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January 24,2024

Benjamin McPherson, PE, NYSDEC Project Manager
New York State Department of Environmental Conservation
700 Delaware Avenue
Buffalo, NY 14209

Re: Final Focused Feasibility Study Report Operable Unit 2 (Site 109) Tonawanda Coke Site – January 2024

Dear Mr. McPherson:

Attached for your approval is the Focused Feasibility Study Report for Operable Unit 2 (Site 109) of the Tonawanda Coke Site required under the Order on Consent (Index No. B9-85-2-77D).

Please contact me at 973-216-2438 if you have any questions.

Sincerely,

Rich Galloway.
Remediation Manager

Enc.

Cc: Chad Staniszewski - NYSDEC
Andrea Caprio – NYSDEC
Teresa Mucha, Esq. – NYSDEC
Charlotte Bethoney – NYSDOH
Angela Martin - NYSDOH
Dale Desnoyers, Esq. – Allen & Desnoyers

FOCUSED FEASIBILITY STUDY
OPERABLE UNIT 2 (SITE 109)
TONAWANDA COKE SITE

3875 RIVER ROAD
TONAWANDA, NEW YORK

Prepared For:

Honeywell

115 Tabor Road
Morris Plains, NJ 09750

Prepared By:

PARSONS

301 Plainfield Road, Suite 330
Syracuse, New York 13212

JANUARY 2024

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LIST OF ACRONYMS

ACRONYM	Definition
AJD	Approved Jurisdictional Determination
BCP	Brownfield Cleanup Program
bgs	below ground surface
C&D	construction and demolition
CAMP	Community Air Monitoring Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPOI	chemical parameters of interest
ECL	Environmental Conservation Law
EWP	Excavation Work Plan
FS	Feasibility Study
HAZWOPER	Hazardous Waste Operations and Emergency Response
Honeywell	Honeywell International Inc
IRM	Interim Remedial Measures
MW	monitoring well
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PAHs	polycyclic aromatic hydrocarbons
PPE	Personal Protective Equipment
QHHEA	Qualitative Human Health Exposure Assessment
RAO	Remedial Action Objective
RD	Remedial Design
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
RITC	Riverview Innovation & Technology Campus, Inc.
ROD	Record of Decision
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objectives
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TCC	Tonawanda Coke Corporation
USACoE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

CERTIFICATION

I, Edward Glaza, certify that I am currently a NYS Registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Focused Feasibility Study 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Edward Glaza P.E.

Edward Glaza

1/31/24 DATE

EXECUTIVE SUMMARY

On behalf of Honeywell International Inc. (Honeywell), Parsons has prepared this Focused Feasibility Study (FS) for Operable Unit (OU) 2 of the Tonawanda Coke State Superfund Site. OU-2, also known as Site 109, is a portion of the former Tonawanda Coke Corporation (TCC) facility at 3875 River Road, Town of Tonawanda, New York. TCC filed for bankruptcy protection in 2018 and all industrial activity on Site 109 ceased at that time.

Legacy environmental conditions at the former TCC facility are being addressed under two separate New York State Department of Environmental Conservation (NYSDEC) remedial programs. Site 109, which is the subject of this report, along with Sites 108 and 110 (being addressed in separate reports), represent a portion of the former TCC facility property, and collectively comprise the Tonawanda Coke State Superfund Site, Site #915055. These three areas are being addressed under the New York State Superfund Program. The remainder of the former TCC facility is being addressed under the New York State Brownfield Cleanup Program (Site #C915353).

Site 109 is an approximately 7.5-acre rectangular parcel oriented perpendicular to the east side of River Road, in the western portion of the 3875 River Road property. Two drainage ditches run through Site 109, one along the southern edge of the Site 109 boundary and one through the north-central portion of Site 109. The eastern section of Site 109 is paved and includes the former truck scale, tarping station and the security office. In 1977, an unknown quantity of brick, rubble, and demolition material was placed within Site 109. A coal conveyor historically ran along the southern site boundary rising from a tunnel under River Road and then elevated adjacent to, and over, the southern drainage ditch on Site 109.

No industrial production processes are known to have occurred on Site 109. The final stormwater treatment ponds for Sites 109, 110 and the Brownfield Cleanup Program (BCP) Site are located on Site 109. Based on historical test pits as well as test pits and monitoring wells installed during the Focused Remedial Investigation (RI), fill is present across most of Site 109.

Riverview Innovation & Technology Campus, Inc. (RITC) owns the former TCC properties and is proposing a commercial/industrial complex on the former TCC facility properties at 3875 River Road and 3800 River Road. The campus will bring high-technology jobs and environmental stewardship to properties that had been abused for decades. Dramatic progress transforming the former TCC facility from an abandoned coke facility to a property with a viable long-term vision has already occurred. The cleanup and redevelopment will allow Sites 108, 109, 110, and the remainder of the former TCC facility to be restored to productive use. The property can support a number of technology and commercial uses across the approximately 140-acre campus.

Following completion of an earlier Remedial Investigation and Feasibility Study (RI/FS), a Record of Decision (2008 ROD) was issued by NYSDEC on March 31, 2008, which presented the selected remedies for Site 109 and Site 110. The remedies were based on industrial use of the property and required institutional and engineering controls involving restricting access and filing an environmental easement to control future use, however, the required easement was never filed by the Tonawanda Coke Corporation The TCC facility was an active industrial facility at the time of the 2008 ROD. The former TCC facility is now inactive and the future use for Sites 109 and 110 is anticipated to include commercial as well as industrial operations. Therefore, as specified in the February 2020 Order on Consent:

> "The supplemental investigation of Sites 109 and 110 will be limited to a Focused RI/FS to determine whether and to what extent additional investigation and/or remedial work may be necessary due to the change in use of the site."

Consistent with the February 2020 Order on Consent, this Focused FS concentrates on identifying remedial work that may be necessary due to the change in use of the site, which is anticipated to include commercial

development. The change in site use from industrial to commercial does not necessitate any additional remedial work associated with groundwater as the institutional controls as specified in the 2008 ROD would prevent unacceptable exposure to site groundwater. Therefore, this Focused FS concentrates on developing and evaluating potential alternatives to address impacted soil at Site 109 that would limit commercial redevelopment.

Nature and Extent of Impacts

There have been historical data gathering events at Site 109 focused on on-site soils, groundwater, surface water, and drainage ditch soils. The scope of the Focused RI, completed by Honeywell in 2020 and 2021, was designed to address data gaps identified through review of historical data. The 2020/2021 Focused RI scope included:

- Surface and subsurface soil investigation
- Groundwater investigation
- Drainage ditch soil investigation
- Surveying of all test pits, monitoring wells, and soil sampling locations

Historical sample results and analytical data compiled as part of the Focused RI were compared to applicable standards, criteria, and guidance (SCG) values for soil and groundwater to assess impacts and to develop an understanding of the nature and distribution of environmental impacts.

SURFACE AND SUBSURFACE SOIL

Soil analytical results were compared to Commercial Use soil SCGs, which is consistent with anticipated future site use. Fill material consists of earthen materials mixed with coal, coke, coke manufacturing by-products, construction and demolition debris (C&D), and other debris. For convenience, references to soil and comparisons to soil cleanup objectives include fill, underlying native soils, and surface and subsurface materials that are non-soil fill, such as coal, breeze, and ash, as well as mixtures of these materials and soil.

Surface soil and, to a lesser extent, subsurface soil concentrations of constituents exceeding the Commercial Use SCGs are present throughout Site 109. The primary constituents exceeding these SCGs are semivolatile organic compounds (SVOCs), particularly polycyclic aromatic hydrocarbons (PAHs). The highest concentrations of constituents occur in southern drainage ditch samples, likely due to spills from the former overhead coal conveyor and/or due to erosion and transport of soils impacted with coal and coke from areas upgradient of Site 109 into the on-site drainage ditch.

GROUNDWATER

Groundwater impacts at Site 109 are limited, with most SCG exceedances observed in the upgradient well. Groundwater samples show exceedances of SCGs for one or more constituents in samples from all wells. However, most exceedances are for metals, which are likely primarily due to naturally occurring conditions.

Groundwater gradients are predominantly to the west-southwest. Groundwater occurs in a perched unit in fill that is likely a series of pocketed saturated areas, some of which are connected, while others are isolated. A thick, low permeability clay layer is present beneath the fill, which prevents significant downward migration of groundwater.

Remedial Action Objectives (RAOs)

The following RAOs for soil and groundwater detailed below were developed considering SCGs, media of concern, chemical parameters of interest (CPOIs), and potential exposure pathways:

- Prevent ingestion of groundwater with concentrations exceeding drinking water standards.
- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent, or reduce to the extent practicable, ingestion/direct contact with soil containing concentrations above the applicable SCGs under the reasonably anticipated future (commercial/industrial) land uses.
- Prevent, or reduce to the extent practicable, migration of contaminants that would result in groundwater, surface water, or sediment impacts in excess of the SCGs.
- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site.

Remedial Action Alternatives Evaluation

To address the RAOs, the following alternatives were developed:

Alternative 1 – No Action

Alternative 2 – Soil Cover/Redevelopment and Institutional Controls

Alternative 3 – Soil Cover/Redevelopment and Institutional Controls with Excavation of Ditch Soils

Alternative 3A – On-site Management of Ditch Soils

Alternative 3B – Off-site Management of Ditch Soils

Each of the remedial action alternatives was assessed based on eight of the nine evaluation criteria set forth in *6 NYCRR 375-1.8(f)*. The ninth criterion (community acceptance) will be addressed after the Focused FS is completed and the public is given an opportunity to review and comment. NYSDEC has provided guidance for evaluating these criteria in *DER-10 / Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010a). These nine evaluation criteria are:

<u>Threshold Criteria</u>

- Overall protection of human health and the environment
- Compliance with SCGs

<u>Primary Balancing Criteria</u>

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost effectiveness
- Land use

<u>Modifying Criteria</u>

- Community acceptance

With the exception of the no-action alternative, an alternative must meet the two threshold criteria to be carried through the detailed analysis of alternatives. If the threshold criteria are met, the primary balancing criteria are evaluated to select an overall remedy among the alternatives. The modifying criterion (community acceptance) will be assessed by the NYSDEC during the development of the ROD Amendment based on the public's overall response to the alternatives described in the and the Focused FS and Draft ROD Amendment.

Recommended Remedial Action Alternative

Based on the comparative evaluation of remedial alternatives, Alternative 3B (Soil Cover/Redevelopment and Institutional Controls with Excavation and Offsite Management of Ditch Soils) is the recommended alternative to achieve RAOs and address the potential risks associated with contaminated materials at Site 109. Alternative 3B would provide overall protection of human health and the environment and comply with SCGs. Through the implementation of institutional controls and installation of the soil cover, this alternative would allow for CPOIs to continue to naturally attenuate while mitigating potential risks to human health and the environment. Alternative 3B is readily implementable, presents no significant short term risks during implementation, and is consistent with the anticipated industrial and/or commercial use of the site. Alternative 3B also provides long-term effectiveness using proven technologies and is cost-effective.

Potential exposure pathways to contaminated soils would be interrupted with the installation of the cover system. Institutional controls would also be implemented to restrict exposure to the contaminated soils and groundwater. These controls would prevent site groundwater from being used as a drinking water source and would place controls on excavation and other construction work at the site.

The soil cover would be a minimum of 12 inches thick. The cover system would be developed and integrated with the redevelopment plans for the site and would include a combination of soil covers (soil or gravel), asphalt or concrete paving, and buildings or structures. To allow for placement of the cover system and manage surface water flow, the site would be regraded, as necessary. This would include retention of the stormwater settling ponds, if needed, and restoration of the drainage ditch along the south side of the site.

As Site 109 is developed, roads, sidewalks, and parking areas may be placed in lieu of or to replace portions of the soil cover. The design of the Site would be incorporated into the stormwater management plan for the site, and in accordance with local and state requirements.

It is anticipated that buildings and structures would be constructed on Site 109 as part of redevelopment. These foundations, slabs, and associated underground utilities would be designed to function as or replace portions of the soil cover. A demarcation/marker layer would be placed below the subgrade fill for all pavement and building slabs.

Soil within the southern drainage ditch impacted with constituents that exceed ecological SCGs would be excavated, and the ditch would be restored with clean fill to create a clean drainage corridor. Removal of materials from the southern drainage ditch and creating a clean corridor would effectively eliminate potential concerns related to erosion of a cover within the drainage ditch and minimize the potential for migration of impacted material after the completion of remedial activities.

Excavated soil from the ditch that exceed 500 mg/kg total PAHs would be management offsite. Options include placement and containment at Site 110 or the BCP Site, and disposal off-site at an approved landfill. The remainder of the excavated material would be placed on Site 109 and graded prior to installation of the demarcation layer and soil cover. The viability of management at Site 110 or the BCP Site of excavated soils that exceed 500 mg/kg total PAHs depends on the final remedy selected for Site 110 and the BCP Site. Therefore, the determination regarding how the material would be managed offsite would be determined during the detailed design following selection of the remedies for Site 110 and the BCP Site.

Any contact construction water generated during construction work would be (1) collected and treated by the central BCP Site System, (2) collected, treated to discharge limits established by the NYSDEC, and discharged in accordance with State Pollution Discharge Elimination System (SPDES) permit requirements, as outlined in *6 NYCRR Part 375*, or (3) discharged to surface water in compliance with a SPDES permit or a SPDES permit equivalency.

The recommended alternative also includes long-term monitoring and maintenance, which would include:

- Periodic mowing of the soil cover. Periodic inspections of the soil cover to verify that the cover is working as intended and there are no areas of significant erosion or other damage, and repair of any damage if required.
- Periodic groundwater monitoring.

This alternative also includes implementation of an institutional control in the form of an environmental easement for Site 109 that would:

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

The SMP would provide all future owners and operators of Site 109 with the required procedures and protocols to maintain the permanent and ongoing components of the remedial actions. Compliance with this document would be required for all future owners and operators of Site 109.

An Excavation Work Plan (EWP) would be a component of the SMP and would define the procedures that must be followed for any intrusive excavation on Site 109 after the remedial actions are complete. The EWP would cover, but is not limited to, personal protective equipment (PPE), air monitoring requirements, and materials management. The EWP would be required to be followed for any intrusive subsurface work at the Site 109 that may encounter remaining contamination beneath the soil cover, which may include, but is not limited to, installing new sidewalks, roads, utilities, foundations, and fence posts.

Based on the current expected activities, it is estimated that this alternative would take one construction season to complete. Actual construction duration could change, as design and construction planning would assess conditions and sequencing factors.

SECTION 1 INTRODUCTION

On behalf of Honeywell International Inc. (Honeywell), Parsons has prepared this Focused Feasibility Study (FS) Report for Operable Unit (OU) 2 of the Tonawanda Coke State Superfund Site located at 3875 River Road in Tonawanda, Erie County, New York. OU-2, also known as Site 109, occupies the western portion of the former Tonawanda Coke Corporation (TCC) facility property at 3875 River Road (**Figure 1**).

TCC filed for bankruptcy protection in 2018 and all industrial activities on the property ceased at that time. On October 10, 2019, the sale of the property was completed to Riverview Innovation & Technology Campus, Inc. (RITC).

Remediation of the property is being completed under two separate New York State Department of Environmental Conservation (NYSDEC) programs: the New York State Superfund Program and the New York State Brownfield Cleanup Program (BCP).

The Tonawanda Coke State Superfund Site is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York state as Site Number 915055 with a Site Classification of "2" pursuant to Environmental Conservation Law (ECL) 27-1305. Three areas, representing a portion of the former TCC facility property and two sections of National Grid Corporation property, together make up the Tonawanda Coke State Superfund Site (**Figure 2**):

- Site 108 is between River Road and the Niagara River at 3800 River Road.
- Site 109, the subject of this report, at 3875 River Road, lies near River Road on the western portion of the 3875 River Road parcel.
- Site 110 lies partially in the northeast portion of the 3875 River Road parcel and extends eastward onto National Grid Corporation property.

These three areas are being addressed under the New York State Superfund Program pursuant to the Order on Consent and Administrative Settlement (Index No. B9-85-2-77D) entered into between Honeywell and the NYSDEC on February 24, 2020. FS reports for Sites 108 and 110 will be prepared and submitted separately to NYSDEC.

The remainder of the former TCC facility property excluding Sites 108, 109 and 110 are being addressed under the New York State BCP pursuant to BCP Agreement (Index No. C915353-02-20) between the NYSDEC and RITC, dated February 14, 2020. This portion of the property is referred to as the BCP Site (Site No. C915353).

A previous Remedial Investigation and Feasibility Study (RI/FS) was completed for the facility, followed by a Record of Decision (ROD) issued by the NYSDEC on March 31, 2008, which presented the selected remedies for Sites 109 and 110. These remedies, based on industrial use of the property, consisted of institutional and engineering controls involving restricting access and filing an environmental easement to control future use, however, the required easement was never filed by the Tonawanda Coke Corporation. At the time of the 2008 ROD, the TCC property was an active industrial facility. Consistent with the February 2020 Order on Consent, this Focused FS concentrates on identifying remedial work that may be necessary due to the change in use of the site, which is anticipated to include commercial development.

1.1 Purpose

According to *DER-10 / Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010a), the purposes of an FS are to:

- Identify the goal of the remedial program.
- Define the nature and extent of contamination to be addressed by the alternatives developed.
- Identify the Remedial Action Objectives (RAOs) for the site.
- Develop the remedial action alternatives.
- Undertake an initial screening and detailed analysis of the alternatives.

To comply with the Order on Consent issued in February of 2020, a Focused RI was conducted in 2021 and 2022 to supplement data collected historically. The purpose of this Focused FS is to evaluate the data collected during the Focused RI in conjunction with historic data to determine whether and to what extent additional remedial work may be necessary due to the change in usage of the site. To accomplish this purpose, this Focused FS:

- Identifies and screens potentially applicable technologies to address the contamination found at the site.
- Develops and compares remedial alternatives capable of meeting the RAOs.
- Provides a recommended remedial approach.

This Focused FS has been prepared in accordance with *DER-10 / Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010a).

1.2 Report Organization

This Focused FS Report is organized as follows:

Section 1 – Introduction
Describes the objectives of the Focused FS and the report organization.

Section 2 – Site Description and History
Provides information regarding the site location and use, and a summary of relevant site history.

Section 3 – Summary of Remedial Investigation and Exposure Assessment
Provides information regarding previous investigations and the previously implemented interim remedial measures (IRMs).

Section 4 – Remedial Goals and Remedial Action Objectives
Presents the RAOs for each impacted media.

Section 5 – General Response Actions
Presents broad categories of media-specific actions that would satisfy the RAOs.

Section 6 – Identification and Screening of Technologies
Identifies and screens control methods and remedial technologies potentially capable of achieving the RAOs.

Section 7 – Development and Evaluation of Remedial Action Alternatives
Provides a detailed description of the Remedial Alternatives, and an evaluation pertaining to how the alternatives compare to the remedy selection factors.

Section 8 – Recommended Remedy

Presents the recommended Remedial Alternative based on the provided analysis.

Section 9 – References

SECTION 2 SITE DESCRIPTION AND HISTORY

2.1 Site Location and Description

The former TCC property at 3875 River Road is located on the east side of River Road in the Town of Tonawanda, Erie County, New York. Site 109, the subject of this report, is an approximately 7.5-acre rectangular area oriented perpendicular to the east side of River Road, in the southwestern portion of the former TCC property (**Figure 2**), referenced by Tax Map/Parcel No. 64.08-1-10 at the address 3875 River Road, Tonawanda, New York 14150. There is a large berm along the west side of Site 109, running parallel to River Road, and another large berm in the east portion of Site 109 close to the BCP Site boundary. Two concrete-lined settling/separation ponds that are part of the stormwater management system are present on Site 109. The western boundary of Site 109 is approximately 0.3 miles east of the Niagara River. The closest residential area to Site 109 is on James Avenue, approximately 0.4 miles to the south (**Figure 3**).

Site 109 is currently zoned for industrial use. The surrounding area is a combination of commercial and industrial operations, a landfill, utility rights-of-way, and public water utilities. The Erie County Water Authority Van De Water Treatment Plant is located to the southwest.

In addition to the portion of the former TCC facility being addressed under the BCP program, there are several sites subject to NYSDEC remedial programs in the vicinity (**Figure 1**), which are tabulated below.

Sites Subject to NYSDEC Remedial Programs	NYSDEC Site Number	Location
The Tonawanda Plastics Site (3821 River Road) – in the BCP	C915003/915003	South of Site 109
Roblin Steel	915056	Northwest of Site 109
River Road/Cherry Farm Niagara Mohawk closed landfill	915031 / 915063	North-northwest of Site 109
The C.R. Huntley Fly Ash Landfill (Niagara Mohawk – Huntley Station)	915076	North of Sites 109 and 110
The C.R. Huntley Steam Station, part of which is in the BCP as the Huntley Power South Parcel	C915337	Southwest of Site 109

2.2 Site History

The history of Site 109 is linked to the remainder of the former TCC facility at 3875 and 3800 River Road. To provide context, a description of the activities of the overall former TCC facility are included, as well as a focused overview of Site 109.

2.2.1 Former TCC Facility

A metallurgical coke manufacturing and by-products plant was operated at the former TCC facility from 1917 through late 2018. The coke manufacturing process involves the removal of gasses, liquids (oils), and tar from coal by heating the coal in the absence of oxygen. The resulting high-carbon material (referred to as “coke”) was

used as a fuel for furnaces, foundries, and for steel production, among other things. The by-products were used in the process or sold for off-site use. Other manufacturing processes used at the plant included light oil distillation, ammonia recovery, and benzene, toluene, and xylene extraction.

The former TCC facility began operation in 1917 under the Semet-Solvay Company, which was absorbed as a subsidiary of the Allied Chemical and Dye Corporation in 1920. In 1947, the Semet-Solvay Company was merged into the Allied Chemical Corporation, who would later merge with Honeywell in 1999. Allied Chemical continued to own and operate the facility until January 27, 1978, when the facility was sold to the TCC. TCC operated the facility from 1978 until they filed for bankruptcy protection in October 2018, at which time all operations ceased.

Between October 2018 and May 2020, the U.S. Environmental Protection Agency (USEPA) conducted emergency response activities to remove gases from pipes and tanks, treat wastewater, and manage stormwater.

On October 10, 2019, the property was sold to RITC through a sale ordered by the U.S. Bankruptcy Court.. RITC entered the BCP Site into the Brownfield Cleanup Program, and following entry into the program transitioned responsibility for the properties from the USEPA to RITC between March and June 2020.

The former TCC facility, exclusive of Sites 108, 109, and 110, is the subject of a BCP Agreement.

2.2.2 Site 109

No active industrial manufacturing processes are known to have occurred on Site 109. In general, the site appears to have been used for stormwater management, materials management, and disposal. Located on the site are two concrete lined stormwater settling ponds, a truck scale, a security office, and underground utilities. The east end of the River Road Tunnel and the footings for the former elevated coal conveyor are also still present along the southern boundary of the site.

During operation of the former TCC facility, disposal of industrial and construction and demolition (C&D) wastes from plant operations occurred at multiple areas throughout the plant property. In 1977, an unknown quantity of brick, rubble, and demolition material was disposed within Site 109. Reinforced concrete settling ponds are present and in use on Site 109 for the treatment and discharge of surface water under a NYSDEC approved Storm Water Pollution Prevention Plan (SWPPP) for the BCP Site.

2.3 Future Site Use

RITC purchased the property in October 2019 and is proposing a commercial / industrial complex on the former TCC properties at 3875 River Road and 3800 River Road. The RITC Campus properties will support commercial and industrial technology-related facilities, offices, and other commercial use operations that are consistent with the potential long-term requirements of the final remedy. The redevelopment strategy integrates the RITC properties into the overall development of the region.

SECTION 3 SUMMARY OF FOCUSED RI AND EXPOSURE ASSESSMENT

3.1 Introduction

Four major investigations and several other sampling events have been conducted previously at the former TCC facility, focusing primarily on Sites 108, 109, and 110. In addition to the historic investigations at Site 109, a Focused RI was conducted by Honeywell in 2021 and 2022 to fill data gaps identified based on review of the historical information. The following activities were carried out during the Site 109 Focused RI:

- Surface and subsurface soil investigation, including test pit excavation and soil sampling during monitoring well installation.
- Drainage ditch surface and subsurface soil investigation, including soil borings and hand coring.
- Groundwater investigation, including the installation of new groundwater monitoring wells and sampling of both new and existing monitoring wells.
- Site Survey, including the collection of location data on groundwater monitoring wells, soil borings, site boundaries, and other notable site features.
- Groundwater elevation survey, which involved measuring water levels in the groundwater monitoring wells prior to sampling in an effort to refine the understanding of groundwater gradients. Additional groundwater elevation data was collected from the adjacent BCP and 3821 River Road sites.

Documentation of site conditions based on the historical investigations and the Focused RI are detailed in the *Remedial Investigation Report for Operable Units 1 (Site 110) and 2 (Site 109), Tonawanda Coke Site* (Parsons 2023) and summarized in the following sections.

3.2 Site Physical Characteristics

3.2.1 Topography

Site 109 is a rectangular parcel with an undulating surface in some areas. Overall, Site 109 slopes from the east to the west, with an overall elevation change of approximately 24 feet from the boundary with the BCP Site to River Road. There are two large berms oriented north-south along the western border of Site 109, with steep slopes extending downward to River Road and to the rest of Site 109. These berms create locally high topography, however in general, the site elevation steadily increases moving east across Site 109. There is another large berm near the east end of Site 109, adjacent to the stormwater settling ponds (**Figure 4**).

3.2.2 Geology

Fill material is the uppermost stratigraphic unit over most of the former TCC facility property, including Site 109, varying in thickness from 0 to 16 feet at Site 109 (**Figures 5 and 6**). Fill thickness is generally consistent with topography, with the greatest thicknesses of fill located in the bermed areas. In general, fill material encountered at Site 109 during the Focused RI was composed of silt, clay, and C&D debris, including concrete, red brick, yellow fire brick, rock fragments, and wood. One or more test pits also contained slag, coke, coke manufacturing

by-products including silt to gravel-sized breeze, coal, ash, and/or large wooden poles. Examples of the fill material encountered are shown in the photographs below.

Silt, clay, coke fragments, brick, and concrete at TP-03-2020.

Breeze-rich fill also containing silt, rock, metal, wood, coal, coke, slag, and brick at TP-06-2020.

Underlying the fill material is a native glaciolacustrine clay layer. No borings were completed through the clay as part of the Focused RI at Site 109. However, borings completed as part of the BCP Site investigation and during investigations of the adjacent Tonawanda Plastics property found the interface between clay and the underlying bedrock at depths ranging from approximately 36 to 51- feet below ground surface (bgs) (Elevations 547- to 551-ft-amsl).

Based on regional data, bedrock underlying the site is the Salina Group, specifically the Camillus shale, which is a shale and mudstone. The Camillus shale also contains gypsum, dolomite, and significant thicknesses of salt beds (La Sala 1968).

3.2.3 Surface Water Hydrology

Surface water hydrology for Site 109 is considered within the context of the site stormwater management program. At the time of the bankruptcy, the TCC facility discharged stormwater to the Niagara River under SPDES Permit Number NY0002399 (NYSDEC 2017) through three outfalls (**Figure 4**), identified as 001, 002, and 004. Outfall 003 was not in use at the time of the bankruptcy and there had been no flow from this outfall since 2008. Currently, stormwater for the property at 3875 River Road, including Site 109, is managed under RITC's SWPPP (Inventum 2020a).

Outfall 001, located on Site 109, served as the historical discharge point for noncontact cooling water, boiler blowdown and stormwater runoff from the former production area after treatment in two concrete-lined settling/skimming ponds/lagoons, also located on Site 109.

Outfall 002, located on the BCP Site, at the southeastern boundary of Site 109, served and still serves, as the discharge point for runoff from the coal and coke yards.

A drainage ditch that is part of the stormwater management system runs along the southern border of Site 109 and receives surface flow from Site 109 and the Tonawanda Plastics Site (**Figure 4**). This ditch flows west and drains into Outfall #004 on the east side of River Road. Another drainage ditch flows along the north side of Site 109 and directs surface water under the western berm and combines with flow from Outfall 004. Outfall 004 discharges the combined flow from Outfalls 001 and 002 on Site 109 as well as flow from portions of the Tonawanda Plastics property. Outfall 004 discharges to a drainage ditch on the east side of River Road where it combines with flows from other industrial properties north and south of Site 109. The combined flow is conveyed through a culvert under River Road, into a drainage ditch on Site 108, and finally to the Niagara River.

3.2.4 Wetlands

As part of RI/FS activities for the BCP Site described in the RI Work Plan (Inventum 2020b) prepared on behalf of RITC, a wetland delineation was conducted. The wetland delineation identified four palustrine emergent (PEM) wetlands on Sites 109 and 110, totaling 0.908 acres (Earth Dimensions, Inc. 2021). The wetland delineation identified the wetlands as being non-federally jurisdictional under the Navigable Waters Protection Rule due to apparent lack of connectivity to an intermittent or perennial stream. A letter was submitted to the U.S. Army Corps of Engineers (USACoE) and NYSDEC requesting Approved Jurisdictional Determination (AJD) for the investigation area. In a letter dated February 1, 2022, the NYSDEC determined that none of the wetlands identified are state regulated. In a letter dated January 3, 2023, the USACoE issued a letter confirming that these areas are not waters of the U.S. and are not regulated under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899.

3.2.5 Hydrogeology

Fill on top of the clay layer is the uppermost water-bearing unit at the former TCC facility, including Site 109. This is a perched fill unit and is likely a series of pocketed saturated areas, some of which are connected while others are isolated. Due to the irregular characteristics of the uppermost water-bearing unit, the fill water-bearing zone at Site 109 is intermittent and based on monitoring well yields cannot produce an adequate volume for groundwater use and is not suitable as a source of potable water.

Fill at Site 109 was noted to frequently contain large amounts of clay, likely contributing to low and variable permeability. Groundwater was not encountered during installation of any of the monitoring wells at Site 109 during the Focused RI. As a result, monitoring wells were installed dry, with the expectation that fill may transmit water seasonally. Water was also not encountered in any test pits at Site 109. Groundwater was present in Site 109 monitoring wells during subsequent gauging and sampling events (December 2020, January 2021, and September 2021); however, during sampling, wells displayed low productivity and were slow to recharge. Average static water levels in Site 109 wells ranged from approximately 4 to 9 feet bgs during the gauging events between December 2020 and September 2021.

Although groundwater is likely discontinuous across the site due to the variable thickness and nature of fill, including some low-permeability, clay-rich fill, groundwater elevations from all three gauging events indicate that the groundwater gradient is generally to the west-southwest across Site 109. Site 109 groundwater elevation contours from January 2021 are shown in **Figure 7**. The groundwater flow pattern was similar for the other two Focused RI gauging events.

The underlying clay unit has a hydraulic conductivity of about 3.3×10^{-8} centimeters per second in the dense, silty upper clay zone and 2.1×10^{-8} centimeters per second in the high plasticity lower clay zone, indicating that this unit serves as an aquitard to vertical groundwater movement (Inventum 2021). Because the clay unit serves as an aquitard, vertical groundwater flow through clay is restricted. Therefore, groundwater flow primarily occurs

horizontally within fill, along the top of the clay unit, and is likely controlled by the permeability of fill and local surface water discharge points.

Based on regional hydrogeology, the upper bedrock, which is at a depth of approximately 50.7 to 54 feet bgs feet-bgs at the BCP Site (Inventum 2021), is expected to be water-bearing. However, given the aquitard between the water-bearing fill and bedrock, the two units are not hydraulically connected.

3.2.6 Nature and Extent of Impacts

The Focused RI significantly expanded site information on groundwater and soil. Field observations and analytical results verified the presence of materials and constituents that would be expected in materials resulting from the coking operations associated with the former TCC facility. The following sections present conclusions drawn during the Focused RI, in conjunction with the historic analytical data and sampling results. Results are compared to applicable standards, criteria, and guidance values (SCGs), as discussed in the next section.

3.2.7 Standards, Criteria, and Guidance Identification

This Focused FS Report summarizes the extent to which SCGs have been exceeded. This includes consideration of SCGs related to soil and groundwater, as detailed below.

3.2.7.1 Soil SCGs

A soil cleanup level may be derived from one or more of the following:

- New York Codes, Rules, and Regulations 6 NYCRR 375-6.8(a) or (b).
- Modified from the regulatory value based on site-specific characteristics.
- Based on other information, including background levels or feasibility.

Feasibility means suitable to site conditions, capable of being successfully carried out with available technology, implementable and cost effective (see 6 NYCRR 375-1.2(s)).

The future use of Site 109 will be commercial/industrial, therefore surface and subsurface soil data are compared to Commercial Use Soil Cleanup Objectives (SCOs), as established in 6 NYCRR Part 375 (NYSDEC 2006). A total polycyclic aromatic hydrocarbon (PAH) concentration of 500 mg/kg may be used as a soil cleanup level in lieu of achieving all of the PAH-specific SCOs in 6 NYCRR 375-6 for non-residential use sites (i.e., commercial or industrial use sites) for all subsurface soil, which is defined for this provision as “soil beneath permanent structures, pavement, or similar cover systems; or at least one foot of soil cover (which must meet the applicable SCOs)” (NYSDEC 2010b).

SCOs for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until these SCOs are in effect, PFAS soil results will be compared to Commercial Use guidance values included in *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs* (NYSDEC 2022).

Fill material at the site is primarily historically placed soils but also includes other materials such as ash and breeze. For convenience, references to soil and comparisons to Commercial Use SCOs include fill soils, underlying native soils, and surface and subsurface materials that are non-soil fill, such as ash and breeze, as well as mixtures of these materials and soil.

3.2.7.2 Groundwater SCGs

Groundwater data for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, pesticides, cyanide, and metals are compared to Class GA water quality standards and guidance values under Division of Water *Technical and Operational Guidance Series* (TOGS) 1.1.1. (NYSDEC 1998). Groundwater data for PFAS are compared to the screening levels established in the 2023 Addendum June 1998 *Division of Water Technical and Operational Guidance No. 1.1.1* (NYSDEC 2023).

3.2.8 Surface and Subsurface Soil

Soil analytical results were compared to Commercial Use SCGs, which is consistent with anticipated future use of Site 109. Surface and subsurface soil exceedances of SCGs are present throughout the site, as shown in **Figure 8**.

The primary constituents exceeding SCGs in surface and subsurface soil samples are PAHs. Exceedances of SCGs for individual PAHs in surface and subsurface soil samples are shown in Figures 9 and 10, respectively. The maximum total PAH concentrations measured at each sampling location are shown in **Figure 11**. The concentration of one metal (arsenic) also exceeded Commercial Use SCGs in one sample (**Figure 12**). There were no exceedances of Commercial Use SCGs for VOCs, PFAS compounds, PCBs, pesticides, or cyanide.

SVOC concentrations exceeded the Commercial Use SCG in at least one sample from 14 of the 15 sampled locations. All SVOCs that exceed standards are PAHs. The SVOCs that exceed SCGs are:

- benzo(a)anthracene
- benzo(a)pyrene
- benzo(b)fluoranthene
- chrysene
- dibenzo(a,h)anthracene
- indeno(1,2,3-cd)pyrene

Surface soil (0.0 to 0.16 feet bgs and 0.16 to 1.0 feet bgs) exceedances for SVOCs are widespread across Site 109, with nine out of nine Focused RI surface soil sample locations showing concentrations exceeding the Commercial Use SCGs in one or both surface soil sample intervals. These results are consistent with historical investigations, which indicate SVOC exceedances of Commercial Use SCGs at four out of five surface sample locations.

The highest SVOC concentrations in surface soil from the 2020 Focused RI occur in samples from SB-01-2020 and SB-02-2020, which are both located within an on-site drainage ditch that runs along the south side of the site. Subsurface soil samples did not exceed Commercial Use SCGs at these locations, indicating the elevated concentrations in surface soils may be due to spills from the former elevated coal conveyor running through this area and/or due to erosion and transport of soils impacted with coal and coke from areas upgradient of Site 109 into the on-site drainage ditch.

Exceedances of Commercial Use SCGs for SVOCs in subsurface soil are less widespread than for surface soil, with five out of nine sampled locations having concentrations of at least one SVOC exceeding the Commercial Use SCGs.

Samples that yielded the highest concentrations of PAHs contained varying amounts of breeze, coke, and/or coal, based on field examination, while the majority of fill at Site 109 consists of C&D debris (brick, concrete, silt). In general, samples collected from C&D debris, in the absence of breeze, coke, and/or coal, yielded lower PAH concentrations than samples collected from breeze, coke, and/or coal. Therefore, it appears that breeze, coke, and/or coal in fill and ditch surface soils are likely the source of PAHs in soil samples from Site 109.

NYSDEC has determined that the Soil SCGs for the Protection of Ecological Resources would also be applicable to the surface soils within the onsite ditch. These criteria are typically lower than the Commercial Use SCGs. Ditch soil results were not compared directly to these criteria, however, given that all ditch surface soil samples exceeded the Commercial Use SCGs, they would also exceed the SCGs for the Protection of Ecological Resources.

3.2.9 Groundwater

Groundwater occurs as perched, intermittent surficial aquifers in the fill unit at Site 109. The occurrence of groundwater is highly dependent on the nature and permeability of the fill. A low conductivity glaciolacustrine clay aquitard is present beneath the fill at Site 109 that restricts vertical flow of groundwater from the fill.

Groundwater impacts at Site 109 are very limited, with most impacts observed in the first round of sampling in the upgradient well (**Figure 13**). Groundwater samples show exceedances of Class GA SCGs for one or more constituents in samples from all wells at Site 109. However, most of these exceedances are for metals, which appears primarily due to naturally occurring conditions. Results indicate that site soils are not significantly impacting site groundwater.

There were no exceedances of Class GA SCGs during the 2020 or 2021 sampling events for PFAS compounds, pesticides, VOCs or cyanide, therefore impacts to groundwater for these parameters are not a concern at Site 109.

SVOCs were only exceeded at the upgradient monitoring well (MW-01-2020) during the 2020 sampling event. SVOCs were not detected above the Class GA SCGs in samples from this well or any other wells during the 2021 sampling event. Groundwater from MW-01-2020 is representative of conditions upgradient of Site 109 or of conditions at the upgradient edge of Site 109 and is not indicative of site-wide impacts to groundwater at Site 109. Based on these results, SVOC impacts to groundwater are not a concern at Site 109.

Total PCBs were detected slightly above Class GA SCGs (0.091 ug/L versus the SCG of 0.09 ug/L) at monitoring well MW-02-2020 during the 2020 sampling event. PCBs were not detected in samples from any other wells in 2020, were not detected in any samples in 2021, and have historically not been detected in Site 109 groundwater. Based on these results, total PCB impacts to groundwater are not a concern at Site 109.

Concentrations of at least one metal exceeded Class GA SCGs in all wells sampled in 2020 and 2021. Concentrations of six metals (iron, magnesium, manganese, sodium, thallium, and antimony) exceeded Class GA SCGs in at least one monitoring well. Iron, magnesium, manganese and sodium are naturally occurring and are generally elevated throughout the Tonawanda, New York area. Therefore, iron, magnesium, manganese, and sodium impacts to groundwater are not a concern at Site 109.

Concentrations of thallium and antimony exceeded their Class GA SCGs at the upgradient monitoring well (MW-01-2020) during the Focused RI. Groundwater from MW-01-2020 is representative of conditions upgradient of Site 109 or of conditions at the upgradient edge of Site 109. The nearby monitoring wells MW-BCP-15A and MW-BCP-16A at the BCP Site were non-detect for these contaminants in 2021 and 2022. In general, the groundwater sampling events completed at the BCP Site have not identified antimony and thallium in concentrations that could be impacting Site 109. Localized thallium and antimony impacts may be due to leaching of coal combustion byproducts, particularly fly ash, as discussed below.

Thallium also exceeded its Class GA SCG at downgradient monitoring well MW-03-2020 in 2021. Samples from this well were not analyzed for metals during the 2020 sampling event due to insufficient productivity from the well. Other than at the upgradient well, discussed above, this was the only well at Site 109 where the thallium concentration was detected above its Class GA SCG. Other than at the upgradient well, discussed above, this was the only well at Site 109 where the thallium concentration was detected above its SCG. Thallium is commonly found in coal combustion products, particularly fly ash, which was observed within the screened interval during well installation. Leaching of thallium from this material is a potential cause of thallium observed in the

groundwater sample. Given the limited distribution of fly ash at Site 109 and the limited detections of thallium in groundwater, there are not significant site-wide sources or associated thallium impacts to groundwater at Site 109. and offsite migration is unlikely. Monitoring well MW-15-2020 was planned for installation at Site 108. This location is downgradient of MW-03-2020. However, only two feet of fill, unsaturated, was found overlying the clay layer at this location, therefore no well was installed. These results further indicate offsite migration is unlikely.

Based on the groundwater sampling results summarized above, impacts to groundwater are not a significant concern at Site 109.

3.2.10 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment (QHHEA) was completed as part of the RI Report, consistent with NYSDEC guidance (NYSDEC 2010a), to evaluate how people might be exposed to site-related constituents, and to identify and characterize the potentially exposed population(s) now and under the reasonably anticipated future use of Site 109. Potential exposures for current and future site use, which is anticipated to be commercial/industrial, are summarized below and shown in **Figure 14**.

The QHHEA was developed based on the results of the historical investigations and the 2020/2021 Focused RI. It is consistent with the anticipated future use of Site 109, which is commercial. Consistent with the prior ROD for Site 109 ,an environmental easement will be placed on the property that, at minimum, will prohibit unpermitted groundwater use and uncontrolled subsurface excavations, and may include other institutional controls to protect commercial and industrial users of the property from potential exposure to environmental impacts related to historical facility operations. An SMP will define the procedures to be followed while redeveloping and maintaining the property. An EWP will define the procedures to be followed while excavating on the property for foundations, utilities, and other subgrade construction.

Groundwater ingestion is not considered a potential exposure pathway for any off-site receptors because groundwater is not in use as, or suitable for use as, a potable source in any adjacent off-site areas. Roblin Steel (former Wickwire Plant), which is downgradient of Site 109, has an environmental easement in place prohibiting the use of groundwater as a potable water source. It is anticipated that a similar environmental easement will be established at Site 108, which is also downgradient of Site 109.

Potential exposure pathways for the four identified potential receptors are discussed in the following table.

- Current site worker
- Future site worker
- Future office worker
- Current and future off-site workers

Environmental Media & Exposure Route	Human Exposure Assessment
Direct contact with groundwater (and incidental ingestion)	• Current site workers may come into contact with impacted groundwater while performing intrusive work such as investigation or IRM/remedial activities.

	• Future site workers may encounter contaminated groundwater during intrusive construction activities for future redevelopment or subsequent construction/maintenance activities. • Current/future off-site utility workers may encounter impacted groundwater during intrusive work off-site at Site 108 and Roblin Steel. These workers may not be HAZWOPER trained or aware of the constituents in groundwater. Remediation may minimize the risk of exposure. • For all of the above potential exposures, proper use of PPE, decontamination methods, and other protective measures would minimize the risk of exposure.
Inhalation (exposure related to volatilization of contaminants / vapor intrusion)	• Current site workers may encounter impacted vapors while performing work at the site. • Future site workers may encounter impacted vapors while performing redevelopment or other work at the site. • Future office workers may encounter impacted vapors via vapor intrusion into buildings of VOCs originating from subsurface tar and/or impacted soil and/or groundwater. Remediation and/or site management may reduce this risk. • VOCs were not detected in downgradient well MW-17-89 and were only detected in low concentrations at downgradient well MW-03-2020. Therefore, offsite exposure to vapors from Site 109 groundwater is not a significant potential exposure pathway for current/future off-site workers.
Inhalation (exposure related to fugitive dust)	• Current site workers may encounter fugitive dust while performing work at the site. • Future site workers may encounter fugitive dust while performing redevelopment work at the site. • For both of the above potential exposures, mitigation measures such as spreading water for dust suppression and air monitoring would minimize the risk of exposure. • Future office workers will not be exposed to fugitive dust because the anticipated commercial use of the site will include paving, buildings, and landscaping, which will cover impacted soil and prevent mobilization.
Direct contact with surface soil (and incidental ingestion)	• Current site workers may come into contact with impacted surface soil while performing work such as investigation or IRM/remedial activities. • Future site workers may encounter impacted surface soil during construction activities for future redevelopment or subsequent construction/maintenance activities. Remediation may minimize the risk of exposure.

	• For all of the above potential exposures, proper use of PPE, decontamination methods, and other protective measures would minimize the risk of exposure. • Future office workers will not be exposed to impacted surface soil because the anticipated commercial use of the site will include paving, buildings, and landscaping, which will cover impacted soil.
Direct contact with subsurface soil (and incidental ingestion)	• Current site workers may come into contact with impacted subsurface soil while performing intrusive work such as investigation or IRM/remedial activities. • Future site workers may encounter impacted subsurface soil during intrusive construction activities for future redevelopment or subsequent construction/maintenance activities. Remediation may minimize the risk of exposure. • For all of the above potential exposures, proper use of PPE, decontamination methods, and other protective measures would minimize the risk of exposure. • Future office workers will not be exposed to impacted subsurface soil because the anticipated commercial use of the site will include paving, buildings, and landscaping, which will cover impacted soil.

3.3 Media and Chemical Parameters of Interest

Based on the results of the Focused RI, the primary chemical parameters of interest (CPOIs) for Site 109 are SVOCs, particularly PAHs. PAHs were found at concentrations that exceed Commercial Use SCGs at soil sample locations throughout the site. The CPOIs were primarily found within the surface and subsurface soils that are part of the fill material in the upper stratigraphic unit of the site. The fill material ranges from 0 to 16 feet bgs across the approximately 7.5-acre site. Based on the Focused RI data, there is approximately 58,000 cubic yards of fill present on-site above the clay layer, of which an estimated 75 percent (43,500 cubic yards) exceeds Commercial Use soil SCGs.

VOCs were not found in concentrations that exceed the Commercial Use SCGs for soil, which take into consideration potential outdoor exposures due to soil vapor intrusion. The maximum concentration in comparison to its criteria was at MW-03, where Trichloroethene was measured at approximately 3% of its Commercial Use SCG, indicating potential concerns regarding exposure via soil vapor intrusion are unlikely. Due to the many site-specific variables involved in determining potential indoor exposures to VOCs, there is no generic SCO developed for that pathway. Although concentrations of VOCs in soil and groundwater at Site 109 are very low, the data to fully evaluate this pathway are not available, therefore provisions for future evaluation of this pathway must be included in the SMP.

Groundwater impacts at Site 109 are very limited. Most of the Class GA SCG exceedances are for metals, which appears primarily due to naturally occurring conditions. Results indicate that site soils are not significantly impacting site groundwater.

SECTION 4 REMEDIAL GOALS AND REMEDIAL ACTION OBJECTIVES

4.1 Remedial Goals

The remedial goals developed for Site 109 are:

- Overall protection of human health and the environment.
- Implementation of remedial actions that allow redevelopment of Site 109 for commercial or industrial purposes.
- Implementation of remedial actions that are permanent and sustainable.
- Implementation of remedial actions that result in a site that is consistent with the developing River Road vision of the Town of Tonawanda.

4.2 Remedial Action Objectives

Consistent with *NYSDEC DER-10* guidance (NYSDEC 2010a), RAOs have been developed for Site 109 that address all impacted media. RAOs are used to develop and evaluate remedial action alternatives and select an appropriate remedy for Site 109. The development of RAOs requires the identification of SCG values, consisting of applicable and promulgated federal and state statutes and regulations for the applicable media. Applicable media of concern CPOIs, and potential exposure pathways must also be identified. The SCGs are then evaluated with the media of concern, CPOIs, and exposure pathways to form RAOs.

RAOs for soil and groundwater detailed below were developed considering SCGs, media of concern, CPOIs, and potential exposure pathways.

4.2.1 Groundwater RAOs

Public Health Protection

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

Environmental Protection

2. Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.

4.2.2 Soil RAOs

Public Health Protection

3. Prevent, or reduce to the extent practicable, ingestion/direct contact with soil containing concentrations above the applicable SCGs under the reasonably anticipated future (commercial/industrial) land uses.

Environmental Protection

4. Prevent, or reduce to the extent practicable, migration of contaminants that would result in groundwater, surface water, or sediment impacts in excess of the SCGs.

4.2.3 Soil Vapor Intrusion

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

SECTION 5 GENERAL RESPONSE ACTIONS

General response actions are broad categories of media-specific actions that, by themselves or in combination with other general response actions, would satisfy the RAOs. General response actions for site soil and groundwater are developed in the following sections.

5.1 Soil

General response actions that are potentially applicable at Site 109 related to soil are:

- No Further Action
- Institutional Controls
- Containment
- Impacted Material Management (includes excavation, treatment and disposal)

Technologies that are within each of these General Response Actions are detailed in **Section 6**.

5.2 Groundwater

As discussed in **Section 3.3**, groundwater impacts at Site 109 are very limited. Most of the Class GA SCG exceedances are for metals, which is likely primarily due to naturally occurring conditions. Results indicate that site soils are not significantly impacting site groundwater.

Consistent with the February 2020 Order on Consent, this Focused FS concentrates on identifying remedial work that may be necessary due to the change in use of the site, which is anticipated to include commercial development. The change in site use from industrial to commercial does not necessitate any additional remedial work associated with groundwater and the institutional controls as specified in the ROD would prevent unacceptable exposure to site groundwater. Therefore, no response actions or remedial alternatives are developed for site groundwater.

SECTION 6 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

This section identifies and screens control methods and remedial technologies potentially capable of achieving the RAOs identified in **Section 4**. These control methods and remedial technologies (collectively referred to as *technologies* in the remainder of this report) are identified based on a variety of technical sources, current and anticipated future site use, and site physical and chemical data. The most appropriate technologies are retained for use in developing remedial alternatives.

6.1 Development and Screening of Technologies

Each General Response Action can be implemented using one or more remedial technologies. Potentially applicable technologies associated with the RAOs listed in Section 4 and general response actions listed in **Section 5** are identified and screened in this section of the Focused FS.

NYSDEC *DER-10* specifies that individual technologies should be preliminarily screened on ability to meet media-specific objectives, short-term and long-term effectiveness, and implementability.

Effectiveness: This criterion includes an assessment of the ability of technologies to meet media-specific objectives, and an assessment of short-term and long-term effectiveness.

Implementability: This criterion includes an assessment of technical feasibility, availability of the technologies, and the administrative feasibility of implementing a control method or technology (NYSDEC 2010a). If a method or technology requires equipment, specialists, or facilities that are unavailable within a reasonable time, it would be eliminated from further consideration.

The screening of technologies, including the technical justification for retaining or not retaining each technology, is discussed in the following sections.

6.1.1 No Action

Under "No Action," no new remedial action or further action of any type would be implemented. The no action alternative reflects site conditions as described in the RI report. The no-action alternative would be appropriate if the site posed no current or future threat to human health or the environment, or if a previous response had eliminated the need for further remedial response. Generally, where institutional controls or remediation are required to control risks, the no-action remedy is inappropriate. Nonetheless, no action is retained in any FS as a general response action to serve as a baseline for comparison with other technologies.

6.1.2 Institutional Controls

Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Institutional controls are widely recognized as suitable for use at impacted sites to mitigate risk (USEPA 2004). Institutional controls may be stand alone or supplement active response actions by reducing potential impacts to human health.

The cost to implement institutional controls can vary widely because of site-specific circumstances, but they are often economical methods for reducing the potential for human exposure to affected media. Institutional controls that are potentially applicable to Site 109 are property controls and government controls.

6.1.2.1 Property Controls

Property controls consist of covenants in deeds for individual properties, which include environmental easements. They can limit, for example, future site use, restrict use of surface soil or groundwater, prohibit well drilling, and define precautions needed for intrusive activities on-site. Such environmental easements can be an effective and low-cost method for preventing human exposure to affected media.

Environmental easements can be an effective and low-cost method for preventing human exposure to affected media. They are retained for further evaluation.

6.1.2.2 Government Controls

Government controls include federal, state, and local government limits for on-site use. They can include requirements to control site use or site modifications and are implemented through zoning codes, property easements, or permits for building or excavation. These controls can be implemented at the discretion of the governing agency with jurisdiction over the site, either by agency action or as court injunctions filed with a court of law. Government controls are retained for further evaluation.

6.1.3 Access Restriction

Access restrictions are physical means of restricting or eliminating the ability to unknowingly enter the property. This most commonly includes physical obstructions such as fencing, but also includes appropriate signage to warn inadvertent trespassers that they are approaching private property that is not accessible as a public thoroughfare or for unapproved public use.

Access restrictions can be an effective and low-cost method for preventing human exposure to affected media. They are retained for further evaluation.

6.1.4 Containment

Containment includes technologies and process options that control mobility of and exposure to constituents of concern by eliminating direct contact between impacted materials and water runoff, limiting exposure by placing a barrier between receptors and residual materials, and supporting or providing erosion resistant surfaces to provide long-term protection.

The cost to implement containment technologies can vary widely because of site-specific circumstances and the various materials that are used. However, they are effective at protecting human health and the environment during and after remedial action by limiting exposure to impacted materials. Containment technologies that are potentially applicable to Site 109 are covers and consolidation areas. Containment technologies are retained for further evaluation.

6.1.4.1 Covers

Covers include materials that interrupt the direct contact pathway to underlying impacted materials that have concentrations of constituents of concerns in excess of the SCGs. Covers under consideration for Site 109 include a soil cover, asphalt or concrete pavement, and structures.

Soil Cover: Soil covers that are properly maintained provide an effective means to interrupt the potential for direct contact with underlying fill. Soil covers for commercial uses are typically a minimum of 12 inches thick. The process of constructing the cover would include clearing, grubbing, grading and compaction of the subgrade.

A cover for Site 109 would consist of one of two types:

1. Vegetated (three layers)
    a. a demarcation layer of polyethylene sheeting, geogrid, or geotextile fabric, or other discernable material
    b. a 9-inch-thick layer of unclassified soil fill that meets the Commercial Use SCGs
    c. 3 inches of topsoil that meets the Commercial Use SCGs
2. Gravel (two layers)
    a. a demarcation layer of polyethylene sheeting, geogrid, or geotextile fabric
    b. a 12-inch-thick layer of gravel fill that meets the requirements of *6 NYCRR Part 375-6.7d* (to be used in areas where redevelopment is anticipated within two years after the remedial action)

The vegetated soil cover would be seeded, fertilized and mulched. The newly seeded covers would be watered and inspected until the vegetation has been established. Depending on the season that a vegetated cover is completed, temporary seeding may be required to maintain the site until the next appropriate planting season.

Cover maintenance (incorporated into the SMP) would, at a minimum, consist of:

- Periodic mowing Inspections to identify any damage to the cap, and repair of any damage.

In areas where the fill is removed and testing verifies the underlying clay meets Commercial Use SCG s, the soil cover may be modified to eliminating the marker layer.

Placement of a soil cover utilizes proven techniques and readily available conventional construction and agricultural equipment. The placement of an equivalent test plot vegetated cover system has been successfully implemented on the BCP Site, near the former shower building in AOI4. There is no limitation to implementation of the technology other than the availability of an off-site topsoil borrow source.

Soil covers are retained for further evaluation.

Asphalt or Concrete Pavement: As Site 109 is developed, roads, sidewalks and parking areas may be placed in lieu of or to replace portions of the soil cover. Pavement, whether placed before or after the soil cover, would comply with the requirements of the Town of Tonawanda. The design of the drainage plans would be incorporated into the stormwater management plan for Site 109, and in accordance with local and state requirements.

If installed after the completion of remedial activities, all excavation for pavement and associated underground utilities would be required to comply with the approved SMP and EWP.

Placement of pavement utilizes proven techniques and readily available conventional construction equipment. There is no limitation to implementation of the technology other than the availability of construction materials (precast concrete utilities, pipe, asphalt and concrete), some of which are only seasonally available.

Pavement as a component of a cover system is retained for further evaluation.

Structures: As part of future redevelopment plans, buildings and structures may be constructed on Site 109. The foundations for structures planned before the soil cover is placed may be constructed before the soil cover is placed. These foundations, slabs, and associated underground utilities would be designed to function as the cover system. Foundation excavations that are conducted in areas where the fill does not meet Commercial Use SCG s would be conducted by construction personnel trained in the management of the materials and in the appropriate PPE. These activities would also be monitored following the Community Air Monitoring Program (CAMP). Foundation excavations that are conducted after completion of the remedial action would be conducted in compliance with an approved SMP and EWP. Earthen materials utilized to support construction of structures

would meet the requirements of 6 NYCRR Part 375-6.7(d).In addition to the standard vapor barriers, a demarcation/marker layer of geotextile would be placed below the subgrade for all building slabs. Building drainage systems would be incorporated into the ground and surface water management plans. Slab design would include testing and, where required, sub-slab depressurization systems.

Construction of buildings and structures utilizes proven techniques and readily available conventional construction equipment. There is no limitation to implementation of the technology other than the availability of construction materials (gravel, pipe, structural steel, and concrete), some of which are only seasonally available.

Buildings and structures as a component of a cover system are retained for further evaluation.

6.1.4.2 Consolidation Areas

Consolidation areas are specifically designated areas that allow placement of materials in a matter that eliminates potential contact by receptors or with shallow groundwater. Consolidation allows development and implementation of the final grading plan while removing contaminated materials from areas of potential exposure.

Like a soil cover, consolidation areas have an erosion-resistant barrier to prevent contact between site receptors and the consolidated materials that exceed Commercial Use SCG s.

Consolidation areas are retained for further evaluation.

6.1.5 Impacted Material Management

The management of impacted materials at Site 109 fall into two categories: excavation and treatment.

The excavation process options address the range of alternatives that could be implemented to handle fill on the property depending on the remedial goals, nature and magnitude of impact, and its position relative to the proposed final grade.

The treatment process options for impacted material at Site 109 address the range of technologies that could be implemented to reduce the toxicity, mobility, or volume of contaminated material, and include in situ treatment and ex situ treatment.

Impacted materials management technologies are retained for further evaluation.

6.1.5.1 Excavation and On-site Placement

Site 109 is primarily comprised of a layer of fill material above clay, with contamination being contained to the fill layer. The final grading of Site 109 may include management of fill materials, including excavation and on-site placement. Activities that may be incorporated into the remedial action include, but are not limited to:

- Excavation of fill to allow access to more impacted materials that require treatment or excavation and off-site management or disposal.
- Excavation of fill to allow installation of surface water controls.
- Excavation of fill for underground utilities, pavement, and foundations.
- Excavation of soil and fill to consolidate materials in areas requiring additional fill and to remove materials from development areas.

The materials would be excavated and remain on Site 109 within the limits of the property in accordance with a final remedial design, and potentially a redevelopment site plan. Regraded fill on the property would be placed below the demarcation layer of a soil cover or in a consolidation area. The fill would be excavated and placed in accordance with an approved remedial design and air monitoring during excavation would be completed in accordance with a CAMP.

Excavation and on-site placement of materials utilizes proven techniques and readily available conventional construction equipment. There is no limitation to implementation of the technology.

Excavation and on-site placement are retained for further evaluation.

6.1.5.2 Excavation and Off-site Management

Excavated fill may be disposed of off-site at an approved landfill. Excavation and off-site disposal technologies introduce a potential off-site exposure pathway associated with trucking on public roadways and increased greenhouse gas emissions associated with both transportation and off-site treatment.

Excavated materials could also be managed at Site 110 or the BCP site, where contamination levels are generally higher than at Site 109. The viability of this approach is dependent on the final selected remedies for Site 110 and the BCP Site.

Excavation and off-site management of materials utilizes proven techniques and readily available conventional construction equipment but is dependent on the availability of transportation and off-site disposal capacity.

Excavation and off-site management are retained for further evaluation.

6.1.5.3 Biotreatment

Biotreatment involves the stimulation of existing bacteria or the introduction of bacteria that consume or transform organic compounds in the fill to less mobile or toxic forms. Biotreatment can be implemented both in situ and ex situ (e.g., bio-piles) and is dependent on the characteristics of the compounds with regard to their bioavailability (i.e., can the bacteria access the compound in the matrix) and the rate the specific compound or compounds biodegrade.

However, while PAHs have, in studies, been successfully treated through biotreatment, the PAHs on Site 109 are largely bound in the fill matrix and are not bioavailable. Therefore, biotreatment is not applicable to the remedial activities at Site 109 and is not retained for further evaluation.

6.1.5.4 Soil Vapor Extraction

Soil vapor extraction (SVE) is a process that accelerates the transfer of VOCs and some SVOCs from a fill or soil matrix to soil vapor and then to a treatment system or the atmosphere depending on measured concentrations. The process depends on volatility of the target compound(s), the ability to maintain vapor flow from the fill/soil matrix (avoiding “short-circuiting to the atmosphere) and the accessibility of the target compound(s).

The primary CPOIs at Site 109 are PAHs and the highest concentrations of concern are in fill layers that are too thin and disconnected to effectively control the radius of influence of the extraction system. VOCs have not been detected above soil Commercial Use SCGs or Class GA groundwater standards. Therefore, soil vapor extraction is not applicable and is not retained for further evaluation.

6.1.5.5 Thermal Desorption/Treatment

Thermal desorption is an extremely high-temperature process that vaporizes the target compounds to allow them to separate from the solid matrix. Thermal treatment is an in situ or ex situ process operated at a reduced, but still high, temperature compared to thermal desorption and is often coupled with SVE processes to mobilize and capture VOCs and less volatile SVOCs. Both thermal desorption and thermal treatment equipment are energy intensive; the associated air control equipment requires specific permitting, and mobilization is expensive.

There is not a sufficient quantity of fill impacted to the degree that would justify mobilization of thermal desorption equipment at Site 109. The majority of the PAH impacted fill on the property was a result of a thermal processes and therefore would not be significantly altered by thermal desorption. Thermal desorption is not

applicable to the majority of the fill at Site 109 due to the origin of the fill from a coke battery (effectively a thermal desorption process). Thermal desorption is not retained for further evaluation.

SECTION 7 DEVELOPMENT AND EVALUATION OF REMEDIAL ACTION ALTERNATIVES

Based on the preliminary evaluations presented in **Section 7**, several remedial technologies have been selected for development and further evaluation as Remedial Alternatives for addressing CPOIs at Site 109. These include:

- Alternative 1: No action
- Alternative 2: Soil Cover/Redevelopment
- Alternative 3: Soil Cover/Redevelopment with Excavation of Ditch Soils
    - Alternative 3A: On-site Management of Ditch Soils
    - Alternative 3B: Off-site Management of Ditch Soils

Consistent with the February 2020 Order on Consent, these alternatives were developed to consider additional actions that may be necessary beyond the institutional controls identified in the 2008 ROD due to the change in use of the site, which is anticipated to include commercial development. A detailed description of these Remedial Alternatives, and an evaluation pertaining to how the alternatives compare to the remedy selection factors set forth in *NYSDEC DER-10*, are presented in the following sections.

7.1 Description of Remedial Alternatives

This section describes remedial alternatives that have been developed for the Site 109 to address contaminated soils that exceed Commercial Use SCGs, based on the evaluation of technologies discussed in **Section 6**. Evaluation of these alternatives, is provided in **Section 7.3**.

7.1.1 Alternative 1 – No Action

Under Alternative 1, no action would be taken to address soil exceedances of Commercial Use SCGs. Natural attenuation would continue in the site subsurface but would not be quantified or monitored. This alternative is used as a baseline for comparison purposes.

7.1.2 Alternative 2 – Soil Cover/Redevelopment and Institutional Controls

Alternative 2 includes a cover system (Figure 15) and institutional controls. Under this alternative, the contact exposure pathway to contaminated soils would be interrupted with the installation of a cover system. Institutional controls would be implemented to restrict exposure to the contaminated soils and groundwater. These controls would prevent site groundwater from being used as a drinking water source and would place controls on excavation and other construction work in the area.

The cover system would be developed and integrated with the redevelopment plans for the site and would include a combination of soil covers, asphalt or concrete paving, and buildings or structures. To allow for placement of the cover system and manage surface water flow, the site would be regraded, as necessary. This would include retention of the stormwater settling ponds and restoration of the drainage ditch along the south side of the site.

The soil cover would be a minimum of 12 inches thick. The process of constructing the cover includes clearing, grubbing, grading, and compaction of the subgrade. The soil cover would consist of one of two types:

1. Vegetated (three layers)
    - a demarcation layer of polyethylene sheeting, geogrid, geotextile fabric, or other discernable material
    - a 9-inch-thick layer of unclassified soil fill that meets the Commercial Use SCGs
    - 3 inches of topsoil that meets the Commercial Use SCGs
2. Gravel (two layers)
    - a demarcation layer of polyethylene sheeting, geogrid, or geotextile fabric
    - a 12-inch-thick layer of gravel fill that meets the requirements of *6 NYCRR Part 375-6.7d* (to be used in areas where redevelopment is anticipated within two years after the remedial action)

Earthen materials used for the cover would meet the Commercial Use SCGs. The 28,600 sf (~0.65 acres) paved surface on the easter side of Site 109 would not be suitable for use as part of the cover system. The pavement would be removed and sent to an offsite recycling facility.

As Site 109 is developed, roads, sidewalks, and parking areas may be placed in lieu of or to replace portions of the soil cover. Pavement, whether placed before or after the soil cover, would comply with the requirements of the Town of Tonawanda. The design of the drainage of all paved areas would be incorporated into the stormwater management plan for the site, and in accordance with local and state requirements.

It is anticipated that buildings and structures would be constructed on Site 109 as part of redevelopment. The foundations for structures planned before the soil cover is placed may be constructed before the soil cover is placed. These foundations, slabs, and associated underground utilities would be designed to function as or replace portions of the soil cover.

Surface water management during and following the remedial action is an important activity associated with Site 109 remediation. Any potential impacts to surface water at the site would be addressed by the cover system. The site would be graded prior to cover construction as necessary to promote appropriate surface water flow and management suitable for both a closed and a redeveloped property. The appropriate collection and control of runoff would limit the potential for erosion of the cover and conveyance of impacted soil.

There are two pre-existing ditches that run through the north and south portions of the site that currently effectively convey water on the property. The northern ditch may or may not be retained depending on final site grading. The southern ditch and related culverts are an integral part of the stormwater collection and conveyance system associated with the site and upgradient BCP Site and would be maintained/restored as part of the remediation. Ditch sections with relatively flat grades can be vegetated while steeper and frequently submerged sections may be lined with more erosion-resistant materials. Earthen materials used for restoration of the ditch would meet sediment and soil ecological SCGs.

It is also assumed that the two concrete-lined settling ponds on Site 109 that receive surface water from the BCP Site would also be retained. However, the existing ponds were designed for the operating TCC Facility, where the majority of the site was covered with permeable surfaces, so the current design may not be appropriate with the planned redevelopment. If the ponds are replaced as part of redevelopment, the design of the retention basins would be dependent on the scope and configuration of the redevelopment. The design would also need to consider space constraints, as specific areas of the retention ponds are required for access, maintenance, and emergency outlets.

This alternative also includes long-term monitoring and maintenance, which would, at a minimum, consist of:

- Periodic mowing of the soil cover
- Periodic inspections of the soil cover to verify that the cover is working as intended and there are no areas of significant erosion or other damage, and repair of any damage if required.

- Periodic groundwater monitoring

This alternative includes implementation of an institutional control in the form of an environmental easement for Site 109 that would:

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

An SMP is a comprehensive document that provides all future owners and operators of Site 109 with the required procedures and protocols to maintain the permanent and ongoing components of the remedial actions. Compliance with this document is required for all future owners and operators of Site 109. The SMP would include the following:

- An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the institutional and engineering controls remain in place and effective.
- An EWP that details the provisions for management of future excavations in areas of remaining impacts.
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions.
- A provision that should a building foundation, building slab, pavement or utility be removed in the future, a cover system consistent with the commercial use would be placed in any area where the upper one foot of exposed surface soil exceeds the applicable SCG s.
- Provisions for the management and inspection of the identified engineering controls.
- Provisions for maintaining site access controls and NYSDEC notification.
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- A Monitoring and Maintenance Plan to assess and ensure the performance and effectiveness of the remedy.
- A provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion.

The EWP is a component of the SMP and defines those procedures that must be followed for any intrusive excavation on Site 109 after the remedial actions are complete. The EWP covers, but is not limited to, project planning, PPE, air monitoring requirements, and materials management. The EWP is required to be followed for any intrusive subsurface work at the Site 109 that may encounter remaining contamination beneath the soil cover, which may include, but is not limited to, installing new sidewalks, roads, utilities, foundations, and fence posts.

Based on the current anticipated activities, it is estimated that this alternative would take one construction season to complete. Actual construction duration could change, as design and construction planning would assess conditions and sequencing factors.

7.1.3 Alternative 3 – Soil Cover/Redevelopment and Institutional Controls with Excavation of Ditch Soils

Under this alternative, in addition to the cover system and institutional controls detailed in Alternative 2, soil within the southern drainage ditch impacted with constituents that exceed soil ecological SCGs would be excavated and restored with clean fill to create a clean drainage corridor (Figure 16). The southern ditch and related culverts are an integral part of the stormwater collection and conveyance system associated with the site and upgradient brownfields site (BCP Site) as they are part of a direct pathway to the Niagara River. Removal of materials that exceed soil ecological SCGs from the southern drainage ditch and creating a clean corridor would effectively eliminate potential concerns related to erosion of a cover within the drainage ditch and minimize the potential for migration of impacted material after the completion of remedial activities.

Based on the results of the Focused RI, it is assumed that the area requiring excavation would be 20 feet wide, following the path of the southern ditch, and 2 feet deep, resulting in approximately 1,200 cubic yards of excavated fill material. Prior to design and construction planning, a Pre-Design Investigation would be conducted to refine excavation areas and depths.

A construction laydown area would be necessary, including sufficient space for the stockpiling of excavated material prior to management or disposal, as well as stockpiling of backfill materials.

Any contact construction water generated during construction work would be (1) collected and treated by the central BCP Site System, (2) collected, treated to discharge limits established by the NYSDEC, and discharged in accordance with SPDES permit requirements, as outlined in *6 NYCRR Part 375*, or (3) discharged to surface water in compliance with a SPDES permit or a SPDES permit equivalency.

Following the completion of excavation activities, the excavated areas would be backfilled with clean fill material that meets soil ecological SCGs, or gravel and rip rap for erosion control, and restored to an appropriate elevation to allow surface water drainage and redevelopment.

Based on the current anticipated activities, it is estimated that this alternative would take approximately one construction season to complete. Actual construction duration could change, as design and construction planning would assess conditions and sequencing factors.

7.1.3.1 Alternative 3a: On-Site Management of Ditch Soils

Under this alternative, the 1,200 cubic yards of soil materials excavated from the drainage ditch would be managed on-site. This material would be placed with the soils on the remainder of Site 109 and graded prior to the installation of the soil cover.

7.1.3.2 Alternative 3b: Off-Site Management of Ditch Soils

Under this alternative, excavated soil from the ditch that exceed 500 mg/kg total PAHs would be management offsite. Options include placement and containment at Site 110 or the BCP Site, and disposal off-site at an approved landfill. The remainder of the excavated material would be placed on Site 109 and graded prior to installation of the demarcation layer and soil cover. The viability of management at Site 110 or the BCP Site of excavated soils that exceed 500 mg/kg total PAHs depends on the final remedy selected for Site 110 and the BCP Site. Therefore, the determination regarding how the material would be managed offsite would be determined during the detailed design following selection of the remedies for Site 110 and the BCP Site.

Based on the results of the Focused RI, it is assumed that 25 percent of the excavated soil (300 cubic yards) would be managed off-site. Based on site analytical data collected during the Focused RI, it has been assumed that excavated material would be considered non-hazardous material for the purposes of disposal.

7.2 Analysis of Alternatives

7.2.1 Criteria for Evaluating Remedial Action Alternatives

Each of the remedial action alternatives is assessed in this Focused FS based on eight of the nine evaluation criteria set forth in *6 NYCRR 375-1.8(f)*. The ninth criterion (community acceptance) would be addressed after the Focused FS is completed. NYSDEC has provided guidance for evaluating these criteria in *DER-10 / Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010a). These nine evaluation criteria are:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with SCGs

Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost effectiveness
- Land use

Modifying Criteria

- Community acceptance

With the exception of the no-action alternative, an alternative must meet the two threshold criteria to be carried through the detailed analysis of alternatives. If the threshold criteria are met, the primary balancing criteria are evaluated to select an overall remedy among the alternatives. The modifying criteria (community acceptance) will be assessed during the development of the ROD Amendment by the NYSDEC based on the public's overall response to the alternatives described in the Focused FS and Draft ROD Amendment.

7.2.1.1 Threshold Criteria

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment is the primary basis for developing the RAOs presented in **Section 4**, and the SCGs have been developed to meet these RAOs. Therefore, by evaluating the extent to which each of the potential alternatives would meet the SCG concentrations, the alternatives are evaluated on their ability to meet the threshold criteria of protection of human health and the environment. This criterion addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with SCGs

SCG compliance is assessed by determining whether or not an alternative meets the federal and state SCGs identified for Site 109. SCGs identified for this site were presented in **Section 3.2** of this Focused FS.

7.2.1.2 Primary Balancing Criteria

Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of a remedial action are evaluated based on the following criteria:

- Permanence of the remedial alternative.
- Magnitude of the human exposures, ecological receptors, and/or impacts to the environment remaining after remediation.
- Adequacy and reliability of controls, if any, used to manage treatment residuals or untreated wastes that remain at the site following remediation.

Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion is evaluated by measuring the effectiveness of material management technologies included as part of an overall remedial alternative. The evaluation of the reduction of toxicity, mobility, or volume through treatment involves consideration of the following:

- Type of containment and treatment.
- Degree of expected reduction in toxicity, mobility, or volume.
- Degree to which treatment would be irreversible.
- Type and quantity of residuals that would be present following treatment.

Short-Term Effectiveness

Short-term effectiveness evaluates the effects of an alternative on human health and the environment during the construction or implementation phase of a remedial action. The following elements are considered while evaluating the short-term effectiveness of each alternative:

- Protection of the community during remedial construction.
- Impacts on the environment.
- Environmental impacts and impacts to site employees and remediation workers during remedial construction.
- Elapsed time until remedial action objectives would be achieved.

Implementability

Implementability considers the technical and administrative feasibility of implementing an alternative and the availability of the services and materials required during its implementation. The following factors are examined as part of implementability to the extent each factor is relevant for a particular alternative:

- Ability to implement selected technologies under site conditions.
- Reliability of technology.
- Availability of necessary equipment, treatment materials, specialists, skilled operators, and provisions to ensure that any necessary additional resources are available.
- Extent and complexity of monitoring remediation effectiveness following implementation.
- Activities needed to coordinate with and obtain consent from other offices and agencies to obtain necessary approvals and permits.

Cost Effectiveness

Cost effectiveness, as described in *DER-10*, is an evaluation of the overall cost effectiveness of all phases of a remedial alternative. Cost estimates are developed for each alternative that include initial capital costs, as well as long-term operation, monitoring and maintenance (OM&M) costs that may be applicable for a remedy. Long-term costs in the cost estimate are normalized to develop a present worth for each alternative for comparison.

Using these estimates, an assessment is made as to whether the cost is proportional to the overall effectiveness of the remedy.

Land Use

Evaluation of land use assesses whether a remedial alternative is reasonable based on the current, intended, and reasonably anticipated future use of the site and its surroundings. This assessment considers factors such as:

- Current use and historical / recent development patterns
- Zoning
- Brownfield redevelopment opportunities
- