.0168	1.00	0.0252	pCi/g	12/21/20 14:05	01/07/21 12:47	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Uranium-232	*79.8*		*30 - 110*	*12/21/20 14:05*	*01/07/21 12:47*	*1*

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-492653/1-A
Matrix: Solid
Analysis Batch: 494355

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 492653

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Uranium-234	6.37	5.953		0.682	1.00	0.104	pCi/g	93	84 - 120
Uranium-238	6.51	5.972		0.682	1.00	0.0732	pCi/g	92	82 - 122

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Uranium-232	*78.3*		*30 - 110*

Lab Sample ID: 460-222314-E-1-J DU
Matrix: Solid
Analysis Batch: 494277

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 492653

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Uranium-234	0.316		0.3899		0.120	1.00	0.0554	pCi/g	0.32	1
Uranium-235	0.00527	U	0.04645	U	0.0469	1.00	0.0578	pCi/g	0.52	1
Uranium-238	0.323		0.2421		0.0932	1.00	0.0512	pCi/g	0.39	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Uranium-232	*86.2*		*30 - 110*

Rad

Leach Batch: 489269

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-222314-E-1-H DU	Duplicate	Total/NA	Solid	Dry and Grind	
460-222314-E-1-J DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 490838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40613-A-1-D DU	Duplicate	Total/NA	Solid	Dry and Grind	

Leach Batch: 490914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-1	TP-BCP-34-A	Total/NA	Solid	Dry and Grind	
160-40621-2	TP-BCP-34-B	Total/NA	Solid	Dry and Grind	
160-40621-3	TP-BCP-32-W45	Total/NA	Solid	Dry and Grind	
160-40621-4	TP-BCP-44-A	Total/NA	Solid	Dry and Grind	
160-40621-5	TP-BCP-44-B	Total/NA	Solid	Dry and Grind	
160-40621-6	TP-BCP-47	Total/NA	Solid	Dry and Grind	

Leach Batch: 490935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114273-A-1-V DU	Duplicate	Total/NA	Solid	Dry and Grind	

Prep Batch: 491399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-1	TP-BCP-34-A	Total/NA	Solid	Fill_Geo-21	490914
160-40621-2	TP-BCP-34-B	Total/NA	Solid	Fill_Geo-21	490914
160-40621-3	TP-BCP-32-W45	Total/NA	Solid	Fill_Geo-21	490914
160-40621-4	TP-BCP-44-A	Total/NA	Solid	Fill_Geo-21	490914
160-40621-5	TP-BCP-44-B	Total/NA	Solid	Fill_Geo-21	490914
160-40621-6	TP-BCP-47	Total/NA	Solid	Fill_Geo-21	490914
MB 160-491399/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-491399/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40613-A-1-D DU	Duplicate	Total/NA	Solid	Fill_Geo-21	490838

Prep Batch: 492632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-1	TP-BCP-34-A	Total/NA	Solid	ExtChrom	490914
160-40621-2	TP-BCP-34-B	Total/NA	Solid	ExtChrom	490914
160-40621-3	TP-BCP-32-W45	Total/NA	Solid	ExtChrom	490914
160-40621-4	TP-BCP-44-A	Total/NA	Solid	ExtChrom	490914
160-40621-5	TP-BCP-44-B	Total/NA	Solid	ExtChrom	490914
160-40621-6	TP-BCP-47	Total/NA	Solid	ExtChrom	490914
MB 160-492632/23-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-492632/1-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
460-222314-E-1-H DU	Duplicate	Total/NA	Solid	ExtChrom	489269

Prep Batch: 492653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-1	TP-BCP-34-A	Total/NA	Solid	ExtChrom	490914
160-40621-2	TP-BCP-34-B	Total/NA	Solid	ExtChrom	490914
160-40621-3	TP-BCP-32-W45	Total/NA	Solid	ExtChrom	490914
160-40621-4	TP-BCP-44-A	Total/NA	Solid	ExtChrom	490914
160-40621-5	TP-BCP-44-B	Total/NA	Solid	ExtChrom	490914

Rad (Continued)

Prep Batch: 492653 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-6	TP-BCP-47	Total/NA	Solid	ExtChrom	490914
MB 160-492653/23-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-492653/1-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
460-222314-E-1-J DU	Duplicate	Total/NA	Solid	ExtChrom	489269

Prep Batch: 492676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40621-1	TP-BCP-34-A	Total/NA	Solid	Thin_Layer	490914
160-40621-2	TP-BCP-34-B	Total/NA	Solid	Thin_Layer	490914
160-40621-3	TP-BCP-32-W45	Total/NA	Solid	Thin_Layer	490914
160-40621-4	TP-BCP-44-A	Total/NA	Solid	Thin_Layer	490914
160-40621-5	TP-BCP-44-B	Total/NA	Solid	Thin_Layer	490914
160-40621-6	TP-BCP-47	Total/NA	Solid	Thin_Layer	490914
MB 160-492676/1-A	Method Blank	Total/NA	Solid	Thin_Layer	
LCS 160-492676/2-A	Lab Control Sample	Total/NA	Solid	Thin_Layer	
180-114273-A-1-V DU	Duplicate	Total/NA	Solid	Thin_Layer	490935

Tracer/Carrier Summary

Client: Inventum Engineering LLC
Project/Site: Tonawanda Radiological Analysis

Job ID: 160-40621-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
160-40621-1	TP-BCP-34-A	75.0
160-40621-2	TP-BCP-34-B	72.1
160-40621-3	TP-BCP-32-W45	81.4
160-40621-4	TP-BCP-44-A	81.3
160-40621-5	TP-BCP-44-B	81.1
160-40621-6	TP-BCP-47	73.5
460-222314-E-1-H DU	Duplicate	84.3
LCS 160-492632/1-A	Lab Control Sample	93.5
MB 160-492632/23-A	Method Blank	87.6

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		U-232
Lab Sample ID	Client Sample ID	(30-110)
160-40621-1	TP-BCP-34-A	81.8
160-40621-2	TP-BCP-34-B	82.0
160-40621-3	TP-BCP-32-W45	87.6
160-40621-4	TP-BCP-44-A	77.7
160-40621-5	TP-BCP-44-B	80.7
160-40621-6	TP-BCP-47	81.6
460-222314-E-1-J DU	Duplicate	86.2
LCS 160-492653/1-A	Lab Control Sample	78.3
MB 160-492653/23-A	Method Blank	79.8

Tracer/Carrier Legend

U-232 = Uranium-232

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: NW. 6-8. 8-11
Sample ID: 634158001
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 11.1%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.52	+/-0.380	0.321	+/-0.405		pCi/g			MXR1	09/13/23	0813	2480270	1
Americium-241	U	0.321	+/-0.448	0.767	+/-0.471		pCi/g							
Antimony-124	U	0.219	+/-0.137	0.283	+/-0.170		pCi/g							
Antimony-125	U	0.0108	+/-0.139	0.259	+/-0.139		pCi/g							
Barium-133	U	0.0188	+/-0.0688	0.108	+/-0.0693		pCi/g							
Barium-140	U	0.556	+/-0.962	1.82	+/-0.995		pCi/g							
Beryllium-7	U	-0.0421	+/-0.653	1.07	+/-0.653		pCi/g							
Bismuth-212	U	1.16	+/-0.935	1.17	+/-0.944		pCi/g							
Bismuth-214		15.5	+/-0.443	0.164	+/-1.72		pCi/g							
Cerium-139	U	0.0372	+/-0.0635	0.104	+/-0.0662		pCi/g							
Cerium-141	U	0.168	+/-0.187	0.310	+/-0.203		pCi/g							
Cerium-144	U	-0.241	+/-0.368	0.659	+/-0.384		pCi/g							
Cesium-134	U	0.0700	+/-0.0535	0.103	+/-0.0625		pCi/g							
Cesium-136	U	0.143	+/-0.372	0.608	+/-0.378		pCi/g							
Cesium-137	U	0.0206	+/-0.0525	0.0871	+/-0.0533	0.100	pCi/g							
Chromium-51	U	-0.795	+/-1.06	1.59	+/-1.12		pCi/g							
Cobalt-56	U	0.00992	+/-0.0582	0.107	+/-0.0584		pCi/g							
Cobalt-57	U	0.00515	+/-0.0477	0.0873	+/-0.0478		pCi/g							
Cobalt-58	U	-0.0601	+/-0.0670	0.0991	+/-0.0725		pCi/g							
Cobalt-60	U	-0.0275	+/-0.0453	0.0768	+/-0.0470		pCi/g							
Europium-152	U	0.0684	+/-0.167	0.281	+/-0.170		pCi/g							
Europium-154	U	0.0187	+/-0.165	0.243	+/-0.165		pCi/g							
Europium-155	U	0.0471	+/-0.197	0.365	+/-0.199		pCi/g							
Iridium-192	U	0.00975	+/-0.0676	0.119	+/-0.0678		pCi/g							
Iron-59	U	-0.0983	+/-0.137	0.233	+/-0.144		pCi/g							
Lead-210	U	-10.3	+/-13.5	22.6	+/-14.4		pCi/g							
Lead-212		1.68	+/-0.183	0.164	+/-0.225		pCi/g							
Lead-214		18.8	+/-0.482	0.201	+/-1.58		pCi/g							
Manganese-54	U	-0.0542	+/-0.0562	0.0826	+/-0.0615		pCi/g							
Mercury-203	U	-0.000573	+/-0.0808	0.142	+/-0.0808		pCi/g							
Neodymium-147	U	-0.294	+/-2.36	4.35	+/-2.37		pCi/g							
Neptunium-239	U	0.100	+/-0.545	0.894	+/-0.547		pCi/g							
Niobium-94	UI	0.000	+/-0.0438	0.0876	+/-0.0612		pCi/g							
Niobium-95	UI	0.000	+/-0.0846	0.187	+/-0.268		pCi/g							
Potassium-40		5.80	+/-1.16	0.835	+/-1.26		pCi/g							
Promethium-144	U	0.0225	+/-0.0428	0.0806	+/-0.0441		pCi/g							
Promethium-146	U	0.0556	+/-0.102	0.116	+/-0.105		pCi/g							
Radium-226		18.8	+/-0.482	0.201	+/-1.58		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: NW. 6-8. 8-11
Sample ID: 634158001

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		1.52	+/-0.380	0.321	+/-0.405		pCi/g							
Ruthenium-106	U	-0.182	+/-0.382	0.687	+/-0.391		pCi/g							
Silver-110m	U	0.00209	+/-0.0677	0.123	+/-0.0677		pCi/g							
Sodium-22	U	0.00544	+/-0.0585	0.0862	+/-0.0586		pCi/g							
Thallium-208		0.590	+/-0.102	0.0834	+/-0.119		pCi/g							
Thorium-234		13.6	+/-7.11	6.19	+/-7.75		pCi/g							
Tin-113	U	-0.0661	+/-0.0740	0.134	+/-0.0799		pCi/g							
Uranium-235		1.00	+/-0.617	0.646	+/-0.621		pCi/g							
Uranium-238		13.6	+/-7.11	6.19	+/-7.75		pCi/g							
Yttrium-88	U	0.0885	+/-0.0631	0.110	+/-0.0750		pCi/g							
Zinc-65	U	0.0442	+/-0.117	0.190	+/-0.119		pCi/g							
Zirconium-95	U	0.0301	+/-0.114	0.210	+/-0.115		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
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Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: W. 0-6. 8-11
Sample ID: 634158002
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 6.35%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date Time	Batch	Mtd.
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"													
Actinium-228		1.18	+/-0.435	0.331	+/-0.447		pCi/g			MXR1	09/13/23 0823	2480270	1
Americium-241	U	0.0675	+/-0.0866	0.155	+/-0.0920		pCi/g						
Antimony-124	U	0.0742	+/-0.140	0.284	+/-0.144		pCi/g						
Antimony-125	U	0.0814	+/-0.134	0.256	+/-0.139		pCi/g						
Barium-133	U	-0.0411	+/-0.0594	0.0950	+/-0.0624		pCi/g						
Barium-140	U	1.56	+/-1.55	1.63	+/-1.56		pCi/g						
Beryllium-7	U	-0.0722	+/-0.553	1.01	+/-0.554		pCi/g						
Bismuth-212		1.32	+/-0.797	1.20	+/-0.809		pCi/g						
Bismuth-214		9.11	+/-0.415	0.171	+/-1.06		pCi/g						
Cerium-139	U	0.00210	+/-0.0516	0.0843	+/-0.0516		pCi/g						
Cerium-141	U	0.0589	+/-0.147	0.245	+/-0.150		pCi/g						
Cerium-144	U	0.0813	+/-0.264	0.482	+/-0.267		pCi/g						
Cesium-134	U	0.0487	+/-0.126	0.111	+/-0.128		pCi/g						
Cesium-136	U	-0.354	+/-0.328	0.552	+/-0.367		pCi/g						
Cesium-137	U	0.0161	+/-0.0492	0.0831	+/-0.0498	0.100	pCi/g						
Chromium-51	U	0.0840	+/-0.748	1.42	+/-0.749		pCi/g						
Cobalt-56	U	0.0738	+/-0.103	0.104	+/-0.104		pCi/g						
Cobalt-57	U	0.00298	+/-0.0339	0.0617	+/-0.0340		pCi/g						
Cobalt-58	U	-0.0217	+/-0.0607	0.104	+/-0.0615		pCi/g						
Cobalt-60	U	0.00812	+/-0.0471	0.0903	+/-0.0472		pCi/g						
Europium-152	U	-0.103	+/-0.134	0.242	+/-0.143		pCi/g						
Europium-154	U	0.0676	+/-0.176	0.266	+/-0.178		pCi/g						
Europium-155	U	0.101	+/-0.116	0.220	+/-0.125		pCi/g						
Iridium-192	U	0.00953	+/-0.0536	0.102	+/-0.0538		pCi/g						
Iron-59	U	0.0941	+/-0.134	0.271	+/-0.141		pCi/g						
Lead-210	UI	0.000	+/-0.705	1.58	+/-2.48		pCi/g						
Lead-212		1.34	+/-0.169	0.138	+/-0.198		pCi/g						
Lead-214		10.4	+/-0.444	0.177	+/-1.01		pCi/g						
Manganese-54	U	-0.00452	+/-0.0625	0.104	+/-0.0625		pCi/g						
Mercury-203	U	0.0462	+/-0.119	0.118	+/-0.119		pCi/g						
Neodymium-147	U	0.939	+/-2.25	4.26	+/-2.29		pCi/g						
Neptunium-239	U	-0.00915	+/-0.332	0.603	+/-0.332		pCi/g						
Niobium-94	U	0.0435	+/-0.0434	0.0847	+/-0.0479		pCi/g						
Niobium-95	UI	0.000	+/-0.0932	0.176	+/-0.136		pCi/g						
Potassium-40		4.72	+/-1.17	0.874	+/-1.24		pCi/g						
Promethium-144	U	-0.0255	+/-0.0434	0.0741	+/-0.0450		pCi/g						
Promethium-146	UI	0.000	+/-0.116	0.107	+/-0.147		pCi/g						
Radium-226		10.4	+/-0.444	0.177	+/-1.01		pCi/g						
Radium-228		1.18	+/-0.435	0.331	+/-0.447		pCi/g						

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: W. 0-6. 8-11
Sample ID: 634158002

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0390	+/-0.401	0.725	+/-0.401		pCi/g							
Silver-110m	U	-0.0163	+/-0.0662	0.124	+/-0.0666		pCi/g							
Sodium-22	U	0.0247	+/-0.0626	0.0951	+/-0.0636		pCi/g							
Thallium-208		0.413	+/-0.0972	0.0855	+/-0.107		pCi/g							
Thorium-234		8.19	+/-2.18	1.50	+/-2.88		pCi/g							
Tin-113	U	-0.0732	+/-0.0754	0.116	+/-0.0826		pCi/g							
Uranium-235	U	0.494	+/-0.553	0.497	+/-0.555		pCi/g							
Uranium-238		8.19	+/-2.18	1.50	+/-2.88		pCi/g							
Yttrium-88	U	0.0577	+/-0.0536	0.122	+/-0.0597		pCi/g							
Zinc-65	U	-0.0543	+/-0.124	0.191	+/-0.126		pCi/g							
Zirconium-95	U	-0.00183	+/-0.122	0.217	+/-0.122		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: E. 30-42. 8-11
Sample ID: 634158003
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 17.2%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis														
Alphaspec Th, Solid "Dry Weight Corrected"														
Thorium-228		0.642	+/-0.368	0.464	+/-0.372	1.00	pCi/g			BV1	09/16/23	1334	2490991	1
Thorium-230		7.54	+/-0.986	0.522	+/-1.21	1.00	pCi/g							
Thorium-232		0.604	+/-0.298	0.254	+/-0.303	1.00	pCi/g							
Alphaspec U, Solid "Dry Weight Corrected"														
Uranium-233/234		7.96	+/-1.34	0.440	+/-1.70	1.00	pCi/g			MP2	09/11/23	0935	2487834	2
Uranium-235/236		0.761	+/-0.483	0.339	+/-0.493	1.00	pCi/g							
Uranium-238		7.94	+/-1.33	0.274	+/-1.69	1.00	pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"	2490991	86.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"	2487834	80.4	(15%-125%)

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 24.4%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0136	+/-0.0254	0.0439	+/-0.0261		pCi/g							
Antimony-124	U	-0.0369	+/-0.0550	0.0975	+/-0.0576		pCi/g							
Antimony-125	U	0.0273	+/-0.0729	0.141	+/-0.0740		pCi/g							
Barium-133	U	-0.0172	+/-0.0334	0.0493	+/-0.0343		pCi/g							
Barium-140	U	-0.0929	+/-0.117	0.198	+/-0.124		pCi/g							
Beryllium-7	U	-0.0500	+/-0.199	0.367	+/-0.200		pCi/g							
Bismuth-212	U	0.762	+/-0.903	0.814	+/-0.909		pCi/g							
Bismuth-214		0.601	+/-0.170	0.102	+/-0.185		pCi/g							
Cerium-139	U	0.00188	+/-0.0144	0.0266	+/-0.0145		pCi/g							
Cerium-141	U	-0.0114	+/-0.0242	0.0433	+/-0.0248		pCi/g							
Cerium-144	U	-0.00401	+/-0.0942	0.174	+/-0.0942		pCi/g							
Cesium-134	U	0.0588	+/-0.0525	0.0853	+/-0.0592		pCi/g							
Cesium-136	U	-0.0164	+/-0.0590	0.109	+/-0.0595		pCi/g							
Cesium-137		0.260	+/-0.0689	0.0499	+/-0.0770	0.100	pCi/g							
Chromium-51	U	-0.0901	+/-0.236	0.348	+/-0.240		pCi/g							
Cobalt-56	U	-0.0193	+/-0.0352	0.0543	+/-0.0363		pCi/g							
Cobalt-57	U	0.00519	+/-0.0110	0.0200	+/-0.0113		pCi/g							
Cobalt-58	U	-0.00795	+/-0.0300	0.0528	+/-0.0302		pCi/g							
Cobalt-60	U	0.0127	+/-0.0402	0.0734	+/-0.0406		pCi/g							
Europium-152	U	-0.000203	+/-0.0640	0.112	+/-0.0640		pCi/g							
Europium-154	U	-0.0737	+/-0.130	0.224	+/-0.135		pCi/g							
Europium-155	U	0.0317	+/-0.0434	0.0851	+/-0.0459		pCi/g							
Iridium-192	U	0.0381	+/-0.0308	0.0420	+/-0.0354		pCi/g							
Iron-59	U	-0.00179	+/-0.0720	0.137	+/-0.0721		pCi/g							
Lead-210		1.11	+/-0.459	0.353	+/-0.470		pCi/g							
Lead-212		0.867	+/-0.0833	0.0643	+/-0.126		pCi/g							
Lead-214		0.822	+/-0.151	0.100	+/-0.165		pCi/g							
Manganese-54	U	0.00952	+/-0.0283	0.0547	+/-0.0286		pCi/g							
Mercury-203	U	-0.00584	+/-0.0224	0.0383	+/-0.0226		pCi/g							
Neodymium-147	U	-0.127	+/-0.212	0.371	+/-0.220		pCi/g							
Neptunium-239	U	-0.0735	+/-0.116	0.210	+/-0.121		pCi/g							
Niobium-94	U	0.0134	+/-0.0307	0.0585	+/-0.0313		pCi/g							
Niobium-95	U	-0.0207	+/-0.0317	0.0525	+/-0.0332		pCi/g							
Potassium-40		16.6	+/-1.67	0.517	+/-2.22		pCi/g							
Promethium-144	U	-0.00522	+/-0.0289	0.0517	+/-0.0290		pCi/g							
Promethium-146	U	0.00287	+/-0.0319	0.0605	+/-0.0319		pCi/g							
Radium-226		0.822	+/-0.151	0.100	+/-0.165		pCi/g							

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g							
Ruthenium-106	U	0.0371	+/-0.245	0.463	+/-0.246		pCi/g							
Silver-110m	U	-0.0335	+/-0.0465	0.0745	+/-0.0491		pCi/g							
Sodium-22	U	-0.0259	+/-0.0457	0.0786	+/-0.0472		pCi/g							
Thallium-208		0.279	+/-0.0730	0.0541	+/-0.0803		pCi/g							
Thorium-234		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Tin-113	U	-0.0189	+/-0.0371	0.0597	+/-0.0381		pCi/g							
Uranium-235	U	0.000690	+/-0.100	0.184	+/-0.100		pCi/g							
Uranium-238		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Yttrium-88	U	0.00173	+/-0.0292	0.0645	+/-0.0292		pCi/g							
Zinc-65	U	-0.0577	+/-0.0713	0.0972	+/-0.0760		pCi/g							
Zirconium-95	U	0.0879	+/-0.0720	0.106	+/-0.0830		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Company : MJW Technical Services
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Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels

Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 26.3%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0314	+/-0.0594	0.0925	+/-0.0611		pCi/g							
Antimony-124	U	0.0128	+/-0.0531	0.130	+/-0.0535		pCi/g							
Antimony-125	U	-0.0889	+/-0.102	0.159	+/-0.110		pCi/g							
Barium-133	U	0.00197	+/-0.0494	0.0773	+/-0.0494		pCi/g							
Barium-140	U	0.135	+/-0.179	0.355	+/-0.190		pCi/g							
Beryllium-7	U	0.0205	+/-0.321	0.599	+/-0.321		pCi/g							
Bismuth-212		1.78	+/-0.993	1.02	+/-1.01		pCi/g							
Bismuth-214		0.699	+/-0.215	0.161	+/-0.227		pCi/g							
Cerium-139	U	0.000346	+/-0.0270	0.0477	+/-0.0270		pCi/g							
Cerium-141	U	0.0434	+/-0.0485	0.0832	+/-0.0525		pCi/g							
Cerium-144	U	-0.0351	+/-0.179	0.314	+/-0.180		pCi/g							
Cesium-134	UI	0.000	+/-0.0817	0.122	+/-0.113		pCi/g							
Cesium-136	U	0.0194	+/-0.0805	0.151	+/-0.0810		pCi/g							
Cesium-137		0.179	+/-0.0761	0.100	+/-0.0785	0.100	pCi/g							
Chromium-51	U	0.184	+/-0.344	0.571	+/-0.355		pCi/g							
Cobalt-56	U	-0.0391	+/-0.0436	0.0705	+/-0.0471		pCi/g							
Cobalt-57	U	-0.0112	+/-0.0225	0.0389	+/-0.0231		pCi/g							
Cobalt-58	U	-0.00625	+/-0.0428	0.0776	+/-0.0429		pCi/g							
Cobalt-60	U	-0.0124	+/-0.0461	0.0862	+/-0.0464		pCi/g							
Europium-152	U	-0.0341	+/-0.101	0.171	+/-0.102		pCi/g							
Europium-154	U	0.0976	+/-0.138	0.291	+/-0.145		pCi/g							
Europium-155	U	0.126	+/-0.136	0.145	+/-0.137		pCi/g							
Iridium-192	U	0.0341	+/-0.0726	0.0624	+/-0.0743		pCi/g							
Iron-59	U	0.00538	+/-0.0995	0.182	+/-0.0996		pCi/g							
Lead-210		1.33	+/-0.761	0.749	+/-0.779		pCi/g							
Lead-212		1.01	+/-0.111	0.0950	+/-0.149		pCi/g							
Lead-214		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Manganese-54	U	-0.0152	+/-0.0453	0.0795	+/-0.0458		pCi/g							
Mercury-203	U	0.00653	+/-0.0319	0.0571	+/-0.0321		pCi/g							
Neodymium-147	U	0.0656	+/-0.343	0.649	+/-0.344		pCi/g							
Neptunium-239	U	-0.000434	+/-0.238	0.424	+/-0.238		pCi/g							
Niobium-94	U	0.00270	+/-0.0454	0.0776	+/-0.0454		pCi/g							
Niobium-95	U	-0.0525	+/-0.0460	0.0700	+/-0.0520		pCi/g							
Potassium-40		18.0	+/-1.84	0.619	+/-2.42		pCi/g							
Promethium-144	U	0.0165	+/-0.0410	0.0784	+/-0.0417		pCi/g							
Promethium-146	U	-0.0115	+/-0.0480	0.0812	+/-0.0483		pCi/g							
Radium-226		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Radium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g							

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Certificate of Analysis

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Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0363	+/-0.338	0.639	+/-0.339		pCi/g							
Silver-110m	U	0.0260	+/-0.0605	0.114	+/-0.0617		pCi/g							
Sodium-22	U	0.0334	+/-0.0481	0.102	+/-0.0505		pCi/g							
Thallium-208		0.370	+/-0.0870	0.0716	+/-0.0948		pCi/g							
Thorium-234		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Tin-113	U	0.0385	+/-0.0462	0.0873	+/-0.0495		pCi/g							
Uranium-235	U	0.141	+/-0.327	0.315	+/-0.328		pCi/g							
Uranium-238		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Yttrium-88	U	0.00781	+/-0.0437	0.0919	+/-0.0439		pCi/g							
Zinc-65	U	-0.0670	+/-0.116	0.162	+/-0.120		pCi/g							
Zirconium-95	U	-0.0103	+/-0.0840	0.152	+/-0.0841		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Appendix C

Summary of the Test Pit Sample Analysis

Nuclide Information Table											
↓Sample ID[1]								GS[3]		AS[3]	
Sample Concentration (pCi/g) →	Lab Report	[Ac-228]	UNC[2]	[K-40]	UNC	[Ra-226]	UNC	[U-238]	UNC	[U-238]	UNC
2020 Sampling Event											
TP-BCP-34-A	J40621-1	U	U	U	U	4.46	0.654	5.04	2.17	3.12	0.327
TP-BCP-34-B	J40621-1	U	U	U	U	3.70	0.76	2.73	1.35	4.06	0.365
TP-BCP-32-W45	J40621-1	0.735	0.225	3.62	1.22	0.515	0.17	0.851	0.584	0.474	0.125
TP-BCP-44-A	J40621-1	1.07	0.338	2.89	1.51	2.99	0.349	2.42	0.908	2.31	0.285
TP-BCP-44-B	J40621-1	1.22	0.522	2.28	1.76	3.26	0.479	3.50	1.10	4.35	0.390
TP-BCP-47	J40621-1	2.58	0.354	14.1	1.72	3.79	0.310	1.59	0.898	3.29	0.356
Average Concentrations		**1.401**	**0.375**	**5.723**	**1.567**	**3.119**	**0.497**	**2.689**	**1.272**	**2.934**	**0.320**
2023 Sampling Event											
NW. 6-8. 8-11	634158	1.52	0.38	5.8	1.16	18.8	0.482	13.6	7.11	N/A	N/A
W. 0-6. 8-11	634158	1.18	0.435	4.72	1.17	10.4	0.444	8.19	2.18	N/A	N/A
E. 30-42. 8-11	634158	N/A	N/A	N/A	N/A	N/A	N/A	7.94	1.33	N/A	N/A
BKGC. 6-42. 8-11	634158	1.38	0.272	9.69	1.47	2.06	0.189	U	U	N/A	N/A
Average Concentrations		**1.360**	**0.369**	**6.737**	**1.275**	**10.420**	**0.394**	**9.910**	**4.362**	**N/A**	**N/A**
2024 Additional Background Samples											
TWT1	651915	0.986	0.276	16.6	1.67	0.822	0.151	1.02	0.518	N/A	N/A
5B1	651915	U	U	18	1.84	0.734	0.135	1.48	0.938	N/A	N/A
TWT1(651915001DUP)	651915	1.25	0.34	18.2	1.64	0.673	0.178	U	U	N/A	N/A
Average Concentrations		**1.118**	**0.310**	**17.600**	**1.719**	**0.743**	**0.156**	**1.250**	**0.758**	**N/A**	**N/A**
2024 Sampling Event											
S2.B1	674299	0.465	0.298	U	U	3.51	0.33	3.26	2.97	N/A	N/A
S2.B2	674299	U	U	2.62	1.36	4.93	0.42	U	U	N/A	N/A
S2.B3	674299	U	U	4.74	1.36	6.32	0.408	U	U	N/A	N/A
S2.B4	674299	0	0.338	7.27	1.47	3.42	0.341	U	U	N/A	N/A
S2.B5	674299	U	U	11	1.7	3.79	0.373	U	U	N/A	N/A
S2.B6	674299	U	U	9.61	1.25	0.326	0.14	U	U	U	U
S2.U1	674299	U	U	1.61	0.708	0.875	0.193	U	U	N/A	N/A
S2.U2	674299	0.246	0.241	2.04	1.02	0.32	0.11	U	U	N/A	N/A
S2.U3	674299	1.16	0.34	4.03	1.16	11	0.525	U	U	N/A	N/A
S2.U4	674299	1.29	0.519	1.86	1.94	10.2	0.57	8.11	5.51	5.39	1.05
S2.U2.D	674299	0.335	0.222	5.09	0.995	0.51	0.17	1.56	1.53	U	U
S3.B1	674299	0.663	0.466	17.1	2.17	1.21	0.234	U	U	0.426	0.366
S3.B2	674299	U	U	4.64	1.08	9.17	0.472	7.48	5.04	7.84	1.38
S3.B3	674299	U	U	U	U	0.529	0.155	U	U	N/A	N/A
S3.B4	674299	0.304	0.314	2.65	0.958	0.598	0.193	U	U	N/A	N/A
S3.U1	674299	U	U	4.68	1.57	10.7	0.474	8.53	2.04	6.33	1.14
S3.U2	674299	U	U	1.66	1.34	2.23	0.284	U	U	N/A	N/A
S3.U3	674299	U	U	1.23	0.541	0.552	0.146	1.97	1.28	N/A	N/A
S3.B4.D	674299	0.214	0.16	1.38	0.984	0.348	0.137	U	U	0.351	0.302
S4.B1	674299	1.19	0.378	8.43	1.48	1.56	0.297	U	U	U	U
S4.B2	674299	0.887	0.342	2.73	0.981	5.77	0.377	U	U	N/A	N/A
S4.U1	674299	0.982	0.379	7.22	1.5	1.24	0.258	U	U	0.581	0.449
S1.B1	674299	0.908	0.463	21.3	2.4	1.12	0.302	U	U	N/A	N/A
S1.B2	674299	1.73	0.555	4.42	1.64	10.6	0.62	10.4	8.19	N/A	N/A
S1.B3	674299	0.94	0.409	18.2	2.3	1.56	0.228	U	U	N/A	N/A
S1.B4	674299	U	U	8.56	2.03	12.6	0.595	5.74	5.9	N/A	N/A
S1.B5	674299	0	0.447	6.58	1.43	8.49	0.516	U	U	5.46	1.02
S1.B6	674299	U	U	17.8	2.25	1.94	0.279	U	U	N/A	N/A
S1.U1	674299	0	0.294	20.4	2.09	0.667	0.275	U	U	N/A	N/A
S1.U2	674299	U	U	13.8	1.94	4.73	0.364	4.74	3.37	3.18	0.835
S1.U3	674299	0	0.264	13.4	1.44	1.94	0.219	3.59	3.72	0.803	0.42
S1.U4	674299	1.32	0.425	10.9	1.78	10.5	0.529	8.21	4.32	N/A	N/A
S1.B1.D	674299	1.44	0.331	18.9	1.85	1.25	0.197	U	U	U	U
F1	674299	U	U	6.6	1.6	0.762	0.163	U	U	0.457	0.346

F2	674299	0.343	0.182	2.16	0.732	0.637	0.189	U	U	N/A	N/A
Control 1	674299	U	U	2.92	0.904	0.41	0.177	U	U	N/A	N/A
Control 2	674299	U	U	2.64	0.957	0.503	0.17	U	U	0.571	0.359
S2.B1(674299001DUP)	674299	U	U	1.94	1.07	3.7	0.35	U	U	N/A	N/A
S4.B2(674299021DUP)	674299	0.873	0.412	3.68	1.13	6.1	0.406	4.2	3.91	N/A	N/A
S2.U2.D(674299011DUP)	674299	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.443	0.366
S2.B6(674299006DUP)	674299	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	U	U
Average Concentrations		**0.695**	**0.368**	**7.454**	**1.513**	**3.759**	**0.343**	**5.649**	**4.414**	**2.653**	**0.765**

1. Sample ID - Field Notation, Refer to Laboratory reports for LAB ID
2. UNC - Counting Uncertainty
3. GS - γ Spec, AS - α Spec
4. U - Unidentified
5. N/A - Not Analyzed

Appendix D

RESRAD Dose Assessment Modeling Reports

Summary : RITC 3875 River Road Industrial Worker - 250 Hrs/yr
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_INDUSTRIAL WORKER.RAD

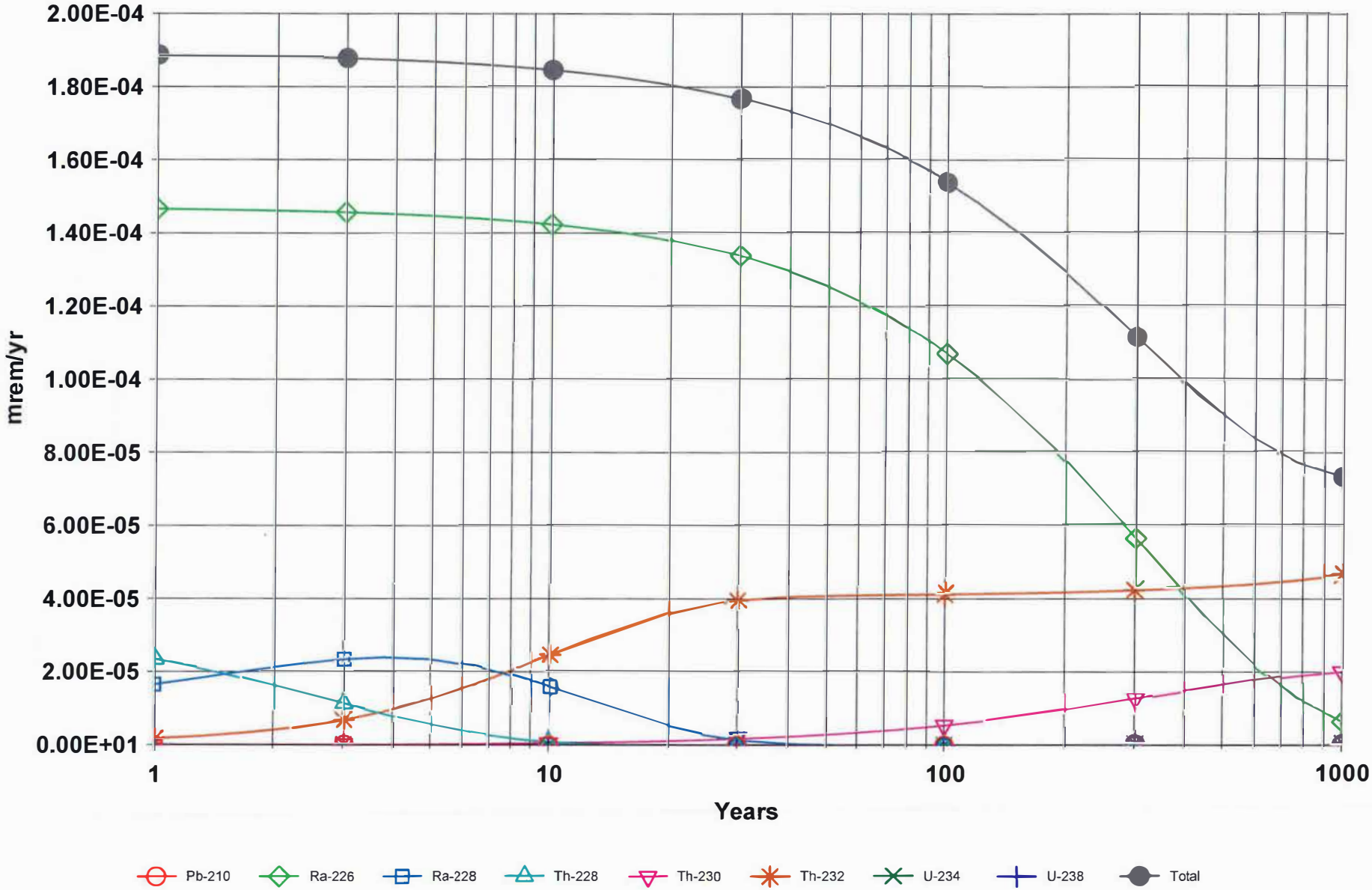
Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	4.150E+00
Thickness:	1.00 meters	Ra-226	4.120E+00
Cover Depth:	0.61 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		Th-232	7.000E-01
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.891E-04	1.887E-04	1.877E-04	1.846E-04	1.767E-04	1.538E-04	1.113E-04	7.280E-05
M(t):	7.564E-06	7.546E-06	7.510E-06	7.382E-06	7.066E-06	6.151E-06	4.451E-06	2.912E-06

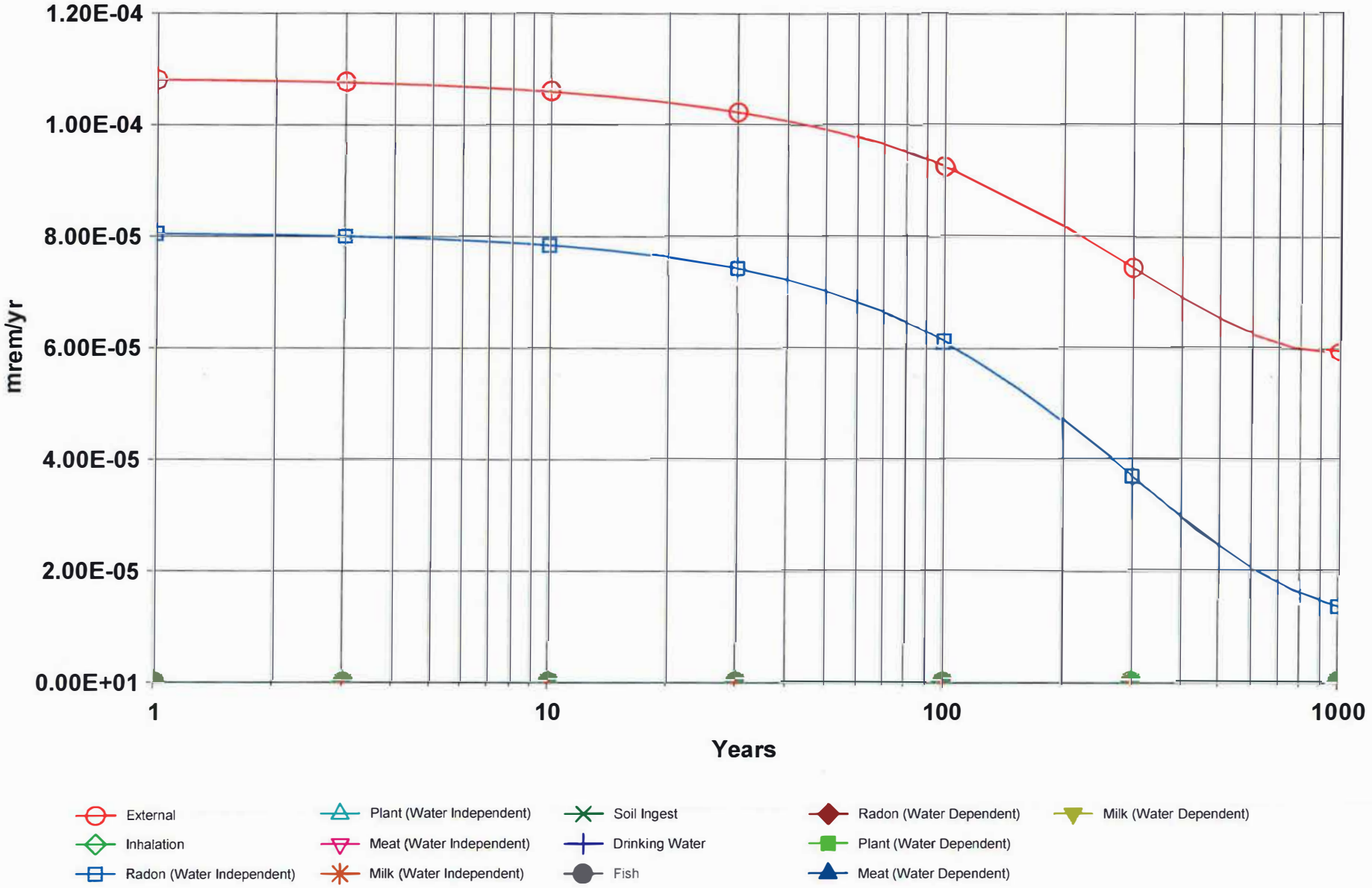
Maximum TDOSE(t): 1.891E-04 mrem/yr at t = 0.000E+00 years

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_INDUSTRIAL WORKER.RAD 03/26/2026 11:08 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_INDUSTRIAL WORKER.RAD 03/26/2026 11:08 GRAPHICS.ASC

Summary : RITC River Road Site Groundskeeper - 344 Hrs/yr
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_GROUNDSKEEPER.RAD

