INVENTUM ENGINEERING, PC

FINAL
Remedial Investigation Report

Riverview Innovation & Technology Campus

Brownfield Cleanup Program Site No. C915353

3875 River Road

Tonawanda, New York 14150

September 3, 2024

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Table of Contents

List of Tables

Nested Tables (Tables nested in Text, Not in Tables Section of Report)

List of Figures

Appendices

List of Acronyms and Abbreviations

AA	Alternatives Analysis
ACM	Asbestos Containing Material
AJD	Approved Jurisdictional Determination
AMSL	Above Mean Sea Level
AOI	Area of Investigation
AST	Aboveground Storage Tank
BCP	Brownfield Cleanup Program
bgs	Below Ground Surface
BMP	Best Management Practices
BTEX	Benzene, Toluene and Xylenes
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CBS	Chemical Bulk Storage
CCR	Construction Completion Report
cm/s	Centimeters per second
COPC	Contaminants of Potential Concern
COG	Coke Oven Gas
CPP	Community Participation Plan
CSM	Conceptual Site Model
DOT	Department of Transportation
DOW	Division of Water
DUSR	Data Usability Summary Report
EDD	Electronic Data Deliverables
EDI	Earth Dimensions, Inc.
EIMS	Environmental Information Management System
EQ	Equalization
ERT	Emergency Response Team
EWP	Excavation Work Plan
FER	Final Engineering Report
FS	Feasibility Study
ft bgs	Feet below ground surface
ft-amsl	Feet above mean sea level
FWRIA	Fish and Wildlife Resources Impact Analysis
HASP	Health and Safety Plan
HDPE	High-density polyethylene
HRS	Hazard Ranking System
HSA	Hollow-Stem Auger
ICC	International Chimney Corporation
IDW	Investigation Derived Waste
IHWS	Inactive Hazardous Waste Site
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/minute
MNA	Monitored Natural Attenuation
MS/MSD	Matrix spike/matrix spike duplicate
MW	Monitoring Well
NAPL	Non-aqueous Phase liquid
ng/L	Nanograms per liter
NWI	National Wetland Inventory
NORM	Naturally Occurring Radioactive Material
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
ORP	Oxidation Reduction Potential
OSC	Ontario Specialty Contracting
OU	Operable Unit
PAH	Polycyclic aromatic hydrocarbon
PFOS	Perfluorooctanesulfonic acid
PFOA	Perfluorooctanoic acid
PBS	Petroleum Bulk Storage
PCB	Polychlorinated biphenyls
PEM	Palustrine Emergent
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization detector
POTW	Publicly Owned Treatment Works
PPE	Personal protective equipment
PRAP	Proposed Remedial Action Plan
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QC	Quality Control
QHHEA	Qualitative human health exposure assessment
RA	Remedial Action
RAO	Remedial Action Objectives
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 Pollution Discharge Elimination System
SRIWP	Supplemental Remedial Investigation Work Plan

SS	Surface Sample
SVOC	Semi-volatile organic compound
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
TP	Test Pit
TPH	Petroleum Hydrocarbon
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 Screen Levels
VOC	Volatile organic compound
W	Water Sample (Not Groundwater)
WOUS	Waters and Wetlands of the United States

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 Investigation Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10), Green Remediation (DER-31) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Respectfully Submitted,

Inventum Engineering, P.C.

John P. Black, P.E.

Date: September 3, 2024

License No: 062818-1

Seal:

STATE OF NEW YORK
JOHN P. BLACK
No. 062818-1
LICENSED PROFESSIONAL ENGINEER

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1 Introduction

On behalf of Riverview Innovation & Technology Campus, Inc (RITC), Inventum Engineering, P.C. (Inventum) has prepared this Remedial Investigation Report (RIR) 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. All work conducted for this RIR was completed on behalf of RITC.

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 BCP Site was permanently suspended in October 2018. On September 23, 2019, the sale of the TCC properties 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 the New York State Department of Environmental Conservation (NYSDEC).

The Remedial Investigation (RI) was conducted in accordance with the BCP Agreement (Index No. C915353-02-20) between the NYSDEC and RITC dated February 14, 2020, DER-10 Technical Guidance for Site Investigation and Remediation (May 2010), the approved Remedial Investigation Work Plan (RIWP, Inventum 2020o), and the Supplemental Remedial Investigation Work Plan (SRIWP, Inventum, 2021g). The RIWP was approved by the NYSDEC after detailed assessment of historical facility operations, consultation with the NYSDEC and the New York State Department of Health (NYSDOH), and with input from the public.

The tax property[1] at 3875 River Road has been segregated into three separate sites for the purpose of addressing legacy environmental conditions as shown on Figure 1-2.

- BCP Site No. C915353 encompasses approximately 86.5± acres and is the subject of this remedial investigation;
- Site 109 (Site No. 915055) is approximately 7.6± acres of the 3875 River Road property and Honeywell International, Inc. (Honeywell) is managing the investigation and remediation on that portion of the former TCC property in accordance with an Administrative Order on Consent (Index No. B9-85-2-77D) with the NYSDEC dated February 14, 2020; and
- Site 110 (Site No. 915055) is approximately 4.8± acres of the 3875 River Road property and Honeywell is managing the investigation and remediation on Site 110 in accordance with an Administrative Order on Consent (Index No. B9-85-2-77D) with the NYSDEC dated February 14, 2020. For clarity, a portion of Site 110 lies on property owned by National Grid, east of the 3875 River Road property owned by RITC.

[1] For purposes of this and other documents the term "Site" refers to the approximate 120-acre Riverview Innovation & Technology Campus, Inc. (RITC) properties at 3875 (S-B-L 64.08-1-10) and 3800 River Road in the Town of Tonawanda. The "BCP Site" is the approximate 86.5-acre portion of the 3875 River Road property addressed by the BCP Agreement and this Remedial Investigation Report.

1.1 RI Program Objectives

The objectives of the RI were to complete a comprehensive investigation of soil and groundwater at the BCP Site; to collect data to support an Alternatives Analysis (AA) for the BCP Site, including recommending the applicable Standards, Criteria, and Guidance (SCGs), and to continue to identify and propose potential Interim Remedial Measures (IRMs) that will address clearly identifiable environmental impacts that resulted from historical operations at the BCP Site that can be resolved in advance of the Remedial Action.

The objectives of the remedial investigation program established for, and achieved are:

- Gather, compile, and evaluate historical investigation data;
- Organize the data collected since the TCC Closure (USEPA and RITC) and compile with historical data;
- Complete the site investigation, including sampling surface soil, shallow fill, subsurface soil, sediments, groundwater, and former TCC process infrastructure (former storage/process tanks, drums, buildings, former process piping, and equipment);
- Conduct a qualitative exposure assessment using the collective data and include assessing conditions at and beyond the perimeter in relation to the site; and
- Identify and propose any IRM activities that may be appropriate to complete in advance of the AA.

In combination with this RIR, Inventum has completed the following:

- Completed an Alternatives Analysis (AA) and identified remedial alternatives for NYSDEC review, and;
- Provided a draft schedule for implementation of the approved remedial actions.

1.2 RI Work Plan Organization

This work plan has been organized in the following sections:

Section 1 - Introduction
Section 2 - BCP Site Description
Section 3 - Interim Remedial Measures
Section 4 - Remedial Investigation Findings
Section 5 - Qualitative Human Health Exposure Assessment
Section 6 - Conclusions of Remedial Investigations
Section 7 –Basis for Alternatives Analysis Report
Section 8 - Schedule
Section 9 - Bibliography
Tables
Figures
Appendices

Due to the Volume of Information, the document is presented in six Volumes:

1. Text and Tables
2. Figures
3. Appendices A through D
4. Appendices E through I
5. Appendix J – Laboratory reports (Raw Data)
6. Appendix K - Data Usability Summary Reports (DUSRs)

1.3 Contacts

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

Key contact information for NYSDEC, 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 report.

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

- 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://www.dec.ny.gov/pubs/109457.html

2 BCP Site Description

The BCP Site (Figure 1-2) represents former operating areas of the TCC. The TCC had a long history of environmental and safety violations and was closed in October 2018. The closure of the facility eliminated the primary source of those environmental violations. The shutdown did not address residuals in buildings, containers, process equipment, or fill at the BCP Site. The residuals left on the BCP Site by TCC have been, and are currently, the subject of numerous Interim Remedial Measures (IRMs) and are the focus of this RI.

2.1 BCP Site Location and Description

The BCP Site 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 approximately 102-acre RITC properties east of River Road and consists broadly of the former production area (ex. battery, powerhouse, oil recovery, and by-products area) and coke and coal yards (described in Section 2.3.1). The former production area (AOI 2, defined in subsection 2.3 1) occupies approximately the northern one-quarter of the BCP Site. The coke and coal yards occupy approximately the southern one-half of the BCP Site. The balance of the BCP Site were former railroad spurs, stormwater and wastewater management areas, and areas used for parking. The rail lines that once serviced the facility and the former Wickwire Spencer Steel Mill, have been removed, with the majority formerly located adjacent to the northern and southern boundaries of the BCP Site. Much of the rail within the limits of the BCP Site, including the northern spurs, and the coal and coke yards was removed by TCC, was sold in the post-bankruptcy auction, and were removed prior to RITC ownership.

The BCP Site, other than the standard of care exercised by TCC, is typical of the more than 30 coke plant sites investigated and remediated by the technical team. The one major difference from the other coke making sites successfully closed, is that the underlying clay at this site has limited the migration of impact, making the BCP Site much easier to characterize and ultimately remediate.

The BCP Site (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 closed reclamation facility/salvage yard (purchased by the Town of Tonawanda), and 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 and 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;
- west by Site 109 (Site No. 915055), the former Allied Chemical Special Chemical Division facility (former Tonawanda Plastics Site, the 3821 River Road, BCP Site No. 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), Suit-kote (an oil terminal and manufacturer), and beyond these industrial properties, the Niagara River.

2.2 BCP Site Background

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 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[2] 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. 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 and has arranged for the proper transportation and disposal of residual materials remaining from the TCC manufacturing period.

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 gas was used to fire the subsequent coking operations, to fuel the boiler house, or sold as fuel[3]. When operating efficiently, coke batteries typically produce twice the volume of coke oven gas (COG) that is required to operate the facility and fire the battery. The surplus COG that had been sold was distributed from a Compressor Building through four gas lines on the site: two leading to the east (Buffalo and Tonawanda/Kenmore), one leading to the south to the Huntley Power Station, and one leading to the southwest to the former Wickwire Spencer Steel Mill. Additional unutilized lines may be present as sections of these four operational lines were replaced for maintenance. The Compressor Building was demolished in 2021 and all the lines that had been cut at some time in the past were identified and plugged by Ontario Specialty Contracting (OSC) on behalf of RITC.

The liquids and tars produced on the 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.

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

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[2] The USEPA managed surface water on the former TCC properties until the NYSDEC approved RITC's current Storm Water Pollution Prevention Plan (SWPPP) in May 2020.

[3] There had been no known offsite sales of refined gasses for decades prior to the BCP Agreement.

maintaining infrastructure over the 18 months following the filing of the bankruptcy petition. Since the acquisition, RITC has implemented a series of IRMs[4] 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 Section 3 of this RIR. 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 the 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 approval of the Stormwater Pollution Prevention Plan (SWPPP, Inventum 2020b).

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[4] IRMs are specific actions reviewed and approved in accordance with the BCA. Activities that do not fall within the scope of the BCA also have work plans but those are not termed IRMs nor do the work plans typically obtain a formal approval.

During the TCC bankruptcy proceedings, Powers Coal and Coke, LLC (Powers) of Cleveland, Ohio was awarded the rights to recover coke and coal that was left on the BCP Site, to the benefit of the creditors[5]. Powers conducted recovery operations in the coal and coke yards from November 2018 to October 2020. Powers did not operate during the winter season 2019/2020 and was not in operation when the BCP Agreement (BCA) between RITC and NYSDEC was finalized. After RITC's entrance into the BCP, Powers was required by RITC to sign an access agreement that included, among other requirements, the NYSDEC stipulation to comply with the NYSDEC approved coal and coke excavation work plan (Inventum, 2020i) for any additional coal/coke removal on the BCP Site. Powers complied with the excavation work plan and completed their removal activities in October 2020. Following Powers demobilization, a Coal Yard Regrading Work Plan (Inventum, 2020m) was successfully implemented to eliminate a large surface water impoundment that resulted from the 2019 coal recovery activities in the South Coal Yard.

Additionally, as a condition of the TCC bankruptcy and prior to RITC's ownership, an auction of abandoned materials, equipment, and other scrap left on the RITC Campus Properties by TCC was held. The auction and subsequent unsupervised removal of the equipment and materials[6] further degraded the physical condition of the BCP Site. Prior to their remobilization after the transfer of control to RITC, the auction company was provided with additional requirements for removal of additional materials and equipment. The auction company declined to comply with RITC's requirements and no further removals of materials or equipment under the terms of the auction bankruptcy condition of sale occurred after RITC ownership. The ongoing Surface Materials Management IRM Scopes of Work (Inventum, 2020c, f, g, and j), comprising 88 individual activities, have eliminated a significant portion of the disturbance caused by the auction recovery activities and has improved and organized the BCP Site to allow access to areas that had been previously disturbed and covered with debris.

A summary of the completed and ongoing IRMs is presented in Section 3 of this report.

2.3 BCP Site Development

The RITC development project is designed to unlock the employment and tax generation capacity of the RITC Site (BCP and State Superfund) and allow the overall RITC Campus development (3875[7] and 3800 River Road, Figure 1-2) to support multiple commercial and industrial tenants. The redevelopment strategy has been developed to integrate the RITC BCP Site into the overall development of the region. The plans for this BCP Site will be coordinated with the ongoing development of the Town of Tonawanda. The key targets for this portion of the development area are commercial activities including, but not limited to, data management, data users, associated academic institutions, and industrial users. The BCP Site(s) will support commercial data management, offices, and other commercial use operations in concert with the potential long-term requirements of the final remedy.

2.3.1 Current Uses

The BCP Site is undergoing active maintenance, IRMs, and demolition activities. All current activities on the RITC Campus Properties are focused on site security, monitoring, maintenance, stormwater management, investigations, IRMs, and demolition.

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[5] RITC was not a party to the coal and coke sales agreement nor is, or was, RITC a creditor to TCC.

[6] RITC was not a party to the equipment auction and the removal of materials and equipment occurred before RITC owned the BCP Site.

[7] Only an 86.5 acre portion of 3875 River Road is addressed under the BCP Agreement and this report and is referred to as the BCP Site in this report.

2.3.2 Future Uses

The Riverview Innovation & Technology Campus (RITC Campus including Sites 108, 109, and 110) occupies nearly 120 acres in the Town of Tonawanda. The development teams' vision is to coordinate closely with the Town of Tonawanda and local business leaders to create a sustainable integrated technology center with commercial facilities. The development will integrate with the larger regional push to redevelop stranded assets in the immediate surrounding areas along the River Road corridor.

A phased redevelopment of the BCP Site is proposed and would complement an operable unit approach to the remedial program. The phasing will allow generation of jobs, tax revenues, tenant interest, and income while additional sections of the site are being remediated.

An environmental easement will be tied to those portions of the BCP Site that do not meet Track 1 criteria and, at minimum, will prohibit groundwater use and may include other institutional controls to protect commercial users of the BCP Site from the defined environmental impacts related to historical facility operations. A Site Management Plan (SMP) will define the procedures to be followed while redeveloping and maintaining the BCP Site.

2.4 Areas of Investigation

For purposes of managing the different conditions at the BCP Site and for the identification of specific areas of investigation during the RI, the BCP Site has been delineated with a grid (Figure 2-1) and subdivided into seven Areas of Investigation (AOIs, Figure 2-2):

- AOI1 – North Rail Corridor – Approximately 6.7 acres - The North Rail Corridor covers an approximately 100-foot-wide (Rows 1 and 2 of the grid) 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. The Surface Materials Management IRM (see Section 3.0) was implemented and has addressed miscellaneous debris/trash and abandoned equipment left by TCC and the auction salvage companies. As a result of completion of the IRM work in the North Rail corridor, the area is now accessible and the potential for erosion of BCP Site related residuals is controlled.

  The mansion sump is the main collection sump for stormwater from the former production area. With the exception of the basement slab for the former office building (a/k/a the "Mansion" or "Building No. 1"), the mansion sump, the scale and former scale house slab, this AOI is unpaved and was heavily disturbed during the post auction (pre-acquisition) track and rail car removals. RITC has recovered the ties, most of the spikes and plates, the majority of the abandoned equipment and debris, and has regraded the surface to direct surface water to the SWPPP permitted storm sewer discharge systems.

  In accordance with the approved Surface Management IRM Work Plan (Inventum 2020c and g), the trash and abandoned equipment was organized and managed. As materials were inspected and approved by NYSDEC the materials have been properly disposed of or recycled offsite.

- 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. Large areas of this AOI are paved, formerly covered with buildings, remnant building and tank slabs, or covered by concrete lined secondary containment structures. Stormwater from this AOI is collected in two underground storm sewer systems (the box culvert and the North Storm Sewer System) and conveyed to the mansion sump and subsequently to two concrete lined settling and oil water separation ponds before discharge through the SWPPP Outfall #001. This stormwater system has been the subject of multiple phases of IRMs to remove the residuals left by TCC and to improve water quality.

  Prior to 1998[8], storm and process water was discharged to the Niagara River through pipelines that crossed the north BCP Site boundary westerly near the Mansion and then traversed the former Wickwire Spencer properties. The discharge location and associated ponds are not on the BCP Site, and therefore are not addressed in this RI. The pipelines had been plugged previously by TCC, and the integrity of the seals were confirmed by Inventum during an abandoned pipeline IRM (Section 3.0). The pipes were broken, separated by no less than 2 feet, and additional hydraulic seals were added by OSC during the IRM. Specific inspections were conducted to determine if there was or could have been flow along the outside of the pipes. No indication that there had been any flow along the pipes on the BCP Site or leaving the BCP Site toward the west was present.

  Asbestos containing materials (ACM) were present throughout AOI2. Extensive removal of ACM was one of the major activities conducted during the first 18 months of RITC ownership. As required by the NYSDOL, a comprehensive ACM and universal waste survey was completed on the BCP Site and a comprehensive ACM abatement program was conducted. The abatement program has been completed except for limited floor tiles in office spaces.

  AOI2 contains the only process tank still remaining on the BCP Site, PT03. Ongoing maintenance, monitoring, sampling, testing, and materials recovery and disposal are the subject of multiple ongoing IRMs in this AOI, including the Groundwater IRM, the Tank Management IRM and the Secondary Containment IRM.

- 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 groundwater (relative to AOIs 1, 2, 4 and 5) BCP site boundary. The land on which the parking lot AOI is located was acquired from Wickwire Spencer in the 1960s.

  The parking lot is an elongated area from north to south located on the western side of the BCP Site. The area varies in width but averages 150-feet wide and is largely within columns A to C of the grid. AOI 3 is bound to the west by Vanocur and Swift River (the offsite industrial properties to the west), the closed recycling center/salvage yard to the north, Site 109 to the south, and production, coal and coke yards AOIs to the east.

  The parking lot contains a wood frame building that was historically and is currently used for office space. There were four structures on the southeast portion of the parking lot that were used for;

[8] The final discharge pond was filled in 1998. The actual date the discharged stopped is unknown but is believed to have been in the mid- to late-1990s.

conveyor equipment (one demolished in 2022), employee locker/shower (demolished in 2021), and main electrical access. Additionally, there is a small fiberglass white shed abutting a grated sump (Grid Cell D25) that is the monitoring point for RITC's Industrial Sewer Discharge permit (Town of Tonawanda Permit No. 331).

No production operations are known to have occurred within this AOI. The area was largely paved over with asphalt and concrete that is currently visibly cracked and rutted. Several underground utilities cross this AOI:

- The North-South Storm Sewer conveys surface water from the mansion sump to the concrete-lined settling ponds on Site 109;
- Former process, fire, and emergency water supply pipes crossed the north, or just north, portion of the AOI;
- Two sealed former discharge pipes crossed the northern portion of the AOI; and
- A gas line that serviced the former Wickwire Spencer Steel Mill crossed the AOI. This gas line was plugged by RITC in 2021.

- AOI4 – Coke Yard – Approximately 23.2 acres - The coke yard is in the middle of the facility and includes(ed) the coke yard, coal crusher building (ACM abated and building demolished in 2021), coke screening building (demolished in 2021), the breeze crusher building (demolished in 2021), the coke laboratory trailer (demolished in 2021), the coke office trailer (demolished in 2021), the thaw shed, and the former coke rail yard and coke conveyor structure (demolished in 2021 and 2022). 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).

  Sedimentation pool #003 is located within this AOI to collect and manage surface water. Powers conducted material recovery activities under approval of the Bankruptcy Court in portions of the coke yard. The current elevation of the coke yard is well below the grade that was present during the TCC operating period presumably due to the removal of coke by Powers. The discharge elevation of sedimentation pool #003 is below the grade of the surrounding access roads, maintaining the water surface below drainage, and therefore below the elevation that would allow overtopping.

  Several pieces of abandoned coke handling and screening equipment were removed from the coke yard. An IRM was completed in 2021 to reconstruct the flow channel from the eastern portion of AOI4 to sedimentation pool #003 and allow access for removal of ACM panels from the coal crusher building.

- 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 (removed in 2020) 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 from sedimentation pool #002 is directed through culverts and below grade conduits to the stormwater retention basin on AOI6 (Water Treatment).

Powers conducted material recovery activities under approval of the U.S. Bankruptcy Court in the coal yard. The removals were conducted during the period that the BCP Site was managed by USEPA and RITC. Work conducted after the BCA was conducted in accordance with a NYSDEC approved Excavation Work Plan.

A coal conveyor tunnel extended from the coal yard (Grid Cell AJ15) to a transfer station that fed a conveyer leading to the former coal crusher building (Grid Cell Y13, Building No. 63). The tunnel was flooded but was dewatered in the Fall 2021 and in 2022 to allow removal of the identified ACM and backfill placement. The tunnel roof was removed, and the former tunnel cavity has been filled.

The coal yard also contains the former mixing pad (Grid Cells AE24 to AF24). The former mixing pad is a containment pad with a concrete floor and poured concrete walls. Historically, coal tar was transferred from the tar decanter hopper (in AOI2 - Former Production Area) and spill materials were brought to the mixing pad. The coal tar and spill materials were blended with coal (possibly coke and coke breeze) on the mixing pad, and the mixture was then charged to the coke battery to recover additional by-products. The mixing pad was the subject of an IRM and has been decontaminated and closed with respect to its former use as a hazardous waste management area. The former mixing pad is now used for non-hazardous solid waste management.

AOI5 is unpaved except the floor and sidewalls of the mixing pad.

- 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 (demolished in 2021) that were associated with the four former large tanks and one former small tank (ST20) located in this area. In the northern portion of the water treatment area is the engineered stormwater sedimentation pool #001, and on the western side of the AOI is the storm water retention basin. Flow from sedimentation pool #001 is conveyed through an underwater pipe system to the stormwater retention basin. Flow from the north ditch (via sedimentation pool #002) enters the northwest corner of the stormwater retention basin. The discharge from the stormwater retention basin is through a below grade conduit which discharges to a small ditch just upstream of SWPPP Outfall #002. Outfall #002 is located on the western portion of the water treatment area at the BCP/Site 109 boundary (Grid Cell C32). The water treatment area contains a portion of a small approximately 0.75-acre non-jurisdictional wetlands identified as part of the wetland and waterways assessment (Section 5.0).

  The four former large Aboveground Storage Tanks (ASTs) within a secondary containment area were originally fuel and pentane storage tanks. The two large tanks (ST21 and ST22) in the western portion of the containment area were converted for use as components of TCC's process water treatment ("wastewater") system. These tanks were used for equalization and neutralization (pH adjustment) prior to discharge to the Town of Tonawanda POTW. These treatment/equalization (EQ) tanks accepted process water via an above-grade piping system from the Ammonia/Lime Still located in the former production area (AOI 2). Acid for neutralization was originally fed from the smallest tank (ST20) in the AOI, but was removed from the process at some point in favor of metering acid from drums. This small tank (ST20) was inspected, found to be empty and removed in 2021. ST21 and ST22 contained a multi-phase residual from the TCC operations. A layer of water was present over a non-aqueous liquid (NAPL) and wastewater treatment sludge. The water from ST21 and ST22 was pumped, treated, and discharged under permit to the Town of

Tonawanda. ST21 and ST22 were emptied, decontaminated and the stabilized contents were disposed offsite.

ST24 was a former pentane tank that contained a relatively thin layer of solid metal scale residuals. ST23 was emptied, decontaminated and closed in accordance with a NYSDEC approved AST IRM Work Plan. ST24 was demolished and recycled.

- 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 are former rail lines, one abandoned rail car (RC04 was decontaminated and removed in 2023, three rail tank cars [RC01, RC02, and RC03] were decontaminated and removed in 2021), 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 south drainage area is largely unpaved except for the south drainage ditch access road which serves as access and a stormwater retention facility. The pavement on the south ditch road was largely degraded and the surface has been reconstructed with recycled concrete. The south drainage area contains a portion of a small approximately 0.75-acre non-jurisdictional wetland identified as part of the wetland and waterways assessment (Section 5.0).

2.5 Topography

A topographic survey of the BCP Site was conducted in April 2022 by Niagara Boundary and Mapping Services, a New York State licensed surveyor (Figure 2-3). The elevation of the BCP Site at that time was generally flat with a slight downslope from east to west and north to south. Surface elevations ranged from approximately 608 feet above mean sea level (ft. AMSL) on the eastern boundary (AOI1) to 600 ft AMSL on the western boundary (AOI6). The average elevation of the former production area (AOI2) is approximately 606 ft AMSL. The entire surface of the BCP Site had been completely altered from its natural grade. No original surface soils/elevations are believed to exist on the BCP Site.

There were various debris piles and coal/coke piles that were[9] elevated above the natural grade at the time of the transfer of responsibility for the BCP Site. The grade of the coal yard created by the recovery of coal in 2019 resulted in an elevated impoundment with a capacity of more than 2,000,000 gallons. The impoundment was created by a combination of the below grade recovery excavations and stockpiles of rejected coal that were up to 25 feet high. The stockpiles were neither compacted nor engineered for water retention but created an impoundment that had accumulated surface water above the surrounding grade. RITC conducted water treatment and earthmoving activities to remove water from the impoundment, installed drainage piping and regraded the south coal yard to prevent additional accumulation of excessive quantities of stormwater.

2.6 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 this RI, regional studies, 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) and as shown in the schematic below.

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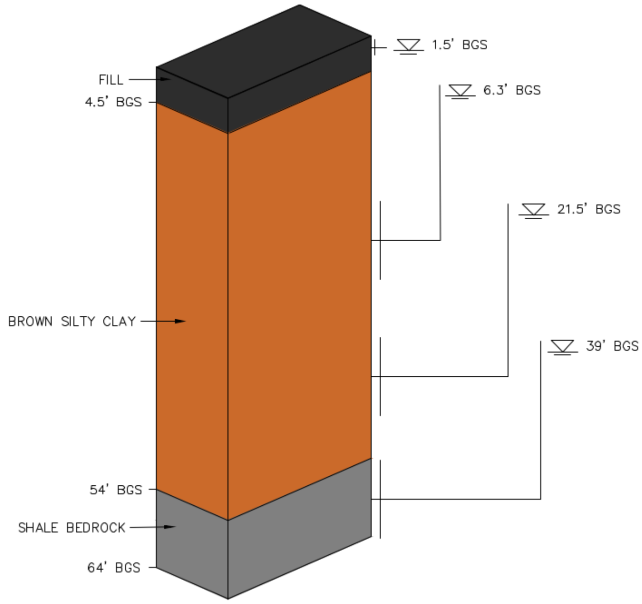
[9] The aerial photography for the survey was conducted in April 2022, after Powers Coal and Coke completed the removal of saleable coal and coke.



The schematic is to scale showing the relative thickness of clay between the fill and the underlying bedrock. The depths to water shown on the right side of the schematic are typical although at several locations across the BCP Site there is discontinuous saturation in the fill layer.

Fill material overlies the native till and clay deposits across the BCP Site and is composed primarily of coal, coke, and breeze and to a lesser extent silt, sand, 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/slag (nodules) appears to have been used as a base for the former rail beds and produce the most water encountered within the fill. Fill thickness (2- to 110-inches) across the BCP Site were mapped and based on ground surface elevations and depths to top of clay observed within the test pits (Figure 2-4) the top of clay was contoured. As anticipated, the fill was thicker within the former operational areas of the BCP Site (AOI2, AOI4, and AOI5) compared to the BCP Site perimeter.

Glacial till consisting of a poorly-sorted, non-stratified mixtures of sand, silt, clay, gravel and rock fragments and a glacial lacustrine 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. Evidence suggests the combined thickness of these till and clay deposits reach more than 95-feet just 1.5-miles to the east of the BCP Site at the Town of Tonawanda Landfill (NYSDEC, 2007) and were measured to be 45.6- to 50-feet thick during the RI (Borings for MW-BCP-01, MW-BCP-03, MW-BCP-05 and MW-BCP-21). Other boring logs reviewed by Inventum for monitoring wells installed on surrounding properties identify till and clay to depths of at least 35 to 45-feet below ground surface (bgs). The clay below the BCP Site was found in all medium and deep boring locations. Permeabilities for clay samples from the BCP Site were 3.3×10^{-8} centimeters per second (cm/s) and 2.1×10^{-8} cm/s.

Inventum made a distinction between the clay and till deposits across the BCP Site based on stiffness, field estimation of moisture content, and plasticity. The upper clay generally 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). This permeability is consistent with the results of 3.3 x 10^{-6} cm/s 2.9 x 10^{-8} cm/s reported in the *Supplementary Site Investigation (SSI) Report* dated July 1990 prepared by Conestoga-Rovers & Associates (CRA, 1990).

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 x 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 samples of 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 predominantly of sandstones, shales, dolostones, and limestones. The stratigraphic sequence of the Erie-Niagara Basin generally consists of glacially derived lacustrine, fluvial, and till deposits overlying the uppermost shale bedrock (Camillus Shale) (NYSDEC, 2007). The Camillus Shale formation is described as a gray or brownish gray thin bedded shale to massive mudstone containing layers of limestone and dolostone. The Camillus Shale also contains numerous gypsum masses and lenses, the dissolution of which can largely affect groundwater flow in the bedrock. 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.

2.7 Surface Water Hydrology

The TCC facility discharged cooling and storm water to the Niagara River under the State Pollution Discharge Elimination System (SPDES) Permit Number NY0002399 (NYSDEC, 2017). The permit was surrendered at the time of the bankruptcy. The USEPA, under emergency authorization continued to discharge surface water through three outfalls[10]:

- Outfall #001 (West of Grid at Row 33 on Site 109) – Former discharge point for non-contact cooling water, boiler blowdown, and stormwater runoff from the former production area after treatment in two concrete-lined settling/skimming ponds/lagoons. More than 300 tons of residual sediments left by TCC were removed from these ponds and properly disposed offsite. Only stormwater runoff has been discharging through this outfall since the BCA. Multiple IRMs have been implemented to address the conditions in and around the stormwater collection facilities at the BCP Site to remove TCC residuals from the system and improve the quality of the surface water.
- Outfall #002 (B32) – Discharge of runoff from the coal and coke yards and the southern drainage area. Two major IRMs were conducted to regrade the surface of the coal yard and reconstruct the south ditch road/retention berm to eliminate the potential for uncontrolled discharge from the coal yard through Outfall #002. Ongoing routine site maintenance activities to clean the catch basins, piping, south ditch, and sedimentation pools are being conducted to improve water quality before it reaches Outfall #002.
- Outfall #004 – (Southwest of Grid on Site 109) – Represents the combined flow from Outfalls #001, #002, Site 109, and a section of the offsite Tonawanda Plastics Site (3821 River Road).

[10] 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).

> 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 Tonawanda Plastics Site and the Energy Transfer Terminal, as well as portions of River Road. The combined flow is conveyed through a culvert under River Road, into a drainage ditch on Site 108, and finally to the Niagara River.

Outfall #002 is located on the BCP Site and Outfalls #001 and #004 are located on the adjacent State Superfund Site 109 (Figure 1-2). As a condition of their SPDES permit, TCC developed a Best Management Practices Plan (BMP) in September 2016, which described institutional and engineering controls to minimize the potential for release of pollutants to waters of New York State (TCC, 2016). Among others, these included maintenance and operation of the two concrete-lined settling/separation ponds at Outfall #001 and a series of earthen settling/sedimentation basins in the coal and coke yards hydraulically upgradient of Outfall #002. The system had not been maintained at the time of the 2019 real estate transfer to RITC and water quality data collected during the TCC operations is not available.

In June 2020, RITC was granted approval to assume management of the surface water discharges in accordance with an approved SWPPP (Inventum, 2020b). The SWPPP was the final approval required to transfer control of the BCP Site from the USEPA to RITC.

Prior to the construction of the North South Storm Sewer and the concrete-lined sedimentation ponds (circa mid-1990s), stormwater was discharged through a discharge line which exited the main TCC facility west-southwest of the mansion sump, crossed Wickwire Spencer property, was conveyed through piping carried by a bridge over River Road and over the former Erie Canal, and to two settling/retention ponds on the Wickwire Spencer facility prior to discharge to the Niagara River. These pipes appear to have been in use from the start of operations in the late 1910s at least until the 1970s when the ponds were installed and likely until mid-1990 with the ponds in place. The pipelines to these ponds were sealed by TCC and the integrity of the seals on the BCP Site have been confirmed and upgraded. No evidence of any flow along the pipes was present on the BCP Site (Inventum 2020l and 2021i).

2.7.1 Existing

Following approval of the BCA, RITC immediately applied for approval of a SWPPP. RITC's SWPPP (Inventum 2020b) was approved on June 5, 2020. RITC assumed responsibility for stormwater management after the approval of the SWPPP. The approved June 2020 SWPPP has been the basis for monthly, quarterly, and semi-annual monitoring conducted and reported to the NYSDEC. The surface water system is effectively divided between the Former Production Areas and the coal and coke yards. RITC has been defining and implementing a series of stormwater management IRMs in a priority driven sequence to address the conditions left by TCC.

2.7.1.1 Former Production Area

The surface water from the North Rail Corridor and Former Production Area flows to one of two systems; the box culvert or the North Storm Sewer System. The box culvert originates at the former compressor building (demolished in 2021), flows south between the purifier boxes, and turns west and 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 site road (east of AOI3) and discharges into the mansion sump. Under normal flow conditions, the flow in the box culvert is pumped to the groundwater treatment system and discharged to the POTW. The north storm sewer originates at the west side of the former firewater standpipe (demolished in 2021) location and flows west to the former Oil House location (Manhole "MHC"). At that location the North Storm Sewer pipe alignment bends 45 degrees to the northwest to convey water to the northeast corner of the former Mansion location, after which it conveys flows west into the mansion sump.

As a part of the stormwater IRMs, accumulated sediment has been removed/excavated or jetted from the box culvert, North Storm Sewer, and the mansion sump. All removed sediment was collected, stabilized and disposed offsite in accordance with a NYSDEC approved IRM Work Plan. Portions of the box culvert walls near the light oil area were compromised after decades of use. A fusion bonded HDPE pipe was installed through a 500-foot-long section of the box culvert in 2021 to bypass stormwater flow. The section of the box culvert with the fusion bonded by-pass pipe was filled with flowable fill to reduce the migration potential of surrounding groundwater.

From the mansion sump, surface and stormwater flow through the North-South Storm Sewer on AOI 3 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. A submersible pump is used to withdraw water from the south basin and broadcast it into the north basin to increase the dissolved oxygen (D.O.) concentration in the system. The water is currently routed to the north pond, then the south pond, and to a pump and filter system that discharges to a chase that contains the Outfall #001 monitoring location. The control valves for the concrete-lined settling ponds were designed and installed to allow flow to be routed to the north pond, south pond, or directly to the chase.

The concrete-lined settling ponds, as designed, are an effective means to treat the stormwater from the Former Production Area under normal conditions of maintenance. Unfortunately, the entire system had been neglected for years, if not decades. The surface water IRMs (Inventum 2020n, 2020p, 2021d and 2021h) included the addition of an aeration system, filters to reduce particulates, and cleaning of the contributory storm sewer systems. Those actions along with the elimination of secondary sources to the storm sewer system have dramatically improved the surface water quality. One of the IRM actions completed during the summer of 2021 was the cleaning of the concrete lined settling ponds to increase the retention time and dispose of a mass of residuals left in the ponds by TCC. The cleaning of the settling ponds removed over 300 tons of residual sediment left by TCC. The removal provided nearly 100 percent additional retention capacity in the ponds and removed a potential source of constituents of interest at the point of discharge.

An additional Groundwater IRM has been approved by the NYSDEC (Inventum, 2021m) to collect and treat groundwater that may be influencing water quality in the north storm sewer and the box culvert. The groundwater IRM incorporates the collection of groundwater from a series of subsurface collection trenches and the flow from the box culvert into a combined treatment stream. The groundwater collection system has reduced the shallow groundwater elevation in the west end of the production area and reduced the constituent loading to the settling ponds.

2.7.1.2 Coal and Coke Yards

The coal and coke yards had been active for decades, and typically contained large piles of coal and coke, with surface elevations well above the surrounding ground surfaces. In 2016, TCC implemented a BMP program that included additional stormwater controls and the construction of an elevated road around the coal yards. At the time of the RITC Campus Properties transfer in 2019, few of these controls were functioning as designed.

Before the sale to RITC, Powers was sold the right to recover the coal and coke from the TCC Site (primarily the BCP Site). Inventum and RITC recognized Power’s coal/coke ongoing reclamation operations were adversely altering the surface water drainage pattern in the coal and coke yards. Prior to acceptance into the

BCP, RITC began working with the NYSDEC, USEPA, and Powers to put in place temporary institutional and engineering control features to maintain the quality of drainage through Outfall #002. The discharge at Outfall #002 was in compliance with the expired permit throughout the period of USEPA management but the coal reclamation activities had the potential to increase the sediment loading to the discharge. RITC prepared a work plan and gained approval to dewater the south coal yard. Subsequently, an excavation work plan was proposed and approved to regrade the coal yard to eliminate the potential for impounding excess quantities of surface water above the stormwater controls.

The TCC BMP that was primarily designed to manage offsite runoff was the south ditch access road. At the time of the acquisition by RITC, the south ditch access road had deteriorated to the point where the pavement was completely missing in places and coal yard runoff could bypass the controls. RITC submitted and gained approval (Inventum 2020m and 2020p) of a Work Plan to regrade the coal yard and eliminate the large pool of accumulated surface water and reconstruct the south ditch access road. This site work restored engineering control and management of flow through the stormwater control structures.

2.7.1.3 Ongoing Management

OSC conducts daily inspections of the controls, and Inventum conducts a detailed monthly inspection. Inventum on behalf of RITC conducts a monthly, quarterly, and semi-annual sampling program in accordance with the approved SWPPP. SWPPP Site Management Reports (SMRs) are submitted monthly to the NYSDEC and provide the results of sampling conducted at the permitted outfalls as well as proposed corrective measures for any exceedances of the permitted action levels. A summary of the SWPPP sampling for the BCP Site is provided in Table 2-1.

The implemented IRMs have allowed RITC to improve the management of surface water on the RITC Campus Properties and address the corrective measures defined in the SMRs. The volume of sediment removed from the box culvert, north storm sewer, mansion sump, and the sedimentation ponds increased the capacity and retention time of the system by more than 100 percent. The reconstruction of the coal yard and cleaning of the south ditch reduced the contact time between surface water and the residual coal, eliminated the potential for sudden releases from the coal yard, and reconstructed the BMPs installed by TCC. The system has functioned as designed since reconstruction and with few exceptions, the Outfall #002 SWPPP action levels have been achieved.

2.8 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) of Elma, New York for this RI (Appendix C). 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 (Figure 2-5). 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 lack of connectivity to an intermittent or perennial stream. The NYSDEC has 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.

An approximately 41.3-acre NYS Freshwater wetland (ID: BW-6) was determined by EDI to be just off-site along the southern BCP Site boundary and a portion of the 100-foot upland adjacent area would fall within the BCP Site boundary. Additional Section 404 or Article 24 permitting may be required through the US Army Corps of Engineers (USACE) and NYSDEC if these upland buffer areas are impacted through implementation the BCP Site remedial alternative.

EDI, on behalf of Inventum and RITC, submitted a letter (Appendix C) to the USACE and NYSDEC on November 21, 2021, requesting an Approved Jurisdictional Determination (AJD) for the investigation area (BCP Site, Site 109, and Site 110) which has been granted (Appendix C). In a letter dated February 1, 2022, the NYSDEC determined that none of the wetlands identified would be state regulated. The NYSDEC confirmed the limits of BW-6 outside of the BCP Site boundary and the corresponding limits of the 100-foot upland adjacent area on the BCP Site. Approximately 2,500 sq. ft. of the upland area may extend onto the extreme eastern portion of AOI1 (North Rail Corridor) and 5,350 sq. ft. onto AOI6 (South Drainage Area) near the offsite Plastics flare.

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

2.9 Groundwater

Groundwater occurs within the BCP Site in three water bearing units (Table 2-11) as evidenced by regional groundwater studies (NYSDEC 2007), site investigations on this and adjacent properties, and historical knowledge and experience of the area.

The fill layer across 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 contained no, or little saturated thickness. For purposes of understanding the groundwater potential energy, a groundwater elevation map (Figure 2-6) has been developed for the water perched in the fill. 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 and other anthropogenic site features.

Groundwater elevations in the fill layer, where present, generally ranged between 0.2 and 7 feet bgs and does not appear to fluctuate significantly (~0.5 feet on average) seasonally. 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 site perimeter and the absence of flowing water in the test pits around the perimeter of the BCP Site suggest the fill water bearing unit is not a complete pathway. There is no observed or 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 BCP Site. 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. Staff gauges were added at locations across the BCP Site in surface water bodies to allow correlation of the interaction between the fill groundwater bearing zone and the surface water management facilities.

Groundwater also occurs in the underlying clay deposits (Figures 2-7 and 2-8). The water in the upper clay and lower clay represents different phreatic surfaces as shown by Figures 2-7 and 2-8. The clay 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.

Groundwater elevations in the upper clay range between 1 and 14 feet bgs and appear fluctuate several feet seasonally. Groundwater elevations in the lower clay are typically greater than 20 feet bgs and do not appear to fluctuate as much as some of the upper clay wells.

Samples of the clay material from the BCP Site were tested by Geotechnics of Pittsburgh, PA (Appendix A). 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. This is consistent with references for the area that suggest the hydraulic conductivity of the clay unit is extremely low, typically ranging from 10^{-6} to 10^{-8} cm/s.

As noted in Section 2.4, the upper most portion of the clay unit is typically described as moist and, in some areas, contained vertical desiccation cracks, the presence of which may allow for some localized vertical flow. The desiccation cracks, when noted, were only observed within the first couple of feet below the Fill/Clay transition. No desiccation cracks were observed in the clay in the test pits installed in the coal and coke yards although it is recognized that identification of fine desiccation cracks in test pits is difficult in a test pit. The clay observed in both the borings and test pits was described as moist; however, the horizontal groundwater flow within the clay unit underlying the BCP Site is described on a regional level as generally not water bearing and yielding only small quantities of water. This was verified during the two rounds of RI groundwater sampling where most of the monitoring wells screened in the upper and lower clay units went dry even at very low purge rates. The limited potential for horizontal groundwater flow in the clay unit can likely be ascribed to thin seams of silt and sand in the top few feet of the uppermost clay unit, but will still be predominantly toward the west and as demonstrated by downgradient wells does not migrate far from its source.

Regionally, the uppermost Camillus Shale bedrock unit is characterized as a confined aquifer and is considered a productive water producing system. Groundwater within the bedrock unit (Figure 2-9) occurs primarily in weathered surface fractures, horizontal gypsum dissolution beds, vertical joints, and small cavities. No vertical fractures or solution cavities were encountered by the bedrock borings on the BCP Site; however, gypsum lenses were identified in the borings for the four monitoring wells (MW-BCP-01D, MW-BCP-03D, MW-BCP-05D, and MW-BCP-21D) advanced into the underlying bedrock. Groundwater elevations in the bedrock are shown on Figure 2-9

Groundwater elevation data collected in January 2021 and September 2021 for the three water bearing units is provided in Table 2-11. Groundwater is not utilized as a source of drinking water in the Town of Tonawanda or 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 is upstream of the RITC properties and BCP Site. Five shallow groundwater collection trenches with sumps have been install along the top of clay beneath the fill within the western portion of AOI 2 in accordance with the December 21, 2021 Groundwater IRM Work Plan – West Production Area and the March 22, 2022 Groundwater IRM Work Plan – Addendum to collect the shallow groundwater to be pumped and treated by the onsite groundwater treatment system. The intent and purpose of the collection trenches and groundwater treatment in the western portion of AOI 2 is to:

- Capture and treat shallow groundwater that had been seeping, and has the potential to seep, into the stormwater system in and around the former by-products area near the box culvert.
- Capture and treat groundwater in the western-most railroad ballast.
- Capture and treat groundwater in areas of potential by-products area groundwater migration near the north storm sewer.

Shallow groundwater extraction from the sumps of the collection trenches began on March 24, 2022, and all five collection trenches were in operation on April 6, 2022. After a few weeks of groundwater extraction, the groundwater elevation along the collection trenches has successfully been reduced a few feet to limit the shallow groundwater migration outside the western portion of AOI 2. The system treated over 1,300,000 gallons of water in 2022 and has operated since April 2022.

2.10 Pre-RI Site Investigation History

Limited targeted historical investigations had been conducted on the BCP Site prior to RITC's ownership. Most of the historical data available was focused on the other areas of the former TCC facility; primarily the State Superfund Site (108, 109, and 110). A summary of the historical investigation scope and data was presented in the RIWP (Inventum Engineering, 2020o) and was utilized to guide aspects of the development of the RI scope of work. The general components of these investigations are summarized below, and any relevant data has been incorporated into the assessment of the nature and extent of impact on the BCP Site.

2.10.1 Phase II – December 1986

A *Phase II Site Investigation Report* (Phase II) dated December 1986 was completed by Malcolm Pirnie, Inc. (Malcolm Pirnie, 1986) for the TCC facility. Phase II study was conducted onsite during 1985 and 1986 and consisted of geophysical testing, test pit excavation, monitoring well installation and sampling, and surface water sampling. The focus of the investigation was the State Superfund Site (108, 109, and 110) in order to determine a Hazard Ranking System score and to supplement existing information regarding the hydrogeological and geochemical characteristics of those areas.

2.10.2 Supplementary Site Investigation – July 1990

A *Supplementary Site Investigation (SSI) Report* dated July 1990 was prepared by Conestoga-Rovers & Associates (CRA, 1990) of Waterloo, Ontario for TCC. The investigation and reporting were completed to supplement then existing information regarding the hydrogeological and geochemical characteristics of the TCC facility (to the extent discernable, the BCP Site). The scope of work included excavation and sampling of several test pits and boreholes, installation of seven monitoring wells on the BCP Site, and the collection of groundwater samples.

2.10.3 Remedial Work Plan for Spill Nos. 12072005 and 1311845

Revision 5 – Remedial Work Plan for Spill Nos. 12072005 and 1311845 dated July 17, 2015, was prepared by GHD (GHD, 2015) at the request of counsel for TCC and submitted to NYSDEC. The objective of this work plan was to address petroleum-impacted soils from seven areas identified by the NYSDEC during a BCP Site visit in November 2012. The RI included investigation activities in these areas to delineate current conditions. The impacts identified by NYSDEC in the work plan are addressed by completed, ongoing, or future IRMs and/or the final selected BCP Site remedial alternative.

2.10.4 Removal Assessment Sampling Report

On August 26, 2019, Weston Solutions, Inc (Weston, 2019) prepared a *Removal Assessment Sampling Report* for the former TCC facility. The work was conducted on behalf of the USEPA ERT during their period of management after the TCC bankruptcy. The purpose of the sampling was to determine if selected materials exhibited the characteristics of a hazardous waste. Sampling was conducted from October 2018 through February 2019. Twenty (20) samples were collected and identified by Weston as containing process materials, soil, drum and tank contents, soil stockpiles, process piping, and storage tank contents.

Upon Inventum's review of the *Removal Assessment Sampling Report* it was discovered that there were several discrepancies in the report associated with sample reporting units of the Toxicity Characteristic Leaching Procedure (TCLP). Inventum prepared a Memorandum dated October 28, 2019, issued to the USEPA to clarify the discrepancies in reporting of the sampling result reporting units when compared to USEPA's Maximum Concentration of Contaminates (MCC) for toxicity characteristics. Although the text of the Weston Solutions report suggests exceedances, the units were incorrectly transposed, the laboratory reports indicate there were no exceedances of the EPA MCC for TCLP metals for the sample collected during this study. A copy of the above referenced memorandum was provided to the NYSDEC under separate cover on June 1, 2020.

2.11 Concurrent Remedial Investigations

In addition to the historic investigations, RIs are being conducted on the adjacent State Superfund Site (108, 109, and 110) in a similar timeframe as the RI for the BCP Site. The data for those investigations are being prepared and presented by others in separate reports, but where there are common boundaries, data have been shared between the parties. In addition, the timing of the groundwater elevation data collection was coordinated so the groundwater contour maps are based on data collected on the same day. The objectives and remedial approaches will be coordinated to the extent allowed by the regulations to ensure the entire RITC Campus is remediated to a consistent standard.

2.12 RIWP Summary

The RI scope of work was designed to eliminate the data gaps identified in the Remedial Investigation Work Plan (RIWP, Inventum 2020o). All investigation work was conducted in accordance with the RIWP and the following supplemental documents:

- Community Participation Plan (CPP, Inventum 2020a) – Outlines steps taken to convey information to the public. In addition to the CPP, RITC was asked to, and has, provided periodic updates at a series of Zoom conferences with the Tonawanda Community Work Group (TCWG).
- Quality Assurance Project Plan (QAPP, in the RIWP Inventum 2020o) – defines the data quality objectives, sampling and analytical method requirements, QA/QC sample collection frequency, quality control requirements, data deliverables, data management, and data review, validation, and verification requirements followed during completion of the RI.
- Health and Safety Plan (HASP, in the RIWP Inventum 2020o) – defines the appropriate health and safety requirements and designated protocols followed during completion of the RI.
- Community Air Monitoring Plan (CAMP, in the RIWP Inventum 2020o) – defines the appropriate air monitoring requirements and designated protocols followed to monitor the air quality emanating from work areas (personal air monitoring is covered by the HASP) during completion of the RI.
- Supplemental Remedial Investigation Work Plan (Inventum 2021g) – Several data gaps were identified by Inventum upon analysis of the initial data collected during the RI. Rather than submit a Draft RI Report with known data gaps, a series of supplemental investigations were proposed, approved by NYSDEC, and implemented.
- Pre-Design Investigation Work Plan (Inventum 2023a) – The collection of actions specific data is proposed in the Pre-Design Investigation Work Plan (PDIWP) scheduled to be completed in the second and third quarter 2023.

As described previously, Inventum separated the BCP Site into seven AOIs (Figure 2-2) based on knowledge of TCC's operations, extensive pre-RIWP BCP Site inspections, the review of thousands of documents, the data and observations provided by the USEPA, the conditions observed during the coal and coke recovery activities, conditions observed during IRM implementation, and decades of experience with coking operations in general. The intent of the AOI designations was to provide a common division of the BCP Site across all plans, add efficiency to the RI work and, if appropriate, facilitate development of separate Conceptual Site Models (CSMs) and Alternatives Analyses. The AOIs were selected based on the limits of similar potential impacts from the TCC operations. The RI results for each AOI are summarized in Sections 4.4 through 4.11 and include a description of the former use, characterization of the subsurface conditions, detected concentrations of potential interest, and a summary of the RI program.

Figures 2-10 through 2-23 show the RI sampling locations over the BCP Site and within each AOI. Tables 2-2 through 2-10 summarize the sampling program for the entire BCP Site by media. Inventum established a 50-foot by 50-foot grid across the entire BCP Site as shown on Figure 2-1 to ease location of sample locations and BCP Site features.

The fill/soil sampling program included sample collection from three distinct intervals:

- Surface Fill – defined per DER-10 as the upper 0 to 2-inches of fill below any vegetative cover (unless sampling for VOCs then the interval is 0 to 6-inches) used to assess potential human exposures. These samples were collected around the BCP Site perimeter in vegetated areas of AOI's 1, 3, 6, and 7 which abut neighboring properties. All samples were collected on the BCP Site. There are unconsolidated materials at the surface within the BCP Site, but all are classified as fill. Pre-industrial native soils were not present on the surface of the BCP Site.
- Shallow Fill – defined here-in as the interval generally between 0 to 2-feet. Shallow fill samples were collected across each AOI and are used herein to visually and analytically characterize the surficial fill that is present across the BCP Site.
- Subsurface Soils – defined here-in as unconsolidated materials (native soils, fill, and clay) present at depths greater than 2-feet bgs. Native soils, as used in this report, are those that were naturally deposited or formed at the location encountered during the RI, no native soils were encountered on the BCP Site above the clay horizon. Subsurface soil and fill samples collected across each AOI are used to characterize potential concentrations of interest in fill and the underlying clay unit. Samples were collected at various depth intervals within the clay.

Several "sediment" samples were collected during the RI. The term "sediment" was applied to unconsolidated materials that settled from surface water in the storm water management ponds and pools and were submerged at the time of sampling. The ponds and pools were designed to function as settling basins, so these sediments represent recently deposited materials that would have been carried by runoff until the ponds and pools reduced the flow velocity and allowed settling. The TCC BMP was constructed in 2017, so these materials, as "sediment", are less than 5 years old and were conveyed from the surface fill on the BCP Site. There are no materials on the site that could be classified as surface water or sediment.

Two rounds of groundwater samples were collected from the monitoring wells installed in accordance with the construction specifications and sampling protocols in the RIWP and Supplemental Work Plan.

In summary, the RI program included:

- 300+ Analytical Samples
- 54 Monitoring Wells

- 51 Test Pits
- 27 Surface Grab Sample Locations
- 8 Sediment Sample Locations
- 8 Water Samples from Pits, Basements and Tunnels (Not including IRM Samples)
- 6 Samples of slag/slag-like materials for radiological screening.

2.12.1 Monitoring Well Installation

The groundwater monitoring program included the installation of monitoring wells in 26 unique locations including twenty-two[11] (22) clustered well pairs of monitoring wells across the identified AOIs (Table 2-2, Figures 2-10 to 2-23, and Appendix B). Monitoring wells targeted specific monitoring intervals and were constructed in accordance with the guidance in the RIWP and as repeated below. The screened intervals were selected based on the real time logging of each boring. Monitoring wells in each cluster were offset from other wells in the same cluster by a minimum of 5-feet, with the exception of cluster MW-BCP-19 which is approximately 30 feet apart. All wells except for one cluster were completed with an above ground surface steel casing. Each of the wells at the MW-BCP-16 cluster was completed with a flush mounted protective well cover. The locations and elevation of the measuring point of each well was measured by Niagara Boundary, a New York State licensed surveyor.

Borings were advanced at each proposed location using hollow-stem auger (HSA) downhole tools. All downhole equipment was decontaminated before use on the BCP Site and between borings. Unconsolidated material (fill/clay) samples were continuously collected with a split-barrel sampler driven through the augers for observation, lithological characterization, and screening with a photo-ionization detector (PID) equipped with a 10.6eV lamp over the total depth of the deepest boring in each cluster. Soil samples for laboratory analysis were selected based on pre-defined intervals from the RIWP and at intervals based on the observations and PID readings to bias collection towards zones of potential impact. Boring Logs are presented in Appendix B.

All monitoring wells were developed prior to collection of ground water samples. The depth to water in the wells was manually measured using an oil/water interface probe prior to development. Wells were developed by purging no less than three well volumes until water quality parameters stabilized or purging the wells until dry. Water quality measurements for pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity were recorded at the start of development and periodically (minimum of every well volume) during the development process.

2.12.1.1 Shallow Depth – "A" Monitoring Wells

Twenty-four (24) shallow depth monitoring wells were installed (see Well Construction Logs, Appendix B). The shallow depth wells were screened within the fill above the clay. Shallow wells were installed to monitor the presence of groundwater flow and to allow quantification of water quality in the fill layer. Water in the fill had originally been assumed to be present across most of the BCP Site. The Test Pit and drilling program determined that the water in the shallow fill is not continuous across the BCP Site. To monitor the presence and movement of water in the shallow fill zone at the interface with existing surface water management attributes, and to provide data to characterize the presence and potential movement of water in the fill zone, nine staff gauges were installed in the surface water system.

Shallow wells were completed with a 2-inch diameter schedule 40 polyvinyl chloride (PVC) well casing and 2 to 3-feet of 0.010-inch slotted screen depending on the depth of the boring. Shallow borings were

[11] Additional wells were installed on the contiguous State Superfund Sites and the data from the perimeter of those sites have been used to supplement the understanding of the data collected during the BCP RI.

extended 1-foot beyond the screened interval to enable placement of a 1-foot section of solid casing beneath the slotted screen which acts as a sump for accumulated sediments. A sand filter pack was placed from 1 foot below the bottom of the screened interval to a minimum of 1 foot above the top of the screen. The remaining annular space was completed with a bentonite seal to within 6 inches of the ground surface. The well locations were completed with a concrete collar to protect the casings.

2.12.1.2 Medium Depth - "B" Monitoring Wells

Sixteen (16) medium depth monitoring wells were installed to monitor the upper portion of the clay unit which is approximately 46-feet thick at the BCP Site (see Well Construction Logs, Appendix B). The monitoring well screens were positioned near the bottom of each boring. No notable zones of higher permeability materials were encountered that required alteration of the screened intervals.

Medium depth wells were installed to a depth of approximately 25-feet bgs and screened entirely within the upper portion of the clay unit. Medium depth wells were completed with a 2-inch diameter Schedule 40 PVC well casing and 10 feet of 0.010-inch slotted screen. A sand filter pack was placed 6-inches below the screen, across the entire screened interval to a minimum of 2-feet above the top of the screen. A 2-foot bentonite seal was placed on top of the filter pack and the remaining annular space was completed with a bentonite-cement grout (Portland Type I cement with 3 to 5 percent bentonite).

Four (4) of the medium depth wells (MW-BCP-02B, MW-BCP-04B, MW-BCP-09B, and MW-BCP-12B) were installed in the former production area (AOI 2). These wells were double cased to limit the potential for developing a preferential migration pathway between the overlying fill and the clay unit. Borings for these wells progressed until the top of clay was encountered and then advanced 1 foot into the clay, enabling the placement of a 9-inch diameter steel casing that was sealed into the top of the clay unit.

The steel casing was set in place with placement of grout into the annular space between the casing and borehole by positive displacement using a tremie pipe. Grout mixture was also poured into the inside of the casing to create a plug at the base of the casing. The grout was allowed to set for a minimum of 24-hours. The borings for the medium depth wells were then advanced through the plug to the total depth of the boring.

2.12.1.3 Medium Deep Depth - "C" Monitoring Wells

Ten (10) medium deep depth "C" monitoring wells were installed (see Well Construction Logs, Appendix B). Medium deep depth wells were installed to monitor deeper portions of the clay at depths greater than 25-feet bgs. The total depth of the borings for the medium deep depth wells was typically 40 feet bgs. The monitoring well screens were positioned near the bottom of each boring. No notable zones of higher permeability materials were encountered that required alteration of the screened intervals.

Medium deep depth "C" wells were completed following the same well construction procedures as the medium depth wells. Three (3) of the medium deep depth wells (MW-BCP-05C, MW-BCP-07C, and MW-BCP-10C) were installed in the former production area (AOI 2) and were double cased following the same specifications as the double cased medium depth "B" wells.

2.12.1.4 Deep Depth (Bedrock) – "D" Monitoring Well

Four (4) deep depth monitoring wells (MW-BCP-01D, MW-BCP-03D, MW-BCP-05D, and MW-BCP-21D) were installed in the north rail corridor (AOI1), former production area (AOI 2), and the parking lot (AOI3) to measure and verify the thickness of the clay, confirm the depth to bedrock, and to monitor the upper bedrock groundwater (see Well Construction Logs, Appendix B). All the deep bedrock wells were double, or triple cased to limit the potential for developing a preferential migration pathway.

At MW-BCP-05D where mobile tar was identified in the overlying fill, the boring was progressed until the top of clay was encountered and then further advanced 1 foot into the clay, enabling the placement of a 12-inch diameter steel casing sealed into the top of the clay unit.

The 12-inch diameter steel casing was set with placement of grout into the annular space between the casing and borehole by positive displacement using a tremie pipe. Grout mixture was also poured into the inside of the casing and allowed to set for a minimum of 24-hours to create a plug at the base of the casing. The boring was then advanced through the plug until the top of bedrock was encountered. After bedrock was encountered, a core barrel was used to drill approximately 1 to 2 feet into the bedrock, enabling placement of a 4-inch diameter steel casing that was sealed into the top of the bedrock unit.

No mobile tar or evidence of impacts was identified in the fill at MW-BCP-01D, MW-BCP-03D, or MW-BCP-21D. At these locations the HSA boring was advanced until the top of bedrock was encountered. After bedrock was encountered, a core barrel was used to drill approximately 1 to 2 feet into the bedrock, enabling placement of a 4-inch diameter steel casing that was sealed into the top of the bedrock unit.

The 4-inch bedrock casing at each of the four deep wells was set in with placement of grout into the annular space between the casing and borehole by positive displacement using a tremie pipe. Grout mixture was also placed in the casing and allowed to set for a minimum of 24-hours to create a plug at the base of the casing. After the casing grout set, the bedrock was cored with a 4-inch diameter (nominal) core barrel a minimum of 10-feet past the bottom of the casing and the wells were completed as open boreholes.

2.12.1.5 Groundwater Sampling

Liquid level measurements[12] were collected from all the wells prior to the collection of any analytical samples during both the initial (January 2021) and supplemental (September 2021) round of sampling. The depth to water and overall total depth of the well was collected using an oil/water interface probe and recorded in a field notebook. The total depth of each well was verified to ensure it had not accumulated a significant amount of sediment. The results of the first round of elevation measurements were analyzed and interpolated groundwater contours in the fill were generated using standard mathematical techniques. The interpolated contours were inconsistent with field observations (water elevations above known ground surface elevations). Rather than simply qualitatively adjust the contours, a series of 9 staff gauges were installed to provide verifiable measurements of surface water elevations to correlate with shallow groundwater measurements.

Monitoring wells were purged prior to sample collection following either low-flow or standard purge procedures (see Purge Logs, Appendix E). Low-flow techniques were initially followed during the first round of groundwater sampling in January 2021; however, most of the monitoring wells would go dry even at exceedingly low purge flow rates. In these instances, the wells were allowed to go dry and then sampled once sufficient recharge had occurred. To maintain a consistent sampling method, all monitoring wells were purged following standard purge procedures during the supplemental sampling event in September 2021, with the exception for the deep bedrock D monitoring wells. The bedrock wells were sampled low-flow procedures. The wells were purged using a bailer or peristaltic pump by removing a minimum of three well volumes or until the well had gone dry. Field measurements of pH, temperature, conductivity, turbidity, dissolved oxygen, and ORP were recorded at intervals during the purge process and recorded in a field book.

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[12] For purposes of developing an indication of groundwater surface(s), water level measurements were coordinated and measured across the BCP Site, Site 110 and Site 109 in two single day events.

Groundwater samples were collected with a bailer or with disposable polyethylene tubing and a peristaltic pump in accordance with the RIWP and SRIWP.

2.12.2 Test Pits

Test pits were advanced using traditional excavation equipment (see Test Pit Logs, Appendix F and Test Pit Photographs, Appendix G). One test pit location (TP-BCP-07) was inaccessible by heavy equipment at the time of the RI sampling. The fill sample for TP-BCP-07 was collected using a hand auger.

Test Pits varied in length from 50-feet to 200-feet (nominal). The test pits were not limited to linear configurations. As conditions were exposed, several test pits had lateral supplemental excavations to fully explore conditions at the given locations. Test pits that encountered visually classified "grossly contaminated material" were extended to delineate the limits of suspect materials. When possible, test pits extended to the clay surface. The only locations that excavation to clay was not possible were TP-BCP-06 that encountered the former Battery No. 1 foundation and TP-BCP-07 which could not be accessed by the heavy equipment. The elevation of the ground surface and top of clay was recorded using GPS equipment and the depths noted in the field logs for each test pit.

Samples (see Sample Summary Table 2-3) were collected from the test pits in accordance with the RIWP. Several additional test pits were also completed as part of the supplemental work plan. All samples were collected using new single-use stainless steel spoons directly from the sidewalls or base of the test pit excavations. In addition to the samples collected in accordance with the RIWP, additional samples were collected based on field assessments by Inventum personnel to further characterize materials where visual observations or field screening (PID) indicated potential impairment (ex. discolored soils or water) or unanticipated materials (ex. slag).

2.13 Supplemental Remedial Investigation Work Plan

Several potential data gaps were identified during preliminary review of the initial RI data collected. A Work Plan for Supplemental Remedial Investigation Activities was submitted to the NYSDEC (Inventum 2021g) to address the identified data gaps and it was approved on June 15, 2021. The supplemental scope of work included the following:

1. North Rail Corridor (AOI1, Figures 2-11 and 2-12)

    a. Installation of monitoring well cluster MW-BCP-21 A, C, and D located north of the MW-BCP-05 cluster. This is a three monitoring well cluster (a shallow, medium-deep, and deep) that was intended to help define the limit of constituents detected at MW-BCP-05 in the former process area. The MW-BCP-21 monitoring well cluster is located along the northern BCP Site boundary approximately 250 feet north of the MW-BCP-05 monitoring well cluster. Three fill and clay samples were collected from the MW-BCP-21D boring consisting of a fill sample, clay below the fill/clay interface, and from the clay at the C-screen interval (approximately 30 to 40-feet bgs).

    b. Installation of shallow monitoring well MW-BCP-23A at the east end of AOI1 to allow analysis of water quality at the northern and eastern boundary to determine if the constituents detected in MW-06-2020 on the adjacent State Superfund Site (110) extended onto the BCP Site. Three fill and clay samples were collected; one at the ground surface, a fill sample, and a clay sample at the clay/fill interface.

2. Production Area (AOI2, Figures 2-13 and 2-14)

   a. Installation of shallow monitoring well MW-BCP-22A northeast of the former compressor building in an area downgradient of TP-BCP-46. Water samples from TP-BCP-46 contained elevated concentrations of SVOCs and cyanide. Two samples were collected; one sample of the fill and one sample from the clay at the clay/fill interface.

3. Parking Lot (AOI3, Figures 2-15 and 2-16)

   a. Installation of deep bedrock wells at the MW-BCP-01 and MW-BCP-03 cluster locations. The deep wells created a complete four stage cluster screened across each potential water bearing unit and allowed for the estimation of groundwater macro flow direction in the bedrock as well as providing additional bedrock groundwater data at the downgradient BCP Site boundary. Soil samples were not required in these borings based on the data already collected from the borings for the other monitoring wells in the associated cluster.

4. Coke Yard (AOI4, Figures 2-17 and 2-18)

   a. Installation of one shallow (MW-BCP-24A) and one medium depth (MW-BCP-24B) well downgradient of the two well MW-BCP-13 cluster. The boring for MW-BCP-13 was the only boring that encountered low viscosity tar and both the shallow and medium depth well groundwater samples contained constituents that exceeded the Class GA Standards. Two samples were collected at the MW-BCP-24 cluster; one of the fill and one from the clay at the clay/fill interface.

5. Coal Yard (AOI5, Figures 2-19 and 2-20)

   a. Installation of one shallow (MW-BCP-25A) and one medium depth (MW-BCP-25B) well downgradient of the two well MW-BCP-19 cluster. Both the shallow and medium depth well groundwater samples from the MW-BCP-19 monitoring wells contained constituents that exceeded the Class GA Standards. Two fill samples were collected; one from fill and one from the clay at the clay/fill interface.

6. South Drainage (AOI7, Figures 2-22 and 2-23)

   a. Relocation and examination of portions of the large stockpiles along the south BCP Site boundary north of the TP-BCP-35 location to determine their content. The movement of the fill piles provided an opportunity to visually classify the materials in those piles.

   b. Two test pits (TP-BCP-49 and TP-BCP-50) to define the limits of the blue stained fill identified in TP-BCP-35. Three fill samples were collected from each test pit consisting of a ground surface sample, stained material sample, and a clay sample below the stained material. The samples were analyzed using both Analytical Methods (9012 and 9010) for Cyanide (Free and Insoluble).

   c. One test pit (TP-BCP-51) extending from the southeast corner of TP-BCP-34 to determine if any mobile tar existed in this area.

   d. One Test Pit (TP-BCP-52) along the southern BCP Site boundary with the 3821 River Road BCP Site east of the flare. The test pit was excavated to investigate the elevated SVOCs, specifically polycyclic aromatic hydrocarbons (PAHs), detected in TP-BCP-31 and to attempt to determine if the former tar and gas lines still existed at this location. The test pit started at the former south rail line as the pipes were suspected to have been installed within 3- to 5-feet of the track.

e. Installation of a Medium depth monitoring well (MW-BCP-26B) downgradient and along the BCP Site boundary from the blue stained fill deposit. This well will bound the limit of constituents detected in samples from MW-BCP-19B (which included cyanide). One sample was collected from the clay. A shallow fill well was also planned for this location; however, only two feet of fill was encountered, and the shallow monitoring well was not installed.

f. Installation of shallow monitoring well (MW-BCP-27A) at the east BCP Site boundary. This well provides additional BCP Site boundary data and bounds the data from the Site 110 monitoring wells.

g. Three surface soil samples to further delineate surficial data collected at SS-BCP-14.

7. Ground and Surface Water Elevation Measurements

   a. A complete set of ground and surface water measurements collected from the monitoring wells on the BCP Site (54 monitoring wells), the surface water staff gauges on the BCP Site (9 gauges), and the monitoring wells on Sites 109 and 110.

8. Groundwater Quality Testing

   a. Collection of a complete round of groundwater samples from all monitoring wells. The samples included the existing monitoring wells and the supplemental monitoring wells. The groundwater and stormwater elevation collection and groundwater sampling were coordinated with similar collection techniques, by others, for monitoring wells on Sites 109 and 110.
   b. During the January 2021 groundwater monitoring well sampling event, Thallium was detected above the Class GA Standard of 0.5 ug/L in unfiltered samples from seven monitoring wells and detected in an additional six monitoring wells during the second round of groundwater sampling in September 2021.
   c. In May 2022 a supplemental groundwater sampling event was conducted with a focus on understanding if the thallium detections are considered to be associated with solids in groundwater samples or a dissolved or mobile constituent in groundwater by also including analysis for dissolved TAL metals.

Groundwater sampling methods were conducted by the same method as the September 2021 sampling event consisting of the "A" (shallow groundwater), "B" (medium groundwater), and "C" (medium deep groundwater) monitoring wells sampled by standard purge and the "D" (deep bedrock groundwater) wells sampled by the low-flow sampling method.

The analytical results from May 2022 for both dissolved (filtered) and total thallium were non-detect for all sampled wells. The thallium detections are considered to be associated with solids in groundwater samples and are not believed to be a dissolved or mobile constituent in groundwater. Other detected metals and SVOCs in the sampled wells were consistent with the previous groundwater sampling events with the exception of:

- Total arsenic detected in monitoring well MW-BCP-05A. The dissolved (filtered) sample result for arsenic was below the Class GA Standard which indicates the arsenic is not believed to be a dissolved or mobile constituent in groundwater.

- Antimony detected in monitoring wells MW-BCP-13A and MW-BCP-19A. The dissolved (filtered) sample result for antimony for MW-BCP-13A was below the Class GA Standard which indicates the total antimony associated with solids in the MW-BCP-13A groundwater sample and is not believed to be a dissolved or mobile constituent in groundwater.
- The dissolved (filtered) sample result for antimony for MW-BCP-19A was above the Class GA standard, 54 ug/L v 3 ug/L. Antimony was not detected in the downgradient MW-BCP-25A sample, indicating that antimony from the MW-BCP-19A location is localized not migrating.
- A Manganese detection (500 ug/L v the Class GA standard of 300 ug/L) in the dissolved sample from monitoring well MW-BCP-03D.

The analytical results from the May 2022 sampling event are provided in Table 4-39 – Supplemental Groundwater Sampling Data – Total and Dissolved Metals, May 2022, and Table 4-40 – Supplement Groundwater Sampling Data – SVOCs and Dissolved SVOCs, May 2022. Section 4 has been updated to show new detected exceedances, not all detections for background metal have been updated.

Monitoring wells MW-BCP-24 A and B and MW-BCP-25 A and B were sampled for natural attenuation parameters to provide data that may be utilized in the AA.

2.14 Underground Utilities

In addition to the investigation of the fill, clay and groundwater, the location and condition of underground utilities were investigated by numerous test pits during the RI and IRMs (Figure 2-24). The investigations were used to confirm the presence of several gas lines associated with the historic offsite sale of COG and also confirmed that the majority of underground pipes at or near BCP Site boundaries were cut and plugged. More than 70 underground lines penetrated the walls of the box culvert, all have been sealed.

2.15 IDW Management

Investigation Derived Waste (IDW) management required multiple approaches throughout the RI.

2.15.1.1 Soils

Soils excavated from test pits that did not exhibit any gross contamination were placed back in the cavity after completion of the test pit. Fill was segregated from clay excavated from a test pit and the clay was placed in the bottom of the test pit cavity. Gross contamination was defined for this purpose as soils or fill exhibiting the presence of mobile tar and/or free oils. Grossly contaminated fill was encountered in several test pits. No natural soil (clay) exhibited the characteristics of grossly contaminated material.

Fill from test pits that exhibited gross contamination was stockpiled in the IDW Storage Area within the Thaw Shed to protect them from weather. Grossly contaminated fill was stockpiled and staged on plastic sheeting (10 mil min). The roof of the Thaw Shed protects the materials against precipitation. Less than 100-cubic yards of grossly contaminated material was produced during the RI, so the material was placed in a single stockpile.

Soils from borings conducted for monitoring well installation that did not exhibit any gross contamination were spread on the surface surrounding the borings. Soils from borings exhibiting gross contamination were stockpiled on plastic and managed with similar materials from the test pit excavations in the Thaw Shed.

2.15.1.2 Water

Monitoring well purge water and equipment decontamination water were containerized in 300-gallon totes, conveyed to the onsite 18,000-gallon pretreatment weir tank, treated, and discharged to the Town of Tonawanda POTW under RITC’s Industrial Sewer Connection Permit No. 331. The POTW permit allows for discharges of up to 2,000 gallons per day of water generated from BCP Site investigations and related equipment decontamination. There were no days that 2,000 gallons were produced during the RI or Supplemental RI.

2.15.1.3 *Personal Protective and Disposable Sampling Equipment*

Personal Protective Equipment (PPE), disposal sampling equipment (ex. bailers and rope), and general trash that may have come into contact with potentially impacted soils, fill, or water generated during completion of the RI were disposed of as C&D after the sample analysis showed no hazardous wastes were encountered.

2.15.2 Survey

Surface Soil, sediment, grab sample, and test pit locations were surveyed with an onsite GPS system based on a datum established by Niagara Boundary, a NYS Licensed Surveyor.

Monitoring well and staff gauge locations were surveyed by Niagara Boundary consistent with standard technical practices. Horizontal locations were referenced to the North American Datum of 1983 and the New York State Plane system and are accurate to within ±0.1 foot. Vertical elevations reference the North American Vertical Datum of 1988 and were reported in feet above mean sea level (ft-AMSL). Vertical measurements are accurate to within ±0.01 foot.

2.16 Data Validation

As part of the RI many soils, sediment, and groundwater samples were analyzed for the full-suite of DER-10 parameters including:

- Target Compound List (TCL) Volatile Organic Compounds (VOCs) by EPA Method 8260C,
- TCL Semi-volatile Organic Compounds (SVOCs) by EPA Method 8270D,
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082A,
- Target Analyte List (TAL) Metals by EPA Method 6010C,
- Mercury by EPA Method 7471B,
- Pesticides by EPA Method 8081B, and Herbicides by EPA Method 8151A.

In addition, select samples were analyzed for:

- Total Cyanide by EPA Method 9012B,
- Ammonia by EPA Method 350.1,
- 1,4-Dioxane by EPA Method 8270D (groundwater only), and
- Per- and Polyfluorinated Substances (PFAS) by EPA Method 537 Modified.

The analytical results from the RI are summarized in the tables referenced in the narrative. NYSDEC Category B laboratory data reports are provided for reference in Appendix J and Data Usability Summary Reports (DUSRs) in Appendix K. Electronic Data Deliverables (EDD) for all analytical data collected during the RI has been compiled following the NYSDECs EQuIS format and submitted through the Environmental Information Management System (EIMS).

All analytical data packages received a Level IV third-party data validation review by Validata, LLC of Seattle, Washington. Third-party data validation was conducted in accordance with the RIWP QAPP and the EPA National Functional Guidelines for Organic and Inorganic Review.

None of the samples collected during the RI were qualified as rejected. In general, the DUSRs did not note any major usability issues associated with the data other than typical application of "J" qualifiers to some of the concentrations in the raw data package.

3 Interim Remedial Measures

IRMs are an efficient and effective tool to eliminate potential safety and environmental threats, and to ultimately accelerate the remediation of the BCP Site. Cleanup activities that may otherwise have occurred after the RI, AA, and Remedial Design (RD) have been accelerated by 3 to 5 years. OSC and Inventum in consultation with the NYSDEC have identified IRMs that address known, defined, and ongoing environmental conditions on the BCP Site. The shutdown of the coke plant eliminated the emissions and discharges from the operations. Therefore, while none of the conditions addressed by the IRM posed an immediate potential exposure to human health or the environment, they did impact RITC's ability to make progress and comply with other BCP Site related permits and approvals (notably the SWPPP), provide a safe and secure means to conduct the RI, and allowed safe access the locations necessary to conduct the RI. More important, the IRMs allowed RITC to eliminate conditions created by TCC that were known to require remedial action, could be defined without extensive investigation, that could mask BCP Site related conditions, and to provide useful data to quantify potential sources of site-related constituents.

The general scope and objective of each IRM is described in the sections below. Independent IRM work plans for each have been submitted to the NYSDEC and NYSDOH for review and approval under separate cover. Approved work plans can be found in the document repositories, on the RITC Web Site (www.riverviewtechcampus.com), and the NYSDEC InfoLocator (https://gisservices.dec.ny.gov/gis/dil/).

3.1 Containment Liquid Management

There are six secondary containment areas around tanks at the BCP Site. These containment areas accumulate rainwater and snowfall. The liquids in the secondary containments must be periodically tested, treated as needed, and discharged. The following IRM work plans under this category have been submitted and/or approved at the time of this RI submittal:

- *Light Oil Area Storm Water Characterization Sampling Work Plan (March 2020)* – Approved: March 19, 2020; Implemented: March 24, 2020, to May 2020. A Light Oil Area Waste Profiling Report was prepared (Inventum, 2020d) documenting the findings of the testing. As a result of this testing, supplemental approval was obtained from the Town of Tonawanda for the discharge of treated water from the Light Oil Area Secondary Containment to the POTW. The last of the light oil tanks is being closed and the secondary containment will be clear of the tanks and their contents in 2023.
- *Mixing Pad Dewatering IRM Work Plan (July 2020)* - Approved: July 16, 2020; Implemented: July 2020 – completed. As a result of this work plan, the Mixing Pad was decontaminated in April 2021 and after approval of the Construction Completion Report (CCR, Inventum 2021j) the unit was closed and has been repurposed for solid waste management.

The investigation and management of the secondary containment structures is addressed in the Secondary Containment IRM Work Plan (See Tank Management)

3.2 Interim Site Management

An *Interim Site Management Plan* IRM (Inventum, 2020c) was approved by the NYSDEC on April 21, 2020. The Site Management IRM includes the required BCP Site security, perimeter air monitoring, BCP Site controls, and management of materials on the surface that are obstructing the ability to safely conduct site security, RI activities, and manage runoff. The *Interim Site Management Plan* has been appended two times (Inventum 2020g and 2020j) after the original approval to include additional scopes of work:

- *Site Management Work Plan – Work Scope No. 2 (June 2020)* – Allowed for cleanup and materials management of the areas that lie within the North Central, Northeast, and Central West areas of the BCP Site. Approved: June 5, 2020; Implemented: June 2020 – ongoing.
- *Site Management Work Plan – Work Scope No. 3 (July 2020)* – Allowed for container sweeping of the buildings, cleanup, and materials management of the areas that lie within the Southwest, Central East, and South-Central areas of the BCP Site. Approved: July 31, 2020; Implemented: August 2020 – ongoing.

In total there were 88 categories of tasks and activities to eliminate obstructions across the surface of the BCP Site that impacted the safety of personnel and the quality of surface water flowing across the BCP Site. All but one of the tasks have been completed at the time of this report preparation.

3.3 Stormwater Pollution Prevention Plan (SWPPP)

A *Stormwater Pollution Prevention Plan* (SWPPP, Inventum 2020b) was approved by the NYSDEC on June 5, 2020, describing storm water control measures, BMPs, and surface water discharge monitoring procedures. IRM work plans have been prepared identifying specific activities required to maintain compliance with the requirements of the approved SWPPP. The following IRM work plans under this category have been submitted and/or approved at the time of this submittal:

- *Outfall #001 Ammonia Reduction IRM (July 2020)* – Approved: July 13, 2020; Implemented: July 13, 2020 – ongoing.
- *Outfall #001 Filtration (December 2020)* – In December 2020 a pump and two stage filtration treatment system were added to the concrete-lined sedimentation basin treatment system to reduce the suspended solids and any associated particulate constituents in the discharge: Approved December 2020; Implemented December 2020 – ongoing.

3.3.1 Storm Sewer System (Box Culvert, North Storm Sewer and Concrete-lined Sediment Ponds)

The storm water collection and treatment system for the northern portion of the BCP Site, Northern Rail (AOI 1), Former Production Area (AOI 2), and Parking Area (AOI 3) consists of five interrelated and interdependent elements: the north storm sewer, box culvert, collection sump (aka the "mansion sump"), the north south storm sewer, and the concrete-lined settling ponds. The maintenance and upgrading of these systems have required the highest levels of IRM effort at the BCP Site. Periodic cleaning of these systems is required to improve the quality of the discharge from the collective system.

A *Surface Water System Maintenance Work Plan* (Inventum 2020f) was approved by the NYSDEC on June 5, 2020, which proposed an initial scope of sampling, investigation, and cleaning of the collective system. Work under that IRM was completed and a series of findings and recommendations have been completed or are ongoing:

- *Surface Water System Maintenance Phase 1 Report, Phase 2 Work Plan (Inventum 2020n)* provided a progress report on the initial investigations to locate and characterize the Box Culvert.
- A summary of the data collected in 2021 was submitted in the draft *Surface Water System – Next Steps Report (Inventum 2021d)* which presents the results of the box culvert and storm sewer surveys and cleaning, outlines a testing program, and presents additional recommended IRMs for the system. The box culvert system was cleaned, a section of the box culvert through the Light Oil Area was relined, and two Coke Oven G[i]as Lines that formerly supplied Battery No. 1 were sealed all to reduce impacts of surface water being collected and conveyed by the system.

- Settling Pond Cleaning and Repairs – The 2021 IRM, *Surface Water System Maintenance IRM Work Plan,* the clean out and repair the weirs in the settling ponds was implemented. More than 1,000 tons of settled solids from the process area stormwater system was removed, stabilized and disposed offsite. The weir plates between the ponds were repaired. – completed.
- Groundwater IRM – The *Groundwater IRM Work Plan (Inventum 2021)* included the construction of 5 collection trenches and assembly and operation of a groundwater treatment plant at the BCP Site. The system effectively reduces the migration of shallow groundwater in the western production area and in the box culvert. - ongoing

3.3.2 Coal and Coke Yard Surface Water Management

During TCC operations, the coal and coke yards were elevated relative to the surrounding surface water management controls; the sedimentation pools #001, #002 and #003, the stormwater retention basin, and the north and south ditches. With the shutdown of operations and the recovery of the residual coal and coke, this elevation difference and positive grade relative to the collection systems no longer existed for significant areas of the coke and coal yards (AOI 4 and AOI 5). As a result, active management of the waters from these areas of accumulation was required throughout the coal and coke excavation program.

A *Coal and Coke EWP* (Inventum 2020i) was approved by the NYSDEC on July 20, 2020, detailing fluid management procedures, including but not limited to, excavation dewatering and equipment decontamination waters, necessary to maintain compliance with the requirements of the approved SWPPP and to meet the requirements of RITC for surface materials handling. Subsequent to Power's completion of their coal and coke recovery operations, the coal yard was accumulating water at a rate that was unacceptable to RITC. Three actions were taken to address the conditions in the coal yard:

- An amendment to the Town of Tonawanda Industrial Waste Discharge Permit No. 331 was approved to allow pumping, treating and discharge of the waters from the coal yard (AOI 5).
- A Work Plan for *Replacement of Unrecovered Coal Yard Stockpiles*, (Inventum 2020 m) was submitted and approved. The implementation of that Work Plan allowed regrading of the uncompacted piles of material left after Powers removed the coal and coke assets.
- Reconstruction of the South Ditch Road was recommended following regrading. The *South Ditch Road Restoration and Improvement* IRM Work Plan (Inventum 2020p) was submitted and approved. The reconstruction of this former BMP allowed effective management of runoff from the south coal yard.

3.4 Drums and Container IRM

A *Drum and Container Management Work Plan* (August 2020) [Approved: August 6, 2020; Implemented: August 6, 2020 – ongoing] was implemented to address oils, lubricants, paints, cleaning liquids, and other process materials that were left on the BCP Site by TCC following the shutdown. The materials are being inventoried, stored, and properly inspected. Known materials were reused or properly recycled. Unknown materials were segregated, characterized, and properly managed for reuse, recycling, or disposal. More than 2,000 containers ranging in volume from 4-ounces to 400-gallons were collected, identified, categorized, and properly managed. All collected containers and fire extinguishers have been properly disposed of off site.

3.5 Abandoned Pipeline IRM

Historical documentation indicated four (4) pipes were used to convey liquids to and from TCC between the start of operations in the late 1910s and the 1970s (Figure 2-24). The pipes were used to convey river water to the coke plant and return the combined storm, non-contact cooling, and process water to the Niagara River. An *Abandoned Pipeline IRM Work Plan* (Inventum 2020l) was approved by the NYSDEC in a letter dated August 26, 2020. The scope of work involved verifying the location of the water and discharge pipes at the BCP Site boundary. The test pit program included in the scope of work confirmed the absence of flow to or from the Niagara River within the pipes, identified soil conditions surrounding the pipes (and the lack of flow along the pipes), and allowed cutting and placement of additional plugs in the pipes at the BCP Site boundary to eliminate any possibility that there could be future migration pathway associated with these utilities.

3.6 ACM

An ACM survey was conducted on the entire RITC Campus Properties (BCP Site and the adjacent Superfund Site). Inventum submitted an *Asbestos Containing Material and Universal Waste Report* (56 Services 2020) to the NYSDEC on May 28, 2020, for reference. The ACM abatement activities are subject to the requirements and review by the New York State Department of Labor (NYSDOL). The ACM materials on the RITC Campus Properties were identified and labeled during the survey. A set of abatement specifications and management plans were developed to address the ACM identified. The survey identified ACM that required three very specialized approaches: stack abatement, generalized thermal system insulation, and controlled demolition. Abatement Plans were developed to address ACM across the three disciplines. International Chimney Corporation (ICC) abated the ACM on and in the three 270-foot-tall stacks associated with the boiler house and the battery. Precision Environmental abated the ACM on, and in, external piping, former process equipment, and the structurally stable buildings excluding the buildings that are being used by OSC. OSC has completed the controlled demolition of the compressor building, the remaining battery, and the multi-story former light oil building. The controlled demolition of the Purifier boxes will be completed as part of the remedial actions.

An *Access Improvement Work Plan* (Inventum 2021b) was prepared and approved to allow earthmoving to provide a stable area for the high lift equipment required to remove transite siding from the south side of the Coal Handling Building.

3.7 Tank Management

There were aboveground storage tanks (ASTs) across the BCP Site, including registered chemical bulk storage (CBS), petroleum bulk storage (PBS), and unregistered tanks, but only two remain; PT03 and RC04. Three IRM Work Plans have been prepared for the management of the tanks and the associated equipment:

- The *Aboveground Storage Tank Management Interim Remedial Measures Work Plan* (Inventum 2021a) defines the sampling and management approach for the aboveground tanks and ancillary equipment that were unregistered.
- The *CBS and PBS Tank Closure Work Plan* (Inventum 2021e) defines the sampling and management approach for the aboveground tanks and ancillary equipment that were registered.
- The *Secondary Containment IRM Work Plan – Closure* (Inventum 2021f) defines the inspection, testing, and management requirements for the secondary containment systems associated with the above ground storage tanks.

All CBS and PBS Tanks have been emptied, decontaminated and properly disposed. No registered tanks remain on the BCP Site. RITC was delisted from the CBS program by the NYSDEC on January 10, 2022, and the PBS application was submitted for closure on February 3, 2022; the NYSDEC inspected the former registered tank locations and acknowledged there are no regulated PBS tanks on August 29, 2022.

All other ASTs were removed, the last AST on the BCP Site was RC04, a rail tank car that was decontaminated and removed in 2023.

3.8 Demolition

All demolition on the BCP Site is subject to the requirements of the Town of Tonawanda Building Department. The Town of Tonawanda Issued Commercial Demolition Permit Number BP2021-0018 for the structures at the BCP Site. In addition, specific approval was required from the Town of Tonawanda for the use of energetic materials (explosives) that are generally prohibited in the Town.

Demolition was subdivided into multiple categories:

1. Twelve (12) buildings constructed of materials that were biodegradable or that could not be compacted to characteristics of structural fill and therefore not suitable for use as fill. These materials include wooden structures (including treated wood trestles), fiberboard, plastic, and fiberglass.
2. Buildings that had been designated for controlled demolition because of the structural condition (3 buildings) or the fact that asbestos containing materials are integrated with the building materials in a manner that they cannot safely be abated (Battery). The *Letter of Condemnation* submitted to OSC for submission to the New York State Department of Labor (NYSDOL) defines the criteria by which the buildings were determined to be unsuitable.
3. Twenty-two (22) buildings that had been impacted by the operations of TCC to the extent that they cannot be reasonably be cleaned for consideration for use as fill.
4. Structures that had no future use or that pose a safety hazard during the BCP Site operations. These include the three stacks, pits, tunnels, the conveyor bridge, and the pipe bridge.
5. Structures associated with the secondary containment for above ground storage and process tanks being removed under separate IRMs.

Structures in categories 1 and 4 would typically remain standing under a remedial program but are being removed by RITC to facilitate redevelopment of the RITC Campus Properties largely in accordance with the requirements of the BCP and the Town of Tonawanda.

The following demolition and associated work plans have been developed for use on the BCP Site:

- The *Demolition Work Plan* (Inventum 2021c) describes the approach for demolition of structures across the BCP Site.
- The *Demolition Work Plan, Boiler House, and Battery Stacks* (Inventum 2021p) describes the approach and monitoring associated with the energetic implosion of the three stacks. The stack demolition was outside the scope of the BCP as the stacks as their materials of construction were not classified as impacted materials or solid waste. This work plan was provided for information only, and was not subject to approval by the NYSDEC or NYSDOH.
- The *Pre-Design Investigation Work Plan* (Inventum 2023a) describes, among other activities, lifting of building slabs in the production area.

3.9 Lime Still IRM Work Plan

The lime still was simply shut down at the time the plant was idled. Lime Still Sludge is a listed hazardous waste (K060) and requires careful management as it is highly corrosive in addition to containing some constituents of COG. The *Lime Still IRM Work Plan* (Inventum, 2021l) defined the procedures to be followed to safely remove and decontaminate the Lime Still.

The Lime Still IRM Work Plan was successfully implemented in 2022 and the Lime Still was decontaminated and properly recycled. Two 55-gallon drums of K060 ("Ammonia still lime sludge from coking operations") waste was removed from the lime still and transported offsite for proper offsite disposal.

3.10 Above Grade Structures

There were above grade structures, process piping, process equipment, emission control equipment, maintenance equipment, and other ancillary structures and equipment that did not fall within the scope of the broader IRMs and other Work Plans listed above. These above grade structures were addressed through a series of specific and individualized IRMs, abatement, and demolition work plans. The IRMs include media specific sampling programs specific to the nature and use of the process/equipment.

The *Coke Oven Gas (COG) Pipe IRM Work Plan* (Inventum, 2021k) specifically details the procedures implemented to safely remove and decontaminate COG Pipes that had the potential to contain materials that produce an exothermic reaction.

The *Process Equipment Removal Interim Remedial Measures Work Plan* (Inventum 2022a) specifically details the procedures required to safely sample, decontaminate, demolish and manage the residuals from the process vessels on the BCP Site. The process vessels have been successfully removed, RITC is managing the residuals.

IRMs have allowed RITC to safely remove millions of pounds of waste and thousands of gallons of liquids from the BCP Site that had the potential to degrade or be mobilized by runoff. All the materials removed from the BCP Site have been properly transported and permanently recycled, treated, or disposed of.

4 Remedial Investigation Findings

The RI findings are summarized in this section of the report. The intent of this section is to provide a summary of those data that exceed criteria applicable to the proposed commercial use of the BCP Site. All the detailed data is provided in the referenced tables, figures, and appendices.

4.1 Identification of Standards, Criteria and Guidance

The Standards, Criteria and Guidance (SCGs) that define the appropriate, relevant, and potentially applicable requirements for the RI, AA, RD, RA, and the long-term Site Management Plan (SMP) are listed below by Agency and Division.

4.1.1 Division of Environmental Remediation SCGs

Document	Description/Applicability
6 NYCRR Part 364 - Waste Transporters	Waste transporter permit requirements
6 NYCRR Part 370 - Hazardous Waste Management System: General	Definitions of terms and general standards applicable to Parts 370-374 & 376
6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes	Hazardous waste determinations
6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities	Manifest system and record keeping, certain management standards
6 NYCRR Subpart 373-2 - Final Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities	Hazardous waste management standards
6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil	Regulates the management of used oil
6 NYCRR Part 375 - Environmental Remediation Programs	Requirements regarding remedial programs and private party programs
6 NYCRR Part 376 - Land Disposal Restrictions	Identifies hazardous waste restricted from land disposal defines land disposal
NYSDEC CP-51/Soil Cleanup Guidance, October 21, 2010	Identifies soil cleanup criteria
NYSDEC DER-10/Technical Guidance for Site Investigation and Remediation, May 3, 2010	Defines requirements for a remedial investigation

4.1.2 Division of Water (DOW) SCGs

Document	Description/Applicability
Technical and Operational Guidance Series (TOGS)	Includes a listing of DOW guidance including TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.
6 NYCRR Part 702.15(a), (b), (c), (d), (e) & (f)	Empowers NYSDEC to apply and enforce guidance where there is no promulgated standard
6 NYCRR Part 700-706 - NYSDEC Water Quality Regulations for Surface Waters and Groundwater	700 - Definitions, Samples and Tests; 701 - Classifications Surface Waters and Groundwaters; 702 - Derivation and Use of Standards and Guidance Values; 703 - Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards
6 NYCRR Part 750-757 - Implementation of NPDES Program in NYS	Regulations regarding the SPDES program

4.1.3 Division of Fish and Wildlife and Marine Resources SCGs

Document	Description/Applicability
Fish, Wildlife and Marine Resource Guide	Presents hazardous material guidance including Fish and Wildlife impact Analysis and the Technical Screening of Contaminated Sediments
6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife	Lists endangered, threatened species and species of special concern and prohibits taking except under permit
6 NYCRR Part 663 - Freshwater Wetlands Permit Requirements	Procedural requirements for various activities in wetlands and adjacent areas and standards for permit issuance
6 NYCRR Part 664 - Freshwater Wetlands Maps and Classifications	Depicts and delineates freshwater wetlands
6 NYCRR Part 665 - Local Government Implementation of the Freshwater Wetlands Act & Statewide Minimum Land - Use Regulations for Freshwater Wetlands	Provides for optional local regulatory authority regarding use and development of freshwater wetlands

4.1.4 Division of Air Resources SCGs

Document	Description/Applicability
Air Guidance and Policy Documents	Includes a listing of DAR guidance including Air guide One - Guidelines for the Control of Toxic Ambient Air Contaminants
6 NYCRR Part 200 (200.6) - General Provisions	Prohibits contravention of AAQS or causes air pollution
6 NYCRR Part 201 - Permits and Registrations	Prohibits construction and/or operation without a permit and/or certificate
6 NYCRR Part 211 (211.1) - General Prohibitions	Prohibits emissions which are injurious to human, plant, or animal life or causes a nuisance
6 NYCRR Part 257 - Air Quality Standards	Applicable air quality standards

4.1.5 NYS Department of Health SCGs

Document	Description/Applicability
Guidance for Evaluating Soil Vapor Intrusion in New York	For use in exposure assessments for vapor intrusion
10 NYCRR Part 170 - Sources of Water Supply	Protecting public water supplies

4.1.6 NYS Department of State SCGs

Document	Description/Applicability
Part 600 - Department of State, Waterfront Revitalization and Coastal Resources Act	"Coastal Area" includes Lakes Erie and Ontario, the St. Lawrence and Niagara rivers, …etc.

4.1.7 U.S. Environmental Protection Agency SCGs

Document	Description/Applicability
Vapor Intrusion Screening Level (VISL) Calculator	The VISL calculator identifies chemicals that may be present at concentrations to warrant investigation of the vapor intrusion pathway.
Waste Cleanup and Risk Assessment	Human health risk assessments

4.1.8 OSHA SCGs

Document	Description/Applicability
29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response	Health and Safety

4.1.9 U.S. Army Corp of Engineers SCGs

Document	Description/Applicability
Protection of Wetlands	Minimize destruction, loss, or degradation of wetlands
33 USC 466 Section 404 - Clean Water Act	Control disturbances in wetlands
33 CFR Parts 320 -330 - Regulatory Programs of the Corps of Engineers	Prohibits construction and/or operation in wetlands without a permit and/or certificate

4.2 Terminology

There are several characteristics of environmental media that are specific to the description of materials encountered on the BCP Site. No natural soils were encountered above the clay. Standard soil classification/description terminology has been used to describe the characteristics of the fill. Comparison of fill sample concentrations to Part 375 SCOs is appropriate as the materials are soil like in overall composition and properties.

The fill above the clay at the BCP Site is composed of soil, silt to gravel size coal, silt to cobble size coke, and other materials (wood, plastic, and metal). While the fill is similar to other urban fills, the coal and coke matrix includes constituents that are not typical of most urban fills. As such, direct comparison to SCOs, while made in the text, may be misleading. The predominance of PAHs are not necessarily "contaminants" in the fill, but a large portion of these constituents are from coal and coke mixed in the fill. The relatively low concentrations of PAHs detected in groundwater samples demonstrate the PAHs detected in fill samples are not significantly mobile. For consistency, the following site-specific terminology is used when discussing the distribution of environmental media above SCGs and the nature and extent of impact on the BCP Site:

- Black tar like materials were field classified as follows:
  - Low Viscosity Tar/Viscous Tar – Tar like materials that occur in a separate layer, typically less than 2-inches in thickness.
  - Tar Saturated – Materials with low viscosity tar that can move from the matrix at ambient temperature and pressure, but in which a discernible layer of vicious tar is not present;
  - Coated Material – Materials with low viscosity tar present but does not move and the matrix is not saturated with tar;
  - Pliable Tar – Tar like materials that do not flow freely but can be deformed by hand pressure;
  - Pliable tar / fill mixture – combination of pliable tar, and other material (matrix described);
  - Hardened/Solidified Tar – Hardened Tar does not become pliable or viscous when heated to at least 70 degrees Fahrenheit (^{0}F);
  - Hardened/Solidified Tar/Fill Mixture – solidified mixture of hardened/solidified tar and fill (matrix described);
  - Crystalline Tar – Solidified brittle tar, distinct fracture faces, does not change state when heated to at least 70 degrees Fahrenheit; and
  - Blebs, globs, sheen – refers to the presence of a non-aqueous phase but not as a measurable layer in ground or surface water.
- Nodules is the term used for a reddish-brown sandy Gravel that was clearly produced in a furnace of some form. The gravel size particles in this material had a smooth rounded surface. These

materials were encountered below former rail tracks suggesting this was a railbed, ballast[13] or subbase material for the tracks. This material was the most productive water source encountered in the RI.

The remaining materials on the BCP Site are described using standard terminology for environmental engineering practice.

4.3 Waste and Residual Characteristics

The TCC coke plant heated coal in the absence of air to separate the liquids and gases from the coal and leave the residual carbon, which is the primary product, coke. The process followed to produce coke and its associated by-products is well understood. The materials resulting from the production of coke that may be present in equipment or materials at the BCP Site included:

- Coal – Three types of metallurgical "met" coal were used to produce coke at TCC. Coal is a naturally occurring sedimentary material. Table 4-1 includes an analysis of a sample of coal from the coal charging building.
- Coke – Coke is the carbon left after the liquids and gases have been removed from the met coal. Coke is a relatively inert material. Table 4-1 includes analysis of a sample of coke. The analysis indicates the effectiveness of the process removing the constituents of coal.
- Tar – There are many forms/types of tar on the BCP Site (See Section 4.2). In its production form it is usable as a component of asphalt, roof shingles, and other commercial goods. When impurities were present in the tar that made the material unsuitable for offsite sale and production, the remaining material was typically recycled in the coke battery. Specific forms of tar contained in certain process equipment, e.g., the coal tar decanter sludge, contained sufficient impurities to be unsuitable for use in production of commercial materials, and if not recycled, was a listed hazardous waste.
- Oil – Oils containing benzene, toluene, xylenes, and other chemicals were produced at the TCC coke plant. These constituents are similar to the components of gasoline. These liquids were present in containers, pipes, tanks, and process equipment at the BCP Site and could be recovered to produce other chemicals and plastics. When combined with other materials or water, the oils may not be suitable for sale and may contain sufficient concentrations of by-products to require management as hazardous waste.
- Flushing Liquor – The coke oven gas leaving the battery, also known as "foul gas", was typically 2,000°F and carried the tar, oils, naphthalene, ammonia, and other constituents released from the coal. The gas was cooled "flushed" to reduce the temperature. The flushing liquid (a/k/a "Flushing Liquor" or simply "Liquor") came into contact with the COG and as the COG cooled the flushing liquor absorbed/collected tar, oils, and other impurities from the gas. Most of the flushing liquor had been treated and discharged from the BCP Site before the RITC purchase; however, some amount remained in piping and process equipment.

Most of these materials have been detected at the BCP Site either by their location, physical characteristics, or in low concentrations by their component constituents. For coal, coke and tar the individual constituents can only be detected by the testing for the RI after the materials are ground down and extracted with aggressive solvents. The components that have been detected include:

[1313] Ballast as used here is the granular material used to form rail beds below the ties and tracks. Where used in association with the RI subsurface sampling it is a granular material typically composed of nodules, slag or gravel. Where encountered it was usually free draining and often saturated.

- VOCs – Found predominately in light oils. Most VOCs were conveyed and consumed in the COG and combustion processes. The occurrence of TCL VOCs was relatively limited in extent and only present where mobile ("viscous") tar or light oil were detected.
- SVOCs – The most prevalent constituents on the BCP Site present as a naturally occurring constituent in coal, and therefore, also found in coke, tar, and oils.
- PAHs – A subset of the SVOCs and the primary components of coal (Table 4-1).
- Naphthalene – A by-product of coke making and prevalent in COG residuals and the process equipment from the tar processing area, through the concentrators, and precipitators.
- Ammonia - A by-product of coke making and prevalent in COG residuals and the process equipment from the tar processing area, through the concentrators, lime still, and weak ammonia liquor tanks.
- Cyanide – a constituent of coal and COG and present throughout the gas processing equipment. Cyanide was concentrated historically in the purifier boxes before COG was sold for offsite consumption. Materials containing cyanide on the BCP Site were typically characterized by a distinct blue color.

4.4 AOI1 – North Rail Corridor

As described in Section 2.6 the north rail corridor (Figures 2-11 and 2-12) is located along the northern boundary of the BCP Site and contained abandoned rail spurs (the rail steel was sold by the Bankruptcy Court), rail scale, scale building[14], a two-story brick house-like structure (the "mansion[15]") that was utilized as office space, a large storm water sump ("collection sump" or "mansion sump"), excavated soil piles, and miscellaneous debris/trash and abandoned equipment. The mansion sump is the main collector sump for stormwater from the former production area (AOI2). The former surplus gas supply lines (Figure 4-1) to Tonawanda/Kenmore and Buffalo crossed from the compressor building to the north rail corridor to the northeast corner of the BCP Site.

[14] Nearly all of the structures on the BCP Site have been demolished since the RI sampling was conducted.

[15] Many structures on the site had been named throughout the history of the BCP Site. For consistency, Inventum has retained these names, but for tracking purposes, all buildings were numbered for clarity and to provide a basis for waste management.

Photo 4-1: August 2020. Looking North. The redline approximates the west end of the North Rail Corridor (AOI1).

Note: structures and equipment shown (Mansion, heavy equipment maintenance, oil house, welding shop, instrument shop, and locomotives) have been demolished/removed since date of photo.

Photo 4-2: Looking east. August 2020. The redline approximates the northern, southern, and eastern limits of AOI1.

Note: structures and equipment shown have been demolished/removed since date of photo. No buildings or equipment remain in the North Rail Corridor.

The rail spur, miscellaneous trash/debris, the rail scale building, and the mansion were removed in accordance with the applicable IRM Work Plans (see Section 3) or demolished in accordance with the Town of Tonawanda Building Permit.

Six test pits (See Appendix F for Test Pit Logs and Appendix G for Test Pit Photographs) were excavated partially or primarily in the North Rail Corridor AOI (Figures 4-2 and 4-3), a portion of a seventh test pit crossed the AOI boundary, and one test pit was adjacent to the AOI southern boundary:

- TP-BCP-04 crossed from the Production Area AOI to the north fence line;
- TP-BCP-05 was excavated in the area that a suspected tar seep was identified by OSC onsite personnel;
- TP-BCP-14 was excavated in the former diesel tank area (the location of a previous and uncompleted removal action[16] by TCC);
- TP-BCP-39 was excavated north of the former compressor building location (the compressor building existed at the time of the test pit exploration);

[16] The diesel tank had been removed by TCC, but they did not complete soils characterization or treatment.

- TP-BCP-46 was excavated primarily in the Former Production Area AOI, but was extended to the North Rail Corridor AOI while identifying a source of perched groundwater;
- TP-BCP-38 was excavated along the northern boundary of the adjacent State Superfund Site (110) in an area with identifiable tar at the ground surface (aka Tar Seep 4) to determine the source of the seepage;
- TP-BCP-40 was the eastern most test pit excavated to explore the conditions where the rail formerly entered the RITC Campus Properties and conditions north of the adjacent State Superfund Site (110); and
- TP-BCP-47 was a supplemental test pit excavated along the north boundary of AOI2 adjacent to the AOI1 boundary. This excavation was added based on discussions with former employees after TP-BCP-01 did not produce the conditions anticipated.

The test pits provided the opportunity to directly evaluate the fill, identify the potential for sources of tar materials, evaluate the diesel spill area, and confirm the depth of fill over the clay unit.

Monitoring well clusters MW-BCP-06 (A/B/C), MW-BCP-21 (A/C/D), MW-BCP-22 (A), and MW-BCP-23 (A) were installed in AOI1. The monitoring well locations in AOI1 were selected to:

- coincide with the location of a historical well that could not be located but available data showed the presence of cyanide at low concentrations;
- define the extent of potential migration from the Production Area AOI;
- define the potential extent of impacts from Site 110 (MW-BCP-23A);
- provide data on groundwater quality with depth north of the production area and at the northeastern boundary of the BCP Site (clusters MW-BCP-06 and MW-BCP-21); and
- provide groundwater quality data north of the compressor building (MW-BCP-22A)

One (1) surface soil sample (0 to 2 inches bgs) and a 0.5 to 2-feet bgs sample were collected at SS-BCP-13 which is representative of the area at the BCP Site boundary shared with National Grid north of the adjacent State Superfund Site (Site 110). This sample represents conditions at the most downwind location (based on the predominant wind direction) of the BCP Site.

Five (5) shallow fill soil samples (0 to 2 feet) were collected:

- Three (3) grab samples from 0 to 2-feet bgs along the northern boundary of the BCP Site to assess the perimeter of the BCP Site adjacent to the closed salvage yard and fly and ash landfill:
  - SS-BCP-10 at the western end of the AOI l near the North Storm Sewer and the Mansion;
  - SS-BCP-11 at the BCP Site boundary north of the former diesel tank excavation; and
  - SS-BCP-12 at the north BCP Site boundary in the vicinity of the historic COG transmission lines.
- Two (2) grab samples (SS-BCP-02 and SS-BCP-03) were collected from 0 to 2-feet bgs from the soil stockpiles where material from an unknown excavation, potentially the suspected diesel tank excavation, was placed before the BCP Site was owned by RITC.

In addition to the monitoring well clusters; soil boring, and groundwater sample data collected from MW-7-2020 (Figure 4-3) as part of the Site 110 RI has been provided by Parsons and incorporated into the AOI1 site characterization.

4.4.1 Fill

The unconsolidated materials above the clay in the North Rail Corridor AOI were identified as fill. No materials that had the appearance of native soils were encountered above the clay in AOI1. The fill varied in thickness from 36- to 77-inches bgs and is composed of soil, coal, and coke that had been reworked or placed over the history of the facility. A layer of rail bed materials was intermittently encountered along the former rail tracks. Where present, the rail bed materials were typically saturated.

4.4.1.1 Visual Description

The fill in AOI1 varied in depth at each location and along the length of the test pits (Appendices F and G). Complete test pit descriptions are provided in Appendix F, but several observations of specific importance are listed below:

- TP-BCP-47 (West End of AOI1, former Heavy Equipment Parking Area) encountered a layer of material described as a 4-inch thick laminated "crusty" layer of black silty Sand.
- Multiple Test Pits throughout AOI1 and other AOIs encountered 6- to 12-inch layers of nodules. These are typical of the materials found below former rail beds at the BCP Site (Radiological Screening Sample TP-BCP-47) and they produced the most groundwater flow of any material encountered in fill at the BCP Site.
- TP-BCP-04 (Excavated from AOI2 North of the Warehouse across AOI1 toward the North). The test pit was more than 60 feet long and the conditions varied over the length of the test pit, but the south end (closest to the Former Production Area) encountered a 2-inch diameter pipe containing low viscosity tar (see Photograph Broken Pipe in TP-BCP-04, 2-inch diameter at S7[17], 24-inches BGS, Appendix G). A thin seam of low viscosity tar like material was encountered intermittently between 15- and 29-feet from the south end of the test pit between 26- to 33-inches bgs (see Photograph TP-BCP-04, Weeping Tar @26 to 33-inches BGS @ S15, Appendix G). A sample at this location contained the greatest number and concentration of SVOCs/PAHs of any sample in AOI1. The entire length of the pipe that was encountered, the viscous tar, and the surrounding soil were subsequently excavated and moved to the grossly contaminated storage area for characterization and disposal;
- TP-BCP-05 (Excavated East to West North of the Tar Management Area). The test pit was approximately 47 feet long and the conditions were consistent over the length. Between 4- and 10-inches bgs, there was black hard crystalline and solidified tar/fill mixture; and
- TP-BCP-46 (Excavated South to North from a location Northeast of the former Rail Car RC10 and crossing the AOI1 boundary, the Test Pit log for this section is designated "TP-BCP-46 NS"). There was a significant volume of debris and a more limited amount of material visually classified as potential purifier fill (based on blue color) at this location.

4.4.1.2 Sample Data

The analytical data for the fill in AOI1 is presented in Table 4-2. No VOCs were detected in the fill samples above the commercial Part 375 Soil Cleanup Objectives (SCOs). As explained earlier, soil criteria have been used but a significant fraction of the PAHs are from coal and coke in the fill. The groundwater data demonstrate these PAHs are not significantly mobile. In addition to the Tables, the complete data set, with detections below the commercial SCOs are presented in the Appendices. The Figures in this Section contain "ChemBoxes" that provide a visual presentation of the data for a given media in a given section of the BCP Site. Figure 4-1 provides two examples (from the most impacted area of the Former Production AOI, MW-BCP-05A), ChemBoxes, and the associated legend for the Figures referenced in the following sections of this chapter.

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[17] For reference the nomenclature used for test pit locations is the starting end (in this case S for south) and the distance from the start (in this case 7 feet), so a sample or photograph that is TP-BCP-04/S7 was collected or taken 7 feet from the south end of the test pit.

SVOCs were detected in all 19 fill samples collected in AOI1 (Figures 4-2 and 4-3) and 15 of the samples contained constituents at concentrations above the commercial use SCO. The highest concentrations of SVOCs in the fill were detected in the sample collected from TP-BCP-04 where a pipe and a thin seam of low viscosity tar-like material was encountered (Figure 4-1). The following table provides a summary of the detected constituents and the locations as shown on Figures 4-2 and 4-3. This table highlights the data in excess of the commercial SCOs, the figures provide the location context:

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Anthracene	580,000	500,000	A single exceedance in TP-BCP-04
Benzo (a) Anthracene	5,600 to 470,000	5,600	Multiple Locations in AOI1
Benzo (a) Pyrene	1,400 to 520,000	1,000	Multiple Locations in AOI1
Benzo (b) Fluoranthene	6,400 to 490,000	5,600	Multiple Locations in AOI1
Benzo (k) Fluoranthene	110,000 to 190,000	56,000	Multiple Locations in AOI1
Chrysene	81,000 and 450,000	56,000	Multiple Locations in AOI1
Dibenz(a,h) Anthracene	760 to 61,000	560	Multiple Locations in AOI1
Dibenzofuran	370,000	350,000	TP-BCP-04 Only
Fluoranthene	1,500,000	500,000	TP-BCP-04 Only
Fluorene	580,000	500,000	TP-BCP-04 Only
Indeno(1,2,3-c,d) Pyrene	11,000 to 300,000	5,600	Multiple Locations in AOI1
Naphthalene	1,900,000	500,000	TP-BCP-04 Only
Phenanthrene	1,900,000	500,000	TP-BCP-04 Only
Pyrene	1,100,000	500,000	TP-BCP-04 Only

Table N4-1: Summary of SVOCs Detected above commercial SCOs in AOI1 Fill

Exceedances of metals above the commercial SCOs were infrequent and not substantially above the respective criteria. The sample from SS-BCP-11 contained Arsenic at 18.5 mg/Kg above the commercial SCO of 16 mg/Kg, the sample from TP-BCP-05 contained Lead at 1,520 mg/Kg above the commercial SCO of 1,000 mg/Kg, and the sample SS-BCP-03 contained Mercury at 3.2 mg/Kg above the commercial SCO of 2.8 mg/Kg. No other exceedances of the commercial SCOs for metals were detected.

No fill samples contained VOCs, 1,4-Dioxane, PCBs, Pesticides, Herbicides, Perfluorooctanesulfonic acid (PFOS), or Perfluorooctanoic acid (PFOA) above the respective commercial SCOs. PFAS constituents are compared to the newly finalized standards.

VOCs were infrequently detected, with the exception of the 0- to 1-foot sample from TB-BCP-04, Benzene at 19,000 ug/Kg, below the commercial SCO of 44,000 ug/Kg, and Ethylbenzene, Styrene, Toluene, and m,p-Xylene, and o-Xylene, all close to or less than 10 percent of their commercial SCOs. No other sample contained a detectable concentration of a VOC above 1 percent of the respective commercial SCO.

The key findings related to the distribution of potential concentrations of interest in fill in AOI1:

1. Exceedances of commercial SCOs were primarily associated with SVOCs.

2. There were no exceedances of the commercial SCOs in the surface fill or shallow fill sample at the BCP Site boundary at the MW-BCP-06 location.
3. The numbers of constituents and concentrations detected in shallow fill above the commercial SCOs were relatively low at the west and east ends of the AOI with the exception of the samples from MW-BCP-23A. The concentrations in the sample from MW-BCP-23A represent a local area of disposal or release from the rail corridor.
4. With only the exceptions noted above, the exceedances were primarily SVOCs.
5. The highest numbers and concentrations of SVOCs above the commercial SCOs are associated with the location of low viscosity tar (TP-BCP-04), which was removed.
6. Samples collected from locations without low viscosity tar contained concentrations that were one to two orders of magnitude less than the TP-BCP-04 sample.
7. The thin layer of low viscosity tar was identified in TP-BCP-04 and within the discharge line excavation for the Groundwater IRM over an estimated area of 5,000 sf.
8. The shallow fill sample from MW-BCP-21A collected from 0 to 1 feet bgs contained five PAHs above the commercial SCOs, but the sample collected from 3 to 4-feet bgs did not have a single compound over the commercial SCOs.
9. The shallow fill sample from MW-BCP-23A collected from the 0 to 1 feet bgs contained six PAHs above the commercial SCOs.
10. Samples from MW-BCP-21A and MW-BCP-23A were indicative of materials from the former rail tracks (bedding and ballast), while SS-BCP-13 was taken away from the former rail lines and had only a single compound (benzo(a)pyrene) above the commercial SCO.

4.4.2 Clay

Impacts to the underlying clay layer are shallow, minor, and localized. Exceedances of SCOs in clay were limited to a single sample near the fill/clay interface at TP-BCP-46, in an area of industrial debris disposal and suspected purifier-impacted fill placement. Only one clay sample from this AOI1 (Figure 4-4 and 4-5, Table 4-3) contained concentrations above the commercial SCOs. The sample collected from 46-inches bgs at TP-BCP-46 from the area of fill north of the former rail car RC10 location contained Barium (619 mg/kg vs. an SCO of 400 mg/kg), Mercury (3.5 mg/Kg vs. an SCO of 2.8 mg/kg), and cyanide (1,140 mg/kg vs. an SCO of 27 mg/kg).

The key findings related to the distribution of potential concentrations of interest in clay in AOI1:

1. With one exception, there were no exceedances of commercial SCOs in samples of clay from the North Rail Corridor, effectively the north BCP Site boundary.
2. There were no exceedances of the commercial SCOs in the clay samples collected in the North Rail Corridor AOI except one location near the fill/clay interface at TP-BCP-46. The exceedance in the clay sample was from the fill/clay in an area of industrial debris and suspected purifier fill placement.
3. There was cyanide detected in the sample from the area immediately northeast of the purifier box location suggesting a legacy source and potential historical impact from the materials management practices observed in the test pit.

4.4.3 Shallow Groundwater – "A" Zone

Shallow groundwater occurrence in the fill was intermittent. Several test pits encountered fill that was unsaturated to the top of clay. Water flowed into test pits at several other areas of the AOI, predominately when rail bed materials were encountered. The materials that produced flowing water most consistently were the granular former rail bed materials.

Shallow groundwater in TP-BCP-04 (near the buried pipe) and TP-BCP-14 (former diesel tank area) produced a sheen. The occurrence of the sheen corresponds to known localized former sources in the AOI.

Monitoring Wells MW-BCP-06A, MW-BCP-21A, MW-BCP-22A and MW-BCP-23A (Figure 4-6 and 4-7) provided data along the length of the AOI. Benzene, PAHs, metals, cyanide, PFOS, PFOA, and ammonia were detected above the Class GA Ambient Water Quality Standards in the fill groundwater, although not uniformly distributed across the AOI:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	1.1	1	MW-BCP-21A Only
Benzo(a)Anthracene	4.7	0.002	MW-BCP-22A Only
Benzo(b)Fluoranthene	1.2 to 7.2	0.002	MW-BCP-06A, MW-BCP-22A and MW-BCP-23A
Benzo(k)Fluoranthene	3	0.002	MW-BCP-22A Only
Chrysene	1.3 and 4.6	0.002	MW-BCP-22A and MW-BCP-23A
Indeno(1,2,3-C,D)Pyrene	5.3	0.002	MW-BCP-22A Only
Arsenic	67.4	25	MW-BCP-22A Only
Chromium	66.1	50	MW-BCP-06A Only (Duplicate was below WQS)
Iron	641 to 97,500	300	All MW Samples
Lead	47.4	25	MW-BCP-22A Only
Magnesium	49,300	35,000	MW-BCP-22A Only
Manganese	418 to 3,600	300	All MW Samples
Selenium	15.1	10	MW-BCP-22A Only
Sodium	22,200 to 135000	20000	MW-BCP-06A, MW-BCP-21A and MW-BCP-23A
Cyanide	0.268	0.2	MW-BCP-23A Only
PCB Aroclor 1248	1.8	0.09	MW-BCP-06A (Not detected in Second Round)
Perfluorooctanesulfonic acid (PFOS)	0.013	0.0027	MW-BCP-06A Only
Perfluorooctanoic acid (PFOA)	0.011 to 0.012	0.0067	MW-BCP-06A Only
Ammonia	3.72	2	MW-BCP-21A Only

Table N4-2 Summary of Water Quality Data for the Shallow Fill Water in AOI1

The inconsistent detection of constituents above the Class GA Standards suggests the shallow groundwater has been impacted more by localized separate events/activities in this AOI rather than from migration of constituents from the Former Production Area (AOI2).

4.4.4 Medium Deep Groundwater "B & C" Zones

Monitoring Wells MW-BCP-06C and MW-BCP-21C (Figure 4-8) were installed along the northern BCP Site boundary. The Medium Deep Monitoring Wells are those screened across the upper clay (the "B" wells) and the lower clay (the "C" wells). The monitoring wells did not produce significant amounts of groundwater, and both were purged dry during sampling.

The MW-BCP-06 cluster was located near the relative location of a historical well (MW12-89) that had produced samples with cyanide detections. The screened interval of MW-BCP-06C was below the screened depth of the historical well to confirm/detect any vertical migration of the historical cyanide data. MW-BCP-21C was located north of MW-BCP-05C to provide an understanding of potential extent and mobility of constituents detected in the Former Production Area in relation to the BCP Site boundary. Cyanide was not detected in the medium deep groundwater sample from MW-BCP-06C. There were detections of phenol, arsenic, and seven metals in the samples from this well slightly above the Class GA Standards. The samples (Table 4-6) contained seven metals above the Class GA Standards. The presence and concentration of four metals (Iron, Manganese, Magnesium, and Sodium) are considered to be representative of naturally occurring background compound concentrations. Arsenic, Beryllium, Chromium, Lead while naturally occurring metals, are not considered representative of background conditions at this BCP Site as they were not detected in a majority of the monitoring wells screened across clay intervals. The detection of phenol in the second round sample from MW-BCP-06C was only slightly above the Class GA Standard. These metals and phenol were only detected above the Class GA Standards in the second round of samples:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Phenol	3.2	1	MW-BCP-06C Only, second round Only
Arsenic	25	25	MW-BCP-06C Only, second round Only
Beryllium	3.5	3	MW-BCP-06C Only, second round Only
Chromium	61.3 to 119	50	MW-BCP-06C Only
Iron	1,320 to 107,000	300	Both MW-BCP-06C and MW-BCP-21C
Lead	41.6	25	MW-BCP-06C, second round Only
Manganese	913 to 2,290	300	MW-BCP-06C Only
Magnesium	84,500 to 168,000	35,000	Both MW-BCP-06C and MW-BCP-21C
Sodium	67,300 to 118,000	20,000	Both MW-BCP-06C and MW-BCP-21C

Table N4-3 Summary of Water Quality Data for the Clay Water Bearing Unit in AOI1

4.4.5 Deep/Bedrock "D" Groundwater

Monitoring well MW-BCP-21D was installed in bedrock at the north BCP Site boundary north of the production area (Figure 4-9). The sample from the bedrock well contained three naturally occurring metals considered to be background groundwater quality above the Class GA Standard, Figure 4-9, Table 4-7. The groundwater in the bedrock has not been impacted by the BCP Site due to the competent low permeability clay layer overlying the bedrock:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	6,550 to 6,780	300	
Magnesium	58,000 to 59,000	35,000	
Sodium	64,900 to 65,800	20,000	

Table N4-4 Summary of Water Quality Data for the Bedrock Water Bearing Unit in AOI1

4.4.6 Utilities and Subsurface Features

There are subsurface features and utilities from the TCC operations throughout the AOI. The most dominant features are associated with the former rail beds, but there were also buried utility pipes (the 8-inch emergency water line and abandoned discharge lines addressed by the Abandoned Pipe IRM), the underground COG lines that historically serviced the Town of Tonawanda and Buffalo, and the underground rail scale vault.

4.5 AOI 2 – Production Area West

AOI 2 – Former Production Area (Figures 4-10 and 4-11) covers approximately 23.6 acres of the BCP Site. The production area AOI encompasses the area of the BCP Site where the 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 includes the locations of former buildings used for heavy vehicle maintenance and the machine shop.

The data and findings from the western section of the production area from the west side of the boiler house to AOI3 is presented in this section. The eastern section from the west side of the boiler house to the Site 110 boundary, is presented in Section 4.6.

Photo 4-3: Looking west at a portion of AOI2 – Former Production Area East

Note: structures and equipment shown may have been demolished/removed since date of photo. Only the Purifier Box remains in AOI 2 East.

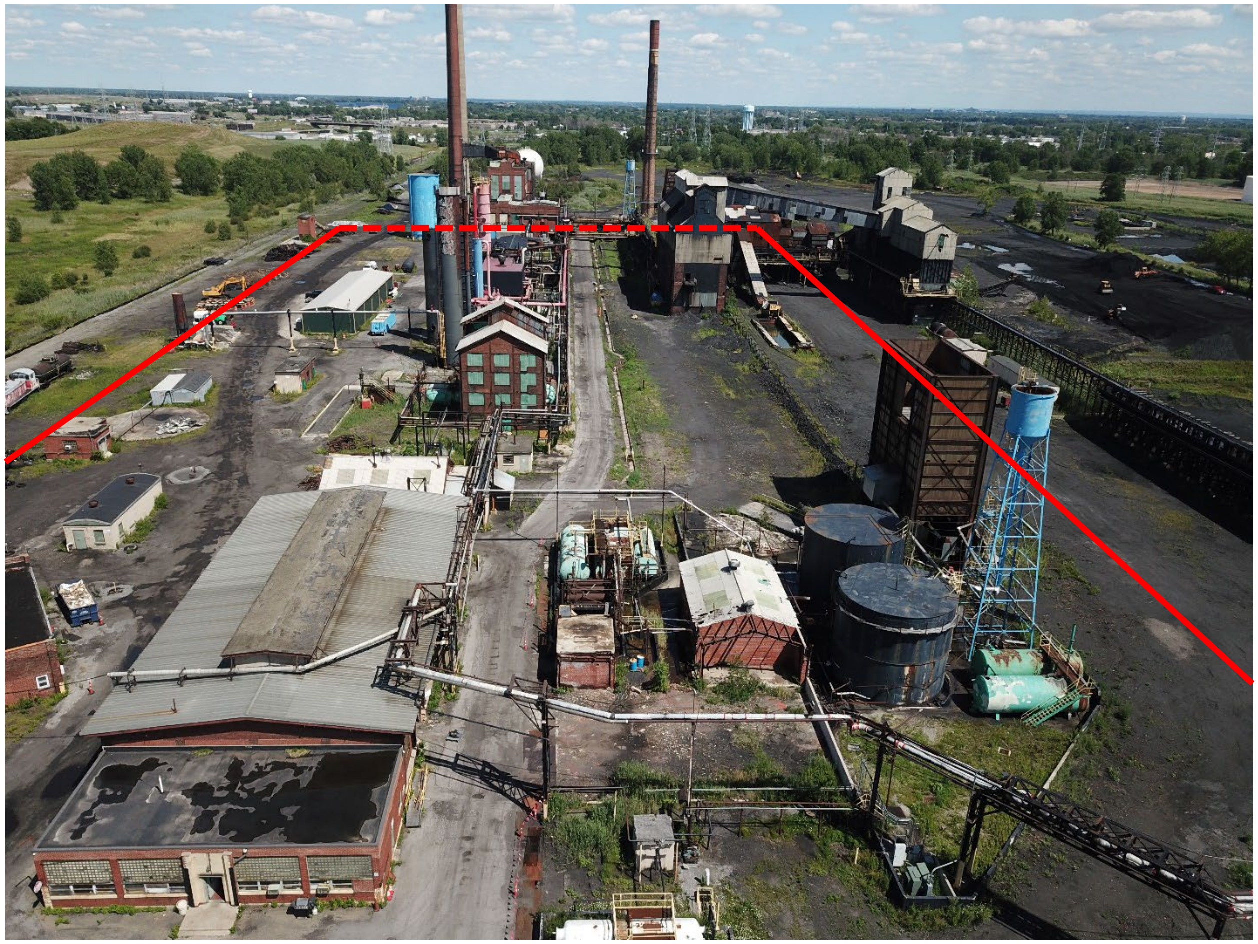

Photo 4-4: Looking east at a portion of AOI2 – Former Production Area West

Note: structures and equipment shown may have been demolished/removed since date of photo. Only the former Maintenance and machine shop in the lower left of the photograph remains.

Large areas of this AOI are paved, covered with two buildings (maintenance and green warehouse), slabs from demolished buildings, or covered by concrete lined secondary containment structures. Stormwater from this AOI is collected in two underground storm sewer systems (the box culvert and the North Storm Sewer System), conveyed to the mansion sump (in AOI1) and subsequently to two concrete lined settling and oil water separator ponds (on Site 109) before discharge through Outfall #001. The stormwater system has been the subject of multiple phases of IRMs to remove the residuals left in the stormwater collection systems by TCC.

Prior to the 1970s, storm and process water was discharged to the Niagara River through pipelines that crossed the north BCP Site boundary near the former "Mansion" office building location and crossed former Wickwire Spencer properties. The water line entered the plant across AOI3 and into a meter pit in front (west) of the maintenance building on AOI2.

ACMs were present throughout AOI2. ACM abatement was one of the major activities completed during the first 18 months of RITC ownership. As required by the NYSDOL, a comprehensive ACM and universal waste survey was completed on the BCP Site. The majority of the ACM abatements were completed during the first 18 months of RITC ownership. This was one of the most comprehensive projects affecting nearly the entire BCP Site and only a limited amount of ACM; buried pipes, the office, and the maintenance building, is known to still exist on the BCP Site[18].

AOI2 contained most of the remaining tanks and process equipment on the BCP Site. Ongoing maintenance, monitoring, sampling, testing, and materials recovery and disposal are the subject of multiple ongoing IRMs in this AOI.

Nine (9) Test Pits (Figure 4-10) were excavated in whole or in part in the West End of AOI2 in areas of suspected releases from former production processes, equipment maintenance and leakage, materials management areas, and in the vicinity of former tanks and utilities:

- TP-BCP-01 was excavated northwest to southeast across the east end of the former heavy equipment maintenance building (aka the Roundhouse) in an area where former TCC personnel had indicated TCC may have had a history of frequent spills and releases of petroleum products;
- TP-BCP-32 was excavated at the west end of the former coke unloading yard immediately south of the weak ammonia liquor storage tanks;
- TP-BCP-47 was added to the RI scope based on a conversation with former employees of TCC in an area where they explained that "old" heavy mobile equipment was frequently parked;
- TP-BCP-02 was excavated from the pad on the east end of the former oil house to the foundation of a former tar storage tank;
- TP-BCP-43 was excavated west of the warehouse and an overhead pipe bridge. The location is immediately north of the COG processing equipment;
- TP-BCP-04 was excavated from AOI2 into AOI1 in an area of a seep identified by OSC site personnel;
- TP-BCP-03 was advanced along the northwest edge of the former Battery No. 1 location, near the box culvert;
- TP-BCP-06 was excavated on the former Battery No. 1 location; and
- TP-BCP-08 was excavated along the north side of Battery No. 2 in the pusher track location.

The west end of the Former Production Area contains the highest density of monitoring wells installed on the BCP Site (Figure 4-12):

- MW-BCP-02A and B were installed downgradient of the Light Oil Area;
- MW-BCP-04A and B were installed at the downgradient side of the weak ammonia liquor tanks area;
- MW-BCP-05 A, C, and D were installed immediately downgradient of the tar management area. MW-BCP-05D is one of four bedrock wells installed during the RI;
- MW-BCP-07C was installed in the coke yard just west of the former west coke wharf;
- MW-BCP-09 A and B were installed on the north side of former Battery No. 1 near the northwest corner of the former coal handling building location; and
- MW-BCP-10 A and C were installed immediately north of the former exhauster building.

One (1) Surface Soil Sample was collected in the AOI2 Production Area West:

- SS-BCP-01 was collected immediately north of the secondary containment around the tar management area.

[18] The remaining known ACM Abatement includes the floor tile in the office and maintenance buildings, and suspected pipe insulation on a buried pipe below the former coke trestle.

4.5.1 Fill

The unconsolidated materials above the clay in the Production Area West AOI were identified as fill (Figure 4-10). No materials that had the appearance of native soils were encountered above the clay in the Production Area AOI. The fill was 20- to 60-inches thick and predominantly contained coal, coke, breeze, some gravel with staining, and reworked soils.

4.5.1.1 Visual Description

The fill at the BCP Site varied in depth at each location (Figure 4-10) and throughout the AOI. The production area, more than any other AOI, had significant variations in use and anticipated impact:

- TP-BCP-01 was a 59-foot-long test pit excavated from the northwest to the southeast near the east end of the former heavy machine maintenance building. Materials encountered near the surface appeared to have a crust of fill and degraded petroleum. There was no free water in TP-BCP-01.
- TP-BCP-32 was a 60-foot-long test pit near the west end of the coke rail yard that contained rubble, coke, nodules, and a small section of solidified tar and fill.
- TP-BCP-47 was a 60-foot-long test pit excavated north of the former entrance to the former heavy equipment building. There was a 4-inch-thick layer of crusted fill that appeared to have been subject to multiple cycles of saturation and degradation of petroleum. Uncharacteristically, the layer of nodules produced little water at this location, potentially because of the control of flow exerted by the nearby North Storm Sewer system.
- TP-BCP-02 was a 50-foot-long test pit excavated from the concrete slab outside the former oil house to the location of a concrete former tank pad. The area appeared to have been the location of a former building as numerous foundations were encountered.
- TP-BCP-43 was excavated west of the pipe bridge located west of the green Warehouse (Building No. 18). This test pit produced the highest PID reading of 4.9 ppm and had the most noticeable odor. The excavation contained significant amounts of brick and foundation debris.
- TP-BCP-04 was excavated from AOI2 North of the Warehouse to the north across AOI1. The test pit was more than 60 feet long and the conditions varied over the length of the test pit, but the south end (closest to the Former Production Area) encountered a pipe containing low viscosity tar. A thin seam of low viscosity tar like material was encountered intermittently between 15- and 29-feet from the south end of the test pit between 26- to 33-inches bgs (see Photograph, Appendix E). The sample collected at this location contained the greatest number and concentration of SVOCs/PAHs of any sample in AOI2. The pipe and surrounding soil were excavated and moved to the grossly contaminated storage area;
- TP-BCP-06 was excavated in the area of the former Battery No. 1. The top of the battery foundation was encountered at 32-inches bgs, and the brick foundation was completely saturated with water.
- TP-BCP-03 was a 50-foot-long test pit excavated along the north side of the former Battery No. 1 immediately south of the box culvert. The fill with nodules produced no water at this location despite the reservoir of water in the battery foundation at TP-BCP-06.
- TP-BCP-08 was a 55-foot-long test pit excavated in the former pusher track immediately north of the existing battery. The upper fill had a significant sand sized coke fraction, while the deeper (>21-inches bgs) fill had significant amounts of brick.

The occurrence of tar in the West Production Area consisted of three forms:

- Near surface (typically surface to 4-inches) solidified tar/fill mixtures that were crusted and laminated (TP-BCP-47 and TP-BCP-05);
- Isolated areas with crystalline tar (TP-BCP-05 [4- to 10-inches bgs]); and

- Viscous tar in the area of TP-BCP-04 (some flowing from a pipe, not in fill. The pipe and surrounding fill were removed during the test pit excavation and during the collection system installation for the groundwater IRM).

Six monitoring well clusters (MW–BCP-02, MW-BCP-04, MW-BCP-05, MW-BCP-07, MW-BCP-09, and MW-BCP-11) were installed in AOI2. The borings for the monitoring wells encountered fill consistent with the observations made during the test pitting program.

4.5.1.2 Sample Data

Twelve (12) samples of fill were collected in the west portion of the Production Area AOI and one or more SVOCs were detected above the commercial SCOs in 11 of the 12 samples.

The analytical data for the fill soil is presented in Table 4-8 and on Figure 4-10. Nine SVOCs were detected in shallow fill samples within the West section of AOI2 at concentrations above the commercial SCOs (Figure 4-10). The maximum concentrations in the west part of AOI2 are typically one order of magnitude higher than the maximum concentrations in the samples of fill from the eastern section of AOI2:

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	6,200 to 330,000	5,600	10 of 13 Fill Samples in AOI2 West
Benzo (a) Pyrene	1,100 to 550,000	1,000	12 of 13 Fill Samples in AOI2 West
Benzo (b) Fluoranthene	8,600 to 510,000	5,600	10 of 13 Fill Samples in AOI2 West
Benzo (k) Fluoranthene	160,000	56,000	One Fill Sample in AOI2 West – TP-BCP-10
Chrysene	340,000	56,000	One Fill Sample in AOI2 West – TP-BCP-10
Dibenz (a,h) Anthracene	730 to 90,000	560	11 of 13 Fill Samples in AOI2 West
Indeno (1,2,3-c,d) Pyrene	5,900 to 470,000	5,600	9 of 13 Fill Samples in AOI2 West
Fluoranthene	520,000	500,000	One Fill Sample in AOI2 West – TP-BCP-10
Pyrene	510,000	500,000	One Fill Sample in AOI2 West – TP-BCP-10

Table N4-8: Summary of SVOCs Detected above Commercial SCOs in AOI2 (West) Fill

Only one fill sample (MW-BCP-05 collected between 0 and 1-foot bgs) contained a metal, Mercury at 3.7 mg/Kg above the commercial SCO of 2.8 mg/Kg.

No fill samples collected in the western section of AOI2 contained other metals, cyanide, 1,4-Dioxane, VOCs, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

VOCs were only detected at low concentrations (all below the commercial SCOs) throughout the fill in the production area surface fill samples. Of the surface samples from AOI2, the samples from fill in the MW-BCP-05 and MW-BCP-10 locations had the highest concentrations and the sample from TP-BCP-03 was the only sample with no detection of VOCs. The highest concentrations were Benzene, 23,000 ug/Kg;

Ethylbenzene 470 ug/KG; Styrene 1,100 ug/KG; Toluene 18,000 ug/Kg; m,p-Xylene 4,200 ug/kg and o-Xylene 1,700 ug/kg; in the 0- to 12-inch bgs sample from the MW-BCP-10 location immediately north of the exhauster building, all below the commercial SCOs.

The key findings for the AOI 2 West Fill sampling:

1. With one exception, the exceedances of commercial SCOs in Fill were associated with SVOCs.
2. The numbers of constituents, range of concentrations, and maximum concentrations detected in shallow fill above the commercial SCOs were higher in the west Production Area than the east Production Area of AOI2.
3. The fill sample from 0-to-1-foot bgs collected at MW-BCP-10A had the highest concentrations of PAHs detected in a sample at the BCP Site. Measurable NAPL (viscous tar) was detected at MW-BCP-10A during both rounds of groundwater sampling conducted during the RI. During the drilling to install MW-BCP-10A, NAPL was observed in the spilt barrel sample from 1.75-feet below bgs to 3-feet bgs and visible NAPL was observed in the clay soil sample from 3-feet to 3.5-feet bgs. At 4-feet bgs the soil transitioned to a reddish brown and dry high plasticity clay with no visible NAPL. This location of the monitoring well cluster was selected in the immediate vicinity of the exhauster building and the tar loadout area. The data confirmed the management of materials in this area had a significant impact on shallow environmental media.
4. The fill sample from TP-BCP-04 contained the highest number of individual constituents and second highest concentrations of SVOCs above the commercial SCOs. The representative sample was collected in the area of a buried and leaking pipeline encountered in the test pit. The pipe and associated soil were removed during the test pit excavation and additionally during the subsequent Groundwater IRM excavation.
5. Tar does not appear to have migrated freely in the fill but is located in areas associated with former process equipment and piping (MW-BCP-10A, TP-BCP-04 and TP-BCP-43).
6. The single detection of mercury above the commercial SCOs in fill was in the near surface sample from MW-BCP-05 near the light oil scrubber.

4.5.2 Clay

Twenty-six (26) samples of clay were collected from the borings in the Western Part of the Former Production Area AOI2. One clay sample contained a single constituent (Table 4-9, Figure 4-11) at a concentration equal to the commercial SCO and one sample contained 5 constituents at concentrations above the commercial SCOs:

- The sample from 5- to 6-feet bgs from the boring for MW-BCP-10 immediately adjacent to exhauster building contained Benzo(a)Pyrene at 1,000 ug/kg equal to the commercial SCO of 1,000 ug/kg.
- The sample from the top of clay (20 to 20.5-inches bgs) from TP-BCP-43 contained four PAH constituents above the commercial SCOs (Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, and Dibenz(a,h)anthracene), and Arsenic at 16.5 mg/kg above the commercial SCO of 16 mg/kg.

The key findings for the AOI2 Clay sampling:

1. The detections at the commercial standard were at locations specific to localized activities and in the shallowest clay sampling depth, collected near the fill/clay interface.

2. The analytical data of all deeper clay samples is consistent with the geotechnical data demonstrating that the silty clay is of extremely low permeability and the concentrations of interest have not migrated vertically at the sampled locations in the AOI.

4.5.3 Shallow Groundwater "A" Zone

Of all the groundwater on the site the range of constituents and concentrations (Table 4-10, Figure 4-12) are greatest in the shallow water in the fill within AOI2 West. As with the other AOIs, groundwater occurrence in the fill was intermittent in AOI2 West. Several test pits contained no saturated fill to the top of clay while test pits and utility trenches near some dry test pits flooded immediately. Water flowed into test pits and utility trenches at several areas of the AOI including (1) over the old battery, (2) north and northwest of the warehouse, and (3) consistently when rail bed materials were encountered. As experienced across the site, the most productive (from a groundwater flow perspective) materials were the ballast materials below the former rail lines on the BCP Site. In this AOI, several broken or open pipes also produced flow. The most notable examples of pipe flow identified and sealed during the box culvert IRM, were two open COG lines that terminated in the box culvert. Both pipes were cut and filled with flowable fill during the box culvert portion of surface water IRM. The Groundwater IRM that is underway is addressing the source(s) of water to these pipes. During construction of the Groundwater IRM collection systems, areas of shallow groundwater flow were targeted and are being recovered.

Monitoring Wells MW-BCP-02A, MW-BCP-04A, MW-BCP-05A, MW-BCP-09A and MW-BCP-10A (Figure 4-12) were installed in the west end of the Production Area AOI. The fill monitoring well water samples contained 2 to 19 constituents above the Class GA Standards (Table 4-10):

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	12 to 5,000	1	MW-BCP-04A, 05A, and 10A
Ethylbenzene	75 to 190	5	MW-BCP-10A
Styrene	350	5	MW-BCP-05A, and 10A
Toluene	84 to 2,100	5	MW-BCP-05A, and 10A
m,p-Xylene	130 to 1,100	5	MW-BCP-05A, and 10A
o-Xylene	76 to 380	5	MW-BCP-05A, and 10A
1,4 Dioxane	2.1 to 2.3	1	MW-BCP-05A, and 10A
2,4-Dimethylphenol	71 to 2,900	50	MW-BCP-05A, and 10A
Benzo(a) Anthracene	2.7 to 2.9	0.002	MW-BCP-05A, and 04A
Benzo(b)Fluoranthene	3.1 to 4.2	0.002	MW-BCP-05A, and 04A

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzo(k)Fluoranthene	2.2	0.002	MW-BCP-04A
Biphenyl(Diphenyl)	26	5	MW-BCP- 10A
Chrysene	2.4 to 2.9	0.002	MW-BCP-05A, and 04A
Fluorene	56	50	MW-BCP-04A
Indeno(1,2,3-C,D)Pyrene	3.2	0.002	MW-BCP-04A
Naphthalene	580 to 6,300	10	MW-BCP-05A, and 10A
Phenol	4.2 to 2,300	1	MW-BCP-05A, and 10A
Arsenic	30.1 to 32.4	25	MW-BCP-05A Note: Arsenic was not detected over the Class GA Ambient Water Quality Standard in filtered sample collected in May 2022
Iron	619 to 4,970	300	All MW Samples
Manganese	687 to 829	300	MW-BCP-02A and 09A
Magnesium	35,600 to 236,000	35,000	MW-BCP-02A and 09A
Sodium	115,000 to 1,810,000	20,000	All MW Samples
Cyanide	0.435 to 751	0.20	MW-BCP-04A, 05A, 09A, and 10A
Beta BHC	0.1	0.04	MW-BCP-10A
Delta BHC	0.14	0.04	MW-BCP-05A
Gamma BHC	0.14	0.05	MW-BCP-05A
Chlordane	0.17	0.05	MW-BCP-05A
1,4-Dioxane	0.35 to 2.3	0.35	MW-BCP-05A, MW-BCP-10A and MW-BCP-12A
PFOS	0.0057 to 0.019	0.0027	MW-BCP-05A, MW-BCP-10A and MW-BCP-12A
PFOA	0.010 to 0.017	0.0067	MW-BCP-05A, MW-BCP-10A and MW-BCP-12A

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Ammonia	2,300 to 254,000	2,000	MW-BCP-04A, 05A
LOCATION REFERENCE:	MW-BCP-02A	West of the Oil Water Separator	
	MW-BCP-04A	West of Weak Ammonia Tank Secondary Containment	
	MW-BCP-05A	Central to Former Production Area	
	MW-BCP-09A	Immediately adjacent to the north side of the former Battery No. 1	
	MW-BCP-10A	Immediately west of the north side of the tar management area.	

Table N4-9 Summary of Water Quality Data for Shallow Groundwater in AOI2 (West)

The water quality in the fill zone in AOI2 West seems to be grouped into two sub-zones:

- The light oil/weak ammonia liquor and battery area (MW-BCP-02, MW-BCP-04, and MW-BCP-09) where exceedances above Class GA standards were primarily metals and cyanide and noticeably less VOCs and SVOCs; and
- The core of the Former Production Area (MW-BCP-05 and MW-BCP-10) with a broad range (metals, cyanide, VOCs, and SVOCs) above Class GA Standards.

Thallium was detected in round 1 for the RI sampling program in monitoring well MW-BCP-09A. Thallium was subsequently analyzed in samples collected in May 2022 for both dissolved and total thallium and was non-detect. The thallium detection is considered to be associated with solids in groundwater samples and is not believed to be a dissolved or mobile constituent in groundwater.

4.5.4 Medium and Medium Deep Groundwater "B & C" Zones

Monitoring wells MW-BCP-02B, MW-BCP-04B, MW-BCP-05C, MW-BCP-07C, MW-BCP-09B, and MW-BCP-10C (Table 4-11, Figure 4-13) were installed in the AOI2 West Former Production Area. The upper clay (medium depth) ground water samples contained (Table 4-11, Figure 4-13) two (2) to ten (10) metals above the Class GA Standards. The lower clay (medium deep depth) groundwater samples contained three (3) to five (5) metals, all considered naturally occurring background in the area, above the Class GA Standards. Cyanide was detected in one sample (MW-BCP-05C) above the Class GA Standard:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Upper Clay (B-Wells)			
Iron	1,600	300	MW-BCP-09B
Magnesium	87,800 to 173,000	35,000	All MW Samples
Sodium	63,900 to 91,500	20,000	All MW Samples
Lower Clay (C-Wells)			
Iron	307 to 39,900	300	All MW Samples
Magnesium	89,000 to 153,000	35,000	All MW Samples
Nickel	799	300	MW-BCP-7C
Sodium	75,000 to 108,000	20,000	All MW Samples

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Cyanide	1.68	0.2	MW-BCP-05C

Table N4-10 Summary of Water Quality Data for the Clay Water Bearing Unit in AOI2 (West)

The absence of VOCs, SVOCS, Pesticides, and PFAS constituents demonstrates the competency of the clay as a barrier to migration at the site.

4.5.5 Deep Bedrock Well "D" Zone

The water quality in the bedrock sample (MW-BCP-5D) is representative of regional groundwater. Three metals considered naturally occurring were detected above the Class GA Standards (Table 4-12, Figure 4-14). Thallium was detected in rounds 1 and 2 for the RI sampling program, but was subsequently sampled in May 2022 for both dissolved (filtered) and total and was not detected. The thallium detections are considered to be associated with solids in groundwater samples and are not believed to be a dissolved or mobile constituent in groundwater.

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	3,860 to 6,780	300	MW-BCP-05D Similar to other bedrock wells, naturally occurring background metals.
Magnesium	51,000 to 59,000	35,000	
Sodium	52,100 to 65,000	20,000	

Table N4-11 Summary of Water Quality Data for the Bedrock Water Bearing Unit in AOI2 (West)

4.5.6 Utilities and Subsurface Features

There are numerous subsurface features and utilities from the TCC operations throughout the western section of the AOI. Pipes, foundations, and utilities were encountered in nearly every test pit. The most dominant features are associated with the former rail beds, the box culvert, the North Storm Sewer, the former gas distribution system, and COG piping that was used to convey gas to the battery, boiler house and compressor building.

The box culvert and the North Storm Sewer have been cleaned and are still functioning as the primary means of stormwater management in the Production Area AOI. The cleaning of the box culvert allowed the identification, location, and sealing of more than 70 underground pipes that formerly crossed or discharged into the box culvert. The most pronounced seepage from or along these pipes was those located south of the monitoring well MW-BCP-05 cluster (two abandoned COG lines) and adjacent to the north side of the light oil secondary containment area. The groundwater at and around those pipes conveyed non-aqueous phase liquid (NAPL) and water with a noticeable and detectable concentrations of SVOCs.

The water in the west quench sump, west coke wharf, exhaust manifold and battery basement were sampled (Table 2-15, Figure 4-12). The water from the west quench sump, west coke wharf, and exhaust manifold was treated and pumped in accordance with the BCP Site POTW discharge permit (IWD Permit No. 331). The battery basement water sample contained metals above the concentrations allowed in the POTW permit and was treated in accordance with approval for discharge to the POTW of the Town of Tonawanda. The battery was removed, and the slab currently only manages stormwater. The exhaust tunnel along the south side of the former battery was in poor condition and produced water containing elevated concentrations of ammonia. A collection sump was installed in the tunnel backfill, and the water is periodically pumped to the groundwater treatment system for treatment and discharge to the Town of Tonawanda POTW in accordance with Permit No. 331.

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzo(a)Anthracene	1.6	0.002	Battery Basement Only
Benzo(b)Fluoranthene	4.1	0.002	Battery Basement Only
Benzo(k)Fluoranthene	1.4	0.002	Battery Basement Only
Chrysene	4	0.002	Battery Basement Only
Indeno(1,2,3-c,d)Pyrene	1.9	0.002	Battery Basement Only
Arsenic	46.4	25	Battery Basement Only
Beryllium	10.1	3	Battery Basement Only
Cadmium	6.2 to 315	5	Exhaust Manifold and Battery Basement
Chromium	1,130	50	Battery Basement Only
Iron	944 to 174,000	300	Quench Sumps and Batter Basement (High Value)
Lead	116	25	Battery Basement Only
Manganese	4,610 to 8,400	300	Exhaust Manifold and Battery Basement
Magnesium	95,000 to 118,000	35,000	Exhaust Manifold and Battery Basement
Nickel	339 to 2,630	100	Exhaust Manifold and Battery Basement
Sodium	31,900 to 522,000	20,000	All
Thallium	34.2 to 47.4	0.5	Exhaust Manifold and Battery Basement

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Zinc	2,420 to 26,000	2,000	Exhaust Manifold and Battery Basement
Cyanide	1.42	0.20	Battery Basement Only

Table N4-12 Summary of Water Quality Data for the Pits, Tunnel and Basement AOI2 (West) – Note: All have been treated and discharged to the POTW. The Pits, Tunnel, and Basements have all been decontaminated and backfilled.

4.6 AOI2 – Former Production Area - East

There were very significant differences in the use of the eastern and western portions of the Former Production Area AOI. This section contains a discussion of the conditions identified within the eastern portion of the AOI extending from the west end of the former location of the boiler house to the BCP Site boundary with adjacent State Superfund Site (Site 110). Unlike the eastern section of AOI 2, historical production processes in this section of the AOI were primarily steam and power production and COG processing and storage prior to sale offsite. Other than a reference to a prussiate recovery building[19] on a 1926 drawing, by-products processing was not known to have been conducted in this section of the AOI.

Six (6) Test Pits (Figure 4-15) were excavated in the eastern portion of AOI2 in areas of suspected materials management impacts and along the boundary between AOI2 and the adjacent State Superfund Site (Site 110):

- TP-BCP-11 was excavated at the east end of the battery in an area that had been frequently flooded by water seeping from the battery basement;
- TP-BCP-12 was excavated along the south side of the Purifier Boxes;
- TP-BCP-13 was excavated south of the pile of iron oxide from the Purifier Boxes;
- TP-BCP-46 was excavated south and north of the former rail car RC10 location and south and east of piles of unsorted materials near AOI1;
- TP-BCP-42 was excavated along the AOI2/Site 110 boundary directly east of the purifier boxes; and
- TP-BCP-48 was excavated along the AOI2/Site 110 boundary west of Tar Seep 2.

Two (2) Monitoring Wells MW-BCP-12A and MW-BCP-12B were installed in the eastern portion of AOI2. Monitoring Well MW-BCP-22A was installed immediately north of the AOI boundary. Two Monitoring Wells MW-07-2020 and MW-04-2020 were installed east of AOI2 on the adjacent State Superfund Site (Site 110) by Parsons Engineering as part of the ongoing remedial investigation of Site 110. The adjacent State Superfund Site (Site 110) is not part of the BCP Site and not included in this RI although groundwater elevations and water quality data help support analysis of the shallow groundwater system.

Three (3) Surface Soil Samples were collected in the AOI2 Former Production Area East:

- SS-BCP-04 was collected north of the Iron Oxide Pile west of the former gas holder location (Demolished in 2021);
- SS-BCP-05 was collected from within the westernmost Purifier Box; and

[19] Prussiate is a ferrocyanide byproduct that may have been produced at the BCP Site. A 1926 drawing indicated that there was a “prussiate recovery building” near the MW-BCP-12 location. No records of the period of operation are available.

- SS-BCP-06 was collected near the base of the east end of the Iron Oxide Pile.

4.6.1 Fill

The unconsolidated materials above the clay in the Former Production Area East AOI were identified as fill (Figure 4-15). No materials that had the appearance of native soils were encountered above the clay in this section of the AOI. The fill varied in thickness from 42- to 110-inches (not including the height of the pile of iron oxide material) and was composed of coke, coal, and soils that had been reworked over the history of the facility. The fill was predominately composed of black colored fine (breeze) to cobble sized coke.

4.6.1.1 Visual Description

The fill characteristics varied in depth at each test pit location and between test pit locations along the length of the eastern portion of the AOI. The conditions east of the boiler house are significantly different than those encountered west of the boiler house. Notable observations in the eastern portion AOI (Appendix F and G) include:

- TP-BCP-11 was excavated at the east end of the battery. The fill encountered in the 30-foot-long test pit was wet and contained a significant volume of industrial debris. Clay was encountered at 42-inches bgs.
- TP-BCP-12 was excavated along the south side of the purifier boxes. A buried rail line was encountered in the originally planned location; however, the excavator could not advance past the feature and the test pit was shifted 10-feet south. The test pit was excavated east to west for approximately 20-feet and bounded by the rail and purifier box to the north, the box culvert to the east and south, and a water line to the west. Nodules typical of former rail bed materials were encountered between 20- and 42-inches bgs. This ballast (nodule) material was saturated and produced flowing water that flooded the test pit;
- TP-BCP-13 was excavated north to south and located immediately south of the iron oxide pile. A hard solidified tar layer was encountered at 45-inches bgs, and the excavator could not advance below the layer;
- TP-BCP-46 was excavated in three sections to identify and define conditions in the vicinity of the rail car RC10 (since removed) and several piles of industrial debris. The test pit encountered cobble size coke, suspected purifier fill, and large amounts of industrial debris. Water seeping into the test pit had a blue color tint suggesting potential purifier waste impact and some sheen suggesting petroleum or biological impacts (See Photographs TP-BCP-46 [West to East] through TP-BCP-46 North [South to North, Flow into trench, slight sheen], Appendix G). The location north of the former rail car (RC-10) appeared to have been used for debris management.
- TP-BCP-42 was 110-feet-long and encountered a single piece of hard tar, nodules, and brick. The nodule material was saturated and produced significant flow which flooded the test pit to a depth of approximately 5-feet bgs.
- TP-BCP-48 was 65-feet-long and excavated along the Site 110 boundary immediately west of Tar Seep 2 (Tar Seep 2 is on Site 110). Significant amounts of debris were encountered but no tar materials. Similar to other test pits there was seepage in the zone where nodule material was present. Some of the debris materials had a pronounced petroleum odor; however, there were no readings/detections on the PID.

The boring logs for MW-BCP-12 and MW-BCP-22 are included in Appendix B. The borings encountered fill consistent with the observations made during the test pitting program.

4.6.1.2 Sample Data

Six fill samples were collected from two test pits, one monitoring well boring, and three surface sample locations in the eastern portion of the Former Production Area AOI. SVOCs were detected at concentrations above commercial SCOs (as explained earlier, comparisons to SCOs can be misleading as the mineral matrix is different than the natural soil materials SCOs were based on) in all samples except for the surface sample collected at SS-BCP-05 which was associated with the iron oxide pile. The samples from the iron oxide in the purifier box are unique to that BCP Site feature and are not representative of the broader discussion of fill impacts on the BCP Site (no SVOCs above criteria and cyanide was detected at 549 mg/kg). As would be expected in an area away from the by-products processing, the other samples had fewer overall SVOCs that the western section of AOI2 and the concentration range was narrower and the maximum concentration lower. The analytical data for the fill is presented in Table 4-13 and on Figure 4-15. The SVOCs detected in shallow fill samples within the eastern portion of AOI2 at concentrations above the commercial SCOs (Figure 4-15) included:

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	7,800 to 15,000	5,600	4 of 7 Samples Collected in AOI 2 East
Benzo (a) Pyrene	1,400 to 19,000	1,000	5 of 7 Samples Collected in AOI 2 East
Benzo (b) Fluoranthene	8,500 to 30,000	5,600	5 of 7 Samples Collected in AOI 2 East
Dibenz (a,h) Anthracene	1,300 to 4,400	560	5 of 7 Samples Collected in AOI 2 East
Indeno (1,2,3-c,d) Pyrene	8,100 to 16,000	5,600	3 of 7 Samples Collected in AOI 2 East

Table N4-5: Summary of SVOCs Detected above Commercial SCOs in AOI 2 (East) Fill

Because the sample results from the eastern portion of AOI2 are on average much lower and have a much narrower range of concentrations than those detected in western portion of the AOI, this area is considered to have been more affected by material management than production.

Three samples were collected that represent material from the “iron oxide[20]” piles. This material is directly (SS-BCP-05) or partly (SS-BCP-04 and SS-BCP-06) from the purifier boxes. The absence of SVOCs above criteria in SS-BCP-05 suggests the purifier box fill in the boxes or pile has had limited contact with and was not comingling with the fill across the surface of the AOI.

The “iron oxide” material in the pile outside the box (SS-BCP-04 and SS-BCP-06) contains SVOCs, metals, and cyanide above commercial SCOs. No other fill soil samples collected in the eastern portion of AOI2 (other than the “iron oxide” piles) contained metals or cyanide above reference criteria. No fill samples from this AOI contained VOCs, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above commercial SCOs.

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[20] The term “iron oxide” has been used at the BCP Site to describe the fill in, and from, the purifier boxes. The material is a residual from the boxes that contains iron oxide, wood fibers, industrial debris, and process residuals. COG was passed through the purifier boxes to remove cyanide and hydrogen sulfide before the gas was sold for offsite use.

VOCs were infrequently detected, with the exception of low estimated concentrations the 0- to 1-foot sample from MW-BCP-12 (in Broadway), and a single low estimated detection of Toluene in the surface sample at TP-BCP-11.

The key findings for the AOI 2 East Fill sampling:

1. The highest numbers and concentrations of SVOCs above the commercial SCOs outside the iron oxide pile are associated with the MW-BCP-12 location, which is near the boiler house, former battery bag house (since removed), and the box culvert. Historically (based on a 1926 drawing) a prussiate recovery building was in that vicinity. Prussiate recovery was a process that produced a ferrocyanide compound.
2. The numbers of constituents and concentrations detected in shallow fill above the commercial SCOs were relatively low at all locations east of MW-BCP-12.
3. Relatively low concentrations of Arsenic (22.3 mg/Kg vs. the commercial SCO of 16 mg/Kg) and Copper (408 mg/Kg vs. the commercial SCO 400 mg/Kg) were detected in the sample collected at SS-BCP-04.
4. Cyanide was detected at concentrations ranging between 20.5 and 549 mg/Kg from the three "iron oxide" samples.

4.6.2 Clay

Samples of the clay were collected from the test pits and the boring for MW-BCP-12. Clay samples were largely free of any concentrations above the commercial SCOs (Table 4-14 and Figure 4-16) with the exception of:

- A shallow clay sample collected from TP-BCP-13 immediately adjacent to the "iron oxide" pile that contained Arsenic at a concentration of 26.7 mg/Kg vs the commercial SCO of 16 mg/Kg.
- A clay sample collected at the base of TP-BCP-46 where there was visual evidence of disposal of purifier waste (overlying fill and perched water had a characteristic blue color) that contained concentrations of Barium (619 mg/Kg vs the commercial SCO of 400 mg/Kg), Mercury (3.5 mg/Kg vs the commercial SCO of 2.8 mg/Kg), and Cyanide (1,140 mg/kg vs. the commercial SCO of 27 mg/Kg).
- A clay sample from TP-BCP-48 along the boundary with Site 110 contained significant concentrations of PAHs. This sample was collected beneath a substantial volume of industrial debris and fill at a depth of 100-inches bgs which is noted as a deeper depth to the top of clay compared to most of the BCP Site.

The key findings for the AOI 2 East Clay sampling:

1. The detections of constituents above the commercial SCOs were limited to areas where TCC had buried debris or purifier materials.
2. There were no exceedances of the commercial SCOs in the clay samples except near the fill/clay interface surface locations associated with bulk disposal of purifier "iron oxide" materials (TP-BCP-13 and TP-BCP-46) and under the industrial debris at the boundary of Site 110.
3. The clay samples with constituents exceeding the commercial SCOs were collected at the fill/clay interface. Samples of the deeper clay collected from the MW-BCP-12 boring were primarily non-detect for VOCs and SVOCs and contained no metals or cyanide above commercial SCOs.

4.6.3 Shallow Groundwater

Groundwater presence in the fill was discontinuous across the AOI. Several test pits were dry and encountered no saturated fill to the top of clay. Groundwater flowed into test pits at several areas of the

AOI and predominately when rail bed materials were encountered which is consistent with fill observations across the BCP Site. The materials that produced the most water were the rail bed/ballast materials below the former rail lines on the BCP Site.

Monitoring Well MW-BCP-12A (Figure 4-17) was installed in the area between the east end of the boiler house, the former battery baghouse, and the box culvert. Unlike other water producing fill zones, this location was in close proximity to the main west-east plant road (aka “Broadway”), the box culvert and samples may represent a combination of shallow groundwater more directly influenced by surface water and road treatment salts than other shallow well samples. During the surface water IRM cleaning of the box culvert, numerous pipes and seeps were located in this vicinity. Those pipes and seeps were sealed with hydraulic cement during the IRM. Monitoring Well MW-BCP-22A was installed north of the compressor building along the AOI1 (North Rail Corridor) boundary. The shallow fill zone/perched monitoring well water samples contained fourteen constituents above the Class GA Standards:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzo(a) Anthracene	3.3 to 4.7	0.002	Both MW-BCP-12A and MW-BCP-22A
Benzo(b)Fluoranthene	4.2 to 7.2	0.002	Both MW-BCP-12A and MW-BCP-22A
Benzo(k)Fluoranthene	1.7 to 3	0.002	Both MW-BCP-12A and MW-BCP-22A
Chrysene	2.1 to 4.6	0.002	Both MW-BCP-12A and MW-BCP-22A
Indeno (1,2,3-C,D)Pyrene	2.1 to 5.3	0.002	Both MW-BCP-12A and MW-BCP-22A
1,4-Dioxane	0.35	0.35	At Standard, MW-BCP-12A Only
Arsenic	67.4	25	MW-BCP-22A Only
Iron	1,620 to 61,700	300	Both MW-BCP-12A and MW-BCP-22A
Lead	47.4	25	MW-BCP-22A Only
Magnesium	49,300	35,000	MW-BCP-22A Only
Manganese	360 to 717	300	Both MW-BCP-12A and MW-BCP-22A
Selenium	15.1	10	MW-BCP-22A Only
Sodium	67,800 to 83,500	20,000	MW-BCP-12A Only
Cyanide	0.347 to 4.78	0.2	MW-BCP-12A Only

Table N4-6 Summary of Water Quality Data for the Shallow Fill Water in AOI2 (East)

Cyanide was not unexpected in proximity to the purifier boxes/building. In addition, a 1926 site plan identified a Prussiate Recovery Building in the area where the bag house was later built.

A grab[21] sample of water from TP-BCP-46 in the area of observed industrial debris, and suspected purifier waste disposal contained seven SVOCs and cyanide:

[21] A “grab” sample of water from a test pit is for qualitative characterization only. The sample cannot be confirmed to represent groundwater as it may contain sediment and other materials mobilized during the excavation of the test pit.

- Benzo (a) Anthracene 4.2 ug/L vs. 0.002 ug/L[22]
- Benzo (b) Fluoranthene 7 ug/L vs. 0.002 ug/L
- Benzo (k) Fluoranthene 2.4 ug/L vs. 0.002 ug/L
- Bis(2-Ethylhexyl)Phthalate 34 ug/L vs. 5 ug/L
- Chrysene 4.6 ug/L vs. 0.002 ug/L
- Indeno (1,2,3-C,D) Pyrene 4.8 ug/L vs. 0.002 ug/L
- Naphthalene 710 ug/L vs. 10 ug/L
- Cyanide 9.6 ug/L vs. 0.20 ug/L

There were no VOCs, PCBs, Pesticides, Herbicides, or PFAS constituents detected above Class GA Standards in the shallow groundwater samples from the eastern portion of the Former Production Area AOI.

4.6.4 Medium Deep Groundwater "B" Zone

Monitoring Well MW-BCP-12B (Table 4-16 and Figure 4-18) was installed in the upper clay in the area between the east end of the boiler house, the former battery baghouse, and the box culvert. Cyanide was detected in the shallow (fill) and medium depth (upper clay) groundwater samples. The medium ground water sample contained four metals above the Class GA Standards that are representative of naturally occurring background constituents (Figure 4-18, Table 4-16):

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	998 to 2550	300	MW-BCP-12B Only
Magnesium	115,000 to 30,000	35,000	MW-BCP-12B Only
Sodium	52,000 to 56400	20,000	MW-BCP-12B Only
Cyanide	1.41 to 1.6	0.20	MW-BCP-12B Only

Table N4-7 Summary of Water Quality Data for the Water in the Clay Water Bearing Unit in AOI2 (East)

Thallium is largely considered a constituent of the natural groundwater and is not detected in filtered samples, showing it is not mobile in the groundwater system. Thallium was detected in round 1 for the RI sampling program in monitoring well MW-BCP-12B. Thallium was subsequently sampled in second September round and also in May 2022 for both dissolved and total thallium and was not detected for total in both sampling events and non-detect for dissolved in the May 2022 sampling event. The thallium detection is considered to be associated with solids in groundwater sample and is not believed to be a dissolved or mobile constituent in groundwater.

4.6.5 Utilities and Subsurface Features

There are subsurface features and utilities from the TCC operations throughout the eastern section of the AOI. The most significant features are associated with the former rail beds, the box culvert, the former COG distribution system, and the east quench sump (closed in 2023) and east coke wharf (closed in 2023). The box culvert has been cleaned as part of an IRM and is still functioning as the primary means of stormwater management in the AOI. The three gas distribution lines (Tonawanda, Buffalo, and Huntley)

[22] For purposes of this analysis, the comparison is to the Class GA Standards.

were identified, excavated, and air gapped[23]. There was no bedding along the outside of the distribution lines that would promote groundwater migration.

The water in the east quench sump and east coke wharf were sampled (Table 2-15). The water in each was resampled following the fire and has been pumped, treated and discharged in accordance with an approval under the IWD Permit No. 331. The east quench sump and east coke wharf were cleaned and backfilled in 2023.

4.7 AOI3 – Parking Lot

AOI3 – Parking Lot Area covers approximately 5.8 acres of the BCP Site. The AOI encompasses the area of the BCP Site where the employees of the coke plant parked for work and contains a small office building, the employee shower building (demolished in 2021), and several underground utilities. The North South Storm Sewer extends from the mansion sump to the Site 109 Boundary across the length of the west side of the AOI. There is a limited amount of equipment that had been stored in the AOI. West of the BCP Site boundary/fence, there is a considerable amount of industrial equipment stored on the Vanocur facility and there are piles of recycled materials stored at the Swift River facility.

Photo 4-5: Looking north at northern section of the Parking Lot AOI.

[23] "Air Gapped" as used herein and at the site is the practice of removing a 1- to 2-foot (minimum) section of pipe and plugging each side of the opening thereby creating a separation between sections of process piping.

Three monitoring well clusters (MW-BCP-01A/B/C, MW-BCP-03A/B/C, and MW-BCP-15A/C) were installed in the AOI as part of the original RI scope of work. Bedrock (deep depth) monitoring wells (MW-BCP-01D and MW-BCP-03D) were installed at their respective cluster locations as part of the supplemental RI scope of work. These deep monitoring wells were added to provide additional monitoring points for bedrock water quality downgradient of the closest upgradient deep well (MW-BCP-05D), located in the former production area AOI (MW-BCP-05D). One test pit (TP-BCP-45) was excavated along the east side of the AOI at the AOI3/AOI4 boundary. Three additional test pits (TP-WL1, TP-DL1 and TP-DL2) were installed in the north section of the AOI as part of the Abandoned Pipeline IRM.

- TP-WL1 was excavated as part of the IRM across the former water line that was used to supply the plant before the Site 108 pump house was constructed;
- TP-DL1 was excavated as part of the IRM across a former discharge line that had been used to discharge storm and process water before the Site 109 Settling Ponds were constructed. The pipe was sealed on the east, but water flowed from the west section of pipe until it drained;
- TP-DL2 was excavated as part of the IRM across a second former discharge line that had been used to discharge storm and process water before the Site 109 Settling Ponds were constructed, and
- TP-BCP-45 was excavated as part of the RI along a former rail bed under the former overhead pipe racks. Water was encountered at TP-BCP-45 in a gravel layer within 12-inches of the ground surface. The test was completely flooded with water from the gravel zone.

4.7.1 Fill

Unconsolidated materials encountered above the clay in the Parking Lot AOI were identified as fill (Figures 4-19 and 4-20). No materials that had the appearance of native soils were encountered above the clay in this AOI. The fill in this AOI was thinner, dryer, and had a higher percentage of pavement materials than other AOIs.

With a few exceptions, the thickness of the fill varied in total depth from 36- to 60-inches bgs and was characterized as containing predominately black colored fine (breeze) to cobble sized coke and reworked soil. Some fill in the upper 2-inches of the ground surface along the perimeter of the AOI maintained some characteristics of topsoil (i.e., heavy in degrading organic vegetation). In a few areas the fill was less than 12-inches thick. The “topsoil” matrix was clearly fill and the vegetation was predominantly invasive species.

4.7.1.1 Parking Lot AOI: Visual Description

The fill characteristics were consistent at each location and along the length of the Parking Lot AOI. The fill conditions in the northwest corner seemed to have a higher percentage of soil-like material, but it was still notably placed material, organic detritus from the phragmites, and therefore classified as a non-native fill. Notable observations in the Parking Lot AOI include:

- TP-WL1 and MW-BCP-15 – The test pit was excavated across the former water line southwest of the former Mansion and the boring was advanced near the current office building. Both test pits encountered a hard slag like material at approximately 12-inches bgs which was likely a base material for the access road and parking lot.
- The fill was dry to moist, except at MW-BCP-03 where it was wet and at the TP-BCP-45 location (along the rail line below the overhead pipe structure) where it was completely saturated, and water was free flowing. Other than TP-BCP-45, the test pits did not produce water from the fill or clay. TP-DL1 was flooded from the west when the former discharge line was broken as part of the IRM (the pipe had been previously plugged on the TCC [east] side of the break and the flow was not

sustained after the pipe drained) and TP-BCP-45 on the east side of the AOI flooded from former rail bed materials. There was no indication of saturated materials along the western BCP Site boundary during the test pit program.

- The observed clay was competent in the borings and test pits.

4.7.1.2 Sample Data

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	24,000	5,600	1 of 5 fill samples, only surface sample at MW-BCP-01
Benzo (a) Pyrene	1,000 to 27,000	1,000	4 of 5 samples, all except the 0.5- to 1-foot bgs sample from MW-BCP-03.
Benzo (b) Fluoranthene	28,000	5,600	1 of 5 fill samples, only surface sample at MW-BCP-01
Dibenz (a,h) Anthracene	730 to 4,700	560	2 of 5 fill samples
Indeno(1,2,3-c,d) Pyrene	18,000	5,600	1 of 5 fill samples, only surface sample at MW-BCP-01
Barium	846 to 1,140	400	2 of 5 fill samples

Table 4-13: Summary of SVOCs Detected above Commercial SCOs in AOI 3 Fill

No fill soil samples collected in the Parking Lot AOI3 contained VOCs, Metals (apart from Barium), cyanide, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

VOCs were only detected at estimated concentrations below the method detection limits of the equipment in the Parking Lot AOI less than 0.1 percent of the commercial SCOs.

The key findings for the AOI3 fill sampling:

1. The surface sample collected from 0 to 2-inches bgs at MW-BCP-01 contained the highest number and highest concentrations of constituents in the samples above the commercial SCOs in this AOI. The lower samples had significantly lower concentrations.
2. As anticipated, the fill in the parking lot samples had been less affected by TCC operations than in other AOIs.

4.7.2 Clay

The native reddish brown silty Clay was encountered at depths between 3 to 5 feet bgs in the borings and test pits completed and extended to a depth of approximately 40 feet bgs. Fourteen samples of the clay were collected (Table 4-18) at depths ranging from just below the fill/clay interface to just above the clay/bedrock interface. There were no exceedances of the commercial SCOs in any of the clay samples collected in the Parking Lot AOI, and therefore no Figures were prepared for clay samples.

4.7.3 Shallow Groundwater "A" Zone

Groundwater occurrence in the fill was only observed in TP-BCP-45 at the time of the investigation. Groundwater elevations at MW-BCP-01A, MW-BCP-03A, and MW-BCP-15A were less than 5 feet bgs. There was no saturated fill in the test pits or borings completed at the northwest corner of the AOI. The fill zone/perched monitoring well water samples (Figures 4-21 and 4-22) contained four naturally occurring background metals and PFOA above the Class GA Standards:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
PFOA	0.0077	0.0067	MW-BCP-01A Only
Iron	657 to 2,910	300	All Samples
Manganese	74,700 to 336,000	35,000	MW-BCP-02A (Adjacent AOI) and MW-BCP-15A
Magnesium	618 to 829	300	All MWs
Sodium	68,100 to 116,000	20,000	MW-BCP-02A and MW-BCP-15A

Table N4-14 Summary of Water Quality Data for Shallow Groundwater in AOI3

The absence of saturated fill in several test pits, the lack of recharge to MW-BCP-03A during the second round of groundwater sampling in September 2021 and lack the of any VOCs or SVOCs in the shallow groundwater demonstrates that there is no offsite migration of constituents of interest across the AOI3 fill as a result of historical facility operations from upgradient AOIs.

4.7.4 Medium Deep "B and C" Groundwater

Two monitoring wells screened in the upper clay (MW-BCP-01B and MW-BCP-03B) and two monitoring wells screened in the lower clay (MW-BCP-01C and MW-BCP-03C) (Figures 4-23 and 4-24) were installed in the Parking Lot AOI.

Thallium was detected in one unfiltered sample in round 1 (MW-BCP-15C) for the RI sampling program, but was subsequently sampled in May 2022 for both dissolved (filtered) and total and was not detected in the filtered samples. The thallium detection is considered to be associated with solids in groundwater samples and Thallium is not believed to be a dissolved or mobile constituent in groundwater.

The medium deep ground water samples (Table 4-20, Figures 4-23 and 4-24) contained three metals above the Class GA Standards that are representative of naturally occurring background constituents:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	838 to 15,700	300	MW-BCP-01C and MW-BCP-15C
Magnesium	143,000 to 371,000	35,000	All Samples
Sodium	31,800 to 140,000	20,000	All Samples

Table N4-15 Summary of Water Quality Data for the Clay Water Bearing Unit in AOI3

4.7.5 Deep/Bedrock Groundwater

Two deep monitoring wells were installed as a component of the supplemental RI scope of work. MW-BCP-01D and MW-BCP-03D were installed to provide BCP boundary bedrock water quality data (Table 4-21 and Figure 4-25). The bedrock wells contained the same four naturally occurring background metals above the Class GA Standards as the wells screened in the upper and lower clay:

Thallium was detected in unfiltered samples in rounds 1 and 2 for the RI sampling program, but was subsequently sampled in May 2022 in a four deep bedrock monitoring wells for both dissolved (filtered) and total and was not detected. The thallium detection is considered to be associated with solids in groundwater samples and are not believed to be a dissolved or mobile constituent in groundwater.

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	1,130 to 104,000 (May 2022)	300	All Bedrock Groundwater Samples
Magnesium	138,000	35,000	MW-BCP-03D
Manganese	500 (May 2022)	300	MW-BCP-03D
Sodium	75,200 to 157,000	20,000	All Bedrock Groundwater Samples

Table N4-16 Summary of Water Quality Data for the Bedrock in AOI3

4.7.6 Utilities and Subsurface Features

There are subsurface features and utilities from the TCC operations, some still in use, throughout the Parking Lot AOI as described above and in previous sections of this RIR. The most dominant features are associated with the former rail beds (TP-BCP-45) and the North South Storm Sewer. The North South Storm Sewer was inspected by video and is relatively free of debris and residual materials.

The sanitary sewer that discharges to the Town of Tonawanda POTW is located on the east side of the AOI. Historically, a 2,300-volt main electrical power line that fed the facility crossed the east side of the AOI, but the electrical supply line has been replaced with overhead service just east of the approximate center of AOI3. Water and discharge lines addressed by the Abandoned Pipeline IRM (Appendix L) that crossed the north end of this AOI were located and the plugging completed by TCC was confirmed and reinforced.

4.8 AOI4 – Coke Yard

Photo 4-6: Looking Northwest Across the Coke Yard. The coal handling and coal charging buildings in the photograph were demolished in 2021

The coke yard encompasses approximately 23.2 acres in the middle of the facility and includes(ed) the coke yard, coal crusher building (ACM abated and demolished in 2021), coke screening building (demolished in 2021), the breeze crusher building (demolished in 2021), the coke laboratory trailer (demolished 2021), the coke office trailer (demolished 2021), the thaw shed, and the former coke rail yard and coke conveyor structure (demolished in 2021 and 2022). This AOI is surrounded by other AOIs (AOI2 to the North, AOI3 to the west, AOI5 to the South) and Site 110 to the east. The AOI is unpaved other than the coal crusher building slab, the breeze crusher building slab, and a portion of the coal yard perimeter stormwater control roadway.

Sedimentation pool #003 is located within the AOI and used to collect and manage surface water from the coke yard. Powers conducted material recovery activities under approval of the Bankruptcy Court in portions of the coke yard. As a result of the material recovery, the overall elevation of the coke yard is well below the grade that was present during the TCC operating period and below the grade that would inhibit RITC's ability to implement BMPs for storm water management.

In addition to the building demolitions, several pieces of abandoned coke handling and screening equipment were removed from the coke yard. An ACM Access IRM Work Plan (Inventum, 2021b) was completed to allow access of mobile equipment required to remove transite paneling (an ACM) from the coal breaker building.

Photo 4-7: View Looking East Across Former Coke Rail Loading Yard (Northern Section of Coke Yard) in 2020.

Notes: All structures within the red boundary lines have been demolished.
The drill rig in center of photo is at the MW-BCP-08 monitoring well cluster location.
The tan cladding on the upper portions of the tall building (coal crusher building) was transite (an ACM).

4.8.1 Fill

Eight test pits were excavated in the Coke Yard AOI (Figures 4-26 and 4-27):

- TP-BCP-45, while primarily in AOI3, was excavated along the western boundary of AOI4;

- TP-BCP-15 was excavated in the west end of the coke yard in an area from which Powers had recovered significant amounts of coke for reuse offsite;
- TP-BCP-07 was planned for a location along the west end of the coal handling building (now demolished); however, the location was inaccessible to the excavator and was completed as a hand boring;
- TP-BCP-16 was excavated on the east embankment of sedimentation pool #003;
- TP-BCP-17 was excavated in the coke yard south of the former rail car tipper (near the north end of the former coal tunnel);
- TP-BCP-18 was excavated south of the former Thaw Shed. The Thaw Shed is the current location of the grossly contaminated material storage area;
- TP-BCP-19 was excavated through and around a large debris pile to determine if the pile and debris had been buried as well as deposited on the ground surface; and
- TP-BCP-34 was excavated in multiple directions to define an area of groundwater seepage and deposition in the southeast corner of the AOI.

The test pits provided the opportunity to directly evaluate the fill, identify the potential for types and sources of tar materials, and confirm the depth of the clay unit.

Monitoring well clusters MW-BCP-08, MW-BCP-11, and MW-BCP-13 each included one (1) shallow monitoring well (MW-BCP-08A, MW-BCP-11A, and MW-BCP-13A) and one medium depth monitoring well (MW-08B, MW-BCP-11B, and MW-BCP-13B) were installed in this AOI. The monitoring well locations (Figures 4-29 and 4-30) were selected to investigate the former coke loading rail yard and the area downgradient of the tar seep on Site 110. Monitoring well cluster MW-BCP-24 (A and B wells) was installed west (presumed downgradient) of the MW-BCP-13 cluster as part of the supplemental RI scope of work (Figure 4-27).

Three (3) surface soil samples (0 to 2 inches) were collected at SS-BCP-07, SS-BCP-08, and SS-BCP-09, which are representative of the wooden pallet pile and at the BCP Site boundary shared with Site 110 (Figure 4-27). These samples represent conditions at the most downwind location (based on the predominant wind direction) of the coke yard on the BCP Site but also are representative of surface materials removed as a part of the surface management IRM.

Eight (8) shallow fill soil samples (0 to 2 feet) and one (1) "sediment" sample were collected:

- Five (5) shallow fill samples from 0 to 1-feet bgs were collected:
    - Shallow fill samples were collected from MW-BCP-08, MW-BCP-11, and MW-BCP-13. A single compound, Benzo(a)Pyrene, was detected at or above the commercial SCOs in the sample from MW-BCP-08 and MW-BCP-11. Five constituents were detected in the surface sample from MW-BCP-13 and at comparatively higher concentrations than in the MW-BCP-08 or MW-BCP-11 samples.
    - One shallow fill sample was collected from the hand auger boring that replaced TP-BCP-07. This sample was collected immediately adjacent to, and under a former mezzanine, of the coal handling/breaker building.
    - A shallow sample was collected from the test pit in the sedimentation pool #003 berm (TP-BCP-16). Benzo(a)Pyrene was the only analyte detected at a concentration (1,700 ug/kg vs. the commercial SCO of 1,100 ug/kg) above the commercial SCOs.
- Three (3) grab surface fill samples (SS-BCP-07, SS-BCP-08, and SS-BCP-09) were collected from 0 to 2-inches bgs from the wooden pallet stockpiles where material was placed before the BCP Site was owned by RITC.

- One “sediment” sample was collected from the sedimentation pool #003 in the coke yard. The “sediment” location was selected to represent the materials transported and deposited in the stormwater management system above Outfall #002. As the sedimentation pool and its drainage area lie completely within the coke yard, the material is representative of the surface materials from the coke yard. The “sediment” sample did not have any constituents that exceeded the commercial SCO.

In addition to the data from the MW-BCP-08, MW-BCP-11, and MW-BCP-13 monitoring well cluster borings, soil boring and groundwater sample data collected from MW-4-2020 (Figure 4-30) collected as part of the Site 110 remedial investigation has been provided by Parsons and is used in the AOI site characterization.

4.8.2 Fill

The unconsolidated materials above the clay in the Coke Yard AOI were identified as fill. No materials that had the appearance of native soils were encountered above the clay. The fill was characterized as predominantly coke and coke fines and varied in thickness from 26- to 110-inches. The fill increased in thickness from the west to the east, with the thickest fill in the east end of the coke yard. Where other fill materials, primarily associated with railroad ballast, were encountered, they were noted.

4.8.2.1 Visual Description

The fill in AOI 4 varied in depth at each location and along the length of the test pits. There were several notable observations:

- TP-BCP-45 (Also described with the AOI3 fill) was located at the western end of the AOI under the overhead pipe structure along the boundary with AOI 3. The test pit had little coke fill over rail bed materials. The rail bed materials held significant amounts of water that immediately flooded the test pit. This is in direct contrast to conditions encountered in test pits on AOI3 and nearby TP-BCP-15 that produced no flow.
- TP-BCP-15 was excavated to the east of TP-BCP-45 and was dry to the top of clay. The absence of any rail bed materials was notable especially as there was standing surface water within 20-feet of the test pit.
- Rail bed materials including nodules were present in multiple test pits through AOI4. This material is typical of the multiple rail lines and associated materials, and they produced the most water of any material encountered by test pits at the BCP Site.
- TP-BCP-34 was excavated from the southeast corner of the AOI and encountered a hard solidified tar layer that was difficult to break through with the excavation equipment.
- The test pits across the eastern end of the AOI had the thickest accumulations of coke-like fill but also contained more and larger industrial debris that any other test pit location.

Three monitoring well clusters and soil borings were advanced in AOI4 as part of the initial RI scope. MW-BCP-08 was installed in the former rail yard west of the coal handling building, MW-BCP-11 was installed east of the coal charging building and immediately south of the battery, and MW-BCP-13 was installed at the eastern end of the AOI. MW-BCP-24 was added west (presumed and confirmed downgradient) of MW-BCP-13 as part of the supplemental RI scope. The boring logs are included in Appendix B.

Three surface soil samples (SS-BCP-07, SS-BCP-08, and SS-BCP-09) were collected in the area of an industrial debris pile in the northeast corner of the AOI. Two of the samples contained Benzo(a) Pyrene above the commercial SCO. The debris piles (primarily old pallets) were removed and properly disposed offsite in accordance with the Surface Materials Management IRM Work Plan. There is no indication they contained materials or constituents that affected the nature or extent of impact in the underlying fill.

4.8.2.2 Sample Data

The analytical data for the fill soils is presented in Table 4-22 and Figures 4-26 and 4-27. No VOCs were detected in the fill samples above the commercial SCOs.

SVOCs were detected in all 5 fill samples collected in the Coke Yard AOI. All of the analytes detected are constituents of coal, suggesting the coke and coke fines that were not sold by TCC were mixed with coal, or that the coking cycle had not been completed before pushing these materials (Figures 4-26 and 4-27):

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	7,800 to 32,000	5,600	MW-BCP-13 and TP-BCP-07
Benzo (a) Pyrene	1,100 to 27,00	1,000	All fill samples in AOI4
Benzo (b) Fluoranthene	18,000 to 32,000	5,600	MW-BCP-13 and TP-BCP-07
Dibenz (a,h) Anthracene	3,000 to 3,400	560	MW-BCP-13 and TP-BCP-07
Indeno (1,2,3-c,d) Pyrene	13,000 to 17,000	5,600	MW-BCP-13 and TP-BCP-07

Table N4-17: Summary of SVOCs Detected above Commercial SCOs in AOI4 Fill

No fill samples contained VOCs, Metals, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

VOCs detected at low estimated concentrations below the method detection limit of the laboratory equipment in the shallow samples from TP-BCP-07, MW-BCP-08, MW-BCP-13, and MW-BCP-24.

The key findings for the AOI4 Fill sampling:

1. The concentrations and numbers of exceedances of the commercial SCOs were far fewer and lower than in fill samples from the adjacent AOI2 (Former Production Area).
2. The only viscous tar encountered was in the MW-BCP-13 location. No viscous tar was encountered at the MW-BCP-24 location downgradient of MW-BCP-13 or upgradient in test pits TP-BCP-19 (A through D).
3. Solidified Tar was encountered in TP-BCP-34 at the southeast corner of the AOI, but the material did not change state when warmed.
4. TP-BCP-34 and TP-BCP-51 encountered thin (2-inch) seams of greenish blue silt and nodules but no tar. The greenish blue material appears to be weathered purifier material. The nodules are typical of the rail bed materials identified throughout the rail corridors on the BCP Site.
5. Test pits in this AOI did not produce water or flood unless rail bed materials were encountered.
6. Industrial debris was encountered in the test pit TP-BCP-48 in the vicinity of the Site 110 boundary.

4.8.3 Clay

Nine (9) samples of clay were collected from the borings and test pits in the coke yard AOI4 (Figure 4-28). Only the sample collected from TP-BCP-40 at a depth of approximately 100-inches bgs (fill/clay interface) contained concentrations of multiple constituents above the commercial SCOs. This test pit was excavated in the extreme northeastern end of the AOI4 along the boundary with Site 110, and encountered significant amounts of industrial debris.

The key findings for the AOI4 Clay sampling:

1. The detections from TP-BCP-40-100 sample at the western boundary of Site 110 were well above the commercial SCOs and were associated with significant buried industrial debris.
2. No other clay samples had any exceedance of the commercial SCOs.

4.8.4 Shallow Groundwater "A" Zone

Monitoring Wells MW-BCP-08A, MW-BCP-11A and MW-BCP-13A were sampled in the coke yard AOI4 during the original RI scope and those monitoring wells and MW-BCP-24A were sampled during the supplemental scope. In addition, a sample of surface water was collected from the east coke wharf (W-BCP-07) for analysis and for the discharge approval. Additional samples were collected from the coke wharf confirming it had not been affected by runoff from the firefighting effort associated with the August 10, 2021 fire, which occurred when a section of removed COG piping spontaneously combusted. The water from the firefighting effort that was collected in the coke wharf has been pumped, treated, and discharged to the POTW under Permit No. 331. The east coke wharf was cleaned and backfilled in 2023.

The shallow groundwater quality at MW-BCP-13A where viscous tar was identified in the boring was distinctly different from the other shallow monitoring wells in the AOI (Figure 4-29 and 4-30). Within the coke yard away from Site 110 the groundwater samples (MW-BCP-08A and MW-BCP-11A, Figure 4-29) contained only ten (10) constituents above the Class GA Standards. The samples from Monitoring Well MW-BCP-13A (Figure 4-30) contained thirty-one (31) constituents above the Class GA Standards. Because of the extreme variation, MW-BCP-24A (Figure 4-30) was installed as part of the supplemental RI scope. The samples from that well contained only 3 constituents, all metals, above the Class GA Standard, delineating a western boundary for the impact at MW-BCP-13A:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	370 to 1,700	1	MW-BCP-13A
Ethylbenzene	21 to 26	5	MW-BCP-13A
Styrene	24 to 33	5	MW-BCP-13A
Toluene	250 to 420	5	MW-BCP-13A
m,p-Xylene	210 to 230	5	MW-BCP-13A
o-Xylene	84 to 100	5	MW-BCP-13A
2,4-Dimethylphenol	95 to 1,200	50	MW-BCP-13A
Acenaphthene	21 to 42	20	MW-BCP-13A
Benzo(b)Fluoranthene	1.5 to 100	0.002	MW-BCP-08A, 11A, and 13A
Biphenyl(Diphenyl)	68 to 120	5	MW-BCP-13A
Chrysene	1.2 to 110	0.002	MW-BCP-08A, 11A, and 13A
Fluoranthene	360		MW-BCP-13A
Fluorene	110 to 340	50	MW-BCP-08A, 11A, and 13A
Indeno(1,2,3-C,D)Pyrene	60		MW-BCP-13A
Naphthalene	9,200 to 14,000	10	MW-BCP-13A
Phenanthrene	92 to 700	50	MW-BCP-13A

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Phenol	11 to 660	1	MW-BCP-13A
Pyrene	270	50	MW-BCP-13A
Antimony	8.2 (May 2022) (Corresponding filtered sample was non detect)	3	MW-BCP-13A
Arsenic	28.3	25	MW-BCP-08A
Chromium, Total	50.7	50	MW-BCP-11A
Iron	605 to 76,800	300	All including East Coke Wharf
Lead	25.5 to 30.4	25	MW-BCP-11A and W-BCP-13A
Manganese	574 to 2,620	300	Groundwater All
Sodium	32,200 to 144,000	20,000	All including East Coke Wharf
Mercury	4.4	0.7	MW-BCP-13A
Cyanide	3.59	0.2	MW-BCP-13A
PCB-1248	1	0.09	MW-BCP-13A, Not detected in Second Round Sample
Silvex (2,4,5-TP)	0.33	0.26	MW-BCP-13A, Not detected in Second Round Sample
LOCATION REFERENCE	MW-BCP-8A	Western half of coke rail yard near the former Coal Breaker Building	
	MW-BCP-11A	Eastern half of the coke rail yard near the Battery Buildings	
	MW-BCP-13A	Eastern section of the coke yard	
	MW-BCP-24A	West and downgradient of MW-BCP-13A	

Table N4-18 Summary of Water Quality Data for Shallow Fill Water in AOI4

The coke wharf sample contained two metal constituents (iron and sodium) above the Class GA Standards. The coke wharf has been dewatered, cleaned and backfilled.

4.8.5 Medium Deep Groundwater "B" Zone

The pattern of water quality in the upper clay between the MW-BCP-08B, MW-BCP-11B, and MW-BCP-13B locations (Figures 4-31 and 4-32) was the same as the shallow wells. Water quality at MW-BCP-13B is significantly more impacted than anywhere else in the AOI. Only metals were detected above the Class GA Standards in the samples from the companion monitoring wells MW-BCP-08A, MW-BCP-11A, and MW-BCP-24B; while an additional twenty-one (21) organic constituents (VOCs and SVOCs), mercury, and cyanides exceeded the Class GA Standards in the sample from MW-BCP-13B:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	310 to 1,300	1	MW-BCP-13B
Ethylbenzene	37 to 78	5	MW-BCP-13B
Styrene	46 to 98	5	MW-BCP-13B
Toluene	280 to 970	5	MW-BCP-13B
m,p-Xylene	460 to 950	5	MW-BCP-13B
o-Xylene	180 to 390	5	MW-BCP-13B
2,4-Dimethylphenol	94 to 520	50	MW-BCP-13B
Acenaphthylene	43	20	MW-BCP-13B
Anthracene	210	50	MW-BCP-13B
Benzo(a)Anthracene	3.6 to 110	0.002	MW-BCP-13B
Benzo(b)Fluoranthene	2.7 to 100	0.002	MW-BCP-13B
Benzo(k)Fluoranthene	56	0.002	MW-BCP-13B
Biphenyl(Diphenyl)	59 to 110	5	MW-BCP-13B
Chrysene	2.4 to 120	0.002	MW-BCP-13B
Fluoranthene	370	50	MW-BCP-13B
Fluorene	93 to 350	50	MW-BCP-13B
Indeno(1,2,3-C,D)Pyrene	68	0.002	
Naphthalene	12,000 to 19,000	10	MW-BCP-13B
Phenanthrene	89 to 740	50	MW-BCP-13B
Phenol	26 to 95	1	MW-BCP-13B
Pyrene	270	50	MW-BCP-13B
Arsenic	82.3 to 198	25	MW-BCP-11B and MW-BCP-13B
Barium	2,040 to 4,090	1,000	MW-BCP-11B, MW-BCP-13B, and MW-BCP-24B
Beryllium	3.6 to 29.3	3	MW-BCP-11B and MW-BCP-13B
Cadmium	14.2	5	MW-BCP-13B
Chromium, Total	112 to 1,080	50	All MWs

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Copper	398 to 958	200	MW-BCP-11B and MW-BCP-13B
Iron	910 to 1,250,000	300	All MWs
Lead	33.1 to 600	25	All MWs
Magnesium	86,500 to 869,000	35,000	All MWs
Manganese	750 to 20,800	300	All Clay MWs in AOI
Nickel	362 to 848	100	MW-BCP-11B and MW-BCP-13B
Selenium	16.8	10	MW-BCP-13B
Sodium	50,100 to 120,000	20,000	All MWs
Zinc	2,770	2,000	MW-BCP-13B
Mercury	9.4	0.7	MW-BCP-13B
Cyanide	0.79 to 1.74	0.20	MW-BCP-13B

Table N4-19 Summary of Water Quality Data for the Water in the Clay Water Bearing Unit in AOI4

The presence of the VOCs and PAHs in the sample from MW-BCP-13B is attributable to viscous tar identified in the boring. The absence of organic constituents in the other monitoring well samples support the finding that there was some form of release or disposal near MW-BCP-13B, but the affected groundwater has not migrated to the location of the downgradient monitoring well MW-BCP-24B.

Thallium was detected in monitoring well MW-BCP-13B in unfiltered samples in round 2 for the RI sampling program, but MW-BCP-13B was subsequently sampled in May 2022 for both dissolved (filtered) and total and was not detected. The thallium detections are considered to be associated with solids in groundwater samples and are not believed to be a dissolved or mobile constituent in groundwater.

4.8.6 Utilities and Subsurface Features

There are few subsurface features and utilities from the TCC operations in the coke yard AOI. The most dominant features are associated with the coal yard tunnel, former rail beds, and the former gas distribution system to the Huntley Plant. The water in the coal yard tunnel was sampled on two occasions, during the RI and in accordance with a request from the Town of Tonawanda pre-treatment coordinator in July 2021 (Table 2-15). The water has been pumped, treated, and discharged in accordance with the IWD Permit No. 331. The top of the tunnel was approximately 7 feet bgs, indicating the tunnel was constructed in the clay zone. The overburden was removed from the tunnel and the roof removed and the cavity backfilled. The excavation of the coal yard tunnel allowed removal of the tar pipes (they were from the north end of the tunnel to the approximate mid-point of the tunnel, no tar pipes ran to the south end of the tunnel and there was no tar in the fill, clay or on the tunnel floor) and a comprehensive characterization and observation of the shallow groundwater flow in the east end of the AOI.

4.9 AOI5 – Coal Yard

Photo 4-8: Looking Northeast across the Coal Yards during regrading and prior to establishing stormwater BMPs.

Photo 4-9: Looking Northeast at the coal yard before regrading and before removal of the stacker reclaimer (center of photo).

The Coal Yard AOI5 includes both the South and North Coal Yards and covers approximately 16.2 acres. The coal yard is south of the Coke Yard AOI4, north and west of the South Drainage AOI7, east of AOIs 3

(Parking Lot) and 6 (Water Treatment Area) and is predominately covered with residual coal that did not meet the quality standards for sale or recovery according to Powers Coal and Coke.

At the time of the RITC Campus properties transfer more than 20 percent of the coal yard was flooded with up to 6 feet of surface water. The surface water runoff from the coal yard was to be controlled by an engineered storm water system, but the system was not fully functional at the time the management of the BCP Site was transferred from the USEPA to RITC. The surface water management systems in the coal yard were restored by RITC and consist of a collection ditch (the "North Ditch") that discharges to sedimentation pool #002 in the northwest corner of the coal yard, catch basins along the south side of the coal yard, and the south ditch road that contains runoff and directs it to the catch basins. The North Ditch conveys flow from the northern half of the coal yard and the adjacent coke yard. Flow from sedimentation pool #002 is directed through culverts and below grade conduits to the stormwater retention basin on AOI 6 (Water Treatment). A series of catch basins in the coal yard allow sediment to settle in the coal yard before stormwater is decanted to the North and South Ditch systems.

The coal conveyor tunnel ran from the coal yard (Grid Cell AJ15) to the east of the coal handling/crusher building location (Grid Cell Y13, Building No. 63). The base of the tunnel is approximately 14-feet below the ground surface and is located within the clay zone. The coal yard tunnel was located entirely on the BCP Site and is not a conduit for flow from or to the BCP Site. The coal yard tunnel was flooded from groundwater infiltration during the time of the RI field work. A supplemental discharge approval to the Sites' IWD Permit was granted by the Town of Tonawanda Pre-treatment Coordinator and the tunnel was dewatered in 2021 to allow inspection of suspect ACM and again in 2022 to allow abatement, cleaning and backfill placement. The tunnel has since been dewatered, the roof removed, the ACM abated, the tar pipe removed, the concrete decontaminated and the tunnel has been backfilled.

The coal yard also contains the former mixing pad (Grid Cells AE24 to AF24). The former mixing pad is a containment pad with a concrete floor and poured concrete walls. Historically, coal tar sludge was transferred from the tar decanter hopper (in AOI2 - Former Production Area) and other spill materials were brought to the mixing pad. The coal tar and spill materials were blended with coal, coke and breeze on the mixing pad, and the mixture was then charged to the coke battery to produce coke and recover additional by-products. The former mixing pad was the subject of a completed IRM and has been decontaminated. The former mixing pad has been closed and is no longer classified as a hazardous waste treatment unit, but is a valuable resource for the management of residuals at the BCP Site. The former mixing pad has been used for the stabilization of the sedimentation pond sediment and other materials recovered on the BCP Site. Recovered non-hazardous materials are stored here, characterized, and transported offsite for disposal.

With the exception of the former mixing pad, this AOI is unpaved. The foundations for the former stacker reclaimer remain in place but do not represent a significant area of the AOI. The former perimeter access road had deteriorated and has been reconstructed with granular materials.

Eleven (11) test pits were excavated in the coal yard (Figures 4-33 and 4-34).

- TP-BCP-20 was excavated at the western end of the AOI south of sedimentation pool #002 and excavated east to west;
- TP- BCP-21 was excavated from the southwest to the northeast across the north coal yard in an area near the access road from the coke yard;
- TP-BCP-22 was excavated from north to south immediately west of the pools of water that accumulated in depressions created by the recovery of coal by Powers;

- TP-BCP-23 was excavated from north to south and was located west of the mixing pad and northwest of the MW-BCP-20 monitoring well cluster;
- TP-BCP-24 was excavated from south to the north and was located northeast of the mixing pad and the former coal yard tunnel entrance;
- TP-BCP-25 was excavated southeast to northwest from the rail car RC-04 location, across Tar Seep No. 2, and to a point where mobile tar was no longer observed in the pit;
- TP-BCP-26 was excavated along the boundary between AOI6 and AOI5 in the area that was west of the former coal yard impoundment created in the south coal yard by the Powers Coal and Coke coal recovery efforts;
- TP-BCP-27 was excavated from the northwest to the southeast across the area that had been the deepest section of the coal yard impoundment;
- TP-BCP-29 was excavated from south to north across the center of the former coal yard impoundment;
- TP-BCP-30 was excavated from west to east and was located south of the mixing pad in the south coal yard; and
- TP-BCP-44 was excavated across the location of the former rail track across the area where a buried diesel tank[24] was encountered and previously removed.

Three monitoring well clusters (MW-BCP-19 A/B, MW-BCP-20 A/B, and MW-BCP-25 A/B) were installed in the eastern end of the coal yard.

- MW-BCP-19A and MW-BCP-19B were located downgradient of Tar Seep No. 2 to provide an indication of groundwater quality in the vicinity of the viscous tar;
- MW-BCP- 20A and MW-BCP-20B were located downgradient of the mixing pad; and
- MW-BCP-25A and MW-BCP-25B were located downgradient of the MW-BCP-19 cluster during the supplemental RI activities.

4.9.1 Fill

The unconsolidated materials above the clay in the coal yard AOI were identified as fill. No materials that had the appearance of native soils were encountered above the clay. Except for the TP-BCP-26 location (Figure 4-33), the fill was 29- to 70-inches thick and was coal and slag that had been reworked over the history of the facility. At the TP-BCP-26 location, adjacent to the stormwater retention basin, a 6-inch-thick layer of reworked light- to dark gray topsoil had been placed and revegetated over the black fill. Test pit TP-BCP-26 was in the area of maintained cover around the basin.

4.9.1.1 Visual Description

The coal yard fill is dominated by varying sizes and gradations of coal materials (See Test Pit Logs in Appendix F and photographs in Appendix G). The presence of slag, railbed materials, and debris rendered the remaining coal materials unsuitable for recovery and sale according to Powers. There were several areas with hard crystalline tar (TP-BCP-20 through TP-BCP-23), and one location with viscous tar (Tar Seep No. 2, TP-BCP-25, Figures 4-33 and 4-34):

- TP-BCP-20 was 97-feet long and located at the eastern end of the AOI. The test pit encountered a loose to medium dense coal overlying a hard layer of crystalline solidified tar over the first 71-feet of the test pit. The coal fill was 50- to 70-inches deep;

[24] The tank was a buried fuel tank from an over the highway tractor, not an engineered tank for underground use.

- TP-BCP-26 was 100-feet long and excavated along the boundary of AOI5 and AOI6, south of TP-BCP-20. The coal fill was thinner at this location and the hardened tar was not present. The coal fill was 10- to 33-inches thick at the west end of the coal yard;
- TP-BCP-21 was 150-feet long and crossed an area of the coal yard that seemed to represent a transition from the active coal management area to an area used for general purposes (equipment staging, soil stockpiles, and stormwater management). The coal fill varied from 54- to 70-inches deep and contained some slag and a 10-foot-long section of hard crystalline tar;
- TP-BCP-27 was 70-feet long and excavated at the deepest location of the former impoundment south of TP-BCP-21. This test pit encountered reworked coal that had been placed as fill by RITC to eliminate the coal yard impoundment. The fill was 45- to 49-inches thick and no tar was encountered;
- TP-BCP-22 was 56-feet long and contained coal with significant amounts of brick and other debris. A 2 to 5-inch-thick solidified tar layer was present starting at depths of 41 to 59-inches bgs;
- TP-BCP-29 was excavated over a length of 50-feet and like TP-BCP-27 consisted of coal fill placed by RITC as part of stormwater management control. The fill at this location was 34 to 57-inches thick;
- TP-BCP-23 was 60-feet long and had 45 to 52-inches of coal fill with debris. A nominal 4-inch hard tar layer was encountered at a depth of 25-inches bgs. One 5-foot section of tar was too hard to break with the excavator;
- TP-BCP-24 was 68-feet long and was the first test pit excavated east of the mixing pad in the coal yard. This test pit contained coal fill to 50 to 59-inches bgs and did not contain the hard crystalline tar that was encountered in the test pit west of this location;
- TP-BCP-30 was 110-feet long and like TP-BCP-27 and TP-BCP-29 was excavated to clay through the reworked coal fill placed by OSC. The coal fill was 26 to 39-inches thick;
- TP-BCP-25 was 105-feet long and was specifically advanced to evaluate the conditions near rail car RC-04 and Tar Seep No. 2. While there was a hard tar layer at 36 to 38-inches bgs near (within the first 10-feet of the test pit) the rail car, there was no evidence that the rail car was the source. A 1-to-3-inch layer of viscous tar was encountered in the test pit at depths ranging between 24 to 41-inches bgs. The viscous tar layer was present along the length of the test pit between 57 and 92-feet from the start of the test pit with the shallowest location occurring within the Tar Seep No. 2 area. The tar was not present from 92-feet from the south to the north end of the test pit;

4.9.1.2 Sample Data

The analytical data for samples collected in the fill is presented in Table 4-26 and on Figures 4-33 and 4-34. Seven SVOCs and arsenic were detected in shallow fill samples within the AOI at concentrations above the commercial SCOs (Figure 4-33 and 4-34). TP-BCP-25 has the most predominant layer of viscous tar (See Photographs TP-BCP-25, Layer of Viscous Tar to TP-BCP-25, Tar Layer North of Tar Seep, Appendix G) on the BCP Site. The maximum concentrations were in the western part of AOI5 in the sample from TP-BCP-20 (Figure 4-33). Significant concentrations were also detected in samples from TP-BCP-26 and TP-BCP-27 in the west end of the coal yard:

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	260,000 7,400 to 25,000	5,600	TP-BCP-20 Other Locations in AOI
Benzo (a) Pyrene	470,000 5,000 to 32,000	1,000	TP-BCP-20 Other Locations in AOI
Benzo (b) Fluoranthene	410,000 7,100 to 34,000	5,600	TP-BCP-20 Other Locations in AOI
Benzo (k) Fluoranthene	150,000 Below SCO	56,000	TP-BCP-20 Other Locations in AOI
Chrysene	270,000 Below SCO	56,000	TP-BCP-20 Other Locations in AOI
Dibenz (a,h) Anthracene	71,000 1,300 to 4,100	560	TP-BCP-20 Other Locations in AOI
Indeno (1,2,3-c,d) Pyrene	310,000 6,300 to 19,000	5,600	TP-BCP-20 Other Locations in AOI
Arsenic	16 to 40.3	16	TP-BCP-24

Table N4-21: Summary of SVOCs Detected above Commercial SCOs in AOI5 Coal Yard Fill

No fill soil samples collected in the coal yard AOI5 contained metals (other than one detection of arsenic [sample and duplicate]), cyanide, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

VOCs were detected at low concentrations in the coal yard AOI. All concentrations were below the commercial SCOs, with the highest concentrations in the shallow sample from TP-BCP-44, the location of a buried underground storage tank (an old over the highway tractor fuel tank) that was removed by OSC. All other VOC detections in the coal yard fill were estimated.

The key findings for the AOI5 Coal Yard Fill sampling:

1. The numbers of constituents, range of concentrations, and maximum concentrations detected in shallow fill above the commercial SCOs were higher at the east and west ends of the AOI in the proximity of observations of tar. The concentrations and range of constituents detected in the samples of the general coal fill in the majority of the AOI was representative of coal.
2. Samples from TP-BCP-20 had the highest numbers and concentrations of SVOCs above the commercial SCOs. This was the area that appeared to have been used for other activities in addition to coal storage. The high concentrations were from samples collected above a solidified tar layer.
3. The concentrations in the fill samples from MW-BCP-19 were the second highest in the AOI and are indicative of the debris and trash observed in the area. MW-BCP-19 is also directly west of Tar Seep No. 2 and TP-BCP-25.

4. The single concentration of benzo(a)pyrene detected in the shallow sample from the MW-BCP-25 boring indicates that at location the overlying fill is more representative of the general coal yard and not the conditions detected at MW-BCP-19.
5. The observations made at TP-BCP-25 indicate the presence of a layer of viscous tar that covers an area of nearly 4,000 square feet. The test pit and other observations made during other IRM intrusive activities in the area (removal of rail ties and debris during the surface management IRM) delineated the limits of viscous tar in the area.

4.9.2 Clay

Eleven (11) samples of clay were collected from the borings in the AOI (Figures 4-35 and 4-36). Of those clay samples, only two contained concentrations of constituents above commercial SCOs:

- MW-BCP-19 was located immediately downgradient of Tar Seep No. 2 and the clay sample from 6.8 to 8 feet bgs contained Benzo(a)Pyrene at 1,600 ug/kg vs the commercial SCO of 1,000 ug/kg, and
- The clay sample (3 to 3.5 feet bgs) from the fill/clay interface below the viscous tar observed at TP-BCP-25 contained benzo(a)pyrene at 2,300 ug/kg vs the commercial SCO of 1,000 ug/kg as well as concentrations of arsenic, copper, mercury, and cyanide above the commercial SCOs.

Of specific and important note, the clay sample from 5 to 5.2 feet bgs collected at TP-BCP-25 below the viscous tar had no detectable concentrations above the commercial SCOs. The viscous tar has not migrated down or leached constituents of concern at this location.

The key findings for the AOI5 Clay sampling:

1. The detection from MW-BCP-19 was slightly above the commercial SCO for just one constituent (benzo(a)pyrene) and is consistent with coal constituents;
2. The detections in the 3- to 3.5-foot sample from TP-BCP-25 indicate the constituents of the viscous tar may be mobile within the fill; and
3. The sample results from the sample collected 5- to 5.2-feet below the tar indicated no exceedances of the commercial SCOs. This is direct evidence that even in the most extreme condition, mobility of tar related constituents is limited by the clay.

4.9.3 Shallow Groundwater "A" Zone

Monitoring Wells MW-BCP-19A, MW-BCP-20A, and MW-BCP-25A were sampled in the western portion of coal yard AOI5 (Figure 4-37). In addition, a sample of water was collected from the coal yard tunnel (W-BCP-01) for analysis and for the POTW discharge approval. Two additional rounds of coal yard tunnel sampling have been collected for discharge approval under Permit No. 331. The water quality in the coal yard tunnel was consistent and approved for discharge to the Town of Tonawanda after treatment.

Water quality in shallow groundwaters samples were extremely different across the coal yard. Within the coal yard west of the mixing pad, the groundwater sample (MW-BCP-20A) contained three PAH constituents above the Class GA Standards. The samples from MW-BCP-25A contained three metals and cyanide above the Class GA Standards. The sample from Monitoring Well MW-BCP-19A contained seventeen (17) constituents above the Class GA Standards. For reference, the shallow groundwater sample from MW-BCP-18A on AOI7, which would be considered cross-gradient to MW-BCP-19A, contained only cyanide above the Class GA Standard. In addition, the data from the samples from MW-BCP-25A did not contain the PAHs detected in the sample from MW-BCP-19A.

Shallow groundwater quality downgradient of the mixing pad (MW-BCP-20A) does not appear to have been impacted by former mixing pad hazardous waste management operations. The first sample from MW-BCP-20A did not contain any constituents above the Class GA standards, and the second sample detected three very low concentrations of three PAHs.

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	109 to 220	1	MW-BCP-19A
Ethylbenzene	11 to 18	5	MW-BCP-19A
Styrene	10	5	MW-BCP-19A
Toluene	82 to 190	5	MW-BCP-19A
m,p-Xylene	230 to 340	5	MW-BCP-19A
o-Xylene	160 to 220	5	MW-BCP-19A
2,4-Dimethylphenol	750 to 860	50	MW-BCP-19A
Benzo(a)Anthracene	3.4	0.002	MW-BCP-19A
Benzo(b)Fluoranthene	2.4	0.002	MW-BCP-19A
Biphenyl(Diphenyl)	37 to 85 (May 2022)	5	MW-BCP-19A
Chrysene	2.1	0.002	MW-BCP-19A
Fluorene	54 to 150 (May 2022)	50	MW-BCP-19A
Naphthalene	5,800 to 12,000 (May 2022)	10	MW-BCP-19A
Phenanthrene	110	50	MW-BCP-19A
Phenol	3.7 to 3,330 (May 2022)	1	MW-BCP-19A
Antimony	12 (May 2022) 54 (Filtered - May 2022)	3	MW-BCP-19A
Iron	5,810 to 393,000	300	MW-BCP-25A, MW-BCP-19A
Lead	26 (May 2022) 25 (Filtered - May 2022)	25	MW-BCP-19A
Manganese	1,520 to 7,100	300	MW-BCP-25A, MW-BCP-19A
Magnesium	173,000	35,000	MW-BCP-19A
Selenium	24 (Filtered – May 2022)	10	MW-BCP-19A
Sodium	40,800 to 203,000	20,000	MW-BCP-25A
Cyanide	0.48 to 12.8	0.2	MW-BCP-19A
Nitrogen, Ammonia	11.1	2	MW-BCP-19A
LOCATION REFERENCE	MW-BCP-19A	West of Tar Seep No. 2	
	MW-BCP-20A	West of the Mixing Pad	
	MW-BCP-25A	West of MW-BCP-19A and Tar Seep No. 2	

Table N4- 22 Summary of Water Quality Data for Shallow Fill Water in AOI5

The coal yard tunnel sample collected during the RI (Table 2-15) contained three metal constituents (iron, manganese, and sodium) above the Class GA Standards at similar concentrations detected above the standards in the MW-BCP-25A samples. This suggests the water in the tunnel could have been a combination of surface water and fill zone groundwater.

4.9.4 Medium Deep Groundwater "B" Zone

The pattern of water quality in the clay between samples from the MW-BCP-20B, MW-BCP-25B, and MW-BCP-19B locations (Figures 4-38) was similar to the pattern of water quality in the shallow monitoring well samples. Five metals and cyanide were detected above the Class GA Standards in the sample from MW-BCP-25B. No impacts above the Class GA Standards were detected in the sample from MW-BCP-20B, yet eighteen (18) constituents were detected above the Class GA Standards in the upper clay zone in the sample from MW-BCP-19B:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Benzene	28	1	MW-BCP-19B
Chloroform	12	7	MW-BCP-19B
Ethylbenzene	14	5	MW-BCP-19B
Toluene	21 to 59	5	MW-BCP-19B
m,p-Xylene	70 to 190	5	MW-BCP-19B
o-Xylene	46 to 150	5	MW-BCP-19B
Benzo(a)Anthracene	9.4 to 15	0.002	MW-BCP-19B
Benzo(b)Fluoranthene	8.3 to 13	0.002	MW-BCP-19B
Benzo(k)Fluoranthene	3.9 to 5	0.002	MW-BCP-19B
Biphenyl(Diphenyl)	33 to 42	5	MW-BCP-19B
Chrysene	10 to 13	0.002	MW-BCP-19B
Fluoranthene	56	50	MW-BCP-19B
Fluorene	87 to 110	50	MW-BCP-19B
Indeno(1,2,3-C,D)Pyrene	4.3 to 6.2	0.002	MW-BCP-19B
Naphthalene	5,300 to 6,000	10	MW-BCP-19B
Phenanthrene	130 to 140	50	MW-BCP-19B
Phenol	7.2	1	MW-BCP-19B
Chromium, Total	51.7	50	MW-BCP-25B
Iron	37,300	300	MW-BCP-25B
Magnesium	244,000	35,000	MW-BCP-25B
Manganese	866	300	MW-BCP-25B
Sodium	72,700	20,000	MW-BCP-25B
Cyanide	0.208 to 6.23	0.20	MW-BCP-19B and MW-BCP-25B
Nitrogen, Ammonia	2.49	2	MW-BCP-19B

Table N4-23 Summary of Water Quality Data for the Water in the Clay Water Bearing Unit in AOI5

The absence of organic constituents (VOCs and SVOCs) in any sample other than the sample from MW-BCP-19B demonstrates that the influence of Tar Seep No. 2 is localized to groundwater in the vicinity of the viscous tar deposition area.

4.10 AOI6 – Water Treatment

Photo 4-10: Looking northeast across the Water Treat AOI.

Notes: The photograph was taken before the surface impounding capacity in the coal yard was eliminated.
The large tanks in the foreground (ST21 to ST24), have been emptied, decontaminated and recycled.
The small black tank to the north (left in the photograph, was found to be empty and has been recycled.

The water treatment area AOI covers approximately 5.7 acres and is located on the southwest corner of the BCP Site. The structures in this AOI included one metal building and two small concrete block buildings that were associated with the four (4) large (removed 2022) and one small tank (removed in 2021). The buildings were demolished in 2021 and the debris was properly disposed. In the northern portion of the water treatment area is the engineered stormwater sedimentation pool #001, and on the western side of the AOI is the storm water retention basin.

The tanks were sampled, characterized and decommissioned in accordance with the Aboveground Storage Tank Management Work Plan (AST Management Work Plan, Inventum, 2020). The smallest tank (ST20, black tank near the center of Photograph 4-10) was a sulfuric acid tank for neutralization of TCC's wastewater. Tank ST20 was found to be empty at the time of the RITC Campus Properties transfer and was removed in 2021. The USEPA used drums for storage of the sulfuric acid they used for water treatment instead of the tank. The large aboveground storage tanks were located within a secondary containment area and were initially used for fuel and pentane storage. The two westernmost tanks (ST21 and ST22, starting in the foreground of Photograph 4-10) were converted for use as components of TCC's process water treatment system. The tanks were used for equalization and neutralization (pH adjustment) of weak ammonia liquor wastewaters prior to discharge to the Town of Tonawanda POTW. These treatment/equalization (EQ) tanks accepted treated process water via an above-grade piping system from the ammonia still via the weak ammonia liquor tanks located in the former production area. Acid for neutralization was originally fed from the smallest tank (ST20) in the AOI, but at some time the process was converted to allow the acid to be metered from drums.

The remaining large tanks, ST23 and ST24, had been out of service for an unknown period. ST23 contained a residual layer of a NAPL underlain by petroleum like sludge (possibly degraded fuel oil) and ST24 was a former pentane tank that had a thin layer of scale in the bottom. All the tanks have been addressed under the AST Management Work Plan. The stabilized sludges from ST21 to ST23 were stabilized and transported offsite for proper management and disposal. ST21 to ST24 were demolished, no concrete base was present under any of these tanks, they had been constructed on a layer of compacted sand fill. Samples of fill and clay have been collected from the secondary containment areas. An Above Ground Storage Tank ST24 Investigation Work Plan (Inventum 2023) was submitted and approved for additional testing in the secondary containment of the former ST24. The sampling was completed and soils with petroleum hydrocarbons, including benzene at concentrations characteristic of hazardous waste (one sample) were detected. The results of the secondary containment testing and a proposed bioremediation pilot test (ST24 Bioremediation Interim Measures Work Plan, Inventum 2023b) were submitted and approved. The bioremediation testing has been initiated and is proposed to proceed from spring 2023 through the first quarter of 2024, if necessary.

The water treatment AOI is dominated by the secondary containment for the water treatment tanks, stormwater sedimentation pool #001 and the storm water retention basin. One test pit (TP-BCP-41) and one monitoring well cluster (MW-BCP-16 A/B/C) were installed in the AOI.

- Test pit TP-BCP-41 was excavated from south to north across the area immediately east of the secondary containment berm; and
- The MW-BCP-16 monitoring well cluster was installed along the roadway immediately west (presumed downgradient) of the tank secondary containment berm.

Samples of the "sediment" were collected from sedimentation pool #001 and the storm water retention basin. As explained earlier, the term sediment is used for below standing water fill samples, although these samples are settled solids in a water treatment pond, not true sediment.

4.10.1 Fill

The unconsolidated materials above the clay (Figure 4-39) in the water treatment AOI were identified as fill. The entire area has been disturbed and reworked by the construction of the tanks, ponds, and roads.

4.10.1.1 Visual Description

No materials that had the appearance of native soils were encountered above the clay. The fill layer was thicker at the monitoring well location (approximately 4 feet) than at the test pit location (varied 12- to 24-inches thick).

- TP-BCP-41 was 155-feet long and excavated along the east side of the secondary containment structure (Figure 4-39) in an area of dense phragmites, vegetation and wet soils. The fill was 12- to 24-inches deep varying with the ground surface. The fill material was black silty coal fines with a dense root matrix.
- MW-BCP-16 encountered dark gray to black sandy gravel fill with some silt to approximately 4-feet bgs. The material at the boring location was coarser grained and denser than the material encountered at the test pit location.

Within the limits of the ST21 to ST24 secondary containments a nominal 6-inch layer of poorly graded brown sand covered the clay under the former tank footprints.

4.10.1.2 Sample Data

Four (4) samples of fill were collected in the AOI from MW-BCP-16 and from TP-BCP-41. Five SVOCs were detected in the fill samples and one in the sediment sample. The SVOCs are indicative of the coal/coke found in the fill matrix. The analytical data for the fill soil is presented in Table 4-30 and on Figure 4-39:

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	9,700 to 14,000	5,600	Both Fill Locations in AOI, Not Sediment
Benzo (a) Pyrene	14,000 to 19,000	1,000	Both Locations in AOI, Sedimentation Pool #001 Sediment
Benzo (b) Fluoranthene	15,000 to 20,000	5,600	Both Locations in AOI, Not Sediment
Dibenz (a,h) Anthracene	2,300 to 2,400	560	Both Locations in AOI, Not Sediment
Indeno (1,2,3-c,d) Pyrene	8,300 to 11,000	5,600	Both Locations in AOI, Not Sediment

Table N4-24: Summary of SVOCs Detected above Commercial SCOs in AOI6 Water Treatment Fill

No fill soil samples collected during the RI in the AOI outside of the secondary containments contained VOCs, metals, cyanide, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

The VOCs detected in the fill samples from the Wastewater Treatment AOI outside the limits of the secondary containments were all estimated at concentrations below the method detection limit of the laboratory equipment. The VOCs (Benzene), PAHs, and Arsenic detected in the fill and clay samples within the secondary containment for ST24 are documented in the ST24 Bioremediation Interim Remedial Measures Work Plan.

The key findings for the AOI6 Water Treatment AOI Fill sampling outside the limits of the secondary containments:

1. The numbers of constituents, range or concentrations, and maximum concentrations detected in shallow fill above the commercial SCOs were fewer and generally lower in concentration than in samples from other AOIs.
2. The highest and lowest concentrations in the samples were from the MW-BCP-16 location although the range in concentrations was small.
3. Tar seeps are visible along a buried pipeline north of the former wastewater treatment tank secondary containments.

The key findings for the AOI6 Water Treatment AOI sampling inside the limits of the secondary containments:

1. The large storage tanks ST21 through ST24 were constructed on a nominal 6-inch thick layer of sand, no concrete base was present.
2. The fill and clay below the ST21 footprint were sampled for the secondary containment IRM in June 2023. High PiD readings were recorded, but the data is not available for this report.
3. The fill and clay below the ST22 footprint were sampled for the secondary containment IRM in June 2023. The data is not available for this report.
4. The fill and clay below the ST23 footprint will be sampled for the secondary containment IRM in June or early July 2023.
5. PAHs, primarily Benzo(A)Pyrene, Benzene, and Arsenic were detected in fill and clay samples (up to 60-inches BGS in the samples from the ST24 secondary containment. The contamination identified inside the ST24 secondary containment is being addressed by the ongoing ST24 Bioremediation Interim Measures Work Plan (Inventum 2023b).

4.10.2 Clay

Four clay samples were collected from the MW-BCP-16 location (Figure 4-40). No constituents were detected above the commercial SCOs.

Twelve samples of the underlying clay were collected from within the ST24 secondary containment. The data are detailed in the ST24 Bioremediation Interim Remedial Measures Work Plan.

The key finding for the AOI6 Clay sampling:

- The constituents detected in the fill are not migrating in the clay matrix. The constituents detected in the secondary containment are not detected in soil or groundwater samples collected immediately outside the secondary containment or downstream of the secondary containment structure.

4.10.3 Shallow Groundwater "A" Zone

Monitoring Well MW-BCP-16A was sampled in the western edge of the AOI (Figure 4-41). The sample contained five (5) constituents. Thallium was detected in rounds 1 and 2 of the RI sampling program, but was subsequently sampled in May 2022 for both dissolved and filtered and was not detected. The thallium detections are considered to be associated with solids in groundwater samples and are not believed to be a dissolved or mobile constituent in groundwater.

The other four metals are all naturally occurring background metals, and were detected above the Class GA Standards:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	1,130	300	MW-BCP-16A
Magnesium	206,000 to 360,000	35,000	MW-BCP-16A
Manganese	1,650 to 2,030	300	MW-BCP-16A
Sodium	909,000 to 1,570,000	20,000	MW-BCP-16A

Table N4-25 Summary of Water Quality Data for the Shallow Fill Water in AOI6

The presence of these constituents is more indicative of road treatment deicing and naturally occurring constituents than of the TCC operations. The absence of cyanide indicates the water quality from the upgradient AOI7 (Southern Drainage) groundwater from the monitoring well MW-BCP-25A location on AOI5 is not migrating to the western AOI boundary. The samples of residuals in the former wastewater tanks contained, Ammonia, BTEX, Cyanide, and PAHs

During the preparation for removal of the tank residuals, multiple phases were identified water, oil/non-aqueous liquid, and sludges/semi-solids in all but ST24. There were no non-aqueous liquids or sludges in ST24.

Samples of the water phase were collected from ST21, ST22, and ST23; there was no water in ST24. The water in ST23 had very high concentrations of ammonia, 765,000 mg/L. All water from the tanks (ST21, ST22, and ST23) was treated and discharged to the Town of Tonawanda POTW.

The non-aqueous liquid samples from ST21 and ST22 had relatively low concentrations of ammonia (0.045- and 0.026U[25] mg/L, respectively). The constituents of the non-aqueous liquids were predominately SVOCs.

All of the oils and sludges were stabilized and transported offsite for incineration.

The absence of ammonia in samples from the shallow groundwater system downgradient of the tanks indicates the water treatment tanks were contained by the secondary containment structures and the underlying clay. There is no indication that the tanks were a source of ammonia in ground water or surface water.

4.10.4 Medium Deep Groundwater "B & C" Zones

Monitoring Wells MW-BCP-16B and MW-BCP-16C were sampled in the western edge of the AOI (Figure 4-42). The groundwater samples from the clay zones from Monitoring Wells MW-BCP-16B and MW-BCP-16C contained four constituents, all naturally occurring background metals, above the Class GA Quality Standards:

[25] U – following a laboratory result indicates the compound was not detected above the laboratory detection limit.

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Iron	399 to 3,050	300	MW-BCP-16B and C
Magnesium	318,000 to 438,000	35,000	MW-BCP-16B and C
Sodium	108,000 to 139,000	20,000	MW-BCP-16B and C

Table N4-26 Summary of Water Quality Data for the Water in the Clay Water Bearing unit in AOI6

Thallium was detected in unfiltered sample in round 1 for the RI sampling program in monitoring well MW-BCP-16B, but was subsequently sampled in May 2022 for both dissolved and filtered and was not detected. The thallium detection is considered to be associated with solids in groundwater samples and is not believed to be a dissolved or mobile constituent in groundwater.

4.10.5 Utilities and Subsurface Features

The only known underground utility is the former Huntley supply pipeline that was air gapped in 2021. The pipe was empty and no backfill or flow along the pipe was observed. Wastewater and fuel were conveyed above ground during TCC operations.

TP-BCP-52 (located on AOI7) was excavated as part of the supplemental RI scope of work to investigate the presence of an underground fuel line suspected to be present along the southern BCP Site line and crossing AOI6. No buried lines were encountered.

4.11 AOI7 – South Drainage

Photo 4-11: Looking east over the South Drainage AOI. Sedimentation Pool #001 is in the foreground of the photograph.

Note: This photograph was taken after the coal yard was regraded.

The South Drainage Area covers approximately 10.3 acres and is located along the southern boundary of the BCP Site south of the Coal Yard (AOI5) and Site 110. The eastern end of the AOI7 is bound by the National Grid high voltage power line right of way (to the east and south). No production processes are known to have occurred in this area but there were former rail lines, four abandoned rail cars (three have been removed, RC04 remains), and the South Ditch in this AOI. There are multiple large piles of fill and debris in the eastern section of this AOI.

Photograph 4-11 (closeup) – Fill piles at the eastern end of the South Ditch.

The South Ditch collects runoff from the southern one-half of the coal yard and the east end of the south drainage area. Approximately 5,300 sq. ft. of the 100-foot upland adjacent area of New York State Freshwater Wetland (ID: BW-6) extends into the AOI. No portion of the wetland is on the BCP Site.

The south drainage AOI is the most densely vegetated portion of the BCP Site, although a large section of the phragmites was cut to allow removal of the south rail. The vegetation is dominated by phragmites, but there are trees, shrubs, and limited areas of native legumes. A wetland and waterways assessment and Phase I FWRIA (Appendix D) has been conducted as part of the remedial investigation (Section 5.0). No jurisdictional wetlands are present on AOI7.

Nine (9) test pits, eight (8) surface soil samples, and six (6) monitoring wells were installed in the AOI (Figures 4-43 and 4-44):

- TP-BCP-36 was excavated along the south BCP Site boundary in the eastern corner of the BCP Site;
- TP-BCP-09 was excavated to investigate activities immediately south of the State Superfund Site (Site 110);
- TP-BCP-10 was 178-feet long and excavated in an area that appeared to have been largely underutilized to determine if any impacts from waste management activities occurred in the south ditch watershed;
- TP-BC-35 was a multi-section test pit excavated between two large debris piles along the south BCP Site boundary to define the southern extent of fill in that location;
- TP-BCP-50 was added as part of the supplemental RI scope to assess the eastern extent of the blue stained fill identified in TP-BCP-35;
- TP-BCP-49 was added as part of the supplemental RI scope to assess the western extent of blue stained fill identified in TP-BCP-35;
- TP-BCP-51 was added as part of the supplemental RI scope to determine if there was any viscous tar associated with observations of solidified tar in TP-BCP-34;

- TP-BCP-28 was 96-feet long and located immediately east of a bend in the south ditch to assess an area of the BCP Site that had been revegetated as a part of the surface water BMPs.
- TP-BCP-31 was 156-feet long and located across the southern part of AOI7 starting immediately north of the former location of rail car RC-01; and
- TP-BCP-52 was added as part of the supplemental RI scope to investigate an area suspected of having buried pipes at the western end of the AOI near the gate to the 3821 River Road BCP Site. No pipes were encountered in the test pit excavation.

Four surface soil samples were collected around the perimeter of the BCP Site boundary (Figures 4-43 and 4-44) to provide data for the qualitative exposure assessment. Four additional surface soil samples were collected as part of the supplemental RI scope at and around the original SS-BCP-14 location to confirm and delineate the data from the original sample.

The monitoring wells were installed along the south drainage AOI to provide an understanding of the groundwater occurrence and quality near the BCP Site boundary:

- The MW-BCP-17 cluster was in the vicinity of the flare associated with the adjacent plastics facility (3821 River Road);
- The MW-BCP-18 cluster was installed at a location where historical records indicate the presence of a monitoring well that produced samples with low concentrations of cyanide. The historical well could not be located;
- The MW-BCP-26B monitoring well was installed to provide data downgradient of the blue stained fill material identified in TP-BCP-35 and to determine if the water quality in MW-BCP-19 extends south. A shallow fill well had been planned, but there was less than one (2) feet of fill over the clay at this location; and
- The MW-BCP-27A monitoring well was installed to determine if the water quality detected in samples from the State Superfund Site (Site 110) was representative of the water quality parameters in the southeast corner of the BCP Site.

4.11.1 Fill

The unconsolidated materials above the clay in the south drainage AOI were identified as fill. No materials that had the appearance of native soils were encountered above the clay. Several large piles of materials had been placed long before the RITC Campus Properties transfer and were partially moved to allow TP-BCP-49, TP-BCP-50, and TP-BCP-51 to be excavated in July 2021. The materials in the pile were observed as they were excavated and were characterized as fill similar to elsewhere on the BCP Site, with limited amounts of industrial debris.

4.11.1.1 Visual Description

The south drainage AOI fill is more varied than the other areas of the BCP Site. A layer of soil was placed over the fill in the southern portion of the AOI (TP-BCP-31 and TP-BCP-28) in an apparent effort to either reduce erosion or to support revegetation. The fill throughout the rest of the AOI was typical of the rest of the BCP Site apart from the area around MW-BCP-26 where the fill layer was very thin. Near the MW-BCP-26 location and to the east to the TP-BCP-51 location, are large piles of fill, the deepest accumulations of fill on the BCP Site. The test pits (Figures 4-43 and 4-44) provided the following observations throughout the AOI:

- TP-BCP-52 was focused on the investigation for underground utilities, but none were found. The test pit encountered black silty sand materials with viscous tar in the first (southern-most) 15-feet of the test pit. The black silty sand extended to the top of the brown silty clay typical of the BCP Site at depths of 30- to 38-inches bgs;

- TP-BCP-31 encountered a thin (1-inch) layer of topsoil like material supporting a dense stand of phragmites. The fill below the soil cover was 12- to 36-inches deep. A 2-inch-thick layer of solidified tar was present for the first 7 feet at the south end of the pit. Between 7 and 40-feet of the south end of the pit there was a thin (0.5-inch) pliable (hard when exposed, pliable after 45-minutes of warming) tar layer;
- TP-BCP-28 was 96-feet long and had a more substantial 7-inch-thick layer of topsoil fill over the black coal/coke fill. Unlike the TP-BCP-31 area, this location was vegetated with grasses that had been maintained for access along the south side of the south ditch. A black loose sandy fill, primarily coal, extended to 24- to 30-inches bgs;
- TP-BCP-35 was originally planned as an east to west test pit to determine if fill near the BCP Site boundary contained BCP Site debris. The presence of blue stained fill indicative of possible purifier materials led to the addition of two lateral test pits and two supplemental test pits;
    - TP-BCP-35 (East West Section) was the originally planned test pit. The fill was characterized as a black silty clay and gravel that was 42- to 46-inches deep. A 5-inch thick layer of blue stained fill was encountered at depths between 24-to 36-inches;
    - TP-BCP-35 (South Section) was excavated to the south to determine if the blue stained fill extended off the BCP Site. The blue stained fill was not present within 10-feet of the south BCP Site boundary, indicating it did not extend off-site;
    - TP-BCP-35 (North Section) was added to determine if the blue fill extended under the debris pile immediately north of the east end of the test pit. The blue soils were present under the debris pile;
- TP-BCP-49 was included in the supplemental RI activities to investigate the western extent of blue stained fill in TP-BCP-35. The test pit encountered black, gray, and brown silty sand. The blue-stained fill was encountered and extended to the north for 50 feet. A thin layer of hard crystalline tar was encountered over a majority of the length of the pit. A thin layer of pliable tar was encountered between 50 and 80 feet from the start of the test pit;
- TP-BCP-50 was included in the supplemental RI activities to investigate the eastern extent of blue stained fill in TP-BCP-35. The test pit encountered black, gray, and brown silty sand. Blue-stained fill was encountered and extended to the north for 85 feet. No tar like materials were encountered in this test pit;
- TP-BCP-10 was 178-feet long and excavated south of the large piles of debris along the former rail corridors that defined the Site 110 boundary. The ground surface varies suggesting significant disturbance and therefore the depth of fill varied from 69- to 114-inches deep. There was a hardened tar layer in the first 51 feet of the test pit. The first 100-feet of the test pit had significantly more debris than the northern section;
- TP-BCP-09 was intended to evaluate the conditions across the former rail tracks entering the BCP Site south of Site 110. The test pit was expanded to include two sections:
    - TP-BCP-09 (South to North orientation) is the originally planned 200-foot-long test pit. The fill along the length of the pit varied from 76- to 91-inches deep. The fill was black silty sand and gravel with brick and other masonry debris. A hard tar/coal layer was present from 66- to 74-inches bgs between 54-to 91-feet from the south end of the test pit;
    - TP-BCP-09 (West to East orientation) was 10-feet-long and excavated at, and parallel to, the Site 110 boundary to evaluate the possibility of tar seepage from Site 110 onto the BCP Site. The fill was 62-inches deep at this location and although there was some nearby surface evidence of tar on the Site 110, there was none identified in the below grade fill;

- TP-BCP-36 was 105-feet long and excavated in the southeast corner of the BCP Site. The test pit was advanced to investigate the extent of fill on the BCP Site. The fill was present to depths of 70- to 72-inches deep. The fill was predominately black sand sized coke like material except the final 40 feet near the east BCP Site corner where a two-foot layer of industrial debris was present at 20-inches bgs; and
- TP-BCP-51 was included in the supplemental remedial investigation activities to investigate the extent of hard tar encountered in TP-BCP-34. The test pit encountered black and gray silty sand. Blue-green stained fill was encountered and extended from the southern start of the test pit to the north for 15 feet. At the base of the test pit was a nominal 30-inch-thick layer of nodules that was saturated and flowed freely. No tar like materials were encountered in this test pit.
- Four test pits were excavated by Parsons Engineering on AOI7 near the north end of TP-BCP-09 to provide data surrounding observations of tar on Site 110:
  - TP-34-2020 – "…tar saturated and pliable/tar fill mixture…" from 1.5 to 7.5 feet bgs;
  - TP-35-2020 – 3.0 to 3.25 feet bgs – "tar saturated"; 5.0 to 6.5 and 7 to 7.7 Feet bgs "pliable tar/fill mixture";
  - TP-36-2020 – no tar observed; and
  - TP-37-2020 – no tar observed.

4.11.1.2 Sample Data

The analytical data for the fill soil is presented in Table 4-34 and on Figures 4-43 and 4-44. Nine (9) SVOCs were detected at concentrations above the commercial SCOs with the highest concentrations in the sample from SS-BCP-16 near the fill piles. Arsenic, barium (one sample), copper (one sample), mercury (four samples) and cyanide (six samples) were also detected in shallow fill samples within the AOI at concentrations above the commercial SCOs (Figures 4-43 and 4-44). The results for the fill samples from MW-BCP-27A and SS-BCP-14 were considered unusual. Multiple samples of the fill in this area have been collected (Figure 4 – 45) in and around this location. The concentrations of mercury and cyanide in the SS-BCP-14 sample at 0.5- to 2-feet bgs are among the highest detected on the BCP Site away from the blue-stained fill near the purifier boxes and from the blue-stained fill (TP-BCP-35 area).

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	6,400 to 380,000	5,600	Exceedances in 14 of 19 Samples
Benzo (a) Pyrene	3,100 to 680,000	1,000	Exceedances in 16 of 19 Samples
Benzo (b) Fluoranthene	10,000 to 600,000	5,600	Exceedances in 14 of 19 Samples
Benzo(k)Fluoranthene	99,000 to 230,000	56,000	Exceedances in SS-BCP-16 and TP-BCP-52 Samples Only
Chrysene	95,000 to 370,000	56,000	Exceedances in 3 of 19 Samples
Dibenz (a,h) Anthracene	1,400 to 100,000	560	Exceedances in 14 of 19 Samples
Fluoranthene	510,000 to 520,000	500,000	Exceedances in SS-BCP-16 and TP-BCP-52 Samples Only
Indeno (1,2,3-c,d) Pyrene	6,000 to 480,000	5,600	Exceedances in 14 of 19 Samples
Pyrene	510,000	500,000	Exceedance only in the SS-BCP-16 Sample
Arsenic	18 to 48.6	16	Exceedances in 5 of 19 Samples
Barium	3,290	400	Exceedance only in the TP-BCP-09 Sample
Copper	319	270	Exceedance only in the TP-BCP-50 Sample
Mercury	3.2 to 16.8	2.8	Exceedances in 5 of 20 Samples
Cyanide	43 to 508	27	Exceedances in 7 of 22 Samples

Table N4-27: Summary of Constituents Detected in Fill Samples above Commercial SCOs in AOI7 South Drainage Area

The analytical data for the surface fill soil samples is presented in Table 3-34 and on Figures 4-43 and 4-44. Seven (7) SVOCs were detected at concentrations above the commercial SCO with the highest concentrations in the sample from SS-BCP-16 near the fill piles. Arsenic was detected above commercial SCOs at two locations near the east end of the AOI. Mercury and cyanide were detected above the commercial SCOs from the extreme eastern portion of the AOI.

Constituent	Concentration Range Above SCO (ug/kg)	Commercial SCO	Note
Benzo (a) Anthracene	6,300 to 200,000	5,600	Exceedances in 14 of 16 Samples
Benzo (a) Pyrene	1,900 to 350,000	1,100	All locations sampled; SS-BCP-16 highest
Benzo (b) Fluoranthene	10,000 to 310,000	5,600	Exceedances in 14 of 16 Samples
Benzo (k) Fluoranthene	120,000	56,000	SS-BCP-16 Only
Chrysene	110,000 to 210,000	56,000	Exceedances in 3 of 16 Samples
Dibenz (a,h) Anthracene	1,400 to 52,000	560	Exceedances in 14 of 16 Samples
Indeno (1,2,3-c,d) Pyrene	7,200 to 240,000	5,600	Exceedances in 14 of 16 Samples
Arsenic	17.2 to 24.6	16	SS-BCP-15 and SS-BCP-19
Mercury	3.3 to 4	2.8	SS-BCP-14/SS-BCP-140 Location Only
Cyanide	35.8 to 52.2	27	SS-BCP-14 Area

Table N4-28: Summary of Constituents Detected in Surface Samples above Commercial SCOs in AOI7 South Drainage Area

Note: SS-BCP-140 is a duplicate for SS-BCP-14.

No fill soil samples collected in the AOI contained VOCs, 1,4-Dioxane, PCBs, Pesticides, Herbicides, or PFAS constituents above the commercial SCOs.

VOCs detected at low concentrations (all below the commercial SCOs) throughout the fill in the south drainage AOI. With the exception of samples collected near the former rail corridors (TP-BCP-09 and TP-BCP-49, all VOC detections were estimated. The detections of VOCs in samples from TP-BCP-09 and TP-BCP-49 were well below 1 percent of the commercial SCOs. The north end of TP-BCP-09 was adjacent to an area where viscous tar was identified near the BCP Site during the Site 110 investigations.

The surface soil "sediment" samples were in an area suspected of being a wetland. The samples were collected on the BCP Site but in the upland adjacent area outside the mapped limits of the wetland. In the "sediment" samples (SD-BCP-05 and SD-BCP-06), Arsenic (21.3 mg/kg vs. the commercial SCO of 16 mg/kg), Cadmium (11 to 13.5 mg/kg vs. the commercial SCO of 9.4 mg/kg), and Copper (292 mg/kg vs. the commercial SCO of 270 mg/kg) were detected.

The key findings for the AOI7 South Drainage Area Fill sampling:

1. The concentrations and occurrence of constituents detected in shallow fill above the commercial SCOs appears to be more localized than in other AOIs;
2. The general fill in the majority of the AOI was representative of fill across the BCP Site, except in two locations along the perimeter at SS-BCP-16 and SS-BCP-14 (confirmed by SS-BCP-18 to SS-BCP-20, and SS-BCP-140);

3. SS-BCP-16 had the highest numbers and concentrations of SVOCs above the commercial SCOs. This was the area that appeared to have been used for deposition of fill materials (the large fill piles);
4. The high detection of Mercury at the eastern BCP Site boundary (SS-BCP-14/SS-BCP-140[26]) was nearly one order of magnitude higher than any other detection of Mercury on the BCP Site. Twelve additional samples were collected around the SS-BCP-14 locations and one sample SS-BCP-19 (2- to 4-inches bgs) contained 52.2 mg/Kg mercury confirming the SS-BCP-14 detection;
5. The detections of arsenic in the fill in the eastern end of the AOI were high compared to other samples collected on the BCP Site;
6. The blue stained fill materials observed and delineated in TP-BCP-35, TP-BCP-49, and TP-BCP-50 cover an approximately 15,000 square foot area. Cyanide concentrations in the blue stained materials ranged from 43- to 508-mg/Kg vs. the commercial SCO of 27 mg/Kg;
7. Two samples of the blue stained fill identified during the RI in the South Drainage Area (AOI7) at TP-BCP-35 were collected for analysis using the Synthetic Precipitation leaching Procedure (SPLP) and ASTM Method D-3987. The leachate from The SPLP and ASTM analysis were then analyzed for cyanide using EPA Method 9012. The study was conducted to provide some estimation of the cyanide leachability of the blue stained soils. The SPLP and ASTM methods are similar procedurally and each use deionized water as the extraction fluid.
   The results were inconclusive. The SPLP leachate of each sample (0.041 mg/L and 0.079 mg/L) was below the Class GA standard of 0.2 mg/L.; however, the SPLP/cyanide analysis was run outside of the holding time due to a laboratory error. The ASTM leachate of each sample was (0.44 mg/L and 0.34 mg/L) and above the 0.2 mg/L Class GA standard. Using the ASTM results as a conservative estimate the blue stained soils show some potential for leaching to shallow groundwater, when present. There was no significant groundwater present in the test pits with the blue-stained fill.
8. A thin layer of viscous tar was observed along the rail tracks at the western end of the AOI in TP-BCP-31 and TP-BCP-52;
9. Unusually high concentrations of metals and cyanide were detected in perimeter surface soil samples both along the BCP Site boundary lines shared with high voltage electrical transmission lines at SS-BCP-14, SS-BCP-15 and SS-BCP-16.

4.11.2 Clay

Eleven (11) samples of clay were collected from the borings and test pits in the AOI (Figures 4-46 and 4-47). Only one sample contained concentrations of constituents above the commercial SCOs. The sample from TP-BCP-31 was collected from the top of the clay (24-inches bgs) below a layer of viscous tar identified along the rail tracks. The fill was relatively thin at this location compared to other locations in the AOI. This area had been entirely reworked along the tracks and the clay was shallow in comparison to the majority of the BCP Site.

The key findings for the AOI7 Clay sampling:

1. The clay has not been largely impacted along the southern boundary of the BCP Site. Some localized impacts near the western rail line are present, as evidenced by observations of viscous tar and associated exceedances of SVOC SCOs in the clay sample from immediately below the fill/clay interface in TP-BCP-31. The nearby clay sample from the same interval in TP-BCP-51 did not contain the SVOCs above the commercial SCOs.

[26] SS-BCP-140 is a duplicate sample collected at the SS-BCP-14 location.

4.11.3 Shallow Groundwater "A" Zone

Monitoring Wells MW-BCP-17A, MW-BCP-18A, and MW-BCP-27A (Figures 4-48 and 4-49) were installed in the south drainage area. A fourth shallow monitoring well was planned at the MW-BCP-26 cluster location, but the fill layer was less than one foot thick at that location. MW-05-2020 and MW-08-202 were installed on Site 110 north of the east end of AOI7. The water quality in the samples from MW-BCP-27A are far more impacted than the rest of the samples from the AOI or the closest monitoring well samples collected on Site 110:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Anthracene	52 to 53	50	MW-BCP-27A
Benzo(a)Anthracene	68 to 98	0.002	MW-BCP-27A
Benzo(b)Fluoranthene	77 to 120	0.002	MW-BCP-27A
Benzo(k)Fluoranthene	27 to 37	0.002	MW-BCP-27A
Biphenyl(Diphenyl)	7 to 7.7	5	MW-BCP-27A
Chrysene	67 to 77	0.002	MW-BCP-27A
Fluoranthene	200 to 220	50	MW-BCP-27A
Fluorene	52 to 60	50	MW-BCP-27A
Indeno(1,2,3-C,D)Pyrene	40 to 76	0.002	MW-BCP-27A
Naphthalene	67 to 84	10	MW-BCP-27A
Phenanthrene	180 to 190	50	MW-BCP-27A
Pyrene	140 to 160	50	MW-BCP-27A
Arsenic	74.4	25	MW-BCP-27A
Chromium, Total	67.4	50	MW-BCP-27A
Iron	106,000 to 192,000	300	MW-BCP-27A
Lead	120 to 472	25	MW-BCP-27A
Manganese	661 to 847	300	MW-BCP-27A
Mercury	3.82 to 46	0.7	MW-BCP-27A
Cyanide	0.248 to 16.0	0.2	MW-BCP-18A and MW-BCP-27A
Nitrogen, Ammonia	5.90 t 11.4	2	MW-BCP-27A

Table N4-29: Summary of Water Quality Data for Shallow Groundwater in AOI7

Apart from the Cyanide detection at MW-BCP-18A, all detections above the Class GA Standards in the AOI were in samples collected from MW-BCP-27A. MW-BCP-27A is in the same general area on the eastern BCP Site boundary as SS-BCP-14 (and the confirmatory SS samples) where concentrations of Mercury in surface soils were elevated compared to other areas of the AOI.

4.11.4 Medium Deep Groundwater "B" Zone

Three monitoring wells MW-BCP-17B, MW-BCP-18B, and MW-BCP-26B (Supplemental RI) were installed in the clay in the AOI (Figure 4-50 and 4-51). With the exception of an acetone detection (first round only) in a sample from MW-BCP-17B, no organic constituents (VOCs or SVOCs) were detected in groundwater samples in the AOI. This contrasts significantly from the concentrations of organic constituents detected in the samples from MW-BCP-19B on AOI6:

Constituent	Concentration Range Above GA WQS (ug/L)	Class GA Ambient Water Quality Standard (ug/L)	Note
Acetone	110	50	MW-BCP-17B, Not Detected in second round sample
Iron	1,480	300	MW-BCP-27A
Magnesium	359,000	35,000	MW-BCP-27A
Sodium	99,600	20,000	MW-BCP-27A

Table N4-30: Summary of Water Quality Data for Clay Zone Groundwater in AOI7

The absence of an exceedance of cyanide in MW-BCP-18B indicates the cyanide in the shallow fill groundwater is not migrating through the clay at this location.

4.11.5 Utilities and Subsurface Features

The utilities and subsurface features in the South Drainage Area AOI include the former COG line to the Huntley Plant and the storm water controls for the south coal yard. TP-BCP-52 confirmed the absence of piping near the flare along the western boundary shared with the plastics site (3821 River Road). No other below grade utilities are known to exist in the AOI.

The south drainage ditch is the primary above grade utility in the AOI.

4.12 Radiological Screening

Six samples of slag were collected from various test pits across the BCP Site. The collected samples represented each of the types of slag that were encountered during the RI.

The collected samples were delivered under chain-of-custody to Eurofins Test America in St. Louis, Missouri for analysis. The results of the analyses are presented in Table 4-48. Inventum provided the laboratory report from Eurofins Test America to The MJW Companies, Radiological Consulting Professionals (MJW) in Amherst, NY for professional review. MJW had collected a background sample on the 3821 River Road BCP Site in an area that had no indication of slag or other radiological impacts. MJW collected a native soil sample from the non-impacted background location in the immediate vicinity of the investigation location:

MJW selected the principal isotopes to demonstrate equilibrium for the NORM parameters. Both gamma spectrometer and isotopic analyses agree within the margin of error. Using regional background data to show that the site-specific results were within the range of background values observed, within 1 to 1.5 times the background. This is the same rationale in preparing the NYSDEC assessment report for the accepted FRAC and gas well development in New York.

Tonawanda Coke Site Background Sample (10_BPC-01)			
Isotope	Result	UNCERT	METHOD
Actinium-228	0.842	0.285	DOE HASL 300, 4.5.2.3/Ga-01-R
Bismuth-214	2.56	0.197	DOE HASL 300, 4.5.2.3/Ga-01-R
Radium-226	2.56	0.197	DOE HASL 300, 4.5.2.3/Ga-01-R
Radium-228	0.842	0.285	DOE HASL 300, 4.5.2.3/Ga-01-R
Thorium-230	3.84	1.41	DOE EML HASL-300, Th-01-RC Modified
Thorium-232	0.866	0.694	DOE EML HASL-300, Th-01-RC Modified
Uranium-238	3.88	1.79	DOE HASL 300, 4.5.2.3/Ga-01-R
Uranium-238	4.37	0.969	DOE EML HASL-300, U-02-RC Modified

As reported by The MJW Companies; "In general, the sample results for Uranium (U)-238 and Thorium (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, Radium (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" (MJW, 2021). Further review concluded " the samples…show similar agreement among the parent and daughter isotopes within the NORM decay chains. …there are some variations due to analytical uncertainty, but …background is 2.56 pCi/g and therefore the samples [collected on the BCP Site],…are at about 1.5 to 2x [times] background and that does not negate the equilibrium assumption.' further "…the alpha spectroscopy results for U-238 and gamma spectroscopy results for Ra-226 in sample 10-BPC-01, are consistent with the Tonawanda area background concentrations and recorded in the Linde ROD." The average test results for all samples except TP-BCP-34A were less than 3 pCi/g and the average of the TP-BCP-34A sample was 3.1 pCi/g within the range of background for the Town of Tonawanda (MJW, 2022).

There is no indication that the samples have been enhanced and should be considered NORM. Given the limited sample size, MJW has recommended additional screening and sampling. That work is underway to supplement the Pre-design Investigations. MJW has conducted a site-wide surface screening and has collected samples of the slag for detailed analysis at EurofinsTestAmerica.

4.13 Nature and Extent

An analysis of the nature and extent of potential impact on the BCP Site is presented based on the RI data provided/summarized in previous sections. The intent of this investigation is to provide sufficient data to form the basis of an Alternatives Analysis. The nature and extent of impact due to the former TCC operations have been grouped into three broad categories:

- Process related impacts associated with the Former Production Area primarily in and around the by-products area which are primarily contained to AOI2, but may have migrated onto AOI1;
- Disposal related impacts associated with the onsite management of wastes which are primarily contained in the east end of AOI1 and the east ends of AOIs 4, 5, and 7; and
- Materials Management related impacts associated with the handling of coal, coke, and other raw and product materials at the BCP Site.

The nature and extent of impact in each AOI are described below. It is important to note that the entire BCP Site is covered with fill comprised mainly or partially of coal and coke and as such, there are concentrations of PAHs throughout the site. Only the areas of concentrations of PAHs above the general BCP Site-wide concentrations are highlighted on the Nature and Extent Figures (Figures 4-52 to 4-64) described in the following sections of this text.

4.13.1 AOI1 – North Rail Corridor

Twenty samples of fill and nineteen samples of clay were collected in AOI1. Seven monitoring wells in four (4) locations were sampled and tested. Two grab samples of water were also collected from test pit TP-BCP-46. The nature and extent of impact in the North Rail Corridor is shown on Figures 4-52 and 4-53 and described below:

- Process related impacts included:
  - Viscous tar NAPL is present in shallow groundwater system but is localized to the vicinity of the Tar Filled Pipe identified in TP-BCP-04. The Test Pit and the excavation of the

collection trench and discharge line for the groundwater IRM allowed removal of the pipe and delineation of the extent of viscous tar (NAPL);
  - Groundwater flow in the vicinity of TP-BCP-04 and along the conveyance line excavation for the groundwater IRM produced a sheen;
  - A thin near surface layer of solidified tar was present in the TP-BCP-05 location, reportedly related to a historic release from the Tar Management Area. The tar was not viscous and did not soften with temperature rise;
  - The investigation of the location of a TCC diesel spill cleanup (TP-BCP-14) confirmed that the cleanup conducted by TCC was not completed, petroleum was encountered in the test pit, but no viscous tar;
  - Groundwater quality in fill in the vicinity of the Former Production Area and the diesel spill area has been affected by process operations; and
  - Groundwater quality at the northern perimeter of the BCP Site is not severely impacted from historical process operations. Benzene and ammonia just slightly above the Class GA Standards were detected in the sample from MW-BCP-21A. Three naturally occurring background metals (Iron, Manganese, and Sodium) were detected above the Class GA Standards.
- Disposal related impacts associated with the onsite management of wastes are present, but predominantly in the east end of AOI1 and localized to the disposal activity areas:
  - Impacts from the disposal of purifier materials and petroleum are evidenced by visual observations and cyanide detections in TP-BCP-46 and groundwater quality at MW-BCP-23A;
  - An abandoned collector main (reportedly from the Bethlehem Lackawanna Plant) was present in the east end of the AOI. Some leaked residuals were present on the ground surface. The residuals from the ground surface were excavated and have been staged in the Thaw Shed with other grossly contaminated materials and will be managed under the selected remedial alternative. The test pit TP-BCP-38 did not encounter subsurface evidence of impact from the residuals; and
  - The collector main was removed and properly recycled in accordance with the surface materials management IRM.
- Materials Management related impacts associated with the handling of coal, coke, and other raw and product materials at the BCP Site occur broadly throughout the North Rail Corridor AOI1;
  - Coal and coke fines are present throughout the fill in AOI1, and as a result, PAH concentrations exceed the commercial SCOs in nearly every fill sample;
  - Several stockpiles of materials created by the USEPA are present in the AOI;
  - Most of the railroad ties have been removed in accordance with the Surface Materials Management IRM Work Plan, but some ties remain buried in the eastern area of the BCP Site at TP-BCP-46. The majority of the rail bed materials, which are highly transmissive of fill groundwater, remain;
  - The buried COG Pipelines that served the Town of Tonawanda and the City of Buffalo are present at the northeastern BCP Site boundary; however, these have been capped and are not a conduit for offsite migration of shallow groundwater; and
  - The groundwater quality in the vicinity of the former compressor building has been impacted by PAHs and metals as evidenced by the sample from MW-BCP-22A and observed during the demolition of the building.

SVOCs are the primary constituents of concern in fill in the AOI and primarily in the vicinity of the Former Production Area (TP-BCP-04 to TP-BCP-05), the diesel spill (TP-BCP-14), and the disposal areas near TP-BCP-46 (Figure 4-53). Metals at concentrations above commercial SCOs are not widespread in the fill or clay. In fill, a single exceedance for Lead was detected in the shallow sample from TP-BCP-05 and for Mercury at TP-BCP-46 near the disposal areas.

The only exceedance of the commercial SCOs in clay soil samples in the AOI were for Mercury and Cyanide at the fill/clay interface in a sample from TP-BCP-46. This was an area significantly disturbed by debris disposal activities.

SVOCs and metals (Lead and Arsenic) are the primary constituents of interest in samples of shallow groundwater. Impacts are not widespread and limited to the vicinity of the former compressor building (MW-BCP-22A) and the materials handling/disposal areas (TP-BCP-46 and MW-BCP-23A). Other constituents (VOCs, PCBs, Ammonia, and PFAS) were not detected at frequencies or concentrations indicative of widespread impacts in the north rail corridor AOI.

Groundwater quality in the clay in the vicinity of the tar management area, in the adjacent AOI2, shows some impact from the former TCC operations. Phenol was detected in a sample from MW-BCP-06C at concentrations above the Class GA Standards as were several metals (Arsenic, Beryllium, Chromium, Iron, Lead, Magnesium, Manganese, and Sodium). The potential impacts from the tar management area are not widespread as evidenced by the absence of these constituents of interest in MW-BCP-21C. MW-BCP-21C was screened across a similar interval as MW-BCP-06C and only three naturally occurring background metals (Iron, Magnesium, and Sodium) were detected above the Class GA standards. No VOCs, SVOCs, PFAS constituents or cyanide were detected above the criteria in the groundwater samples from the monitoring wells screened in clay.

Groundwater quality in the bedrock has not been impacted by any process, disposal, or material management related impacts. Samples collected from the AOI1 bedrock monitoring well (MW-BCP-21D) contained only three naturally occurring background metals (Iron, Magnesium, and Sodium) above the Class GA standards.

4.13.2 AOI2 – Former Production Area

The Former Production Area was subject to the most sampling (RI and IRMs) of any area of the BCP Site because this area had the widest range of historical activity on the BCP Site. Nineteen (19) samples of fill and forty-two (42) samples of clay were collected in AOI2. Samples from seventeen (17) groundwater monitoring wells in and around the AOI were collected and tested. Five (5) samples of accumulated liquids (assumed surface water) were collected from pits, sumps, and basements in the Former Production Area. The nature and extent of impact in the Former Production Area (Figures 4-56 and 4-57) is dominated by process related impacts:

- Shallow fill samples contained varying PAHs at concentrations representative of coal and coke composition. The exception being the 0- to 1-foot sample from MW-BCP-10 that had a total PAH concentration of more than 3,000 mg/kg.
- Samples of groundwater in the western end of the AOI near the light oil area (MW-BCP-04A) contained concentrations of benzene, five (5) PAHs, cyanide, and ammonia above their respective Class GA Standards. The samples from MW-BCP-02A (cross gradient from MW-BCP-04A) and MW-BCP-09A (upgradient) were free of those constituents.

- NAPL (oil-like materials and viscous tar) was observed in the vicinity of the east end of the Light Oil Area at the box culvert. The NAPL was similar in color and viscosity to materials identified in the light oil secondary containment;
- During the installation of MW-BCP-10A, tar NAPL was observed in the spilt barrel sample from 1.75-feet bgs to 3-feet BGS and visible NAPL was observed in the clay soil sample from 3-feet to 3.5-feet BGS. At 4-feet bgs the soil transitioned to a reddish brown and dry high plasticity clay with no visible NAPL.
- NAPL was observed in MW-BCP-10A for the first time during the site wide groundwater gauging event on September 20, 2021, at elevation 600.44 feet Above Mean Sea Level (AMSL) to 600.14 feet. The groundwater depth was at an elevation of 604.98 feet AMSL. The ground elevation at MW-BCP-10A is 605.83 feet AMSL. The observation of NAPL in a monitoring well was limited to monitoring well MW-BCP-10A.
- TP-BCP-43 encountered the most heavily stained materials encountered during the RI test pit program. The odor from the materials encountered in the test pit were discernable up to 25-feet from the excavation, far greater than any other materials encountered. The surface of the clay, at the fill/clay interface contained PAHs. No PAHs were detected in the clay sample collected 24-inches lower than the interface.
- Shallow groundwater in the vicinity of the by-products area (MW-BCP-05A, TP-BCP-43, and MW-BCP-10A) was much more heavily impacted than the downgradient samples from MW-BCP-04A. The samples from MW-BCP-05A and MW-BCP-10A contained the VOCs (benzene, toluene, ethylbenzene, and xylenes [BTEX]), eight SVOCs (although different between MW-BCP-05A and MW-BCP-10A), metals, cyanide, ammonia, 1,4-Dioxane, two PFAS constituents, and ammonia.
- The samples of fill in the area around the oil house had significant petroleum hydrocarbon (TPH) impacts;
- Viscous and solidified tar was detected north of the Tar Management Area extending to the TP-BCP-04 and TP-BCP-05 locations. The extent of viscous tar was delineated during the installation of the groundwater IRM, and the solidified tar extended onto AOI1;
- Fill in the Iron Oxide Pile and remaining Purifier Boxes contains cyanide typical of COG purifier media; and
- Significant amounts of buried plant debris have been identified in the east end of the AOI in the vicinity of TP-BCP-46 and TP-BCP-48. The test pits between these locations did not encounter the debris.

SVOCs are the primary constituent of concern in the fill and present in every location sampled except the surface sample east of the former gas holder/rail car (RC10) location. Two of the surface samples (both less than 12-inches deep) contained more than 500 mg/Kg SVOCs. These locations were near the former location of the oil house (TP-BCP-02) and the exhauster building area (MW-BCP-10). A single exceedance for Mercury was detected near the disposal areas in TP-BCP-46. The fill samples from the iron oxide box and pile contained SVOCs and cyanide above the commercial criteria.

Impacts to the underlying clay are shallow, relatively low exceedances, and localized. The only location that SVOCs were detected above the commercial l criteria in clay was in the sample from TP-BCP-43 north of the by-products area, west of the warehouse. Exceedances of other commercial criteria in clay soil samples were Arsenic in TP-BCP-43 (as described above, the most impacted materials encountered during the RI) near the by-products area and TP-BCP-12 south of the iron oxide pile (both collected at the fill/clay interface). Barium, mercury, and cyanide exceeded the commercial SCO in the sample collected at the fill/clay interface in TP-BCP-46. The clay sample collected at the fill/clay interface in MW-BCP-05 contained Benzo(a)Pyrene at the commercial criteria.

As with other AOIs, the groundwater in shallow fill on the western end of the Former Production Area is discontinuous. The groundwater quality in the shallow fill was affected to various degrees throughout the Former Production Area AOI. Shallow groundwater samples contained VOCs, SVOCs, metals, cyanide, pesticides, PFAS constituents, and ammonia above their respective Class GA standards. The low concentrations of pesticides and PFAS were detected in samples from the monitoring wells in the immediate vicinity of the process equipment (MW-BCP-05A and MW-BCP-10A). Samples from MW-BCP-02A west of the light oil area contained only three metals above Class GA Standards. Samples from MW-BCP-04A near the weak ammonia tanks contained benzene, PAHs, cyanide, and ammonia. Monitoring wells MW-BCP-05A and MW-BCP-10A are located in the areas of the Former Production Area that had the highest probability of releases. The samples from these two wells had the highest number of constituents with concentrations above their Class GA standards and the concentrations of BTEX are the highest detected on the BCP Site. The concentration of cyanide in samples from MW-BCP-12A are indicative of the gas processing that occurred in the vicinity. The high concentration of Perfluorooctanoic sulfonic acid in the September sample from MW-BCP-12A is the highest PFAS compound detected at the BCP Site. The arsenic concentration and the PAHs in the water sample north of the compressor building (MW-BCP-22A) is in the vicinity of the historic gas processing.

Groundwater quality in the upper clay (15- to 25-feet bgs) has been affected by metals in the center of the former production area (MW-BCP-05C in AOI2), metals, including arsenic south of the battery (MW-BCP-11B), and cyanide near the former cyanide management area (MW-BCP-12B).

Groundwater quality in the lower clay is largely unaffected by the former TCC operations. Cyanide was detected above the Class GA Standard in one sample (second round only) from MW-BCP-05C. There are naturally occurring background metals (iron, magnesium, manganese, and sodium) detected in ground water samples above the Class GA Standards. No VOCs, SVOCs, pesticides, or PFAS constituents were detected above their criteria in groundwater samples from the clay zone.

Groundwater quality in the bedrock has not been impacted by any process, disposal, or material management related impacts above the Class GA standards. Samples collected from the AOI2 bedrock monitoring well (MW-BCP-05D) contained only four naturally occurring background metals (iron, magnesium, sodium, and manganese) above the Class GA Standards.

4.13.3 AOI3 – Parking Area

Eleven (11) samples of fill and thirteen (13) samples of clay were collected in AOI3. Nine (9) groundwater monitoring wells clustered in three locations were sampled and the groundwater was tested. In addition to the RI sampling, samples were collected during the Abandoned Pipeline IRM, and the North-south Sewer that traverses the AOI was inspected with a robotic video camera. While there were utilities, some grading and equipment storage occurred, no significant processing, waste disposal or materials management are known to have been conducted in the Parking Lot AOI.

No significant impacts were noted in the Parking Lot AOI. The minor impacts noted in AOI3 (Figures 4-56 and 4-57) are due to materials management practices associated with employee parking and equipment storage.

The impacts in fill are SVOCs and a single metal, barium. All detections above the commercial SCOs were in fill samples collected less than 12-inches deep. Three of the five fill sample locations contained a single compound, Benzo(a)pyrene, at concentrations above the commercial SCO. Two surface fill samples collected near the western fence contained Barium above the commercial SCO. The two surface (0- to 2-inches, and 0- to 1-foot) samples collected at MW-BCP-01 contained PAHs at concentrations representative of coal and coke composition.

Native clay has not been impacted by any process, disposal, or material management related impacts. There were no detections of compounds above commercial SCOs in samples of clay from the Parking Lot AOI.

Shallow groundwater was highly discontinuous, absent in some areas, and did not recharge when purged (wells purged dry with no recovery) in the shallow monitoring well at MW-BCP-03 (during both sampling rounds) and absent in the test pits excavated for the abandoned pipeline IRM. Groundwater quality in the shallow fill in the samples from MW-BCP-01A and MW-BCP-15A contained naturally occurring background metals (iron, magnesium, and sodium) above the Class GA criteria. The absence of shallow water in more than one-half of the AOI and the absence of organic compounds (VOCs and SVOCs) in the shallow water samples confirms there is no shallow groundwater discharge with constituents associated with the former coke plant across the western boundary of the BCP Site.

The groundwater quality in the clay is unaffected by the former TCC operations, only four naturally occurring metals (Iron, Magnesium, Sodium, and Thallium), were detected in ground water samples above the Class GA Standards.

Groundwater quality in the bedrock has not been impacted by any process, disposal, or material management related impacts. Samples collected from the AOI3 bedrock monitoring well (MW-BCP-01D and MW-BCP-03D) contained only the four naturally occurring metals present in the upgradient bedrock well samples above their respective Class GA standards.

4.13.4 AOI4 – Coke Yard

Ten (10) samples of fill and nine (9) samples of clay were collected in AOI4. Eight (8) groundwater monitoring wells were sampled and tested. One sample of the water in the east coke wharf was collected. After the August 10, 2021, fire, an additional sample of the east coke wharf water was collected. The distribution of constituents of interest in the Coke Yard AOI (Figures 4-58 and 4-59) is primarily related to more than 100 years of materials management practices, although the east end of the AOI has been affected by disposal practices:

- Disposal Practices;
  - Viscous tar NAPL is present above shallow groundwater but localized to the vicinity of Tar Seep No. 1 (on adjacent Site 110) under the two former debris piles and to the MW-BCP-13A location. As a result, VOCs, SVOCs, and metals are also present in samples from MW-BCP-13A at concentrations above Class GA standards;
  - Hardened tar was observed in the southeastern portion of the AOI at the eastern end of (TP-BCP-34). TP-BCP-51 was excavated to determine if the solidified tar extended to the east. No hardened/solidified tar was encountered in TP-BCP-51 but a thin layer of greenish blue stained fill (silt) was encountered in the southern 15 feet of the test pit.
  - A thin layer of blue-stained fill was encountered in the southern one-half of TP-BCP-51 which is the eastern limit of the blue fill identified in TP-BCP-35 and TP-BCP-50 (AOI7).

- Materials Management related;
  - Coke and coke fines are present throughout the fill in AOI4 and as a result, PAHs are present at concentrations reflective of the material composition;

- A tar pipeline was identified within the Coal yard tunnel that crossed the coke yard. The tunnel was excavated, the roof removed, and the tar pipe and ACM materials were removed from the tunnel. After cleaning and decontamination, the tunnel was backfilled.
- Most of the railroad ties and pallets were removed in accordance with the Surface Materials Management IRM Work Plan, but some ties remain buried in the eastern area of the AOI near the thaw shed and along the former rail tracks south of Site 110;
- Sedimentation pool #003 is located within the coke yard. The sediments do not contain significant concentrations of compounds over the commercial SCOs, but the sediment pool must be maintained or replaced to maintain surface water quality; and
- The former coal conveyor crossed the coke yard in a tunnel. This tunnel was completely contained on the BCP Site, but the structural integrity of the roof was compromised, construction joints leaked, and as a result the tunnel collected groundwater. The coal yard tunnel was closed in place.

The impacts in fill samples are SVOCs and relatively low with Benzo(a)Anthracene, Benzo(a) Pyrene, Benzo(b)Pyrene, Dibenz(a,h)Anthracene and Indeno(1,2,3-c,d)Pyrene detected above the commercial SCOs in most of the fill samples from the AOI. Additional SVOC exceedances of the commercial SCOs were found in the sample collected under the mezzanine of the coal breaker building (TP-BCP-07) and the sample collected from MW-BCP-13 near the disposal areas.

The native clay has not been impacted by any process, disposal, or material management related impacts in this AOI. There were no detections of compounds above commercial SCOs in samples of clay from the Coke Yard AOI. There were observable indications of tar within fractures of the clay, but the constituents of tar were not detected in the clay matrix, confirming the limited mobility and partitioning of constituents from the tar.

Shallow groundwater samples collected from MW-BCP-13A near the former debris piles contained VOCs, SVOCs, metals, PCB-1248, and Silvex (an herbicide) above Class GA Standards. These exceedances are localized to the known former disposal area as evidenced by the order of magnitude lower concentrations of overlapping constituents (PAHs and Metals only) in MW-BCP-08A and MW-BCP-11A and the absence of PAHs in MW-BCP-25A. Shallow groundwater quality in these areas of the AOI are indicative of the coal and coke fill (i.e., PAH's and metals above Class GA Standards).

Groundwater quality in the upper clay has been impacted by former TCC operations only in the vicinity of MW-BCP-13B where VOCs, SVOCs, metals (including mercury), and cyanide were detected at concentration above Class GA Standards. However, like shallow groundwater quality at this location, these impacts have not migrated and remain localized to the area near the former debris piles. Only metals were detected in samples from MW-BCP-08B, MW-BCP-11B, and MW-BCP-24B. Arsenic was detected in the second-round sample from MW-BCP-11B.

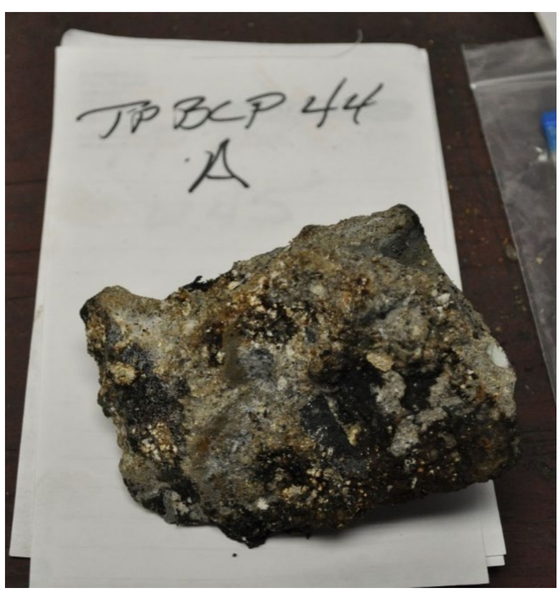
4.13.5 AOI5 – Coal Yards

Fifteen (15) samples of fill and thirteen samples of clay were collected in AOI5. Six (6) groundwater monitoring wells were sampled. One sample of the water from the coal conveyor tunnel was collected for the RI and four additional samples from the coal conveyor tunnel were collected for discharge approval to the Town of Tonawanda POTW. The water in the coal conveyor tunnel was pumped, treated, and discharged under permit to the POTW to allow visual inspection, sampling and overall assessment of the coal yard tunnel and associated ACM pipe insulation and to allow ACM abatement, decontamination and closure.

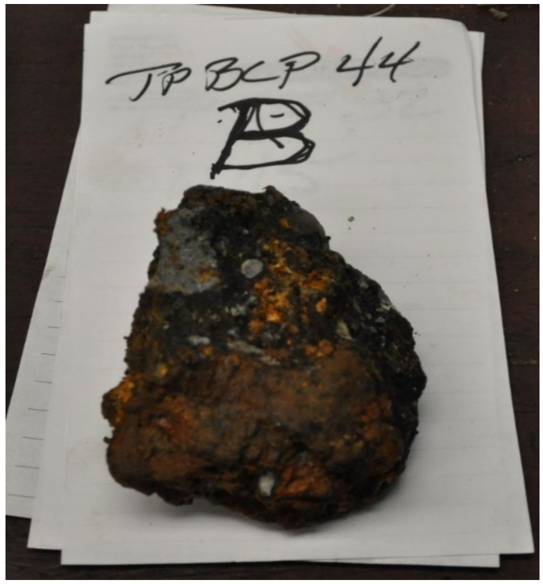
The nature and extent of impacts from the former TCC operations in the Coal Yards AOI (Figures 4-60 and 4-61) is related primarily to materials management, although the east end of the AOI has been significantly affected by disposal practices:

- Disposal Practices;
  - Visual observations from test pits excavated in the west end of the north coal yard (TP-BCP-20 through TP-BCP-24) indicate past disposal of materials, including tar. Concentrations of SVOCs in excess of 500 mg/kg were detected in shallow (less than 12-inches bgs) fill samples;
  - Viscous tar was identified at Tar Seep No. 2, TP-BCP-25, and the MW-BCP-19 monitoring well cluster. The viscous tar was delineated by TP-BCP-25, MW-BCP-19 and the eastern seep identified during the surface materials management (Figure 4-61);
- Materials Management related;
  - Coal and coal fines are present throughout the fill in AOI 5. The coal yard had been used for coal management for more than 100 years. The surface of the coal yard had been dramatically altered by the mining and recovery of coal under the sale by the bankruptcy court. In accordance with an approved IRM Work Plan, the surface of the coal yard was regraded to improve management of surface water;
  - The mixing pad is located within this AOI. The mixing pad was used for blending coal tar decanter sludge and spill materials with coal before charging to the coke battery. The mixing pad was closed under an approved IRM work plan in 2021. Based on the shallow groundwater quality west (downstream) of the former mixing pad, the mixing pad was competent, and the operation of the mixing pad did not influence shallow groundwater; and
  - The coal conveyor tunnel crossed the coal yard AOI but the water quality from the tunnel dewatering indicates it did not have an adverse impact on water quality.

The rail and conveyor for the stacker reclaimer were removed. The conveyor foundations and the rail bed (densely compacted slag) remain between the north and south coal yards. This material was very different from the water bearing nodule materials that have the consistency and grain-size distribution of sandy gravel:



Photograph 4-15 – Slag Sample – TP-BCP-44



Photograph 4-16 – Slag Sample – TP-BCP-44

SVOCs were detected in every fill sample in the coal yard as expected. Coal contains SVOCs, and apart from the concentrations in samples from known disposal areas (ex. TP-BCP-20 through TP-BCP-24), the concentrations are relatively consistent across the AOI with those found in coal. A sample from TP-BCP-20 detected the constituents of tar in the sample and the seven PAHs detected were one to two orders of magnitude higher than found in the typical coal fill samples.

Clay samples collected in the coal yard were free of any detections above commercial SCOs apart from the samples collected downstream and immediately below the viscous tar identified near Tar Seep No. 2 (MW-BCP-19 and TP-BCP-25). At these two locations, only the samples collected just below the fill/clay interface contained TCC related compounds (Benzo(a) Pyrene) above the commercial SCOs. The shallow clay sample from TP-BCP-25 also contained arsenic, copper, and cyanide above the commercial SCO. None of the deeper clay samples collected in this AOI contained constituents at concentrations above the commercial SCO.

Shallow groundwater quality downgradient of the mixing pad (MW-BCP-20A) does not appear to have been impacted by former hazardous waste management operations. The sample from MW-BCP-20A did not contain any constituents above the Class GA standards, except very low concentrations of three PAHs in the second-round sampling. The sample from MW-BCP-19A immediately downgradient of Tar Seep No. 2 and TP-BCP-25 show some impact to shallow groundwater because of past disposal practices as the MW-BCP-19A samples contained VOCs, SVOCs, and cyanide above the Class GA standards.

Groundwater in the upper clay zone near Tar Seep No. 2 shows some impact from past disposal practices. MW-BCP-19B contained VOCs, SVOCs and cyanide above the Class GA standards.

4.13.6 AOI 6 – Water Treatment Area

Four (4) samples of fill, four (4) samples of clay, and two (2) samples of "sediment" were collected in AOI6. The "sediment" samples were collected from the sedimentation pool #001 and the stormwater retention basin. The sediment in these stormwater control facilities is a result of their proper function as sediment removal ponds prior to surface water discharging from Outfall #002. Two rounds of groundwater samples were collected from the MW-BCP-16 cluster. The nature and extent of impact in the Water Treatment Area AOI (Figure 4-62) is related primarily to materials management:

- Materials Management related;
  - The area was originally developed as onsite worker residences and subsequently as fuel storage;
  - Following the closure of the co-generation facility, two of the fuel tanks (ST21 and ST22) were converted for use as water treatment tanks;
  - Sedimentation pool #001 is the drainage catchment for the surface water from the South Coal Yard, the south drainage ditch, and the South Drainage AOI; and
  - The surface water retention basin is the final treatment component prior to surface water discharge through Outfall #002.

The fill is relatively thin in the eastern portion of AOI 6, varying from 12- to 24-inches thick. At MW-BCP-16, the western edge of AOI6, the fill was measured at 4.5 feet thick. Five (5) SVOCs were detected above the commercial SCOs in shallow fill samples in the AOI and Benzo(a) Pyrene was detected over the commercial SCO[27] in the Sedimentation pool #001 sample. The western one-half of sedimentation pool #001 was dredged in 2021. The materials removed from the sedimentation pool were coke breeze from the proper functioning of the surface water system and were replaced in the coal yard.

The AOI is dominated by the footprint of the four large ASTs that were closed. The area below the tanks has been impacted by petroleum hydrocarbons and a bioremediation IRM is being tested in the secondary containment of ST24.

The native clay has not been impacted by any process, disposal, or material management related impacts at the monitoring well or test pit locations outside the secondary containments. There were no detections of compounds above commercial SCOs in the RI samples of clay from the water treatment area or the retention basin outside the secondary containments. The upper 3 feet of clay is impacted below the western quarter of the former ST24 location. Samples of fill and clay were collected in the area from which ST24 was removed. This area is being addressed by the ST24 Bioremediation Interim Remedial Measures Work Plan.

Shallow groundwater does not appear to be impacted by any process, disposal, or material management related impacts. Concentrations of some natural occurring metals (Iron, Magnesium, and Sodium) were detected in MW-BCP-16A above the Class GA Standards, but no ammonia or benzene that would be present if the contents of ST21 or ST22 were migrating from the secondary containment. The groundwater quality in the shallow fill sample collected down gradient of the treatment tanks contained iron, magnesium, manganese, and sodium, considered naturally occurring background metals, above the Class GA standards.

Groundwater samples collected from the upper and lower clay zones (MW-BCP-16B and MW-BCP-16C) also contained natural occurring background metals (iron, magnesium, and sodium) above Class GA Standards.

4.13.7 AOI7 – South Drainage

Twenty-two (22) samples of fill, twelve (12) samples of clay, twenty-one (21) surface fill and two samples of sediment were collected in AOI7. Twelve (12) groundwater samples from four monitoring well locations were collected and tested from AOI7. A fill zone monitoring well was planned at the MW-BCP-26 location, but the fill was less than two feet thick and there was no water above the clay at that location. The nature

[27] There are no true sediments on the BCP Site, the sedimentation pools are water treatment units to allow settling of surface soils conveyed through the system by surface water runoff.

and extent of impact from the TCC operations in the South Drainage Area AOI (Figures 4-63 and 4-64) are related primarily to disposal practices and materials management:

- Disposal Practices:
  - The eastern end of AOI7 is largely open space along the southeastern BCP Site boundary with numerous large piles of fill and industrial debris;
  - A thin approximately 15,000 sq. ft. area of blue-stained fill indicative of disposal from purifier wastes was encountered near the large debris piles. The extent of the blue-stained fill was delineated by the excavation and observations made in TP-BCP-35, TP-BCP-49, TP-BCP-50, and TP-BCP-51. The blue stained fill ranged from 1- to 12-inches thick, but was typically less than 5 inches thick;
  - An area of hardened tar was identified at the west end of TP-BCP-34 adjacent to AOI7 in AOI5; and
  - Elevated concentrations of PAHs, metals, and cyanide were found near the eastern BCP Site boundary in the vicinity of MW-BCP-27A and SS-BCP-14. The detections were confirmed with SS-BCP-18 to SS-BCP-20 and the SS-BCP-140 duplicate samples.
- Materials Management related;
  - The boundary between Site 110 and AOI 7 is a former rail corridor. Multiple tracks crossed AOI7. The track alignments are typically defined by the underlying nodules that is the most hydraulically transmissive material identified at the BCP Site;
  - The fill in the immediate vicinity of the rail at the western boundary of the BCP Site has been impacted by viscous tar, presumably associated with rail car storage in that location.

SVOCs were detected in shallow fill samples across the entire AOI at concentrations above the commercial SCOs[28] including in the "sediment" sample collected from the downgradient sedimentation pool # 001 on AOI6. Total SVOC concentrations in surface soils in excess of 500 mg/kg were present at several locations corresponding to past disposal practices including along the south ditch, former rail tracks and rail car locations, and the debris piles near TP-BCP-49.

Metals (Arsenic, Barium, and Copper) were detected in fill samples above commercial SCOs, but not as widespread as the samples with SVOC detections above the commercial SCOs. Mercury was detected above the commercial SCO in the blue stained fill sample from TP-BCP-35 and well above the commercial criteria in sample SS-BCP-14. Surface fill samples SS-BCP-19, SS-BCP-20, SS-BCP-21, and SS-BCP-140 (resampling of the SS-BCP-14 location) were collected to confirm and delineate the presence of Mercury detected in SS-BCP-14 at the eastern BCP Site boundary. There were no detections of mercury above the commercial SCO in any of the 12 fill samples collected at and around the SS-BCP-14 location; however, observations made during installation of MW-BCP-27A as well as the corresponding shallow groundwater sample results, are indicative of some form of localized disposal at this location. Cyanide was detected above the commercial SCOs in samples collected from the blue stained soils in TP-BCP-35 and in the surface samples in the eastern end of the BCP Site (SS-BCP-14 and SS-BCP-15). TP-BCP-49 and TP-BCP-50 were excavated to define the limits of the detected cyanide concentrations in blue stained fill. TP-BCP-51 and TP-BCP-35 defined the southern, eastern and western ends of the blue stained fill. TP-BCP-49 and TP-BCP-50 defined the north and south limits of the blue stained fill.

[28] The term sediments as used on the BCP Site are the fine materials in the sedimentation pools and ponds. The pools and ponds are water treatment units to allow settling of surface soils conveyed through the system by surface water runoff and the presence of these constituents is an indication the ponds are performing their intended function.

There were no detections above the commercial SCOs in any clay samples in the AOI7 samples except the sample of clay just below the fill/clay interface at TP-BCP-31 adjacent to the abandoned rail car RC01 (removed in 2021). The clay sample from TP-BCP-31 was collected from material that had visible tar inclusions and the total SVOC concentration in that sample was higher than 500 mg/Kg.

Shallow groundwater samples collected over a majority of the AOI were relatively free of impacts from historical operations. Cyanide was the only constituent detected above Class GA Standards and only in the sample from MW-BCP-18A between the south ditch road and south ditch. There were no detections above Class GA Standards in the groundwater samples from MW-BCP-17A which is located by the flare and the small wetland area. A sample from MW-BCP-27A shows some impact from past disposal practices and contains PAHs, mercury, cyanide, and ammonia above Class GA Standards.

Groundwater samples collected from the upper clay do not show impact from past process, disposal, or material management practices. Groundwater samples from the upper clay zone were free of all constituents except an anomalous detection of acetone in the sample at the western monitoring well (MW-BCP-17B) near the flare on the adjacent 3821 River Road BCP Site. The groundwater sample from MW-BCP-26B also contained concentrations above the Class GA Standards

of three naturally occurring background metals (iron, magnesium, and sodium) found across the BCP Site. Notably the high concentrations of PAHs, cyanide, and ammonia detected on AOI 5 (MW-BCP-19B) did not migrate to the MW-BCP-26B location at the southern BCP Site boundary.

5 Qualitative Human Health Exposure Assessment

Inventum completed a qualitative human health exposure assessment (QHHEA) in accordance with NYSDEC DER-10 requirements. The QHHEA consists of a qualitative evaluation of the route, intensity, frequency, and duration of actual or potential exposures to BCP Site-related compounds to human receptors based on current and anticipated future use. The QHHEA evaluated the data for soil, groundwater, and "sediment" presented in this RI (Tables 5-1 and 5-2).

The initial step in evaluating the potential for current and future human exposure is to identify potentially complete exposure pathways. The following must exist for an exposure pathway to be complete:

- contaminant source;
- contaminant release and transport mechanisms;
- point of exposure;
- route of exposure; and
- receptor population.

An exposure pathway may be eliminated from further evaluation when any one of the five elements noted above has not existed in the past, does not exist in the present, and can reasonably be anticipated to never exist in the future.

The findings of the QHHEA are summarized in the table below with expanded discussion in the proceeding subsections.

Environmental Media and Exposure Route	Human Exposure Assessment
Direct Contact (and incidental ingestion) with Surface Soils (including NAPL and viscous tar)	• Current or potential future public exposure is not a complete pathway. Public access is restricted by fencing and full-time security. The future use of the site is strictly commercial. • Current or future commercial workers, approved visitors, and trespassers may come into contact with contaminated surface soils.
Direct Contact (and incidental ingestion) with Subsurface Soils (including NAPL and viscous tar)	• Current or future construction workers and utility workers may come into contact with contaminated subsurface soils during intrusive work on the BCP site.
Ingestion of Groundwater	• There are no current or future potential exposure pathways. • Contaminated groundwater is not being used for drinking water. • There are no known domestic water supply wells in the area. • Future institutional controls will include prohibition on groundwater use without necessary water quality treatment.

Environmental Media and Exposure Route	Human Exposure Assessment
Direct contact with Groundwater	• Current and future construction workers and utility workers may come into contact with contaminated groundwater during intrusive work on the BCP site.
Inhalation of Air (exposures related to soil vapor intrusion)	• A soil vapor intrusion evaluation will be completed for new construction planned on the BCP Site in the future.
Direct contact (and incidental ingestion) with Stormwater	• Current or future commercial workers, utility/construction workers, and trespassers could potentially be exposed to BCP Site related constituents at concentrations above SWPPP action levels.

Table N5-1: Qualitative Human Health Exposure Assessment Summary

5.1 Potential Exposure Pathway Analysis

The current and future use of the BCP Site is for commercial and industrial purposes. None of the buildings currently on the BCP Site are anticipated to be re-utilized as part of the RITC campus re-development. The office building located on AOI3 (Parking Lot Area) is currently being utilized for contractor office space and would likely maintain that use over some of the re-development process. All the other BCP Site buildings have been dismantled/demolished or will be in the future. There are six[29] buildings on the BCP Site and two above ground storage tanks that are being, or will be, removed prior to the remedial actions to be completed under the BCP. There are a number of slabs and secondary containment structures at the BCP Site. The buildings, slabs, process equipment, above ground storage tanks, and secondary containment structures potentially contain residuals of the by-products processes including constituents of COG, light oil, and Tar.

The BCP Site is surrounded by security fencing and there are multiple security cameras that allow for continuous monitoring of the fence line and structures. There is a security guard controlling and monitoring access to the BCP Site on a 24-hour 7 day per week (24/7) basis. It is assumed that a trespasser could gain access to the BCP Site by breaching security although the duration would be limited until the police arrived.

A Community Air Monitoring Program (CAMP) is in place to monitor air quality along the perimeter of the BCP Site and within 50 feet of intrusive activities. The CAMP data has demonstrated that the controls in place during the intrusive activities have prevented any potential exposure due to airborne dust or vapor.

Groundwater use on the BCP Site will be prohibited by use restriction and there is no potential for exposure via potable uses at this time as no potable water wells exist on the BCP Site.

The potential current and future BCP Site receptors include the commercial and industrial workers, visitors, trespasser, and construction/utility worker.

[29] At the time of this document the following buildings remained on the BCP Site; the office, the MG Building, the former conveyor structure next to the MG Building, the Maintenance Building, the green warehouse and the thaw shed. The purifier boxes are not considered a building in the context of this section.

5.2 Direct Contact – Surface Soils

Based on current and anticipated future land use, commercial workers, construction/utility workers, visitors and/or trespassers may be exposed to surface fill (0 to 2 inches bgs) and shallow fill (< 2 feet bgs) in unpaved areas of the BCP Site. Shallow fill with exceedances of commercial SCOs are prevalent across the BCP Site and associated primarily with SVOCs, Metals, and Cyanide and to a more limited extent, VOCs.

Receptors may be exposed to soils located at or near the ground surface during non-intrusive, routine, or occasional activities.

5.3 Direct Contact – Subsurface Soils

Based on current and anticipated future land use, construction and utility workers may be exposed to subsurface soil if these receptors are involved in intrusive activities. Subsurface soils (>2 feet bgs) with exceedances of commercial Use SCOs are prevalent across the BCP Site in the fill but limited in the clay to defined former disposal areas. When present in the underlying clay the exceedances above commercial SCOs do not typically extend past the first 2-feet below the fill/clay interface. Subsurface soils with exceedances of commercial SCOs are primarily associated with SVOCs, Metals, and Cyanide.

Any future use of the BCP Site will involve construction activities where subsurface soil may be encountered during the development process. Potential exposures for construction and/or utility workers can be mitigated with the use of engineering controls, personal protective equipment (PPE), and other health and safety protocols. A required component prior to issuance of the BCP Certificate of Completion will entail submittal of a Site Management Plan (SMP) and Excavation Work Plan (EWP) which detail the health and safety protection required for current and future construction and utility worker receptors.

5.4 Inhalation – Soil Particulates and Groundwater vapors/indoor air

Construction and utility workers may be exposed to BCP Site related constituents in shallow fill, subsurface soil, or groundwater via inhalation during current and future activities. Shallow fill and shallow groundwater in the former production area may contain NAPL in the form of a viscous mobile tar. Other isolated areas of the BCP Site in the vicinity of known disposal areas may also contain viscous tar in shallow fill.

Potential exposures for construction and/or utility workers can be mitigated with the use of engineering controls, PPE, and other health and safety protocols. A required component prior to issuance of the BCP Certificate of Completion will entail submittal of an SMP and EWP which detail the health and safety protection required for current and future construction and utility worker receptors.

VOCs and SVOCs detected in shallow groundwater were compared to USEPA Groundwater Vapor Intrusion Screening Levels (VISLs) (Table 5-3). The VISLs provide generally recommended, media-specific, risk-based screening-level concentrations for groundwater. The VISL's were used as a surrogate for site-specific soil gas sampling to identify areas where vapor intrusion may pose a potential exposure to future receptors, where additional assessment may be necessary prior to any future redevelopment, and/or where vapor intrusion controls should be considered within the AA.

Several compounds are present at concentrations in shallow groundwater that exceed the generic (non-site specific) target groundwater concentration indicative of a potential vapor intrusion potential exposure. These are almost exclusively in the Former Production Area (AOI2) where NAPL was identified in shallow groundwater (MW-BCP-10A) or in nearby test pits (TP-BCP-05). The distribution and concentration of VOCs and SVOCs in shallow groundwater outside of the limits of the Former Production Area indicates little potential for vapor migration into indoor air, although NAPL in these areas must be considered a potential exposure for future redevelopment. A completed soil vapor intrusion evaluation in accordance with DER-10 was unable to be conducted during the RI due to the condition of the structures on the site.

5.5 Direct Contact – Groundwater

Potential current/future receptors include commercial workers and utility/construction workers. Groundwater occurs in the fill, clay, and bedrock and generally flows from east-northeast to south-southwest across the BCP Site. Groundwater is discontinuous in the overlying fill.

Groundwater is not used as a potable water source at or near the BCP Site and future BCP Site use will require maintenance of an environmental easement strictly prohibiting groundwater use. Construction and/or utility workers could potentially be exposed to groundwater during intrusive activities, if encountered. Potential exposures for construction and/or utility workers can be mitigated with the use of engineering controls, PPE, and other health and safety protocols. A required component prior to issuance of the BCP Certificate of Completion will entail submittal of an SMP and EWP which detail the health and safety protection required for current and future construction and utility worker receptors.

Shallow groundwater data from the downgradient (MW-BCP-03A and MW-BCP-15A) monitoring wells at the BCP Site boundary do not suggest a potential open point of exposure for offsite receptors.

5.6 Direct Contact – NAPL/Viscous Tar

Potential current/future receptors include commercial workers and utility/construction workers. NAPL/Viscous tar is present primarily in the fill in the Former Production Area (AOI2) and localized to known disposal areas in other AOIs (AOI4 and AOI5) on the BCP Site.

Commercial workers could be exposed to viscous tar at the tar seep locations.

Construction and/or utility workers could potentially be exposed to NAPL/Viscous Tar during intrusive activities. The NAPL identified on the BCP Site may contain elevated concentrations of VOCs (Benzene), SVOCs (primarily PAHs), Metals (including Mercury), and Cyanide.

Potential exposures for commercial, construction and/or utility workers can be mitigated with the use of engineering controls, PPE, and other health and safety protocols. A required component prior to issuance of the BCP Certificate of Completion will entail submittal of an SMP and EWP which detail the health and safety protection required for current and future construction and utility worker receptors.

No NAPL/Viscous tar was identified in any surface sample, boring, or test pit completed at the BCP Site boundary. There is no potential for exposure to offsite receptors.

5.7 Direct Contact – Stormwater

Potential current/future receptors include commercial workers, utility/construction workers, and trespassers. Stormwater occurs within the BMPs engineered and controlled to manage storm water on the BCP Site. Stormwater discharges from the BCP Site are conducted and monitored under an approved SWPPP. Discharges at Outfall #001 and #Outfall 004 have shown periodic exceedances of the action levels for Cyanide, Ammonia, and Mercury. In accordance with the SWPPP, corrective measures in the form of NYSDEC approved IRMs have been put in place to address the action level exceedances as the RI and associated IRMs progress towards a final implemented BCP Site remedy.

Commercial workers, utility/construction workers, and trespassers could potentially be exposed to BCP Site related constituents at concentrations above SWPPP action levels. Potential exposures for construction and/or utility workers can be mitigated with the use of engineering controls, PPE, and other health and safety protocols. Potential exposures for trespassers can be mitigated through ongoing and future BCP Site security measures.

A required component prior to issuance of the BCP Certificate of Completion will entail submittal of an SMP and a SWPPP or a State Pollutant Discharge Elimination System permit (SPDES) which detail the health and safety protection required for current and future commercial, construction and utility worker receptors and that define the water quality requirements for surface water to protect human health and the environment.

Discharges are conducted under an approved SWPPP or a SPDES Permit and will continue to be post-development, as required. RITC also controls the storm water discharge flow features downgradient of the BCP Site on the adjacent/contiguous State Superfund Sites (109 and 108). No exceedance of the SWPPP action levels have been detected on the contiguous and downgradient State Superfund Site (108). Potential exposures for offsite trespasser receptors may be mitigated through permitting controls/compliance and BCP Site security.

6 Conclusions of Remedial Investigations

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 and the RIs on the adjacent Sites 109 and 110. The RI and IRM data provide the information required to conduct an Alternatives Analysis (AA).

6.1 Objectives

As stated in the RI Work Plan, the objectives of the RI programs were to complete a comprehensive investigation of soil and groundwater for the BCP Site, recommend the applicable SCGs, and propose potential additional IRMs to address environmental impacts that resulted from historical operations at the BCP Site.

To achieve these goals, the following objectives were achieved during the RI program.

- Gather, compile, and evaluate existing historical investigation data;
  - *The data available from historical reports, the USEPA Emergency Response Team, the NYSDEC, and recoverable TCC records were used to complete this RI.*
  - *In addition to the dozens of documents listed in the Bibliography, more than 2,000 historic drawings and maps were recovered and reviewed.*
- Compile the data collected since the TCC Closure (USEPA and RITC) and compile with historical data;
  - *This RIR report presents the compilation of the historic, IRM and RI data.*
- Complete the investigation of the BCP Site, including surface soil, shallow fill, and subsurface soil, sediments, groundwater, and former TCC process infrastructure (former storage/process tanks, drums, buildings, former process piping, and equipment);
  - *The investigation of the BCP Site was comprehensive. The data collected during the RI, the supplemental data collection, and the IRMs provide data to identify and characterize the conditions at the BCP Site to the extent required to complete an AA.*
- Conduct qualitative exposure assessments for both onsite and offsite using the collective data for the BCP Site and including assessing conditions at and beyond the perimeter in relation to the BCP Site;
  - *The qualitative exposure assessments are provided in Section 5.0 of this RIR.*
- Identify and propose any IRM activities that may be appropriate to complete in advance of the AA to protect the environment and ensure continued protection of public safety and health;
  - *Inventum has identified and recommended IRMs throughout the RI. Section 3 describes the NYSDEC and NYSDOH approved IRMs that have been completed or are ongoing at the BCP Site.*
- Complete an AA and identify the appropriate remedy(ies) for NYSDEC consideration and public comment, and;
  - *The AAR was prepared and approved (see Section 9.2 – Schedule).*
- Provide a draft schedule for implementation of the proposed remedial actions.
  - *Section 9.2 - Schedule presents the proposed high-level schedule for completion of the AA, RD, ongoing IRMs, and remedial actions (RAs)*

6.2 Conclusions

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 RI data establish that:

- The BCP Site surface is entirely covered with fill. There are no areas suitable for unrestricted use in their current condition.
- The removal of over 29 million pounds of waste (through February 28, 2023) has accounted for the significant quantity of the mobile chemicals left on the BCP Site.
- The fill at the BCP Site does not pose potential exposure to human health or the environment off-site.
- With very few isolated and near surface exceptions, the clay at the BCP Site has not been affected by the TCC operations. The data for clay samples near the BCP Site boundaries does not indicate offsite transport in the clay zone has or is occurring. No samples have been collected off the BCP Site.
- The impacts to groundwater, with very few isolated exceptions in the upper clay, are limited to shallow groundwater in the fill.
- Impacts to shallow groundwater are contained on the BCP Site and do not flow off the BCP Site in the shallow fill groundwater system, as defined by the perimeter test pits and monitoring wells.
- Shallow groundwater is collected by the site stormwater system and discharges through the monitored outfalls #001 and #002.
- Shallow groundwater flow on the BCP Site is largely controlled by the former railroad bedding materials and the engineered surface water system.
- Naturally occurring background metals are the only compounds detected above Class GA Standards in clay groundwater samples in areas away from the tar deposition areas.
- The only compounds detected in bedrock water samples above the Class GA Standards that are believed to be mobile are naturally occurring background metals.
- The most significant area of impact is in fill below western portion of the former production area between the Boiler House and the Light Oil Area.
- Other areas of significant impact are associated with former process or storage (tanks) equipment or areas of waste management.

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

- Low Impacts: AOI3 (Parking Lot Area) and AOI6 (Water Treatment Area);
- Materials Management Impacts: AOI4 (Coke Yard), AOI5 (Coal Yard), and AOI7 (Southern Drainage Area); and
- Production Area Impacts: AOI1 (North Rail Corridor) and AOI2 (Former Production Area).

6.2.1 Low-impact Areas

The low impact areas are the two areas of investigation (Figures 4-56, 4-57 and 4-64) that produced data with limited impacts in the general BCP Site fill, no impacts in clay outside the storage tank secondary containment structures and no migration of constituents from TCC in shallow groundwater. The impacts in these areas in the general BCP Site fill is due to the presence of coal and coke and the constituents contained within those materials, some tar from above ground pipes, and from the areas of the former storage tanks.

6.2.2 Materials Management Impact Areas

The area affected by TCC materials management practices are those AOIs (Figures 4-58, 4-59, 4-60, 4-61, 4-65 and 4-66) to that in general are covered with a layer of coal and coke containing fill, but also have isolated areas impacted by management of wastes or transportation (rail bed materials) related impacts. These isolated areas contain viscous mobile tar that is localized to the disposal area and has been defined spatially by the RI data and observations. The isolated transportation related impacts are those discontinuous areas where slag-like nodules are present in the fill and comparatively elevated concentrations of BCP Site related compounds of potential concern (primarily PAHs) are found in the shallow groundwater.

6.2.3 Production Area Impact

The former production area and contiguous portions of the north rail corridor (Figures 4-52 to 4-55) are characterized by more widespread, continuous, and significant impacts from the TCC operations. The numbers and concentrations of compounds above the commercial criteria are highest in these areas. NAPL and viscous tar are possible within the limits of this area within the fill and shallow groundwater.

There are no areas of the BCP Site that are unaffected by historical uses, and therefore no areas that would be suitable for unrestricted use.

6.3 Data Gaps

There are no known data gaps that have not been addressed by the RI, supplemental RI, or ongoing IRMs that must be filled to complete a comprehensive understanding of the nature and extent of impact on the BCP Site.

Inventum had identified additional information that may be beneficial to complete the AA that will be addressed by the complete and ongoing IRMs and the Pre-Design Investigations:

1. The presence and mobility of liquids and sludges in tanks and piping are addressed through the demolition and Above-ground Storage Tank (AST) IRMs;
2. The control of groundwater mobility and the effectiveness of shallow groundwater collection and treatment is being tested using the groundwater treatment IRM;
3. The potential impacts associated with tank removals are being assessed by completion of the Secondary Containment IRMs and the Pre-Design Investigations;
4. The implementability of multiple treatment technologies have and are being tested through ongoing IRMs associated with specific types of impacted media identified during the RI and IRMs;
5. Surface water quality associated with the BCP Site is closely monitored at the three outfalls;

At both the MW-BCP-13A/B and MW-BCP-19A/B locations the zone of impact was clearly observable in the clay samples recovered during drilling. At the time the wells were installed, discussions were held with NYSDEC to specifically locate the well screen in MW-BCP-19B across the zone of impact to provide data for the most significantly impacted zone. These locations were selected to provide data on the locations impacted, but the logging identified intact clay with no indication of impact (odor, color or PiD reading) below the screened intervals. The clay samples across the screened interval contained VOC concentrations below the commercial SCOs, confirming the VOCs in the tar are not affecting the surrounding clay matrix. As a result the characterization of these areas are not considered a data gap for purposes of the RI or AA.

7 Basis for Alternative Analysis Report

The selection of a remedy (or remedies) under the BCP Program is based on the characterization of nature and extent of impact on the BCP Site and the qualitative exposure assessment. As a Volunteer in the Brownfield Cleanup Program, RITC has evaluated effective remedies to address the impact on-site as well as the remedial actions required to prevent migration of impacted media to off-site properties.

The Remedial Alternatives Analysis Report identifies a recommended remedial alternative(s) based on an evaluation of the effectiveness of each screened alternative with respect to the remedy selection evaluation criteria as presented in 6 NYCRR Part 375 and DER-10. Remedies in the BCP are selected from four cleanup tracks (See 6 NYCRR Part 375-3.8):

- Track 1 - no restrictions on the use of the property;
- Track 2 - restricted use with generic soil cleanup objectives (SCOs) based on the intended use of the property-residential, restricted residential (single family houses not allowed), commercial, or industrial;
- Track 3 - restricted use with modified SCOs based on the same uses described in track 2 above;
- Track 4 - restricted use with site-specific soil cleanup objectives, where the shallow exposed soils must meet the generic SCOs used for track 2 above.

The RITC BCP Site AA evaluates remedial actions including areas of the BCP Site eligible for Track 1 and Track 4 cleanup (commercial SCOs). Alternative SCOs will not be proposed and current surface materials at the BCP Site do not meet the commercial SCOs.

The technologies selected for screening have been combined into remedial alternatives. Multiple remedial alternatives were proposed and based on the BCP Site as a whole or based on the various areas of the BCP Site. The remedial actions will incorporate the conditions on Sites 109 and 110 that are contiguous with the east and west ends of the BCP Site to insure there is no gap in the protections offered by the remedial actions.

Due to the range of conditions identified, a single remedial technology is not suitable for all areas of the BCP Site. Remedial technologies and alternatives assembled for the various parts of the BCP Site have been evaluated in accordance with the following Remedy Selection Evaluation Criteria in DER10:

- Threshold Criteria
  - Overall Protection of Human Health and the Environment;
  - Compliance with SGCs;
- Primary Balancing Criteria
  - Long-term Effectiveness and Permanence;
  - Reduction of Toxicity, Mobility or Volume;
  - Short-term Impact and Effectiveness;
  - Implementability;
  - Cost Effectiveness;
  - Land Use;
- Modifying Criterion
  - Community Acceptance.

The AA Report details the steps completed to select a recommended remedial action:

1. Remedial Goals
2. Establish RAOs
3. Identify General Response Actions;
4. Identify and Screen Technologies;
5. Assemble the Technologies into Remedial Actions;
6. Evaluate the Remedial Actions in Accordance with the Evaluation Criteria by AOI or BCP Site-wide; and
7. Select the Recommended Remedial Alternative(s).

8 Schedule

The overall project schedule is summarized in Table 9-1. The RITC Campus Properties were purchased by RITC on October 10, 2019, through proceedings with the U.S. Bankruptcy Court. RITC immediately applied for entry into the NYSDEC BCP Program, and the BCP Agreement was signed on February 14, 2020. The execution of the BCP Agreement triggered a series of submittals from the CPP to IRM Work Plans, the SWPPP, and the RIWP. As shown in Table 9-1 RITC has been actively managing the BCP Site since acquisition.

Looking forward from the RI:

- BCP Site and stormwater management will continue until the current protocols are modified by a Site Management Plan (SMP).
- The Alternatives Analysis Report was submitted in August 2023. The AAR was subject to a formal public comment period. The Decision Document with he selected remedial alternative was released by NYSDEC August 29, 2024.
- IRMs will continue until the final remedial actions are initiated.
- The Remedial Design(s) are typically submitted in three phases; preliminary, pre-final and final with review and comments on each phase. In concert with the remedial design will be the permit applications and the Remedial Action Work Plan (RAWP) required for the construction activities.
- The investment RITC has committed to the IRMs will reduce the schedule for the implementation of the Remedial Designs. Depending on the seasons following approval of the Remedial Designs, the implementation of the remedial action could be completed in as little as 8 months.
- Anticipating the scope and number of active elements in the remedial program, a three-month startup period for any active remedial actions is anticipated.
- Completion of the remedy triggers a series of submittals starting with the Final Engineering Report (FER). The FER will be a large document detailing the work implemented over the period of RITC BCP Site management.
- The other major submittal will include the SMP which will define the activities that will be required for long-term care of the BCP Site.

9 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 remedial investigation 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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Tables

Table 4 - 1
Coal, Coke and Asphalt Representative Samples
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	Coal - 10152021	Coke - 10152021		Asphalt - 10152021	
	Commercial	Industrial						
			Sample Date:	10/15/2021	10/15/2021		10/15/2021	
			Source:	Coal	Coke		Asphalt	
			Location:	Coal Charging	Coke Pile West of Battery		Site 108	
TCL VOCs (SW8260C)								
1,1,1-Trichloroethane (TCA)	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,1,2,2-Tetrachloroethane			ug/kg	<23.4	<6.58	U	<3.86	U
1,1,2-Trichloroethane			ug/kg	<23.4	<6.58	U	<3.86	U
1,1,2-Trichloro-1,2,2-Trifluoroethane			ug/kg	<23.4	<6.58	U	<3.86	U
1,1-Dichloroethane	240,000	480,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,1-Dichloroethene	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,2,3-Trichlorobenzene			ug/kg	<58.5	<16.4	U	<9.65	U
1,2,4-Trichlorobenzene			ug/kg	<58.5	<16.4	U	<9.65	U
1,2-Dibromo-3-Chloropropane			ug/kg	<117	<32.9	U	<19.3	U
1,2-Dibromoethane (Ethylene Dibromide)			ug/kg	<23.4	<6.58	U	<3.86	U
1,2-Dichlorobenzene	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,2-Dichloroethane	30,000	60,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,2-Dichloropropane			ug/kg	<23.4	<6.58	U	<3.86	U
1,3-Dichlorobenzene	280,000	560,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,4-Dichlorobenzene	130,000	250,000	ug/kg	<23.4	<6.58	U	<3.86	U
1,4-Dioxane (P-Dioxane)	130,000	250,000	ug/kg	<117	<32.9	U	<19.3	U
Methyl Ethyl Ketone (2-Butanone)	500,000	1,000,000	ug/kg	<117	<32.9	U	<19.3	U
2-Hexanone			ug/kg	<58.5	<16.4	U	<9.65	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)			ug/kg	<58.5	<16.4	U	<9.65	U
Acetone	500,000	1,000,000	ug/kg	<117	<32.9	U	<19.3	U
Benzene	44,000	89,000	ug/kg	**78.2**	<6.58	U	<9.65	U
Bromochloromethane			ug/kg	<58.5	<16.4	U	<9.65	U
Bromodichloromethane			ug/kg	<23.4	<6.58	U	<3.86	U
Bromoform			ug/kg	<58.5	<16.4	U	<9.65	U
Bromomethane			ug/kg	<23.4	<6.58	U	<3.86	U
Carbon Disulfide			ug/kg	<23.4	<6.58	U	<3.86	U
Carbon Tetrachloride	22,000	44,000	ug/kg	<23.4	<6.58	U	<3.86	U
Chlorobenzene	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
Chloroethane			ug/kg	<23.4	<6.58	U	<3.86	U
Chloroform	350,000	700,000	ug/kg	<23.4	<6.58	U	<3.86	U
Chloromethane			ug/kg	<23.4	<6.58	U	<3.86	U
Cyclohexane			ug/kg	<117	<32.9	U	<19.3	U
Dibromochloromethane			ug/kg	<23.4	<6.28	U	<3.86	U
Dichlorodifluoromethane			ug/kg	<23.4	<6.58	U	<3.86	U
Methylene Chloride	500,000	1,000,000	ug/kg	<58.5	<16.4	U	<9.65	U
Ethylbenzene	390,000	780,000	ug/kg	**60.9**	<6.58	U	<3.86	U
Isopropylbenzene (Cumene)			ug/kg	<23.4	<6.58	U	<3.86	U
Methyl Acetate			ug/kg	<23.4	<6.58	U	<3.86	U
Tert-Butyl Methyl Ether	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
Methylcyclohexane			ug/kg	<23.4	<6.58	U	<3.86	U
Styrene			ug/kg	**106**	<16.4	U	<9.65	U
Tetrachloroethylene (PCE)	150,000	300,000	ug/kg	<23.4	<6.58	U	<3.86	U
Toluene	500,000	1,000,000	ug/kg	**181**	<6.58	U	<3.86	U
Trichloroethylene (TCE)	200,000	400,000	ug/kg	<23.4	<6.58	U	<3.86	U
Trichlorofluoromethane			ug/kg	<23.4	<6.58	U	<3.86	U
Vinyl Chloride	13,000	27,000	ug/kg	<23.4	<6.58	U	<3.86	U
Cis-1,2-Dichloroethylene	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
Cis-1,3-Dichloropropene			ug/kg	<23.4	<6.58	U	<3.86	U
m,p-Xylene	500,000	1,000,000	ug/kg	**336**	<6.58	U	<3.86	U
O-Xylene (1,2-Dimethylbenzene)	500,000	1,000,000	ug/kg	**308**	<6.58	U	<3.86	U
Trans-1,2-Dichloroethene	500,000	1,000,000	ug/kg	<23.4	<6.58	U	<3.86	U
Trans-1,3-Dichloropropene			ug/kg	<23.4	<6.58	U	<3.86	U

Table 4 - 1
Coal, Coke and Asphalt Representative Samples
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	Coal - 10152021		Coke - 10152021		Asphalt - 10152021	
		Sample Date:		10/15/2021		10/15/2021		10/15/2021	
		Source:		Coal		Coke		Asphalt	
		Location:		Coal Charging		Coke Pile West of Battery		Site 108	
TCL SVOCs (SW8270D)									
1,1-Biphenyl			ug/kg	**20000**	J	<286	U	<1240	U
1,2,4,5-Tetrachlorobenzene			ug/kg	<28200	U	<286	U	<1240	U
2,3,4,6-Tetrachlorophenol			ug/kg	<28200	U	<286	U	<1240	U
2,4,5-Trichlorophenol			ug/kg	<28200	U	<286	U	<1240	U
2,4,6-Trichlorophenol			ug/kg	<28200	U	<286	U	<1240	U
2,4-Dichlorophenol			ug/kg	<28200	U	<286	U	<1240	U
2,4-Dimethylphenol			ug/kg	<28200	U	<286	U	<1240	U
2,4-Dinitrophenol			ug/kg	<113000	U	<1140	U	<4950	U
2,4-Dinitrotoluene			ug/kg	<28200	U	<286	U	<1240	U
2,6-Dinitrotoluene			ug/kg	<28200	U	<286	U	<1240	U
2-Chloronaphthalene			ug/kg	<28200	U	<286	U	<1240	U
2-Chlorophenol			ug/kg	<28200	U	<286	U	<1240	U
2-Methylnaphthalene			ug/kg	**73500**		**165**	J	<1240	U
2-Methylphenol (O-Cresol)	500,000	1,000,000	ug/kg	<28200	U	<286	U	<1240	U
2-Nitroaniline			ug/kg	<28200	U	<286	U	<1240	U
2-Nitrophenol			ug/kg	<28200	U	<286	U	<1240	U
3,3'-Dichlorobenzidine			ug/kg	<28200	U	<286	U	<1240	U
Cresols, M & P	500,000	1,000,000	ug/kg	<28200	U	<286	U	<1240	U
3-Nitroaniline			ug/kg	<28200	U	<286	U	<1240	U
4,6-Dinitro-2-Methylphenol			ug/kg	<56500	U	<571	U	<2480	U
4-Bromophenyl Phenyl Ether			ug/kg	<28200	U	<286	U	<1240	U
4-Chloro-3-Methylphenol			ug/kg	<28200	U	<286	U	<1240	U
4-Chloroaniline			ug/kg	<28200	U	<286	U	<1240	U
4-Chlorophenyl Phenyl Ether			ug/kg	<28200	U	<286	U	<1240	U
4-Nitroaniline			ug/kg	<28200	U	<286	U	<1240	U
4-Nitrophenol			ug/kg	<28200	U	<286	U	<1240	U
Acenaphthene	500,000	1,000,000	ug/kg	**39600**		<286	U	<1240	U
Acenaphthylene	500,000	1,000,000	ug/kg	**90200**		<286	U	<1240	U
Acetophenone			ug/kg	<28200	U	<286	U	<1240	U
Anthracene	500,000	1,000,000	ug/kg	**154000**		<286	U	<1240	U
Atrazine			ug/kg	<28200	U	<286	U	<1240	U
Benzo(A)Anthracene	5,600	11,000	ug/kg	**208000**		<286	U	<1240	U

Table 4 - 1
Coal, Coke and Asphalt Representative Samples
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	Coal - 10152021		Coke - 10152021		Asphalt - 10152021	
		Sample Date:		10/15/2021		10/15/2021		10/15/2021	
		Source:		Coal		Coke		Asphalt	
		Location:		Coal Charging		Coke Pile West of Battery		Site 108	
Benzaldehyde			ug/kg	<28200	U	<286	U	<1240	U
Benzo(A)Pyrene	1,000	1,100	ug/kg	**147000**		<286	U	<1240	U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**134000**		<286	U	<1240	U
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	**76100**		<286	U	<1240	U
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**134000**		<286	U	<1240	U
Biphenyl (Diphenyl)			ug/kg	NS		NS		NS	
Bis(2-Chloroisopropyl) Ether			ug/kg	NS		NS		NS	
Bis(2-Chloroethoxy) Methane			ug/kg	<28200	U	<286	U	<1240	U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)			ug/kg	<28200	U	<286	U	<1240	U
Bis(2-Ethylhexyl) Phthalate			ug/kg	<28200	U	<286	U	<1240	U
Benzyl Butyl Phthalate			ug/kg	<28200	U	<286	U	<1240	U
Caprolactam			ug/kg	<28200	U	<286	U	<1240	U
Carbazole			ug/kg	**70900**		<286	U	<1240	U
Chrysene	56,000	110,000	ug/kg	**184000**		<286	U	<1240	U
Di-N-Butyl Phthalate			ug/kg	<28200	U	<286	U	<1240	U
Di-N-Octylphthalate			ug/kg	<28200	U	<286	U	<1240	U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**24000**		<286	U	<1240	U
Dibenzofuran	350,000	1,000,000	ug/kg	**91400**		<286	U	<1240	U
Diethyl Phthalate			ug/kg	<28200	U	<286	U	<1240	U
Dimethyl Phthalate			ug/kg	<28200	U	<286	U	<1240	U
Fluoranthene	500,000	1,000,000	ug/kg	**539000**		**347**		<1240	U
Fluorene	500,000	1,000,000	ug/kg	**140000**		<286	U	<1240	U
Hexachlorobenzene	6,000	12,000	ug/kg	<28200	U	<286	U	<1240	U
Hexachlorobutadiene			ug/kg	<28200	U	<286	U	<1240	U
Hexachlorocyclopentadiene			ug/kg	<113000	U	<1140	U	<4950	U
Hexachloroethane			ug/kg	<28200	U	<286	U	<1240	U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**79400**		<286	U	<1240	U
Isophorone			ug/kg	<28200	U	<286	U	<1240	U
N-Nitrosodi-N-Propylamine			ug/kg	<28200	U	<286	U	<1240	U
N-Nitrosodiphenylamine			ug/kg	<28200	U	<286	U	<1240	U
Naphthalene	500,000	1,000,000	ug/kg	**213000**		**1290**		<1240	U
Nitrobenzene			ug/kg	<28200	U	<286	U	<1240	U
Pentachlorophenol	6,700	55,000	ug/kg	<56500	U	<286	U	<2480	U
Phenanthrene	500,000	1,000,000	ug/kg	**611000**		**432**		<1240	U
Phenol	500,000	1,000,000	ug/kg	<2820	U	<286	U	<1240	U
Pyrene	500,000	1,000,000	ug/kg	**382000**		**260**	J	<1240	U

Table 4 - 1
Coal, Coke and Asphalt Representative Samples
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	Coal - 10152021		Coke - 10152021		Asphalt - 10152021	
	Commercial	Industrial							
			Sample Date:	10/15/2021		10/15/2021		10/15/2021	
			Source:	Coal		Coke		Asphalt	
			Location:	Coal Charging		Coke Pile West of Battery		Site 108	
TAL Metals (SW6010)									
Aluminum			mg/kg	5500		686	M	1860	
Antimony			mg/kg	<2.88	U	<2.94	U	<2.91	U
Arsenic	16	16	mg/kg	6.89		1.21		1.73	
Barium	400	10,000	mg/kg	75.8		12.8		11.6	
Beryllium	590	2,700	mg/kg	0.441		<0.245	U	<0.243	U
Cadmium	9.3	60	mg/kg	0.354		<0.245	U	0.135	J
Calcium			mg/kg	21800		258	DM	148000	
Chromium, Total			mg/kg	9.15		1.35		3.55	
Cobalt			mg/kg	4.77		<2.45	U	1.27	J
Copper	270	10,000	mg/kg	21.3		7.63	D	5.33	
Iron			mg/kg	9150		1770		3640	
Lead	1,000	3,900	mg/kg	38.0		1.63		2.44	
Magnesium			mg/kg	7330		88.6	J	3830	
Manganese	10,000	10,000	mg/kg	311		14.0	D	141	
Nickel	310	10,000	mg/kg	9.69		1.48	J	14.3	
Potassium			mg/kg	1100		129		356	
Selenium	1,500	6,800	mg/kg	0.917	J	<0.980	U	<0.971	U
Silver	1,500	6,800	mg/kg	<0.481	U	<0.490	U	<0.485	U
Sodium			mg/kg	158		62.4	J	138	
Thallium			mg/kg	<1.20	U	<1.23	U	<1.21	U
Vanadium			mg/kg	11.9		1.42		14.8	
Zinc	10,000	10,000	mg/kg	74.9		5.51		28.2	
Mercury (SW7471)									
Mercury	2.8	5.7	mg/kg	2.21		0.00548		0.00741	
SOLIDS									
Total Solids			%	88.4		98.6		98.7	

Note:
NS: Not sampled
"<": Analyzed for but not detected at or above the quantitation limit
D: Sample, laboratory Control Sample, or Matric Spike Duplicate results abbove Relative Percent Difference limit.
M: Matrix spike recoveries outside QC limits. Matrix bias indicated.
J: Result estimated between the quantitation limit and half the quantitation limit

Table 4-2
Analytical Data - Fill Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-38		TP-BCP-01		TP-BCP-14		TP-BCP-14	
			Sample Date:	11/4/2020		11/10/2020		11/10/2020		11/10/2020	
			Sample Interval:	0 - 1 ft		0 - 1 ft		0 - 1 ft		0 - 1 ft (DUP)	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)											
Anthracene	500,000	1,000,000	ug/kg	27000	D	140000	D	1100		9300	D
Benzo(A)Anthracene	5,600	11,000	ug/kg	81000	D	9800	J	2900		33000	D
Benzo(A)Pyrene	1,000	1,100	ug/kg	98000	D	15000	D	4000		39000	D
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	110000	D	18000	D	6400		48000	D
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	38000	D	5000	DJ	1900		16000	D
Chrysene	56,000	110,000	ug/kg	86000	D	17000	D	4000		37000	D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	15000	DJ	2500	DJ	980		6800	DJ
Dibenzofuran	350,000	1,000,000	ug/kg	5200	DJ	5500	DJ	610	J	2300	DJ
Fluoranthene	500,000	1,000,000	ug/kg	180000	D	26000	D	5500		77000	D
Fluorene	500,000	1,000,000	ug/kg	11000	DJ	12000	D	210	J	4600	DJ
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	65000	D	11000	DJ	4900		32000	D
Naphthalene	500,000	1,000,000	ug/kg	3800		7000	DJ	1000		3100	DJ
Phenanthrene	500,000	1,000,000	ug/kg	95000	D	33000	D	2900		47000	D
Pyrene	500,000	1,000,000	ug/kg	140000	D	25000	D	4800		63000	D
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	11.6		7.5	J	7.6	J	8.8	J
Lead	1,000	3,900	mg/kg	151		119		42.8		54.9	
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	1.4	J	0.52		0.193		0.168	
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	8.34		0.73		1.58		2.44	
				1		2		3		4	

Table 4-2
Analytical Data - Fill Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-04		TP-BCP-05		TP-BCP-47		MW-BCP-06	
			Sample Date:	11/11/2020		11/1//2020		11/18/2020		11/11/2020	
			Sample Interval:	0 - 1 ft		0 - 1 ft		0 to 1 ft		0 - 1 ft	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)											
Anthracene	500,000	1,000,000	ug/kg	**580000**	D	**9200**	J	**1800**	J	<110	U
Benzo(A)Anthracene	5,600	11,000	ug/kg	**470000**	D	**40000**		**4000**	J	**260**	J
Benzo(A)Pyrene	1,000	1,100	ug/kg	**520000**	D	**58000**		**5900**		**260**	J
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**490000**	D	**72000**		**7700**		**480**	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**190000**		**22000**		**2400**	J	<140	U
Chrysene	56,000	110,000	ug/kg	**450000**	D	**49000**		**4300**		**360**	J
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**61000**	J	**10000**	J	<1300	U	<120	U
Dibenzofuran	350,000	1,000,000	ug/kg	**370000**	D	**2700**	J	**970**	J	<76	U
Fluoranthene	500,000	1,000,000	ug/kg	**1500000**	D	**85000**		**7600**		**660**	
Fluorene	500,000	1,000,000	ug/kg	**580000**	D	**4100**	J	<960	U	<89	U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**300000**	D	**48000**		**5000**		**250**	J
Naphthalene	500,000	1,000,000	ug/kg	**1900000**	D	**6000**	J	**2300**	J	<99	U
Phenanthrene	500,000	1,000,000	ug/kg	**1900000**	D	**46000**		**5100**		**370**	J
Pyrene	500,000	1,000,000	ug/kg	**1100000**		**73000**		**6200**		**500**	
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	**3.5**		**9.4**		NS		**14.5**	
Lead	1,000	3,900	mg/kg	**10.1**		**1520**		NS		**18.5**	
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	**0.094**		**0.286**		NS		**0.047**	
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	**17.5**		**4.48**		NS		**9.86**	
				5		6		7		8	

Table 4-2
Analytical Data - Fill Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-21A		MW-BCP-21A		MW-BCP-22A		MW-BCP-23A	
			Sample Date:	6/23/2021		6/23/2021		6/24/2021		6/24/2021	
			Sample Interval:	0 - 1 ft		3 - 4 ft		0 - 1 ft		0 - 1 ft	
			Formation:	Fill		Fill		Fill		Fill	
TCL SVOCs (SW8270D)											
Anthracene	500,000	1,000,000	ug/kg	**9400**	J	<70	U	**310**	J	**27000**	J
Benzo(A)Anthracene	5,600	11,000	ug/kg	**19000**	J	<62	U	**1000**		**81000**	D
Benzo(A)Pyrene	1,000	1,100	ug/kg	**27000**	J	<120	U	**1400**		**93000**	J
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**29000**	J	<70	U	**1700**		**110000**	J
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**8700**	J	<68	U	**550**		**35000**	D
Chrysene	56,000	110,000	ug/kg	**22000**	J	<62	U	**1100**		**81000**	D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**3500**	J	<91	U	**250**	J	**12000**	
Dibenzofuran	350,000	1,000,000	ug/kg	**3600**	J	<76	U	**310**	J	**6300**	
Fluoranthene	500,000	1,000,000	ug/kg	**57000**	J	<110	U	**1800**		**230000**	D
Fluorene	500,000	1,000,000	ug/kg	**7300**	J	<78	U	**130**	J	**12000**	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**18000**	J	<140	U	**1000**		**63000**	D
Naphthalene	500,000	1,000,000	ug/kg	**14000**	J	<78	UJ	**910**	J	**4300**	J
Phenanthrene	500,000	1,000,000	ug/kg	**44000**	J	<59	U	**1600**		**120000**	D
Pyrene	500,000	1,000,000	ug/kg	**45000**	J	<70	U	**1500**		**180000**	D
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	**10.1**		**4.1**		**6.7**	J	**7.5**	J
Lead	1,000	3,900	mg/kg	**54.2**		**12**		**17.2**		**15.9**	
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	**0.2**		**0.025**	J	**0.13**		**0.311**	
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	**1.39**		<0.18	U	**1.89**		**0.94**	
				9		10		11		12	

Table 4-2
Analytical Data - Fill Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	SS-BCP-10		SS-BCP-11		SS-BCP-02		SS-BCP-03	
	Commercial	Industrial									
			Sample Date:	11/10/2020		11/10/2020		11/11/2020		11/11/2020	
			Sample Interval:	0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)											
Anthracene	500,000	1,000,000	ug/kg	**590**		<140	U	**3300**	DJ	**3400**	
Benzo(A)Anthracene	5,600	11,000	ug/kg	**3300**	D	<150	U	**10000**	D	**24000**	D
Benzo(A)Pyrene	1,000	1,100	ug/kg	**4700**	D	<180	U	**14000**	D	**31000**	D
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**5500**	D	**240**	J	**18000**	D	**41000**	D
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**1600**	D	<180	U	**5800**	D	**12000**	DJ
Chrysene	56,000	110,000	ug/kg	**3700**	D	**220**	J	**12000**	D	**25000**	D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**760**	DJ	<150	U	**2900**	DJ	**3600**	
Dibenzofuran	350,000	1,000,000	ug/kg	**97**	J	<94	U	**1600**	DJ	**930**	J
Fluoranthene	500,000	1,000,000	ug/kg	**5900**	D	**270**	J	**19000**	D	**50000**	D
Fluorene	500,000	1,000,000	ug/kg	**160**	J	<110	U	**910**	DJ	**670**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**3700**	D	<160	U	**12000**	D	**25000**	D
Naphthalene	500,000	1,000,000	ug/kg	**200**	J	**140**	J	**5500**	D	**2600**	
Phenanthrene	500,000	1,000,000	ug/kg	**2100**	D	**290**	J	**8600**	D	**11000**	DJ
Pyrene	500,000	1,000,000	ug/kg	**5400**	D	**210**	J	**15000**	D	**40000**	D
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	**10.7**	N	**18.5**	J	**8.6**		**9.3**	
Lead	1,000	3,900	mg/kg	**61.8**		**10.2**		**30.1**		**46.8**	
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	**0.302**		**0.099**		**0.35**		**3.2**	
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	**0.78**		**2.53**		**2.22**		**1.47**	
					13	14		15		16	

Table 4-2
Analytical Data - Fill Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	SS-BCP-12	SS-BCP-13	SS-BCP-13	SS-BCP-13	Minimum (Above SCO)	Maximum	Commercial SCO
			Sample Date:	11/11/2020	11/11/2020	11/11/2020	11/11/2020			
			Sample Interval:	0 - 2 ft	0 - 2 in	2 - 6 in	0.5 - 2 ft			
			Formation:	Shallow Fill	Surface Soil	Surface Soil	Shallow Fill			
TCL SVOCs (SW8270D)										
Anthracene	500,000	1,000,000	ug/kg	**570**	**370** J	NS	**520**	N.A.	580,000	500,000
Benzo(A)Anthracene	5,600	11,000	ug/kg	**1700**	**1300**	NS	**820**	9800	470,000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	**2600**	**1900**	NS	**900**	1900	520,000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**3300**	**2200**	NS	**1300**	6400	490,000	5,600
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**1100**	**720**	NS	**400** J	N.A.	190,000	56,000
Chrysene	56,000	110,000	ug/kg	**2100**	**1600**	NS	**1200**	81000	450,000	56,000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**450**	**310** J	NS	**190** J	760	61,000	560
Dibenzofuran	350,000	1,000,000	ug/kg	**270** J	**150** J	NS	**280** J	N.A.	370,000	350,000
Fluoranthene	500,000	1,000,000	ug/kg	**2700**	**2300**	NS	**1300**	N.A.	1,500,000	500,000
Fluorene	500,000	1,000,000	ug/kg	<110 U	**160** J	NS	<110 U	N.A.	580,000	500,000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**2000**	**1400**	NS	**570**	11000	300,000	5,600
Naphthalene	500,000	1,000,000	ug/kg	**420** J	**300** J	NS	**290** J	N.A.	1,900,000	500,000
Phenanthrene	500,000	1,000,000	ug/kg	**1900**	**2300**	NS	**2500**	N.A.	1,900,000	500,000
Pyrene	500,000	1,000,000	ug/kg	**2600**	**2300**	NS	**1300**	N.A.	1,100,000	500,000
TAL Metals (SW6010)										
Arsenic	16	16	mg/kg	**14.2**	**13.1**	NS	**8.7**	N.A.	18.5	16
Lead	1,000	3,900	mg/kg	**96.1**	**50.5**	NS	**27.7**	N.A.	1520	1,000
Mercury (SW7471)										
Mercury	2.8	5.7	mg/kg	**0.188**	**0.227**	NS	**0.102**	N.A.	3.2	3
Total Cyanide (SW9012B)										
Cyanide	27	10,000	mg/kg	**1.23**	NS	NS	**1.73**	N.A.	N.A.	27
				17	18	19	20			

Table 4-3
Analytical Data - Clay Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-40		TP-BCP-40		TP-BCP-46		TP-BCP-46		TP-BCP-46		TP-BCP-01		TP-BCP-14	
			Sample Date:	11/4/2020		11/4/2020		11/5/2020		11/5/2020		11/5/2020		11/10/2020		11/10/2020	
			Sample Interval:	64 - 64.5		DUP (64 - 64.5 in)		24 - 48 in		46 - 46.5 in		50 - 50.5 in		54 - 54.5 in		40 - 40.5 in	
			Formation:	Clay		Clay		Clay		Clay		Clay		Clay		Clay	
TAL Metals (SW6010)																	
Barium	400	10,000	mg/kg	**105**		**134**		**39.3**		**619**		**223**		**127**	J	**37.6**	J
Mercury (SW7471)																	
Mercury	2.8	5.7	mg/kg	**0.03**	J	**0.027**	J	**0.337**		**3.5**		**0.032**	J	**0.034**	J	**0.036**	J
Total Cyanide (SW9012B)																	
Cyanide	27	10,000	mg/kg	**0.22**	J	**0.24**	J	**13.3**		**1140**		**1.59**		<0.19	U	NS	

Table 4-3
Analytical Data - Clay Samples
AOI 1
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-04	TP-BCP-47	MW-BCP-06	MW-BCP-06	MW-BCP-21A	MW-BCP-21A	MW-BCP-22A	MW-BCP-23A	MW-BCP-21D	Minimum (Above SCO)	Maximum	Commercial SCO
			Sample Date:	11/11/2020	11/18/2020	11/11/2020	11/11/2020	6/23/2021	6/23/2021	6/24/2021	6/24/2021	6/25/2021			
			Sample Interval:	62 - 62.5 in	35 - 35.5 in	5 - 6 ft	8 - 9 ft	6 - 7 ft	13 - 14 ft	5 - 6 ft	5 - 6 ft	45 - 47 ft			
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay			
TAL Metals (SW6010)															
Barium	400	10,000	mg/kg	**211**	NS	**142**	**87.3**	**128**	**98.3**	**186** J	**234** J	**131**	N.A.	619	400
Mercury (SW7471)															
Mercury	2.8	5.7	mg/kg	**0.027**	NS	**0.027** J	**0.032** J	**0.016** J	<0.015 U	**0.028** J	**0.075**	<0.017 U	N.A.	3.5	2.8
Total Cyanide (SW9012B)															
Cyanide	27	10,000	mg/kg	<0.18	NS	<0.17 U	**1.03**	<0.17 U	<0.17 U	<0.17 U	**0.52**	<0.23 U	N.A.	1140	27

Table 4-5
Groundwater Sample Data - Fill Zone Wells
AOI 1
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-06A	MW-BCP-06A	MW-BCP-100A (DUP 06A)	MW-BCP-21A	MW-BCP-22A	MW-BCP-99A (DUP 22A)	MW-BCP-23A	Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/13/2021	9/22/2021	9/22/2021	9/24/2021	9/23/2021	9/23/2021	9/23/2021			
		Screen Interval (ft bgs):	2.0 - 4.0	2.0 - 4.0	2.0 - 4.0	2.0 - 5.0	2.0 - 5.0	2.0 - 5.0	2.0 - 5.0			
		Screened Formation:	Fill	Fill	Fill	Fill	Fill	Fill	Fill			
TCL VOCs (SW8260C)												
Benzene	1	ug/l	<0.20 U	<0.20 U	<0.20 U	**1.1** J	<0.20 U	NS	<0.20 U	**1.1**	**1.1**	**1**
TCL SVOCs (SW8270D)												
Benzo(A)Anthracene	0.002	ug/l	<1.5 U	<1.6 U	<1.6 U	<1.6 U	**4.7** J	NS	<1.6 UJ		**4.7**	**0.002**
Benzo(B)Fluoranthene	0.002	ug/l	<1.1 U	**1.2** J	<1.2 U	<1.2 U	**7.2** J	NS	**1.6** J	**1.2**	**7.2**	**0.002**
Benzo(K)Fluoranthene	0.002	ug/l	<1.1 U	<1.3 U	<1.3 U	<1.3 U	**3** J	NS	<1.3 UJ		**3**	**0.002**
Chrysene	0.002	ug/l	<1.1 U	<1.2 U	<1.2 U	<1.2 U	**4.6** J	NS	**1.3** J	**1.3**	**4.6**	**0.002**
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.6 U	<1.8 U	<1.8 U	<1.8 U	**5.3** J	NS	<1.8 UJ		**5.3**	**0.002**
TAL Metals (SW6010)												
Arsenic	25	ug/l	<5.5 U	**23.2**	**8.8** J	<5.5 U	**67.4**	NS	**22.2**		**67.4**	**25**
Chromium, Total	50	ug/l	<0.59 U	**66.1**	**31.3**	**1.4** J	**46.3**	NS	**5** J		**66.1**	**50**
Iron	300	ug/l	**641**	**97500** J	**42900** J	**2550**	**61700**	NS	**18400**	**641**	**97500**	**300**
Lead	25	ug/l	<2.1 U	**161**	**70.4**	<2.1 U	**47.4** J	NS	**12.5** J	**47.4**	**161**	**25**
Magnesium	35,000	ug/l	**15400**	**32700**	**23100**	**28400**	**49300**	NS	**27200**		**49300**	**35000**
Manganese	300	ug/l	**940**	**3600**	**2090**	**418**	**485**	NS	**1740**	**418**	**3600**	**300**
Selenium	10	ug/l	<6.4 U	<6.4 U	<6.4 U	<6.4 U	**15.1**	NS	<6.4 U		**15.1**	**10**
Sodium	20,000	ug/l	**14900**	**23200**	**22200**	**135000**	**17600**	NS	**88800**	**22200**	**135000**	**20000**
Cyanide (SW9012B/ KELADA-01)												
Cyanide	0.20	mg/l	**0.0071** J	**0.045** J	<0.040 U	<0.040 U	<0.16 U	NS	**0.268**		**0.268**	**0.2**
PCBs (8082A)												
PCB-1248 (Aroclor 1248)	0.09	ug/l	**1.8**	<0.50 U	NS	<0.50 U	<0.55 U	NS	<0.55 U	**1.8**	**1.8**	**0.09**
PFAS (E537)												
Perfluorooctanesulfonic acid (PFOS)	2.7	ng/l	**8.5**	**13**	NS	NS	NS	NS	NS	**8.5**	**13**	**2.7**
Perfluorooctanoic acid (PFOA)	6.7	ng/l	**12**	**11** J	NS	NS	NS	NS	NS	**11**	**12**	**6.7**
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	100	ng/l	<0.55 U	**0.64** J	NS	NS	NS	NS	NS			**100**
Ammonia (E350.1)												
Nitrogen, Ammonia (As N)	2	mg/l	NS	NS	NS	**3.72**	**0.904**	**0.908**	**1.93**		**3.72**	**2**

Table 4-6
Groundwater Sample data - Clay Zones (B C)
AOI 1
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-06C		MW-BCP-06C		MW-BCP-21C		Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/13/2021		9/22/2021		9/24/2021				
	Screen Interval (ft bgs):		30 - 40		30 - 40		29 - 39				
	Screened Formation:		Lower Clay		Lower Clay		Lower Clay				
TCL SVOCs (SW8270D)											
Phenol	1	ug/l	<0.91	U	**3.2**	J	<1.0	U	**3.2**	**3.2**	**1**
TAL Metals (SW6010)											
Arsenic	25	ug/l	**7**	J	**25**		<5.5	U	**25**	**25**	**25**
Beryllium	3	ug/l	**1.8**	J	**3.5**		<0.13	U	**3.5**	**3.5**	**3**
Chromium, Total	50	ug/l	**61.3**		**119**		**5**	J	**61.3**	**119**	**50**
Iron	300	ug/l	**46500**		**107000**	J	**1320**		**1320**	**107000**	**300**
Lead	25	ug/l	**16.3**	J	**41.6**	J	<2.1	U	**41.6**	**41.6**	**25**
Magnesium	35,000	ug/l	**124000**		**84500**		**168000**		**84500**	**168000**	**35000**
Manganese	300	ug/l	**913**		**2290**		**15.1**		**913**	**2290**	**300**
Sodium	20,000	ug/l	**114000**		**67300**		**118000**		**67300**	**118000**	**20000**

Date:3/9/2022

Table 4-7
Groundwater Sample Data - Bedrock Zone D
AOI 1
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-21D		MW-BCP-97D (DUP 21D)		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	9/24/2021		9/24/2021				
		Borehole Interval (ft bgs):	53.5 - 63.5		53.5 - 63.5				
		Formation:	Bedrock		Bedrock				
TAL Metals (SW6010)									
Iron	300	ug/l	**6780**		**6550**		**6550**	**6780**	**300**
Magnesium	35,000	ug/l	**59000**		**58000**		**58000**	**138000**	**35000**
Sodium	20,000	ug/l	**65800**		**64900**		**64900**	**157000**	**20000**
Thallium	0.5	ug/l	<6.6	U	<6.6	U			**0.5**

Date:3/9/2022

Table 4-8
Analytical Data - Fill Samples
AOI 2 West
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	TP-BCP-01		TP-BCP-11		TP-BCP-02		TP-BCP-03		TP-BCP-08		MW-BCP-07	
	Commercial	Industrial													
			Sample Date:	11/10/2020		11/6/2020		11/11/2020		11/122020		11/12/2020		11/10/2020	
			Sample Interval:	0 - 1 ft		0 to 1 ft		9 - 12 in		0 - 1 ft		0 to 1 ft		0 - 1 ft	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	**9800**	J	**7800**	D	**60000**	D	**6500**	D	**12000**	D	**360**	J
Benzo(A)Pyrene	1,000	1,100	ug/kg	**15000**	D	**6100**	D	**66000**	D	**10000**	D	**10000**	D	<430	U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**18000**	D	**8600**	D	**67000**	D	**11000**	D	**14000**	D	**430**	J
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**5000**	DJ	**2600**	D	**26000**	D	**4300**	D	**4500**	D	<430	U
Chrysene	56,000	110,000	ug/kg	**17000**	D	**9300**	D	**53000**	D	**13000**	D	**14000**	D	**490**	J
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**2500**	DJ	**1600**	D	**9000**	DJ	**2800**	D	**2300**	DJ	<350	U
Fluoranthene	500,000	1,000,000	ug/kg	**26000**	D	**9000**	D	**120000**	D	**8000**	D	**18000**	D	**1500**	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**11000**	DJ	**3500**	D	**37000**	D	**9100**	D	**7500**	D	<390	U
Pyrene	500,000	1,000,000	ug/kg	**25000**	D	**7600**	D	**99000**	D	**7800**	D	**15000**	D	**1100**	J
TAL Metals (SW6010)															
Arsenic	16	16	mg/kg	**7.5**	J	**12.8**		**5.3**		**3.2**		**4.1**		**2.4**	J
Copper	270	10,000	mg/kg	**70.5**		**31.4**		**31.8**		**16.2**		**21**		**10.1**	
Mercury (SW7471)															
Mercury	2.8	5.7	mg/kg	**0.52**		**0.036**	J	**0.318**		**0.267**		**0.208**		<0.019	U
Total Cyanide (SW9012B)															
Cyanide	27	10,000	mg/kg	**0.73**		**7.01**	J	**9.83**		**3.31**		**1.93**		**0.22**	J

Table 4-8
Analytical Data - Fill Samples
AOI 2 West
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	MW-BCP-11	MW-BCP-05	MW-BCP-09	MW-BCP-10	MW-BCP-02	MW-BCP-04	SS-BCP-01	Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	11/9/2020	11/12/2020	11/17/2020	11/13/2020	11/16/2020	11/16/2020	11/18/2020			
			Sample Interval:	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft			
			Formation:	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill			
TCL SVOCs (SW8270D)													
Benzo(A)Anthracene	5,600	11,000	ug/kg	890	6200	6400	330000 D	3400	19000 D	8300	6200	330000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	1100	9000	11000	550000 D	3700 D	35000 D	8500	1100	550000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	1600	11000	12000	510000 D	4100 D	34000 D	12000	8600	510000	5,600
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	490	3500 J	3900	160000 D	1500	12000 D	3900 J	N.A.	160000	56,000
Chrysene	56,000	110,000	ug/kg	1300	7300	7300	340000 D	3600 D	22000 D	10000	N.A.	340000	56,000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	260 J	1800 J	2100	90000 DJ	730 DJ	5600 D	2100 J	730	90000	560
Fluoranthene	500,000	1,000,000	ug/kg	2200	13000	10000	520000 D	5100 D	29000 D	12000	N.A.	520000	500,000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	860	7700	9800	470000 D	2800 D	27000 D	5900	5900	470000	5,600
Pyrene	500,000	1,000,000	ug/kg	1700	13000	10000	510000 D	6100 D	29000 D	8400	N.A.	510000	500,000
TAL Metals (SW6010)													
Arsenic	16	16	mg/kg	7.2	4.7	NS	8.2 J	8.9 J	10.4 J	3.3	N.A.	N.A.	16
Copper	270	10,000	mg/kg	49.4	27.4	NS	24.1	44.8 J	39.5 J	21.2	N.A.	N.A.	270
Mercury (SW7471)													
Mercury	2.8	5.7	mg/kg	1.6	3.7	0.101	1.1	0.037	0.202	0.138	N.A.	3.7	3
Total Cyanide (SW9012B)													
Cyanide	27	10,000	mg/kg	0.51 J	13.3	1.16	4.28	2.63	1.19	4.22	N.A.	N.A.	27

Table 4-9
Analytical Data - Clay Samples
AOI 2 West
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	TP-BCP-01	TP-BCP-02	TP-BCP-43	TP-BCP-43	TP-BCP-03	TP-BCP-08	MW-BCP-07	MW-BCP-07	MW-BCP-07	MW-BCP-07
			Sample Date:	11/10/2020	11/11/2020	11/11/2020	11/11/2020	11/122020	11/12/2020	11/10/2020	11/10/2020	11/10/2020	11/10/2020
			Sample Interval:	54 - 54.5 in	40 - 25 in	20 - 20.5 in	46 - 46.5 in	40 - 40.5 in	42 - 42.5 in	3 - 4 ft	7 - 8 ft	13 - 14 ft	38 - 40 ft
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
TCL SVOCs (SW8270D)													
Acenaphthene	500,000	1,000,000	ug/kg	<95 U	<100 U	7700 DJ	<98 U	<92 U	<92 U	<93 U	<88 U	<88 U	<83 U
Acenaphthylene	500,000	1,000,000	ug/kg	<120 U	<120 U	58000 D	<120 U	<110 U	<110 U	<110 U	<110 U	<110 U	<97 U
Anthracene	500,000	1,000,000	ug/kg	<120 U	<130 U	15000 DJ	<130 U	<120 U	<120 U	<120 U	<110 U	<110 U	<110 U
Benzo(A)Anthracene	5,600	11,000	ug/kg	<130 U	<140 U	11000 DJ	<130 U	<130 U	<130 U	<130 U	<120 U	<120 UJ	<110 U
Benzo(A)Pyrene	1,000	1,100	ug/kg	<160 U	<170 U	13000 DJ	<160 U	<150 U	<150 U	<150 U	<150 U	<150 UJ	<140 U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<150 U	<150 U	11000 DJ	<150 U	<140 U	<140 U	<140 U	<140 U	<130 UJ	<130 U
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	<120 U	<120 U	6100	<120 U	<110 U	<110 U	<110 U	<110 U	<110 UJ	<97 U
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<160 U	<170 U	2900 J	<160 U	<150 U	<150 U	<150 U	<150 U	<150 U	<140 U
Chrysene	56,000	110,000	ug/kg	<160 U	<170 U	13000 DJ	<160 U	<150 U	<150 U	<150 U	<150 U	<150 UJ	<140 U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<130 U	<140 U	1400 J	<130 U	<130 U	<130 U	<130 U	<120 U	<120 UJ	<110 U
Dibenzofuran	350,000	1,000,000	ug/kg	<83 U	<88 U	4100 J	<86 U	<81 U	<81 U	<81 U	<77 U	<77 U	<73 U
Fluoranthene	500,000	1,000,000	ug/kg	<160 U	<170 U	24000 DJ	<160 U	<150 U	<150 U	<150 U	<150 U	<150 UJ	<140 U
Fluorene	500,000	1,000,000	ug/kg	<97 U	<110 U	27000 DJ	<100 U	<95 U	<95 U	<95 U	<90 U	<90 U	<85 U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<150 U	<150 U	5200	<150 U	<140 U	<140 U	<140 U	<140 U	<130 UJ	<130 U
Naphthalene	500,000	1,000,000	ug/kg	<110 U	<120 U	200000 D	<120 U	<110 U	<110 U	<110 U	<110 U	<110 U	<95 U
Phenanthrene	500,000	1,000,000	ug/kg	<130 U	<130 U	50000 D	<130 U	<120 U	<120 U	<120 U	<120 U	<120 U	<110 U
Pyrene	500,000	1,000,000	ug/kg	<170 U	<180 U	32000 D	<180 U	<170 U	<170 U	<170 U	<160 U	<160 UJ	<150 U
TAL Metals (SW6010)													
Arsenic	16	16	mg/kg	3.5 J	3	16.5	5.6	5.5	4.5	9.5 J	1.9 J	4.1 J	2.1 J
Barium	400	10,000	mg/kg	127 J	172	65.2	267	163	140	121 J	142 J	89.5 J	73.3 J
Mercury (SW7471)													
Mercury	2.8	5.7	mg/kg	0.034 J	0.046	1.2	0.026 J	0.035 J	0.022 J	0.03 J	0.019 J	<0.018 U	<0.016 U
Total Cyanide (SW9012B)													
Cyanide	27	10,000	mg/kg	<0.19 U	0.43	5.43	2.62	0.7	<0.17 U	<0.17 U	<0.17 U	<0.18 U	<0.18 U

Table 4-9
Analytical Data - Clay Samples
AOI 2 West
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	MW-BCP-11		MW-BCP-11		MW-BCP-11		MW-BCP-05		MW-BCP-05		MW-BCP-05		MW-BCP-05		MW-BCP-05		MW-BCP-09		MW-BCP-09		MW-BCP-09	
			Sample Date:	11/9/2020		11/9/2020		11/9/2020		11/12/2020		11/23/2020		11/23/2020		11/24/2020		12/1/2020		11/17/2020		11/20/2020		11/20/2020	
			Sample Interval:	10 - 11 ft		14 - 15 ft		20 - 22 ft		6 - 7 ft		8 - 10 ft		16 - 18 ft		36 - 38 ft		50 - 52 ft		5 - 6 ft		8 - 10 ft		18 -20 ft	
			Formation:	Clay		Clay		Clay		Clay		Clay		Clay		Clay		Clay		Clay		Clay		Clay	
TCL SVOCs (SW8270D)																									
Acenaphthene	500,000	1,000,000	ug/kg	<88	U	<86	U	<86	U	<85	U	<89	U	<87	U	<110	U	<80	U	<88	U	<89	U	<89	U
Acenaphthylene	500,000	1,000,000	ug/kg	<110	U	<110	U	<110	U	<100	U	<110	U	<110	U	<120	U	<94	U	<110	U	<110	U	<110	U
Anthracene	500,000	1,000,000	ug/kg	<110	U	<110	U	<110	U	<110	U	<120	U	<110	U	<130	U	<99	U	<110	U	<110	U	<120	U
Benzo(A)Anthracene	5,600	11,000	ug/kg	<120	U	<120	U	<120	U	<120	U	<120	U	<120	U	<140	U	<110	U	<120	U	<120	U	<120	U
Benzo(A)Pyrene	1,000	1,100	ug/kg	<150	U	<140	U	<140	U	<140	U	<150	U	<140	U	<170	U	<130	U	<150	U	<150	U	<150	U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<140	U	<130	U	<130	U	<130	U	<140	U	<130	U	<160	U	<120	U	<130	U	<140	U	<140	U
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	<110	U	<110	U	<110	U	<100	U	<110	U	<110	U	<120	U	<94	U	<110	U	<110	U	<110	U
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<150	U	<140	U	<140	U	<140	U	<150	U	<140	U	<170	U	<130	U	<150	U	<150	U	<150	U
Chrysene	56,000	110,000	ug/kg	<150	U	<140	U	<140	U	<140	U	<150	U	<140	U	<170	U	<130	U	<150	U	<150	U	<150	U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<120	U	<120	U	<120	U	<120	U	<120	U	<120	U	<140	U	<110	U	<120	U	<120	U	<120	U
Dibenzofuran	350,000	1,000,000	ug/kg	<78	U	<75	U	<76	U	<75	U	<78	U	<76	U	<90	U	<70	U	<77	U	<78	U	<78	U
Fluoranthene	500,000	1,000,000	ug/kg	<150	U	<140	U	<140	U	<140	U	<150	U	<140	U	<170	U	<130	U	<150	U	<150	U	<150	U
Fluorene	500,000	1,000,000	ug/kg	<91	U	<88	U	<88	U	<88	U	<91	U	<89	U	<110	U	<82	U	<90	U	<91	U	<91	U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<140	U	<130	U	<130	U	<130	U	<140	U	<130	U	<160	U	<120	U	<130	U	<140	U	<140	U
Naphthalene	500,000	1,000,000	ug/kg	<110	U	<98	U	<99	U	<98	U	<110	U	<100	U	<120	U	<92	U	<110	U	<110	U	<110	U
Phenanthrene	500,000	1,000,000	ug/kg	<120	U	<120	U	<120	U	<120	U	<120	U	<120	U	<140	U	<110	U	<120	U	<120	U	<120	U
Pyrene	500,000	1,000,000	ug/kg	<160	U	<150	U	<160	U	<150	U	<160	U	<160	U	<180	U	<140	U	<160	U	<160	U	<160	U
TAL Metals (SW6010)																									
Arsenic	16	16	mg/kg	**6.6**		**4.2**		**3.9**		**5.2**		**4**		**4.8**		**5.1**		**3.3**		**5.3**		NS		NS	
Barium	400	10,000	mg/kg	**101**		**172**		**116**		**147**		**111**		**64.6**		**130**		**67.7**		**142**		NS		NS	
Mercury (SW7471)																									
Mercury	2.8	5.7	mg/kg	<0.014	U	<0.014	U	<0.015	U	**0.278**		<0.015	U	<0.014	U	<0.018	U	**0.015**	J	<0.015	U	<0.014	U	<0.015	U
Total Cyanide (SW9012B)																									
Cyanide	27	10,000	mg/kg	<0.17	UJ	<0.19	UJ	<0.20	UJ	**11.1**		**8.98**	J	**2.1**	J	<0.23	U	<0.17	U	<0.17	U	<0.17	UJ	<0.17	UJ

Table 4-9
Analytical Data - Clay Samples
AOI 2 West
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-10	MW-BCP-10	MW-BCP-10	MW-BCP-10	MW-BCP-02	MW-BCP-02	MW-BCP-02	MW-BCP-04	MW-BCP-04	Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	11/13/2020	11/23/2020	11/23/2020	11/23/2020	11/16/2020	11/18/2020	11/18/2020	11/16/2020	11/19/2020			
			Sample Interval:	5 - 6 ft	8 - 9 ft	15 - 16 ft	38-40 ft	7 - 8 ft	9 - 10 ft	24 - 25 ft	6 - 7 ft	9 - 10 ft			
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay			
TCL SVOCs (SW8270D)															
Acenaphthene	500,000	1,000,000	ug/kg	**120** J	<89 U	<87 U	<81 U	<92 U	<88 U	<90 U	<85 U	<90 U	N.A.	N.A.	500,000
Acenaphthylene	500,000	1,000,000	ug/kg	**1300**	**120** J	<110 U	<95 U	<110 U	<110 U	<110 U	<100 U	<110 U	N.A.	N.A.	500,000
Anthracene	500,000	1,000,000	ug/kg	**1100**	<110 U	<110 U	<110 U	<120 U	<110 U	<120 U	<110 U	<120 U	N.A.	N.A.	500,000
Benzo(A)Anthracene	5,600	11,000	ug/kg	**1200**	**130** J	<120 U	<110 U	<120 U	<120 U	<120 U	<120 U	<120 U	N.A.	11,000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	**1000**	<150 U	<140 U	<140 U	<150 U	<150 U	<150 U	<140 U	<150 U	1000	13,000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**1000**	<140 U	<130 U	<120 U	<140 U	<140 U	<140 U	<130 U	<140 U	N.A.	11,000	5,600
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	**430**	<110 U	<110 U	<95 U	<110 U	<110 U	<110 U	<100 U	<110 U	N.A.	N.A.	500,000
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**350** J	<150 U	<140 U	<140 U	<150 U	<150 U	<150 U	<140 U	<150 U	N.A.	N.A.	56,000
Chrysene	56,000	110,000	ug/kg	**1000**	<150 U	<140 U	<140 U	<150 U	<150 U	<150 U	<140 U	<150 U	N.A.	N.A.	56,000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**170** J	<120 U	<120 U	<110 U	<130 U	<120 U	<120 U	<120 U	<120 U	N.A.	1,400	560
Dibenzofuran	350,000	1,000,000	ug/kg	**670**	<78 U	<76 U	<71 U	<81 U	<78 U	<79 U	<75 U	<79 U	N.A.	N.A.	350,000
Fluoranthene	500,000	1,000,000	ug/kg	**2400**	**240** J	<140 U	<140 U	<150 U	<150 U	<150 U	<140 U	<150 U	N.A.	N.A.	500,000
Fluorene	500,000	1,000,000	ug/kg	**1100**	**100** J	<89 U	<83 U	<94 U	<91 U	<92 U	<88 U	<92 U	N.A.	N.A.	500,000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**520**	<140 U	<130 U	<120 U	<140 U	<140 U	<140 U	<130 U	<140 U	N.A.	N.A.	5,600
Naphthalene	500,000	1,000,000	ug/kg	**4000**	**550**	<100 U	<93 U	<110 U	<110 U	<110 U	<98 U	<110 U	N.A.	N.A.	500,000
Phenanthrene	500,000	1,000,000	ug/kg	**3400**	**300** J	<120 U	<110 U	<120 U	<120 U	<120 U	<110 U	<120 U	N.A.	N.A.	500,000
Pyrene	500,000	1,000,000	ug/kg	**1800**	**170** J	<160 U	<150 U	<170 U	<160 U	<160 U	<150 U	<160 U	N.A.	N.A.	500,000
TAL Metals (SW6010)															
Arsenic	16	16	mg/kg	**5.3** J	**5.7**	**2.7**	**2.8**	**3.9** J	**4.5**	**10.4**	NS	NS	N.A.	16.5	16
Barium	400	10,000	mg/kg	**180**	**108**	**74.2**	**76.1**	**111**	**112**	**82.1**	NS	NS	N.A.	N.A.	400
Mercury (SW7471)															
Mercury	2.8	5.7	mg/kg	**0.111**	<0.014 U	<0.015 U	<0.014 U	**0.018** J	<0.014 U	<0.015 U	<0.014 U	<0.015 U	N.A.	N.A.	3
Total Cyanide (SW9012B)															
Cyanide	27	10,000	mg/kg	**0.28** J	<0.19 UJ	<0.17 UJ	<0.17 UJ	<0.17 U	<0.17 U	<0.17 U	<0.17 U	<0.18 U	N.A.	N.A.	27

Table 4-10
Groundwater Sample Data - Fill Zone Wells
AOI 2 West
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-02A	MW-BCP-02A (DUP)	MW-BCP-02A	MW-BCP-02A	MW-BCP-04A	MW-BCP-04A	MW-BCP-04A	MW-BCP-05A	MW-BCP-05A (DUP)	MW-BCP-05A	MW-BCP-98A (DUP 05A)	MW-BCP-09A	MW-BCP-09A	MW-BCP-10A		MW-BCP-12A
	Sample Date		1/12/2021	1/12/2021	9/22/2021	10/27/2021	1/12/2021	9/21/2021	10/27/2021	1/14/2021	1/14/2021	9/23/2021	9/23/2021	1/12/2021	9/24/2021	1/14/2021		1/13/2021
	Screen Interval (ft bgs):		3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	2.0 - 5.0	2.0 - 5.0	2.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	2.5 - 4.5	2.5 - 4.5	3.0 - 5.0		3.0 5.0
	Screened Formation:		Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill		Fill

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-02A	MW-BCP-02A (DUP)	MW-BCP-02A	MW-BCP-02A	MW-BCP-04A	MW-BCP-04A	MW-BCP-04A	MW-BCP-05A	MW-BCP-05A (DUP)	MW-BCP-05A	MW-BCP-98A (DUP 05A)	MW-BCP-09A	MW-BCP-09A	MW-BCP-10A	Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/12/2021	1/12/2021	9/22/2021	10/27/2021	1/12/2021	9/21/2021	10/27/2021	1/14/2021	1/14/2021	9/23/2021	9/23/2021	1/12/2021	9/24/2021	1/14/2021			
	Screen Interval (ft bgs):		3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	2.0 - 5.0	2.0 - 5.0	2.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	2.5 - 4.5	2.5 - 4.5	3.0 - 5.0			
	Screened Formation:		Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill			
TCL VOCs (SW8260C)																			
Benzene	1	ug/l	<0.20 U	NS	<0.20 U	NS	12	75	NS	5000	NS	3300	NS	<0.20 U	<0.20 U	2000	12	5000	1
Ethylbenzene	5	ug/l	<0.20 U	NS	<0.20 U	NS	<0.20 U	<0.20 U	NS	190 J	NS	94 J	NS	<0.20 U	<0.20 U	75 J	75	190	5
Styrene	5	ug/l	<0.20 U	NS	<0.20 U	NS	<0.20 U	<0.20 U	NS	<10 U	NS	<5.0 U	NS	<0.20 U	<0.20 U	350	350	350	5
Toluene	5	ug/l	<0.20 U	NS	<0.20 U	NS	0.58 J	0.29 J	NS	190 J	NS	84 J	NS	<0.20 U	<0.20 U	2100	84	2100	5
m,p-Xylene	5	ug/l	<0.20 U	NS	<0.20 U	NS	0.26 J	0.45 J	NS	220 J	NS	130	NS	<0.20 U	<0.20 U	1100	130	1100	5
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	<0.20 U	NS	<0.20 U	NS	0.37 J	1.7 J	NS	130 J	NS	76 J	NS	<0.20 U	<0.20 U	380	76	380	5
1,4-Dioxane (SW8270D/ BNASIM)																			
1,4-Dioxane (P-Dioxane)	1	ug/l	NS	NS	NS	NS	NS	NS	NS	2.2	NS	2.1	2.3	NS	NS	0.39	2.1	2.3	1
TCL SVOCs (SW8270D)																			
2,4-Dimethylphenol	50	ug/l	<1.3 U	NS	<1.5 U	NS	<1.3 U	<1.4 U	NS	77 J	NS	71 J	NS	<1.5 U	<1.4 U	2900 J	71	2900	50
Benzo(A)Anthracene	0.002	ug/l	<1.5 U	NS	<1.7 U	NS	<1.5 U	2.9 J	NS	<1.7 U	NS	2.7 J	NS	<1.7 U	<1.6 U	<7.9 U	2.7	2.9	0.002
Benzo(B)Fluoranthene	0.002	ug/l	<1.1 U	NS	<1.3 U	NS	<1.1 U	4.2 J	NS	<1.2 U	NS	3.1 J	NS	<1.2 U	<1.2 U	<5.6 U	3.1	4.2	0.002
Benzo(K)Fluoranthene	0.002	ug/l	<1.1 U	NS	<1.4 U	NS	<1.1 U	2.2 J	NS	<1.3 U	NS	<1.3 U	NS	<1.3 U	<1.3 U	<6.1 U	2.2	2.2	0.002
Biphenyl (Diphenyl)	5	ug/l	<1.3 U	NS	<1.5 U	NS	<1.3 U	<1.4 U	NS	2.4 J	NS	3.5 J	NS	<1.5 U	<1.4 UJ	26 J		26	5
Chrysene	0.002	ug/l	<1.1 U	NS	<1.3 U	NS	<1.1 U	2.9 J	NS	<1.3 U	NS	2.4 J	NS	<1.3 U	<1.2 U	<5.9 U	2.4	2.9	0.002
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.6 U	NS	<1.9 U	NS	<1.6 U	3.2 J	NS	<1.9 U	NS	<1.8 U	NS	<1.9 U	<1.8 U	<8.8 U		3.2	0.002
Naphthalene	10	ug/l	<1.1 U	NS	<1.3 U	NS	<1.1 U	4.7 J	NS	580 D	NS	1400 D	NS	<1.3 U	<1.2 U	6300 D	580	6300	10
Phenol	1	ug/l	<0.91 U	NS	<1.1 U	NS	<0.91 U	<1.0 U	NS	8.5 J	NS	4.2 J	NS	<1.1 U	<1.0 U	2300 D	4.2	2300	1
TAL Metals (SW6010)																			
Arsenic	25	ug/l	<5.5 U	<5.5 U	<5.5 U	NS	NS	NS	NS	32.4	NS	30.1	NS	<5.5 U	NS	22.1	30.1	32.4	25
Iron	300	ug/l	2670	2910	2420 J	NS	NS	NS	NS	1080	NS	4970	NS	774	NS	619	619	4970	300
Magnesium	35,000	ug/l	22300	22500	35600	NS	NS	NS	NS	18200	NS	9110	NS	236000	NS	609 J	35600	236000	35000
Manganese	300	ug/l	807	829	687	NS	NS	NS	NS	32.7	NS	89	NS	757	NS	10.5	687	829	300
Sodium	20,000	ug/l	324000	325000	162000	NS	NS	NS	NS	1810000	NS	1500000	NS	162000	NS	115000	115000	1810000	20000
Thallium	0.5	ug/l	<6.6 U	<6.6 U	<6.6 U	NS	NS	NS	NS	<6.6 U	NS	<6.6 U	NS	10	NS	<6.6 U		10	0.5
Cyanide (SW9012B/ KELADA-01)																			
Cyanide	0.20	mg/l	0.031	NS	<0.040 U	NS	0.155	0.435	NS	751	NS	646	NS	1.89	0.96	1.48	0.435	751	0.2
Pesticides (8081B)																			
Beta Bhc (Beta Hexachlorocyclohexane)	0.04	ug/l	NS	NS	NS	NS	NS	NS	NS	0.021 J	NS	<0.020 UJ	<0.020 UJ	NS	NS	0.1 J		0.1	0.04
Delta BHC (Delta Hexachlorocyclohexane)	0.04	ug/l	NS	NS	NS	NS	NS	NS	NS	0.14	NS	<0.020 UJ	<0.020 UJ	NS	NS	<0.020 U		0.14	0.04
Gamma Bhc (Lindane)	0.05	ug/l	NS	NS	NS	NS	NS	NS	NS	0.14	NS	<0.020 UJ	<0.020 UJ	NS	NS	<0.020 U		0.14	0.05
Chlordane (Technical)	0.05	ug/l	NS	NS	NS	NS	NS	NS	NS	0.17	NS	<0.020 UJ	<0.020 UJ	NS	NS	<0.020 U		0.17	0.05
PFAS (E537)																			
Perfluorooctanesulfonic acid (PFOS)	10	ng/l	NS	NS	NS	NS	NS	NS	NS	15 J	NS	17 J	19 J	NS	NS	5.2	15	19	10
Perfluorooctanoic acid (PFOA)	10	ng/l	NS	NS	NS	NS	NS	NS	NS	16 J	NS	14	17	NS	NS	10	10	17	10
Ammonia (E350.1)																			
Nitrogen, Ammonia (As N)	2	mg/l	NS	NS	NS	0.993	5.61	7.51	2.30	249	254	232	NS	NS	NS	NS	2.3	254	2

Table 4-11
Groundwater Sample data - Clay Zones (B C)
AOI 2 West
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-02B	MW-BCP-02B	MW-BCP-04B	MW-BCP-04B	MW-BCP-05C	MW-BCP-05C	MW-BCP-07C	MW-BCP-07C	MW-BCP-08B	MW-BCP-08B	MW-BCP-09B	MW-BCP-09B
	Sample Date		1/12/2021	9/22/2021	1/12/2021	9/21/2021	1/15/2021	9/23/2021	1/12/2021	9/24/2021	1/12/2021	9/24/2021	1/12/2021	9/23/2021
	Screen Interval (ft bgs):		0 - 15	0 - 15	15 - 25	15 - 25	29 - 39	29 - 39	30 - 40	30 - 40	15 - 25	15 - 25	10 - 20	10 - 20
	Screened Formation:		Upper Clay	Upper Clay	Upper Clay	Upper Clay	Lower Clay	Lower Clay	Lower Clay	Lower Clay	Upper Clay	Upper Clay	Upper Clay	Upper Clay
TAL Metals (SW6010)														
Arsenic	25	ug/l	<5.5 U	<5.5 U	NS	NS	<5.5 U	12.4	5.6 J	7.8 J	<5.5 U	16	<5.5 U	5.5 J
Barium	1,000	ug/l	66.4	64	NS	NS	151	180	269	127	85.1	486	87.6	93.9
Beryllium	3	ug/l	<0.13 U	<0.13 U	NS	NS	0.3 J	0.7 J	1.5 J	0.4 J	<0.13 U	2.7 J	<0.13 U	<0.13 U
Chromium, Total	50	ug/l	3.5 J	<1.4 U	NS	NS	20.9	34.3	48.8	12.2	2.6 J	86.7	9.5 J	4.8 J
Copper	200	ug/l	<3.9 U	<3.9 U	NS	NS	6.6 J	23.6	40.3	9.2 J	<3.9 U	62.4	<3.9 U	<3.9 U
Iron	300	ug/l	112	75.1 J	NS	NS	6320	15000	39900	11000	157	84000	<61 U	1600
Lead	25	ug/l	<2.1 U	<2.1 U	NS	NS	2.7 J	7.5 J	14.9 J	6.1 J	<2.1 U	33.1 J	<2.1 U	<2.1 U
Magnesium	35,000	ug/l	148000	173000	NS	NS	153000	185000	89000	51900	86500	194000	87800	131000
Manganese	300	ug/l	73	85.2	NS	NS	133	271	799	195	117	1810	60	32.1
Nickel	100	ug/l	<2.6 U	<2.6 U	NS	NS	<2.6 U	7.8 J	<2.6 U	5 J	<2.6 U	56.8	<2.6 U	<2.6 U
Selenium	10	ug/l	<6.4 U	<6.4 U	NS	NS	<6.4 U	<6.4 U	<6.4 U	<6.4 U	<6.4 U	<6.4 U	<6.4 U	<6.4 U
Sodium	20,000	ug/l	91500	87100	NS	NS	79300	82500	108000	81800	120000	77100	66500	63900
Thallium	0.5	ug/l	<6.6 U	<6.6 U	NS	NS	<6.6 U	6.8 J	7.7 J	<6.6 U	<6.6 U	<6.6 U	<6.6 U	<6.6 U
Zinc	2,000	ug/l	<9.4 U	4.7 J	NS	NS	18 J	38.6	107	24.4	<9.4 U	199	<9.4 U	6.7 J
Cyanide (SW9012B/ KELADA-01)														
Cyanide	0.20	mg/l	<0.0040 U	<0.040 U	0.0133	<0.040 U	<0.0040 U	1.68	<0.0040 U	<0.08 U	0.0104	<0.20 U	<0.0040 U	<0.040 U

Table 4-11
Groundwater Sample data - Clay Zones (B C)
AOI 2 West
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-10C		MW-BCP-10C		MW-BCP-11B		MW-BCP-11B		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/15/2021		9/24/2021		1/15/2021		9/23/2021				
		Screen Interval (ft bgs):	29 - 39		29 - 39		15 - 25		15 - 25				
		Screened Formation:	Lower Clay		Lower Clay		Upper Clay		Upper Clay				
TAL Metals (SW6010)													
Arsenic	25	ug/l	<5.5	U	<5.5	U	<5.5	U	82.3			82.3	25
Barium	1,000	ug/l	87.2		69.6		225		2040			2040	1000
Beryllium	3	ug/l	<0.13	U	<0.13	U	<0.13	U	13.2			13.2	3
Chromium, Total	50	ug/l	1.8	J	<1.4	U	0.7	J	462		86.7	462	50
Copper	200	ug/l	<3.9	U	<3.9	U	<3.9	U	398			398	200
Iron	300	ug/l	307		391		910		444000		307	444000	300
Lead	25	ug/l	<2.1	U	<2.1	U	<2.1	U	227		33.1	227	25
Magnesium	35,000	ug/l	153000		154000		238000		461000		51900	461000	35000
Manganese	300	ug/l	73.4		51		750		6430		750	6430	300
Nickel	100	ug/l	<2.6	U	<2.6	U	<2.6	U	362			362	100
Selenium	10	ug/l	<6.4	U	<6.4	U	<6.4	U	<6.4	U		0	10
Sodium	20,000	ug/l	75900		78100		102000		87200		52000	120000	20000
Thallium	0.5	ug/l	<6.6	U	7.1	J	<6.6	U	<6.6	U	6.8	7.7	0.5
Zinc	2,000	ug/l	<9.4	U	4	J	<9.4	U	1110			1110	2000
Cyanide (SW9012B/ KELADA-01)													
Cyanide	0.20	mg/l	<0.0040	U	<0.040	U	0.0258		<0.08	U	N.A.	1.68	0.2

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Table 4-12
Groundwater Sample Data - Bedrock Zone D
AOI 2
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-05D	MW-BCP-05D	Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/14/2021	9/23/2021			
	Borehole Interval (ft bgs):		56.0 - 66.0	56.0 - 66.0			
	Formation:		Bedrock	Bedrock			
TAL Metals (SW6010)							
Iron	300	ug/l	**3860**	**3960**	**3860**	**3960**	**300**
Magnesium	35,000	ug/l	**51000**	**54100**	**51000**	**54100**	**35000**
Sodium	20,000	ug/l	**52100**	**58400**	**52100**	**58400**	**20000**
Thallium	0.5	ug/l	**14.1**	**18.2**	**14.1**	**18.2**	**0.5**

Date:3/9/2022

Table 4-13
Analytical Data - Fill Samples
AOI 2 East
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-11		TP-BCP-12		MW-BCP-12	
			Sample Date:	11/6/2020		11/6/2020		11/16/2020	
			Sample Interval:	0 to 1 ft		0 - 1 ft		0 - 1 ft	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)									
Benzo(A)Anthracene	5,600	11,000	ug/kg	7800	D	4600	D	15000	
Benzo(A)Pyrene	1,000	1,100	ug/kg	6100	D	6900	D	19000	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	8600	D	8500	D	21000	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	2600	D	2900	D	7500	
Chrysene	56,000	110,000	ug/kg	9300	D	5600	D	15000	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	1600	D	1300	DJ	3800	J
Fluoranthene	500,000	1,000,000	ug/kg	9000	D	7000	D	30000	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	3500	D	5400	D	16000	
Pyrene	500,000	1,000,000	ug/kg	7600	D	6300	D	24000	
TAL Metals (SW6010)									
Arsenic	16	16	mg/kg	12.8		15.6		11.6	J
Copper	270	10,000	mg/kg	31.4		41.4		37.5	J
Mercury (SW7471)									
Mercury	2.8	5.7	mg/kg	0.036	J	0.624		0.684	
Total Cyanide (SW9012B)									
Cyanide	27	10,000	mg/kg	7.01	J	13.3	J	1.91	

Table 4-13
Analytical Data - Fill Samples
AOI 2 East
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	SS-BCP-04		SS-BCP-05		SS-BCP-06	
	Commercial	Industrial							
			Sample Date:	11/18/2020		11/18/2020		11/18/2020	
			Sample Interval:	0 - 1 ft		0 - 1 ft		0 - 1 ft	
			Formation:	Iron Oxide Pile		Iron Oxide Pile		Iron Oxide Pile	
TCL SVOCs (SW8270D)									
Benzo(A)Anthracene	5,600	11,000	ug/kg	15000	D	1500	D	8800	
Benzo(A)Pyrene	1,000	1,100	ug/kg	10000	D	600		8900	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	30000	D	3900		15000	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	9200	DJ	1200	D	4800	
Chrysene	56,000	110,000	ug/kg	22000	D	3500	D	10000	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	4400	DJ	450	J	2100	J
Fluoranthene	500,000	1,000,000	ug/kg	17000	D	4000	D	17000	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	16000	D	1400	D	8100	
Pyrene	500,000	1,000,000	ug/kg	11000	D	1000		13000	
TAL Metals (SW6010)									
Arsenic	16	16	mg/kg	22.3		1.8		14.4	
Copper	270	10,000	mg/kg	408		21.2		114	
Mercury (SW7471)									
Mercury	2.8	5.7	mg/kg	1.3		2		1.4	
Total Cyanide (SW9012B)									
Cyanide	27	10,000	mg/kg	110		549		20.5	

Analytes	Minimum (Above SCOs)	Maximum	Commercial SCO
	Minimum (Above SCOs)	Maximum	SCO
Benzo(A)Anthracene	7800	15000	5,600
Benzo(A)Pyrene	6100	19000	1,000
Benzo(B)Fluoranthene	8500	30000	5,600
Benzo(K)Fluoranthene	N.A.	N.A.	56,000
Chrysene	N.A.	N.A.	56,000
Dibenz(A,H)Anthracene	1300	4400	560
Fluoranthene	N.A.	N.A.	500,000
Indeno(1,2,3-C,D)Pyrene	8100	16000	5,600
Pyrene	N.A.	N.A.	500,000
Arsenic	N.A.	22.3	16
Copper	N.A.	408	270
Mercury	N.A.	N.A.	3
Cyanide	110	549	27

Table 4-14
Analytical Data - Clay Samples
AOI 2 East
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	TP-BCP-13	TP-BCP-13	TP-BCP-46	TP-BCP-46	TP-BCP-46	TP-BCP-11	TP-BCP-12	TP-BCP-48-100
	Commercial	Industrial									
			Sample Date:	11/5/2020	11/5/2020	11/5/2020	11/5/2020	11/5/2020	11/6/2020	11/6/2020	11/18/2020
			Sample Interval:	18 - 20 in	80 - 82 in	24 - 48 in	46 - 46.5 in	50 - 50.5 in	44 - 44.5 in	44 - 44.5 in	100 - 100.5 in
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
TCL SVOCs (SW8270D)											
Acenaphthene	500,000	1,000,000	ug/kg	<110 U	<94 U	<110 U	NS	<94 U	<96 U	<97 U	**1200000** DJ
Acenaphthylene	500,000	1,000,000	ug/kg	**150** J	<120 U	<130 U	NS	<110 U	<120 U	<120 U	**1200000** DJ
Anthracene	500,000	1,000,000	ug/kg	**310** J	<120 U	<130 U	NS	<120 U	<120 U	<130 U	**1200000** D
Benzo(A)Anthracene	5,600	11,000	ug/kg	**580**	<130 U	<140 U	NS	<130 U	<130 U	<130 U	**1100000** D
Benzo(A)Pyrene	1,000	1,100	ug/kg	**520**	<160 U	<170 U	NS	<160 U	<160 U	<160 U	**1100000** D
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**1000**	<140 U	<160 U	NS	<140 U	<150 U	<150 U	**1100000** D
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	**380** J	<120 U	<130 U	NS	<110 U	<120 U	<120 U	**660000** D
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**350** J	<160 U	<170 U	NS	<160 U	<160 U	<160 U	**430000** D
Chrysene	56,000	110,000	ug/kg	**880**	<160 U	<170 U	NS	<160 U	<160 U	<160 U	**950000** D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<150 U	<130 U	<140 U	NS	<130 U	<130 U	<130 U	**140000**
Dibenzofuran	350,000	1,000,000	ug/kg	**220** J	<83 U	<91 U	NS	<82 U	<84 U	<86 U	**1200000** DJ
Fluoranthene	500,000	1,000,000	ug/kg	**1300**	<160 U	**210** J	NS	<160 U	<160 U	<160 U	**3400000** DJ
Fluorene	500,000	1,000,000	ug/kg	<120 U	<97 U	<110 U	NS	<96 U	<99 U	<100 U	**1500000** D
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**460** J	<140 U	<160 U	NS	<140 U	<150 U	<150 U	**650000** D
Naphthalene	500,000	1,000,000	ug/kg	**610**	<110 U	**210** J	NS	<110 U	<110 U	<120 U	**15000000** D
Phenanthrene	500,000	1,000,000	ug/kg	**800**	<130 U	**170** J	NS	<130 U	<130 U	<130 U	**5000000** D
Pyrene	500,000	1,000,000	ug/kg	**940**	<170 U	<190 U	NS	<170 U	<170 U	<180 U	**2600000** DJ
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	**7**	**26.7**	**11.3**	**5.7**	**2.9**	<10.1 U	**3.8**	NS
Barium	400	10,000	mg/kg	**239**	**143**	**39.3**	**619**	**223**	**121**	**65.5**	NS
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	**0.032** J	**1.2**	**0.337**	**3.5**	**0.032** J	**0.034** J	**0.032** J	NS
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	**20**	**4.39**	**13.3**	**1140**	**1.59**	<0.20 UJ	**2.38** J	NS

Table 4-14
Analytical Data - Clay Samples
AOI 2 East
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-11	MW-BCP-11	MW-BCP-11	MW-BCP-12	MW-BCP-12	MW-BCP-12	MW-BCP-22A	Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	11/9/2020	11/9/2020	11/9/2020	11/16/2020	11/19/2020	11/19/2020	6/24/2021			
			Sample Interval:	10 - 11 ft	14 - 15 ft	20 - 22 ft	5 - 6 ft	8 - 10 ft	24 - 25 ft	5 - 6 ft			
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay			
TCL SVOCs (SW8270D)													
Acenaphthene	500,000	1,000,000	ug/kg	<88 U	<86 U	<86 U	<86 U	<88 U	<110 U	<79 U	N.A.	1,200,000	500,000
Acenaphthylene	500,000	1,000,000	ug/kg	<110 U	<110 U	<110 U	<110 U	<110 U	<130 U	<85 U	N.A.	1,200,000	500,000
Anthracene	500,000	1,000,000	ug/kg	<110 U	<110 U	<110 U	<110 U	<110 U	<130 U	<70 U	N.A.	1,200,000	500,000
Benzo(A)Anthracene	5,600	11,000	ug/kg	<120 U	<120 U	<120 U	<120 U	<120 U	<140 U	<62 U	N.A.	1,100,000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	<150 U	<140 U	<140 U	<140 U	<150 U	<170 U	<120 U	N.A.	1,100,000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<140 U	<130 U	<130 U	<130 U	<140 U	<160 U	<70 U	N.A.	1,100,000	5,600
Benzo(G,H,I)Perylene	500,000	1,000,000	ug/kg	<110 U	<110 U	<110 U	<110 U	<110 U	<130 U	<96 U	N.A.	660,000	500,000
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<150 U	<140 U	<140 U	<140 U	<150 U	<170 U	<68 U	N.A.	430,000	56,000
Chrysene	56,000	110,000	ug/kg	<150 U	<140 U	<140 U	<140 U	<150 U	<170 U	<62 U	N.A.	950,000	56,000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<120 U	<120 U	<120 U	<120 U	<120 U	<140 U	<91 U	N.A.	140,000	560
Dibenzofuran	350,000	1,000,000	ug/kg	<78 U	<75 U	<76 U	<75 U	<78 U	<92 U	<76 U	N.A.	1,200,000	350,000
Fluoranthene	500,000	1,000,000	ug/kg	<150 U	<140 U	<140 U	<140 U	<150 U	<170 U	<110 U	N.A.	3,400,000	500,000
Fluorene	500,000	1,000,000	ug/kg	<91 U	<88 U	<88 U	<88 U	<91 U	<110 U	<79 U	N.A.	1,500,000	500,000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<140 U	<130 U	<130 U	<130 U	<140 U	<160 U	<140 U	N.A.	650,000	5,600
Naphthalene	500,000	1,000,000	ug/kg	<110 U	<98 U	<99 U	<98 U	<110 U	<120 U	<79 UJ	N.A.	15,000,000	500,000
Phenanthrene	500,000	1,000,000	ug/kg	<120 U	<120 U	<120 U	<120 U	<120 U	<140 U	**69** J	N.A.	5,000,000	500,000
Pyrene	500,000	1,000,000	ug/kg	<160 U	<150 U	<160 U	<150 U	<160 U	<190 U	<70 U	N.A.	2,600,000	500,000
TAL Metals (SW6010)													
Arsenic	16	16	mg/kg	**6.6**	**4.2**	**3.9**	**2.2** J	**4.3**	**2.9**	**3.3** J	N.A.	26.7	16
Barium	400	10,000	mg/kg	**101**	**172**	**116**	**129**	**71.6**	**145**	**186** J	N.A.	619	400
Mercury (SW7471)													
Mercury	2.8	5.7	mg/kg	<0.014 U	<0.014 U	<0.015 U	<0.014 U	<0.015 U	<0.017 U	**0.028** J	N.A.	3.5	3
Total Cyanide (SW9012B)													
Cyanide	27	10,000	mg/kg	<0.17 UJ	<0.19 UJ	<0.20 UJ	**5.71**	**0.63**	**1**	<0.17 U	N.A.	1140	27

Table 4-15
Groundwater Sample Data - Fill Zone Wells
AOI 2 East
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-12A	MW-BCP-12A (DUP)	MW-BCP-12A	MW-BCP-22A	MW-BCP-99A (DUP 22A)	Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/13/2021	1/13/2021	9/22/2021	9/23/2021	9/23/2021			
		Screen Interval (ft bgs):	3.0 5.0	3.0 5.0	3.0 5.0	2.0 - 5.0	2.0 - 5.0			
		Screened Formation:	Fill	Fill	Fill	Fill	Fill			
TCL SVOCs (SW8270D)										
Benzo(A)Anthracene	0.002	ug/l	<1.7 U	<1.5 U	**3.3** J	**4.7** J	NS	3.3	4.7	0.002
Benzo(B)Fluoranthene	0.002	ug/l	<1.2 U	<1.1 U	**4.2** J	**7.2** J	NS	4.2	7.2	0.002
Benzo(K)Fluoranthene	0.002	ug/l	<1.3 U	<1.1 U	**1.7** J	**3** J	NS	1.7	3	0.002
Chrysene	0.002	ug/l	<1.2 U	<1.1 U	**2.1** J	**4.6** J	NS	2.1	4.6	0.002
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.8 U	<1.6 U	**2.1** J	**5.3** J	NS	2.1	5.3	0.002
TAL Metals (SW6010)										
Arsenic	25	ug/l	<5.5 U	NS	**7.4** J	**67.4**	NS		67.4	25
Iron	300	ug/l	**1620**	NS	**11800** J	**61700**	NS	1620	61700	300
Lead	25	ug/l	<2.1 U	NS	**23.2** J	**47.4** J	NS		47.4	25
Magnesium	35,000	ug/l	**18400**	NS	**28800**	**49300**	NS		49300	35000
Manganese	300	ug/l	**360**	NS	**717**	**485**	NS	360	717	300
Nickel	100	ug/l	<2.6 U	NS	<2.6 U	**24.1** J	NS			100
Selenium	10	ug/l	<6.4 U	NS	<6.4 U	**15.1**	NS		15.1	10
Sodium	20,000	ug/l	**67800**	NS	**83500**	**17600**	NS	67800	83500	20000
Cyanide (SW9012B/ KELADA-01)										
Cyanide	0.20	mg/l	**0.347** J	**0.382** J	**4.78**	<0.16 U	NS	0.347	4.78	0.2
PFAS (E537)										
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	100	ng/l	<0.55 U	NS	**280** J	NS	NS		280	100

Table 4-16
Groundwater Sample data - Clay Zones (B C)
AOI 2 East
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-12B		MW-BCP-12B		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/14/2021		9/22/2021				
		Screen Interval (ft bgs):	15 - 25		15 - 25				
		Screened Formation:	Upper Clay		Upper Clay				
TAL Metals (SW6010)									
Arsenic	25	ug/l	<5.5	U	<5.5	U			**25**
Barium	1,000	ug/l	**72.9**		**110**				**1000**
Beryllium	3	ug/l	<0.13	U	**0.2**	J			**3**
Chromium, Total	50	ug/l	**2.2**	J	**8.7**	J			**50**
Copper	200	ug/l	<3.9	U	**5.3**	J			**200**
Iron	300	ug/l	**998**		**2550**	J	**998**	**2550**	**300**
Lead	25	ug/l	<2.1	U	<2.1	U			**25**
Magnesium	35,000	ug/l	**115000**		**130000**		**115000**	**130000**	**35000**
Manganese	300	ug/l	**52**		**70.8**				**300**
Nickel	100	ug/l	<2.6	U	<2.6	U			**100**
Selenium	10	ug/l	<6.4	U	<6.4	U			**10**
Sodium	20,000	ug/l	**52000**		**56400**		**52000**	**56400**	**20000**
Thallium	0.5	ug/l	**6.9**	J	<6.6	U		**6.9**	**0.5**
Zinc	2,000	ug/l	<9.4	U	**8**	J			**2000**
Cyanide (SW9012B/ KELADA-01)									
Cyanide	0.20	mg/l	**1.41**		**1.60**		**1.41**	**1.60**	**0.2**

Date:5/14/2024

Table 4-17
Analytical Data - Fill Samples
AOI 3
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-15		MW-BCP-15		MW-BCP-15	MW-BCP-15	MW-BCP-15	
			Sample Date:	10/29/2020		10/29/2020		10/29/2020	10/29/2020	10/29/2020	
			Sample Interval:	0 - 2 in		DUP (0 - 2 in)		2 - 6 in	DUP (2 - 6 in)	0.5 - 1 ft	
			Formation:	Surface Soil		Surface Soil		Surface Soil	Surface Soil	Shallow Fill	
TCL SVOCs (SW8270D)											
Benzo(A)Anthracene	5,600	11,000	ug/kg	**2500**	J	**1300**		NS	NS	**1200**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**3600**	J	**2100**		NS	NS	**1500**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**4400**	J	**2600**		NS	NS	**1700**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**490**	J	<330	U	NS	NS	**220**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**2200**	J	**1500**		NS	NS	**860**	
TAL Metals (SW6010)											
Barium	400	10,000	mg/kg	**147**		**158**		NS	NS	**1140**	

Table 4-17
Analytical Data - Fill Samples
AOI 3
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-03		MW-BCP-03		MW-BCP-03		MW-BCP-01		MW-BCP-01		MW-BCP-01	
			Sample Date:	10/27/2020		10/27/2020		10/27/2020		10/28/2020		10/28/2020		10/28/2020	
			Sample Interval:	0 - 2 in		2 - 6 in		0.5 - 1 ft		0 - 2 in		2 - 6 in		0 - 1 ft	
			Formation:	Surface Soil		Surface Soil		Shallow Fill		Surface Soil		Surface Soil		Shallow Fill	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	**2900**		NS		**460**		**24000**	D	NS		**750**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**4100**		NS		**790**		**27000**	D	NS		**1000**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**5100**	D	NS		**910**		**28000**	D	NS		**1200**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**740**	DJ	NS		**140**	J	**4500**	DJ	NS		**150**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**3400**	D	NS		**660**		**18000**	D	NS		**610**	
TAL Metals (SW6010)															
Barium	400	10,000	mg/kg	**146**		NS		**846**		**59.4**		NS		**92.6**	

Analytes	Minimum (Above SCOs)	Maximum	Commercial SCO
Benzo(A)Anthracene	N.A.	24000	5,600
Benzo(A)Pyrene	1000	27000	1,000
Benzo(B)Fluoranthene	N.A.	28000	5,600
Dibenz(A,H)Anthracene	740	4500	560
Indeno(1,2,3-C,D)Pyrene	N.A.	18000	5,600
Barium	846	1140	400

Table 4-18
Analytical Data - Clay Samples
AOI 3
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	MW-BCP-15	MW-BCP-15	MW-BCP-15	MW-BCP-15	MW-BCP-03	MW-BCP-03	MW-BCP-03	MW-BCP-03	MW-BCP-01	MW-BCP-01	MW-BCP-01	MW-BCP-01	MW-BCP-01
	Commercial	Industrial														
			Sample Date:	10/29/2020	10/29/2020	10/29/2020	10/29/2020	10/27/2020	10/27/2020	10/27/2020	10/27/2020	10/28/2020	10/28/2020	10/28/2020	10/28/2020	10/28/2020
			Sample Interval:	4 - 6 ft	8 - 10 ft	13 - 14 ft	36 - 38 ft	4 - 5 ft	6 - 8 ft	16 - 18 ft	28 - 30 ft	3 - 4 ft	6 - 8 ft	18 - 20 ft	28 - 30 ft	38 - 40 ft
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay

To date no sample contained a compound above the Commercial SCOs

Table 4-19
Groundwater Sample Data - Fill Zone Wells
AOI 3
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-01A	MW-BCP-01A (DUP)	MW-BCP-01A	MW-BCP-01A	MW-BCP-02A	MW-BCP-02A (DUP)	MW-BCP-02A	MW-BCP-02A	MW-BCP-03A	MW-BCP-03A (DUP)	MW-BCP-03A	MW-BCP-03A	MW-BCP-15A	MW-BCP-15A (DUP)	Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/12/2021	1/12/2021	9/21/2021	10/27/2021	1/12/2021	1/12/2021	9/22/2021	10/27/2021	1/12/2021	1/12/2021	9/21/2021	10/27/2021	1/12/2021	1/12/2021			
		Screen Interval (ft bgs):	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5	1.5 - 3.5			
		Screened Formation:	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill			
TAL Metals (SW6010)																			
Iron	300	ug/l	**657**	NS	<61 U	NS	**2670**	**2910**	**2420** J	NS	NS	NS	NS	NS	<61 U	**1480**	**657**	**2910**	**300**
Magnesium	35,000	ug/l	**38000**	NS	**56800**	NS	**22300**	**22500**	**35600**	NS	NS	NS	NS	NS	**74700**	**336000**	**35600**	**336000**	**35000**
Manganese	300	ug/l	**51.9**	NS	**34.3**	NS	**807**	**829**	**687**	NS	NS	NS	NS	NS	**618**	**277**	**618**	**829**	**300**
Sodium	20,000	ug/l	**8090**	NS	**15700**	NS	**324000**	**325000**	**162000**	NS	NS	NS	NS	NS	**68100**	**116000**	**68,100**	**325000**	**20000**
PFAS (E537)																			
Perfluorobutanoic Acid	100	ng/l	**66**	**64**	**390** J	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		**390**	**100**

Date:3/9/2022

Table 4-20
Groundwater Sample Data - Clay Zones (B C)
AOI 3
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-01B		MW-BCP-01B		MW-BCP-01C		MW-BCP-01C		MW-BCP-02B		MW-BCP-02B		MW-BCP-03B	
		Sample Date	1/12/2021		9/21/2021		1/12/2021		9/22/2021		1/12/2021		9/22/2021		1/12/2021	
		Screen Interval (ft bgs):	10 - 20		10 - 20		29 - 39		29 - 39		0 - 15		0 - 15		14 - 24	
		Screened Formation:	Upper Clay		Upper Clay		Lower Clay		Lower Clay		Upper Clay		Upper Clay		Upper Clay	
TAL Metals (SW6010)																
Iron	300	ug/l	**113**		<61	U	**9480**		**15700**	J	**112**		**75.1**	J	NS	
Magnesium	35,000	ug/l	**143000**		**146000**		**144000**		**150000**		**148000**		**173000**		NS	
Sodium	20,000	ug/l	**35200**		**31800**		**82300**		**70900**		**91500**		**87100**		NS	
Thallium	0.5	ug/l	<6.6	U	<6.6	U	<6.6	U	<6.6	U	<6.6	U	<6.6	U	NS	

Table 4-20
Groundwater Sample Data - Clay Zones (B C)
AOI 3
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-03B		MW-BCP-03C		MW-BCP-03C		MW-BCP-15C		MW-BCP-15C		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	9/21/2021		1/12/2021		9/21/2021		1/12/2021		9/21/2021				
		Screen Interval (ft bgs):	14 - 24		29 - 39		29 - 39		29 - 39		29 - 39				
		Screened Formation:	Upper Clay		Lower Clay		Lower Clay		Lower Clay		Lower Clay				
TAL Metals (SW6010)															
Iron	300	ug/l	NS		NS		NS		**838**		**1250**		**838**	**15700**	**300**
Magnesium	35,000	ug/l	NS		NS		NS		**349000**		**371000**		**143000**	**371000**	**35000**
Sodium	20,000	ug/l	NS		NS		NS		**120000**		**140000**		**31800**	**140000**	**20000**
Thallium	0.5	ug/l	NS		NS		NS		**7.7**	J	<6.6	U		**7.7**	**0.5**

Date:3/9/2022

Table 4-21
Groundwater Sample Data - Bedrock Zone D
AOI 3
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-01D		MW-BCP-101A (DUP 01D)		MW-BCP-03D		MW-BCP-05D		MW-BCP-05D		MW-BCP-21D		MW-BCP-97D (DUP 21D)		Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		9/21/2021		9/21/2021		9/21/2021		1/14/2021		9/23/2021		9/24/2021		9/24/2021				
	Borehole Interval (ft bgs):		55.5 - 65.5		55.5 - 65.5		54.5 - 64.5		56.0 - 66.0		56.0 - 66.0		53.5 - 63.5		53.5 - 63.5				
	Formation:		Bedrock		Bedrock		Bedrock		Bedrock		Bedrock		Bedrock		Bedrock				
TAL Metals (SW6010)																			
Iron	300	ug/l	**1130**		**1150**		**6730**		**3860**		**3960**		**6780**		**6550**		**1130**	**6780**	**300**
Magnesium	35,000	ug/l	**10500**		**15900**		**138000**		**51000**		**54100**		**59000**		**58000**		**51000**	**138000**	**35000**
Sodium	20,000	ug/l	**78100**		**75200**		**157000**		**52100**		**58400**		**65800**		**64900**		**52100**	**157000**	**20000**
Thallium	0.5	ug/l	**17.6**		**18.2**		<6.6	U	**14.1**		**18.2**		<6.6	U	<6.6	U	**14.1**	**18.2**	**0.5**

Table 4-22
Analytical Data - Fill Samples
AOI 4
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-16		TP-BCP-45		TP-BCP-07		MW-BCP-13		MW-BCP-08		MW-BCP-24A	
			Sample Date:	11/12/2020		11/12/2020		11/17/2020		11/5/2020		11/10/2020		6/22/2021	
			Sample Interval:	0 to 1 ft		0 - 1 ft		0 to 1 ft		0 - 1 ft		0 - 1 ft		0 - 1 ft	
	Formation:			Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Fill	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	<1100	U	**2000**		**13000**	D	**32000**	D	**1800**		**3600**	J
Benzo(A)Pyrene	1,000	1,100	ug/kg	**1700**	J	**1800**		**17000**	D	**27000**	D	**2200**		**4700**	J
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**1900**	J	**3400**		**18000**	D	**32000**	D	**3200**		**5900**	J
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<1100	U	**480**	J	**3000**	DJ	**3400**	J	**370**	J	**790**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**1300**	J	**1800**		**13000**	D	**17000**	DJ	**1300**		**3800**	J

Table 4-22
Analytical Data - Fill Samples
AOI 4
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	SS-BCP-07		SS-BCP-08		SS-BCP-09		SD-BCP-03		Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	11/12/2020		11/12/2020		11/12/2020		11/17/2020				
			Sample Interval:	Debris Pile		Debris Pile		Debris Pile		Sediment				
			Formation:	Shredder Material		Shredder Material		Shredder Material		Sediment Pond #003				
TCL SVOCs (SW8270D)														
Benzo(A)Anthracene	5,600	11,000	ug/kg	**3800**		<1100	U	**1600**	J	**730**		13000	32000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	**2200**	J	<1300	U	**1800**	J	**780**		1700	27000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**4900**		<1200	U	**2700**	J	**850**		5900	32000	5,600
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<690	U	<1100	U	<1100	U	<190	U	790	3400	560
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**1800**	J	<1200	U	**1400**	J	**400**	J	13000	17000	5,600

Table 4-23
Analytical Data - Clay Samples
AOI 4
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	TP-BCP-18	TP-BCP-18	TP-BCP-45	MW-BCP-13	MW-BCP-08	MW-BCP-08	MW-BCP-11	MW-BCP-11	MW-BCP-24A
	Commercial	Industrial										
			Sample Date:	11/13/2020	11/13/2020	11/12/2020	11/5/2020	11/10/2020	11/10/2020	11/9/2020	11/9/2020	6/22/2021
			Sample Interval:	67 - 67.5 in	DUP (67 - 67.5 in)	30 - 30.5 in	17 - 18 ft	8 - 9 ft	12 - 13 ft	10 - 11 ft	14 - 15 ft	11 - 12 ft
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay

To date no sample contained a compound above the Commercial SCOs

Table 4-24
Groundwater Sample Data - Fill Zone Wells
AOI 4
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-08A		MW-BCP-08A		MW-BCP-11A		MW-BCP-11A		MW-BCP-13A		MW-BCP-13A		MW-BCP-24A		Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/12/2021		9/24/2021		1/14/2021		9/23/2021		1/13/2021		9/22/2021		9/23/2021				
	Screen Interval (ft bgs):		2.0 - 7.0		2.0 - 7.0		2.0 - 7.0		2.0 - 7.0		5.5 - 7.5		5.5 - 7.5		3.5 - 8.5				
	Screened Formation:		Fill		Fill		Fill		Fill		Fill		Fill		Fill				
TCL VOCs (SW8260C)																			
Benzene	1	ug/l	<0.20	U	<0.20	U	**0.21**	J	<0.20	U	**370**		**1700**		<0.20	U	**370**	**1700**	**1**
Ethylbenzene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**21**	J	**26**	J	<0.20	U	**21**	**26**	**5**
Styrene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**24**	J	**33**	J	<0.20	U	**24**	**33**	**5**
Toluene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**250**		**420**		<0.20	U	**250**	**420**	**5**
m,p-Xylene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**210**	J	**230**	J	<0.20	U	**210**	**230**	**5**
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	**84**	J	**100**	J	<0.20	U	**84**	**100**	**5**
TCL SVOCs (SW8270D)																			
2,4-Dimethylphenol	50	ug/l	<1.4	U	<1.4	U	<1.5	UJ	<1.4	U	**95**		**1200**		<1.4	U	**95**	**1200**	**50**
Acenaphthene	20	ug/l	<1.4	U	<1.4	U	<1.4	U	<1.4	U	**21**		**42**	J	<1.4	U	**21**	**42**	**20**
Anthracene	50	ug/l	<1.3	U	<1.3	U	<1.3	U	<1.3	U	**17**		**190**		<1.3	U		**190**	**50**
Benzo(A)Anthracene	0.002	ug/l	<1.6	U	<1.6	U	<1.7	U	**3.1**	J	**2.1**	J	**130**		<1.6	U	**2.1**	**130**	**0.002**
Benzo(B)Fluoranthene	0.002	ug/l	<1.2	U	**1.5**	J	<1.2	U	**3.7**	J	<1.2	U	**100**		<1.2	U	**1.5**	**100**	**0.002**
Benzo(K)Fluoranthene	0.002	ug/l	<1.3	U	<1.3	U	<1.3	U	**1.5**	J	<1.3	U	**37**	J	<1.3	U	**1.5**	**37**	**0.002**
Biphenyl (Diphenyl)	5	ug/l	<1.4	U	<1.4	UJ	<1.5	U	<1.4	U	**68**		**120**		<1.4	U	**68**	**120**	**5**
Chrysene	0.002	ug/l	<1.2	U	**1.2**	J	<1.3	U	**2.7**	J	**1.3**	J	**110**		<1.2	U	**1.2**	**110**	**0.002**
Fluoranthene	50	ug/l	<1.5	U	**2.5**	J	<1.6	U	**3.5**	J	**13**		**360**		<1.5	U		**360**	**50**
Fluorene	50	ug/l	<1.3	U	<1.3	U	<1.3	U	<1.3	U	**110**		**340**		<1.3	U	**110**	**340**	**50**
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.8	U	<1.8	U	<1.9	U	<1.8	U	<1.8	U	**60**	J	<1.8	U		**60**	**0.002**
Naphthalene	10	ug/l	<1.2	U	<1.2	U	<1.3	U	<1.2	U	**9200**	D	**14000**	D	<1.2	U	**9,200**	**14000**	**10**
Phenanthrene	50	ug/l	<1.4	U	**2.4**	J	<1.4	U	**1.7**	J	**92**		**700**		<1.4	U	**92**	**700**	**50**
Phenol	1	ug/l	<1.0	U	<1.0	U	<1.1	U	<1.0	U	**11**		**660**		<1.0	U	**11**	**660**	**1**
Pyrene	50	ug/l	<1.5	U	**2**	J	<1.5	U	**2.8**	J	**8**	J	**270**		<1.5	U		**270**	**50**
TAL Metals (SW6010)																			
Arsenic	25	ug/l	<5.5	U	**28.3**		<5.5	U	**23**		<5.5	U	**22.1**		<5.5	U		**28.3**	**25**
Chromium, Total	50	ug/l	<0.59	U	**16.4**		<0.59	U	**50.7**		<0.59	U	**7.2**	J	<1.4	U		**50.7**	**50**
Iron	300	ug/l	**10300**		**35700**		**605**		**49000**		**40200**		**76800**	J	**13100**		**605**	**76800**	**300**
Lead	25	ug/l	<2.1	U	**22.1**	J	<2.1	U	**30.4**	J	<2.1	U	**25.5**	J	<2.1	U	**25.5**	**30.4**	**25**
Manganese	300	ug/l	**1330**		**1160**		**1660**		**785**		**1890**		**2620**		**574**		**574**	**2620**	**300**
Sodium	20,000	ug/l	**119000**		**84800**		**101000**		**144000**		**38800**		**32200**		**34000**		**32,200**	**144000**	**20000**
Mercury (SW7470)																			
Mercury	0.7	ug/l	<0.077	U	**0.172**	J	<0.077	U	<0.077	U	**0.084**	J	**4.4**		<0.077	U		**4.4**	**0.7**
Cyanide (SW9012B/ KELADA-01)																			
Cyanide	0.20	mg/l	**0.0309**		<0.08	U	**0.0075**		<0.040	U	**0.178**	J	**3.59**		**0.078**			**3.59**	**0.2**
PCBs (8082A)																			
PCB-1248 (Aroclor 1248)	0.09	ug/l	NS		NS		NS		NS		**1**		<0.50	U	<0.50	UJ		**1**	**0.09**
Herbicides (SW8151A)																			
Silvex (2,4,5-TP)	0.26	ug/l	NS		NS		NS		NS		**0.33**	J	<0.12	UJ	<0.12	U		**0.33**	**0.26**

Table 4-25
Groundwater Sample Data - Clay Zones (B C)
AOI 4
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

DRAFT

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-08B		MW-BCP-08B		MW-BCP-11B		MW-BCP-11B		MW-BCP-13B		MW-BCP-13B		MW-BCP-24B		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/12/2021		9/24/2021		1/15/2021		9/23/2021		1/14/2021		9/22/2021		9/23/2021				
		Screen Interval (ft bgs):	15 - 25		15 - 25		15 - 25		15 - 25		20 - 30		20 - 30		14 - 24				
		Screened Formation:	Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay				
TCL VOCs (SW8260C)																			
Benzene	1	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	1300		310		<0.20	U	310	1300	1
Ethylbenzene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	78	J	37	J	<0.20	U	37	78	5
Styrene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	98	J	46	J	<0.20	U	46	98	5
Toluene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	970		280		<0.20	U	280	970	5
m,p-Xylene	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	950		460		<0.20	U	460	950	5
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	<0.20	U	<0.20	U	<0.20	U	<0.20	U	390		180	J	<0.20	U	180	390	5
TCL SVOCs (SW8270D)																			
2,4-Dimethylphenol	50	ug/l	<1.5	U	<1.4	U	<1.4	U	<1.4	U	520	J	94		<1.4	U	94	520	50
Acenaphthene	20	ug/l	<1.4	U	<1.4	U	<1.4	U	<1.4	U	19		43	J	<1.4	U	19	43	20
Anthracene	50	ug/l	<1.3	U	<1.3	U	<1.3	U	<1.3	U	20		210		<1.3	U	20	210	50
Benzo(A)Anthracene	0.002	ug/l	<1.7	U	<1.6	U	<1.7	U	<1.6	U	3.6	J	110		<1.6	U	3.6	110	0.002
Benzo(B)Fluoranthene	0.002	ug/l	<1.2	U	<1.2	U	<1.2	U	<1.2	U	2.7	J	100		<1.2	U	2.7	100	0.002
Benzo(K)Fluoranthene	0.002	ug/l	<1.3	U	<1.3	U	<1.3	U	<1.3	U	<1.1	U	56	J	<1.3	U	56	56	0.002
Biphenyl (Diphenyl)	5	ug/l	<1.5	U	<1.4	UJ	<1.4	U	<1.4	U	59		110		<1.4	U	59	110	5
Chrysene	0.002	ug/l	<1.3	U	<1.2	U	<1.2	U	<1.2	U	2.4	J	120		<1.2	U	2.4	120	0.002
Fluoranthene	50	ug/l	<1.6	U	<1.5	U	<1.5	U	<1.5	U	17		370		<1.5	U	17	370	50
Fluorene	50	ug/l	<1.3	U	<1.3	U	<1.3	U	<1.3	U	93		350		<1.3	U	93	350	50
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.9	U	<1.8	U	<1.8	U	<1.8	U	<1.6	U	68	J	<1.8	U	68	68	0.002
Naphthalene	10	ug/l	<1.3	U	<1.2	U	<1.2	U	<1.2	U	12000	D	19000	D	<1.2	U	12000	19000	10
Phenanthrene	50	ug/l	<1.4	U	<1.4	U	<1.4	U	<1.4	U	89		740		<1.4	U	89	740	50
Phenol	1	ug/l	<1.1	U	<1.0	U	<1.1	U	<1.0	U	95		26	J	<1.0	U	26	95	1
Pyrene	50	ug/l	<1.5	U	<1.5	U	<1.5	U	<1.5	U	12		270		<1.5	U		270	50
TAL Metals (SW6010)																			
Arsenic	25	ug/l	<5.5	U	16		<5.5	U	82.3		<5.5	U	198		23.9		82.6	198	25
Barium	1,000	ug/l	85.1		486		225		2040		255		4090		526		2040	4090	1000
Beryllium	3	ug/l	<0.13	U	2.7	J	<0.13	U	13.2		0.6	J	29.3		3.6		3.6	29.3	3
Cadmium	5	ug/l	<0.35	U	0.8	J	<0.35	U	4.2	J	<0.35	U	14.2		0.6	J		14.2	5
Chromium, Total	50	ug/l	2.6	J	86.7		0.7	J	462		21		1080		112		112	1080	50
Copper	200	ug/l	<3.9	U	62.4		<3.9	U	398		12.6	J	958		82.5		398	958	200
Iron	300	ug/l	157		84000		910		444000		15200		1250000	J	103000		910	1250000	300
Lead	25	ug/l	<2.1	U	33.1	J	<2.1	U	227		7.5	J	600		45.4	J	33.1	600	25
Magnesium	35,000	ug/l	86500		194000		238000		461000		187000		869000		218000		86500	869000	35000
Manganese	300	ug/l	117		1810		750		6430		1030		20800		2100		750	20800	300
Nickel	100	ug/l	<2.6	U	56.8		<2.6	U	362		<2.6	U	848		84.3			848	100
Selenium	10	ug/l	<6.4	U	<6.4	U	<6.4	U	<6.4	U	<6.4	U	16.8		<6.4	U		16.8	10
Sodium	20,000	ug/l	120000		77100		102000		87200		76900		81800		50100		50100	120000	20000
Thallium	0.5	ug/l	<6.6	U	<6.6	U	<6.6	U	<6.6	U	<6.6	U	42		<6.6	U		42	0.5
Zinc	2,000	ug/l	<9.4	U	199		<9.4	U	1110		42.8		2770		278			2770	2000
Mercury (SW7470)																			
Mercury	0.7	ug/l	<0.077	U	<0.077	U	<0.077	U	0.157	J	0.674		9.4		0.169	J	0.157	9.4	0.7
Cyanide (SW9012B/ KELADA-01)																			
Cyanide	0.20	mg/l	0.0104		<0.20	U	0.0258		<0.08	U	1.74		0.79		<0.08	U	0.79	1.74	0.2

Date:3/9/2022

Table 4-26
Analytical Data - Fill Samples
AOI 5
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-25		TP-BCP-20		TP-BCP-26		TP-BCP-24		TP-BCP-24		TP-BCP-44	
			Sample Date:	10/29/2020		11/9/2020		11/9/2020		11/13/2020		11/13/2020		11/13/2020	
			Sample Interval:	0 - 1 ft		0 - 1 ft		0 - 1 ft		0 - 1 ft		DUP (0 - 1 ft)		0 - 1 ft	
			Formation:	Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	**7800**	D	**260000**	D	**17000**	D	**7400**	D	**5400**	D	**10000**	D
Benzo(A)Pyrene	1,000	1,100	ug/kg	**8100**	D	**470000**	D	**24000**	D	**8800**	D	**6000**	D	**14000**	D
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**10000**	D	**410000**	D	**24000**	D	**10000**	D	**7100**	D	**15000**	D
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**3300**	D	**150000**	DJ	**8800**	D	**3400**	D	**2500**	D	**5100**	D
Chrysene	56,000	110,000	ug/kg	**8600**	D	**270000**	D	**16000**	D	**7800**	D	**5300**	D	**11000**	D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**1500**	D	**71000**	DJ	**4100**	DJ	**1700**	DJ	**1300**	DJ	**2500**	D
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**5400**	D	**310000**	D	**18000**	D	**6300**	D	**4500**	D	**10000**	D
TAL Metals (SW6010)															
Arsenic	16	16	mg/kg	**5.6**	J	**3.7**		**5.9**		**16**	J	**40.3**	J	**7.3**	J

Table 4-26
Analytical Data - Fill Samples
AOI 5
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-44	TP-BCP-22	TP-BCP-22	TP-BCP-27	TP-BCP-27	MW-BCP-19	MW-BCP-20	MW-BCP-25A
		Sample Date:		11/13/2020	11/16/2020	11/16/2020	11/16/2020	11/16/2020	11/5/2020	11/6/2020	6/22/2021
		Sample Interval:		DUP (0 - 1 ft)	0 to 1 ft	DUP (0 to 1 ft)	0 to 1 ft	DUP (0 to 1 ft)	0 - 1 ft	0 - 1 ft	0 - 1 ft
		Formation:		Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Fill
TCL SVOCs (SW8270D)											
Benzo(A)Anthracene	5,600	11,000	ug/kg	16000 D	5500 D	8600 D	8900 D	8700 D	25000 D	130000 D	4500 J
Benzo(A)Pyrene	1,000	1,100	ug/kg	19000 D	7800 D	12000 D	14000 D	14000 D	32000 D	130000 D	5000 J
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	20000 D	7500 D	11000 D	13000 D	14000 D	34000 D	130000 D	5500 J
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	7400 D	2600 D	4000 D	4500	4700	13000 D	47000 DJ	1800 J
Chrysene	56,000	110,000	ug/kg	16000 D	5800	8300 D	10000 D	9400 D	27000 D	130000 D	4900 J
Dibenz(A,H)Anthracene	560	1,100	ug/kg	3800 DJ	1300 DJ	2000 D	2400 D	2400 D	4100 DJ	19000 DJ	<1600 UJ
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	13000 D	5300 D	8400 D	10000 D	10000 D	19000 D	72000 D	3200 J
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	4.4 J	6	5.3	6.5	6.5	NS	2.5	4.5 J

Table 4-26
Analytical Data - Fill Samples
AOI 5
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	SD-BCP-02	
	Commercial	Industrial			
			Sample Date:	11/17/2020	
			Sample Interval:	Sediment	
			Formation:	Sediment Pond #002	
TCL SVOCs (SW8270D)					
Benzo(A)Anthracene	5,600	11,000	ug/kg	**670**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**1100**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**1100**	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**410**	J
Chrysene	56,000	110,000	ug/kg	**720**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**150**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**630**	
TAL Metals (SW6010)					
Arsenic	16	16	mg/kg	**5**	

Analytes	Minimum (Above SCOs)	Maximum	Commercial SCO
Benzo(A)Anthracene	7400	260000	5,600
Benzo(A)Pyrene	1100	470000	1,000
Benzo(B)Fluoranthene	7100	410000	5,600
Benzo(K)Fluoranthene	N.A.	150000	56,000
Chrysene	130000	270000	56,000
Dibenz(A,H)Anthracene	1300	71000	560
Indeno(1,2,3-C,D)Pyrene	6300	310000	5,600
Arsenic	16	40.3	16

Table 4-27
Anallytical Data - Clay Samples
AOI 5
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-25	TP-BCP-25	TP-BCP-21	TP-BCP-26	TP-BCP-44	MW-BCP-19	MW-BCP-19
			Sample Date:	10/29/2020	10/29/2020	11/6/2020	11/9/2020	11/13/2020	11/5/2020	11/5/2020
			Sample Interval:	3 - 3.5 ft	5 - 5.2 ft	57 - 57.5 in	30 - 30.5 in	66 - 66.5 in	6.8 - 8 ft	10 - 11 ft
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay	Clay
TCL SVOCs (SW8270D)										
Benzo(A)Pyrene	1,000	1,100	ug/kg	**2300**	<150 U	<170 U	<160 U	<170 U	**1600** D	**290** J
TAL Metals (SW6010)										
Arsenic	16	16	mg/kg	**32.7** J	**3.9** J	**3.4**	**4.6**	**3.5** J	NS	NS
Copper	270	10,000	mg/kg	**499** J	**21.5** J	**12.1**	**20.8**	**22.4**	NS	NS
Mercury (SW7471)										
Mercury	2.8	5.7	mg/kg	**5.1**	<0.015 U	**0.071**	**0.025** J	**0.018** J	**0.035** J	<0.015 U
Total Cyanide (SW9012B)										
Cyanide	27	10,000	mg/kg	**1160**	**9.77**	<0.21 UJ	<0.19 UJ	<0.17 U	**0.83**	**0.29**

Table 4-27
Anallytical Data - Clay Samples
AOI 5
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	MW-BCP-19	MW-BCP-20	MW-BCP-20	MW-BCP-20	MW-BCP-25A	MW-BCP-25A	Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	11/5/2020	11/6/2020	11/6/2020	11/6/2020	6/22/2021	6/22/2021			
			Sample Interval:	18 - 20 ft	18 - 20 ft	5.5 - 7 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft			
			Formation:	Clay	Clay	Clay	Clay	Clay	Clay			
TCL SVOCs (SW8270D)												
Benzo(A)Pyrene	1,000	1,100	ug/kg	<160 U	<150 U	<160 U	<150 U	<110 U	<110 U	1600	2300	1,000
TAL Metals (SW6010)												
Arsenic	16	16	mg/kg	NS	**2.7**	**5.9**	**3.1**	**6.9** J	**7.5** J	N.A.	32.7	16
Copper	270	10,000	mg/kg	NS	**21**	**23.8**	**20.1**	**24.4** J	**25.6** J	N.A.	499	270
Mercury (SW7471)												
Mercury	2.8	5.7	mg/kg	<0.015 U	NS	NS	NS	**0.018** J	**0.019** J	N.A.	5.1	3
Total Cyanide (SW9012B)												
Cyanide	27	10,000	mg/kg	<0.17 U	<0.17 UJ	<0.18 UJ	<0.17 UJ	<0.17 U	**0.24** J	N.A.	1160	27

Table 4-28
Groundwater Sample Data - Fill Zone Wells
AOI 5
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-18A	MW-BCP-18A	MW-BCP-19A	MW-BCP-19A	MW-BCP-20A	MW-BCP-20A	MW-BCP-25A	Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/13/2021	9/22/2021	1/12/2021	9/22/2021	1/15/2021	9/22/2021	9/23/2021			
	Screen Interval (ft bgs):		2.0 - 4.0	2.0 - 4.0	4.0 - 6.0	4.0 - 6.0	2.0 - 5.0	2.0 - 5.0				
	Screened Formation:		Fill	Fill	Fill	Fill	Fill	Fill	Fill			
TCL VOCs (SW8260C)												
Benzene	1	ug/l	<0.20 U	<0.20 U	**220**	**190**	<0.20 U	<0.20 U		**190**	**220**	**1**
Ethylbenzene	5	ug/l	<0.20 U	<0.20 U	**18** J	**11** J	<0.20 U	<0.20 U		**11**	**18**	**5**
Styrene	5	ug/l	<0.20 U	<0.20 U	<5.0 U	**10** J	<0.20 U	<0.20 U			**10**	**5**
Toluene	5	ug/l	<0.20 U	<0.20 U	**190**	**82** J	<0.20 U	<0.20 U		**82**	**190**	**5**
m,p-Xylene	5	ug/l	<0.20 U	<0.20 U	**340**	**230**	**0.51** J	<0.20 U		**230**	**340**	**5**
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	<0.20 U	<0.20 U	**220**	**160**	**0.5** J	<0.20 U		**220**	**220**	**5**
TCL SVOCs (SW8270D)												
2,4-Dimethylphenol	50	ug/l	<1.3 U	<1.5 U	**860** D	**750** D	<1.4 U	<1.4 U		**750**	**860**	**50**
Benzo(A)Anthracene	0.002	ug/l	<1.5 U	<1.7 U	<1.7 U	**3.4** J	<1.7 U	**2** J		**2**	**3.4**	**0.002**
Benzo(B)Fluoranthene	0.002	ug/l	<1.1 U	<1.3 U	<1.2 U	**2.4** J	<1.2 U	**1.7** J		**1.7**	**2.4**	**0.002**
Biphenyl (Diphenyl)	5	ug/l	<1.3 U	<1.5 U	**37**	**46**	<1.4 U	<1.4 U		**37**	**46**	**5**
Chrysene	0.002	ug/l	<1.1 U	<1.3 U	<1.3 U	**2.1** J	<1.2 U	**1.9** J		**1.9**	**2.1**	**0.002**
Fluorene	50	ug/l	<1.2 U	<1.4 U	**54**	**96**	<1.3 U	**1.7** J		**54**	**96**	**50**
Naphthalene	10	ug/l	<1.1 U	<1.3 U	**5800** D	**6200** D	<1.2 U	**2.8** J		**5,800**	**6200**	**10**
Phenanthrene	50	ug/l	<1.3 U	<1.5 U	**41**	**87**	<1.4 U	**4.7** J			**87**	**50**
Phenol	1	ug/l	<0.91 U	<1.1 U	**270**	**3.7** J	<1.1 U	<1.0 U		**3.7**	**270**	**1**
TAL Metals (SW6010)												
Iron	300	ug/l	NS	NS	NS	NS	NS	NS	**5810**		**5810**	**300**
Manganese	300	ug/l	NS	NS	NS	NS	NS	NS	**1520**		**1520**	**300**
Sodium	20,000	ug/l	NS	NS	NS	NS	NS	NS	**40800**		**40800**	**20000**
Cyanide (SW9012B/ KELADA-01)												
Cyanide	0.20	mg/l	**0.48**	**0.248**	**12.8**	NS	**0.022**	<0.040 U	**1.32**	**0.248**	**12.8**	**0.2**
Ammonia (E350.1)												
Nitrogen, Ammonia (As N)	2	mg/l	NS	NS	NS	**11.1**	NS	NS		**3.72**	**11.1**	**2**

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Table 4-29
Groundwater Sample Data - Clay Zones (B C)
AOI 5
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-19B		MW-BCP-19B		MW-BCP-20B		MW-BCP-20B		MW-BCP-25B		Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/12/2021		9/22/2021		1/14/2021		9/22/2021		9/23/2021				
	Screen Interval (ft bgs):		10 - 20		10 - 20		10 - 20		10 - 20		14 - 24				
	Screened Formation:		Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay				
TCL VOCs (SW8260C)															
Benzene	1	ug/l	28	J	<10	U	<0.20	U	<0.20	U	<0.20	U		28	1
Chloroform	7	ug/l	12	J	<12	U	<0.24	U	<0.24	U	<0.24	U		12	7
Ethylbenzene	5	ug/l	14	J	<10	U	<0.20	U	<0.20	U	<0.20	U		14	5
Toluene	5	ug/l	59	J	21	J	<0.20	U	<0.20	U	<0.20	U	21	59	5
m,p-Xylene	5	ug/l	190	J	70	J	<0.20	U	<0.20	U	<0.20	U	70	190	5
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	150	J	46	J	<0.20	U	<0.20	U	<0.20	U	46	150	5
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	0.002	ug/l	15		9.4		<1.6	U	<1.6	U	<1.6	U	9.4	15	0.002
Benzo(B)Fluoranthene	0.002	ug/l	13		8.3	J	<1.1	U	<1.2	U	<1.2	U	8.3	13	0.002
Benzo(K)Fluoranthene	0.002	ug/l	5	J	3.9	J	<1.2	U	<1.3	U	<1.3	U	3.9	5	0.002
Biphenyl (Diphenyl)	5	ug/l	33		42		<1.4	U	<1.4	U	<1.4	U	33	42	5
Chrysene	0.002	ug/l	13		10		<1.2	U	<1.2	U	<1.2	U	10	13	0.002
Fluoranthene	50	ug/l	56		45		<1.5	U	<1.5	U	<1.5	U	45	56	50
Fluorene	50	ug/l	87		110		<1.3	U	<1.3	U	<1.3	U	87	110	50
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	6.2	J	4.3	J	<1.8	U	<1.8	U	<1.8	U	4.3	6.2	0.002
Naphthalene	10	ug/l	6000	D	5300	D	<1.2	U	<1.2	U	<1.2	U	5300	6000	10
Phenanthrene	50	ug/l	130		140		<1.4	U	<1.4	U	<1.4	U	130	140	50
Phenol	1	ug/l	7.2	J	<1.0	U	<0.99	U	<1.0	U	<1.0	U	7.2	7.2	1
TAL Metals (SW6010)														0	0
Chromium, Total	50	ug/l	NS		NS		NS		NS		51.7			51.7	50
Iron	300	ug/l	NS		NS		NS		NS		37300			37300	300
Magnesium	35,000	ug/l	NS		NS		NS		NS		244000			244000	35000
Manganese	300	ug/l	NS		NS		NS		NS		866			866	300
Sodium	20,000	ug/l	NS		NS		NS		NS		72700			72700	20000
Cyanide (SW9012B/ KELADA-01)															
Cyanide	0.20	mg/l	6.23		NS		<0.0040	U	NS		0.208		0.208	6.23	0.2
Ammonia (E350.1)															
Nitrogen, Ammonia (As N)	2	mg/l	NS		2.49		NS		<0.040	U	NS			2.49	2

Date:3/9/2022

Table 4-30
Analytical Data - Fill Samples
AOI 6
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	TP-BCP-41		MW-BCP-16		MW-BCP-16		MW-BCP-16	
	Commercial	Industrial									
			Sample Date:	10/28/2020		11/3/2020		11/3/2020		11/3/2020	
			Sample Interval:	0 to 1 ft		0 - 2 in		2 - 6 in		0.5 - 1 ft	
			Formation:	Shallow Fill		Surface Soil		Surface Soil		Shallow Fill	
TCL SVOCs (SW8270D)											
Benzo(A)Anthracene	5,600	11,000	ug/kg	**9700**	D	**450**	J	NS		**14000**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**14000**	D	**720**		NS		**19000**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**15000**	D	**790**		NS		**20000**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**2300**	D	<140	U	NS		**2400**	J
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**8300**	D	**480**		NS		**11000**	

Table 4-30
Analytical Data - Fill Samples
AOI 6
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	SD-BCP-01		SD-BCP-04		SD-BCP-04	
	Commercial	Industrial							
			Sample Date:	11/17/2020		11/17/2020		11/17/2020	
			Sample Interval:	Sediment		Sediment		DUP (Sediment)	
			Formation:	Sediment Pond #001		SW Basin		SW Basin	
TCL SVOCs (SW8270D)									
Benzo(A)Anthracene	5,600	11,000	ug/kg	**880**		<130	U	<140	U
Benzo(A)Pyrene	1,000	1,100	ug/kg	**1300**		<160	U	<170	U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**1400**		<150	U	<160	U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**190**	J	<130	U	<140	U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**750**		<150	U	<160	U

Analytes	Minimum (Above SCOs)	Maximum	Commercial SCO
Benzo(A)Anthracene	9700	14000	5,600
Benzo(A)Pyrene	1300	19000	1,000
Benzo(B)Fluoranthene	15000	20000	5,600
Dibenz(A,H)Anthracene	2300	2400	560
Indeno(1,2,3-C,D)Pyrene	8300	11000	5,600

Table 4-31
Analytical Data - Clay Samples
AOI 6
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	MW-BCP-16	MW-BCP-16	MW-BCP-16	MW-BCP-16
	Commercial	Industrial					
			Sample Date:	11/3/2020	11/3/2020	11/3/2020	11/3/2020
			Sample Interval:	4.5 - 6 ft	7.5 - 9 ft	20 - 21 ft	30 - 31 ft
			Formation:	Clay	Clay	Clay	Clay

To date no sample contained a compound above the Commercial SCOs

Table 4-32
Groundwater Sample Data - Fill Zone Wells
AOI 6
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-16A		MW-BCP-16A		MW-BCP-25A		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/12/2021		9/21/2021		9/23/2021				
		Screen Interval (ft bgs):	2.5 - 4.5		2.5 - 4.5		2.0 - 6.0				
		Screened Formation:	Fill		Fill		Fill				
TAL Metals (SW6010)											
Iron	300	ug/l	**177**		**1130**	J	**5810**		**1130**	**5810**	**300**
Magnesium	35,000	ug/l	**206000**		**360000**		**25500**		**206000**	**360000**	**35000**
Manganese	300	ug/l	**1650**		**2030**		**1520**		**1520**	**2030**	**300**
Sodium	20,000	ug/l	**909000**		**1570000**		**40800**		**40,800**	**1570000**	**20000**
Thallium	0.5	ug/l	**16.1**		**22.6**		<6.6	U	**16.1**	**22.6**	**0.5**
Cyanide (SW9012B/ KELADA-01)											
Cyanide	0.20	mg/l	**0.0053**		<0.040	U	**1.32**			**1.32**	**0.2**

Date:3/9/2022

Table 4-33
Groundwater Sample Data - Clay Zones (B C)
AOI 6
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-16B		MW-BCP-16B		MW-BCP-16C		MW-BCP-16C		Minimum above GA WQS	Maximum above GA WQS	GA WQS
	Sample Date		1/12/2021		9/21/2021		1/12/2021		9/21/2021				
	Screen Interval (ft bgs):		10 - 20		10 - 20		29 - 39		29 - 39				
	Screened Formation:		Upper Clay		Upper Clay		Lower Clay		Lower Clay				
TAL Metals (SW6010)													
Iron	300	ug/l	**164**		**3050**		**399**		**1480**		**399**	**3050**	**300**
Magnesium	35,000	ug/l	**438000**		**461000**		**325000**		**318000**		**318000**	**461000**	**35000**
Sodium	20,000	ug/l	**122000**		**139000**		**108000**		**132000**		**108000**	**139000**	**20000**
Thallium	0.5	ug/l	**6.7**	J	<6.6	U	<6.6	U	<6.6	U		**6.7**	**0.5**

Date:3/9/2022

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-09	TP-BCP-35	TP-BCP-35S-34-9010-0321	TP-BCP-35S-34-9012-0321	TP-BCP-36	TP-BCP-31	TP-BCP-10
			Sample Date:	11/12/2020	10/30/2020	3/4/2021	3/4/2021	11/2/2020	10/29/2020	11/3/2020
			Sample Interval:	0 to 1 ft	32 - 48 in	34 in	34 in	0 - 1 ft	0 - 1 ft	0 - 1 ft
			Formation:	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TCL SVOCs (SW8270D)										
Benzo(A)Anthracene	5,600	11,000	ug/kg	**2700** D	NS	NS	NS	**2800** DJ	**9200** D	**31000**
Benzo(A)Pyrene	1,000	1,100	ug/kg	**3500** D	NS	NS	NS	**3200** DJ	**17000** D	**44000**
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**4100** D	NS	NS	NS	**3500** DJ	**16000** D	**47000**
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**1300** D	NS	NS	NS	**1200** J	**6200**	**15000**
Chrysene	56,000	110,000	ug/kg	**3100** D	NS	NS	NS	**2900** DJ	**11000** D	**36000**
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**540**	NS	NS	NS	**490** DJ	**2500** D	**6800** J
Fluoranthene	500,000	1,000,000	ug/kg	**5200** D	NS	NS	NS	**6600** DJ	**14000** D	**61000**
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**2400**	NS	NS	NS	**2100** J	**11000** D	**31000**
Pyrene	500,000	1,000,000	ug/kg	**4500** D	NS	NS	NS	**5600** DJ	**13000** D	**54000**
TAL Metals (SW6010)										
Arsenic	16	16	mg/kg	**15.1** J	**5.2** J	NS	NS	**12.1** J	**11.7** J	**48.6**
Barium	400	10,000	mg/kg	**3290**	**84.1**	NS	NS	**102**	**96.4**	**122**
Cadmium	9.3	60	mg/kg	**1.4**	**0.462** J	NS	NS	**0.591** J	**0.301** J	**1.9**
Copper	270	10,000	mg/kg	**146** J	**76.3** J	NS	NS	**42.2** J	**42.1** J	**178**
Mercury (SW7471)										
Mercury	2.8	5.7	mg/kg	**0.227**	**3.2**	NS	NS	**0.091**	**0.04**	**1.1** J
Total Cyanide (SW9012B)										
Cyanide	27	10,000	mg/kg	**2.66**	**68.1**	**378**	**505**	**4.16**	**0.3** J	**1.31**
				1	2	3	4	5	6	7

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-10	TP-BCP-49-28	TP-BCP-49-45	TP-BCP-49-CL	TP-BCP-50-35	TP-BCP-50-51	TP-BCP-52-28
		Sample Date:		11/3/2020	7/28/2021	7/27/2021	7/28/2021	7/28/2021	7/28/2021	7/29/2021
		Sample Interval:		DUP (0 - 1 ft)	28-inches	48-inches	75-inches	35-inches	51-inches	28-inches
		Formation:		Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
TCL SVOCs (SW8270D)										
Benzo(A)Anthracene	5,600	11,000	ug/kg	23000 D	92000 D	6700	<62 U	16000 J	45000 D	200000
Benzo(A)Pyrene	1,000	1,100	ug/kg	33000 D	170000 D	7000	<120 U	20000	47000 D	240000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	35000	160000 J	10000	<70 U	28000	51000 D	240000
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	12000	55000 D	3900	<67 U	8800 J	18000 D	99000
Chrysene	56,000	110,000	ug/kg	25000	95000 D	6600	<61 U	18000	44000 D	200000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	5300 DJ	24000 D	1400 J	<91 U	3900 J	6300	30000 J
Fluoranthene	500,000	1,000,000	ug/kg	45000 D	130000 D	9200	<110 U	24000	110000 D	510000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	25000 D	120000 J	6800	<140 U	16000 J	29000 J	130000
Pyrene	500,000	1,000,000	ug/kg	41000 D	120000 D	6600	<69 U	24000	83000 D	380000
TAL Metals (SW6010)										
Arsenic	16	16	mg/kg	19.8	11.9	7.2	4.9	10.6	23.2	18
Barium	400	10,000	mg/kg	134	129	188	115	168	108	85
Cadmium	9.3	60	mg/kg	1.8	0.549 J	0.465 J	0.249 J	0.628	1.5	0.548 J
Copper	270	10,000	mg/kg	121	43.7	170	18.8	56.4	319	18.8
Mercury (SW7471)										
Mercury	2.8	5.7	mg/kg	0.963 J	0.227	16.8	0.03 J	1.8	6.4	0.054
Total Cyanide (SW9012B)										
Cyanide	27	10,000	mg/kg	3.28	6.46	508	4.4	43	123	0.67
				8	9	10	11	12	13	14

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	TP-BCP-52-CL	MW-BCP-17	MW-BCP-17	MW-BCP-17	MW-BCP-18	MW-BCP-26A
			Sample Date:	7/29/2021	10/30/2020	11/2/2020	11/2/2020	11/4/2020	6/24/2021
			Sample Interval:	40-inches	0 - 2 in	2 - 6 in	0.5 - 1 ft	0 - 1 ft	2 - 4 ft
			Formation:	Shallow Fill	Surface Soil	Surface Soil	Shallow Fill	Shallow Fill	Fill
TCL SVOCs (SW8270D)									
Benzo(A)Anthracene	5,600	11,000	ug/kg	<61 U	**6300** D	NS	**6400**	**31000**	<67 U
Benzo(A)Pyrene	1,000	1,100	ug/kg	<110 U	**9700** D	NS	**10000**	**43000**	<120 U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<68 U	**10000** D	NS	**11000**	**45000**	<76 U
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<66 U	**3700** D	NS	**3800**	**15000**	<73 U
Chrysene	56,000	110,000	ug/kg	<60 U	**7100** D	NS	**7500**	**32000**	<67 U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<89 U	**1400** DJ	NS	**1500**	**6400** J	<98 U
Fluoranthene	500,000	1,000,000	ug/kg	<110 U	**9500** D	NS	**8500**	**62000**	<120 U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<140 U	**6000** D	NS	**6200**	**28000**	<150 U
Pyrene	500,000	1,000,000	ug/kg	<68 U	**9100** D	NS	**8500**	**51000**	<75 U
TAL Metals (SW6010)									
Arsenic	16	16	mg/kg	**4.9**	**9.7** J	NS	**11.6** J	NS	<8.2 UJ
Barium	400	10,000	mg/kg	**154**	**91.6**	NS	**92.8**	NS	**179** J
Cadmium	9.3	60	mg/kg	**1.2**	**0.511** J	NS	**0.28** J	NS	**0.326** J
Copper	270	10,000	mg/kg	**21.3**	**18.4** J	NS	**18.1** J	NS	**21.9** J
Mercury (SW7471)									
Mercury	2.8	5.7	mg/kg	**0.04** J	**0.046**	NS	**0.025** J	**0.258** J	<0.017 U
Total Cyanide (SW9012B)									
Cyanide	27	10,000	mg/kg	<0.18 U	NS	NS	<0.17 U	**2.15**	**0.87**
				15	16	17	18	19	20

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs: Commercial	Part 375 SCOs: Industrial	Units	MW-BCP-27A	SS-BCP-16	SS-BCP-16	SS-BCP-16	SS-BCP-17	SS-BCP-17	SS-BCP-17
			Sample Date:	6/24/2021	11/13/2020	11/13/2020	11/13/2020	11/13/2020	11/13/2020	11/13/2020
			Sample Interval:	0 - 1 ft	0 - 2 in	2 - 6 in	0.5 - 2 ft	0 - 2 in	2 - 6 in	0.5 - 2 ft
			Formation:	Fill	Surface Soil	Surface Soil	Shallow Fill	Surface Soil	Surface Soil	Shallow Fill
TCL SVOCs (SW8270D)										
Benzo(A)Anthracene	5,600	11,000	ug/kg	17000	200000 D	NS	380000 D	2600 D	NS	32000
Benzo(A)Pyrene	1,000	1,100	ug/kg	23000	350000 D	NS	680000 D	3100 D	NS	36000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	29000	310000 D	NS	600000 D	3700	NS	43000
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	10000	120000 D	NS	230000 D	1300 D	NS	18000
Chrysene	56,000	110,000	ug/kg	19000	210000 D	NS	370000 D	3000 D	NS	43000 D
Dibenz(A,H)Anthracene	560	1,100	ug/kg	4200 J	52000 DJ	NS	100000 DJ	540 DJ	NS	6500 DJ
Fluoranthene	500,000	1,000,000	ug/kg	32000	270000 D	NS	520000 D	5700 D	NS	120000 D
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	19000	240000 D	NS	480000 D	2100 D	NS	29000 D
Pyrene	500,000	1,000,000	ug/kg	26000	260000 D	NS	510000 D	4800 D	NS	85000
TAL Metals (SW6010)										
Arsenic	16	16	mg/kg	5.6 J	5.6	NS	7.1	12	NS	7.8
Barium	400	10,000	mg/kg	184 J	83	NS	56.3	91.7	NS	57.8
Cadmium	9.3	60	mg/kg	0.304 J	0.46 J	NS	0.875	<0.279 U	NS	<0.264 U
Copper	270	10,000	mg/kg	136 J	43.4	NS	30.1	21.2	NS	14.8
Mercury (SW7471)										
Mercury	2.8	5.7	mg/kg	3.5	0.446	NS	0.818	0.046	NS	0.042
Total Cyanide (SW9012B)										
Cyanide	27	10,000	mg/kg	5.53	NS	NS	2.19	NS	NS	0.21 J
				21	22	23	24	25	26	27

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	SS-BCP-15		SS-BCP-15	SS-BCP-15	SS-BCP-14		SS-BCP-14	SS-BCP-140		SS-BCP-140	
			Sample Date:	11/17/2020		11/17/2020	11/17/2020	11/17/2020		11/17/2020	7/27/2021		7/27/2021	
			Sample Interval:	0 - 2 in		2 - 6 in	0.5 - 2 ft	0 - 2 in		2 - 6 in	0 - 2 in		2 - 4 in	
			Formation:	Surface Soil		Surface Soil	Shallow Fill	Surface Soil		Surface Soil	Surface Soil		Surface Soil	
TCL SVOCs (SW8270D)														
Benzo(A)Anthracene	5,600	11,000	ug/kg	**1100**		NS	**2400**	**32000**	D	NS	**21000**		**43000**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**1900**		NS	**3600**	**42000**	D	NS	**26000**		**48000**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**2100**		NS	**4400**	**48000**	D	NS	**29000**		**51000**	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**680**	J	NS	**1600**	**16000**		NS	**11000**		**21000**	
Chrysene	56,000	110,000	ug/kg	**1200**		NS	**2800**	**36000**	D	NS	**21000**		**42000**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<330	U	NS	**550**	**7300**		NS	**3900**	J	**6500**	J
Fluoranthene	500,000	1,000,000	ug/kg	**1800**		NS	**4000**	**56000**	D	NS	**48000**		**120000**	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**1200**		NS	**2500**	**30000**		NS	**18000**		**30000**	
Pyrene	500,000	1,000,000	ug/kg	**1700**		NS	**3900**	**49000**	D	NS	**35000**		**83000**	
TAL Metals (SW6010)														
Arsenic	16	16	mg/kg	**24.6**		NS	**12.7**	**9.9**		NS	**11.1**	J	**11.2**	J
Barium	400	10,000	mg/kg	**80.8**		NS	**51.1**	**89.6**		NS	**121**		**203**	
Cadmium	9.3	60	mg/kg	**1.9**		NS	**0.782**	**0.484**	J	NS	**0.592**	J	**0.361**	J
Copper	270	10,000	mg/kg	**58.6**		NS	**26.5**	**62.8**		NS	**66**	J	**95.8**	J
Mercury (SW7471)														
Mercury	2.8	5.7	mg/kg	**0.227**		NS	**0.34**	**0.531**		NS	**3.3**		**4**	
Total Cyanide (SW9012B)														
Cyanide	27	10,000	mg/kg	NS		NS	**41.8**	NS		NS	**7.93**		**35.8**	
				28		29	30	31		32	21		22	

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	SS-BCP-140		SD-BCP-05		SD-BCP-06		SD-BCP-06		SS-BCP-18		SS-BCP-18		SS-BCP-18	
			Sample Date:	7/27/2021		11/12/2020		11/12/2020		11/12/2020		7/27/2021		7/27/2021		7/27/2021	
			Sample Interval:	2 - 6 in		Sediment		Sediment		DUP (Sediment)		0 - 2 in		2 - 4 in		2 - 6 in	
			Formation:	Surface Soil		Suspect Wetland		Suspect Wetland		Suspect Wetland		Surface Soil		Surface Soil		Surface Soil	
TCL SVOCs (SW8270D)																	
Benzo(A)Anthracene	5,600	11,000	ug/kg	**15000**		<320	U	<750	U	NS		**39000**		**120000**		**9100**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	**18000**		<400	U	<920	U	NS		**45000**		**110000**		**11000**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**21000**		<370	U	<850	U	NS		**50000**		**130000**		**12000**	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**7100**		<400	U	<920	U	NS		**16000**		**43000**		**4100**	
Chrysene	56,000	110,000	ug/kg	**15000**		<400	U	<920	U	NS		**37000**		**110000**		**8400**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**2800**		<330	U	<750	U	NS		**6000**	J	**17000**	J	**1700**	
Fluoranthene	500,000	1,000,000	ug/kg	**31000**		<400	U	<920	U	NS		**93000**		**310000**		**19000**	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**13000**		<370	U	<850	U	NS		**29000**		**64000**		**7200**	
Pyrene	500,000	1,000,000	ug/kg	**26000**		<430	U	<1000	U	NS		**70000**		**220000**		**15000**	
TAL Metals (SW6010)																	
Arsenic	16	16	mg/kg	**8.9**	J	**21.3**		**7.4**		NS		**9.5**	J	**9.8**	J	**13.1**	J
Barium	400	10,000	mg/kg	**129**		**54.8**		**48.6**		NS		**132**		**157**		**141**	
Cadmium	9.3	60	mg/kg	**0.419**	J	**13.5**		**11**		NS		**1.2**		**0.508**	J	**0.452**	J
Copper	270	10,000	mg/kg	**51.6**	J	**48.9**		**292**		NS		**79.3**	J	**89.3**	J	**95.8**	J
Mercury (SW7471)																	
Mercury	2.8	5.7	mg/kg	**2.4**		**0.199**		<0.055	U	NS		**2.5**		**0.759**		**1.2**	
Total Cyanide (SW9012B)																	
Cyanide	27	10,000	mg/kg	**6.99**		**6.33**		**5.2**		NS		**8.4**		**8.8**		**6.07**	
				23		24		25		26		27		28		29	

Table 4-34
Analytical Data - Fill Sample
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	SS-BCP-19	SS-BCP-19	SS-BCP-19	SS-BCP-20	SS-BCP-20	Minimum (Above SCOs)	Maximum	Commercial SCO
			Sample Date:	7/27/2021	7/27/2021	7/27/2021	7/27/2021	7/27/2021			
			Sample Interval:	0 - 2 in	2 - 4 in	2 - 6 in	0 - 2 in	2 - 6 in			
			Formation:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil			
TCL SVOCs (SW8270D)											
Benzo(A)Anthracene	5,600	11,000	ug/kg	**17000**	**26000**	**17000**	**48000**	**97000**	6300	380,000	5,600
Benzo(A)Pyrene	1,000	1,100	ug/kg	**26000**	**29000**	**25000**	**66000**	**130000**	1900	680,000	1,000
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	**29000**	**34000**	**31000**	**73000**	**140000**	10000	600,000	5,600
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	**11000**	**13000**	**10000**	**26000**	**44000**	99000	230,000	56,000
Chrysene	56,000	110,000	ug/kg	**20000**	**28000**	**21000**	**53000**	**110000**	95000	370,000	56,000
Dibenz(A,H)Anthracene	560	1,100	ug/kg	**4300**	**4600** J	**4200**	**10000**	**17000** J	1400	100,000	560
Fluoranthene	500,000	1,000,000	ug/kg	**28000**	**59000**	**31000**	**100000**	**230000**	510000	520,000	500,000
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	**20000**	**20000**	**19000**	**46000**	**86000**	6000	480,000	5,600
Pyrene	500,000	1,000,000	ug/kg	**23000**	**45000**	**26000**	**83000**	**180000**	N.A.	510,000	500,000
TAL Metals (SW6010)											
Arsenic	16	16	mg/kg	**11.5** J	**17.2** J	**13.1** J	**8.2** J	**10.2** J	17.2	48.6	16
Barium	400	10,000	mg/kg	**107**	**152**	**103**	**76.7**	**81.8**	N.A.	3290	400
Cadmium	9.3	60	mg/kg	**0.303** J	**0.455** J	**0.318** J	**0.384** J	**0.365** J	11	13.5	9
Copper	270	10,000	mg/kg	**92.1** J	**147** J	**98.4** J	**43.4** J	**58.6** J	292	319	270
Mercury (SW7471)											
Mercury	2.8	5.7	mg/kg	**0.75**	**1.5**	**0.859**	**0.22**	**0.216**	3.2	16.8	3
Total Cyanide (SW9012B)											
Cyanide	27	10,000	mg/kg	**26.4**	**52.2**	**20.5**	**4.2**	**4.94**	35.8	508	27
				30	31	32	33	34			

Table 4-35
Analytical Data - Clay Samples
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs Commercial	Part 375 SCOs Industrial	Units	TP-BCP-28		TP-BCP-35S-96-9010-0321		TP-BCP-35S-96-9010-0321		TP-BCP-31		TP-BCP-50-CL		MW-BCP-17	
			Sample Date:	10/30/2020		3/4/2021		3/4/2021		10/29/2020		7/28/2021		11/2/2020	
			Sample Interval:	30 - 36 in		96 in		96 in		24-inches		71-inches		5 - 7 ft	
			Formation:	Clay		Clay		Clay		Clay		Clay		Clay	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	<130	U	NS		NS		**250000**	D	<64	U	<140	U
Benzo(A)Pyrene	1,000	1,100	ug/kg	<150	U	NS		NS		**250000**	D	<120	U	<170	U
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<140	U	NS		NS		**230000**	D	<72	U	<160	U
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<150	U	NS		NS		**91000**	DJ	<70	U	<170	U
Chrysene	56,000	110,000	ug/kg	<150	U	NS		NS		**210000**	DJ	<63	U	<170	U
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<130	U	NS		NS		**31000**	DJ	<93	U	<140	U
Fluoranthene	500,000	1,000,000	ug/kg	<150	U	NS		NS		**740000**	D	<110	U	<170	U
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<140	U	NS		NS		**130000**	D	<140	U	<160	U
Naphthalene	500,000	1,000,000	ug/kg	<110	U	NS		NS		**1700000**	D	<80	U	<130	U
Phenanthrene	500,000	1,000,000	ug/kg	<120	U	NS		NS		**1100000**	D	<61	U	<140	U
Pyrene	500,000	1,000,000	ug/kg	<170	U	NS		NS		**510000**	D	<71	U	<190	U

Table 4-35
Analytical Data - Clay Samples
AOI 7
Riverview Innovation Technology Campus
Town of Tonawanda, New York

Analytes	Part 375 SCOs		Units	MW-BCP-17		MW-BCP-18		MW-BCP-18		MW-BCP-18		MW-BCP-26A		MW-BCP-27A	
	Commercial	Industrial													
			Sample Date:	11/2/2020		11/4/2020		11/4/2020		11/4/2020		6/24/2021		6/24/2021	
			Sample Interval:	8 - 10 ft		4 - 6 ft		7 - 8 ft		18 - 20 ft		5 - 6 ft		7 - 8 ft	
			Formation:	Clay		Clay		Clay		Clay		Clay		Clay	
TCL SVOCs (SW8270D)															
Benzo(A)Anthracene	5,600	11,000	ug/kg	<160	U	<140	U	<130	U	<120	U	<64	U	**620**	
Benzo(A)Pyrene	1,000	1,100	ug/kg	<200	U	<170	U	<150	U	<150	U	<120	U	**650**	
Benzo(B)Fluoranthene	5,600	11,000	ug/kg	<180	U	<160	U	<140	U	<140	U	<71	U	**690**	
Benzo(K)Fluoranthene	56,000	110,000	ug/kg	<200	U	<170	U	<150	U	<150	U	<69	U	**270**	J
Chrysene	56,000	110,000	ug/kg	<200	U	<170	U	<150	U	<150	U	<63	U	**590**	
Dibenz(A,H)Anthracene	560	1,100	ug/kg	<160	U	<140	U	<130	U	<120	U	<93	U	<95	U
Fluoranthene	500,000	1,000,000	ug/kg	<200	U	<170	U	<150	U	<150	U	<110	U	**1600**	
Indeno(1,2,3-C,D)Pyrene	5,600	11,000	ug/kg	<180	U	<160	U	<140	U	<140	U	<140	U	**390**	J
Naphthalene	500,000	1,000,000	ug/kg	<140	U	<120	U	<110	U	<110	U	<80	UJ	**330**	J
Phenanthrene	500,000	1,000,000	ug/kg	<160	U	<140	U	<120	U	<120	U	<61	U	**1100**	
Pyrene	500,000	1,000,000	ug/kg	<220	U	<190	U	<170	U	<160	U	<71	U	**1200**	

Table 4-36
Groundwater Sample Data - Fill Zone Wells
AOI 7
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New york

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-17A		MW-BCP-18A		MW-BCP-18A		MW-BCP-27A		MW-BCP-27A		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	9/22/2021		1/13/2021		9/22/2021		9/24/2021		11/15/2021				
		Screen Interval (ft bgs):	2.0 - 4.0		2.0 - 4.0		2.0 - 4.0		3.0 - 5.5		3.0 - 5.5				
		Screened Formation:	Fill		Fill		Fill		Fill		Fill				
TCL SVOCs (SW8270D)															
Anthracene	50	ug/l	<1.3	U	<1.2	U	<1.4	U	**52**	J	**53**		**52**	**53**	**50**
Benzo(A)Anthracene	0.002	ug/l	<1.6	U	<1.5	U	<1.7	U	**68**	J	**98**		**68**	**98**	**0.002**
Benzo(B)Fluoranthene	0.002	ug/l	<1.2	U	<1.1	U	<1.3	U	**77**	J	**120**		**77**	**120**	**0.002**
Benzo(K)Fluoranthene	0.002	ug/l	<1.3	U	<1.1	U	<1.4	U	**27**	J	**37**		**27**	**37**	**0.002**
Biphenyl (Diphenyl)	5	ug/l	<1.4	U	<1.3	U	<1.5	U	**7**	J	**7.7**	J	**7**	**7.7**	**5**
Chrysene	0.002	ug/l	<1.2	U	<1.1	U	<1.3	U	**67**	J	**77**		**67**	**77**	**0.002**
Fluoranthene	50	ug/l	<1.5	U	<1.4	U	<1.6	U	**200**	J	**220**		**200**	**220**	**50**
Fluorene	50	ug/l	<1.3	U	<1.2	U	<1.4	U	**60**	J	**52**		**52**	**60**	**50**
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.8	U	<1.6	U	<1.9	U	**40**	J	**76**		**40**	**76**	**0.002**
Naphthalene	10	ug/l	<1.2	U	<1.1	U	<1.3	U	**84**		**67**		**67**	**84**	**10**
Pentachlorophenol	1	ug/l	<9.7	U	<8.9	U	<11	U	<9.7	U	**1.2**	J		**1.2**	**1**
Phenanthrene	50	ug/l	<1.4	U	<1.3	U	<1.5	U	**180**	J	**190**		**180**	**190**	**50**
Phenol	1	ug/l	<1.0	U	<0.91	U	<1.1	U	<1.0	U	<0.57	U			
Pyrene	50	ug/l	<1.5	U	<1.3	U	<1.6	U	**140**	J	**160**		**140**	**160**	**50**
TAL Metals (SW6010)															
Arsenic	25	ug/l	NS		NS		NS		**74.4**		**16**			**74.4**	**25**
Chromium, Total	50	ug/l	NS		NS		NS		**67.4**		**8**	J		**67.4**	**50**
Iron	300	ug/l	NS		NS		NS		**192000**		**106000**		**106000**	**192000**	**300**
Lead	25	ug/l	NS		NS		NS		**472**		**120**		**120**	**472**	**25**
Manganese	300	ug/l	NS		NS		NS		**847**		**661**		**661**	**847**	**300**
Mercury (SW7470)															
Mercury	0.7	ug/l	NS		NS		NS		**4.6**		**3.82**		**3.82**	**4.6**	**0.7**
Cyanide (SW9012B/ KELADA-01)															
Cyanide	0.20	mg/l	<0.040	U	**0.48**		**0.248**		**9.25**		**16.0**		**0.248**	**16**	**0.2**
Ammonia (E350.1)															
Nitrogen, Ammonia (As N)	2	mg/l	NS		NS		NS		**5.90**		**11.4**		**5.9**	**11.4**	**2**

Date:3/9/2022

Table 4-37
Groundwater Sample Data - Clay Zones (B C)
AOI 7
Riverview Innovation Technology Campus, Inc.
Site # C915353
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-17B		MW-BCP-17B		MW-BCP-18B		MW-BCP-18B		MW-BCP-19B		MW-BCP-19B		MW-BCP-26B		Minimum above GA WQS	Maximum above GA WQS	GA WQS
		Sample Date	1/13/2021		9/21/2021		1/13/2021		9/21/2021		1/12/2021		9/22/2021		9/22/2021				
		Screen Interval (ft bgs):	10 - 20		10 - 20		10 - 20		10 - 20		10 - 20		10 - 20		9 - 19				
		Screened Formation:	Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay		Upper Clay				
TCL VOCs (SW8260C)																			
Acetone	50	ug/l	**110**		<5.0	U	<5.0	U	<5.0	U	<250	U	<250	U	<5.0	U		**110**	**50**
Benzene	1	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	**28**	J	<10	U	<0.20	U		**28**	**1**
Chloroform	7	ug/l	<1.2	U	<0.24	U	<0.24	U	<0.24	U	**12**	J	<12	U	<0.24	U		**12**	**7**
Ethylbenzene	5	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	**14**	J	<10	U	<0.20	U		**14**	**5**
Styrene	5	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	<10	U	<10	U	<0.20	U		**0**	**5**
Toluene	5	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	**59**	J	**21**	J	<0.20	U		**59**	**5**
m,p-Xylene	5	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	**190**	J	**70**	J	<0.20	U		**190**	**5**
O-Xylene (1,2-Dimethylbenzene)	5	ug/l	<1.0	U	<0.20	U	<0.20	U	<0.20	U	**150**	J	**46**	J	<0.20	U		**150**	**5**
TCL SVOCs (SW8270D)																			
Benzo(A)Anthracene	0.002	ug/l	<1.5	U	<1.6	U	<1.5	U	<1.6	U	**15**		**9.4**		<1.6	U		**15**	**0.002**
Benzo(B)Fluoranthene	0.002	ug/l	<1.1	U	<1.2	U	<1.1	U	<1.2	U	**13**		**8.3**	J	<1.2	U		**13**	**0.002**
Benzo(K)Fluoranthene	0.002	ug/l	<1.1	U	<1.3	U	<1.1	U	<1.3	U	**5**	J	**3.9**	J	<1.3	U		**5**	**0.002**
Biphenyl (Diphenyl)	5	ug/l	<1.3	U	<1.4	U	<1.3	U	<1.4	U	**33**		**42**		<1.4	U		**42**	**5**
Chrysene	0.002	ug/l	<1.1	U	<1.2	U	<1.1	U	<1.2	U	**13**		**10**		<1.2	U		**13**	**0.002**
Fluoranthene	50	ug/l	<1.4	U	<1.5	U	<1.4	U	<1.5	U	**56**		**45**		<1.5	U		**56**	**50**
Fluorene	50	ug/l	<1.2	U	<1.3	U	<1.2	U	<1.3	U	**87**		**110**		<1.3	U		**110**	**50**
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<1.6	U	<1.8	U	<1.6	U	<1.8	U	**6.2**	J	**4.3**	J	<1.8	U		**6.2**	**0.002**
Naphthalene	10	ug/l	<1.1	U	<1.2	U	<1.1	U	<1.2	U	**6000**	D	**5300**	D	<1.2	U		**6000**	**10**
Phenanthrene	50	ug/l	<1.3	U	<1.4	U	<1.3	U	<1.4	U	**130**		**140**		<1.4	U		**140**	**50**
Phenol	1	ug/l	<0.91	U	<1.0	U	<0.91	U	<1.0	U	**7.2**	J	<1.0	U	<1.0	U		**7.2**	**1**
TAL Metals (SW6010)																			
Iron	300	ug/l	NS		NS		NS		NS		NS		NS		**1480**	J		**1480**	**300**
Magnesium	35,000	ug/l	NS		NS		NS		NS		NS		NS		**359000**			**359000**	**35000**
Sodium	20,000	ug/l	NS		NS		NS		NS		NS		NS		**99600**			**99600**	**20000**
Thallium	0.5	ug/l	NS		NS		NS		NS		NS		NS		**7**	J		**7**	**0.5**
Cyanide (SW9012B/ KELADA-01)																			
Cyanide	0.20	mg/l	**0.0076**	J	<0.040	U	**0.0305**	J	**0.046**	J	**6.23**		NS		**0.093**			**6.23**	**0.2**
Ammonia (E350.1)																			
Nitrogen, Ammonia (As N)	2	mg/l	NS		NS		NS		NS		NS		**2.49**		NS			**2.49**	**2**

Date:5/14/2024

Table 4-38
Radiological Screening
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Radiological Background Activity	Units	TP-BCP-34-A		TP-BCP-34-B		TP-BCP-32-W45		TP-BCP-44-A		TP-BCP-44-B		TP-BCP-47	
		Sample Date	10/30/2020		10/30/2020		11/9/2020		11/13/2020		11/13/2020		11/18/2020	
		Location:	TP-BCP-34		TP-BCP-34		TP-BCP-32		TP-BCP-44		TP-BCP-44		TP-BCP-47	
Gross Alpha & Beta (SW9310)														
Gross Alpha		pCi/g	50.9		54.9		7.73		23.3		26.3		44.3	
Gross Beta		pCi/g	16.7		24.3		6.48		9.51		10.2		24.7	
Gamma Emitting Radionucleotides (E901.1)														
Actinium-227		pCi/g	<2.95	U	<2.72	U	<0.082	U	<1.85	U	<1.57	U	<1.29	
Actinium-228		pCi/g	<1.51	U	<1.1	U	0.735		1.07		1.22		2.58	
Bismuth-212		pCi/g	<7.53	U	<6.29	U	1.86	U	<2.88	U	<3.13	U	3.9	
Bismuth-214		pCi/g	4.46		3.7		0.515		2.99		3.26		3.79	
Lead-210		pCi/g	5.42		4.06		<1.48	U	3.16		2.4		2.73	
Lead-212		pCi/g	1.48		1.28		0.409		0.815		0.961		2.77	
Lead-214		pCi/g	4.08		3.79		0.481		2.62		3.29		3.63	
Potassium-40		pCi/g	<4.16	U	<5.65	U	3.62		2.89		2.28		14.1	
Protactinium-231		pCi/g	<18.7	U	<16.9	U	<4.94	U	<10.8	U	<10.8	U	<8.84	U
Radium-226		pCi/g	4.46		3.7		0.515		2.99		3.26		3.79	
Radium-228		pCi/g	<1.51	U	<1.1	U	0.735		1.07		1.22		2.58	
Thallium-208		pCi/g	0.386		0.561		0.198		0.336		0.33		1	
Thorium-232	1.5	pCi/g	<1.51	U	<1.1	U	0.735		1.07		1.22		2.58	
Thorium-234		pCi/g	5.04		2.73		0.851		2.42		3.5		1.59	
Uranium-235		pCi/g	<3.04	U	<2.24	U	<0.852	U	<1.25	U	<1.29	U	<1.52	U
Uranium-238	1.5	pCi/g	5.04		2.73		0.851		2.42		3.5		1.59	
Gamma Radio Assay (A-01-R)														
Thorium-228		pCi/g	1.91		0.681		2.4		0.323		0.892		2.03	
Thorium-229		%	75		72.1		81.4		81.3		81.1		73.5	
Thorium-230		pCi/g	4.22		2.25		5.09		0.471		3.69		3.09	
Thorium-232		pCi/g	1.36		0.737		1.58		0.322		0.783		1.95	
Uranium-232		%	81.8		82		87.6		77.7		80.7		81.6	
Uranium-234		pCi/g	3.12		4		0.593		2.34		4.49		3.41	
Uranium-235		pCi/g	0.0904		0.196		<0.0615	U	0.106		0.297		0.246	
Uranium-238		pCi/g	3.12		4.06		0.474		2.31		4.35		3.29	

Date: 3/9/2022

Table 4-40
Supplemental Sampling
SOVCs and Dissoloved SVOCs Analyses May 2022
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-05A-05262022		MW-BCP-100A-05252022		MW-BCP-12A-05252022	
		Sample Date	5/26/2022		5/25/2022		5/25/2022	
		Location:	MW-BCP-05A		MW-BCP-12A-DUPE		MW-BCP-12A	
		Sample Type:	Shallow Groundwater		Shallow Groundwater		Shallow Groundwater	
TCL SVOCs (SW8270D) Unfiltered - GC/MS								
1,2,4,5-Tetrachlorobenzene	5	ug/l	NS		NS	U	NS	
2,3,4,6-Tetrachlorophenol		ug/l	NS		NS	U	NS	
2,4,5-Trichlorophenol		ug/l	<4.8	U	<0.48	U	<2.4	UHT
2,4,6-Trichlorophenol		ug/l	<6.1	U	<0.61	U	<3.1	UHT
2,4-Dichlorophenol	5	ug/l	<5.1	U	<0.51	U	<2.6	UHT
2,4-Dimethylphenol	50	ug/l	**120**		<0.50	U	<2.5	UHT
2,4-Dinitrophenol	10	ug/l	<22	U	<2.2	U	<11	UHT
2,4-Dinitrotoluene	5	ug/l	<4.5	U	<0.45	U	<2.2	UHT
2,6-Dinitrotoluene	5	ug/l	<4.0	U	<0.40	U	<2.0	UHT
2-Chloronaphthalene	10	ug/l	<4.6	U	<0.46	U	<2.3	UHT
2-Chlorophenol		ug/l	<5.3	U	<0.53	U	<2.7	UHT
2-Methylnaphthalene		ug/l	**29**	J	<0.60	U	<3.0	UHT
2-Methylphenol (O-Cresol)		ug/l	**180**		<0.40	U	<2.0	UHT
2-Nitroaniline	5	ug/l	<4.2	U	<0.42	U	<2.1	UHT
2-Nitrophenol		ug/l	<4.8	U	<0.48	U	<2.4	UHT
3,3'-Dichlorobenzidine	5	ug/l	<4.0	U	<0.40	U	<2.0	UHT
4-Methylphenol (P-Cresol)		ug/l	**33**	J	<0.36	U	<1.8	UHT
3-Nitroaniline	5	ug/l	<4.8	U	<0.48	U	<2.4	UHT
4,6-Dinitro-2-Methylphenol		ug/l	<22	U	<2.2	U	<11	UHT
4-Bromophenyl Phenyl Ether		ug/l	<4.5	U	<0.45	U	<2.3	UHT
4-Chloro-3-Methylphenol		ug/l	<4.5	U	<0.45	U	<2.3	UHT
4-Chloroaniline	5	ug/l	<5.9	U	<0.59	U	<3.0	UHT
4-Chlorophenyl Phenyl Ether		ug/l	<3.5	U	<0.35	U	<1.8	UHT
4-Nitroaniline	5	ug/l	<2.5	U	<0.25	U	<1.3	UTHT
4-Nitrophenol		ug/l	<15	U	<1.5	U	<7.6	UHT
Acenaphthene	20	ug/l	**12**	J	<0.41	U	<2.1	UHT
Acenaphthylene		ug/l	**15**	J	<0.38	U	<1.9	UHT
Acetophenone		ug/l	**19**	J	<0.54	U	<2.7	UHT
Anthracene	50	ug/l	<2.8	U	<0.28	U	<1.4	UHT
Atrazine	7.5	ug/l	<4.6	U	<0.46	U	<2.3	UHT
Benzo(A)Anthracene	0.002	ug/l	<3.6	U	<0.36	U	<1.8	UHT
Benzaldehyde		ug/l	<2.7	U	<0.27	U	<1.3	UHT
Benzo(A)Pyrene		ug/l	<4.7	U	<0.47	U	<2.4	UHT
Benzo(B)Fluoranthene	0.002	ug/l	<3.4	U	<0.34	U	<1.7	UHT
Benzo(G,H,I)Perylene		ug/l	<3.5	U	<0.35	U	<1.8	UHT
Benzo(K)Fluoranthene	0.002	ug/l	<7.3	U	<0.73	U	<3.7	UHT
Biphenyl (Diphenyl)	5	ug/l	<6.5	U	<0.65	U	<3.3	UHT
Bis(2-Chloroisopropyl) Ether	5	ug/l	<5.2	U	<0.52	U	<2.6	UHT
Bis(2-Chloroethoxy) Methane	5	ug/l	<3.5	U	<0.35	U	<1.8	UHT
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	1	ug/l	<4.0	U	<0.40	U	<2.0	UHT
Bis(2-Ethylhexyl) Phthalate	5	ug/l	<22	U	<2.2	U	<11	UHT
Benzyl Butyl Phthalate	50	ug/l	<10	U	<1.0	U	<5.0	UHT
Caprolactam		ug/l	<22	U	<2.2	U	<11	UHT
Carbazole		ug/l	**4.0**	J	<0.30	U	<1.5	UTHT
Chrysene	0.002	ug/l	<3.3	U	<0.33	U	<1.7	UHT
Di-N-Butyl Phthalate	50	ug/l	<3.1	U	<0.31	U	<1.6	UHT
Di-N-Octylphthalate	50	ug/l	<4.7	U	<0.47	U	<2.4	UHT
Dibenz(A,H)Anthracene		ug/l	<4.2	U	<0.42	U	<2.1	UHT
Dibenzofuran		ug/l	<5.1	U	<0.51	U	<2.6	UHT
Diethyl Phthalate	50	ug/l	<2.2	U	<0.22	U	<1.1	UHT
Dimethyl Phthalate	50	ug/l	<3.6	U	<0.36	U	<1.8	UHT
Fluoranthene	50	ug/l	<4.0	U	**0.82**	J	<2.0	UHT
Fluorene	50	ug/l	**4.9**	J	<0.36	U	<1.8	UHT
Hexachlorobenzene	0.04	ug/l	<5.1	U	<0.51	U	<2.6	UHT
Hexachlorobutadiene	0.5	ug/l	<6.8	U	<0.68	U	<3.4	UHT
Hexachlorocyclopentadiene	5	ug/l	<5.9	U	<0.59	U	<3.0	UHT
Hexachloroethane	5	ug/l	<5.9	U	<0.59	U	<3.0	UHT
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<4.7	U	<0.47	U	<2.4	UHT
Isophorone	50	ug/l	<4.3	U	<0.43	U	<2.2	UHT
N-Nitrosodi-N-Propylamine		ug/l	<5.4	U	<0.54	U	<2.7	UHT
N-Nitrosodiphenylamine	50	ug/l	<5.1	U	<0.51	U	<2.6	UHT
Naphthalene	10	ug/l	**1400**		<0.76	U	<3.8	UHT
Nitrobenzene	0.4	ug/l	<2.9	U	<0.29	U	<1.5	UHT
Pentachlorophenol	1	ug/l	<22	U	<2.2	U	<11	UHT
Phenanthrene	50	ug/l	**4.7**	J	<0.44	U	<2.2	UHT
Phenol	1	ug/l	**12**	J	<0.39	U	<2.0	UHT
Pyrene	50	ug/l	<3.4	U	**0.77**	J	<1.7	UHT

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-05A-05262022		MW-BCP-100A-05252022		MW-BCP-12A-05252022	
		Sample Date	5/26/2022		5/25/2022		5/25/2022	
		Location:	MW-BCP-05A		MW-BCP-12A-DUPE		MW-BCP-12A	
		Sample Type:	Shallow Groundwater		Shallow Groundwater		Shallow Groundwater	
TCL SVOCs (SW8270D) Dissolved								
1,2,4,5-Tetrachlorobenzene	5	ug/l	NS		NS		NS	
2,3,4,6-Tetrachlorophenol		ug/l	NS		NS		NS	
2,4,5-Trichlorophenol		ug/l	<48	U	<0.48	UHT	<2.4	U
2,4,6-Trichlorophenol		ug/l	<61	U	<0.61	UHT	<3.1	U
2,4-Dichlorophenol	5	ug/l	<51	U	<0.51	UHT	<2.6	U
2,4-Dimethylphenol	50	ug/l	**110**	J	<0.50	UHT	<2.5	U
2,4-Dinitrophenol	10	ug/l	<220	U	<2.2	UHT	<11	U
2,4-Dinitrotoluene	5	ug/l	<45	U	<0.45	UHT	<2.2	U
2,6-Dinitrotoluene	5	ug/l	<40	U	<0.40	UHT	<2.0	U
2-Chloronaphthalene	10	ug/l	<46	U	<0.46	UHT	<2.3	U
2-Chlorophenol		ug/l	<53	U	<0.53	UHT	<2.7	U
2-Methylnaphthalene		ug/l	<60	U	<0.60	UHT	<3.0	U
2-Methylphenol (O-Cresol)		ug/l	**190**	J	<0.40	UHT	<2.0	U
2-Nitroaniline	5	ug/l	<42	U	<0.42	UHT	<2.1	U
2-Nitrophenol		ug/l	<48	U	<0.48	UHT	<2.4	U
3,3'-Dichlorobenzidine	5	ug/l	<40	U	<0.40	UHT	<2.0	U
4-Methylphenol (P-Cresol)		ug/l	<36	U	<0.36	UHT	<1.8	U
3-Nitroaniline	5	ug/l	<48	U	<0.48	UHT	<2.4	U
4,6-Dinitro-2-Methylphenol		ug/l	<220	U	<2.2	UHT	<11	U
4-Bromophenyl Phenyl Ether		ug/l	<45	U	<0.45	UHT	<2.3	U
4-Chloro-3-Methylphenol		ug/l	<45	U	<0.45	UHT	<2.3	U
4-Chloroaniline	5	ug/l	<59	U	<0.59	UHT	<3.0	U
4-Chlorophenyl Phenyl Ether		ug/l	<35	U	<0.35	UHT	<1.8	U
4-Nitroaniline	5	ug/l	<25	UT	<0.25	UTHT	<1.3	U
4-Nitrophenol		ug/l	<150	U	<1.5	UHT	<7.6	U
Acenaphthene	20	ug/l	<41	U	<0.41	UHT	<2.1	U
Acenaphthylene		ug/l	<38	U	<0.38	UHT	<1.9	U
Acetophenone		ug/l	<54	U	<0.54	UHT	<2.7	U
Anthracene	50	ug/l	<28	U	<0.28	UHT	<1.4	U
Atrazine	7.5	ug/l	<46	U	<0.46	UHT	<2.3	U
Benzo(A)Anthracene	0.002	ug/l	<36	U	<0.36	UHT	<1.8	U
Benzaldehyde		ug/l	<27	U	<0.27	UHT	<1.3	U
Benzo(A)Pyrene		ug/l	<47	U	<0.47	UHT	<2.4	U
Benzo(B)Fluoranthene	0.002	ug/l	<34	U	<0.34	UHT	<1.7	U
Benzo(G,H,I)Perylene		ug/l	<35	U	<0.35	UHT	<1.8	U
Benzo(K)Fluoranthene	0.002	ug/l	<73	U	<0.73	UHT	<3.7	U
Biphenyl (Diphenyl)	5	ug/l	<65	U	<0.65	UHT	<3.3	U
Bis(2-Chloroisopropyl) Ether	5	ug/l	<52	U	<0.52	UHT	<2.6	U
Bis(2-Chloroethoxy) Methane	5	ug/l	<35	U	<0.35	UHT	<1.8	U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	1	ug/l	<40	U	<0.40	UHT	<2.0	U
Bis(2-Ethylhexyl) Phthalate	5	ug/l	<220	U	<2.2	UHT	<11	U
Benzyl Butyl Phthalate	50	ug/l	<100	U	<1.0	UHT	<5.0	U
Caprolactam		ug/l	<220	U	<2.2	UHT	<11	U
Carbazole		ug/l	<30	UT	<0.30	UTHT	<1.5	U
Chrysene	0.002	ug/l	<33	U	<0.33	UHT	<1.7	U
Di-N-Butyl Phthalate	50	ug/l	<31	U	<0.31	UHT	<1.6	U
Di-N-Octylphthalate	50	ug/l	<47	U	<0.47	UHT	<2.4	U
Dibenz(A,H)Anthracene		ug/l	<42	U	<0.42	UHT	<2.1	U
Dibenzofuran		ug/l	<51	U	<0.51	UHT	<2.6	U
Diethyl Phthalate	50	ug/l	<22	U	<0.22	UHT	<1.1	U
Dimethyl Phthalate	50	ug/l	<36	U	<0.36	UHT	<1.8	U
Fluoranthene	50	ug/l	<40	U	<0.40	UHT	<2.0	U
Fluorene	50	ug/l	<36	U	<0.36	UHT	<1.8	U
Hexachlorobenzene	0.04	ug/l	<51	U	<0.51	UHT	<2.6	U
Hexachlorobutadiene	0.5	ug/l	<68	U	<0.68	UHT	<3.4	U
Hexachlorocyclopentadiene	5	ug/l	<59	U	<0.59	UHT	<3.0	U
Hexachloroethane	5	ug/l	<59	U	<0.59	UHT	<3.0	U
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<47	U	<0.47	UHT	<2.4	U
Isophorone	50	ug/l	<43	U	<0.43	UHT	<2.2	U
N-Nitrosodi-N-Propylamine		ug/l	<54	U	<0.54	UHT	<2.7	U
N-Nitrosodiphenylamine	50	ug/l	<51	U	<0.51	UHT	<2.6	U
Naphthalene	10	ug/l	**1300**		**2.9**	JHT	<3.8	U
Nitrobenzene	0.4	ug/l	<29	U	<0.29	UHT	<1.5	U
Pentachlorophenol	1	ug/l	<220	U	<2.2	UHT	<11	U
Phenanthrene	50	ug/l	<44	U	<0.44	UHT	<2.2	U
Phenol	1	ug/l	<39	U	<0.39	UHT	<2.0	U
Pyrene	50	ug/l	<34	U	<0.34	UHT	<1.7	U

Table 4-40
Supplemental Sampling
SOVCs and Dissoloved SVOCs Analyses May 2022
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-13A-05252022		MW-BCP-13B-05252022		MW-BCP-19A-05262022	
		Sample Date	5/25/2022		5/25/2022		5/26/2022	
		Location:	MW-BCP-13A		MW-BCP-13B		MW-BCP-19A	
		Sample Type:	Shallow Groundwater		Upper Clay Groundwater		Shallow Groundwater	
TCL SVOCs (SW8270D) Unfiltered - GC/MS								
1,2,4,5-Tetrachlorobenzene	5	ug/l	NS		NS		NS	
2,3,4,6-Tetrachlorophenol		ug/l	NS		NS		NS	
2,4,5-Trichlorophenol		ug/l	<2.4	U	<4.8	U	<4.8	U
2,4,6-Trichlorophenol		ug/l	<3.1	U	<6.1	U	<6.1	U
2,4-Dichlorophenol	5	ug/l	<2.6	U	<5.1	U	<5.1	U
2,4-Dimethylphenol	50	ug/l	**71**		**46**	J	**1600**	
2,4-Dinitrophenol	10	ug/l	<11	U	<22	U	<22	U
2,4-Dinitrotoluene	5	ug/l	<2.2	U	<4.5	U	<4.5	U
2,6-Dinitrotoluene	5	ug/l	<2.0	U	<4.0	U	<4.0	U
2-Chloronaphthalene	10	ug/l	<2.3	U	<4.6	U	<4.6	U
2-Chlorophenol		ug/l	<2.7	U	<5.3	U	<5.3	U
2-Methylnaphthalene		ug/l	**140**		**1000**	J	**540**	
2-Methylphenol (O-Cresol)		ug/l	**83**		**31**	J	**1900**	
2-Nitroaniline	5	ug/l	<2.1	U	<4.2	U	<4.2	U
2-Nitrophenol		ug/l	<2.4	U	<4.8	U	<4.8	U
3,3'-Dichlorobenzidine	5	ug/l	<2.0	U	<4.0	U	<4.0	U
4-Methylphenol (P-Cresol)		ug/l	**230**		**74**	J	**2900**	
3-Nitroaniline	5	ug/l	<2.4	U	<4.8	U	<4.8	U
4,6-Dinitro-2-Methylphenol		ug/l	<11	U	<22	U	<22	U
4-Bromophenyl Phenyl Ether		ug/l	<2.3	U	<4.5	U	<4.5	U
4-Chloro-3-Methylphenol		ug/l	<2.3	U	<4.5	U	<4.5	U
4-Chloroaniline	5	ug/l	<3.0	U	<5.9	U	<5.9	U
4-Chlorophenyl Phenyl Ether		ug/l	<1.8	U	<3.5	U	<3.5	U
4-Nitroaniline	5	ug/l	<1.3	U	<2.5	U	<2.5	U
4-Nitrophenol		ug/l	<7.6	U	<15	U	<15	U
Acenaphthene	20	ug/l	**20**	J	**37**	J	<4.1	U
Acenaphthylene		ug/l	**120**		**420**		**170**	
Acetophenone		ug/l	<2.7	U	<5.4	U	<5.4	U
Anthracene	50	ug/l	**22**	J	<2.8	U	<2.8	U
Atrazine	7.5	ug/l	<2.3	U	<4.6	U	<4.6	U
Benzo(A)Anthracene	0.002	ug/l	<1.8	U	**11**	J	<3.6	U
Benzaldehyde		ug/l	<1.3	U	<2.7	U	**3.6**	J
Benzo(A)Pyrene		ug/l	<2.4	U	**7.3**	J	<4.7	U
Benzo(B)Fluoranthene	0.002	ug/l	<1.7	U	**8.7**	J	<7.3	U
Benzo(G,H,I)Perylene		ug/l	<1.8	U	**3.9**	J	<3.5	U
Benzo(K)Fluoranthene	0.002	ug/l	<3.7	U	<7.3	U	<7.3	U
Biphenyl (Diphenyl)	5	ug/l	**37**		**84**		**85**	
Bis(2-Chloroisopropyl) Ether	5	ug/l	<2.6	U	<5.2	U	<5.2	U
Bis(2-Chloroethoxy) Methane	5	ug/l	<1.8	U	<3.5	U	<3.5	U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	1	ug/l	<2.0	U	<4.0	U	<4.0	U
Bis(2-Ethylhexyl) Phthalate	5	ug/l	<11	U	<22	U	<22	U
Benzyl Butyl Phthalate	50	ug/l	<5.0	U	<10	U	<10	U
Caprolactam		ug/l	<11	U	<22	U	<22	U
Carbazole		ug/l	**45**		**180**		**370**	
Chrysene	0.002	ug/l	<1.7	U	**10**	J	<3.3	U
Di-N-Butyl Phthalate	50	ug/l	<1.6	U	<3.1	U	<3.1	U
Di-N-Octylphthalate	50	ug/l	<2.4	U	<4.7	U	<4.7	U
Dibenz(A,H)Anthracene		ug/l	<2.1	U	<4.2	U	<4.2	U
Dibenzofuran		ug/l	**110**		**180**		**160**	
Diethyl Phthalate	50	ug/l	<1.1	U	<2.2	U	<2.2	U
Dimethyl Phthalate	50	ug/l	<1.8	U	<3.6	U	<3.6	U
Fluoranthene	50	ug/l	**22**	J	**51**		**14**	J
Fluorene	50	ug/l	**160**		**180**		**150**	
Hexachlorobenzene	0.04	ug/l	<2.6	U	<5.1	U	<5.1	U
Hexachlorobutadiene	0.5	ug/l	<3.4	U	<6.8	U	<6.8	U
Hexachlorocyclopentadiene	5	ug/l	<3.0	U	<5.9	U	<5.9	U
Hexachloroethane	5	ug/l	<3.0	U	<5.9	U	<5.9	U
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<2.4	U	<4.7	U	<4.7	U
Isophorone	50	ug/l	<2.2	U	<4.3	U	<4.3	U
N-Nitrosodi-N-Propylamine		ug/l	<2.7	U	<5.4	U	<5.4	U
N-Nitrosodiphenylamine	50	ug/l	<2.6	U	<5.1	U	<5.1	U
Naphthalene	10	ug/l	**4500**		**18000**		**12000**	
Nitrobenzene	0.4	ug/l	<1.5	U	<2.9	U	<2.9	U
Pentachlorophenol	1	ug/l	<11	U	<22	U	<22	U
Phenanthrene	50	ug/l	**180**		**190**		**110**	
Phenol	1	ug/l	**47**		**11**	J	**3300**	
Pyrene	50	ug/l	**13**	J	**34**	J	**9.0**	J

Table 4-40
Supplemental Sampling
SOVCs and Dissoloved SVOCs Analyses May 2022
Riverview Innovation Technology Campus, Inc.
Town of Tonawanda, New York

Analytes	Class GA Ambient Water Quality Standards and Guidance Values	Units	MW-BCP-13A-05252022		MW-BCP-13B-05252022		MW-BCP-19A-05262022	
		Sample Date	5/25/2022		5/25/2022		5/26/2022	
		Location:	MW-BCP-13A		MW-BCP-13B		MW-BCP-19A	
		Sample Type:	Shallow Groundwater		Upper Clay Groundwater		Shallow Groundwater	
TCL SVOCs (SW8270D) Dissolved								
1,2,4,5-Tetrachlorobenzene	5	ug/l	NS		NS		NS	
2,3,4,6-Tetrachlorophenol		ug/l	NS		NS		NS	
2,4,5-Trichlorophenol		ug/l	<48	UHT	<96	UHT	<96	U
2,4,6-Trichlorophenol		ug/l	<61	UHT	<120	UHT	<120	U
2,4-Dichlorophenol	5	ug/l	<51	UHT	<100	UHT	<100	U
2,4-Dimethylphenol	50	ug/l	**93**	JHT	<100	UHT	**1300**	
2,4-Dinitrophenol	10	ug/l	<220	UHT	<440	UHT	<440	U
2,4-Dinitrotoluene	5	ug/l	<45	UHT	<89	UHT	<89	U
2,6-Dinitrotoluene	5	ug/l	<40	UHT	<80	UHT	<80	U
2-Chloronaphthalene	10	ug/l	<46	UHT	<92	UHT	<92	U
2-Chlorophenol		ug/l	<53	UHT	<110	UHT	<110	U
2-Methylnaphthalene		ug/l	**130**	JHT	**750**	JHT	**580**	J
2-Methylphenol (O-Cresol)		ug/l	**110**	JHT	<80	UHT	**1400**	
2-Nitroaniline	5	ug/l	<42	UHT	<84	UHT	<84	U
2-Nitrophenol		ug/l	<48	UHT	<96	UHT	<96	U
3,3'-Dichlorobenzidine	5	ug/l	<40	UHT	<80	UHT	<80	U
4-Methylphenol (P-Cresol)		ug/l	**330**	JHT	<72	UHT	**2000**	
3-Nitroaniline	5	ug/l	<48	UHT	<96	UTHT	<96	U
4,6-Dinitro-2-Methylphenol		ug/l	<220	UHT	<440	UHT	<440	U
4-Bromophenyl Phenyl Ether		ug/l	<45	UHT	<90	UHT	<90	U
4-Chloro-3-Methylphenol		ug/l	<45	UHT	<90	UHT	<90	U
4-Chloroaniline	5	ug/l	<59	UHT	<120	UHT	<120	U
4-Chlorophenyl Phenyl Ether		ug/l	<35	UHT	<70	UHT	<70	U
4-Nitroaniline	5	ug/l	<25	UTHT	<50	UHT	<50	UT
4-Nitrophenol		ug/l	<150	UHT	<300	UHT	<300	U
Acenaphthene	20	ug/l	<41	UHT	<82	UHT	<82	U
Acenaphthylene		ug/l	**98**	JHT	**340**	JHT	<76	U
Acetophenone		ug/l	<54	UHT	<110	UHT	<110	U
Anthracene	50	ug/l	<28	UHT	<56	UHT	<56	U
Atrazine	7.5	ug/l	<46	UHT	<92	UHT	<92	U
Benzo(A)Anthracene	0.002	ug/l	<36	UHT	<72	UHT	<72	U
Benzaldehyde		ug/l	<27	UHT	<53	UHT	<53	U
Benzo(A)Pyrene		ug/l	<47	UHT	<94	UHT	<94	U
Benzo(B)Fluoranthene	0.002	ug/l	<34	UHT	<68	UHT	<68	U
Benzo(G,H,I)Perylene		ug/l	<35	UHT	<70	UHT	<70	U
Benzo(K)Fluoranthene	0.002	ug/l	<73	UHT	<68	UHT	<150	U
Biphenyl (Diphenyl)	5	ug/l	<65	UHT	<130	UHT	<130	U
Bis(2-Chloroisopropyl) Ether	5	ug/l	<52	UHT	<100	UHT	<100	U
Bis(2-Chloroethoxy) Methane	5	ug/l	<35	UHT	<70	UHT	<70	U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	1	ug/l	<40	UHT	<80	UHT	<80	U
Bis(2-Ethylhexyl) Phthalate	5	ug/l	<220	UHT	<440	UHT	<440	U
Benzyl Butyl Phthalate	50	ug/l	<100	UHT	<200	UHT	<200	U
Caprolactam		ug/l	<220	UHT	<440	UHT	<440	U
Carbazole		ug/l	<30	UTHT	<60	UTHT	**180**	JT
Chrysene	0.002	ug/l	<33	UHT	<66	UHT	<66	U
Di-N-Butyl Phthalate	50	ug/l	<31	UHT	<62	UHT	<62	U
Di-N-Octylphthalate	50	ug/l	<47	UHT	<94	UHT	<94	U
Dibenz(A,H)Anthracene		ug/l	<42	UHT	<84	UHT	<84	U
Dibenzofuran		ug/l	**96**	JHT	**140**	JHT	**130**	J
Diethyl Phthalate	50	ug/l	<22	UHT	<44	UHT	<44	U
Dimethyl Phthalate	50	ug/l	<36	UHT	<72	UHT	<72	U
Fluoranthene	50	ug/l	<40	UHT	<80	UHT	<80	U
Fluorene	50	ug/l	**130**	JHT	**130**	JHT	**110**	J
Hexachlorobenzene	0.04	ug/l	<51	UHT	<140	UHT	<100	U
Hexachlorobutadiene	0.5	ug/l	<68	UHT	<140	UHT	<140	U
Hexachlorocyclopentadiene	5	ug/l	<59	UHT	<120	UHT	<120	U
Hexachloroethane	5	ug/l	<59	UHT	<120	UHT	<120	U
Indeno(1,2,3-C,D)Pyrene	0.002	ug/l	<47	UHT	<94	UHT	<94	U
Isophorone	50	ug/l	<43	UHT	<86	UHT	<86	U
N-Nitrosodi-N-Propylamine		ug/l	<54	UHT	<110	UHT	<110	U
N-Nitrosodiphenylamine	50	ug/l	<51	UHT	<100	UHT	<100	U
Naphthalene	10	ug/l	**3900**	HT	**12000**	HT	**10000**	
Nitrobenzene	0.4	ug/l	<29	UHT	<58	UHT	<58	U
Pentachlorophenol	1	ug/l	<220	UHT	<440	UHT	<440	U
Phenanthrene	50	ug/l	**170**	JHT	**130**	JHT	<88	U
Phenol	1	ug/l	**74**	JHT	<78	UHT	**2400**	
Pyrene	50	ug/l	<34	UHT	<68	UHT	<68	U

Inventum Engineering, P.C.

Figures

Appendices

Appendix A - Geotechnical Data

Appendix B - Boring and Monitoring Well Installation Logs

Appendix C - Wetlands and Waterways Assessment

Appendix D - Fish and Wildlife Resource Impact Analysis (FWRIA)

Appendix E - Purge and Ground Water Sample Collection Logs

Appendix F - Test Pit Logs

Appendix G - Test Pit Photographs

Appendix H - Surface Soil and Sediment Logs

Appendix I - Water Sample Collection Logs

Appendix J - Laboratory Reports

Appendix K - DUSRs