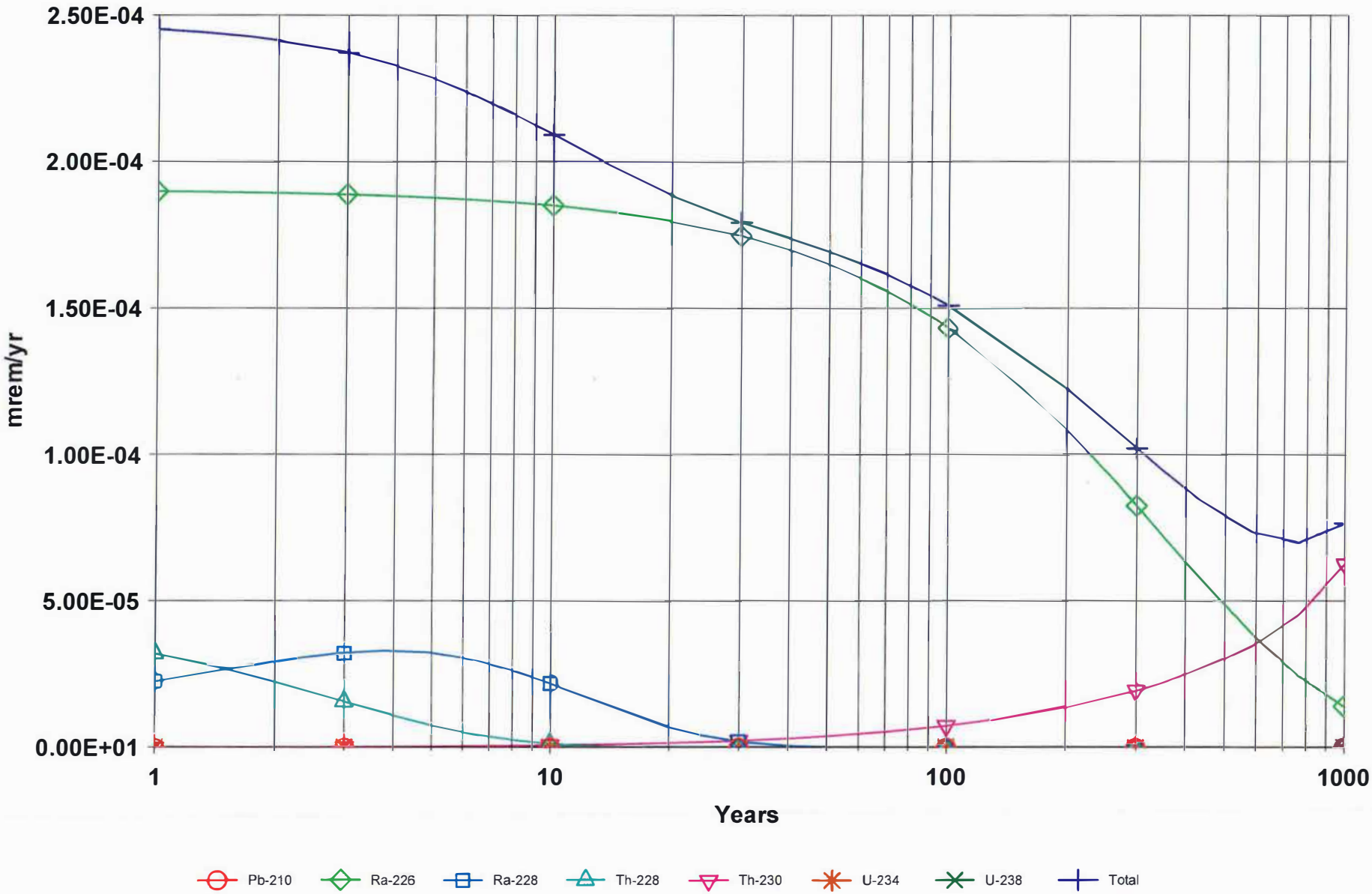
Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	4.150E+00
Thickness:	1.00 meters	Ra-226	4.150E+00
Cover Depth:	0.61 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.477E-04	2.452E-04	2.373E-04	2.093E-04	1.795E-04	1.511E-04	1.023E-04	7.681E-05
M(t):	9.908E-06	9.807E-06	9.491E-06	8.371E-06	7.179E-06	6.043E-06	4.091E-06	3.073E-06

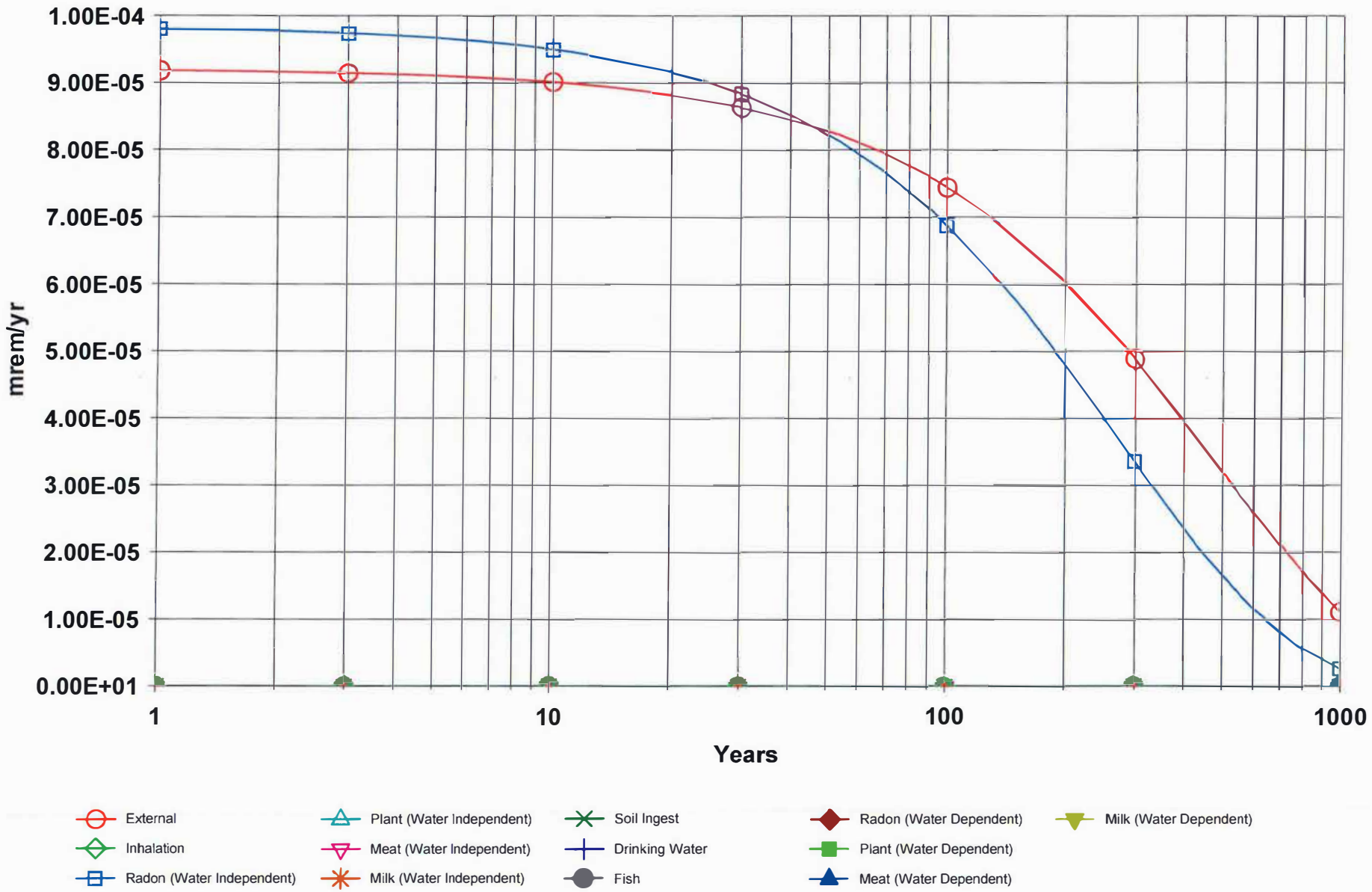
Maximum TDOSE(t): 2.477E-04 mrem/yr at t = 0.000E+00 years

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_GROUNDSKEEPER.RAD 03/26/2026 11:24 GRAPHICS.ASC Includes All Pathways

DOSE: Ra-226, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_GROUNDSKEEPER.RAD 03/26/2026 11:24 GRAPHICS.ASC

Summary : RITC Recreational User - 156 Hrs/yr
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RECREATIONAL_USER.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	4.150E+00
Thickness:	1.00 meters	Ra-226	4.150E+00
Cover Depth:	0.61 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.130E-04	1.127E-04	1.109E-04	1.034E-04	1.044E-04	1.834E-04	1.953E-03	9.984E-02
M(t):	4.518E-06	4.509E-06	4.437E-06	4.137E-06	4.178E-06	7.337E-06	7.813E-05	3.994E-03

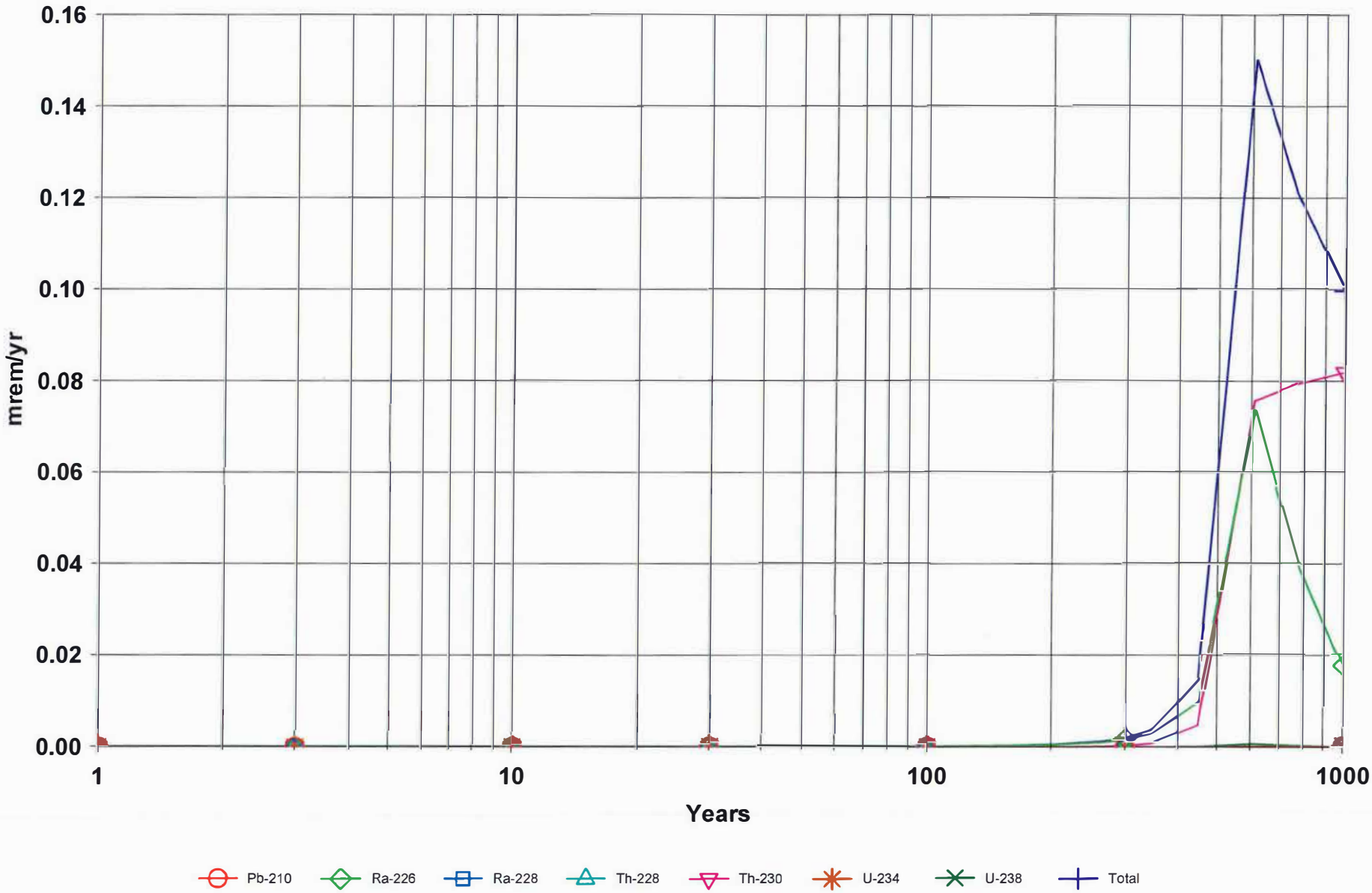
Maximum TDOSE(t): 1.503E-01 mrem/yr at t = 609 ± 1 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 6.094E+02 years

Water Independent Pathways (Inhalation excludes radon)

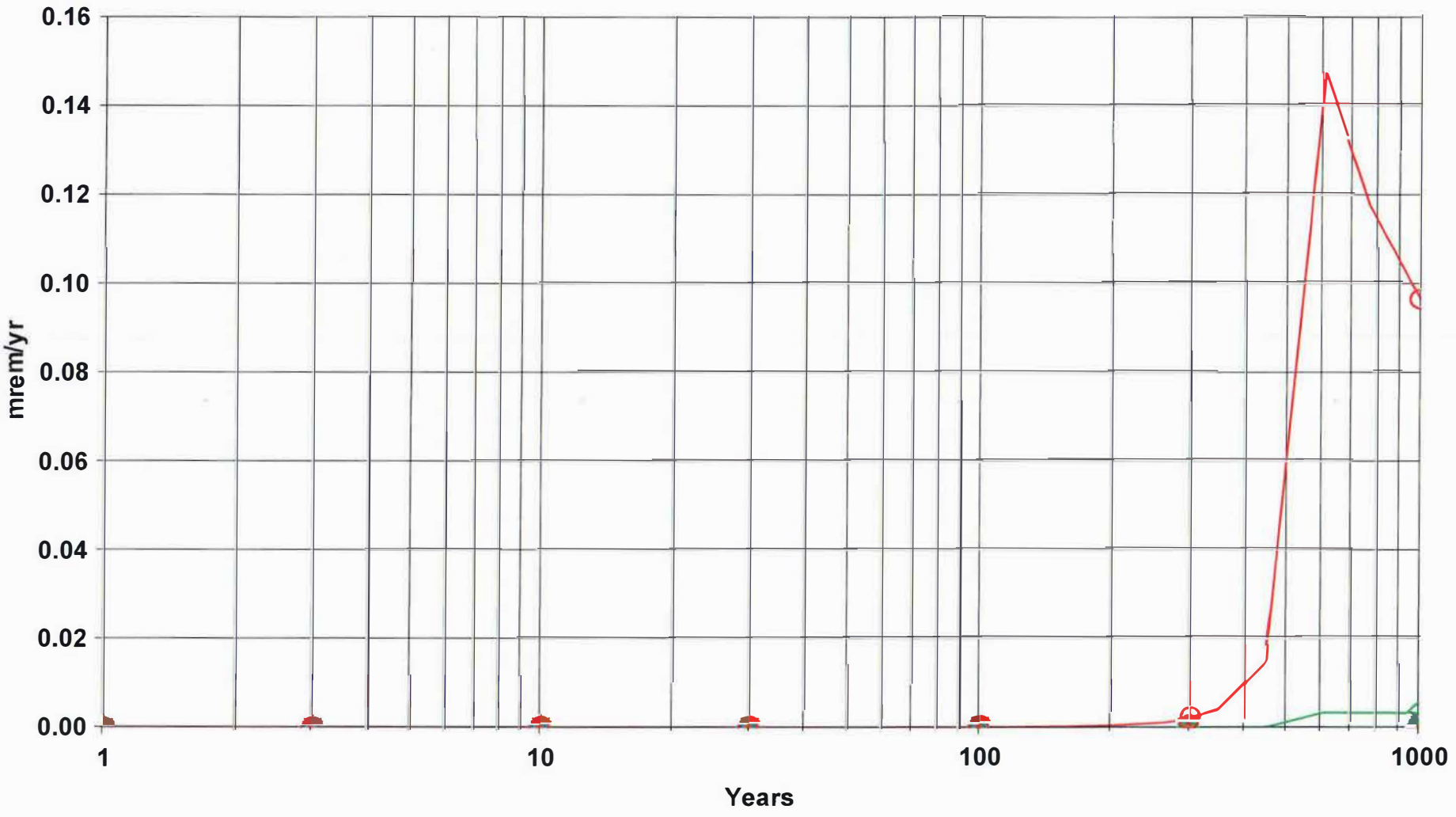
Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.925E-13	0.0000	4.463E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	7.359E-02	0.4896	7.068E-05	0.0005	8.170E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	7.257E-02	0.4828	3.224E-03	0.0214	8.048E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	1.184E-04	0.0008	2.557E-05	0.0002	1.295E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	6.761E-04	0.0045	1.680E-05	0.0001	5.405E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.470E-01	0.9777	3.337E-03	0.0222	1.623E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RECREATIONAL_USER.RAD 03/26/2026 13:02 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RECREATIONAL_USER.RAD 03/26/2026 13:02 GRAPHICS.ASC

Summary : RITC Future Industrial Worker - 2000 Hrs/yr, 12.5% Spent Outside
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE INDUSTRIAL WORKER_8 PER HR BLDG EXCHANGE_30 YR_USER.RAD

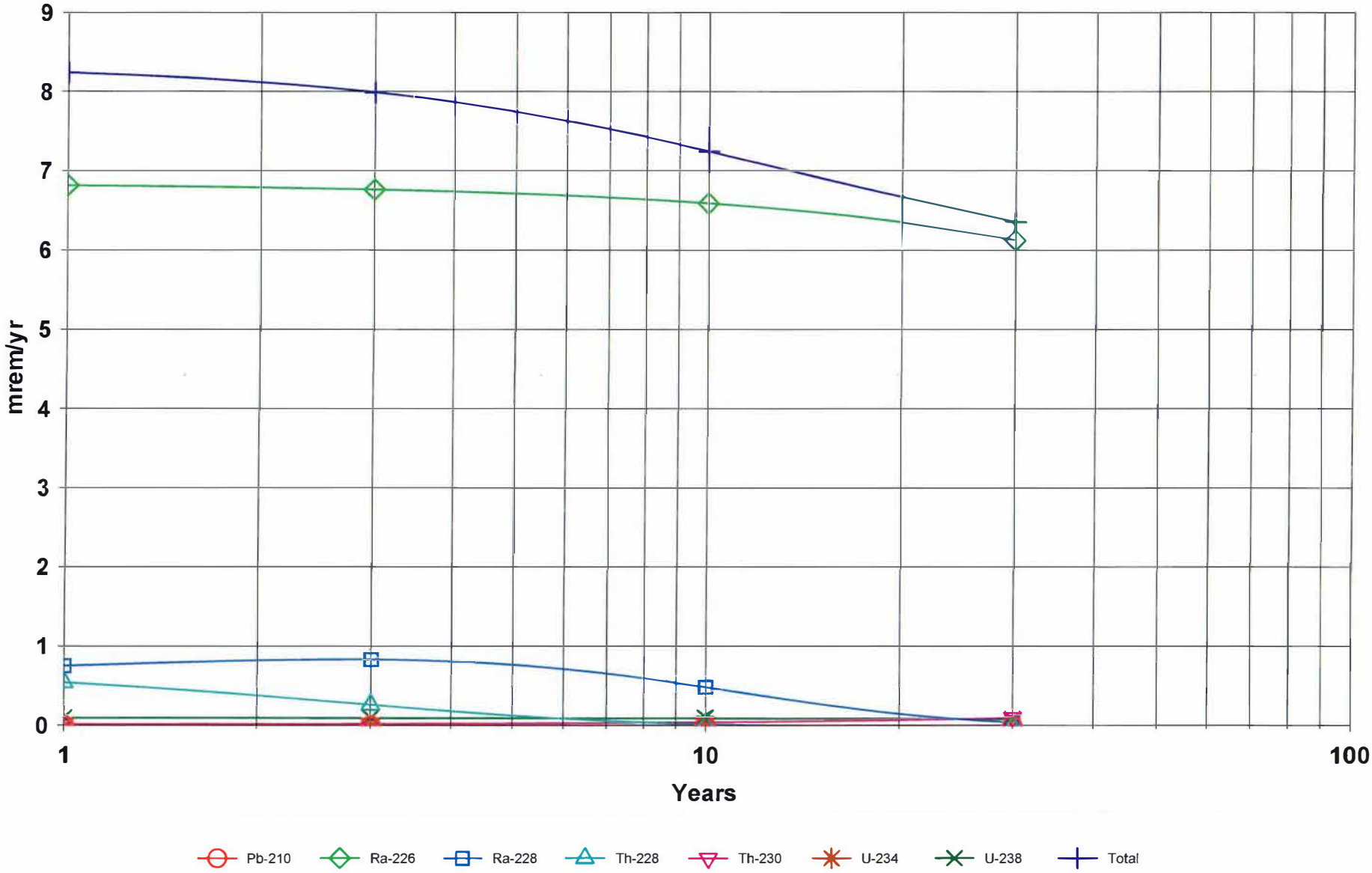
Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	4.150E+00
Thickness:	1.00 meters	Ra-226	4.150E+00
Cover Depth:	0.00 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01
TDOSE(t):	8.346E+00	8.239E+00	7.992E+00	7.248E+00	6.361E+00
M(t):	3.339E-01	3.295E-01	3.197E-01	2.899E-01	2.545E-01

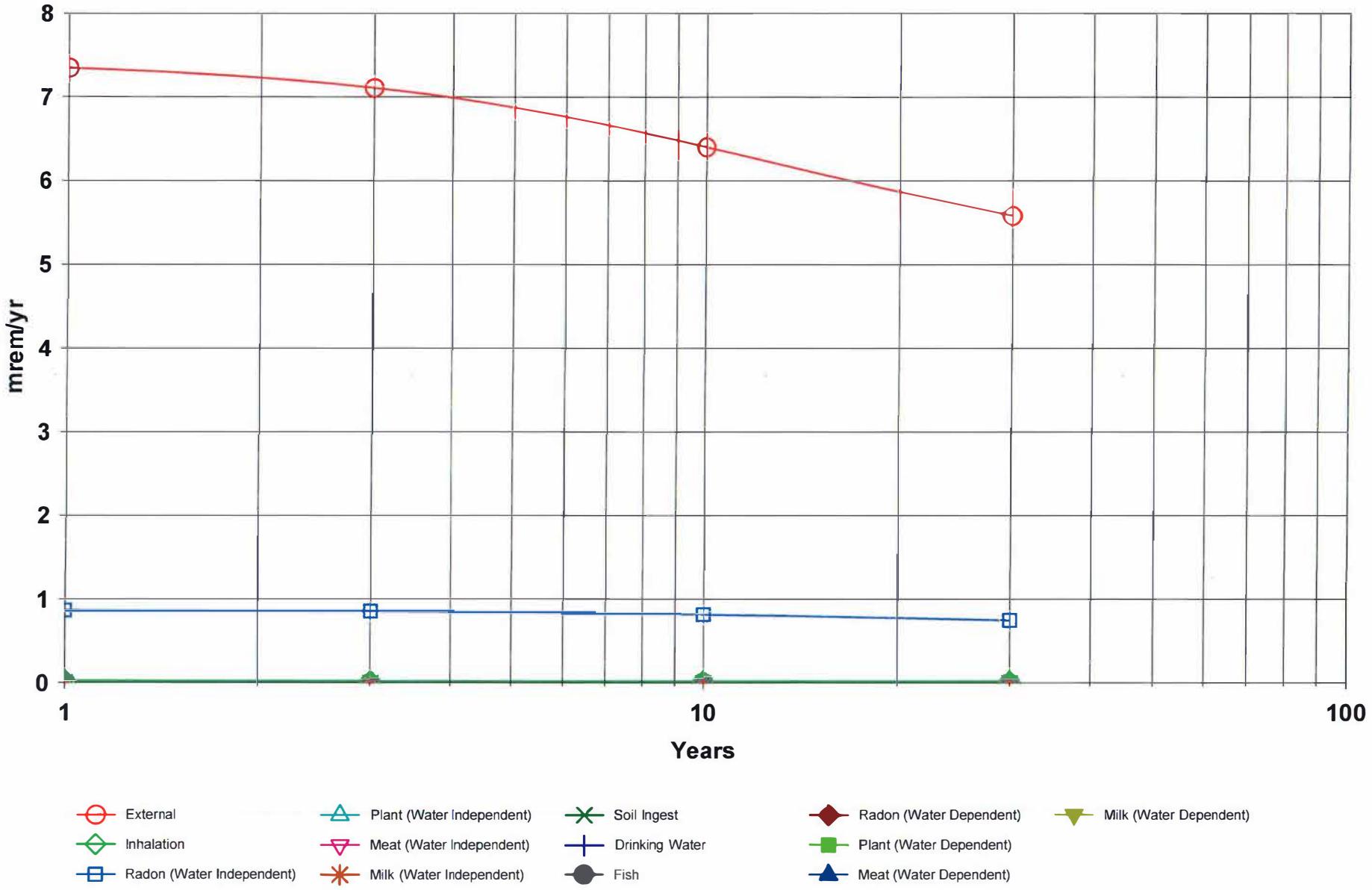
Maximum TDOSE(t): 8.346E+00 mrem/yr at t = 0.000E+00 years

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE INDUSTRIAL WORKER_8 PER HR BLDG EXCHANGE_30 YR_USER.RAD 03/26/2026 14:31 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE INDUSTRIAL WORKER_8 PER HR BLDG EXCHANGE_30 YR_USER.RAD 03/26/2026 14:31 GRAPHICS.ASC

Summary : RITC Future Construction Worker_Inadvertant Intruder
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE CONSTRUCTION WORKER_INADVERTANT INTRUDER.RAD

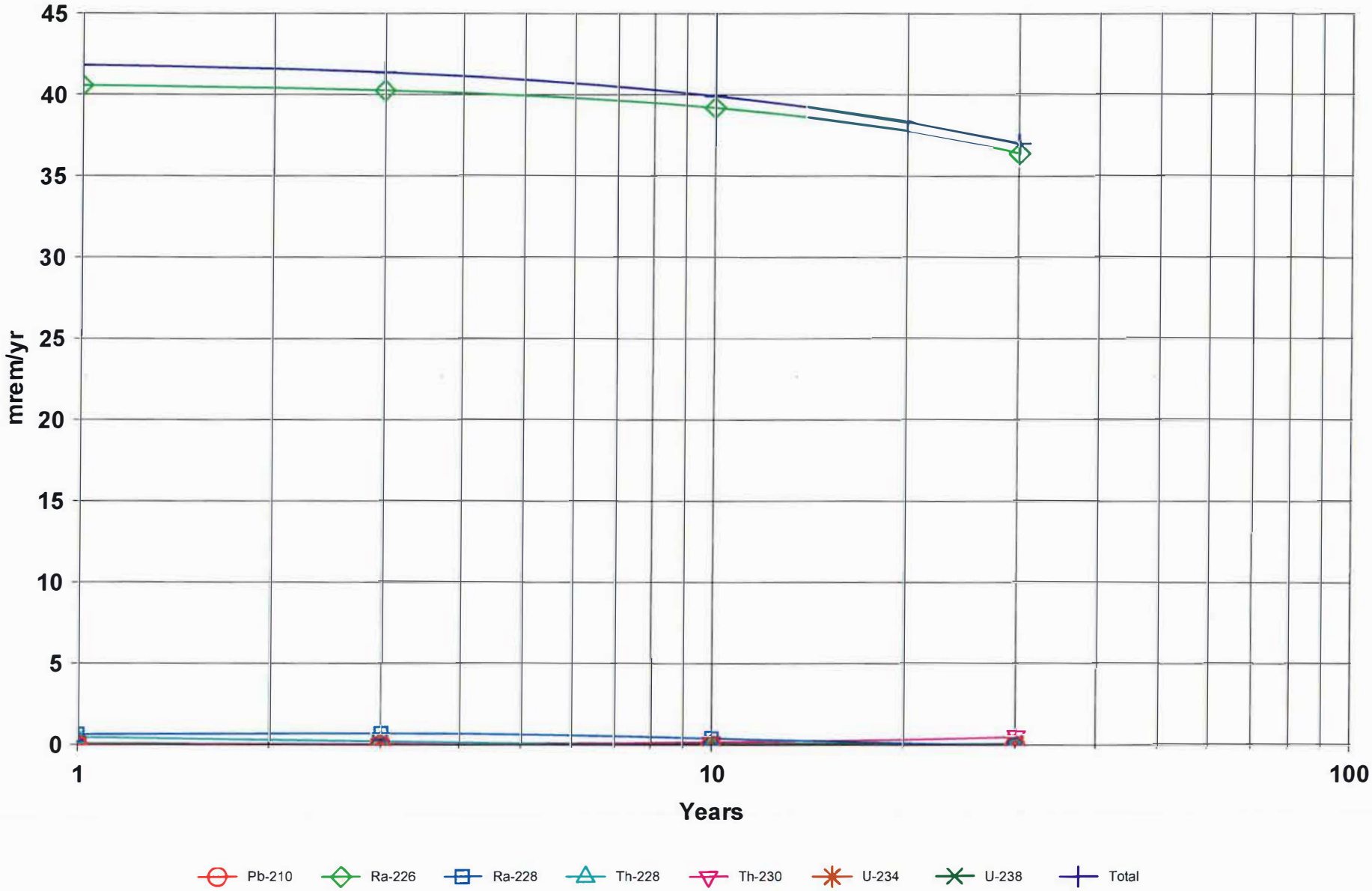
Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	4.150E+00
Thickness:	1.00 meters	Ra-226	4.150E+00
Cover Depth:	0.00 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01
TDOSE(t):	4.203E+01	4.182E+01	4.137E+01	3.993E+01	3.699E+01
M(t):	1.681E+00	1.673E+00	1.655E+00	1.597E+00	1.479E+00

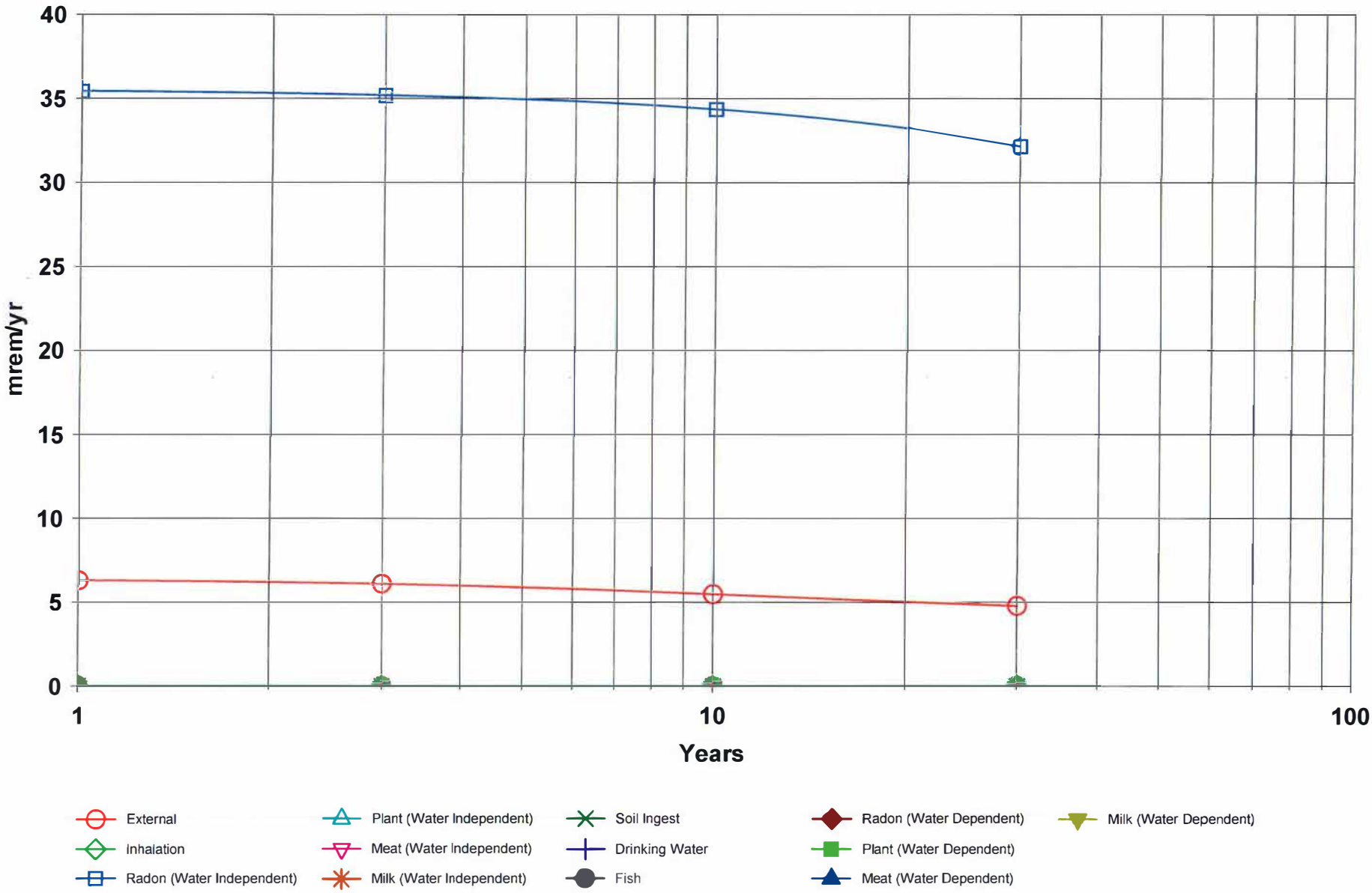
Maximum TDOSE(t): 4.203E+01 mrem/yr at t = 0.000E+00 years

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE CONSTRUCTION WORKER_INADVERTANT INTRUDER.RAD 03/26/2026 15:03 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_FUTURE CONSTRUCTION WORKER_INADVERTANT INTRUDER.RAD 03/26/2026 15:03 GRAPHICS.ASC

Summary : RITC Residential Farmer Exposure Assessment
File : C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RESIDENTIAL FARMER EXPOSURE ASSESSMENT.RAD

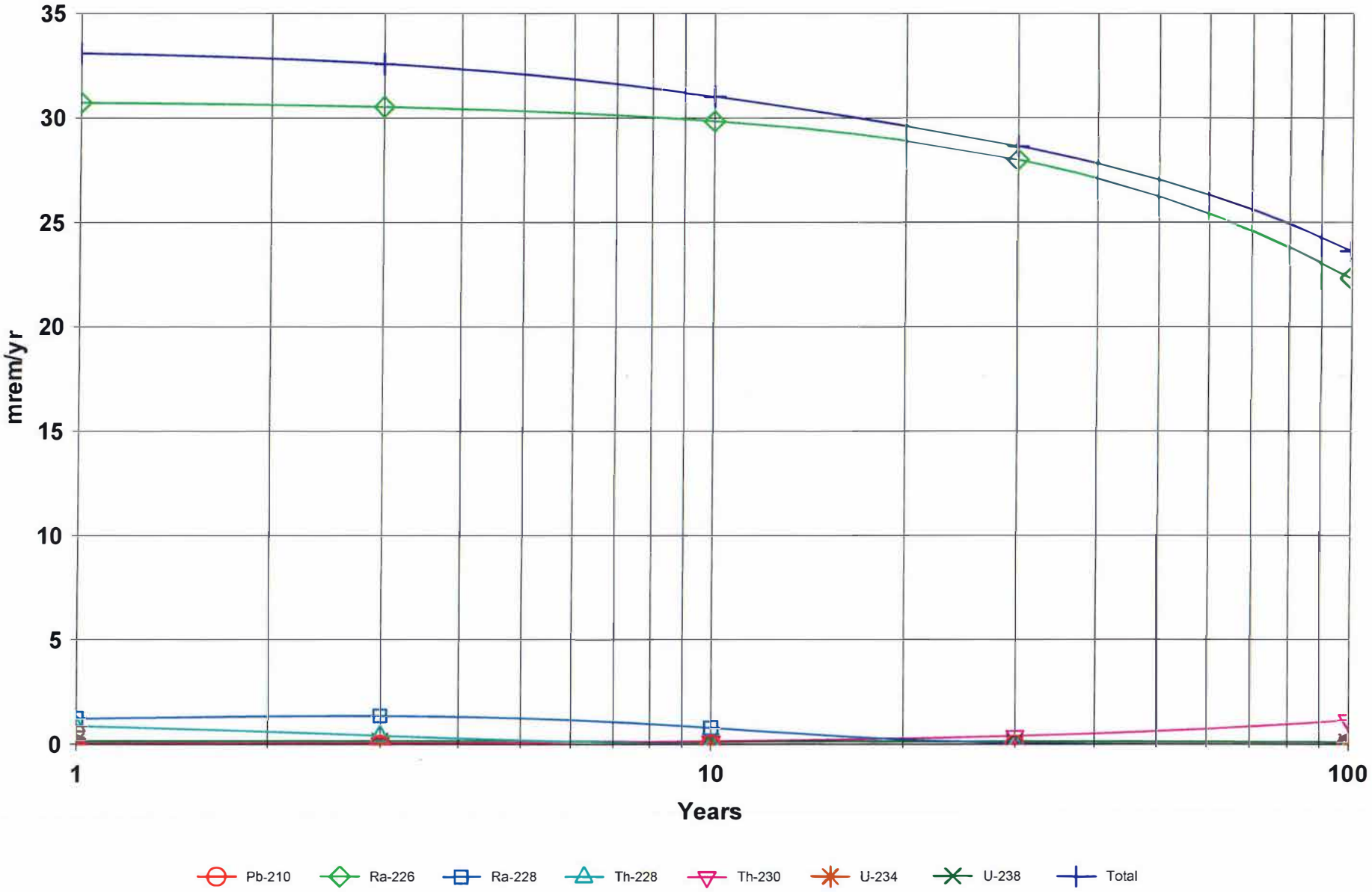
Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1626.00 square meters	Pb-210	4.150E+00
Thickness:	1.22 meters	Ra-226	4.150E+00
Cover Depth:	0.00 meters	Ra-228	7.000E-01
		Th-228	7.000E-01
		Th-230	4.150E+00
		U-234	4.150E+00
		U-238	4.150E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02
TDOSE(t):	3.331E+01	3.309E+01	3.259E+01	3.103E+01	2.865E+01	2.364E+01
M(t):	1.333E+00	1.324E+00	1.304E+00	1.241E+00	1.146E+00	9.457E-01

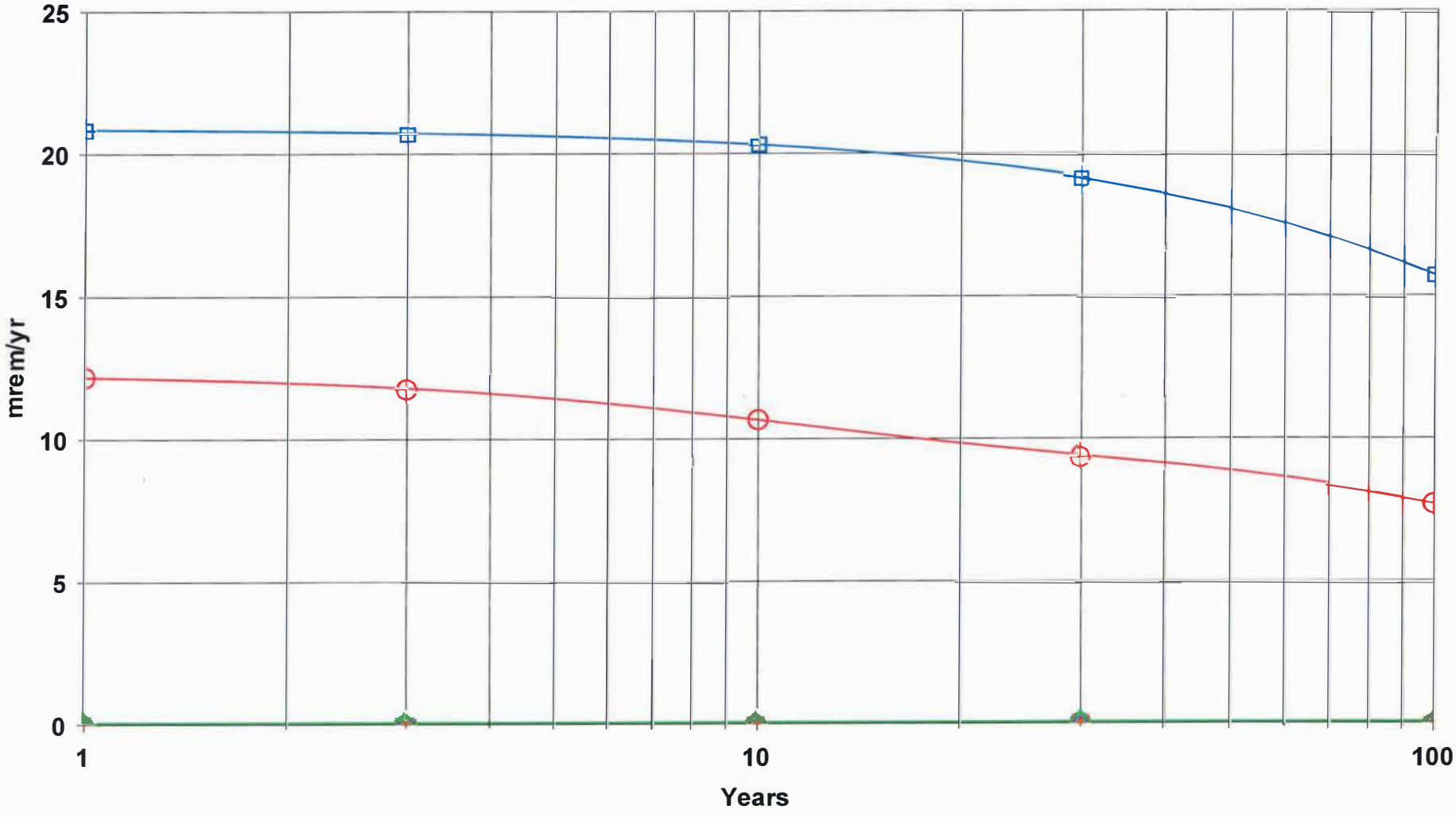
Maximum TDOSE(t): 3.331E+01 mrem/yr at t = 0.000E+00 years

DOSE: All Nuclides Summed, All Pathways Summed



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RESIDENTIAL FARMER EXPOSURE ASSESSMENT.RAD 03/26/2026 15:51 GRAPHICS.ASC Includes All Pathways

DOSE: All Nuclides Summed, Component Pathways



C:\RESRAD_FAMILY\ONSITE\7.2\USERFILES\RITC_RESIDENTIAL FARMER EXPOSURE ASSESSMENT.RAD 03/26/2026 16:35 GRAPHICS.ASC

Appendix E

GEL Laboratory Sample Reports for Site Sample Collected 8/2023, 01/2024 and 07/2024

GEL Laboratories LLC
a member of The GEL Group INC

2040 Savage Road | Charleston, SC 29407
843.556.8171
gel.com

September 18, 2023

Alex Bartels
MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Re: Ton Coke
Work Order: 634158

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 21, 2023. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

Purchase Order: GELP22-
Enclosures

MJW Technical Services
Ton Coke
SDG: 634158

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.4

Data Review Qualifier Definitions.....7

Radiological Analysis.....10

Case Narrative.....11

Sample Data Summary.....19

Quality Control Data.....28

Alpha Spectroscopy Raw Data.....42

Continuing Calibration Data.....59

Background and Efficiency Data.....64

RAD Standards Traceability.....115

Runlogs.....139

Gamma Spectroscopy Raw Data.....142

Continuing Calibration Data.....292

Background and Efficiency Data.....295

RAD Standards Traceability.....324

Runlogs.....341

Case Narrative

Case Narrative
for
MJW Technical Services
SDG: 634158

September 18, 2023

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 21, 2023 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
634158001	NW. 6-8. 8-11
634158002	W. 0-6. 8-11
634158003	E. 30-42. 8-11
634158004	BKGC. 6-42. 8-11

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

List of current GEL Certifications as of 18 September 2023

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122023-4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2022-160
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-23-21
Utah NELAP	SC000122022-37
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Chain of Custody and Supporting Documentation

Page: 1 of 1
Project # Tom Coke
GL Quote #:
COC Number (1):
PO Number: Iventum

634158

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number:
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: MJW Companies
Phone # 716 631 8291
Project/Site Name: Tom Coke
Fax #
Address: 18 Hazelwood Dr Suite 112
Collected By: Forest Shostak
Send Results To: fshostak@mjwcorp.com

Sample Analysis Requested (5) (Fill in the number of containers for each test)

SDG #	Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	Should this sample be considered: (7) Known or possible Hazards	Total number of containers	Gamma Spec	Alpha Spec	<-- Preservative Type (6)	Comments
	MW. 6-8.8-11	8-11-23	1015	N		SD	N		1	X			21 day ingrowth
	SB. 0-6.8-11	8-11-23	1045	N		SD			1	X			
	SB 30-42.8-11	8-11-23	1245	N		SD			1		X		
	BKgC. 6-42.8-11	8-11-23	1120	C		SO			1	X			

Note: extra sample is required for sample specific QC

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1		8-17-23	1600		8.21.23	1000
2						
3						

TAT Requested: Normal: X Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: 2.1 °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [X] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

1) Chain of Custody Number = Client Determined

2) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4) Matrix Codes DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5) Sample Analysis Requested Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

6) Preservative Type HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7) KNOWN OR POSSIBLE HAZARDS

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Misc. RCRA metals

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: NUC	SDG/AR/COC/Work Order: 634144 / 634158 JC
Received By: MVH	Date Received: 8-21-2023
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 773089942044 773088598510

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?	✓		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 1050 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*			✓	Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 21
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR2-21 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?			✓	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?			✓	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):
Samples 20230816-Oxy-Scale-Tank and 20230816-Oxy-Scale-Tank-Dup had 2x background

PM (or PMA) review: Initials AM Date 8/23/23 Page 1 of 1

GL-CHL-SR-001 Rev 7

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services
SDG #: 634158

Product: **Alphaspec U, Solid**
Analytical Method: DOE EML HASL-300, U-02-RC Modified
Analytical Procedure: GL-RAD-A-011 REV# 28
Analytical Batch: 2487834

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2480210

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
634158003	E. 30-42. 8-11
1205508583	Method Blank (MB)
1205508584	634144002(NonSDG) Sample Duplicate (DUP)
1205508585	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Alphaspec Th, Solid**
Analytical Method: DOE EML HASL-300, Th-01-RC Modified
Analytical Procedure: GL-RAD-A-038 REV# 18
Analytical Batch: 2490991

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2480210

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
634158003	E. 30-42. 8-11
1205514263	Method Blank (MB)
1205514264	634144002(NonSDG) Sample Duplicate (DUP)
1205514265	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Method Blank Criteria
The blank result (See Below) is greater than the MDC but less than the required detection limit.

Sample	Analyte	Value
1205514263 (MB)	Thorium-230	Result: 0.407 pCi/g > MDA: 0.370 pCi/g <= RDL: 1.00 pCi/g

Technical Information

Sample Re-prep/Re-analysis
Sample 634158003 (E. 30-42. 8-11) was reprepped due to low carrier/tracer yield. The re-analysis is being reported.

Miscellaneous Information

Manual Integration
Manual integrations of alpha spectroscopy spectra 1205514263 (MB) and 1205514265 (LCS) were performed to fully separate counts in Regions of Interest which would have been biased.

Additional Comments
The tracer peak centroid for sample 1205514265 (LCS) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

Product: Dry Weight
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2480210

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
634158001	NW. 6-8. 8-11
634158002	W. 0-6. 8-11
634158003	E. 30-42. 8-11
634158004	BKGC. 6-42. 8-11

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 28
Analytical Batch: 2480270

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2480210

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
634158001	NW. 6-8. 8-11
634158002	W. 0-6. 8-11
634158004	BKGC. 6-42. 8-11
1205495288	Method Blank (MB)
1205495289	634144001(NonSDG) Sample Duplicate (DUP)
1205495290	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample
The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1205495289 (Non SDG 634144001DUP)	Lead-210	RPD 158* (0.0%-100.0%) RER 1.88 (0-3)

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Thorium-234	634158004	BKGC. 6-42. 8-11
		Uranium-238	634158004	BKGC. 6-42. 8-11
UI	Results are considered a false positive due to interference.	Europium-155	1205495289	20230816-Oxy-Dry(634144001DUP)
UI	Results are considered a false positive due to low abundance.	Cesium-134	1205495289	20230816-Oxy-Dry(634144001DUP)
		Lead-210	634158002	W. 0-6. 8-11
		Lead-214	1205495288	MB for batch 2480270
		Niobium-94	634158001	NW. 6-8. 8-11
		Niobium-95	634158001	NW. 6-8. 8-11
		Niobium-95	634158002	W. 0-6. 8-11
		Promethium-146	634158002	W. 0-6. 8-11
		Radium-226	1205495288	MB for batch 2480270
UI	Results are considered a false positive due to no valid peak.	Thallium-208	1205495288	MB for batch 2480270

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2480210
Analyst: LC2
Date/Time: 22-AUG-2023
Procedure Code: PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
634144001	SAMPLE		SP-C238839655	09:03	12.24	424.75	354.8	412.51	342.56	16.957
634144002	SAMPLE		SP-C238839655	09:03	3.04	97.06	80.91	94.02	77.87	17.177
634144005	SAMPLE		SP-C238839655	09:03	12.24	649.16	448.38	636.92	436.14	31.523
634144006	SAMPLE		SP-C238839655	09:03	12.23	628.34	426.21	616.11	413.98	32.807
634144007	SAMPLE		SP-C238839655	09:03	12.15	659.79	424.34	647.64	412.19	36.355
634144008	SAMPLE		SP-C238839655	09:03	12.25	335.4	228.05	323.15	215.8	33.219
634144009	SAMPLE		SP-C238839655	09:03	12.24	268.39	225.02	256.15	212.78	16.931
634144010	SAMPLE		SP-C238839655	09:03	12.14	137.15	119.75	125.01	107.61	13.918
634144011	SAMPLE		SP-C238839655	09:03	12.12	129.96	110.98	117.84	98.86	16.106
634158001	SAMPLE		SP-C238839655	09:03	12.17	348.91	311.7	336.74	299.53	11.05
634158002	SAMPLE		SP-C238839655	09:03	12.21	280.24	263.22	268.03	251.01	6.35
634158003	SAMPLE		SP-C238839655	09:03	2.98	81.68	68.14	78.7	65.16	17.204
634158004	SAMPLE		SP-C238839655	09:03	12.13	427.84	382.75	415.71	370.62	10.846

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

Evaporative Loss LogBook

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 634158 GEL Work Order: 634158

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: **Name: Kate Gellatly**

Date: 18 SEP 2023 **Title: Analyst 1 PT**

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: NW. 6-8. 8-11
Sample ID: 634158001
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 11.1%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.52	+/-0.380	0.321	+/-0.405		pCi/g			MXR1	09/13/23	0813	2480270	1
Americium-241	U	0.321	+/-0.448	0.767	+/-0.471		pCi/g							
Antimony-124	U	0.219	+/-0.137	0.283	+/-0.170		pCi/g							
Antimony-125	U	0.0108	+/-0.139	0.259	+/-0.139		pCi/g							
Barium-133	U	0.0188	+/-0.0688	0.108	+/-0.0693		pCi/g							
Barium-140	U	0.556	+/-0.962	1.82	+/-0.995		pCi/g							
Beryllium-7	U	-0.0421	+/-0.653	1.07	+/-0.653		pCi/g							
Bismuth-212	U	1.16	+/-0.935	1.17	+/-0.944		pCi/g							
Bismuth-214		15.5	+/-0.443	0.164	+/-1.72		pCi/g							
Cerium-139	U	0.0372	+/-0.0635	0.104	+/-0.0662		pCi/g							
Cerium-141	U	0.168	+/-0.187	0.310	+/-0.203		pCi/g							
Cerium-144	U	-0.241	+/-0.368	0.659	+/-0.384		pCi/g							
Cesium-134	U	0.0700	+/-0.0535	0.103	+/-0.0625		pCi/g							
Cesium-136	U	0.143	+/-0.372	0.608	+/-0.378		pCi/g							
Cesium-137	U	0.0206	+/-0.0525	0.0871	+/-0.0533	0.100	pCi/g							
Chromium-51	U	-0.795	+/-1.06	1.59	+/-1.12		pCi/g							
Cobalt-56	U	0.00992	+/-0.0582	0.107	+/-0.0584		pCi/g							
Cobalt-57	U	0.00515	+/-0.0477	0.0873	+/-0.0478		pCi/g							
Cobalt-58	U	-0.0601	+/-0.0670	0.0991	+/-0.0725		pCi/g							
Cobalt-60	U	-0.0275	+/-0.0453	0.0768	+/-0.0470		pCi/g							
Europium-152	U	0.0684	+/-0.167	0.281	+/-0.170		pCi/g							
Europium-154	U	0.0187	+/-0.165	0.243	+/-0.165		pCi/g							
Europium-155	U	0.0471	+/-0.197	0.365	+/-0.199		pCi/g							
Iridium-192	U	0.00975	+/-0.0676	0.119	+/-0.0678		pCi/g							
Iron-59	U	-0.0983	+/-0.137	0.233	+/-0.144		pCi/g							
Lead-210	U	-10.3	+/-13.5	22.6	+/-14.4		pCi/g							
Lead-212		1.68	+/-0.183	0.164	+/-0.225		pCi/g							
Lead-214		18.8	+/-0.482	0.201	+/-1.58		pCi/g							
Manganese-54	U	-0.0542	+/-0.0562	0.0826	+/-0.0615		pCi/g							
Mercury-203	U	-0.000573	+/-0.0808	0.142	+/-0.0808		pCi/g							
Neodymium-147	U	-0.294	+/-2.36	4.35	+/-2.37		pCi/g							
Neptunium-239	U	0.100	+/-0.545	0.894	+/-0.547		pCi/g							
Niobium-94	UI	0.000	+/-0.0438	0.0876	+/-0.0612		pCi/g							
Niobium-95	UI	0.000	+/-0.0846	0.187	+/-0.268		pCi/g							
Potassium-40		5.80	+/-1.16	0.835	+/-1.26		pCi/g							
Promethium-144	U	0.0225	+/-0.0428	0.0806	+/-0.0441		pCi/g							
Promethium-146	U	0.0556	+/-0.102	0.116	+/-0.105		pCi/g							
Radium-226		18.8	+/-0.482	0.201	+/-1.58		pCi/g							

GEL LABORATORIES LLC

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels

Project: Ton Coke

Client Sample ID: NW. 6-8. 8-11
Sample ID: 634158001

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		1.52	+/-0.380	0.321	+/-0.405		pCi/g							
Ruthenium-106	U	-0.182	+/-0.382	0.687	+/-0.391		pCi/g							
Silver-110m	U	0.00209	+/-0.0677	0.123	+/-0.0677		pCi/g							
Sodium-22	U	0.00544	+/-0.0585	0.0862	+/-0.0586		pCi/g							
Thallium-208		0.590	+/-0.102	0.0834	+/-0.119		pCi/g							
Thorium-234		13.6	+/-7.11	6.19	+/-7.75		pCi/g							
Tin-113	U	-0.0661	+/-0.0740	0.134	+/-0.0799		pCi/g							
Uranium-235		1.00	+/-0.617	0.646	+/-0.621		pCi/g							
Uranium-238		13.6	+/-7.11	6.19	+/-7.75		pCi/g							
Yttrium-88	U	0.0885	+/-0.0631	0.110	+/-0.0750		pCi/g							
Zinc-65	U	0.0442	+/-0.117	0.190	+/-0.119		pCi/g							
Zirconium-95	U	0.0301	+/-0.114	0.210	+/-0.115		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels

Project: Ton Coke

Client Sample ID: W. 0-6. 8-11
Sample ID: 634158002
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 6.35%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.18	+/-0.435	0.331	+/-0.447		pCi/g			MXR1	09/13/23	0823	2480270	1
Americium-241	U	0.0675	+/-0.0866	0.155	+/-0.0920		pCi/g							
Antimony-124	U	0.0742	+/-0.140	0.284	+/-0.144		pCi/g							
Antimony-125	U	0.0814	+/-0.134	0.256	+/-0.139		pCi/g							
Barium-133	U	-0.0411	+/-0.0594	0.0950	+/-0.0624		pCi/g							
Barium-140	U	1.56	+/-1.55	1.63	+/-1.56		pCi/g							
Beryllium-7	U	-0.0722	+/-0.553	1.01	+/-0.554		pCi/g							
Bismuth-212		1.32	+/-0.797	1.20	+/-0.809		pCi/g							
Bismuth-214		9.11	+/-0.415	0.171	+/-1.06		pCi/g							
Cerium-139	U	0.00210	+/-0.0516	0.0843	+/-0.0516		pCi/g							
Cerium-141	U	0.0589	+/-0.147	0.245	+/-0.150		pCi/g							
Cerium-144	U	0.0813	+/-0.264	0.482	+/-0.267		pCi/g							
Cesium-134	U	0.0487	+/-0.126	0.111	+/-0.128		pCi/g							
Cesium-136	U	-0.354	+/-0.328	0.552	+/-0.367		pCi/g							
Cesium-137	U	0.0161	+/-0.0492	0.0831	+/-0.0498	0.100	pCi/g							
Chromium-51	U	0.0840	+/-0.748	1.42	+/-0.749		pCi/g							
Cobalt-56	U	0.0738	+/-0.103	0.104	+/-0.104		pCi/g							
Cobalt-57	U	0.00298	+/-0.0339	0.0617	+/-0.0340		pCi/g							
Cobalt-58	U	-0.0217	+/-0.0607	0.104	+/-0.0615		pCi/g							
Cobalt-60	U	0.00812	+/-0.0471	0.0903	+/-0.0472		pCi/g							
Europium-152	U	-0.103	+/-0.134	0.242	+/-0.143		pCi/g							
Europium-154	U	0.0676	+/-0.176	0.266	+/-0.178		pCi/g							
Europium-155	U	0.101	+/-0.116	0.220	+/-0.125		pCi/g							
Iridium-192	U	0.00953	+/-0.0536	0.102	+/-0.0538		pCi/g							
Iron-59	U	0.0941	+/-0.134	0.271	+/-0.141		pCi/g							
Lead-210	UI	0.000	+/-0.705	1.58	+/-2.48		pCi/g							
Lead-212		1.34	+/-0.169	0.138	+/-0.198		pCi/g							
Lead-214		10.4	+/-0.444	0.177	+/-1.01		pCi/g							
Manganese-54	U	-0.00452	+/-0.0625	0.104	+/-0.0625		pCi/g							
Mercury-203	U	0.0462	+/-0.119	0.118	+/-0.119		pCi/g							
Neodymium-147	U	0.939	+/-2.25	4.26	+/-2.29		pCi/g							
Neptunium-239	U	-0.00915	+/-0.332	0.603	+/-0.332		pCi/g							
Niobium-94	U	0.0435	+/-0.0434	0.0847	+/-0.0479		pCi/g							
Niobium-95	UI	0.000	+/-0.0932	0.176	+/-0.136		pCi/g							
Potassium-40		4.72	+/-1.17	0.874	+/-1.24		pCi/g							
Promethium-144	U	-0.0255	+/-0.0434	0.0741	+/-0.0450		pCi/g							
Promethium-146	UI	0.000	+/-0.116	0.107	+/-0.147		pCi/g							
Radium-226		10.4	+/-0.444	0.177	+/-1.01		pCi/g							
Radium-228		1.18	+/-0.435	0.331	+/-0.447		pCi/g							

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels

Project: Ton Coke

Client Sample ID: W. 0-6. 8-11
Sample ID: 634158002

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	-0.0390	+/-0.401	0.725	+/-0.401		pCi/g							
Silver-110m	U	-0.0163	+/-0.0662	0.124	+/-0.0666		pCi/g							
Sodium-22	U	0.0247	+/-0.0626	0.0951	+/-0.0636		pCi/g							
Thallium-208		0.413	+/-0.0972	0.0855	+/-0.107		pCi/g							
Thorium-234		8.19	+/-2.18	1.50	+/-2.88		pCi/g							
Tin-113	U	-0.0732	+/-0.0754	0.116	+/-0.0826		pCi/g							
Uranium-235	U	0.494	+/-0.553	0.497	+/-0.555		pCi/g							
Uranium-238		8.19	+/-2.18	1.50	+/-2.88		pCi/g							
Yttrium-88	U	0.0577	+/-0.0536	0.122	+/-0.0597		pCi/g							
Zinc-65	U	-0.0543	+/-0.124	0.191	+/-0.126		pCi/g							
Zirconium-95	U	-0.00183	+/-0.122	0.217	+/-0.122		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels

Project: Ton Coke

Client Sample ID: E. 30-42. 8-11
Sample ID: 634158003
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 17.2%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis														
Alphaspec Th, Solid "Dry Weight Corrected"														
Thorium-228		0.642	+/-0.368	0.464	+/-0.372	1.00	pCi/g			BV1	09/16/23	1334	2490991	1
Thorium-230		7.54	+/-0.986	0.522	+/-1.21	1.00	pCi/g							
Thorium-232		0.604	+/-0.298	0.254	+/-0.303	1.00	pCi/g							
Alphaspec U, Solid "Dry Weight Corrected"														
Uranium-233/234		7.96	+/-1.34	0.440	+/-1.70	1.00	pCi/g			MP2	09/11/23	0935	2487834	2
Uranium-235/236		0.761	+/-0.483	0.339	+/-0.493	1.00	pCi/g							
Uranium-238		7.94	+/-1.33	0.274	+/-1.69	1.00	pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"	2490991	86.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"	2487834	80.4	(15%-125%)

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: E. 30-42. 8-11
Sample ID: 634158003

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**							**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:
DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels

Project: Ton Coke

Client Sample ID: BKGC. 6-42. 8-11
Sample ID: 634158004
Matrix: Solid
Collect Date: 11-AUG-23
Receive Date: 21-AUG-23
Collector: Client
Moisture: 10.8%

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		1.38	+/-0.272	0.195	+/-0.309		pCi/g			MXR1	09/13/23	0824	2480270	1
Americium-241	U	-0.0984	+/-0.255	0.441	+/-0.259		pCi/g							
Antimony-124	U	0.000	+/-0.0881	0.170	+/-0.000		pCi/g							
Antimony-125	U	0.00630	+/-0.0730	0.133	+/-0.0731		pCi/g							
Barium-133	U	-0.00752	+/-0.0355	0.0570	+/-0.0356		pCi/g							
Barium-140	U	0.276	+/-0.558	1.04	+/-0.572		pCi/g							
Beryllium-7	U	0.234	+/-0.296	0.574	+/-0.315		pCi/g							
Bismuth-212		1.10	+/-0.603	0.688	+/-0.611		pCi/g							
Bismuth-214		1.62	+/-0.175	0.0977	+/-0.221		pCi/g							
Cerium-139	U	0.00776	+/-0.0275	0.0489	+/-0.0278		pCi/g							
Cerium-141	U	0.0134	+/-0.165	0.131	+/-0.165		pCi/g							
Cerium-144	U	0.0460	+/-0.165	0.300	+/-0.167		pCi/g							
Cesium-134	U	0.0277	+/-0.0375	0.0711	+/-0.0396		pCi/g							
Cesium-136	U	0.0760	+/-0.234	0.438	+/-0.236		pCi/g							
Cesium-137	U	0.0273	+/-0.0535	0.0516	+/-0.0536	0.100	pCi/g							
Chromium-51	U	-0.0189	+/-0.471	0.866	+/-0.471		pCi/g							
Cobalt-56	U	-0.0228	+/-0.0360	0.0617	+/-0.0375		pCi/g							
Cobalt-57	U	0.00703	+/-0.0213	0.0392	+/-0.0216		pCi/g							
Cobalt-58	U	-0.0515	+/-0.0381	0.0600	+/-0.0449		pCi/g							
Cobalt-60	U	-0.00428	+/-0.0301	0.0567	+/-0.0302		pCi/g							
Europium-152	U	-0.0424	+/-0.0831	0.130	+/-0.0854		pCi/g							
Europium-154	U	-0.0441	+/-0.0962	0.172	+/-0.0983		pCi/g							
Europium-155	U	0.0145	+/-0.0836	0.154	+/-0.0839		pCi/g							
Iridium-192	U	0.0219	+/-0.0341	0.0653	+/-0.0355		pCi/g							
Iron-59	U	-0.0742	+/-0.0893	0.155	+/-0.0957		pCi/g							
Lead-210	U	21.3	+/-24.8	26.3	+/-25.0		pCi/g							
Lead-212		1.23	+/-0.110	0.0824	+/-0.157		pCi/g							
Lead-214		2.06	+/-0.189	0.104	+/-0.263		pCi/g							
Manganese-54	U	-0.0110	+/-0.0286	0.0507	+/-0.0291		pCi/g							
Mercury-203	U	0.0214	+/-0.0411	0.0785	+/-0.0422		pCi/g							
Neodymium-147	U	0.0920	+/-1.28	2.31	+/-1.28		pCi/g							
Neptunium-239	U	0.137	+/-0.205	0.386	+/-0.214		pCi/g							
Niobium-94	U	-0.00502	+/-0.0270	0.0493	+/-0.0271		pCi/g							
Niobium-95	U	0.0320	+/-0.0469	0.0816	+/-0.0491		pCi/g							
Potassium-40		9.69	+/-1.47	0.763	+/-1.77		pCi/g							
Promethium-144	U	-0.00818	+/-0.0290	0.0526	+/-0.0293		pCi/g							
Promethium-146	U	0.00590	+/-0.0349	0.0636	+/-0.0350		pCi/g							
Radium-226		2.06	+/-0.189	0.104	+/-0.263		pCi/g							
Radium-228		1.38	+/-0.272	0.195	+/-0.309		pCi/g							

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: September 18, 2023

Contact: Alex Bartels
Project: Ton Coke

Client Sample ID: BKGC. 6-42. 8-11
Sample ID: 634158004

Project: MJWC00723
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0884	+/-0.251	0.487	+/-0.255		pCi/g							
Silver-110m	U	0.0193	+/-0.0418	0.0807	+/-0.0427		pCi/g							
Sodium-22	U	-0.0142	+/-0.0345	0.0620	+/-0.0351		pCi/g							
Thallium-208		0.283	+/-0.0819	0.0460	+/-0.0853		pCi/g							
Thorium-234	UI	0.000	+/-5.09	3.18	+/-5.21		pCi/g							
Tin-113	U	0.000917	+/-0.0381	0.0696	+/-0.0381		pCi/g							
Uranium-235	U	0.228	+/-0.350	0.315	+/-0.351		pCi/g							
Uranium-238	UI	0.000	+/-5.09	3.18	+/-5.21		pCi/g							
Yttrium-88	U	-0.00866	+/-0.0253	0.0494	+/-0.0256		pCi/g							
Zinc-65	U	0.0289	+/-0.0826	0.144	+/-0.0837		pCi/g							
Zirconium-95	U	0.0574	+/-0.0609	0.125	+/-0.0664		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	08/22/23	0903	2480210

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Appendix E - Continued

GEL Laboratory Sample Reports for Site Samples Collected 8/2023, 01/2024 and 07/2024

GEL Laboratories LLC
a member of The GEL Group INC

2040 Savage Road | Charleston, SC 29407
843.556.8171
gel.com

January 18, 2024

Alex Bartels
MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Re: Inventum
Work Order: 651915

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 16, 2024. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

Purchase Order: GELP23-1647
Enclosures

MJW Technical Services
Inventum
SDG: 651915

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.4

Data Review Qualifier Definitions.....7

Radiological Analysis.....10

Case Narrative.....11

Sample Data Summary.....16

Quality Control Data.....21

Gamma Spectroscopy Raw Data.....33

Continuing Calibration Data.....139

Background and Efficiency Data.....142

RAD Standards Traceability.....155

Runlogs.....172

Case Narrative

Case Narrative
for
MJW Technical Services
SDG: 651915

January 18, 2024

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 16, 2024 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
651915001	01122024-TWT1
651915002	01122024-SB1

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

A Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

List of current GEL Certifications as of 18 January 2024

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122024-05
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-23-21
Utah NELAP	SC000122023-38
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Chain of Custody and Supporting Documentation

Page 2 of 2
Project #
GEL Quote #
COC Number [1]
PO Number

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: 651915
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

651915

Client Name: MJW Companies
Phone # (716) 631-8291
Project/Site Name: Inventum
Fax #
Address: 15 Hazelwood Dr Suite 112 Amherst NY 14228
Collected By: P. Koch
Send Results To: abarteis@mjwcorp.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (?) Known or possible hazards	Total number of containers	Gamma Spec	<-- Preservative Type (6)
01122024-TWT1	01-12-24	1500	N	N	S	N		1	X	
01122024-SB1	01-12-24	1500	N	N	S	N		1	X	

Comments
Note: extra sample is required for sample specific QC

1
7 0
10 day TAT

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 Carl Fa	01-12-24	1630	1 [illegible]	1/16/24	930
2			2		
3			3		

TAT Requested: Normal: ____ Rush: X Specify: 10 day (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No *Cooler Temp:* ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1) Chain of Custody Number = Client Determined

2) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4) Matrix Codes DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5) Sample Analysis Requested Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

6) Preservative Type HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7) *Are there any known or possible hazards associated with these samples?*

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e. Origin of sample(s), type of site collected from, odd matrices, etc.)*

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Miscellaneous RCRA metals

TSCA Regulated
PCB = Polychlorinated biphenyls

651915

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WTWC	SDG/AR/COC/Work Order: 5-F
Received By: Thyasia Tatum	Date Received: 1-16-24
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7748 0097 2886

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Wet Ice Ice Packs Dry ice None Other: 6 *all temperatures are recorded in Celsius TEMP: 10C
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR2-23 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		✓		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 01/17/24 Page 1 of 1

GL-CHL-SR-001 Rev 7

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services
SDG #: 651915

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2554103

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
651915001	01122024-TWT1
651915002	01122024-SB1

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 28
Analytical Batch: 2554552

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2554103

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
651915001	01122024-TWT1
651915002	01122024-SB1
1205625369	Method Blank (MB)
1205625370	651915001(01122024-TWT1) Sample Duplicate (DUP)
1205625371	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample
The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they

do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1205625370 (01122024-TWT1DUP)	Actinium-228	RPD 23.3* (0.00%-20.00%) RER 1.08 (0-3)
	Bismuth-214	RPD 21.2* (0.00%-20.00%) RER 0.884 (0-3)
	Cesium-137	RPD 35.6* (0.00%-20.00%) RER 1.41 (0-3)
	Lead-210	RPD 161* (0.0%-100.0%) RER 0.622 (0-3)
	Radium-228	RPD 23.3* (0.00%-20.00%) RER 1.08 (0-3)

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Thorium-234	1205625370	01122024-TWT1(651915001DUP)
		Uranium-238	1205625370	01122024-TWT1(651915001DUP)
UI	Results are considered a false positive due to high peak-width.	Bismuth-212	1205625370	01122024-TWT1(651915001DUP)
		Manganese-54	1205625370	01122024-TWT1(651915001DUP)
UI	Results are considered a false positive due to low abundance.	Actinium-228	651915002	01122024-SB1
		Cesium-134	651915002	01122024-SB1
		Radium-228	651915002	01122024-SB1

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2554103
Analyst: LC2
Date/Time: 16-JAN-2024
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
651915001	SAMPLE		SP-C234673837	12:08	11.93	403.72	308.16	391.79	296.23	24.39
651915002	SAMPLE		SP-C234673837	12:08	11.85	401.82	299.32	389.97	287.47	26.284
651916001	SAMPLE		SP-C234673837	12:08	11.96	429.35	329.74	417.39	317.78	23.864
651916002	SAMPLE		SP-C234673837	12:08	11.94	460.8	344.23	448.86	332.29	25.97

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

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Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 651915 GEL Work Order: 651915

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Kenshalla Oston **Name: Kenshalla Oston**

Date: 23 JAN 2024 **Title: Analyst I**

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 24.4%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0136	+/-0.0254	0.0439	+/-0.0261		pCi/g							
Antimony-124	U	-0.0369	+/-0.0550	0.0975	+/-0.0576		pCi/g							
Antimony-125	U	0.0273	+/-0.0729	0.141	+/-0.0740		pCi/g							
Barium-133	U	-0.0172	+/-0.0334	0.0493	+/-0.0343		pCi/g							
Barium-140	U	-0.0929	+/-0.117	0.198	+/-0.124		pCi/g							
Beryllium-7	U	-0.0500	+/-0.199	0.367	+/-0.200		pCi/g							
Bismuth-212	U	0.762	+/-0.903	0.814	+/-0.909		pCi/g							
Bismuth-214		0.601	+/-0.170	0.102	+/-0.185		pCi/g							
Cerium-139	U	0.00188	+/-0.0144	0.0266	+/-0.0145		pCi/g							
Cerium-141	U	-0.0114	+/-0.0242	0.0433	+/-0.0248		pCi/g							
Cerium-144	U	-0.00401	+/-0.0942	0.174	+/-0.0942		pCi/g							
Cesium-134	U	0.0588	+/-0.0525	0.0853	+/-0.0592		pCi/g							
Cesium-136	U	-0.0164	+/-0.0590	0.109	+/-0.0595		pCi/g							
Cesium-137		0.260	+/-0.0689	0.0499	+/-0.0770	0.100	pCi/g							
Chromium-51	U	-0.0901	+/-0.236	0.348	+/-0.240		pCi/g							
Cobalt-56	U	-0.0193	+/-0.0352	0.0543	+/-0.0363		pCi/g							
Cobalt-57	U	0.00519	+/-0.0110	0.0200	+/-0.0113		pCi/g							
Cobalt-58	U	-0.00795	+/-0.0300	0.0528	+/-0.0302		pCi/g							
Cobalt-60	U	0.0127	+/-0.0402	0.0734	+/-0.0406		pCi/g							
Europium-152	U	-0.000203	+/-0.0640	0.112	+/-0.0640		pCi/g							
Europium-154	U	-0.0737	+/-0.130	0.224	+/-0.135		pCi/g							
Europium-155	U	0.0317	+/-0.0434	0.0851	+/-0.0459		pCi/g							
Iridium-192	U	0.0381	+/-0.0308	0.0420	+/-0.0354		pCi/g							
Iron-59	U	-0.00179	+/-0.0720	0.137	+/-0.0721		pCi/g							
Lead-210		1.11	+/-0.459	0.353	+/-0.470		pCi/g							
Lead-212		0.867	+/-0.0833	0.0643	+/-0.126		pCi/g							
Lead-214		0.822	+/-0.151	0.100	+/-0.165		pCi/g							
Manganese-54	U	0.00952	+/-0.0283	0.0547	+/-0.0286		pCi/g							
Mercury-203	U	-0.00584	+/-0.0224	0.0383	+/-0.0226		pCi/g							
Neodymium-147	U	-0.127	+/-0.212	0.371	+/-0.220		pCi/g							
Neptunium-239	U	-0.0735	+/-0.116	0.210	+/-0.121		pCi/g							
Niobium-94	U	0.0134	+/-0.0307	0.0585	+/-0.0313		pCi/g							
Niobium-95	U	-0.0207	+/-0.0317	0.0525	+/-0.0332		pCi/g							
Potassium-40		16.6	+/-1.67	0.517	+/-2.22		pCi/g							
Promethium-144	U	-0.00522	+/-0.0289	0.0517	+/-0.0290		pCi/g							
Promethium-146	U	0.00287	+/-0.0319	0.0605	+/-0.0319		pCi/g							
Radium-226		0.822	+/-0.151	0.100	+/-0.165		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g							
Ruthenium-106	U	0.0371	+/-0.245	0.463	+/-0.246		pCi/g							
Silver-110m	U	-0.0335	+/-0.0465	0.0745	+/-0.0491		pCi/g							
Sodium-22	U	-0.0259	+/-0.0457	0.0786	+/-0.0472		pCi/g							
Thallium-208		0.279	+/-0.0730	0.0541	+/-0.0803		pCi/g							
Thorium-234		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Tin-113	U	-0.0189	+/-0.0371	0.0597	+/-0.0381		pCi/g							
Uranium-235	U	0.000690	+/-0.100	0.184	+/-0.100		pCi/g							
Uranium-238		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Yttrium-88	U	0.00173	+/-0.0292	0.0645	+/-0.0292		pCi/g							
Zinc-65	U	-0.0577	+/-0.0713	0.0972	+/-0.0760		pCi/g							
Zirconium-95	U	0.0879	+/-0.0720	0.106	+/-0.0830		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels

Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 26.3%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0314	+/-0.0594	0.0925	+/-0.0611		pCi/g							
Antimony-124	U	0.0128	+/-0.0531	0.130	+/-0.0535		pCi/g							
Antimony-125	U	-0.0889	+/-0.102	0.159	+/-0.110		pCi/g							
Barium-133	U	0.00197	+/-0.0494	0.0773	+/-0.0494		pCi/g							
Barium-140	U	0.135	+/-0.179	0.355	+/-0.190		pCi/g							
Beryllium-7	U	0.0205	+/-0.321	0.599	+/-0.321		pCi/g							
Bismuth-212		1.78	+/-0.993	1.02	+/-1.01		pCi/g							
Bismuth-214		0.699	+/-0.215	0.161	+/-0.227		pCi/g							
Cerium-139	U	0.000346	+/-0.0270	0.0477	+/-0.0270		pCi/g							
Cerium-141	U	0.0434	+/-0.0485	0.0832	+/-0.0525		pCi/g							
Cerium-144	U	-0.0351	+/-0.179	0.314	+/-0.180		pCi/g							
Cesium-134	UI	0.000	+/-0.0817	0.122	+/-0.113		pCi/g							
Cesium-136	U	0.0194	+/-0.0805	0.151	+/-0.0810		pCi/g							
Cesium-137		0.179	+/-0.0761	0.100	+/-0.0785	0.100	pCi/g							
Chromium-51	U	0.184	+/-0.344	0.571	+/-0.355		pCi/g							
Cobalt-56	U	-0.0391	+/-0.0436	0.0705	+/-0.0471		pCi/g							
Cobalt-57	U	-0.0112	+/-0.0225	0.0389	+/-0.0231		pCi/g							
Cobalt-58	U	-0.00625	+/-0.0428	0.0776	+/-0.0429		pCi/g							
Cobalt-60	U	-0.0124	+/-0.0461	0.0862	+/-0.0464		pCi/g							
Europium-152	U	-0.0341	+/-0.101	0.171	+/-0.102		pCi/g							
Europium-154	U	0.0976	+/-0.138	0.291	+/-0.145		pCi/g							
Europium-155	U	0.126	+/-0.136	0.145	+/-0.137		pCi/g							
Iridium-192	U	0.0341	+/-0.0726	0.0624	+/-0.0743		pCi/g							
Iron-59	U	0.00538	+/-0.0995	0.182	+/-0.0996		pCi/g							
Lead-210		1.33	+/-0.761	0.749	+/-0.779		pCi/g							
Lead-212		1.01	+/-0.111	0.0950	+/-0.149		pCi/g							
Lead-214		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Manganese-54	U	-0.0152	+/-0.0453	0.0795	+/-0.0458		pCi/g							
Mercury-203	U	0.00653	+/-0.0319	0.0571	+/-0.0321		pCi/g							
Neodymium-147	U	0.0656	+/-0.343	0.649	+/-0.344		pCi/g							
Neptunium-239	U	-0.000434	+/-0.238	0.424	+/-0.238		pCi/g							
Niobium-94	U	0.00270	+/-0.0454	0.0776	+/-0.0454		pCi/g							
Niobium-95	U	-0.0525	+/-0.0460	0.0700	+/-0.0520		pCi/g							
Potassium-40		18.0	+/-1.84	0.619	+/-2.42		pCi/g							
Promethium-144	U	0.0165	+/-0.0410	0.0784	+/-0.0417		pCi/g							
Promethium-146	U	-0.0115	+/-0.0480	0.0812	+/-0.0483		pCi/g							
Radium-226		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Radium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels

Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0363	+/-0.338	0.639	+/-0.339		pCi/g							
Silver-110m	U	0.0260	+/-0.0605	0.114	+/-0.0617		pCi/g							
Sodium-22	U	0.0334	+/-0.0481	0.102	+/-0.0505		pCi/g							
Thallium-208		0.370	+/-0.0870	0.0716	+/-0.0948		pCi/g							
Thorium-234		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Tin-113	U	0.0385	+/-0.0462	0.0873	+/-0.0495		pCi/g							
Uranium-235	U	0.141	+/-0.327	0.315	+/-0.328		pCi/g							
Uranium-238		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Yttrium-88	U	0.00781	+/-0.0437	0.0919	+/-0.0439		pCi/g							
Zinc-65	U	-0.0670	+/-0.116	0.162	+/-0.120		pCi/g							
Zirconium-95	U	-0.0103	+/-0.0840	0.152	+/-0.0841		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Data

QC Summary

Client : MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York

Contact: Alex Bartels

Workorder: 651915

Report Date: January 23, 2024

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
QC1205625370 651915001 DUP										
Actinium-228		0.986		1.25	pCi/g	23.3*		(0%-20%)	MXR1	01/17/2417:33
	Uncert:	+/-0.276		+/-0.340						
	TPU:	+/-0.295		+/-0.366						
Americium-241	U	0.0136	U	-0.000279	pCi/g	0		N/A		
	Uncert:	+/-0.0254		+/-0.186						
	TPU:	+/-0.0261		+/-0.186						
Antimony-124	U	-0.0369	U	-0.00697	pCi/g	0		N/A		
	Uncert:	+/-0.0550		+/-0.0661						
	TPU:	+/-0.0576		+/-0.0662						
Antimony-125	U	0.0273	U	0.0673	pCi/g	0		N/A		
	Uncert:	+/-0.0729		+/-0.0929						
	TPU:	+/-0.0740		+/-0.0979						
Barium-133	U	-0.0172	U	0.0161	pCi/g	0		N/A		
	Uncert:	+/-0.0334		+/-0.0434						
	TPU:	+/-0.0343		+/-0.0441						
Barium-140	U	-0.0929	U	0.196	pCi/g	0		N/A		
	Uncert:	+/-0.117		+/-0.157						
	TPU:	+/-0.124		+/-0.181						
Beryllium-7	U	-0.0500	U	-0.0778	pCi/g	0		N/A		
	Uncert:	+/-0.199		+/-0.319						
	TPU:	+/-0.200		+/-0.321						
Bismuth-212	U	0.762	UI	0.000	pCi/g	0		N/A		
	Uncert:	+/-0.903		+/-1.24						
	TPU:	+/-0.909		+/-1.25						
Bismuth-214		0.601		0.486	pCi/g	21.2*		(0%-20%)		
	Uncert:	+/-0.170		+/-0.171						
	TPU:	+/-0.185		+/-0.176						
Cerium-139	U	0.00188	U	0.0140	pCi/g	0		N/A		
	Uncert:	+/-0.0144		+/-0.0336						
	TPU:	+/-0.0145		+/-0.0343						
Cerium-141	U	-0.0114	U	0.00332	pCi/g	0		N/A		
	Uncert:	+/-0.0242		+/-0.0501						
	TPU:	+/-0.0248		+/-0.0501						
Cerium-144	U	-0.00401	U	0.128	pCi/g	0		N/A		
	Uncert:	+/-0.0942		+/-0.190						
	TPU:	+/-0.0942		+/-0.199						
Cesium-134	U	0.0588	U	0.0554	pCi/g	0		N/A		
	Uncert:	+/-0.0525		+/-0.0546						
	TPU:	+/-0.0592		+/-0.0603						
Cesium-136	U	-0.0164	U	0.0142	pCi/g	0		N/A		
	Uncert:	+/-0.0590		+/-0.0619						

QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
	TPU:	+/-0.0595		+/-0.0622						
Cesium-137		0.260		0.181	pCi/g	35.6*		(0%-20%)		
	Uncert:	+/-0.0689		+/-0.0763						
	TPU:	+/-0.0770		+/-0.0778						
Chromium-51	U	-0.0901	U	0.235	pCi/g	0		N/A		
	Uncert:	+/-0.236		+/-0.285						
	TPU:	+/-0.240		+/-0.304						
Cobalt-56	U	-0.0193	U	0.00365	pCi/g	0		N/A		
	Uncert:	+/-0.0352		+/-0.0339						
	TPU:	+/-0.0363		+/-0.0340						
Cobalt-57	U	0.00519	U	-0.00941	pCi/g	0		N/A		
	Uncert:	+/-0.0110		+/-0.0239						
	TPU:	+/-0.0113		+/-0.0243						
Cobalt-58	U	-0.00795	U	-0.0158	pCi/g	0		N/A		
	Uncert:	+/-0.0300		+/-0.0310						
	TPU:	+/-0.0302		+/-0.0319						
Cobalt-60	U	0.0127	U	0.0122	pCi/g	0		N/A		
	Uncert:	+/-0.0402		+/-0.0423						
	TPU:	+/-0.0406		+/-0.0427						
Europium-152	U	-0.000203	U	0.0180	pCi/g	0		N/A		
	Uncert:	+/-0.0640		+/-0.0857						
	TPU:	+/-0.0640		+/-0.0861						
Europium-154	U	-0.0737	U	-0.0107	pCi/g	0		N/A		
	Uncert:	+/-0.130		+/-0.119						
	TPU:	+/-0.135		+/-0.119						
Europium-155	U	0.0317	U	-0.0971	pCi/g	0		N/A		
	Uncert:	+/-0.0434		+/-0.0993						
	TPU:	+/-0.0459		+/-0.109						
Iridium-192	U	0.0381	U	0.00642	pCi/g	0		N/A		
	Uncert:	+/-0.0308		+/-0.0306						
	TPU:	+/-0.0354		+/-0.0307						
Iron-59	U	-0.00179	U	0.0930	pCi/g	0		N/A		
	Uncert:	+/-0.0720		+/-0.0850						
	TPU:	+/-0.0721		+/-0.0953						
Lead-210		1.11	U	-0.818	pCi/g	161*		(0% - 100%)		
	Uncert:	+/-0.459		+/-6.06						
	TPU:	+/-0.470		+/-6.07						
Lead-212		0.867		0.999	pCi/g	14.1		(0%-20%)		
	Uncert:	+/-0.0833		+/-0.112						
	TPU:	+/-0.126		+/-0.140						
Lead-214		0.822		0.673	pCi/g	19.9		(0%-20%)		
	Uncert:	+/-0.151		+/-0.178						
	TPU:	+/-0.165		+/-0.186						
Manganese-54	U	0.00952	UI	0.000	pCi/g	0		N/A		
	Uncert:	+/-0.0283		+/-0.126						
	TPU:	+/-0.0286		+/-0.127						

QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
Mercury-203	U	-0.00584	U	0.0241	pCi/g	0		N/A		
	Uncert:	+/-0.0224		+/-0.0334						
	TPU:	+/-0.0226		+/-0.0352						
Neodymium-147	U	-0.127	U	0.258	pCi/g	0		N/A		
	Uncert:	+/-0.212		+/-0.306						
	TPU:	+/-0.220		+/-0.328						
Neptunium-239	U	-0.0735	U	-0.0481	pCi/g	0		N/A		
	Uncert:	+/-0.116		+/-0.243						
	TPU:	+/-0.121		+/-0.244						
Niobium-94	U	0.0134	U	0.0159	pCi/g	0		N/A		
	Uncert:	+/-0.0307		+/-0.0349						
	TPU:	+/-0.0313		+/-0.0356						
Niobium-95	U	-0.0207	U	-0.0143	pCi/g	0		N/A		
	Uncert:	+/-0.0317		+/-0.0397						
	TPU:	+/-0.0332		+/-0.0402						
Potassium-40		16.6		18.2	pCi/g	9.21		(0%-20%)		
	Uncert:	+/-1.67		+/-1.64						
	TPU:	+/-2.22		+/-2.61						
Promethium-144	U	-0.00522	U	-0.0171	pCi/g	0		N/A		
	Uncert:	+/-0.0289		+/-0.0371						
	TPU:	+/-0.0290		+/-0.0380						
Promethium-146	U	0.00287	U	0.0205	pCi/g	0		N/A		
	Uncert:	+/-0.0319		+/-0.0442						
	TPU:	+/-0.0319		+/-0.0452						
Radium-226		0.822		0.673	pCi/g	19.9		(0%-20%)		
	Uncert:	+/-0.151		+/-0.178						
	TPU:	+/-0.165		+/-0.186						
Radium-228		0.986		1.25	pCi/g	23.3*		(0%-20%)		
	Uncert:	+/-0.276		+/-0.340						
	TPU:	+/-0.295		+/-0.366						
Ruthenium-106	U	0.0371	U	-0.0787	pCi/g	0		N/A		
	Uncert:	+/-0.245		+/-0.338						
	TPU:	+/-0.246		+/-0.340						
Silver-110m	U	-0.0335	U	-0.00500	pCi/g	0		N/A		
	Uncert:	+/-0.0465		+/-0.0531						
	TPU:	+/-0.0491		+/-0.0531						
Sodium-22	U	-0.0259	U	-0.00824	pCi/g	0		N/A		
	Uncert:	+/-0.0457		+/-0.0441						
	TPU:	+/-0.0472		+/-0.0443						
Thallium-208		0.279		0.276	pCi/g	1.3		(0%-20%)		
	Uncert:	+/-0.0730		+/-0.0777						
	TPU:	+/-0.0803		+/-0.0812						
Thorium-234		1.02	UI	0.000	pCi/g	80.1		(0% - 100%)		
	Uncert:	+/-0.518		+/-3.14						
	TPU:	+/-0.566		+/-3.20						
Tin-113	U	-0.0189	U	0.0172	pCi/g	0		N/A		

QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
	Uncert:	+/-0.0371		+/-0.0458						
	TPU:	+/-0.0381		+/-0.0465						
Uranium-235	U	0.000690	U	0.0574	pCi/g	0		N/A		
	Uncert:	+/-0.100		+/-0.383						
	TPU:	+/-0.100		+/-0.383						
Uranium-238		1.02	UI	0.000	pCi/g	80.1		(0% - 100%)		
	Uncert:	+/-0.518		+/-3.14						
	TPU:	+/-0.566		+/-3.20						
Yttrium-88	U	0.00173	U	0.0192	pCi/g	0		N/A		
	Uncert:	+/-0.0292		+/-0.0388						
	TPU:	+/-0.0292		+/-0.0397						
Zinc-65	U	-0.0577	U	0.00640	pCi/g	0		N/A		
	Uncert:	+/-0.0713		+/-0.0989						
	TPU:	+/-0.0760		+/-0.0989						
Zirconium-95	U	0.0879	U	0.0106	pCi/g	0		N/A		
	Uncert:	+/-0.0720		+/-0.0652						
	TPU:	+/-0.0830		+/-0.0654						
QC1205625371 LCS										
Actinium-228			U	2.14	pCi/g				MXR1	01/17/2417:34
	Uncert:			+/-2.25						
	TPU:			+/-2.46						
Americium-241	483			524	pCi/g		108	(75%-125%)		
	Uncert:			+/-4.29						
	TPU:			+/-42.8						
Antimony-124			U	0.171	pCi/g					
	Uncert:			+/-0.416						
	TPU:			+/-0.423						
Antimony-125			U	-0.358	pCi/g					
	Uncert:			+/-1.18						
	TPU:			+/-1.20						
Barium-133			U	0.308	pCi/g					
	Uncert:			+/-0.479						
	TPU:			+/-0.500						
Barium-140			U	0.840	pCi/g					
	Uncert:			+/-1.43						
	TPU:			+/-1.48						
Beryllium-7			U	-2.32	pCi/g					
	Uncert:			+/-4.13						
	TPU:			+/-4.27						
Bismuth-212			U	1.52	pCi/g					
	Uncert:			+/-5.19						
	TPU:			+/-5.23						
Bismuth-214			U	-0.295	pCi/g					
	Uncert:			+/-0.708						
	TPU:			+/-0.721						
Cerium-139			U	-0.0268	pCi/g					

Appendix E - Continued

GEL Laboratory Sample Reports for Site Samples Collected 8/2023, 01/2024 and 07/2024

GEL Laboratories LLC
a member of The GEL Group INC

2040 Savage Road | Charleston, SC 29407
843.556.8171
gel.com

January 18, 2024

Alex Bartels
MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Re: Inventum
Work Order: 651915

Dear Alex Bartels:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 16, 2024. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4422.

Sincerely,

A. Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

Purchase Order: GELP23-1647
Enclosures

MJW Technical Services
Inventum
SDG: 651915

Table of Contents

Case Narrative.....1

Chain of Custody and Supporting Documentation.4

Data Review Qualifier Definitions.....7

Radiological Analysis.....10

Case Narrative.....11

Sample Data Summary.....16

Quality Control Data.....21

Gamma Spectroscopy Raw Data.....33

Continuing Calibration Data.....139

Background and Efficiency Data.....142

RAD Standards Traceability.....155

Runlogs.....172

Case Narrative

Case Narrative
for
MJW Technical Services
SDG: 651915

January 18, 2024

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 16, 2024 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
651915001	01122024-TWT1
651915002	01122024-SB1

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

A Melendrez

Adrian Melendrez for
Jacob Crook
Project Manager

List of current GEL Certifications as of 18 January 2024

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-00651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	KY90129
Kentucky Wastewater	KY90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2023019
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122024-05
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2023-152
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-23-21
Utah NELAP	SC000122023-38
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Chain of Custody and Supporting Documentation

Page 2 of 2
Project #
GEL Quote #
COC Number [1]
PO Number

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Work Order Number: 651915
GEL Project Manager:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

651915

Client Name: MJW Companies
Phone # (716) 631-8291
Project/Site Name: Inventum
Fax #
Address: 15 Hazelwood Dr Suite 112 Amherst NY 14228
Collected By: P. Koch
Send Results To: abarteis@mjwcorp.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (Please supply isotopic info.)	Should this sample be considered: (?) Known or possible hazards	Total number of containers	Gamma Spec	<-- Preservative Type (6)
01122024-TWT1	01-12-24	1500	N	N	S	N		1	X	
01122024-SB1	01-12-24	1500	N	N	S	N		1	X	

Comments
Note: extra sample is required for sample specific QC

1
7 0
10 day TAT

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 Carl Fa	01-12-24	1630	1 [illegible]	1/16/24	930
2			2		
3			3		

TAT Requested: Normal: ____ Rush: X Specify: 10 day (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] Level 1 [ ] Level 2 [ ] Level 3 [X] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No *Cooler Temp:* ____ °C

> ***For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)***

Sample Collection Time Zone [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ____

1) Chain of Custody Number = Client Determined

2) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4) Matrix Codes DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5) Sample Analysis Requested Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

6) Preservative Type HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

7) *Are there any known or possible hazards associated with these samples?*

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e. Origin of sample(s), type of site collected from, odd matrices, etc.)*

RCRA Metals
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Pb = Lead
Hg= Mercury
Se= Selenium
Ag= Silver
MR= Miscellaneous RCRA metals

TSCA Regulated
PCB = Polychlorinated biphenyls

651915

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WTWC	SDG/AR/COC/Work Order: 5-F
Received By: Thyasia Tatum	Date Received: 1-16-24
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7748 0097 2886

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Wet Ice Ice Packs Dry ice None Other: 6 *all temperatures are recorded in Celsius TEMP: 10C
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR2-23 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		✓		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 01/17/24 Page 1 of 1

GL-CHL-SR-001 Rev 7

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
MJW Technical Services
SDG #: 651915

Product: **Dry Weight**
Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2554103

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
651915001	01122024-TWT1
651915002	01122024-SB1

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Gammaspec, Gamma, Solid (Standard List)**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 28
Analytical Batch: 2554552

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 25
Preparation Batch: 2554103

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
651915001	01122024-TWT1
651915002	01122024-SB1
1205625369	Method Blank (MB)
1205625370	651915001(01122024-TWT1) Sample Duplicate (DUP)
1205625371	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Duplication Criteria between QC Sample and Duplicate Sample
The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they

do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1205625370 (01122024-TWT1DUP)	Actinium-228	RPD 23.3* (0.00%-20.00%) RER 1.08 (0-3)
	Bismuth-214	RPD 21.2* (0.00%-20.00%) RER 0.884 (0-3)
	Cesium-137	RPD 35.6* (0.00%-20.00%) RER 1.41 (0-3)
	Lead-210	RPD 161* (0.0%-100.0%) RER 0.622 (0-3)
	Radium-228	RPD 23.3* (0.00%-20.00%) RER 1.08 (0-3)

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Thorium-234	1205625370	01122024-TWT1(651915001DUP)
		Uranium-238	1205625370	01122024-TWT1(651915001DUP)
UI	Results are considered a false positive due to high peak-width.	Bismuth-212	1205625370	01122024-TWT1(651915001DUP)
		Manganese-54	1205625370	01122024-TWT1(651915001DUP)
UI	Results are considered a false positive due to low abundance.	Actinium-228	651915002	01122024-SB1
		Cesium-134	651915002	01122024-SB1
		Radium-228	651915002	01122024-SB1

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Moisture LogBook

Batch: 2554103
Analyst: LC2
Date/Time: 16-JAN-2024
Procedure Code:___PREPD
Procedure Description: Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-RAD-A-021

Sample St	Sample Id	Rpd(%)

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
651915001	SAMPLE		SP-C234673837	12:08	11.93	403.72	308.16	391.79	296.23	24.39
651915002	SAMPLE		SP-C234673837	12:08	11.85	401.82	299.32	389.97	287.47	26.284
651916001	SAMPLE		SP-C234673837	12:08	11.96	429.35	329.74	417.39	317.78	23.864
651916002	SAMPLE		SP-C234673837	12:08	11.94	460.8	344.23	448.86	332.29	25.97

Comments:

A) Result = (Net Initial - Net Final) /Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

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Qualifier Definition Report
for

MJWC001 MJW Technical Services

Client SDG: 651915 GEL Work Order: 651915

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI Gamma Spectroscopy--Uncertain identification

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Kenshalla Oston **Name: Kenshalla Oston**

Date: 23 JAN 2024 **Title: Analyst I**

Sample Data Summary

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 24.4%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0136	+/-0.0254	0.0439	+/-0.0261		pCi/g							
Antimony-124	U	-0.0369	+/-0.0550	0.0975	+/-0.0576		pCi/g							
Antimony-125	U	0.0273	+/-0.0729	0.141	+/-0.0740		pCi/g							
Barium-133	U	-0.0172	+/-0.0334	0.0493	+/-0.0343		pCi/g							
Barium-140	U	-0.0929	+/-0.117	0.198	+/-0.124		pCi/g							
Beryllium-7	U	-0.0500	+/-0.199	0.367	+/-0.200		pCi/g							
Bismuth-212	U	0.762	+/-0.903	0.814	+/-0.909		pCi/g							
Bismuth-214		0.601	+/-0.170	0.102	+/-0.185		pCi/g							
Cerium-139	U	0.00188	+/-0.0144	0.0266	+/-0.0145		pCi/g							
Cerium-141	U	-0.0114	+/-0.0242	0.0433	+/-0.0248		pCi/g							
Cerium-144	U	-0.00401	+/-0.0942	0.174	+/-0.0942		pCi/g							
Cesium-134	U	0.0588	+/-0.0525	0.0853	+/-0.0592		pCi/g							
Cesium-136	U	-0.0164	+/-0.0590	0.109	+/-0.0595		pCi/g							
Cesium-137		0.260	+/-0.0689	0.0499	+/-0.0770	0.100	pCi/g							
Chromium-51	U	-0.0901	+/-0.236	0.348	+/-0.240		pCi/g							
Cobalt-56	U	-0.0193	+/-0.0352	0.0543	+/-0.0363		pCi/g							
Cobalt-57	U	0.00519	+/-0.0110	0.0200	+/-0.0113		pCi/g							
Cobalt-58	U	-0.00795	+/-0.0300	0.0528	+/-0.0302		pCi/g							
Cobalt-60	U	0.0127	+/-0.0402	0.0734	+/-0.0406		pCi/g							
Europium-152	U	-0.000203	+/-0.0640	0.112	+/-0.0640		pCi/g							
Europium-154	U	-0.0737	+/-0.130	0.224	+/-0.135		pCi/g							
Europium-155	U	0.0317	+/-0.0434	0.0851	+/-0.0459		pCi/g							
Iridium-192	U	0.0381	+/-0.0308	0.0420	+/-0.0354		pCi/g							
Iron-59	U	-0.00179	+/-0.0720	0.137	+/-0.0721		pCi/g							
Lead-210		1.11	+/-0.459	0.353	+/-0.470		pCi/g							
Lead-212		0.867	+/-0.0833	0.0643	+/-0.126		pCi/g							
Lead-214		0.822	+/-0.151	0.100	+/-0.165		pCi/g							
Manganese-54	U	0.00952	+/-0.0283	0.0547	+/-0.0286		pCi/g							
Mercury-203	U	-0.00584	+/-0.0224	0.0383	+/-0.0226		pCi/g							
Neodymium-147	U	-0.127	+/-0.212	0.371	+/-0.220		pCi/g							
Neptunium-239	U	-0.0735	+/-0.116	0.210	+/-0.121		pCi/g							
Niobium-94	U	0.0134	+/-0.0307	0.0585	+/-0.0313		pCi/g							
Niobium-95	U	-0.0207	+/-0.0317	0.0525	+/-0.0332		pCi/g							
Potassium-40		16.6	+/-1.67	0.517	+/-2.22		pCi/g							
Promethium-144	U	-0.00522	+/-0.0289	0.0517	+/-0.0290		pCi/g							
Promethium-146	U	0.00287	+/-0.0319	0.0605	+/-0.0319		pCi/g							
Radium-226		0.822	+/-0.151	0.100	+/-0.165		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels
Project: Inventum

Client Sample ID: 01122024-TWT1
Sample ID: 651915001

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Radium-228		0.986	+/-0.276	0.224	+/-0.295		pCi/g							
Ruthenium-106	U	0.0371	+/-0.245	0.463	+/-0.246		pCi/g							
Silver-110m	U	-0.0335	+/-0.0465	0.0745	+/-0.0491		pCi/g							
Sodium-22	U	-0.0259	+/-0.0457	0.0786	+/-0.0472		pCi/g							
Thallium-208		0.279	+/-0.0730	0.0541	+/-0.0803		pCi/g							
Thorium-234		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Tin-113	U	-0.0189	+/-0.0371	0.0597	+/-0.0381		pCi/g							
Uranium-235	U	0.000690	+/-0.100	0.184	+/-0.100		pCi/g							
Uranium-238		1.02	+/-0.518	0.425	+/-0.566		pCi/g							
Yttrium-88	U	0.00173	+/-0.0292	0.0645	+/-0.0292		pCi/g							
Zinc-65	U	-0.0577	+/-0.0713	0.0972	+/-0.0760		pCi/g							
Zirconium-95	U	0.0879	+/-0.0720	0.106	+/-0.0830		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels

Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002
Matrix: Solid
Collect Date: 12-JAN-24
Receive Date: 16-JAN-24
Collector: Client
Moisture: 26.3%

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Actinium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g			MXR1	01/17/24	1257	2554552	1
Americium-241	U	0.0314	+/-0.0594	0.0925	+/-0.0611		pCi/g							
Antimony-124	U	0.0128	+/-0.0531	0.130	+/-0.0535		pCi/g							
Antimony-125	U	-0.0889	+/-0.102	0.159	+/-0.110		pCi/g							
Barium-133	U	0.00197	+/-0.0494	0.0773	+/-0.0494		pCi/g							
Barium-140	U	0.135	+/-0.179	0.355	+/-0.190		pCi/g							
Beryllium-7	U	0.0205	+/-0.321	0.599	+/-0.321		pCi/g							
Bismuth-212		1.78	+/-0.993	1.02	+/-1.01		pCi/g							
Bismuth-214		0.699	+/-0.215	0.161	+/-0.227		pCi/g							
Cerium-139	U	0.000346	+/-0.0270	0.0477	+/-0.0270		pCi/g							
Cerium-141	U	0.0434	+/-0.0485	0.0832	+/-0.0525		pCi/g							
Cerium-144	U	-0.0351	+/-0.179	0.314	+/-0.180		pCi/g							
Cesium-134	UI	0.000	+/-0.0817	0.122	+/-0.113		pCi/g							
Cesium-136	U	0.0194	+/-0.0805	0.151	+/-0.0810		pCi/g							
Cesium-137		0.179	+/-0.0761	0.100	+/-0.0785	0.100	pCi/g							
Chromium-51	U	0.184	+/-0.344	0.571	+/-0.355		pCi/g							
Cobalt-56	U	-0.0391	+/-0.0436	0.0705	+/-0.0471		pCi/g							
Cobalt-57	U	-0.0112	+/-0.0225	0.0389	+/-0.0231		pCi/g							
Cobalt-58	U	-0.00625	+/-0.0428	0.0776	+/-0.0429		pCi/g							
Cobalt-60	U	-0.0124	+/-0.0461	0.0862	+/-0.0464		pCi/g							
Europium-152	U	-0.0341	+/-0.101	0.171	+/-0.102		pCi/g							
Europium-154	U	0.0976	+/-0.138	0.291	+/-0.145		pCi/g							
Europium-155	U	0.126	+/-0.136	0.145	+/-0.137		pCi/g							
Iridium-192	U	0.0341	+/-0.0726	0.0624	+/-0.0743		pCi/g							
Iron-59	U	0.00538	+/-0.0995	0.182	+/-0.0996		pCi/g							
Lead-210		1.33	+/-0.761	0.749	+/-0.779		pCi/g							
Lead-212		1.01	+/-0.111	0.0950	+/-0.149		pCi/g							
Lead-214		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Manganese-54	U	-0.0152	+/-0.0453	0.0795	+/-0.0458		pCi/g							
Mercury-203	U	0.00653	+/-0.0319	0.0571	+/-0.0321		pCi/g							
Neodymium-147	U	0.0656	+/-0.343	0.649	+/-0.344		pCi/g							
Neptunium-239	U	-0.000434	+/-0.238	0.424	+/-0.238		pCi/g							
Niobium-94	U	0.00270	+/-0.0454	0.0776	+/-0.0454		pCi/g							
Niobium-95	U	-0.0525	+/-0.0460	0.0700	+/-0.0520		pCi/g							
Potassium-40		18.0	+/-1.84	0.619	+/-2.42		pCi/g							
Promethium-144	U	0.0165	+/-0.0410	0.0784	+/-0.0417		pCi/g							
Promethium-146	U	-0.0115	+/-0.0480	0.0812	+/-0.0483		pCi/g							
Radium-226		0.734	+/-0.135	0.132	+/-0.152		pCi/g							
Radium-228	UI	0.000	+/-0.409	0.677	+/-0.728		pCi/g							

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Amherst, New York 14228

Report Date: January 23, 2024

Contact: Alex Bartels

Project: Inventum

Client Sample ID: 01122024-SB1
Sample ID: 651915002

Project: MJWC01524
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
Gammaspec, Gamma, Solid (Standard List) "Dry Weight Corrected"														
Ruthenium-106	U	0.0363	+/-0.338	0.639	+/-0.339		pCi/g							
Silver-110m	U	0.0260	+/-0.0605	0.114	+/-0.0617		pCi/g							
Sodium-22	U	0.0334	+/-0.0481	0.102	+/-0.0505		pCi/g							
Thallium-208		0.370	+/-0.0870	0.0716	+/-0.0948		pCi/g							
Thorium-234		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Tin-113	U	0.0385	+/-0.0462	0.0873	+/-0.0495		pCi/g							
Uranium-235	U	0.141	+/-0.327	0.315	+/-0.328		pCi/g							
Uranium-238		1.48	+/-0.938	0.910	+/-1.00		pCi/g							
Yttrium-88	U	0.00781	+/-0.0437	0.0919	+/-0.0439		pCi/g							
Zinc-65	U	-0.0670	+/-0.116	0.162	+/-0.120		pCi/g							
Zirconium-95	U	-0.0103	+/-0.0840	0.152	+/-0.0841		pCi/g							

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LC2	01/16/24	1208	2554103

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Data

QC Summary

Client : MJW Technical Services
15 Hazelwood Drive
Suite 112
Amherst, New York

Contact: Alex Bartels

Workorder: 651915

Report Date: January 23, 2024

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
QC1205625370 651915001 DUP										
Actinium-228		0.986		1.25	pCi/g	23.3*		(0%-20%)	MXR1	01/17/2417:33
	Uncert:	+/-0.276		+/-0.340						
	TPU:	+/-0.295		+/-0.366						
Americium-241	U	0.0136	U	-0.000279	pCi/g	0		N/A		
	Uncert:	+/-0.0254		+/-0.186						
	TPU:	+/-0.0261		+/-0.186						
Antimony-124	U	-0.0369	U	-0.00697	pCi/g	0		N/A		
	Uncert:	+/-0.0550		+/-0.0661						
	TPU:	+/-0.0576		+/-0.0662						
Antimony-125	U	0.0273	U	0.0673	pCi/g	0		N/A		
	Uncert:	+/-0.0729		+/-0.0929						
	TPU:	+/-0.0740		+/-0.0979						
Barium-133	U	-0.0172	U	0.0161	pCi/g	0		N/A		
	Uncert:	+/-0.0334		+/-0.0434						
	TPU:	+/-0.0343		+/-0.0441						
Barium-140	U	-0.0929	U	0.196	pCi/g	0		N/A		
	Uncert:	+/-0.117		+/-0.157						
	TPU:	+/-0.124		+/-0.181						
Beryllium-7	U	-0.0500	U	-0.0778	pCi/g	0		N/A		
	Uncert:	+/-0.199		+/-0.319						
	TPU:	+/-0.200		+/-0.321						
Bismuth-212	U	0.762	UI	0.000	pCi/g	0		N/A		
	Uncert:	+/-0.903		+/-1.24						
	TPU:	+/-0.909		+/-1.25						
Bismuth-214		0.601		0.486	pCi/g	21.2*		(0%-20%)		
	Uncert:	+/-0.170		+/-0.171						
	TPU:	+/-0.185		+/-0.176						
Cerium-139	U	0.00188	U	0.0140	pCi/g	0		N/A		
	Uncert:	+/-0.0144		+/-0.0336						
	TPU:	+/-0.0145		+/-0.0343						
Cerium-141	U	-0.0114	U	0.00332	pCi/g	0		N/A		
	Uncert:	+/-0.0242		+/-0.0501						
	TPU:	+/-0.0248		+/-0.0501						
Cerium-144	U	-0.00401	U	0.128	pCi/g	0		N/A		
	Uncert:	+/-0.0942		+/-0.190						
	TPU:	+/-0.0942		+/-0.199						
Cesium-134	U	0.0588	U	0.0554	pCi/g	0		N/A		
	Uncert:	+/-0.0525		+/-0.0546						
	TPU:	+/-0.0592		+/-0.0603						
Cesium-136	U	-0.0164	U	0.0142	pCi/g	0		N/A		
	Uncert:	+/-0.0590		+/-0.0619						

QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
	TPU:	+/-0.0595		+/-0.0622						
Cesium-137		0.260		0.181	pCi/g	35.6*		(0%-20%)		
	Uncert:	+/-0.0689		+/-0.0763						
	TPU:	+/-0.0770		+/-0.0778						
Chromium-51	U	-0.0901	U	0.235	pCi/g	0		N/A		
	Uncert:	+/-0.236		+/-0.285						
	TPU:	+/-0.240		+/-0.304						
Cobalt-56	U	-0.0193	U	0.00365	pCi/g	0		N/A		
	Uncert:	+/-0.0352		+/-0.0339						
	TPU:	+/-0.0363		+/-0.0340						
Cobalt-57	U	0.00519	U	-0.00941	pCi/g	0		N/A		
	Uncert:	+/-0.0110		+/-0.0239						
	TPU:	+/-0.0113		+/-0.0243						
Cobalt-58	U	-0.00795	U	-0.0158	pCi/g	0		N/A		
	Uncert:	+/-0.0300		+/-0.0310						
	TPU:	+/-0.0302		+/-0.0319						
Cobalt-60	U	0.0127	U	0.0122	pCi/g	0		N/A		
	Uncert:	+/-0.0402		+/-0.0423						
	TPU:	+/-0.0406		+/-0.0427						
Europium-152	U	-0.000203	U	0.0180	pCi/g	0		N/A		
	Uncert:	+/-0.0640		+/-0.0857						
	TPU:	+/-0.0640		+/-0.0861						
Europium-154	U	-0.0737	U	-0.0107	pCi/g	0		N/A		
	Uncert:	+/-0.130		+/-0.119						
	TPU:	+/-0.135		+/-0.119						
Europium-155	U	0.0317	U	-0.0971	pCi/g	0		N/A		
	Uncert:	+/-0.0434		+/-0.0993						
	TPU:	+/-0.0459		+/-0.109						
Iridium-192	U	0.0381	U	0.00642	pCi/g	0		N/A		
	Uncert:	+/-0.0308		+/-0.0306						
	TPU:	+/-0.0354		+/-0.0307						
Iron-59	U	-0.00179	U	0.0930	pCi/g	0		N/A		
	Uncert:	+/-0.0720		+/-0.0850						
	TPU:	+/-0.0721		+/-0.0953						
Lead-210		1.11	U	-0.818	pCi/g	161*		(0% - 100%)		
	Uncert:	+/-0.459		+/-6.06						
	TPU:	+/-0.470		+/-6.07						
Lead-212		0.867		0.999	pCi/g	14.1		(0%-20%)		
	Uncert:	+/-0.0833		+/-0.112						
	TPU:	+/-0.126		+/-0.140						
Lead-214		0.822		0.673	pCi/g	19.9		(0%-20%)		
	Uncert:	+/-0.151		+/-0.178						
	TPU:	+/-0.165		+/-0.186						
Manganese-54	U	0.00952	UI	0.000	pCi/g	0		N/A		
	Uncert:	+/-0.0283		+/-0.126						
	TPU:	+/-0.0286		+/-0.127						

QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
Mercury-203	U	-0.00584	U	0.0241	pCi/g	0		N/A		
	Uncert:	+/-0.0224		+/-0.0334						
	TPU:	+/-0.0226		+/-0.0352						
Neodymium-147	U	-0.127	U	0.258	pCi/g	0		N/A		
	Uncert:	+/-0.212		+/-0.306						
	TPU:	+/-0.220		+/-0.328						
Neptunium-239	U	-0.0735	U	-0.0481	pCi/g	0		N/A		
	Uncert:	+/-0.116		+/-0.243						
	TPU:	+/-0.121		+/-0.244						
Niobium-94	U	0.0134	U	0.0159	pCi/g	0		N/A		
	Uncert:	+/-0.0307		+/-0.0349						
	TPU:	+/-0.0313		+/-0.0356						
Niobium-95	U	-0.0207	U	-0.0143	pCi/g	0		N/A		
	Uncert:	+/-0.0317		+/-0.0397						
	TPU:	+/-0.0332		+/-0.0402						
Potassium-40		16.6		18.2	pCi/g	9.21		(0%-20%)		
	Uncert:	+/-1.67		+/-1.64						
	TPU:	+/-2.22		+/-2.61						
Promethium-144	U	-0.00522	U	-0.0171	pCi/g	0		N/A		
	Uncert:	+/-0.0289		+/-0.0371						
	TPU:	+/-0.0290		+/-0.0380						
Promethium-146	U	0.00287	U	0.0205	pCi/g	0		N/A		
	Uncert:	+/-0.0319		+/-0.0442						
	TPU:	+/-0.0319		+/-0.0452						
Radium-226		0.822		0.673	pCi/g	19.9		(0%-20%)		
	Uncert:	+/-0.151		+/-0.178						
	TPU:	+/-0.165		+/-0.186						
Radium-228		0.986		1.25	pCi/g	23.3*		(0%-20%)		
	Uncert:	+/-0.276		+/-0.340						
	TPU:	+/-0.295		+/-0.366						
Ruthenium-106	U	0.0371	U	-0.0787	pCi/g	0		N/A		
	Uncert:	+/-0.245		+/-0.338						
	TPU:	+/-0.246		+/-0.340						
Silver-110m	U	-0.0335	U	-0.00500	pCi/g	0		N/A		
	Uncert:	+/-0.0465		+/-0.0531						
	TPU:	+/-0.0491		+/-0.0531						
Sodium-22	U	-0.0259	U	-0.00824	pCi/g	0		N/A		
	Uncert:	+/-0.0457		+/-0.0441						
	TPU:	+/-0.0472		+/-0.0443						
Thallium-208		0.279		0.276	pCi/g	1.3		(0%-20%)		
	Uncert:	+/-0.0730		+/-0.0777						
	TPU:	+/-0.0803		+/-0.0812						
Thorium-234		1.02	UI	0.000	pCi/g	80.1		(0% - 100%)		
	Uncert:	+/-0.518		+/-3.14						
	TPU:	+/-0.566		+/-3.20						
Tin-113	U	-0.0189	U	0.0172	pCi/g	0		N/A		

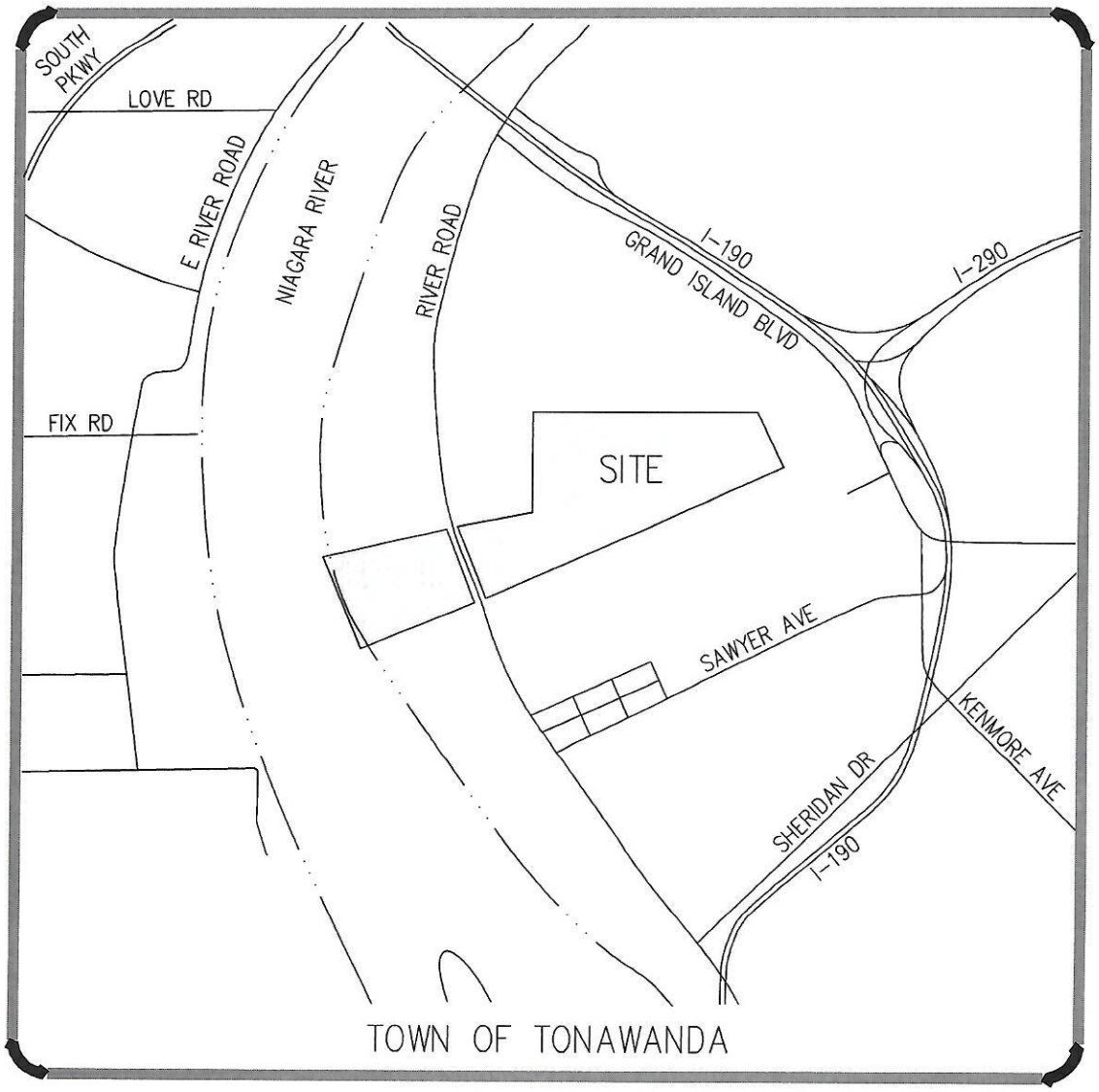
QC Summary

Workorder: 651915

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gamma Spec										
Batch 2554552										
	Uncert:	+/-0.0371		+/-0.0458						
	TPU:	+/-0.0381		+/-0.0465						
Uranium-235	U	0.000690	U	0.0574	pCi/g	0		N/A		
	Uncert:	+/-0.100		+/-0.383						
	TPU:	+/-0.100		+/-0.383						
Uranium-238		1.02	UI	0.000	pCi/g	80.1		(0% - 100%)		
	Uncert:	+/-0.518		+/-3.14						
	TPU:	+/-0.566		+/-3.20						
Yttrium-88	U	0.00173	U	0.0192	pCi/g	0		N/A		
	Uncert:	+/-0.0292		+/-0.0388						
	TPU:	+/-0.0292		+/-0.0397						
Zinc-65	U	-0.0577	U	0.00640	pCi/g	0		N/A		
	Uncert:	+/-0.0713		+/-0.0989						
	TPU:	+/-0.0760		+/-0.0989						
Zirconium-95	U	0.0879	U	0.0106	pCi/g	0		N/A		
	Uncert:	+/-0.0720		+/-0.0652						
	TPU:	+/-0.0830		+/-0.0654						
QC1205625371 LCS										
Actinium-228			U	2.14	pCi/g				MXR1	01/17/2417:34
	Uncert:			+/-2.25						
	TPU:			+/-2.46						
Americium-241	483			524	pCi/g		108	(75%-125%)		
	Uncert:			+/-4.29						
	TPU:			+/-42.8						
Antimony-124			U	0.171	pCi/g					
	Uncert:			+/-0.416						
	TPU:			+/-0.423						
Antimony-125			U	-0.358	pCi/g					
	Uncert:			+/-1.18						
	TPU:			+/-1.20						
Barium-133			U	0.308	pCi/g					
	Uncert:			+/-0.479						
	TPU:			+/-0.500						
Barium-140			U	0.840	pCi/g					
	Uncert:			+/-1.43						
	TPU:			+/-1.48						
Beryllium-7			U	-2.32	pCi/g					
	Uncert:			+/-4.13						
	TPU:			+/-4.27						
Bismuth-212			U	1.52	pCi/g					
	Uncert:			+/-5.19						
	TPU:			+/-5.23						
Bismuth-214			U	-0.295	pCi/g					
	Uncert:			+/-0.708						
	TPU:			+/-0.721						
Cerium-139			U	-0.0268	pCi/g					

Appendix F

Existing Site and Proposed Site Layout and Landcover



A

NOTE:
1. DRAWING NOT TO SCALE.

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

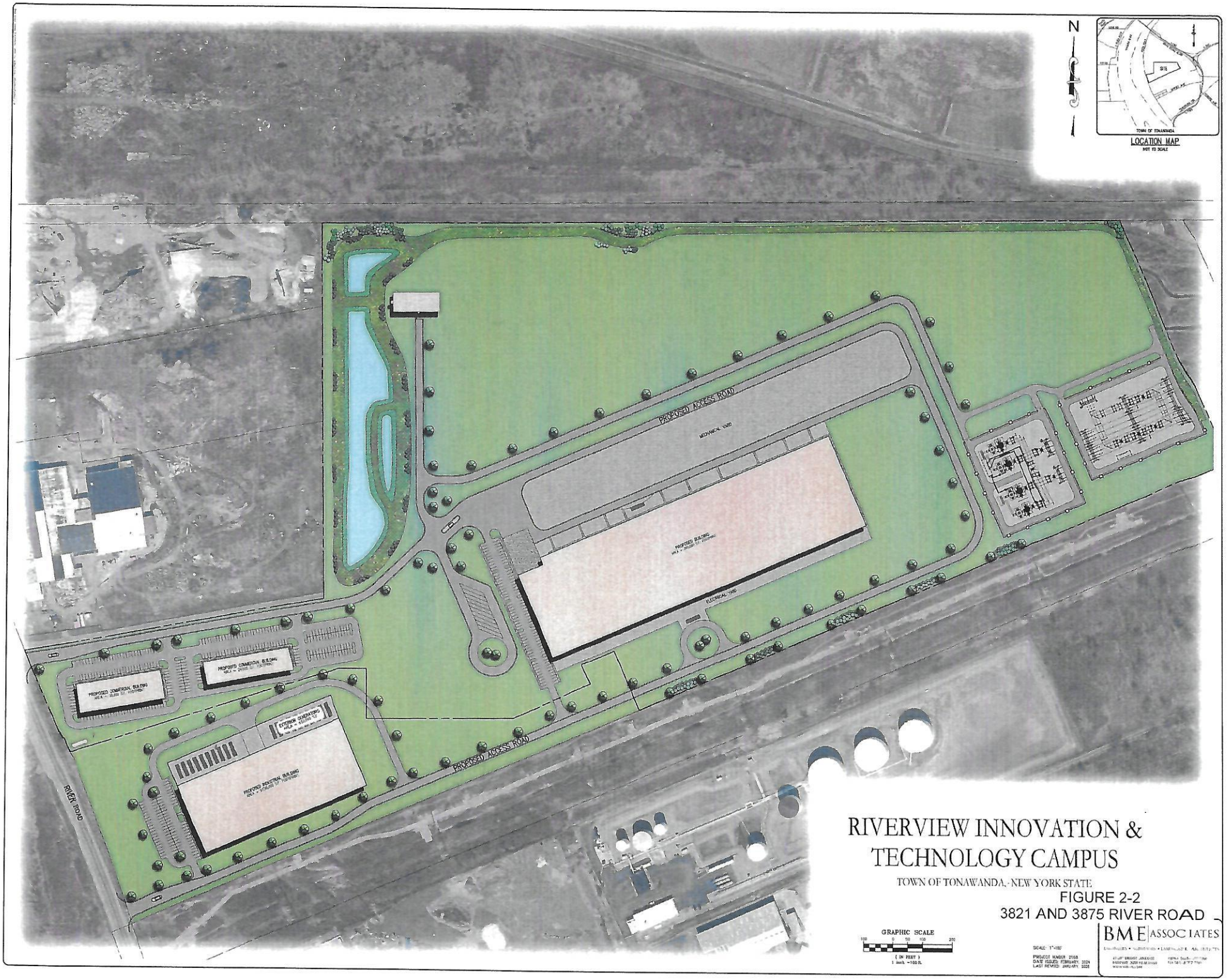
LOCATION MAP
RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
TOWN OF TONAWANDA, NEW YORK

FIGURE 2-1

DRAWING NUMBER

DRAWING BY	CB
CHECKED	
APPROVED	

Google Earth Areal of the 3875 River Road Property Tonawanda as of June 12, 2024

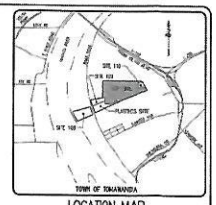

N
SITE
TOWN OF TONAWANDA
LOCATION MAP
NOT TO SCALE
PROPOSED ACCESS ROAD
MECHANICAL YARD
PROPOSED BUILDING
ELECTRICAL YARD
PROPOSED COMMERCIAL BUILDING
PROPOSED COMMERCIAL BUILDING
PROPOSED COMMERCIAL BUILDING
CYTOGEN CORPORATION
PROPOSED INDUSTRIAL BUILDING
PROPOSED ACCESS ROAD
RIVER ROAD
RIVERVIEW INNOVATION &
TECHNOLOGY CAMPUS
TOWN OF TONAWANDA, - NEW YORK STATE
FIGURE 2-2
3821 AND 3875 RIVER ROAD
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
SCALE: 1"=100'
PROJECT NUMBER 2168
DATE ISSUED: FEBRUARY, 2024
LAST REVISED: JANUARY, 2025
BME ASSOCIATES

RIVERVIEW LOT 108

CONCEPT PLAN

TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK

PREPARED FOR:
INVENTUM ENGINEERING
441 CARLISLE DRIVE SUITE C
HERNDON, VIRGINIA 20170



LOCATION MAP
NOT TO SCALE

FIGURE 2-3
3800 RIVER ROAD

SCALE: 1"=50'
PROJECT NUMBER: 29000
DATE ISSUED: MARCH 2020

BME ASSOCIATES

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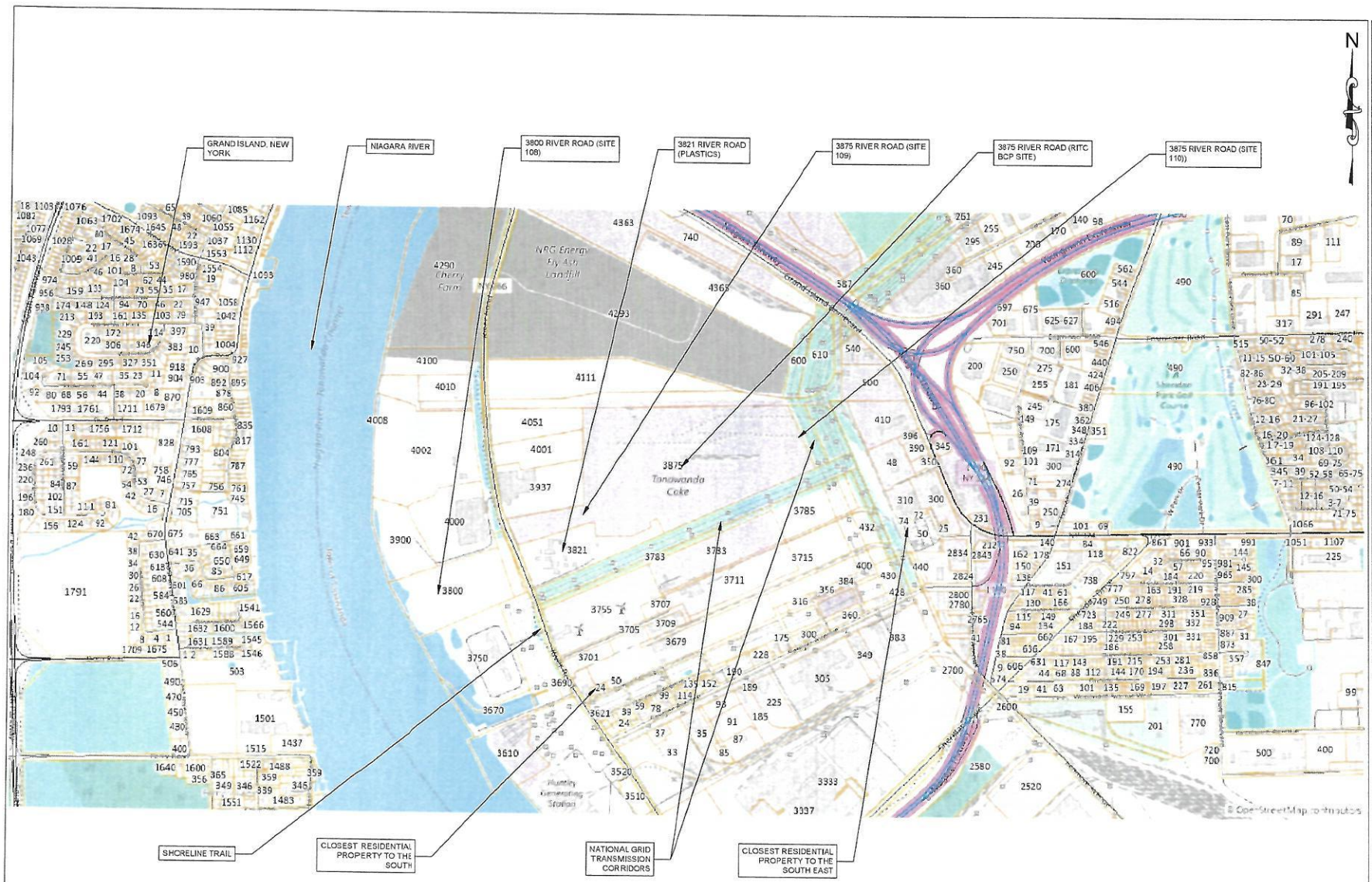
BME Associates



D

NOTE
1 DRAWING NOT TO SCALE

SOURCE
1 https://gis.ene.gov/Geocortex/Essentials/REST/TempFiles/Export.png?guid=a11e97de-6008-4284-98e4-522498a0f84f&contentType=image%2Fpng

DRAWN BY | JB
CHECKED
APPROVED

SURROUNDING PROPERTY MAP
RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS
3800, 3821, AND 3875 RIVER ROAD
TOWN OF TONAWANDA, NEW YORK

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FIGURE 2-4
DRAWING NUMBER

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

THE MJW COMPANIES
Radiological Consulting Professionals and Expert Technical Services

Memorandum

February 10, 2021

To: Mr. James Edwards
Inventum Engineering, PC
481 Carlisle Dr. Suite 202
Herndon, Virginia 20170

From: Martin Willett
Director of Health Physics and Remediation Services
MJW Corporation

Subject: Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

Introduction

A quality assurance and quality control (QA/QC) review of the Laboratory Analytical Data received from Eurofins TestAmerica, St. Louis, Laboratory Job ID: 160-40621-1 and released on 1/11/2021 was performed for Inventum Engineering LLC by MJW Corporation. The laboratory data report contained results for six (6) soil samples collected during a Tonawanda Coke facility investigation conducted between October and November 2020.

Summary of Laboratory Sample Receipt Condition:

- Standard analytical laboratory protocols were followed during the analysis of the samples and no problems were encountered or anomalies observed, laboratory quality control samples were within established control limits.
- Analytical methods and test results met NELAP requirements for parameters for which accreditation is required or available.
- Samples were received on 11/30/2020 in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

Laboratory Notes Related to Analytical Methods and Results:

Radium-226 By Gamma Spec (21 Day Ingrowth)

- Samples were analyzed for Radium-226 by gamma spec after a 21-day ingrowth period in accordance with EPA method 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020. As a result, samples met the 21day ingrowth requirement prior to analysis for Ra-226.

- Samples results for *Pb-210 by gamma spec (method 901.1) were estimated*.

- *Insufficient sample was provided for a sample to fill the geometry calibrated for Ra-226 analysis by gamma spectroscopy*. The samples contained large pieces of rock.

- Results for several requested isotopes have no or low abundance gamma peaks. *Quantification of the analyte was inferred under the assumption of equilibrium with decay chain progeny or parent isotopes. This assumption was added by the laboratory and was not based on process knowledge*.

Gross Alpha and Gross Beta Radioactivity

- Sample analysis was performed on 12/23/.2020 following method SW-846 Method 9310. No analytical or quality issues were noted.

Isotopic Thorium and Uranium (Alpha Spectrometry)

- Sample analysis was performed on 01/04/2021 and 01/07/21 following method DOE A01R_Th and U. For Thorium analysis, *a correction to data results to account for interference observed in the blank sample was applied.*
- Quality issues were not observed for U isotopic analysis.

Sample Analytical Results

Samples Analyzed

Lab ID	Client Sample ID	Collected Date / Time	Received
160-40621-1	TP-BCP-34-A	10/30/20 11:15	11/30/20 13:47
160-40621-2	TP-BCP-34-B	10/30/20 11:15	11/30/20 13:47
160-40621-3	TP-BCP-32-W45	11/09/20 01:00	11/30/20 13:47
160-40621-4	TP-BCP-44-A	11/13/20 11:50	11/30/20 13:47
160-40621-5	TP-BCP-44-B	11/13/20 11:50	11/30/20 13:47
160-40621-6	TP-BCP-47	11/18/20 09:20	11/30/20 13:47

Table 1: Laboratory Sample Results

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-3	TH-232	Alpha Spec A-01-R	1.58		0.270	0.0487
160-40621-3	U-238	Alpha Spec A-01-R	0.474		0.131	0.0598
160-40621-3	AC- 228	Gamma 901.1	0.735		0.237	0.258
160-40621-3	BI-214	Gamma 901.1	0.515		0.178	0.168
160-40621-3	RA-226	Gamma 901.1	0.515		0.178	0.168
160-40621-3	TH -232	Gamma 901.1	0.735		0.237	0.258
160-40621-3	U-238	Gamma 901.1	0.851		0.591	0.810
160-40621-1	TH-232	Alpha Spec A-01-R	1.36		0.253	0.0521
160-40621-1	U-238	Alpha Spec A-01-R	3.12		0.419	0.0527
160-40621-1	AC- 228	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	BI-214	Gamma 901.1	4.46		0.785	0.415
160-40621-1	RA-226	Gamma 901.1	4.46		0.785	0.415
160-40621-1	TH -232	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	U-238	Gamma 901.1	5.04		2.24	2.92
160-40621-2	TH-232	Alpha Spec A-01-R	0.737		0.182	0.0554
160-40621-2	U-238	Alpha Spec A-01-R	4.06		0.499	0.0612
160-40621-2	AC- 228	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	BI-214	Gamma 901.1	3.70		0.841	0.597
160-40621-2	RA-226	Gamma 901.1	3.70		0.841	0.597
160-40621-2	TH -232	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	U-238	Gamma 901.1	2.73		1.38	2.53
160-40621-4	TH-232	Alpha Spec A-01-R	0.322		0.107	0.0402
160-40621-4	U-238	Alpha Spec A-01-R	2.31		0.344	0.0490
160-40621-4	AC- 228	Gamma 901.1	1.07		0.355	0.312
160-40621-4	BI-214	Gamma 901.1	2.99		0.467	0.205
160-40621-4	RA-226	Gamma 901.1	2.99		0.467	0.205

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-4	TH -232	Gamma 901.1	1.07		0.355	0.312
160-40621-4	U-238	Gamma 901.1	2.42		0.947	1.45
160-40621-5	TH-232	Alpha Spec A-01-R	0.783		0.177	0.0258
160-40621-5	U-238	Alpha Spec A-01-R	4.35		0.534	0.0583
160-40621-5	AC- 228	Gamma 901.1	1.22		0.536	0.681
160-40621-5	BI-214	Gamma 901.1	3.26		0.575	0.380
160-40621-5	RA-226	Gamma 901.1	3.26		0.575	0.380
160-40621-5	TH -232	Gamma 901.1	1.22		0.536	0.681
160-40621-5	U-238	Gamma 901.1	3.50		1.16	1.59
160-40621-6	TH-232	Alpha Spec A-01-R	1.95		0.319	0.0464
160-40621-6	U-238	Alpha Spec A-01-R	3.29		0.451	0.0539
160-40621-6	AC- 228	Gamma 901.1	2.58		0.440	0.294
160-40621-6	BI-214	Gamma 901.1	3.79		0.495	0.214
160-40621-6	RA-226	Gamma 901.1	3.79		0.495	0.214
160-40621-6	TH -232	Gamma 901.1	2.58		0.440	0.294
160-40621-6	U-238	Gamma 901.1	1.59		0.915	1.43

1. U Result is less than the sample detection limit.

QA/QC Summary:

There were no laboratory quality assurance sample result exceptions noted. Results for LCS, Blanks and Duplicate samples were within acceptance criteria and all duplicate Relative Error Ration (RER) results were in RER limit of 1. Based on QC sample results, the data are determined usable and no upward or down bias in sample results is evidenced.

The laboratory narrative identified a deficiency in sample volume for one sample however, the sample was not identified and analytical results for all samples were reported without exceptions noted.

In general, the sample results for U-238 and Th-232 are slightly above the range of concentrations that are inferred for average background soils (.5 to 1.5 pCi/g) but not outside the range of concentrations that can be encountered. Based on the gamma spectroscopy result for U-238, Ra-226 and Th-232 progeny nuclides appear to be in equilibrium with parents and alpha spectroscopy results generally confirm the gamma spec results. The samples do not appear to indicate any enhancement of one isotope or the other and concentration ranges are likely due to soil types from the area.

Figure 1. November 2020 Test Pitting Locations Radiological Monitoring at RITC Site

Attachment 2

Gamma Walkover Survey and Associated Sampling Report

Gamma Walkover Survey And Associated Sampling Report

For

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

Prepared for:

INVENTUM ENGINEERING
441 CARLISLE DRIVE
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(703) 722-6049
www.InventumEng.com

By:

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS
15 Hazelwood Dr., Suite 112
Amherst, NY, 14228

September 17, 2024
Revised: March 31, 2025

MJW Project No. 24.1007.3

Extreme heat warnings were issued in western New York on the days this survey was performed, so to protect the health and safety of MJW radiological control technicians, other field operatives, and meet project requirements, transects were skipped at regular intervals if no counts above background had been documented on the prior transect. In areas where elevated readings were found or had the potential to be found, these skipped transects were scanned to fully delineate the elevated area. Extended surveying of previously documented and newly discovered potentially elevated measurement locations (EMLs) took place, irrespective of other conditions.

Background gamma count data was collected at the nearby Erie County Water Authority located at 3750 River Road, Tonawanda, NY 14150. Data was collected over impervious and pervious surfaces. The background data had been previously collected for the preliminary walkover and was utilized for consistency and standardization of data.

Twenty (20) biased and twelve (12) unbiased soil samples (Figure 3) were collected utilizing the data from the gamma walkover. EMLs were identified according to the outer bounds of elevated data points, and with respect to each area size, a proportion of biased and unbiased samples were assigned. Two (2) biased samples were reserved for areas that had been previously inaccessible for sampling by flooding. The flooded areas were still partially inaccessible for gamma surveying, and an excavator was used to pull surficial and sub-surface material out for sampling activities. Two (2) additional unbiased samples were collected as MJW field operatives traversed the site and were totally random.

Samples were collected from test pits. Prior to ground-breaking, the area would be scanned with a 1-minute scaler count using a Ludlum 44-10 paired with a Ludlum 2241-2. Following the scan, the test pit would be excavated from between 1-4 feet, depending on subsurface conditions. Following the removal of soil and subsurface materials, a 500-gram sample was pulled and placed within a sample jar. The sample jar was then scanned by placing the Ludlum 44-10 on top of the jar, no cover, and a scaler 1-minute count was recorded. All of this information is recorded in Attachment 1, Field Sample Log Sheets. The sheets record the sample ID (pre-determined), time at which the sample was placed in the jar, the relevant sample information for consistency with Attachment 5 (the lab Chain-of-Custody), the gross surface reading (1-min on ground scaler count) and then the notes section provides a more in-depth description of the sample material and the on-jar scaler count.

All 37 collected samples were analyzed with gamma-spectroscopy (DOE HASL 300, 4.5.2.3/Ga-01-R) 10% of samples were collected with sufficient volume to analyze field duplicates. Three (3) field duplicates were collected; three (3) lab duplicates were also analyzed. Fifteen (15) samples were analyzed by alpha-spectroscopy for isotopic Uranium and Thorium (DOE EML HASL-300, U-02-RC Modified, DOE EML HASL-300, Th-01-RC Modified). This additional analysis provides confirmatory results for the broader gamma-spectroscopy performed on all samples. All samples were sent to GEL Labs facilities in Charleston, North Carolina, under a valid Chain of Custody (COC).

3.0 Data Analysis

3.1 Gamma Walkover

Background data was statistically analyzed using Visual Sample Plan (VSP). 614 data points were analyzed with a mean of 8,392.9 counts per minute (cpm).

Table 2.

Nuclide Information Table										
↓Sample ID[1]							GS[3]		AS[3]	
Sample Concentration (pCi/g) →	[Ac-228]	UNC[2]	[K-40]	UNC	[Ra-226]	UNC	[U-238]	UNC	[U-238]	UNC
S2.B1	0.465	0.298	U	U	3.51	0.33	3.26	2.97	N/A	N/A
S2.B2	U	U	2.62	1.36	4.93	0.42	U	U	N/A	N/A
S2.B3	U	U	4.74	1.36	6.32	0.408	U	U	N/A	N/A
S2.B4	0	0.338	7.27	1.47	3.42	0.341	U	U	N/A	N/A
S2.B5	U	U	11	1.7	3.79	0.373	U	U	N/A	N/A
S2.B6	U	U	9.61	1.25	0.326	0.14	U	U	U	U
S2.U1	U	U	1.61	0.708	0.875	0.193	U	U	N/A	N/A
S2.U2	0.246	0.241	2.04	1.02	0.32	0.11	U	U	N/A	N/A
S2.U3	1.16	0.34	4.03	1.16	11	0.525	U	U	N/A	N/A
S2.U4	1.29	0.519	1.86	1.94	10.2	0.57	8.11	5.51	5.39	1.05
S2.U2.D	0.335	0.222	5.09	0.995	0.51	0.17	1.56	1.53	U	U
S3.B1	0.663	0.466	17.1	2.17	1.21	0.234	U	U	0.426	0.366
S3.B2	U	U	4.64	1.08	9.17	0.472	7.48	5.04	7.84	1.38
S3.B3	U	U	U	U	0.529	0.155	U	U	N/A	N/A
S3.B4	0.304	0.314	2.65	0.958	0.598	0.193	U	U	N/A	N/A
S3.U1	U	U	4.68	1.57	10.7	0.474	8.53	2.04	6.33	1.14
S3.U2	U	U	1.66	1.34	2.23	0.284	U	U	N/A	N/A
S3.U3	U	U	1.23	0.541	0.552	0.146	1.97	1.28	N/A	N/A
S3.B4.D	0.214	0.16	1.38	0.984	0.348	0.137	U	U	0.351	0.302
S4.B1	1.19	0.378	8.43	1.48	1.56	0.297	U	U	U	U
S4.B2	0.887	0.342	2.73	0.981	5.77	0.377	U	U	N/A	N/A
S4.U1	0.982	0.379	7.22	1.5	1.24	0.258	U	U	0.581	0.449
S1.B1	0.908	0.463	21.3	2.4	1.12	0.302	U	U	N/A	N/A
S1.B2	1.73	0.555	4.42	1.64	10.6	0.62	10.4	8.19	N/A	N/A
S1.B3	0.94	0.409	18.2	2.3	1.56	0.228	U	U	N/A	N/A
S1.B4	U	U	8.56	2.03	12.6	0.595	5.74	5.9	N/A	N/A
S1.B5	0	0.447	6.58	1.43	8.49	0.516	U	U	5.46	1.02
S1.B6	U	U	17.8	2.25	1.94	0.279	U	U	N/A	N/A
S1.U1	0	0.294	20.4	2.09	0.667	0.275	U	U	N/A	N/A
S1.U2	U	U	13.8	1.94	4.73	0.364	4.74	3.37	3.18	0.835
S1.U3	0	0.264	13.4	1.44	1.94	0.219	3.59	3.72	0.803	0.42
S1.U4	1.32	0.425	10.9	1.78	10.5	0.529	8.21	4.32	N/A	N/A
S1.B1.D	1.44	0.331	18.9	1.85	1.25	0.197	U	U	U	U
F1	U	U	6.6	1.6	0.762	0.163	U	U	0.457	0.346
F2	0.343	0.182	2.16	0.732	0.637	0.189	U	U	N/A	N/A
Control 1	U	U	2.92	0.904	0.41	0.177	U	U	N/A	N/A
Control 2	U	U	2.64	0.957	0.503	0.17	U	U	0.571	0.359
S2.B1(674299001DUP)	U	U	1.94	1.07	3.7	0.35	U	U	N/A	N/A
S4.B2(674299021DUP)	0.873	0.412	3.68	1.13	6.1	0.406	4.2	3.91	N/A	N/A
S2.U2.D(674299011DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.443	0.366
S2.B6(674299006DUP)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	U	U
Average Concentrations	**0.695**	**0.368**	**7.454**	**1.513**	**3.759**	**0.343**	**5.649**	**4.414**	**2.653**	**0.765**

1. Sample ID - S(Sample Area Number)#.U/B (Unbiased or Biased)#.D(Field Duplicate)
2. UNC - Counting Uncertainty
3. GS - γ Spec, AS - α Spec
4. U - Unidentified
5. N/A - Not Analyzed

Management of material in excess of the approved EMLs that must be disturbed to implement the Remedial Action Work Plan (RAWP) shall be governed by a DEC-approved TENORM Management Plan. For material identified as TENORM Fill (5.0-15 pCi/g) above area background to remain on-site, a variance application will be submitted in conjunction with the TENORM Management Plan. Overall disposition and usage of material is subject to NYSDEC approval.

6.0 List of Attachments

Attachment 1. Field Sample Log Sheets
Attachment 2. Instrument Calibration Sheets
Attachment 3. MJWRCP-40 Performing a GPS Enhanced Gamma Radiation Survey, Rev. 4
Attachment 4. MJWRCP-66 Soil Sampling Protocols, Rev 0
Attachment 5. GEL Chain of Custody Form
Attachment 6. GEL Lab Report SDG674299

Figure 1:

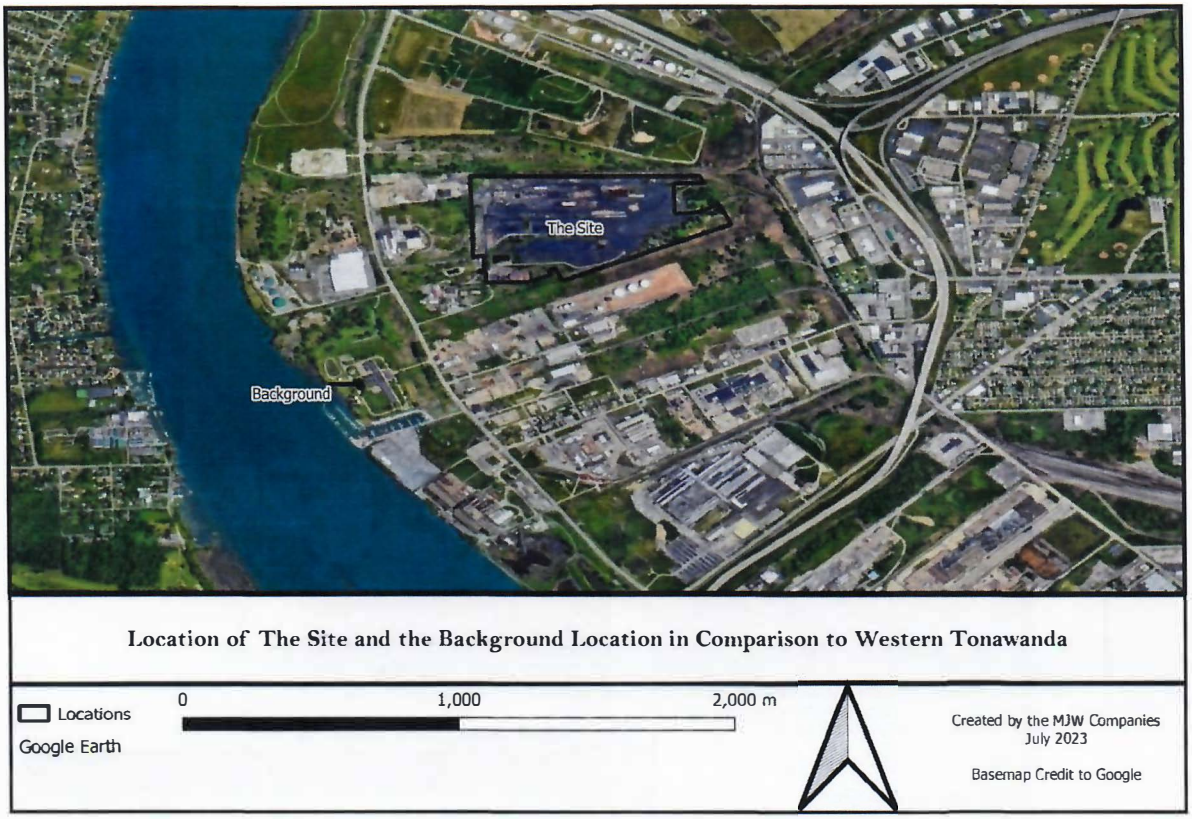
The Site
Background
Location of The Site and the Background Location in Comparison to Western Tonawanda
Locations
Google Earth
0
1,000
2,000 m
Created by the MJW Companies
July 2023
Basemap Credit to Google

Figure 3.

(Dark blue areas on satellite imagery represent water retention ponds and areas of regular flooding)

Attachment 3

NYSDEC-Approved Radiological Work Plan, 2024, Riverview Innovation & Technology Campus Brownfield Cleanup Program Site No. C915353, River Road, Tonawanda NY 14150

RADIOLOGICAL WORK PLAN RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS 3875 RIVER ROAD TOWN OF TONAWANDA, NEW YORK NYSDEC SITE #C915353

Prepared for:

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441 Carlisle Drive, Suite C
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Prepared by:

MJW CORPORATION
Radiation Consulting Professionals

15 Hazelwood Drive, Suite 112
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April 15, 2024

MJW Job No. 23.2029

1.0 Introduction

1.1 General

This radiological work plan has been prepared to address the radiological monitoring and safety activities required during site investigation to determine the presence of potential (Technically Enhanced Naturally Occurring Radioactive Material (TENORM). Slag was encountered during the Remedial Investigation of the Riverview Innovation & Technology Campus (RITC) Brownfield Cleanup Program Site located at 3875 River Road, Town of Tonawanda, New York (BCP Site). In accordance with the approved Remedial Investigation Work Plan (RIWP), the slag was screened by MJW and submitted for radiological analysis. The results of the analyses conducted by MJW were included in the Draft RI Report and comments from the New York State Department of Environmental Conservation (NYSDEC) triggered the need for additional testing to define the procedure required for the development of the Remedial Action Work Plan (RAWP). Remediation of TENORM is not a requirement of the BCP, a component of the alternatives analysis process, or a criteria for selection of the remedial actions at the BCP Site. The management of TENORM is a RAWP and Site Management Plan criteria.

The BCP Site is the Riverview Innovation & Technology Campus, Inc. (RTIC) Brownfield Cleanup Program (BCP) Site (#C915353). The property was a portion of the former Tonawanda Coke facility location at 3875 River Road in the Town of Tonawanda, New York. Figure 1 shows the location of the site with respect to River Road. Industrial properties and the Niagara River further west of River Road. In addition to the work described herein, MJW has conducted work and is preparing work plans for three properties around the BCP Site. For clarity, the following site names are used by MJW:

- BCP Site – That portion of the 3875 River Road property RITC entered into the BCP.
- Site 108 – 3800 River Road, a portion of the Tonawanda Coke Corporation (TCC) State Superfund Site, NYSDEC #915055. The work on Site 108 was conducted for Parsons Engineering.
- 4111 River Road Site – Property previously owned by the Erie County Industrial Development Agency (ECIDA), now owned by the Town of Tonawanda. The 4111 Site is north of the BCP Site, separated by a railroad right of way. Work on this Site was conducted for the ECIDA.

This Work Plan is required to provide specific work details, the areal and vertical extent of the BCP Site that may contain TENORM, and provides a existing data available from the project area for development of radiological work precautions. The Draft Remedial Investigation Report (RIR)[1] is available on the NYSDEC Infolocator: (https://extapps.dec.ny.gov/data/DecDocs/C915353/)

This plan includes the components of the new policy document DMM-5 issued by NYSDEC regarding management of TENORM (Reference 1). Guidance is provided for how to appropriately handle TENORM encountered during construction or earthwork projects, such as clearing, grading, excavation, filling, demolition, or stockpiling.

The MJW Corporation has been performing radiological work in Western New York, New York State and several other sites in the US since 1991. The company has been involved in the characterization and remediation of sites with potential radiological issues across a wide spectrum of nuclides and quantities.

[1] https://extapps.dec.ny.gov/data/DecDocs/C915353/Report.BCP.C915353.2023-08-18.Volume%20%231%20-%20DRAFT%20RI%20REPORT%20-%20Text%20and%20Tables%20.pdf

Consequently, MJW has developed procedures to perform all of the tasks necessary to characterize the BCP Site and also to provide the expert radiological management and trained technicians to ensure work done on the BCP Site is done safely when TENORM or radioactive source management is required.

1.2 Previous Site Investigative Work

The BCP Site has been the subject of detailed remedial investigation activities since the fourth quarter of 2020. At the time the Remedial Investigation Work Plan (RIWP) was prepared, the potential for slag materials was addressed but there was no direct evidence of the presence of materials until they were subsequently encountered during the field investigations. Inventum Engineering and the NYSDEC observed possible TENORM slag and samples were collected for screening and subsequently submitted for radiological analysis. MJW performed a GPS-enhanced overland gamma survey in response to comments on the Draft RIR and to provide data for the preparation of this work plan. MJW has completed soil sampling on the BCP Site, Site 108 and the 4111 Site beginning in late 2020.

Samples collected on the BCP Site are included in the report *Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY* dated February 10, 2021 (Attachment 1). The samples described in that report were collected between October 30, 2020, and November 18, 2020. The samples were submitted to Eurofins TestAmerica in St. Louis, MO with gamma spectroscopy and alpha spectroscopy analyses performed for U-238 and Th-232. A summary of the radiological analytical results is shown in Table 1 below.

Table 1. BCP Site (3875 River Road) Test Pit Soil Analysis (Samples Collected 10/30 to 11/18/2020

Method→	901.1, Gamma Spec	901.1, Gamma Spec	Alpha Spec	901.1, Gamma Spec	Alpha Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[U-238], pCi/g**	**[Th-232], pCi/g**	**[Th-232], pCi/g**
TP-BCP-34-A	4.46	5.04	3.12	0.858	1.36
TP-BCP-34-B	3.7	2.73	4.06	0.561	0.737
TP-BCP-32-W45	0.515	0.851	0.474	0.735	1.58
TP-BCP-44A	2.99	2.42	2.31	1.07	0.322
TP-BCP-44B	3.26	3.5	4.35	1.22	0.783
TP-BCP-47	3.79	1.59	3.29	2.58	1.95
Averages:	**3.12**	**2.67**	**2.93**	**1.17**	**1.12**

The gamma spectroscopy analyses for Ra-226 and gamma and alpha spectroscopy analysis for U-238 show that all samples analyzed are in equilibrium, and thus were classified as naturally occurring radioactive material (NORM). Th-232 results show an average of about 1.12 picocuries per gram (pCi/g) which is very near a Th-232 background concentration of 1 pCi/g. The sample locations are shown in Attachment 1.

The BCP Site was serviced by numerous rail lines to deliver coal and transport coke, tar and other by products of the TCC coking process. The tracks, including those of a central coal stacker reclaimer, were constructed over ballast composed primarily of various types of slag. The samples listed in Table 1 represent the different slag materials encountered during the RI. Although the origin of the slag is

unknown, it would have likely been purchased starting in 1917, there was a fully integrated steel mill adjacent to the TCC Site that was known to have produced both blast furnace and open-hearth furnace slags. The steelmaking process may have slightly increased the NORM in their raw materials but as previously mentioned the slag tested during the Remedial Investigation were tested and the Ra-226 concentrations averaged about 3 pCi/g.

1.3 Discussion of Tonawanda Regional Radiological Background in Soils

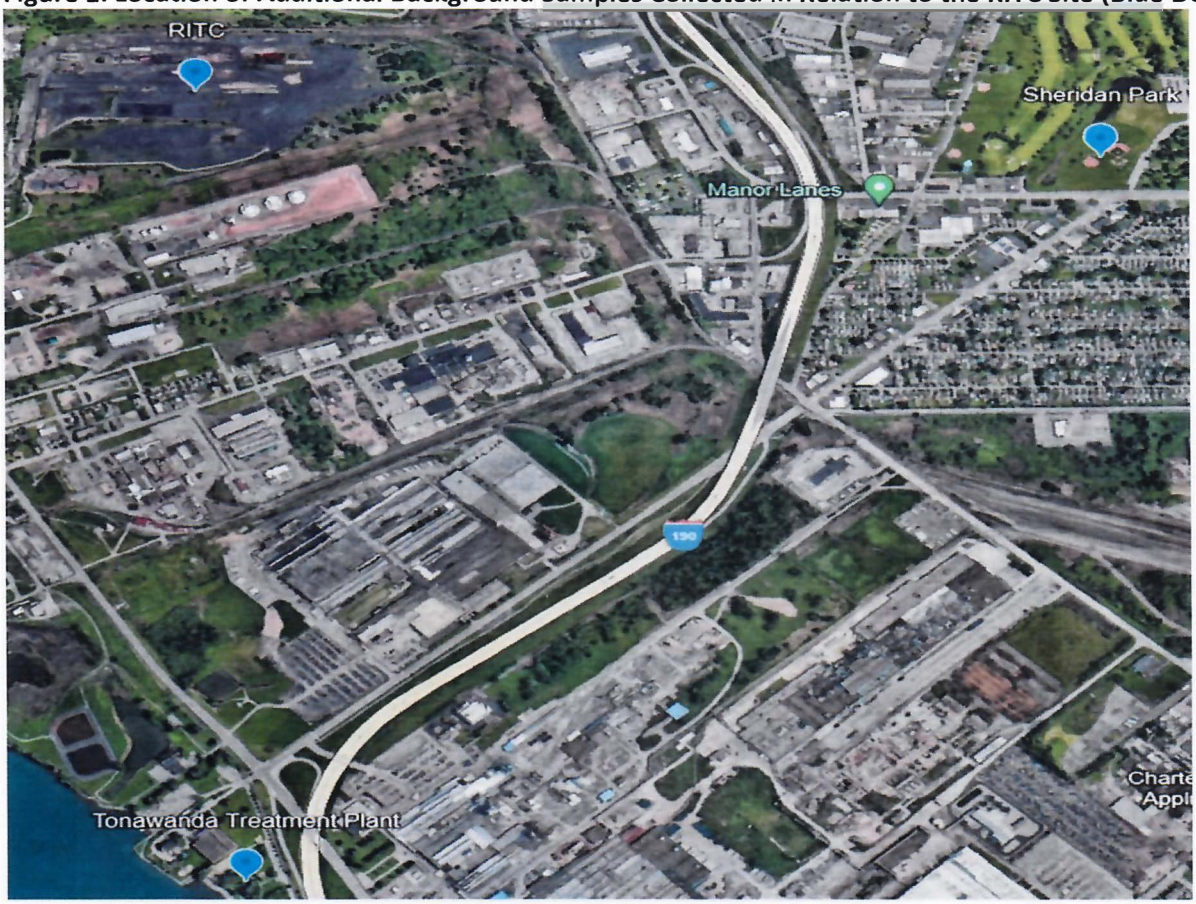
The background sample for the RITC BCP site was collected from the 4111 River Road site adjacent to and just north of the RITC BCP site. It should be noted that this property lies between a railroad right of way, has former rail lines and is adjacent to a large fly ash landfill (the NRG landfill for the former Huntley station is immediately north of 4111 River Road. Unfortunately, the 4111 River Road background sample analysis did not produce a usable U-238 value as alpha spectroscopy analysis was not requested, only gamma spectroscopy. The Ra-226, Ra-228 and Th-232 values for the 4111 River Road Site sample were usable and indicated general area background levels of Radium (Ra-226) of 2.06 Ci/g, Ra-228 of 1.38 pCi/g and Th-232 of 1.38 pCi/g, respectively. Due to this unusable result for U-238, MJW decided to collect two additional area background samples for analysis. One from the Tonawanda Treatment Plant property near Aqua Lane (GPS coordinates 42°57'54.6"N 78°55'22.3"W) and one in Sheridan Park just north of Sheridan Drive (GPS coordinates 42°58'54.2"N 78°54'04.0"W). These additional sample data are shown in Table 2 below and sample locations in relation to the RITC are shown on Figure 1 below.

Table 2. Results of Additional Background Sampling for The RITC Site (Samples Collected 12/24/2023)

Method→	901.1, Gamma Spec	901.1, Gamma Spec	901.1, Gamma Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[Ra-228], pCi/g**
01122024-TWT1	0.822	1.02	0.986
01122024-SB1	0.734	1.48	0
01122024-TWT1(DUP)	0.673	0	1.25
Average (Non-Zero Results)	**0.74**	**1.25**	**1.12**

The sample collected at the Tonawanda Water Treatment Plant (TWT1) is located 1.24 miles south of the RITC site. The Sheridan Park sample (SB1) is located 1.36 miles east of the RITC site. The average concentration results are in the same range as the other background sample results discussed above. The location of these additional samples in relation to the RITC are shown in Figure 1 below.

Figure 1. Location of Additional Background Samples Collected in Relation to the RITC Site (Blue Dots)



It should be noted that in Oak Ridge National Laboratory (ORNL) report number ORNL/TM-7343 (11/1981) titled "State Background Radiation Levels: Results of Measurements Taken During 1975-1979", six surface soil samples were collected in New York State, three collected in the Tonawanda area as follows:

- *NY-1 City of Tonawanda at the city limit on River Rd. across from Consolidated Freightways Terminal (about 1.5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 0.97±0.08 pCi/g; Th-232, 0.65±0.06 pCi/g, and U-238, 0.99 pCi/g.*

- *NY-3 West side of River Rd. across from the Allied Chemical Corp. (5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 1.2±0.04 pCi/g; Th-232, 0.88±0.06 pCi/g, and U-238, 1.2 pCi/g.*

- *NY-4 Intersection of Tonawanda Creek Rd. and Niagara Falls Blvd. in North Tonawanda (5.6 mi northeast of RITC). Measured soil nuclide concentrations were: Ra-226, 0.69±0.04 pCi/g; Th-232, 0.40±0.12 pCi/g, and U-238, 0.76 pCi/g.*

The three other New York sites that were sampled were all in Lockport, NY (approximately 18 miles directly northeast of the RITC site) and reported similar background values to those above. The three U-238 values were: NY-2, 0.97; NY-5, 0.85, and NY-6, 0.96 pCi/g. The average of all reported U-238 soil

samples analyzed is 0.96 pCi/g, for Ra-226 the average is 0.85 pCi/g and for Th-232 the average is 0.71 pCi/g. All reported counting errors were 2 Sigma.

1.4 GPS-Enhanced Gamma Walkover Survey of the RITC Site

A review of the information in Table 1 shows that for the RITC BCP Site, six slag samples were taken in February of 2021 during the remedial investigation. As a result of the preliminary remedial investigation sample results and comments from the NYSDEC, a gamma walkover survey was then conducted to provide information to prepare this work plan. Attachment 2 is titled *Gamma Walkover Survey Report for the Riverview Innovation & Technology Campus, Inc. 3875 River Road, Tonawanda, New York 14150. BCP SITE No. C915353*. The results of the gamma walkover survey performed in June of 2023 show an elevated area of gamma activity in the central/western portion of the site approximately 20 meters (m) wide by 200 m long. The focus of this work plan is to expand upon this preliminary GPS overland gamma information by:

1. Performing additional gamma walkover survey(s) beginning just east of the elevated activity areas and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas.
2. Following this additional walkover survey, MJW technical staff will collect 20 biased soil samples and 12 unbiased surface and subsurface samples in and around areas of elevated activity.

Radiological monitoring and related actions are required for all activities that may be impacted by TENORM materials at the RITC to protect public and worker health and safety and to control potential release of materials off-site (i.e., fugitive dust emissions, runoff, etc.) to levels as low as reasonably achievable (ALARA). Attachment 3 is MJWRCP-03, Field Investigation Survey Procedure, dated September 15, 2015. The BCP Site has an ongoing NYSDEC and New York State Department of Health (NYSDOH) approved Community Air Monitoring Program (CAMP) that will be operating throughout all sampling activities.

SITE DESCRIPTION

2.0 Site History

Prior to the TCC bankruptcy, the BCP Site was an operating coke making and by-products facility for more than 100-years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company merged into Allied Chemical Corporation, which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility from 1978 through October 2018. TCC filed for bankruptcy in 2018 and all manufacturing on the property BCP Site was permanently idled. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the remaining TCC properties to RITC was approved by the U.S. Bankruptcy Court. The purchase of the properties was completed October 10, 2019. Management of the properties was transitioned from the USEPA to RITC between September 2019 and June 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a). The volunteer status is a recognition that RITC had never conducted coking or by-product production operations on the BCP Site, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the BCP Site, and has exercised all appropriate care since acquisition. Additionally, in recognition of the focus of this Work Plan, RITC did not import any slag materials to the BCP Site. Based on the results of the Remedial Investigation, the slag was used for construction of the rail lines on the property, presumably starting in or about 1917.

Following approval of the BCP Agreement, RITC has conducted extensive site management and cleanup activities in accordance with a series of NYSDEC and NYSDOH approved IRM work plans, has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period, conducted a remedial investigation of the BCP Site, and drafted an alternatives analysis.

Manufacturing processes used at the plant included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating the coal in the absence of oxygen. The resulting carbon material "coke" was used, among other things, in foundries and for the production of steel.

The extracted coke oven gas (COG) was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel. When operating efficiently, coke batteries typically produce twice the volume of COG that is required to operate the facility and fire the battery.

The liquids and tar by-products produced on the property BCP Site were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials by TCC was the source of the majority of releases to the ground surface. While there was a steel manufacturing facility west of the site and a coal-fired power plant southwest of the site, slag was not produced by the coke making process. The presence of TENORM appears to be associated slag that was used as base and ballast materials under railroad tracks on the BCP Site.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of rapidly deteriorating condition as there was no party responsible for maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC implemented a series of IRMs and associated activities to improve the safety, eliminated potential sources of releases, and improved control of the remaining infrastructure, both within and outside the requirements of the BCP Program. The implemented and ongoing IRMs are eliminating potential exposures and safety hazards on the BCP Site. Descriptions of the RI and IRM scope of work completed under the BCP are provided in the work plans and reports posted on the NYSDEC InfoLocator. Work completed

prior to and during the RI that has dramatically improved conditions on the BCP Site include, but are not limited to:

- Surface Materials and Site Management – The conditions at the site were allowed to deteriorate for years if not decades under previous ownership. Full time management of the site has been funded by RITC to control and improve the BCP Site.
- Surface Water Management – Surface water management has been the focus of the most IRMs at the site since the USEPA transferred responsibility for surface water to RITC. The IRMs have addressed conditions across the entire BCP Site including elimination of poorly constructed impoundments, regrading areas to eliminate erosion, dredging ponds and ditches, cleaning and repairs to sewers and drains, and cleaning of the surface to manage debris that concentrated runoff.
- Asbestos Containing Materials (ACM) Survey – A comprehensive assessment of ACM was completed on the BCP Site in 2019 and 2020.
- Asbestos Abatement – Multiple phases of asbestos abatement were completed and are ongoing at the BCP Site including the abatement of ACM in the three stacks, abatement of ACM on and in the former process buildings on the BCP Site, abatement of ACM on pipes and external equipment, abatement of ACM in buildings, and controlled demolition of ACM containing buildings that are not suitable for occupancy. ACM abatement is conducted in accordance with New York State Department of Labor (NYSDOL) requirements.
- Process Equipment Removal Interim Remedial Measures Work Plan – removal of the remaining outdoor vertical process vessels including characterization of the contents, demolition of the vessels, and proper offsite disposal of the contents.
- Building Demolition – buildings across the BCP Site were demolished to allow access to the BCP Site for IRMs and the RI. The condition of the buildings, many over 100 years old, had deteriorated to the point where they were posing a safety concern. Four had deteriorated to a condition that required they be condemned because they could no longer be safely occupied.

During the period between the TCC bankruptcy and RITC's purchase of the RITC Campus Properties, the USEPA Emergency Response Team (ERT) managed responsibility for identifying and stabilizing conditions that were deemed necessary for the protection of human health and the environment. The USEPA were not responsible, or likely funded, for general site condition maintenance. USEPA undertook several response actions and investigations while on the RITC Campus Properties in accordance with a series of Action Memorandums granted by the Acting Director of the Region 2 Superfund and Emergency Management Division. RITC worked with both the USEPA and NYSDEC prior to and after the change of ownership to identify those conditions requiring short-, medium- and long-term action. As soon as the sale was approved, RITC, NYSDEC and USEPA began the transfer of responsibility for care, custody, and control of the RITC Campus Properties which was completed in June 2020 after the NYSDEC approval of the Stormwater Pollution Prevention Plan.

3.0 Work Plan Roles and Responsibilities

The project team for the implementation of this radiological work plan include:

Project Manager – The project manager overseeing this work plan is the president of MJW, David A. Dooley, Ph.D., CHP. Dr. Dooley brings 40 years of experience for this work.

Radiation Safety Officer – Alex Bartells is MJW's RSO for our NYSDOH radioactive materials license and he oversees all of the radiation protection technicians we employee.

Radiation Protection Technicians – MJW's radiation protection technicians are trained according to MJW's Radiological Control Manual and all of the associated implementing procedures. They are also required to have current Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

MJW is not managing the ongoing IRMs on the property and will comply with the OSC Health and Safety Plan (HASP) and CAMP. MJW will coordinate all onsite activities with Dan Flanigan and Matt Reardon of Ontario Specialty Contracting (OSC).

4.0 Overland GPS Gamma Survey Protocols

As described, MJW will perform additional gamma walkover survey(s) beginning just east of the elevated activity areas (Center of the coke yard just west of the Thaw Shed) and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas. All overland gamma GPS assisted property surveys shall be performed in accordance with MJW Radiological Control Procedure No. 40., Performing a GPS Enhanced Radiation Survey and Data Assessment, Rev.4, dated October 29, 2021. MJWRCP 40 is attached to this work plan as Attachment 4.

5.0 Soil Sample Collection and Analysis

Following the additional walkover survey, MJW technical staff will collect 20 biased surface and subsurface soil samples and 12 unbiased surface and subsurface samples in and around the areas of elevated activity areas. The sample locations will be marked in the field with pin flags noting the associated sample numbers. OSC will document the location and elevation using the onsite GPS equipment.

All soil sample collection will be performed in accordance with MJWRCP-66 Soil Sampling Protocols Rev. 0 dated December 4, 2020. This procedure is shown in Attachment 5. Attachment 6 is the Soil Sample Data Sheet which catalogs all of the field data used for the selection of the location including sample type, radiation readings at various distances, analyses requested, etc.

6.0 Laboratory Analysis of Samples

Collected samples will be placed in appropriate containers and shipped to an accredited laboratory for radiological analysis. MJW routinely uses GEL Labs located in Charleston, SC and that is the laboratory proposed for the sampling of this work plan.
For more information about GEL's radiochemistry services see the following link: https://www.gel.com/laboratories/services/radiochemistry-analysis GEL's chain of custody (COC) form is shown in Attachment 7.

7.0 Disposition of On-Site Background-Comparable Material

During the investigation, MJW would seek to return the material from the test pits to the excavation area. In accordance with DMM-5 policy Section B: "TENORM (Background-comparable) (below 5 pCi/g of radium-226) – the Department may either grant a variance to allow the excavated TENORM (Background-comparable) to be returned to the excavation/AOC, or the assigned ERS determines, and approves, that the proposed use and handling in the AOC is acceptable. The Department will also require that appropriate and approved institutional control(s) be put in place (e.g., deed restriction, environmental easement) for each AOC." For purposes of this investigation phase, it is assumed the materials are "background comparable" as all sample data, with one exception at 5.04 pCi/g have been below the DMM-5 policy value of 5 pCi/g. The range of sample data concentrations collected to date will not significantly increase radiological risk to anyone working on or near the site if it is re-interred. The long-term plan for the site is industrial/commercial allowing any remaining materials to be interred under a building slab or a parking lot as was the case for the 310 Ship Canal site per Part C "Management Plan Requirements for TENORM Fill". The work plan will be revised to change "background level" to "background-comparable".

In MJW's experience with this material, Ra-226 concentrations for overland gamma surveys have to typically be at least 2-3 times background levels to be considered statistically significant. Lastly, DMM-5 policy Attachment A, Sections 3 and 4 discuss survey levels at 1.5 times background as a level above background that should be investigated. MJW has 2 Ph.D. statisticians on staff and their characterization on this issue is that 1.5 times background is extremely difficult to confirm that it is statistically significant. In the attached Excel file, please find an example of this very issue on a site in the western US. The point of the graph shown is that the average Ra-226 concentration is 1.14+/-0.25 pCi/g while the average gamma count per minute (CPM) is 12,023+/-1,339.4. The graph trendline shows a Coefficient of Correlation or R^2 value of 0.22 which means there is little correlation between these two values. The problem is natural soils have more energetic gamma signals from K-40 and Th-232 than from Ra-226.

8.0 Radiological Controls and Workplace Safety

Radiation Protection Technicians/radiological control technicians (RCT) and radiological control supervisory personnel (RCS) will provide radiological coverage to ensure the radiological safety of MJW, OSC and Inventum Engineering workers during work activities required for any surface and subsurface survey and sampling work.

8.1 Radiological Monitoring Documentation

The RCT and/or RCS will complete daily field notes to identify work activities performed, site conditions, notable events, and radiological findings. The notes will include a site work area map and samples collected. MJW Corporation "*Survey Data Form*" (Attachment 8) will be completed for all walk-over or investigative surveys performed in response to significantly elevated instrument readings or off-normal events (i.e., instrument count rates > 2 times background or personnel contamination. A COC form (Attachment 7) will be initiated in the field for all samples collected.

9.0 Personal Protective Equipment (PPE) and Radiological Hygiene

Workers will follow all requirements for PPE and hygiene actions based on radiological, chemical, and physical hazards as established by MJW safety manuals and procedures and the OSC Health and Safety Plan for the BCP Site. The minimum requirements based upon anticipated radiological and physical conditions will include:

9.1 Required PPE

The required PPE will be worn at all times on the site outside the parking lot or office building.

- Safety glasses or shield,
- Hard hat,
- Ear plugs,
- Hard-toe work boots,
- Work gloves, and
- Safety (high visibility) vest or similar.

More stringent controls may be required if higher levels of radioactivity are encountered.

9.2 Hygiene and Contamination Monitoring

The following precautions shall be observed to promote work-place safety and in accordance with the BCP Site HASP (Appendix C of the RIWP):

- No eating, drinking, smoking, or chewing within any active work area,
- Hand washing required upon exit from any active work area,
- Hand and foot radiological survey meter "frisk" when exiting areas where elevated radioactivity has been detected. Personnel frisks will be performed using the Ludlum 44-10, 2"x2" Nal probe, the Ludlum 44-9, GM probe and/or the Ludlum 44-89, Alpha/beta probe or equivalent instrument combinations.
- Excavator buckets and tires/tracks to be frisked before release to non-restricted use.

When release surveys using field instruments exceed 2 times the instrument background count rate, the RCT and RCS will take measures to confirm results using longer count times or by moving more slowly over the area. If an elevated count rate is confirmed, the RCT may wipe or wash the area, remove debris or soil material and resurvey the area until readings indicate ALARA. Materials or personnel exceeding 3 times instrument backgrounds should not be released without further decontamination efforts and count rates indicate ALARA. This information will be documented on forms such as those similar to Attachment 8, MJWRCP-04. Rad Contamination Survey Map and Data Sheet.

Materials and equipment released for unrestricted use will not exceed NYS and NRC limits as stated in NYSDOH Radiation Guide 10.10, Table 1 (Attachment 9), see Reference 2. It is the responsibility of the RCS to evaluate field instrument counts per minute (CPM) against Table 1 release limits in disintegrations per minute (DPM) using instrument calibration factors for the radionuclides of interest.

9.3 Control of Fugitive Dusts

MJW supported by OSC will take reasonable steps shall be taken to suppress potentially contaminated fugitive dusts such as by misting with water or curtailing intrusive activities. Dust monitoring shall be conducted in accordance with the BCP Site CAMP (Appendix D of the RIWP) by Inventum Engineering. In addition to the perimeter monitoring conducted for the CAMP a potable air monitoring station will be located no more than 50 feet downwind of the subsurface sample locations that involve the use of heavy construction equipment.

10.0 Reports

MJW will prepare a report detailing the activities and the results of the additional GPS overland gamma survey performed and the activities and analytical results for all surface and subsurface soils collected. The report and data will be in a form that will allow Inventum Engineering to incorporate the requirements into the RAWP and the Site Management plans for the BCP Site.

11.0 References

11.1 NYSDEC, Radioactive Materials Management Section, 2023, DMM-5, Management of Soils Contaminated with Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), October.

11.2 NYSDOH Radiation Guide 10.10, 1986, Guide for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Radioactive Materials.

11.3 Inventum, October 20, 2023, Remedial Investigation Work Plan, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

11.4 Inventum, August 18, 2023, Draft, Remedial Investigation Report, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

THE MJW COMPANIES

Memorandum

February 10, 2021

To: Mr. James Edwards
Inventum Engineering, PC
481 Carlisle Dr. Suite 202
Herndon, Virginia 20170

From: Martin Willett
Director of Health Physics and Remediation Services
MJW Corporation

Subject: Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

Introduction

A quality assurance and quality control (QA/QC) review of the Laboratory Analytical Data received from Eurofins TestAmerica, St. Louis, Laboratory Job ID: 160-40621-1 and released on 1/11/2021 was performed for Inventum Engineering LLC by MJW Corporation. The laboratory data report contained results for six (6) soil samples collected during a Tonawanda Coke facility investigation conducted between October and November 2020.

Summary of Laboratory Sample Receipt Condition:

- Standard analytical laboratory protocols were followed during the analysis of the samples and no problems were encountered or anomalies observed, laboratory quality control samples were within established control limits.
- Analytical methods and test results met NELAP requirements for parameters for which accreditation is required or available.
- Samples were received on 11/30/2020 in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

Laboratory Notes Related to Analytical Methods and Results:

Radium-226 By Gamma Spec (21 Day Ingrowth)

- Samples were analyzed for Radium-226 by gamma spec after a 21-day ingrowth period in accordance with EPA method 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020. As a result, samples met the 21day ingrowth requirement prior to analysis for Ra-226.

- Samples results for *Pb-210 by gamma spec (method 901.1) were estimated.*

- *Insufficient sample was provided for a sample to fill the geometry calibrated for Ra-226 analysis by gamma spectroscopy.* The samples contained large pieces of rock.

- Results for several requested isotopes have no or low abundance gamma peaks. *Quantification of the analyte was inferred under the assumption of equilibrium with decay chain progeny or parent isotopes. This assumption was added by the laboratory and was not based on process knowledge.*

Gross Alpha and Gross Beta Radioactivity

- Sample analysis was performed on 12/23/.2020 following method SW-846 Method 9310. No analytical or quality issues were noted.

Isotopic Thorium and Uranium (Alpha Spectrometry)

- Sample analysis was performed on 01/04/2021 and 01/07/21 following method DOE A01R_Th and U. For Thorium analysis, *a correction to data results to account for interference observed in the blank sample was applied.*
- Quality issues were not observed for U isotopic analysis.

Sample Analytical Results

Samples Analyzed

Lab ID	Client Sample ID	Collected Date / Time	Received
160-40621-1	TP-BCP-34-A	10/30/20 11:15	11/30/20 13:47
160-40621-2	TP-BCP-34-B	10/30/20 11:15	11/30/20 13:47
160-40621-3	TP-BCP-32-W45	11/09/20 01:00	11/30/20 13:47
160-40621-4	TP-BCP-44-A	11/13/20 11:50	11/30/20 13:47
160-40621-5	TP-BCP-44-B	11/13/20 11:50	11/30/20 13:47
160-40621-6	TP-BCP-47	11/18/20 09:20	11/30/20 13:47

Table 1: Laboratory Sample Results

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-3	TH-232	Alpha Spec A-01-R	1.58		0.270	0.0487
160-40621-3	U-238	Alpha Spec A-01-R	0.474		0.131	0.0598
160-40621-3	AC- 228	Gamma 901.1	0.735		0.237	0.258
160-40621-3	BI-214	Gamma 901.1	0.515		0.178	0.168
160-40621-3	RA-226	Gamma 901.1	0.515		0.178	0.168
160-40621-3	TH -232	Gamma 901.1	0.735		0.237	0.258
160-40621-3	U-238	Gamma 901.1	0.851		0.591	0.810
160-40621-1	TH-232	Alpha Spec A-01-R	1.36		0.253	0.0521
160-40621-1	U-238	Alpha Spec A-01-R	3.12		0.419	0.0527
160-40621-1	AC- 228	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	BI-214	Gamma 901.1	4.46		0.785	0.415
160-40621-1	RA-226	Gamma 901.1	4.46		0.785	0.415
160-40621-1	TH -232	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	U-238	Gamma 901.1	5.04		2.24	2.92
160-40621-2	TH-232	Alpha Spec A-01-R	0.737		0.182	0.0554
160-40621-2	U-238	Alpha Spec A-01-R	4.06		0.499	0.0612
160-40621-2	AC- 228	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	BI-214	Gamma 901.1	3.70		0.841	0.597
160-40621-2	RA-226	Gamma 901.1	3.70		0.841	0.597
160-40621-2	TH -232	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	U-238	Gamma 901.1	2.73		1.38	2.53
160-40621-4	TH-232	Alpha Spec A-01-R	0.322		0.107	0.0402
160-40621-4	U-238	Alpha Spec A-01-R	2.31		0.344	0.0490
160-40621-4	AC- 228	Gamma 901.1	1.07		0.355	0.312
160-40621-4	BI-214	Gamma 901.1	2.99		0.467	0.205
160-40621-4	RA-226	Gamma 901.1	2.99		0.467	0.205

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-4	TH -232	Gamma 901.1	1.07		0.355	0.312
160-40621-4	U-238	Gamma 901.1	2.42		0.947	1.45
160-40621-5	TH-232	Alpha Spec A-01-R	0.783		0.177	0.0258
160-40621-5	U-238	Alpha Spec A-01-R	4.35		0.534	0.0583
160-40621-5	AC- 228	Gamma 901.1	1.22		0.536	0.681
160-40621-5	BI-214	Gamma 901.1	3.26		0.575	0.380
160-40621-5	RA-226	Gamma 901.1	3.26		0.575	0.380
160-40621-5	TH -232	Gamma 901.1	1.22		0.536	0.681
160-40621-5	U-238	Gamma 901.1	3.50		1.16	1.59
160-40621-6	TH-232	Alpha Spec A-01-R	1.95		0.319	0.0464
160-40621-6	U-238	Alpha Spec A-01-R	3.29		0.451	0.0539
160-40621-6	AC- 228	Gamma 901.1	2.58		0.440	0.294
160-40621-6	BI-214	Gamma 901.1	3.79		0.495	0.214
160-40621-6	RA-226	Gamma 901.1	3.79		0.495	0.214
160-40621-6	TH -232	Gamma 901.1	2.58		0.440	0.294
160-40621-6	U-238	Gamma 901.1	1.59		0.915	1.43

1. U Result is less than the sample detection limit.

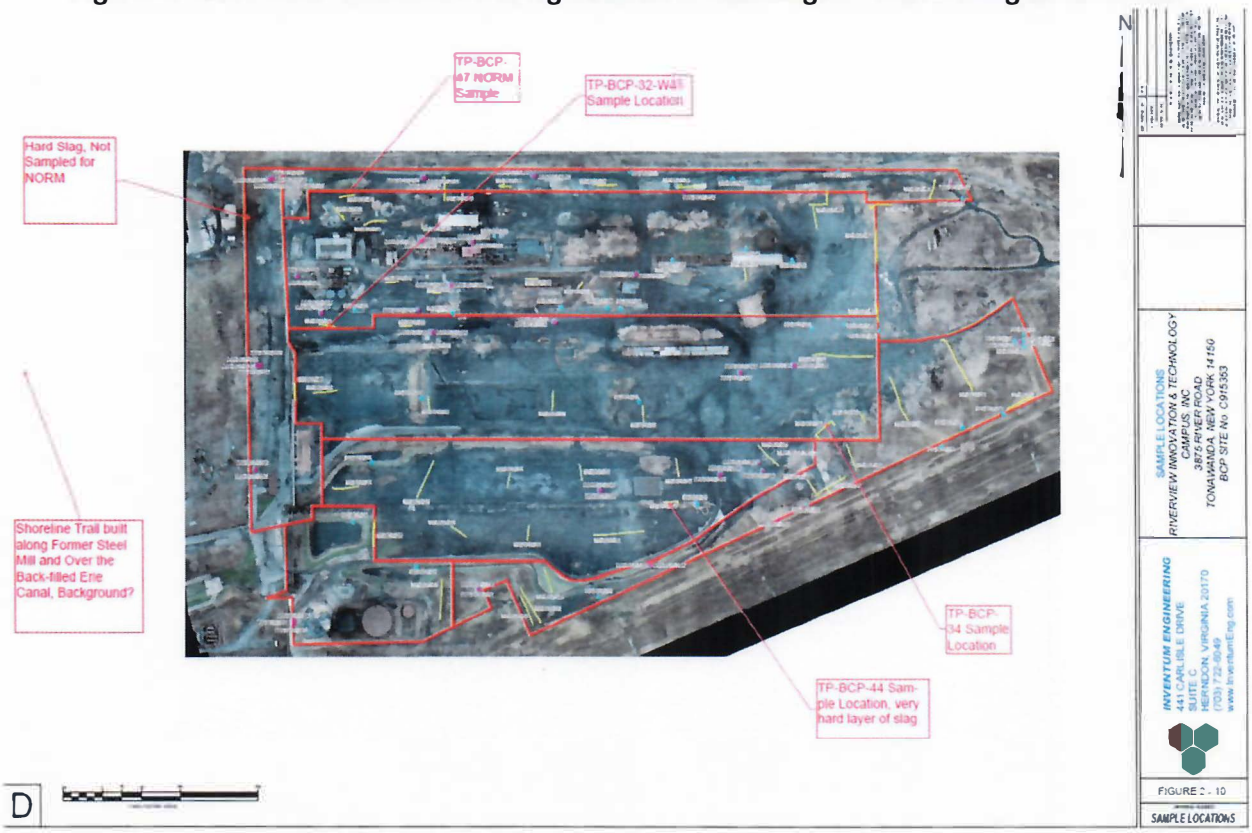
QA/QC Summary:

There were no laboratory quality assurance sample result exceptions noted. Results for LCS, Blanks and Duplicate samples were within acceptance criteria and all duplicate Relative Error Ration (RER) results were in RER limit of 1. Based on QC sample results, the data are determined usable and no upward or down bias in sample results is evidenced.

The laboratory narrative identified a deficiency in sample volume for one sample however, the sample was not identified and analytical results for all samples were reported without exceptions noted.

In general, the sample results for U-238 and Th-232 are slightly above the range of concentrations that are inferred for average background soils (.5 to 1.5 pCi/g) but not outside the range of concentrations that can be encountered. Based on the gamma spectroscopy result for U-238, Ra-226 and Th-232 progeny nuclides appear to be in equilibrium with parents and alpha spectroscopy results generally confirm the gamma spec results. The samples do not appear to indicate any enhancement of one isotope or the other and concentration ranges are likely due to soil types from the area.

Figure 1. November 2020 Test Pitting Locations Radiological Monitoring at RITC Site



Attachment 2. Tonawanda Coke GPS Report for Inventum Engineering

Attachment 3. MJWRCP-03 Field Investigation Survey Procedure_09_15_2015

Attachment 4. MJWRCP-40 Performing a GPS Enhanced Gamma Radiation Survey, Rev. 4

Attachment 5. MJWRCP-66 Soil Sampling Protocols, Rev 0

Attachment 6. Soil Sample Data Sheet

Attachment 7. GEL Chain of Custody Form

Attachment 8. MJWRCP-04_Rad Contamination Survey Map and Data Sheet

Attachment 9. NYSDOH BERP Radiation Guide 10.10_1986

RADIOLOGICAL WORK PLAN RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS 3875 RIVER ROAD TOWN OF TONAWANDA, NEW YORK NYSDEC SITE #C915353

Prepared for:

Inventum Engineering, PC
441 Carlisle Drive, Suite C
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Prepared by:

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Radiation Consulting Professionals

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April 15, 2024

MJW Job No. 23.2029

1.0 Introduction

1.1 General

This radiological work plan has been prepared to address the radiological monitoring and safety activities required during site investigation to determine the presence of potential (Technically Enhanced Naturally Occurring Radioactive Material (TENORM). Slag was encountered during the Remedial Investigation of the Riverview Innovation & Technology Campus (RITC) Brownfield Cleanup Program Site located at 3875 River Road, Town of Tonawanda, New York (BCP Site). In accordance with the approved Remedial Investigation Work Plan (RIWP), the slag was screened by MJW and submitted for radiological analysis. The results of the analyses conducted by MJW were included in the Draft RI Report and comments from the New York State Department of Environmental Conservation (NYSDEC) triggered the need for additional testing to define the procedure required for the development of the Remedial Action Work Plan (RAWP). Remediation of TENORM is not a requirement of the BCP, a component of the alternatives analysis process, or a criteria for selection of the remedial actions at the BCP Site. The management of TENORM is a RAWP and Site Management Plan criteria.

The BCP Site is the Riverview Innovation & Technology Campus, Inc. (RTIC) Brownfield Cleanup Program (BCP) Site (#C915353). The property was a portion of the former Tonawanda Coke facility location at 3875 River Road in the Town of Tonawanda, New York. Figure 1 shows the location of the site with respect to River Road. Industrial properties and the Niagara River further west of River Road. In addition to the work described herein, MJW has conducted work and is preparing work plans for three properties around the BCP Site. For clarity, the following site names are used by MJW:

- BCP Site – That portion of the 3875 River Road property RITC entered into the BCP.
- Site 108 – 3800 River Road, a portion of the Tonawanda Coke Corporation (TCC) State Superfund Site, NYSDEC #915055. The work on Site 108 was conducted for Parsons Engineering.
- 4111 River Road Site – Property previously owned by the Erie County Industrial Development Agency (ECIDA), now owned by the Town of Tonawanda. The 4111 Site is north of the BCP Site, separated by a railroad right of way. Work on this Site was conducted for the ECIDA.

This Work Plan is required to provide specific work details, the areal and vertical extent of the BCP Site that may contain TENORM, and provides a existing data available from the project area for development of radiological work precautions. The Draft Remedial Investigation Report (RIR)[1] is available on the NYSDEC Infolocator: (https://extapps.dec.ny.gov/data/DecDocs/C915353/)

This plan includes the components of the new policy document DMM-5 issued by NYSDEC regarding management of TENORM (Reference 1). Guidance is provided for how to appropriately handle TENORM encountered during construction or earthwork projects, such as clearing, grading, excavation, filling, demolition, or stockpiling.

The MJW Corporation has been performing radiological work in Western New York, New York State and several other sites in the US since 1991. The company has been involved in the characterization and remediation of sites with potential radiological issues across a wide spectrum of nuclides and quantities.

[1] https://extapps.dec.ny.gov/data/DecDocs/C915353/Report.BCP.C915353.2023-08-18.Volume%20%231%20-%20DRAFT%20RI%20REPORT%20-%20Text%20and%20Tables%20.pdf

Consequently, MJW has developed procedures to perform all of the tasks necessary to characterize the BCP Site and also to provide the expert radiological management and trained technicians to ensure work done on the BCP Site is done safely when TENORM or radioactive source management is required.

1.2 Previous Site Investigative Work

The BCP Site has been the subject of detailed remedial investigation activities since the fourth quarter of 2020. At the time the Remedial Investigation Work Plan (RIWP) was prepared, the potential for slag materials was addressed but there was no direct evidence of the presence of materials until they were subsequently encountered during the field investigations. Inventum Engineering and the NYSDEC observed possible TENORM slag and samples were collected for screening and subsequently submitted for radiological analysis. MJW performed a GPS-enhanced overland gamma survey in response to comments on the Draft RIR and to provide data for the preparation of this work plan. MJW has completed soil sampling on the BCP Site, Site 108 and the 4111 Site beginning in late 2020.

Samples collected on the BCP Site are included in the report *Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY* dated February 10, 2021 (Attachment 1). The samples described in that report were collected between October 30, 2020, and November 18, 2020. The samples were submitted to Eurofins TestAmerica in St. Louis, MO with gamma spectroscopy and alpha spectroscopy analyses performed for U-238 and Th-232. A summary of the radiological analytical results is shown in Table 1 below.

Table 1. BCP Site (3875 River Road) Test Pit Soil Analysis (Samples Collected 10/30 to 11/18/2020

Method→	901.1, Gamma Spec	901.1, Gamma Spec	Alpha Spec	901.1, Gamma Spec	Alpha Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[U-238], pCi/g**	**[Th-232], pCi/g**	**[Th-232], pCi/g**
TP-BCP-34-A	4.46	5.04	3.12	0.858	1.36
TP-BCP-34-B	3.7	2.73	4.06	0.561	0.737
TP-BCP-32-W45	0.515	0.851	0.474	0.735	1.58
TP-BCP-44A	2.99	2.42	2.31	1.07	0.322
TP-BCP-44B	3.26	3.5	4.35	1.22	0.783
TP-BCP-47	3.79	1.59	3.29	2.58	1.95
Averages:	**3.12**	**2.67**	**2.93**	**1.17**	**1.12**

The gamma spectroscopy analyses for Ra-226 and gamma and alpha spectroscopy analysis for U-238 show that all samples analyzed are in equilibrium, and thus were classified as naturally occurring radioactive material (NORM). Th-232 results show an average of about 1.12 picocuries per gram (pCi/g) which is very near a Th-232 background concentration of 1 pCi/g. The sample locations are shown in Attachment 1.

The BCP Site was serviced by numerous rail lines to deliver coal and transport coke, tar and other by products of the TCC coking process. The tracks, including those of a central coal stacker reclaimer, were constructed over ballast composed primarily of various types of slag. The samples listed in Table 1 represent the different slag materials encountered during the RI. Although the origin of the slag is

unknown, it would have likely been purchased starting in 1917, there was a fully integrated steel mill adjacent to the TCC Site that was known to have produced both blast furnace and open-hearth furnace slags. The steelmaking process may have slightly increased the NORM in their raw materials but as previously mentioned the slag tested during the Remedial Investigation were tested and the Ra-226 concentrations averaged about 3 pCi/g.

1.3 Discussion of Tonawanda Regional Radiological Background in Soils

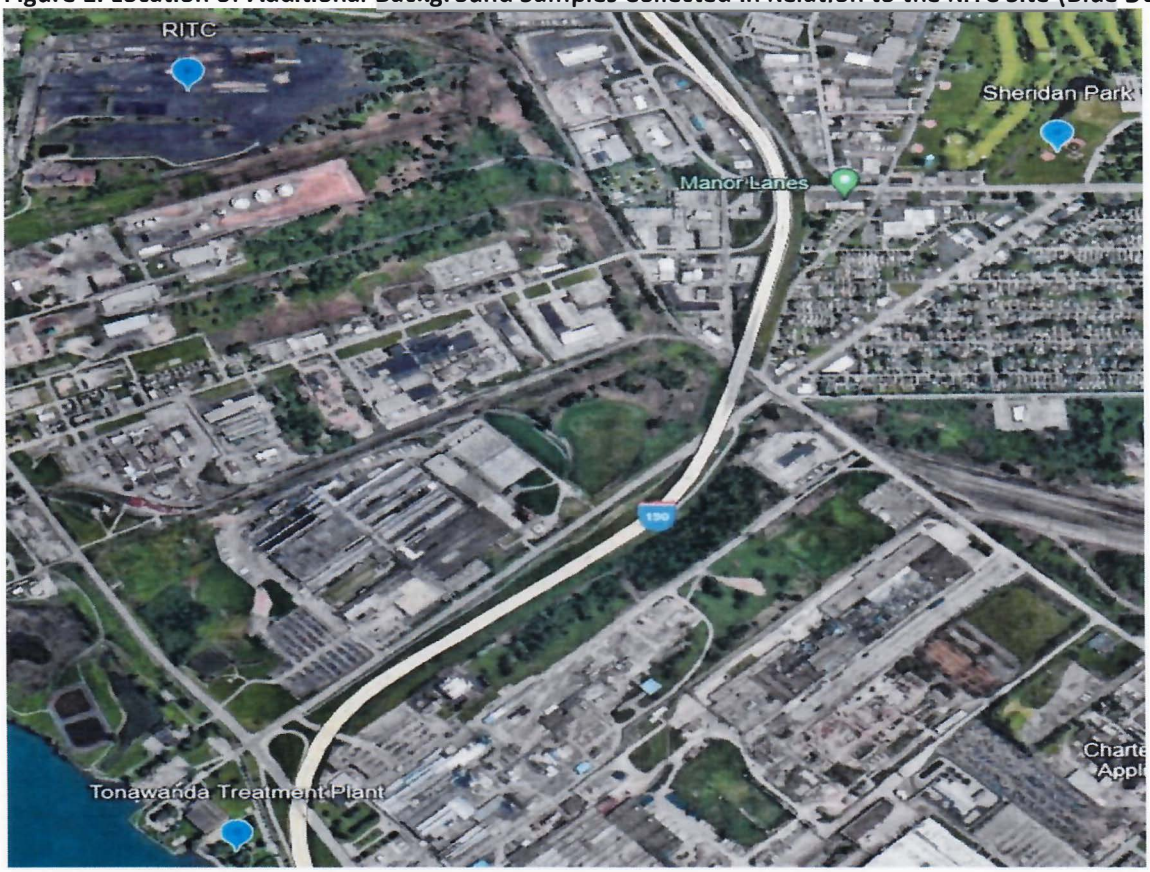
The background sample for the RITC BCP site was collected from the 4111 River Road site adjacent to and just north of the RITC BCP site. It should be noted that this property lies between a railroad right of way, has former rail lines and is adjacent to a large fly ash landfill (the NRG landfill for the former Huntley station is immediately north of 4111 River Road. Unfortunately, the 4111 River Road background sample analysis did not produce a usable U-238 value as alpha spectroscopy analysis was not requested, only gamma spectroscopy. The Ra-226, Ra-228 and Th-232 values for the 4111 River Road Site sample were usable and indicated general area background levels of Radium (Ra-226) of 2.06 Ci/g, Ra-228 of 1.38 pCi/g and Th-232 of 1.38 pCi/g, respectively. Due to this unusable result for U-238, MJW decided to collect two additional area background samples for analysis. One from the Tonawanda Treatment Plant property near Aqua Lane (GPS coordinates 42°57'54.6"N 78°55'22.3"W) and one in Sheridan Park just north of Sheridan Drive (GPS coordinates 42°58'54.2"N 78°54'04.0"W). These additional sample data are shown in Table 2 below and sample locations in relation to the RITC are shown on Figure 1 below.

Table 2. Results of Additional Background Sampling for The RITC Site (Samples Collected 12/24/2023)

Method→	901.1, Gamma Spec	901.1, Gamma Spec	901.1, Gamma Spec
Sample Number	**[Ra-226], pCi/g**	**[U-238], pCi/g**	**[Ra-228], pCi/g**
01122024-TWT1	0.822	1.02	0.986
01122024-SB1	0.734	1.48	0
01122024-TWT1(DUP)	0.673	0	1.25
Average (Non-Zero Results)	**0.74**	**1.25**	**1.12**

The sample collected at the Tonawanda Water Treatment Plant (TWT1) is located 1.24 miles south of the RITC site. The Sheridan Park sample (SB1) is located 1.36 miles east of the RITC site. The average concentration results are in the same range as the other background sample results discussed above. The location of these additional samples in relation to the RITC are shown in Figure 1 below.

Figure 1. Location of Additional Background Samples Collected in Relation to the RITC Site (Blue Dots)



It should be noted that in Oak Ridge National Laboratory (ORNL) report number ORNL/TM-7343 (11/1981) titled "State Background Radiation Levels: Results of Measurements Taken During 1975-1979", six surface soil samples were collected in New York State, three collected in the Tonawanda area as follows:

- *NY-1 City of Tonawanda at the city limit on River Rd. across from Consolidated Freightways Terminal (about 1.5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 0.97±0.08 pCi/g; Th-232, 0.65±0.06 pCi/g, and U-238, 0.99 pCi/g.*

- *NY-3 West side of River Rd. across from the Allied Chemical Corp. (5 miles north of RITC). Measured soil nuclide concentrations were: Ra-226, 1.2±0.04 pCi/g; Th-232, 0.88±0.06 pCi/g, and U-238, 1.2 pCi/g.*

- *NY-4 Intersection of Tonawanda Creek Rd. and Niagara Falls Blvd. in North Tonawanda (5.6 mi northeast of RITC). Measured soil nuclide concentrations were: Ra-226, 0.69±0.04 pCi/g; Th-232, 0.40±0.12 pCi/g, and U-238, 0.76 pCi/g.*

The three other New York sites that were sampled were all in Lockport, NY (approximately 18 miles directly northeast of the RITC site) and reported similar background values to those above. The three U-238 values were: NY-2, 0.97; NY-5, 0.85, and NY-6, 0.96 pCi/g. The average of all reported U-238 soil

samples analyzed is 0.96 pCi/g, for Ra-226 the average is 0.85 pCi/g and for Th-232 the average is 0.71 pCi/g. All reported counting errors were 2 Sigma.

1.4 GPS-Enhanced Gamma Walkover Survey of the RITC Site

A review of the information in Table 1 shows that for the RITC BCP Site, six slag samples were taken in February of 2021 during the remedial investigation. As a result of the preliminary remedial investigation sample results and comments from the NYSDEC, a gamma walkover survey was then conducted to provide information to prepare this work plan. Attachment 2 is titled *Gamma Walkover Survey Report for the Riverview Innovation & Technology Campus, Inc. 3875 River Road, Tonawanda, New York 14150. BCP SITE No. C915353*. The results of the gamma walkover survey performed in June of 2023 show an elevated area of gamma activity in the central/western portion of the site approximately 20 meters (m) wide by 200 m long. The focus of this work plan is to expand upon this preliminary GPS overland gamma information by:

1. Performing additional gamma walkover survey(s) beginning just east of the elevated activity areas and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas.
2. Following this additional walkover survey, MJW technical staff will collect 20 biased soil samples and 12 unbiased surface and subsurface samples in and around areas of elevated activity.

Radiological monitoring and related actions are required for all activities that may be impacted by TENORM materials at the RITC to protect public and worker health and safety and to control potential release of materials off-site (i.e., fugitive dust emissions, runoff, etc.) to levels as low as reasonably achievable (ALARA). Attachment 3 is MJWRCP-03, Field Investigation Survey Procedure, dated September 15, 2015. The BCP Site has an ongoing NYSDEC and New York State Department of Health (NYSDOH) approved Community Air Monitoring Program (CAMP) that will be operating throughout all sampling activities.

SITE DESCRIPTION

2.0 Site History

Prior to the TCC bankruptcy, the BCP Site was an operating coke making and by-products facility for more than 100-years. The facility was owned and operated from circa 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye Corporation. In 1947, Semet Solvay Company merged into Allied Chemical Corporation, which owned and operated the facility until 1978, when it sold the facility to TCC. TCC owned and operated the facility from 1978 through October 2018. TCC filed for bankruptcy in 2018 and all manufacturing on the property BCP Site was permanently idled. Between October 2018 and March 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks and treat wastewater. The USEPA continued to manage stormwater through May 2020. On September 23, 2019, the sale of the remaining TCC properties to RITC was approved by the U.S. Bankruptcy Court. The purchase of the properties was completed October 10, 2019. Management of the properties was transitioned from the USEPA to RITC between September 2019 and June 2020.

RITC is a volunteer under the terms of the BCP Agreement signed on February 14, 2020 (NYSDEC, 2020a). The volunteer status is a recognition that RITC had never conducted coking or by-product production operations on the BCP Site, had never operated any of the equipment that is presumed to have caused releases to the environment, had never disposed any waste on or previously from the BCP Site, had never conducted any commercial or industrial operations on the BCP Site, and has exercised all appropriate care since acquisition. Additionally, in recognition of the focus of this Work Plan, RITC did not import any slag materials to the BCP Site. Based on the results of the Remedial Investigation, the slag was used for construction of the rail lines on the property, presumably starting in or about 1917.

Following approval of the BCP Agreement, RITC has conducted extensive site management and cleanup activities in accordance with a series of NYSDEC and NYSDOH approved IRM work plans, has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period, conducted a remedial investigation of the BCP Site, and drafted an alternatives analysis.

Manufacturing processes used at the plant included coking, by-products recovery, light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction. Coke making involves the removal of gases, liquids (oils) and tar from coal by heating the coal in the absence of oxygen. The resulting carbon material "coke" was used, among other things, in foundries and for the production of steel.

The extracted coke oven gas (COG) was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel. When operating efficiently, coke batteries typically produce twice the volume of COG that is required to operate the facility and fire the battery.

The liquids and tar by-products produced on the property BCP Site were conveyed through pipes to onsite by-products facilities where they were processed for sale as raw materials or feedstocks. The management of these materials by TCC was the source of the majority of releases to the ground surface. While there was a steel manufacturing facility west of the site and a coal-fired power plant southwest of the site, slag was not produced by the coke making process. The presence of TENORM appears to be associated slag that was used as base and ballast materials under railroad tracks on the BCP Site.

At the time of the RITC acquisition of the BCP Site, the facility buildings, equipment, and other infrastructure were in various states of rapidly deteriorating condition as there was no party responsible for maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC implemented a series of IRMs and associated activities to improve the safety, eliminated potential sources of releases, and improved control of the remaining infrastructure, both within and outside the requirements of the BCP Program. The implemented and ongoing IRMs are eliminating potential exposures and safety hazards on the BCP Site. Descriptions of the RI and IRM scope of work completed under the BCP are provided in the work plans and reports posted on the NYSDEC InfoLocator. Work completed prior to and during the RI that has dramatically improved conditions on the BCP Site include, but are not limited to:

- Surface Materials and Site Management – The conditions at the site were allowed to deteriorate for years if not decades under previous ownership. Full time management of the site has been funded by RITC to control and improve the BCP Site.
- Surface Water Management – Surface water management has been the focus of the most IRMs at the site since the USEPA transferred responsibility for surface water to RITC. The IRMs have addressed conditions across the entire BCP Site including elimination of poorly constructed impoundments, regrading areas to eliminate erosion, dredging ponds and ditches, cleaning and

repairs to sewers and drains, and cleaning of the surface to manage debris that concentrated runoff.

- Asbestos Containing Materials (ACM) Survey – A comprehensive assessment of ACM was completed on the BCP Site in 2019 and 2020.
- Asbestos Abatement – Multiple phases of asbestos abatement were completed and are ongoing at the BCP Site including the abatement of ACM in the three stacks, abatement of ACM on and in the former process buildings on the BCP Site, abatement of ACM on pipes and external equipment, abatement of ACM in buildings, and controlled demolition of ACM containing buildings that are not suitable for occupancy. ACM abatement is conducted in accordance with New York State Department of Labor (NYSDOL) requirements.
- Process Equipment Removal Interim Remedial Measures Work Plan – removal of the remaining outdoor vertical process vessels including characterization of the contents, demolition of the vessels, and proper offsite disposal of the contents.
- Building Demolition – buildings across the BCP Site were demolished to allow access to the BCP Site for IRMs and the RI. The condition of the buildings, many over 100 years old, had deteriorated to the point where they were posing a safety concern. Four had deteriorated to a condition that required they be condemned because they could no longer be safely occupied.

During the period between the TCC bankruptcy and RITC's purchase of the RITC Campus Properties, the USEPA Emergency Response Team (ERT) managed responsibility for identifying and stabilizing conditions that were deemed necessary for the protection of human health and the environment. The USEPA were not responsible, or likely funded, for general site condition maintenance. USEPA undertook several response actions and investigations while on the RITC Campus Properties in accordance with a series of Action Memorandums granted by the Acting Director of the Region 2 Superfund and Emergency Management Division. RITC worked with both the USEPA and NYSDEC prior to and after the change of ownership to identify those conditions requiring short-, medium- and long-term action. As soon as the sale was approved, RITC, NYSDEC and USEPA began the transfer of responsibility for care, custody, and control of the RITC Campus Properties which was completed in June 2020 after the NYSDEC approval of the Stormwater Pollution Prevention Plan.

3.0 Work Plan Roles and Responsibilities

The project team for the implementation of this radiological work plan include:

Project Manager – The project manager overseeing this work plan is the president of MJW, David A. Dooley, Ph.D., CHP. Dr. Dooley brings 40 years of experience for this work.

Radiation Safety Officer – Alex Bartells is MJW's RSO for our NYSDOH radioactive materials license and he oversees all of the radiation protection technicians we employee.

Radiation Protection Technicians – MJW's radiation protection technicians are trained according to MJW's Radiological Control Manual and all of the associated implementing procedures. They are also required to have current Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

MJW is not managing the ongoing IRMs on the property and will comply with the OSC Health and Safety Plan (HASP) and CAMP. MJW will coordinate all onsite activities with Dan Flanigan and Matt Reardon of Ontario Specialty Contracting (OSC).

4.0 Overland GPS Gamma Survey Protocols

As described, MJW will perform additional gamma walkover survey(s) beginning just east of the elevated activity areas (Center of the coke yard just west of the Thaw Shed) and scan the property in a north/south direction and work the survey to the west to provide as much information as possible about the extent of the elevated activity areas. All overland gamma GPS assisted property surveys shall be performed in accordance with MJW Radiological Control Procedure No. 40., Performing a GPS Enhanced Radiation Survey and Data Assessment, Rev.4, dated October 29, 2021. MJWRCP 40 is attached to this work plan as Attachment 4.

5.0 Soil Sample Collection and Analysis

Following the additional walkover survey, MJW technical staff will collect 20 biased surface and subsurface soil samples and 12 unbiased surface and subsurface samples in and around the areas of elevated activity areas. The sample locations will be marked in the field with pin flags noting the associated sample numbers. OSC will document the location and elevation using the onsite GPS equipment.

All soil sample collection will be performed in accordance with MJWRCP-66 Soil Sampling Protocols Rev. 0 dated December 4, 2020. This procedure is shown in Attachment 5. Attachment 6 is the Soil Sample Data Sheet which catalogs all of the field data used for the selection of the location including sample type, radiation readings at various distances, analyses requested, etc.

6.0 Laboratory Analysis of Samples

Collected samples will be placed in appropriate containers and shipped to an accredited laboratory for radiological analysis. MJW routinely uses GEL Labs located in Charleston, SC and that is the laboratory proposed for the sampling of this work plan.
For more information about GEL's radiochemistry services see the following link:
https://www.gel.com/laboratories/services/radiochemistry-analysis GEL's chain of custody (COC) form is shown in Attachment 7.

7.0 Disposition of On-Site Background-Comparable Material

During the investigation, MJW would seek to return the material from the test pits to the excavation area. In accordance with DMM-5 policy Section B: "TENORM (Background-comparable) (below 5 pCi/g of radium-226), the NYSDEC may either grant a variance to allow the excavated TENORM (Background-comparable) to be returned to the excavation or Area of Concern (AOC), or the assigned ERS determines, and approves, that the proposed use and handling in the AOC is acceptable. For purposes of this investigation phase, it is assumed the materials are "background comparable" as all sample data, with one exception at 5.04 pCi/g have been below the DMM-5 policy value of 5 pCi/g. The range of sample data concentrations collected to date will not significantly increase radiological risk to anyone working on or near the site if it is re-interred. The long-term plan for the site is industrial/commercial

allowing any remaining materials to be interred under a building slab or a parking lot as was the case for the 310 Ship Canal site per Part C "Management Plan Requirements for TENORM Fill".

In MJW's experience with this material, Ra-226 concentrations for overland gamma surveys have to typically be at least 2-3 times background levels to be considered statistically significant. Lastly, DMM-5 policy Attachment A, Sections 3 and 4 discuss survey levels at 1.5 times background as a level above background that should be investigated.

8.0 Radiological Controls and Workplace Safety

Radiation Protection Technicians/radiological control technicians (RCT) and radiological control supervisory personnel (RCS) will provide radiological coverage to ensure the radiological safety of MJW, OSC and Inventum Engineering workers during work activities required for any surface and subsurface survey and sampling work.

8.1 Radiological Monitoring Documentation

The RCT and/or RCS will complete daily field notes to identify work activities performed, site conditions, notable events, and radiological findings. The notes will include a site work area map and samples collected. MJW Corporation "*Survey Data Form*" (Attachment 8) will be completed for all walk-over or investigative surveys performed in response to significantly elevated instrument readings or off-normal events (i.e., instrument count rates > 2 times background or personnel contamination. A COC form (Attachment 7) will be initiated in the field for all samples collected.

9.0 Personal Protective Equipment (PPE) and Radiological Hygiene

Workers will follow all requirements for PPE and hygiene actions based on radiological, chemical, and physical hazards as established by MJW safety manuals and procedures and the OSC Health and Safety Plan for the BCP Site. The minimum requirements based upon anticipated radiological and physical conditions will include:

9.1 Required PPE

The required PPE will be worn at all times on the site outside the parking lot or office building.

- Safety glasses or shield,
- Hard hat,
- Ear plugs,
- Hard-toe work boots,
- Work gloves, and
- Safety (high visibility) vest or similar.

More stringent controls may be required if higher levels of radioactivity are encountered.

9.2 Hygiene and Contamination Monitoring

The following precautions shall be observed to promote work-place safety and in accordance with the BCP Site HASP (Appendix C of the RIWP):

- No eating, drinking, smoking, or chewing within any active work area,
- Hand washing required upon exit from any active work area,
- Hand and foot radiological survey meter "frisk" when exiting areas where elevated radioactivity has been detected. Personnel frisks will be performed using the Ludlum 44-10, 2"x2" NaI probe, the Ludlum 44-9, GM probe and/or the Ludlum 44-89, Alpha/beta probe or equivalent instrument combinations.
- Excavator buckets and tires/tracks to be frisked before release to non-restricted use.

When release surveys using field instruments exceed 2 times the instrument background count rate, the RCT and RCS will take measures to confirm results using longer count times or by moving more slowly over the area. If an elevated count rate is confirmed, the RCT may wipe or wash the area, remove debris or soil material and resurvey the area until readings indicate ALARA. Materials or personnel exceeding 3 times instrument backgrounds should not be released without further decontamination efforts and count rates indicate ALARA. This information will be documented on forms such as those similar to Attachment 8, MJWRCP-04. Rad Contamination Survey Map and Data Sheet.

Materials and equipment released for unrestricted use will not exceed NYS and NRC limits as stated in NYSDOH Radiation Guide 10.10, Table 1 (Attachment 9), see Reference 2. It is the responsibility of the RCS to evaluate field instrument counts per minute (CPM) against Table 1 release limits in disintegrations per minute (DPM) using instrument calibration factors for the radionuclides of interest.

9.3 Control of Fugitive Dusts

MJW supported by OSC will take reasonable steps shall be taken to suppress potentially contaminated fugitive dusts such as by misting with water or curtailing intrusive activities. Dust monitoring shall be conducted in accordance with the BCP Site CAMP (Appendix D of the RIWP) by Inventum Engineering. In addition to the perimeter monitoring conducted for the CAMP a potable air monitoring station will be located no more than 50 feet downwind of the subsurface sample locations that involve the use of heavy construction equipment.

10.0 Reports

MJW will prepare a report detailing the activities and the results of the additional GPS overland gamma survey performed and the activities and analytical results for all surface and subsurface soils collected. The report and data will be in a form that will allow Inventum Engineering to incorporate the requirements into the RAWP and the Site Management plans for the BCP Site.

11.0 References

11.1 NYSDEC, Radioactive Materials Management Section, 2023, DMM-5, Management of Soils Contaminated with Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), October.

11.2 NYSDOH Radiation Guide 10.10, 1986, Guide for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Radioactive Materials.

11.3 Inventum, October 20, 2023, Remedial Investigation Work Plan, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

11.4 Inventum, August 18, 2023, Draft, Remedial Investigation Report, Riverview Innovation & Technology Campus, Brownfield Cleanup Program, Site No. C915353, 3875 River Road, Tonawanda, NY 14150.

Attachment 3, Continued

NYSDEC-Approved Radiological Work Plan, 2024, Riverview Innovation & Technology Campus Brownfield Cleanup Program Site No. C915353, River Road, Tonawanda NY 14150

Attachment 1. Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

THE MJW COMPANIES

Memorandum

February 10, 2021

To: Mr. James Edwards
Inventum Engineering, PC
481 Carlisle Dr. Suite 202
Herndon, Virginia 20170

From: Martin Willett
Director of Health Physics and Remediation Services
MJW Corporation

Subject: Analytical Data Quality Assurance Review for Six Soil Samples Collected During a Site Investigation of The Tonawanda Coke River Road Facility in Tonawanda, NY

Introduction

A quality assurance and quality control (QA/QC) review of the Laboratory Analytical Data received from Eurofins TestAmerica, St. Louis, Laboratory Job ID: 160-40621-1 and released on 1/11/2021 was performed for Inventum Engineering LLC by MJW Corporation. The laboratory data report contained results for six (6) soil samples collected during a Tonawanda Coke facility investigation conducted between October and November 2020.

Summary of Laboratory Sample Receipt Condition:

- Standard analytical laboratory protocols were followed during the analysis of the samples and no problems were encountered or anomalies observed, laboratory quality control samples were within established control limits.
- Analytical methods and test results met NELAP requirements for parameters for which accreditation is required or available.
- Samples were received on 11/30/2020 in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 9.4 C.

Laboratory Notes Related to Analytical Methods and Results:

Radium-226 By Gamma Spec (21 Day Ingrowth)

- Samples were analyzed for Radium-226 by gamma spec after a 21-day ingrowth period in accordance with EPA method 901.1. The samples were dried on 12/04/2020, prepared on 12/10/2020 and analyzed on 12/31/2020. As a result, samples met the 21day ingrowth requirement prior to analysis for Ra-226.

- Samples results for *Pb-210 by gamma spec (method 901.1) were estimated.*

- *Insufficient sample was provided for a sample to fill the geometry calibrated for Ra-226 analysis by gamma spectroscopy.* The samples contained large pieces of rock.

- Results for several requested isotopes have no or low abundance gamma peaks. *Quantification of the analyte was inferred under the assumption of equilibrium with decay chain progeny or parent isotopes. This assumption was added by the laboratory and was not based on process knowledge.*

Gross Alpha and Gross Beta Radioactivity

- Sample analysis was performed on 12/23/.2020 following method SW-846 Method 9310. No analytical or quality issues were noted.

Isotopic Thorium and Uranium (Alpha Spectrometry)

- Sample analysis was performed on 01/04/2021 and 01/07/21 following method DOE A01R_Th and U. For Thorium analysis, *a correction to data results to account for interference observed in the blank sample was applied.*
- Quality issues were not observed for U isotopic analysis.

Sample Analytical Results

Samples Analyzed

Lab ID	Client Sample ID	Collected Date / Time	Received
160-40621-1	TP-BCP-34-A	10/30/20 11:15	11/30/20 13:47
160-40621-2	TP-BCP-34-B	10/30/20 11:15	11/30/20 13:47
160-40621-3	TP-BCP-32-W45	11/09/20 01:00	11/30/20 13:47
160-40621-4	TP-BCP-44-A	11/13/20 11:50	11/30/20 13:47
160-40621-5	TP-BCP-44-B	11/13/20 11:50	11/30/20 13:47
160-40621-6	TP-BCP-47	11/18/20 09:20	11/30/20 13:47

Table 1: Laboratory Sample Results

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-3	TH-232	Alpha Spec A-01-R	1.58		0.270	0.0487
160-40621-3	U-238	Alpha Spec A-01-R	0.474		0.131	0.0598
160-40621-3	AC- 228	Gamma 901.1	0.735		0.237	0.258
160-40621-3	BI-214	Gamma 901.1	0.515		0.178	0.168
160-40621-3	RA-226	Gamma 901.1	0.515		0.178	0.168
160-40621-3	TH -232	Gamma 901.1	0.735		0.237	0.258
160-40621-3	U-238	Gamma 901.1	0.851		0.591	0.810
160-40621-1	TH-232	Alpha Spec A-01-R	1.36		0.253	0.0521
160-40621-1	U-238	Alpha Spec A-01-R	3.12		0.419	0.0527
160-40621-1	AC- 228	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	BI-214	Gamma 901.1	4.46		0.785	0.415
160-40621-1	RA-226	Gamma 901.1	4.46		0.785	0.415
160-40621-1	TH -232	Gamma 901.1	0.858	U	1.07	1.51
160-40621-1	U-238	Gamma 901.1	5.04		2.24	2.92
160-40621-2	TH-232	Alpha Spec A-01-R	0.737		0.182	0.0554
160-40621-2	U-238	Alpha Spec A-01-R	4.06		0.499	0.0612
160-40621-2	AC- 228	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	BI-214	Gamma 901.1	3.70		0.841	0.597
160-40621-2	RA-226	Gamma 901.1	3.70		0.841	0.597
160-40621-2	TH -232	Gamma 901.1	0.561	U	0.957	1.10
160-40621-2	U-238	Gamma 901.1	2.73		1.38	2.53
160-40621-4	TH-232	Alpha Spec A-01-R	0.322		0.107	0.0402
160-40621-4	U-238	Alpha Spec A-01-R	2.31		0.344	0.0490
160-40621-4	AC- 228	Gamma 901.1	1.07		0.355	0.312
160-40621-4	BI-214	Gamma 901.1	2.99		0.467	0.205
160-40621-4	RA-226	Gamma 901.1	2.99		0.467	0.205

Lab ID	Analyte	Method	Result (pCi/g)	Lab Qualifier[1]	Error (pCi/g)	MDA (pCi/g)
160-40621-4	TH -232	Gamma 901.1	1.07		0.355	0.312
160-40621-4	U-238	Gamma 901.1	2.42		0.947	1.45
160-40621-5	TH-232	Alpha Spec A-01-R	0.783		0.177	0.0258
160-40621-5	U-238	Alpha Spec A-01-R	4.35		0.534	0.0583
160-40621-5	AC- 228	Gamma 901.1	1.22		0.536	0.681
160-40621-5	BI-214	Gamma 901.1	3.26		0.575	0.380
160-40621-5	RA-226	Gamma 901.1	3.26		0.575	0.380
160-40621-5	TH -232	Gamma 901.1	1.22		0.536	0.681
160-40621-5	U-238	Gamma 901.1	3.50		1.16	1.59
160-40621-6	TH-232	Alpha Spec A-01-R	1.95		0.319	0.0464
160-40621-6	U-238	Alpha Spec A-01-R	3.29		0.451	0.0539
160-40621-6	AC- 228	Gamma 901.1	2.58		0.440	0.294
160-40621-6	BI-214	Gamma 901.1	3.79		0.495	0.214
160-40621-6	RA-226	Gamma 901.1	3.79		0.495	0.214
160-40621-6	TH -232	Gamma 901.1	2.58		0.440	0.294
160-40621-6	U-238	Gamma 901.1	1.59		0.915	1.43

1. U Result is less than the sample detection limit.

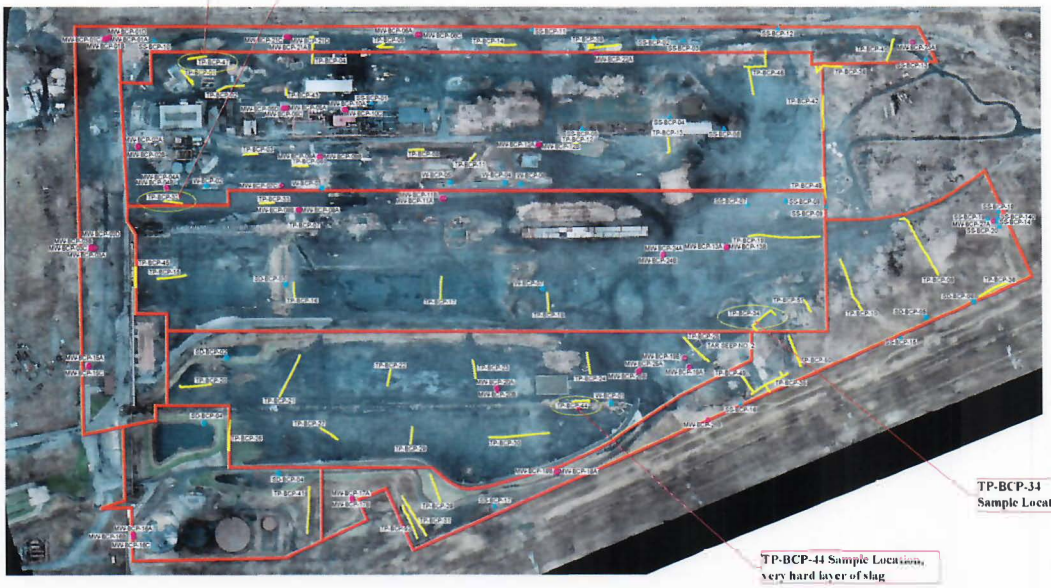
QA/QC Summary:

There were no laboratory quality assurance sample result exceptions noted. Results for LCS, Blanks and Duplicate samples were within acceptance criteria and all duplicate Relative Error Ration (RER) results were in RER limit of 1. Based on QC sample results, the data are determined usable and no upward or down bias in sample results is evidenced.

The laboratory narrative identified a deficiency in sample volume for one sample however, the sample was not identified and analytical results for all samples were reported without exceptions noted.

In general, the sample results for U-238 and Th-232 are slightly above the range of concentrations that are inferred for average background soils (.5 to 1.5 pCi/g) but not outside the range of concentrations that can be encountered. Based on the gamma spectroscopy result for U-238, Ra-226 and Th-232 progeny nuclides appear to be in equilibrium with parents and alpha spectroscopy results generally confirm the gamma spec results. The samples do not appear to indicate any enhancement of one isotope or the other and concentration ranges are likely due to soil types from the area.

Figure 1. November 2020 Test Pitting Locations Radiological Monitoring at RITC Site



Note: Test Pit Rad Soil Analysis (Samples Collected 10/30 to 11/18/2020) are circled in yellow.

D

SAMPLE LOCATIONS
RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.inventumEng.com

Figure 1

SAMPLE LOCATIONS

Attachment 2. Tonawanda Coke GPS Report for Inventum Engineering

THE MJW COMPANIES

Radiological Consulting Professionals and Expert Technical Services

Gamma Walkover Survey Report

For

RIVERVIEW INNOVATION & TECHNOLOGY CAMPUS, INC.
3875 RIVER ROAD
TONAWANDA, NEW YORK 14150
BCP SITE No. C915353

Prepared for:

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By:

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15 Hazelwood Dr., Suite 112
Amherst, NY, 14228

1.0 Introduction

During June of 2023, MJW was requested by Inventum Engineering to perform a GPS enabled gamma walkover survey (GWS) of the 86.5-acre Riverview Innovation and Technology Campus, located at 3875 River Road, Tonawanda, New York 14150 (Site). The Site was previously used as a Coke plant storage location and railroad junction for the former Tonawanda Coke Company during the majority of the twentieth century. The Site location is shown in Figure 1.

The Site is becoming largely vegetated and soils appear to consist of various types of fill materials originating from plant and railroad operations. The observable fill in soils at the Site contained coke, coal, brick, concrete, slag, wood and other materials, with little to no native soil identifiable in the upper two (2) feet of the surface. The composition of the fill materials, including the slag material, was not uniform based on visual observations in-field.

The GWS was requested to identify surface gamma radiation levels resulting from surface and near-surface soils and fill materials. During the GWS, surface gamma radiation readings in counts-per-minute (cpm), were logged together with GPS coordinates, at 1-second intervals. The data were then used in determining the location and potential for Technically Enhanced Natural Occurring Radioactive Materials (TENORM) at the Site. MJW performed these activities over a three-day period beginning on June 30th, and including July 3rd, and July 5th.

Previous Site characterization activities involving soil sampling and test pits excavation were completed in October and November of 2020.

2.0 Methodology

Instrumentation utilized for the survey consisted of a GPS enabled Ludlum 2221 ratemeter coupled with a Ludlum 44-10 2"x2" NaI detector. MJW mounted the equipment to a specially modified cart to enable consistent detector geometry at ten (10) centimeters above the ground surface. The integrated GPS unit logged gamma and location data at 1-sec intervals during the GWS.

A transect plan was created to provide guidance in-field for optimal survey coverage. Transects were spaced twelve (12) meters apart to provide a high probability of discovering locations exhibiting elevated gamma readings or trends in near surface soils. The Site covers approximately 86.5 acres and there are active remediation and demolition activities taking place. Preplanned survey transects were followed to the extent possible with deviations required to avoid locations where activities were on-going and topography or site conditions such as pits, overgrown vegetation, fencing, and flooding prevented access. Transects were walked wherever possible but in-field adjustments were made to avoid obstructions and to delineate elevated gamma reading locations when observed.

Background gamma count rate data were collected at the nearby Erie County Water Authority property located at 3750 River Road in Tonawanda, NY. The background scan location is west of the Site adjacent to the Niagara River and has similar soils and geology with no known radiological impacts. Data was collected over impervious (paved) and pervious soil surfaces. The soil/vegetation surface cover average from count rate data collected in the background area was used to evaluate site GWS due to the similarity in surface cover over the majority of the Site survey area. Site Locations with hard cover such as concrete will be evaluated separately using the appropriate background average count rate. Figure 1 displays the location of both the background study area and the Site.

3.0 Data Analysis

The Site and background GWS data were statistically analyzed using Visual Sample Plan (VSP). The data collected were evaluated using indicators such as outliers tests, data distribution, and sample population statistical values to determine usability. Based on the 614 data points collected in the background location over soil covered areas, a mean gamma count rate for near surface soils was determined to be 8392.9 ± 400.08 counts per minute (cpm) with a near normal distribution. The background location and data are shown in Figure 2.

The Site GWS resulted in 28,884 data points over the three days the survey was conducted. Based on a statistical evaluation of the data, the data mean, and standard deviation were determined to be 7900.8 ± 3065.9 cpm indicating that much of the survey area is at or near background gamma levels. A histogram of Site GWS data showing the data distribution is provided in Figure 3. The histogram shows that count rate data above the study area mean (to the right of the red vertical line in Figure 3) were observed in approximately one third of the data with the more elevated data results falling outside what might be expected if the data were normally distributed near tale and right of the curved red line in Figure 3). The locations associated with this data have a greater potential for the presence of TENORM. Figure 4 shows the GWS data located on the Site.

4.0 Results

Site GWS data binned using the Jenks Natural Breaks algorithm along the gamma readings is shown in Figure 4. Although the potential for radiological impacts below the upper 1-ft of soil or hardcover material cannot be dismissed with GWS results alone, the potential for near-surface and deeper impacts is much greater in areas with GWS data above 1.5x background or in locations indicating an increasing trend in the near surface gamma readings. As observed in Figure 4, the majority of the northern half of the Site is characterized by increasing count rate data exceeding 1.5x the average background reading with several locations exceeding twice the background mean count rate. To a lesser extent, the southwestern area of the Site also showed increasing trends in readings at or above 1.5x the background mean. Based on these results, the presence of TENORM in the northern half and southern perimeter areas of the site are most likely. Because the elevated reading locations do not appear to be consistent over the Site, other than the most elevated locations which are located in the central area of the Site, it is probable that fill materials containing elevated levels of Naturally Occurring Radioactive Materials (NORM) or TENORM were used as fill during periodic filling or railroad operations when the facility was operating. To determine the nature and extent of the NORM or TENORM impacts for use in evaluating potential management or disposal options and costs during future Site development or management activities, additional investigations including sampling and analysis would be required.

Figures

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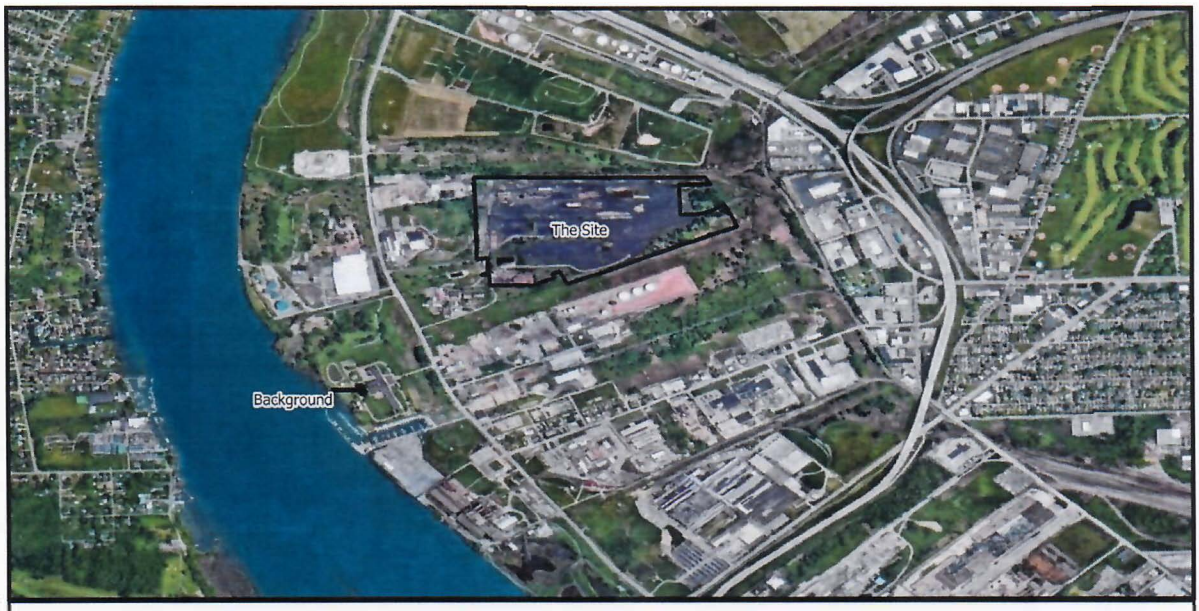
Figure 1:



Location of The Site and the Background Location in Comparison to Western Tonawanda

Locations
Google Earth

0 1,000 2,000 m

Created by the MJW Companies
July 2023

Basemap Credit to Google

Figure 2:
Background Gamma Walkover Survey Data Collected at
Erie County Water Authority Property Adjacent to Riverview Site

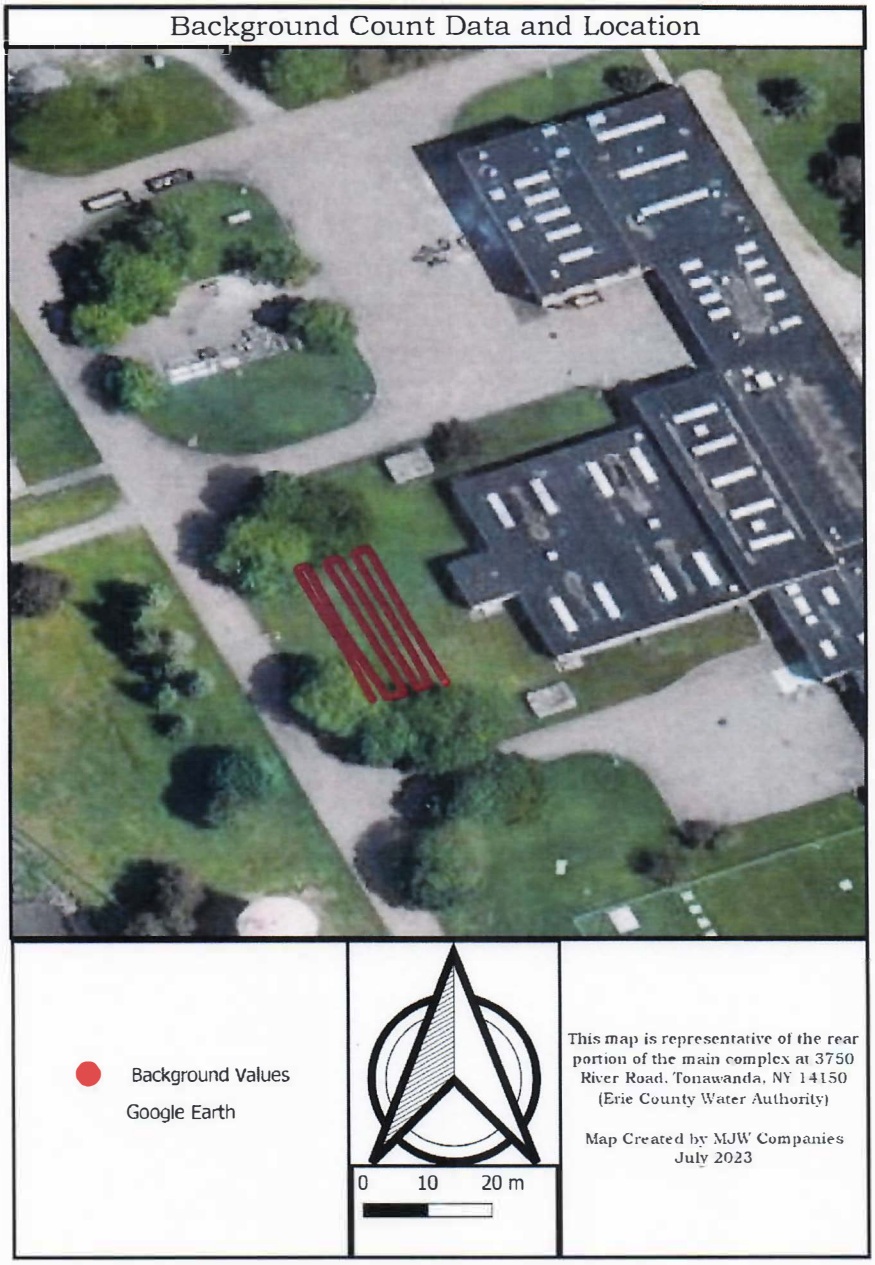


Figure 3: Histogram of Riverview Technology Center Gamma Walkover Data Distribution

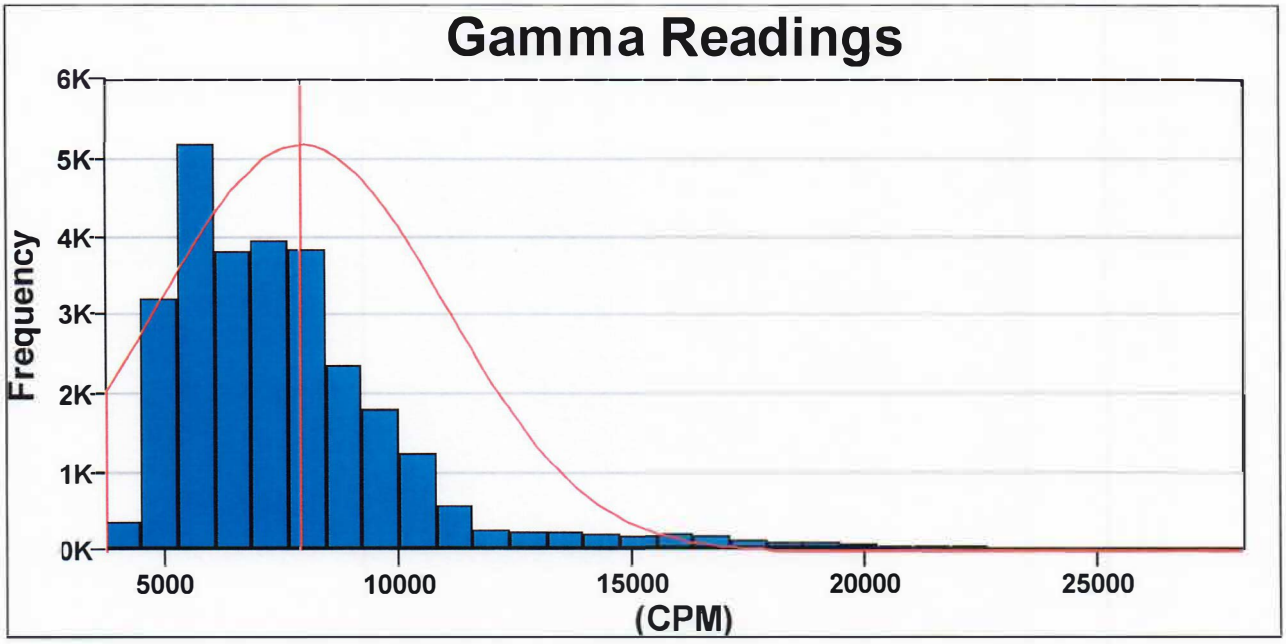
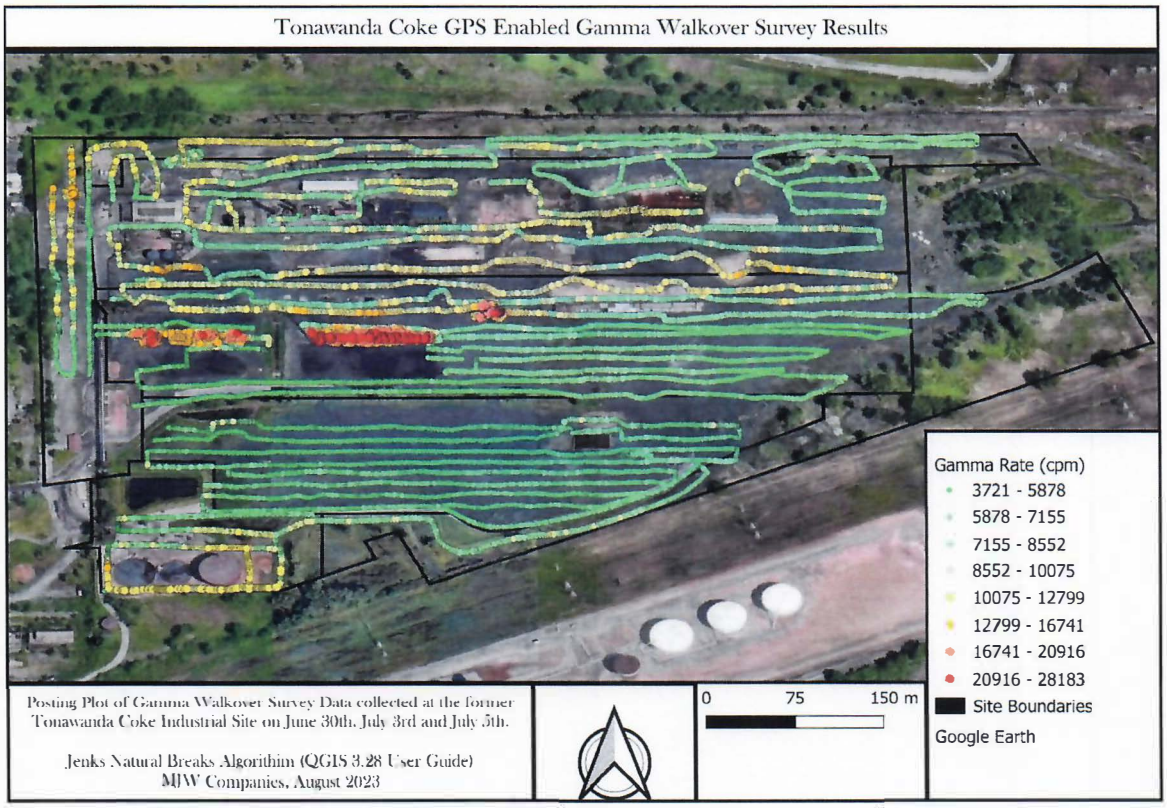


Figure 4:


Tonawanda Coke GPS Enabled Gamma Walkover Survey Results
Gamma Rate (cpm)
3721 - 5878
5878 - 7155
7155 - 8552
8552 - 10075
10075 - 12799
12799 - 16741
16741 - 20916
20916 - 28183
Site Boundaries
Google Earth
0
75
150 m
Posting Plot of Gamma Walkover Survey Data collected at the former Tonawanda Coke Industrial Site on June 30th, July 3rd and July 5th.
Jenks Natural Breaks Algorithim (QGIS 3.28 User Guide)
MJW Companies, August 2023

Attachment 3. MJWRCP-03 Field Investigation Survey Procedure_09_15_2015

MJW CORPORATION
RADIATION CONSULTING PROFESSIONALS

General Radiological Survey Procedure for Radiological Site Investigations

1.0 PURPOSE

The objective of this procedure is to detail the required methods and actions to be taken for collecting radiological survey data of sufficient quality and quantity to meet regulatory guidance outlined in MARSSIM and other relevant or referenced documentation.

This procedure will outline standardized techniques to ensure comparability and reproducibility of the survey data.

2.0 RESPOSIBILITIES

2.1 Radiological Control Supervisor (RSC)

The radiological control supervisor (RCS) is responsible for review of the survey plan and all supporting documentation to ensure that the survey Data Quality Objectives (DQOs) are understood and can be related to field staff conducting the survey. The RCS will ensure that complete documentation is collected for survey points and samples, that field audits are performed during data collection, and that audit findings and data are reviewed and properly logged and narrated in the project file.

2.2 Radiological Control Technician (RCT)

The RCT is responsible for reading, understanding, and executing the protocol and techniques described in this procedure including the operation of instrumentation and completing the required documentation described or referenced in this procedure.

3.0 PREREQUISITES/REQUIREMENTS

The RSC and RCTs must be trained and competent in the techniques and instrumentation described, understand work site hazards and safe work protocol required to perform the work described in this procedure.

4.0 PROCEDURE

Survey details and techniques, including calculations and instrument requirements, will be fully described and specified in specific project or task documentation. The following sections outline the general requirements necessary for performing surveys of the type identified:

4.1 Fixed Survey/Sample Point Location

Every fixed sample location must be spatially located within a Survey Unit. Survey Units (SU) can be comprised of small or large surface areas, a single room or several rooms in a building, grouped together according to their contamination potential (i.e., Class 1, 2 or 3, etc.). Prior to entering the field to conduct a survey:

- SUs with their respective origin points must be identified on a site map
- The number of samples required for each SU should be calculated or approximated and located on the survey map
- The location of each sample location should be identified with local x and y coordinates, measured from the SU referenced origin point.

Sample locations will be identified through a diagram on survey data sheets to ensure proper location identification during the survey in each unit. Survey points can be moved for various reasons as long as the new location is accurately identified with local coordinate's measured from the identified SU origin point.

4.2 Gamma Survey Grid Layout

When areas are required to be surveyed with a specified coverage percentage, survey grids are typically established over the area and a scan survey is conducted. The scan survey follows a predetermined grid laid out over the SU in a density pattern sufficient to measure radiation levels at specified intervals to meet the coverage requirement. Survey grid markers are often used and set up as reference points to assist the surveyor in tracking survey locations and grid lines over large areas.

To establish a survey grid in a building space such as a room, hallway etc., or in outdoor areas, the grid spacing must first be established. Grid spacing will be determined and documented in the Survey Work Plan during survey planning. Grid layout and spacing is based upon the required coverage obtained by factoring in survey meter window area, the instrument type being used, measurement interval, rate of distance traveled between measurements, and the instrument height above the ground surface.

The percent coverage of the survey must be known prior to the field investigation and is a critical DQO for setting up and planning any gamma or instrument scan during a site investigation. Once the survey DQOs are identified and an appropriate Investigation Work Plan has been prepared to identify the variables necessary to determine grid size and spacing, the following steps will be performed:

Laying out the Grid:

- Inspect the area to be delineated and when possible, remove unnecessary objects or vegetation to provide as clear and unobstructed view as possible.
- Identify the area/room origin or reference point
- Using paint, tape, stakes, flags or other appropriate marking devise, measure the required X axis grid distance from the origin point and mark the surface at the required spacing interval. Always include a North arrow and scale on the site drawing and include dominate features to be sure that the grid can be recreated after the survey is completed.
- Repeat the same process along the Y axis from the origin.

- When wall surveys are required, mark a Z axis from the origin up the wall. Z coordinate locations will have the X and Y coordinates respective to their position along the floor/surface grid.
- Draw the area indicating the location of the origin; X and Y axis, and any dominate features (doorways, tables, landscape features, etc.)

4.3 Instrument Surveys

4.3.1 Identifying and Preparing Instruments for Use

An appropriate and calibrated ratemeter/scaler match (i.e., Ludlum 43-68 probe/and 43-60 ratemeter, Model 239-1F floor monitor, Ludlum 43-10 and 2241-2, or equivalent), must be tested for sensitivity and the detection of the investigation contaminates of concern (COC). The instrument sensitivity must be below the COC investigation action level (AL), preferably under 50% of the AL. Once the instrument has been determined to be sensitive enough to use, it can be deployed to perform direct alpha/beta counts to verify the presence of contamination at investigation levels.

When using gas proportional counters (Ludlum 43-68 probe or the Model 239-1F floor monitor), instrument purging using P-10 gas is required prior to operational use. The RCT must be familiar with instrument operation and care prior to field use. Always refer to the operational procedure or the manufacturers' manual for complete instructions if there is uncertainty concerning the use of a particular instrument.

4.3.1.1 Instrument Operational Checks

Prior to performing any measurements, the following Operational Checks must be performed:

- Select the "Battery Check" indicator to verify batteries are fully charged. Replace batteries if necessary. Record reading on field work sheet.
- Select High Voltage (HV) setting and compare reading to the required setting used during calibration for detection of general or specific isotopes as necessary to perform the survey. Record reading on field work sheet.
- Set ratemeter detection setting, if present, to the appropriate setting required by the survey work plan for detection of contaminates of interest (e.g. alpha/beta, alpha, beta, etc.). Record setting on field work sheet.
- Set ratemeter time setting, if present to "one minute" unless otherwise stated in survey work plan.
- If gas proportional counters are being used, purge the instruments with P-10 gas and set the gas flow to the required flow rate prior to use.
- Perform a minimum of 5 background readings in a non-impacted location and record readings. Calculate the average background count rate and check that it is within normal expected range for the area background.
- Perform a minimum of 5 source checks in a non-impacted location and record readings. Calculate the average source count rate. Check to be sure that the average source reading is within 20% of the calibration reading for the source(s) being used.

Use the Field Data Survey Sheet specifically designed for the survey being performed or when appropriate, a more generic survey data sheet can be used to record the operational data collected.

Note: Survey data cannot be collected without instrument operational data recorded and reviewed prior to field measurements.

4.3.1.2 Survey Data Collection

Scaler or Fixed Position Readings:
Scaler readings are the total integrated counts observed at a particular location by the survey probe for the time interval selected on the meter.

- Using a properly calibrated and field checked instrument, hold or place the instrument probe over the area of interest at the specified height for the duration of the time setting (e.g., one minute, .5 minute, etc.) as indicated by the ratemeter/scaler window freezing or an indicator displayed in the window.
- With the instrument probe in-place over the location to be investigated, set the instrument to the "scaler" setting and activate the scaler count using the appropriate switch or toggle on the ratemeter.
- Record the activity observed, instrument used, time constant, and surveyor on the field data sheet. If a fraction of one minute (i.e., 0.5, etc) is selected, record the meter reading on the data sheet with the time constant used.

Scanning/Ratemeter Surveys:
In ratemeter mode, the ratemeter continuously evaluates data from the survey probe. The ratemeter display is updated every 2 seconds and the surveyor must continuously observe the meter readout and the survey progresses. The following steps are used to perform a survey in ratemeter mode:

- Using a properly calibrated and field checked instrument set the ratemeter/scaler on the appropriate scale for the survey area. Use the lowest scale available. If the meter goes off scale, step back and reset the scale to the next higher setting.
- To better monitor the relative intensity of the contamination present, activate the audio on the ratemeter.
- Slowly (approx. 2ft/sec) move the probe over the area being surveyed and observe or listen to the count rate.
- Record survey data for a given distance or transect line as the estimated average count rate over the distance. Note an associated range (high and low readings) as the area is covered.
- Hot Spot Investigation: If an elevated count rate is indicated (generally 3x the area background readings or at the survey AL), stop and resurvey the area by holding the probe over the location long enough to determine the actual count rate as indicated by a steady reading or performing a scaler reading. Record the reading and note the location based on grid location and/or location features on the survey data sheet and survey plan layout drawing.
- If elevated counts are identified, continue to survey the area until the "hot spot" perimeter is delineated and the activity levels are determined by one or more one

minute scaler readings. Delineate the area using measuring tape, perimeter GPS coordinates or by marking the area and documenting the findings on the site drawings and survey data sheets.

- To conclude the survey, perform an operational check of the instrument by taking a background and source count. Record the data on the Daily Calibration Worksheet.
- Review the field data sheets to check for completeness, erroneous data points and/or trends. In addition, check instrument stability by comparing operational check data for background and efficiency before and after the survey. Data should be within 20%.
- Complete survey documentation including data sheets, field notes, unusual conditions and survey descriptions.

4.4 Removable Contamination Survey

Removable contamination will be evaluated through the use of swipe samples. Swipes will be collected using 4.7 cm diameter filter papers (or equivalent) passed over an area of approximately 100 cm^2 (4"x 4") using moderate pressure. To collect swipe samples, the following steps will be taken:

- Don gloves and other protective clothing as required by the task specific work plan or Radiation Work Plan prior to collecting swipes.
- Label swipe samples (e.g.., consecutive numbers, object names, etc.) prior to use to ensure correct identification. Be sure field documentation reflects the same nomenclature and description of each swipe. Swipes collected for alpha or beta analyses can be labeled on the back (smooth side) of the filter paper. Swipes that will be counted in vials (i.e, counted in Liquid Scintillation Counters (LSC)) must be labeled on the envelop container and/or the vial top (**Not** on the swipe itself or the side of the LSC vial).
- Swipe samples must be labeled with unique identifiers and the sample location logged to identify exactly where they were collected, by whom and when.
- On rough surfaces, care must be taken to avoid damaging the filter paper as it is passed over the surface.
- Care will be taken to avoid excess loading of the swipe with dirt or water in heavily soiled areas tis may require swiping a smaller area which must be recorded in the swipe documentation
- Place used swipes in small envelopes or other sleeves to segregate and protect the swipe samples. Swipes placed in counting vials (H-3, C-14, etc.) must be placed with dirty side facing the outside of the vial.
- Swipe sample Chain of Custody (COC) forms must be completed before delivery to the laboratory for analyses.
- When counting swipes in the field for gross alpha or beta contamination, a suitable calibrated counter of know efficiency and background, will be used (Ludlum 2929 or equiv.)
- Swipes counted in the field will be placed in a counting planchet. The filter should be laid flat to avoid counting errors due to geometry and the planchet changed or cleaned between samples.
- Record all required data, including sample counts, instrument serial number and model and counting instrument background and efficiency on the appropriate sample data sheets.

4.4.1 Tritium and Carbon-14 Swipe Sampling

Swipes for low energy beta emissions (H-3, C-14 etc.) will be collected in the same manner as described in section 4.4 above using moistened swipes. Swipes should be moistened with a small amount of clean (Deionized water preferred) water prior to collection. After collection, place the filter directly into the counting vial, dirty side out, or a separate coin envelope pending analysis by the laboratory. Label the container with the sample identification.

Note: Low energy beta swipes cannot be evaluated with a field counter (i.e., Ludlum 2929 etc.)

5.0 RECORDS

5.1 Each type of survey described above will require the generation of specific data records and survey narrative. The records that are expected to be generated as a result of implementation of this procedure include:

- Daily instrument field operability and calibration sheets. (Attachment 1)
- Complete Alpha/Beta or beta/gamma survey data sheets and maps (Attachment 2)
- Removable contamination survey data and location map (Attachment 2)
- Scanning survey results describing pre and post operational data, background levels, survey unit averages and range, the locations of elevated or anomalous readings, and survey description with a map of the area
- Sample Chain of Custody forms
- Calculations for instrument MDCs, scan MDCR, and sample numbers if appropriate
- Project survey log including daily activities and issues
- Data assessment and evaluation work sheets

All the records generated as a result of implementation of this procedure will be maintained as part of the MJW Corporation project file that will include the associated Project Work Plan.

Attachment 4. MJWRCP-40 Performing a GPS Enhanced Gamma Radiation Survey, Rev. 4

THE MJW COMPANIES Radiological Consulting Professionals and Expert Technical Services		MJWRCP RCP-40 Rev. 4
Performing a GPS Enhanced Gamma Radiation Survey and Data Assessment		**FIELD PROCEDURE**
Effective Date: 10/29/21	Approved By: *M.J. Willett*	

1.0 PURPOSE/DISSCUSSION

The purpose of this procedure is to establish protocols and data collection requirements necessary to perform reproducible low-level radiation overland gamma surveys.

Overland gamma radiation surveys are often enhanced with the coupling of radiation and satellite geographical location measurements collected from global positioning and radiation instrumentation and software. The use of both instruments simultaneously allows rapidly recorded radiation readings to be precisely located across varied terrain and large areas. MJW uses the ERG 105G handheld GPS surveying system and accompanying software.

The 105G is a simple to use GPS mapping system for performing outdoor gamma radiological scans. It consists of an interface tablet containing all necessary software to acquire position correlated radiological scan data from a gamma detector and export the data for processing using a variety of applications, such as Microsoft Excel, or ESRI ArcGIS. The handheld logger comes installed with two applications necessary for collecting data and exporting to a removable disk drive. The ERG RadScout is used to collect gamma data and couple it to a GPS position. The RadSync software is also included on the handheld computer and is used to export all field data to a single removable disk. Using the ERG RadScene software, the data can be managed, analyzed, and merged from a single processing computer.

The 105G uses off-the-shelf Ludlum equipment for radiological detection. The system uses the Ludlum model 2221 meter. An optional setup uses a 2221 with Bluetooth radio incorporated to allow a completely wireless interface between the data logger, 2221, and sub-meter GPS receiver. If the survey is performed in a location where projection information is not available, then the user will be required to apply the spatial correction during data evaluation and download.

2.0 SCOPE

This procedure is applicable for general or discrete radiation surveys intended to measure direct radiation and/or contamination levels of areas expected to be at or near background levels. It is also applicable for sites where radiological contamination may be extensive.

Gamma or alpha/beta survey procedures, including grid layout, coverage and instrument use and data DQOs will be detailed in job specific work plans. Standard or typical survey methodology is described in MJW Corporation instrument and survey procedures.

3.0 RESPONSIBILITIES

3.1 All survey instruments used to determine direct radiation levels or contamination levels shall have been calibrated within twelve months prior to performing the survey.

3.2 Surveys shall be performed in accordance with all applicable standards as listed in Section 8.0 (references).

3.3 Persons performing the survey shall be responsible for proper instrument checks and operation, properly recorded measurements, and map per Section 4.0 of this procedure.

4.0 PROCEDURE

4.1 Equipment List

- Surveying and staking materials (subcontract to licensed surveyor)
- Bicron microRem LE (or equivalent)
- Ludlum Model 2241 survey meter (or equivalent) with Ludlum 44-10 2"x2" Nal detector (or equivalent)
- Area maps as appropriate (topographic, street, quadrangle, etc.)
- Mason's line marked at designated intervals (for detailed area surveys)
- Ludlum 44-10 Lead Collimator (Optional)
- Ludlum 1000/2200 with 43-10 and 44-40 smear counters
- Miscellaneous marking and recording equipment
- 100-foot tape measure
- Protective clothing as appropriate
- Smears (1 box)

4.2 MEASUREMENT PROTOCOLS

4.2.1 Perform a battery check, source check and calibration data check prior to use of survey instrument per the requirements of Section 3.1.

4.2.2 At a minimum of three (3) separate locations known to be free of contamination, make several background measurements, recording data, time, survey instrument serial number, surveyor and general survey area location noting any significant landmarks. Record data on Form RCP 40-1.

4.2.3 In consultation with a licensed surveyor establish the primary reference point for the survey and any second reference points required to adequately describe the site and allow for creation and recreation of the survey grid. The reference point shall be designated as point 0, 0 or equivalent with magnetic north indicated clearly in reference to point 0,0. Compass points shall be used such as ON, OE, OS, OW, etc. depending upon the reference point location.

4.2.4 From the primary and any secondary reference points, establish area survey points using stakes, flags and/or marked string lines at the predetermined survey interval. All other grid locations will be designed in alphanumeric sequence from the reference point (i.e., 5 feet due east of reference point ON, OE would be designated as ON, 5E; 5 feet north and 5 feet east as 5N, 5E etc.). Use Form RCP 40-2 to show survey grid, detailing the primary reference point, any secondary points, landmarks and grid spacing. Use accurate area maps or any available CAD drawing to lay out grids.

NOTE: Grid pattern spacing should be no more than ten (10) meters apart for complete coverage for sites with a known or suspected radiological history. Grid spacing may be increased up to 100 meters for large sites where no radiological involvement is expected.

Minimum detectable activity will be dependent upon background levels and instrument efficiencies. Decreasing the grid spacing will give higher detection probability for low activity or diffuse sources.

For a uniformly distributed Co-60 source the predicted exposure rate at one meter above the surface is 5.79 E-04 Sv/yr per Bg/cm^2 (NUJREG/CR-1918). This translates to ~ 43 microR/hr per uCi/m^2.

4.2.5 Measure the gamma radiation level at the reference location at a distance of one meter (approximately waist height) and at ten centimeters from the ground surface.

CAUTION: Survey instruments must not come into contact with any potentially contaminated surfaces. Precautions must be taken such as bagging the instrument should such potential exist.

4.2.6 Record measurements from designated survey locations on Forms RCP 40-3 and 3A, including alphanumeric survey locations, gamma radiation readings at 1 meter and 10 cm and any remarks for the location. Complete the top of each form with the following data: job number, date, surveyor and relevant instrument data (model, serial number, etc.) as discussed in section 4.2.4.

4.2.7 Proceed at a slow pace (approximately 0.5 m per second) to the next survey point, continually checking the instrument readout for any strong fluctuations.

4.2.8 Once four grid points forming a square have been measured perform an intragrid survey of the square with the meter at a distance of 10cm from the surface. Begin in one corner of the grid and using a zig-zag or cross-crossing pattern at 1m (~ 3') intervals survey the grid on the diagonal at a slow pace ~ 0.5 m per second.

4.2.9 If during the intragrid survey a significant survey meter response is encountered, take readings from a distance of one centimeter to define the area of the increased activity. Use spray paint, flags, string or another method to mark the area(s) of elevated activity. Also mark the location of this/these intragrid area(s) on Form RCP 40-2. The point of the most elevated reading as well as the apparent boundaries of any area(s) of elevated activity should be thoroughly marked and described.

4.2.10 After all initial survey points have been recorded, return to any areas of elevated readings. Perform a detailed survey to define the areas and note the upper limits of the measurements using one of the following methods: (document all results on Forms RCP 40-4 and 4A).

- Using concentric circles, define the center and then the radius of contamination and record this on the survey form, or

- Using a small-spaced grid pattern of 1 meter or less, find the center and general outline of the area of contamination and record this information on the survey form, RCP 40-4 or 4A as appropriate.

NOTE: Per step 4.2.8 use spray paint, string or other suitable medium to define the physical limits of the contamination/radiation. Use standard precautions to avoid personal or equipment contamination during the survey.

4.2.11 Check the survey map for complete coverage. Notify the appropriate client personnel if immediate posting or cleanup actions may be required.

4.2.12 Remove all nonpermanent markers and stakes only after all data has been checked and verified. Grid markers should be maintained if further action is required or if additional surveys are to be performed by regulatory agencies, etc. Monitor all personnel and materials for potential radioactive contamination before they leave any areas of suspected or confirmed contamination.

4.3 INSTRUMENT CALIBATION

4.3.1 All instruments shall be calibrated annually and shall have a valid calibration sticker at the time of sue. Survey instruments used for overland gamma surveys shall be calibrated within six months of the actual survey date.

4.3.2 Instruments will be tagged "out of service" for:

- Failure to properly respond to check sources, or
- Instrument damage, or
- Suspect operation of the instrument

Any instrument tagged "out of service" shall be repaired or replaced and shall be calibrated before use.

4.3.3 All instruments will be operationally checked in the field at the beginning of each workday and each time the meter is turned on.

5.0 PRE-SURVEY PREPARATION

5.1 Instruments and Equipment

5.1.1 GPS instrument case –ERG Model 105G, serial cables, external antenna cable, USB cable.

5.1.2 Wheeled cart and/or backpack mounting equipment and measuring tape. (Carts are stored on shelves in storage garage)

5.1.3 GPS antenna and cable

5.1.4 Stakes, flagging, markers, field notebooks, etc.

5.2 Check List Items

5.2.1 Check to be sure GPS and radiation instruments, check source, log book, cables, carrier equipment, antenna, tremble software and batteries are available, charged and in good condition and calibrated (green light on battery charger indicates batteries are fully charged) . ***Note: Batteries take 24 hours to fully charge***.

5.2.2 Determine Survey sensitivity and geological coordinate system requirements (i.e.. WGS83, State Plane, NAD83, etc.)

5.2.3 Review terrain conditions from proposal, client contact or via Google Earth or maps to identify accessibility and survey method (cart vs walking/backpack mount)

5.2.4 Identify survey grid coverage and spacing.

5.2.5 Prepare grid marking or line-of sight aids (e.g. cones, paint, rope, etc.) to facilitate walkover coverage and maintain speed.

5.2.6 Prepare map of survey area.

5.3 Preparing the Instruments to Begin GPS Enhanced Gamma Survey

5.3.1 Setting up the Field Equipment

5.3.1.1 Power on the Rad Scout by pressing the power button once, located on the bottom right-hand corner of the front of the device. To unlock the device and reveal the homes screen, slide a finger upwards on the display. Open the Rad Scout program by tapping on its icon on the desktop.

5.3.1.2 The typical radiological instruments used with the system are the Ludlum Model 2221 Counter with a gamma detector (44-10).

5.3.1.3 Source check the instrument and record background and source check count rate data in the daily source check logbook located in the instrument case. Evaluate the source count rate to ensure instrument sensitivity is within the required range (dpm/cpm =+/- 20% of source calibration dpm count rate).

5.3.2 Connecting the Meter to Tablet

5.3.2.1 When using the wireless 2221 option, the meter incorporates a Bluetooth device that syncs with the RadScout. To connect to a specific meter, ensure the meter you wish to connect to is turned on and that the Bluetooth modem has a flashing blue light. In the RadScout software tap the Program Settings option from the File menu, and select the button next to the METER SOURCE drop down box as shown in Figure 1. Note that for this option to be available, the meter must be disconnected. Connect and disconnect the meter from the Settings menu in the main form. The window, as shown in Figure 2 will appear with all discovered Bluetooth devices. Click on the serial name that matches the Bluetooth device of the 2221 you want to connect to and click SELECT. If the pairing is successful, the device name will show up in the drop down box. Save the project settings and connect to the meter through the settings menu in the main form by clicking on , METER – OPEN. If the meter is opened successfully, the values will be displayed next to the trifoil symbol in the bottom left-hand corner of the screen. A red error icon indicates there is no connection.

5.3.2.2 Once the Bluetooth device is paired and selected in the drop down box, the device will be connected on every startup of the software.

5.3.3 Connecting to Goede GPS

5.3.3.1 The internal GPS is adequate for most surveying needs, but if sub-meter accuracy is desired, the external Geode sub-meter receiver may be used as the GPS source. To connect the Geode receiver,

press the power button on the receiver to turn the unit on. From the File menu, tap Program Settings and select Geode from menu labeled GPS SOURCE as shown in Figure 3. Note that this option is only available when the GPS is disconnected. The GPS may be connected and disconnected through the settings menu . If the Geode being used is different than the one in the drop down menu, the new Geode must be paired by clicking on the button to the right of the drop down box and selecting the proper device. The Geode serial number may be found on the bottom of the receiver as a six-digit number. Once selected, click on the Settings menu, and tap GPS, then CONNECT to connect the new device. The internal tablet GPS may also be used as the primary GPS source to reduce hardware. To select the internal GPS open the Program Settings window and select the Internal Mesa GPS in the drop down menu. Note that the GPS must be disconnected for this option to be available.

5.3.3.1.1.1 Note that once a successful connection is established, the software will reconnect the last device used upon starting the software.

5.3.4 Refer to ERG User Guide for further reference

6.0 PERFORMING A SURVEY

6.1 The Rad Scout software is used to view, collect, and analyze spatially correlated radiological data with superior accuracy and data quality. Using the position of the GPS receiver, or internal tablet GPS, collected radiological data are viewed in real-time. In addition, the program provides the ability to apply a legend to background and survey data to provide real-time mapping of the gamma levels.

6.2 *Defining a Coordinate System*

6.2.1 By default, the software will use the WGS84 longitude latitude geographical system for all mapping and log file collection. There are times, however, where it is necessary or practical to define a projected coordinate system. For instance, when adding a geotagged world image file, it is necessary to set the coordinate system to the same system as defined in the image. The coordinate system will also be beneficial when collecting point features, which will be discussed in more detail below.

6.2.2 To define a coordinate system, click on FILE, then COORDINATE SYSTEM. Select the desired System and Zone, then click Save to set the project coordinate system. Once set, the saved coordinate system will be applied every time the software is opened.

6.3 *Defining a Legend*

6.3.1 The legend can be used to define specific colors to ranges of count rate data. Although the 2221 records both ratemeter and one-second scalar data, only the ratemeter will be evaluated and displayed using the legend. To apply a legend, tap Legend in the Settings menu. To add a new legend break, tap the Add button. Enter the new threshold, desired point size, and the color, then tap Save. The threshold is defined as the count rate at which the data will be colored if it is equal to, or exceeds.

6.3.2 To edit an existing break, tap on the break you wish to edit, and tap the edit button , or simply double tap on the break to bring up the legend properties. Make the necessary changes to the threshold, point size, or color and tap the Save button to apply changes. Note that the default map point will be defined by the ≥ 0 cpm break. The color and size of the point may be modified, but the threshold must be zero, and the break may not be deleted. Up to 10 breaks may be added to the legend. Once the legend is defined, tap the Save button to apply changes.

6.3.3 The legend will be applied to both the background layers and the real time data. When adding background layers, the legend breaks will be ordered from smallest to largest values when being drawn on the map. This allows the larger, and typically more important values, to be more visible when viewing the data that are on top of each other spatially.

6.3.4 If multiple legends are being used, use the menu in the legend editor to save and recall legends.

6.4 *Creating a Survey File and Collecting Data*

6.4.1 Prior to collecting survey data, a file must be created that will store all the records. To create a file, tap on the Create File tool from the File menu. The filename will be automatically created using the date, time, and the system ID of the Rad Scout. The system ID is provided as an integer to distinguish files easily when multiple data loggers are used for a single survey. The system ID for each data logger is predefined and may not be modified. If desired, add additional information to the beginning of the filename string, however it is highly recommended that the numerical fields are not modified. If necessary, enter additional information in the following textboxes, such as the survey unit, the technician, and any additional comments. Tap the Create button to create the file. Once a survey file has been created, survey data may be collected. Tap the Collect tool to start collecting data. Logged data will appear on the map in real time as individual points and the tablet will produce an audible beep when a new data point has been logged. Volume can be adjusted using the P1 and P2 hardware buttons on the front of the tablet. The total number of records logged to the file is also shown in the status bar. To pause the data collection, press the Stop tool. When surveying is complete, close the file by tapping the Close tool in the File menu. Once a file is closed, it may not be reopened to append data, however all collected filles may be opened as background layers.

6.5 *Data Features*

6.5.1 The Data Feature function is useful for displaying points that are used for navigational or informational purposes. For instance, it might be necessary to navigate to previously defined sample locations as a shapefile. To open a feature file, select Data Feature from the file menu, then tap Open Feature File. A list of available shape files will appear. To add custom shapefiles to the menu, the file must be copied into the RadScout folder in the My Documents directory. Select a file, then tap Open. The points will be displayed on the map as shown in Figure 10. Unlike the background files, the data features allow user interaction through the map interface.

6.5.2 Click on the feature to bring up the sample window. From the menu,

select one of the three options as described

6.5.2.1 The Edit tool may be used to edit information about a previously added data feature point.

6.5.2.1.1 Thise option only available for points added manually.

6.5.2.2 The Select tool may be used to select a specific data feature. Once selected, the data feature can be navigated to by clicking FILE, DATA FEATURE, NAVIGATE TO.

6.5.2.3 The Visibility tool may be used to turn individual samples on and off. This feature is useful to determine when tasks at specific locations have been completed.

7.0 DOWNLOADING, ANALYZING AND EDITING THE SURVEY DATA

Following the collection of data, it is often necessary to transfer all field data to a central computer used for processing and reporting. This section discusses the process for transferring field data from multiple field tablets to a single removable disk.

7.1 Synchronizing Data

7.2 The Mesa tablet includes the ERG RadSync software which greatly simplifies the data exporting process and ensures no data are overwritten or deleted.

7.3 To export field data, place a removable disk in the USB slot on the bottom of the Mesa tablet and open the RadSync application. The application will display the gsf survey files and data feature shapefiles that will be transferred to the removable drive. The application will only display and attempt to transfer files that do not already exist on the removable drive. If the data feature shapefiles on the tablet are determined to be larger than the files on the disk (for instance, if features were added since the last transfer) then the shapefiles will be replaced with the newer file. All original files will always be maintained on the field tablet.

7.4 The application also provides an easy method of getting data onto the field computer to be used as background files or data files. To synchronize import data, place the desired files (.gsf, .jpg, .tif, or .shp) on the removable drive in the directory "<Drive>:\RadScout\". The software will copy these files to the field computer if they do not already exist.

7.4.1 Note that when this approach is used for synchronizing world image files, only the name will be used to determine if the file already exists

Attachment 4

MJWRCP-66 Soil Sampling Protocols, Rev. 2

dated October 14, 2023

THE MJW COMPANIES Radiological Consulting Professionals and Expert Technical Services		MJWRCP-66 Rev. 2
PROCEDURE FOR SOIL SAMPLING FOR RADIOACTIVE MATERIAL		**FIELD PROCEDURE**
Effective Date: 10/14/2023	Approved By: D. A. Dooley	

1.0 PURPOSE

This procedure describes the general and specific procedures, methods and considerations to be used and observed when collecting soil samples for field screening and/or laboratory analysis.

2.0 SCOPE

The procedures described in this document are to be used by qualified field personnel when collecting and handling soil samples in the field. If MJW field personnel determine if any of the procedural steps may be inappropriate, they will contact their field supervisor immediately to discuss and resolve the issue. Any and all such issues will be recorded in the field logbook.

3.0 SAFETY PRECAUTIONS

Proper safety precautions must be observed when collecting soil samples. Field personnel must refer to the RECON Project Health & Safety Plan Rev 1 for guidelines on safety precautions to be followed for this type of field work.

4.0 PROCEDURAL PRECAUTIONS

Special care must be taken not to contaminate collected samples. This includes but it not limited to storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody sealed during long-term storage or shipment. Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party. If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.

5.0 FIELD OPERATIONS

5.1 General

These sampling methods are used primarily to collect surface and shallow subsurface soil samples. Surface soils are generally classified as soils between the ground surface and 6 to 12 inches below ground surface (BGS). The most common interval is 0 to 6

inches BGS, however, the data quality objectives of the investigation may dictate another interval, i.e., 0-3 inches BGS, for risk assessment purposes. The shallow subsurface interval may be considered to extend from approximately 12 inches BGS to a site-specific depth at which sample collection using manual collection methods becomes impractical.

5.2 Soil Collection Using Spoons

Stainless steel spoons may be used for surface soil sampling to depths of approximately 6 inches BGS where conditions are generally soft and non-indurated and there is no problematic vegetative layer to penetrate. If the soil being sampled is cohesive and crumbles when removed from the ground surface, consider using a hand auger to collect the sample.

When compositing a sample, make sure each composite location consists of equal volumes, i.e., same number of equal spoonfuls. If a thick matted root zone is present at or near the surface, it should be removed before the sample is collected.

When spoons are utilized on a push driver rig the following procedure will be followed:

MJW will survey samples as they are brought up, the drilling contractor will transport the closed split spoon to a designated space for radiological surveying. When conducting a survey of samples, ensure Soil Boring Survey Log is properly filled out before work commences. Allow the drilling contractor to open the split spoon for radiological surveying. The split spoon will be analyzed by passing a GM and a 2x2 NaI detector across the surface at a slow rate to identify any elevated sections. If elevated sections are detected they will be segregated and sampled according to section 5.5 for radiological analysis.

5.3 Soil Collection Using Hand Augers

Hand augers may be used to advance boreholes and collect soil samples in the surface and shallow subsurface intervals. Typically, 4-inch stainless steel auger buckets with cutting heads are used. The bucket is advanced by simultaneously pushing and turning using an attached handle. Auger buckets may be used with a handle alone or with a handle and extensions. The bucket is advanced to the appropriate depth and the contents are transferred to the homogenization container for processing.

The practical depth of investigation using a hand auger depends on the soil properties and depth of investigation. For example, sandy soil may flow out or collapse at depth. Conversely, tight clays and cemented sands may offer too much resistance to sampling and powered equipment may need to be used.

Because of the tendency for the auger bucket to scrap material from the sides of the auger hole while being extracted, the top several inches of soil in the auger bucket should be discarded prior to placing the bucket contents in the homogenization

container for processing. The hand auger assembly must be decontaminated between each borehole that is advanced per Section 5.6.

5.4 Standing Water Grab Sample

Using a 500 mL polypropylene sample container, gently submerge the open container to collect water. Take care to avoid disturbing the water and collecting particulate matter. Once the container is full, close the container and rinse the exterior of the container off with DI water. Dry the container with a paper towel and place label. Then place the labeled sample container in a plastic bag.

5.5 Sample Collection, Identification and Documentation

A nominal 500-gram (1.1 lb) sample will be collected and placed into a double-lined plastic bag or sealable laboratory containers. When necessary, additional borings will be placed adjacent to the original location to obtain adequate sample volume for laboratory testing. When multiple borings and core samples are required to obtain adequate sample volume, a composite sample from similar materials and at approximately equal depths of the cores used, will be collected for analysis.

All samples will be labeled to include:

- Location ID
- Depth
- Date/time
- Sampler
- Sample number
- Radiation readings (Gross CPM)
- Analyses required

Sample bags or containers will be transported in totes, coolers, or similar to the radiological storage area pending completion of GEL laboratories Chain-of-Custody (COC) forms (Attachment 1), and shipment for analysis. COC forms will be completed as required and will reflect laboratory analysis for gamma spectroscopy using method 901.1 (HASL 300) and/or alpha spectroscopy for U and Th isotopic. All samples will be submitted via contract carrier.

Sample IDs will consist of an alpha-numeric code including the location, boring ID, sample matrix, sample type, sample depth, and an identifier for composite sample.

- Location: This will be site coordinate and map location
- Sample ID: A sample designation starting with SU1 or BRA (survey unit designation) followed by dash and a two-digit number separated by dash for sample ID, followed by depth designation (A =0-6, B=6-12, C=0-12, D=12-18, as appropriate)
- Sample Matrix: So (soil), Con (concrete) or other.
- If the sample is a composite sample, the sample ID will have the letter C at the end.

Example #1: SU1-2-1ASoC. A soil sample (So) collected at soil sampling location (2-1), from 0.0 to 6 inches bgs (A), composite (C).

Samples will be analyzed by a ELAP certified laboratory. Sample custody will be documented, and analysis requirements communicated using laboratory provided Chain of Custody Forms

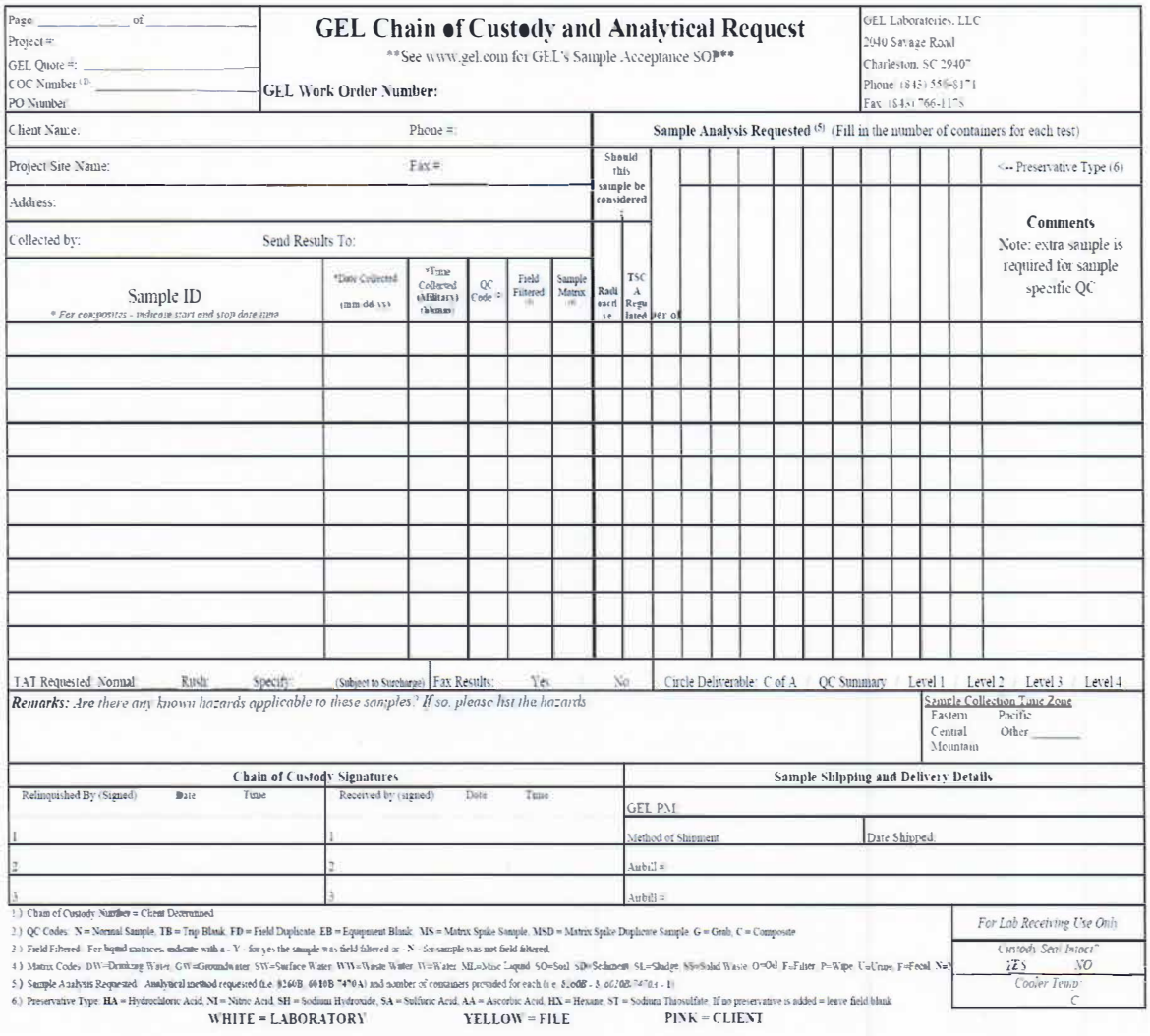
5.6 Step for Sampling Equipment Decontamination

Decontamination efforts will follow a four-step approach for hand tools and equipment used to collect samples. The four-step approach for sampling equipment decontamination is as follows:

- A detergent and water wash to remove all visible particulate matter and residual oils and grease.

- Tap water rinse.
- Distilled and deionized water rinse (for samples requiring chemical analyses)
- Scan equipment between each use using on-site surface radiation equipment.

Attachment 1. GEL Laboratories Chain of Custody Form



Page: _____ of _____
Project #:
GEL Quote #:
COC Number (1):
PO Number:

GEL Chain of Custody and Analytical Request
See www.gel.com for GEL's Sample Acceptance SOP
GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Phone #:
Project/Site Name: Fax #:
Address:
Collected by: Send Results To:

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hh:mm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive	Should this sample be considered: TSCA Regulated	Number of	<-- Preservative Type (6)	Comments
										Note: extra sample is required for sample specific QC

TAT Requested: Normal / Rush / Specify: (Subject to Surcharge) | Fax Results: Yes / No | Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone: Eastern / Central / Mountain / Pacific / Other _____

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by: (signed)	Date	Time
1			1		
2			2		
3			3		

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
AirBill #:
AirBill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B, 7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

For Lab Receiving Use Only
Custody Seal Intact? YES / NO
Cooler Temp: C

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

Surface and Shallow Subsurface Soil Sampling Check List

Conduct Tailgate Safety Review..... _____

(date) (date) (date) (date)

Review sampling parameters ..... _____ _____ _____ _____

(date) (date) (date) (date)

Determine required tools based upon sampling desire (hand augurs or spoons etc.) ..... _____ _____ _____ _____

(date) (date) (date) (date)

Verify all required tools, supplies, and equipment available ..... _____

(date) (date) (date) (date)

Prepare radiological instruments for use and perform operability checks..... _____ _____ _____ _____

(date) (date) (date) (date)

Collect Digital image(s) including location sign..... _____ _____ _____ _____

(date) (date) (date) (date)

Document relevant terrain, location, and other relevant physical features..... _____

(date) (date) (date) (date)

Collect and ID samples in accordance with procedure and sampling parameters ..... _____ _____ _____ _____

(date) (date) (date) (date)

Document relevant sample features such as clay, sandy, different colors etc. ..... _____ _____ _____ _____

(date) (date) (date) (date)

Verify all required samples have been collected and documentation is complete _____ _____ _____ _____

(date) (date) (date) (date)

Pack samples and equipment for transport back to vehicle(s)..... _____ _____ _____ _____

(date) (date) (date) (date)

Transport samples and equipment to Storage facility..... _____ _____ _____ _____

(date) (date) (date) (date)

Decontaminate the tools ..... _____ _____ _____ _____

(date) (date) (date) (date)

Fill out appropriate paperwork for sample chain of custody ..... _____ _____ _____ _____

(date) (date) (date) (date)

Attachment 5

GEL's Chain of Custody (CoC) Form

PO Number: _____
Project #: _____
GEL Quote #: _____
GEL Project Manager: _____

GEL Laboratories LLC

CHEMISTRY RADIOCHEMISTRY RADIOBIOASSAY SPECIALTY ANALYTICS

843.556.8171 | 2040 Savage Road | Charleston, SC 29407 | gel.com

Chain of Custody and Analytical Record

(1) COC Number :

Page: _____ of _____

GEL Work Order Number: _____

GEL Client Name: _____

Phone Number: _____

Project/Site Name: _____

Address: _____

Collected By: _____

Send Results To: _____

Turn Around Time Requested.
Rush subject to surcharge.

Standard: _____

Rush (Specify): _____

(5) Sample Analysis Requested
Enter Analysis Requested like 8270 PAH or 6010 Metals

Enter total number of container(s) per test below the request on line that corresponds with the sample ID.

< (6) Preservative Type

Sample ID Each ID listed will be reported as a unique sample unless otherwise instructed. * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	(2) Field Filtered	(3) QC Code	(4) Sample Matrix	Should this sample be considered: (7) Radioactive (Y or N)	Should this sample be considered: (8) Known or possible Hazards	Total number of containers	Comments Note: extra sample is required for sample specific QC

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1			1		
2			2		
3			3		

Select Deliverable: [ ] Results and QC Summary [ ]Calibration Summary [ ] Raw Data [ ] Standards Traceability

EDD Required? [ ] If yes, specify type.

Required Certification:

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

Additional Comments:

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No Cooler Temp: _____ °C

For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

(1) Chain of Custody Number
Client Determined

(2) Field Filtered
For liquid matrices, indicate with a Y for yes the sample was field filtered.

(3) QC Codes
Equipment Blank (EB) Matrix Spike (MS)
Field Reagent Blank Matrix Spike Duplicate (MSD)
Field Duplicate (DUP) Composite (C)
Trip Blank (TB) Grab (G)

(4) Matrix Codes

Biosolid (SB)	Leachate (L)	Soil (SO)	Urine (U)
Concrete (C)	Misc Liquid (ML)	Solid Waste (SS)	Vegetation (V)
Drinking Water (DW)	Oil (O)	Storm Water (WS)	Waste Water (WW)
Fecal (FC)	Sediment (SD)	Surface Water (SW	Water (W)
Filter (F)	Sludge (SL)	Tissue (T)	Wipe (P)
Groundwater (GW)			

(6) Preservative Type

Ammonium Acetate (AM)	Nitric Acid (NI)	Sodium Thiosulfate (ST)
Ascorbic Acid (AA)	Sodium Hydroxide (SH)	Sulfuric Acid (SA)
Hexane (HX)	Sodium Bisulfate (SBA)	Trizma (TZ)
Hydrochloric Acid (HA)	Sodium BisulfiteSBI)	Zinc Acetate (ZA)
Methanol (ME)		

Leave blank if no preservative is added.

(7) Radioactive *** *If yes, email rso@gel.com prior to shipment for approval. Isotopic data should be included in the email and with the sample shipment.* * **

(8) Known or Possible Hazards
Identify the "Source of the Sample" material
(e.g., NPDES discharge, waste material, stormwater, groundwater, Superfund Site etc.)

RCRA Metals
Arsenic (As) Chromium (Cr) Selenium (Se)
Barium (Ba) Lead (Pb) Silver (Ag)
Cadmium (Cd) Mercury (Hg) Misc. RCRA (MR)

Is this sample known or suspected to be RCRA Hazardous?
Yes / / No / /

Characteristic
Flammable/Ignitable (FL)
Corrosive (CO)
Reactive (RE)

TSCA Regulated
Polychlorinated biphenyls (PCB)

Listed Waste
Listed Waste (LW)
(F,K,P and U-listed wastes.)
Waste code(s):

Other
Other / Unknown (OT)
(i.e.: asbestos, beryllium, High/low pH, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns.

Appendix J – SMP/EWP Outline

The SMP will include, three separate plans including the information Listed Below:

Institutional and Engineering Control (IEC) plan

Monitoring Plan.

Operation and Maintenance Plan. The operation and maintenance (O&M) plan is

The Overall outline of the SMP is included below:

1. Introduction
2. Institutional and Engineering Controls Plan
    - Confirmation and Certification Activities
    - Period Review Reports (PRRs)
    - Note: Include the environmental easement or deed restriction as an appendix to the SMP.
3. IC/EC Certification
    - Reference Site Plan with Track 4 Area(s)
4. Monitoring Plan
    - Introduction and Scope
        - Reference Site Plan with Track 4 Areas and Consolidation Cell
    - Engineering Controls
        - Cover Systems
            - Track 4 Areas
            - Consolidation Cell
            - Erosion
            - Ponding/settlement/surveying
        - Surface Water
            - Sampling Points
            - Water Quality
            - Control Systems
                - Ditches
                - Retention Basin
                - Outfall
        - Groundwater
            - Monitoring Network
            - Elevation and Gradient
            - Quality
    - Reporting
        - PRR Data
            - Trend Analysis
            - Excursions
            - Goals
        - Impairment and Repairs
        - Shutdown
5. Operation and Maintenance Plan
    - Introduction and Scope
        - Groundwater Treatment System

        - Sub slab Depressurization
    - Operation Manuals
    - Reporting

Appendix A - HASP

Appendix B - Excavation Work Plan

1. Introduction
2. Activities Subject to EWP
    - Notifications
3. Excavation
    - Management of Subgrade Materials
        - Track 4 Areas
        - Consolidation Cell
4. Sampling and Analysis
5. Offsite Disposal
6. Groundwater Management
7. Subgrade Placement
    - Import Request (if Applicable)
8. Cover and Cap Repair
9. Documentation and Reporting

Appendix C – CAMP

Appendix D – Sampling and Analysis Plan

Surface Water

Groundwater

Sample Protocols

QA/QC

Reporting

Appendix E – OM&M – Groundwater Treatment System

Appendix F – OM&M – Sub slab Depressurization System

Appendix K – FER Outline

1. Certification
2. Introduction
3. Description of the Remedial Actions
    - Interim Remedial Measures
    - Final Remedial Actions
        - Remedial Action Objects (Annotated)
    - Operation Maintenance and Monitoring
4. Final Remedial Action – As-built
    - As-built Sheets
    - Modifications During Implementation
    - Final Quantities
    - Disposal Documentation
    - Green and Sustainable Remediation Metrics
5. Institutional and Engineering Controls
6. Tables
7. Figures
8. Bibliography
9. Appendices
    - "As-built" drawings bearing a NYS professional engineer's stamp
    - Waste Management Documents
    - Laboratory Reports

https://inventumengineering.sharepoint.com/Shared Documents/Inventum/Project Files/Tonawanda/Work Plans and Site Management Plans/Remedial Action Work Plan/June 2026 Draft RAWP/Comments/R37211_RAWP _ RITC #C915353_2026_June 27_DRAFT RLSO.docx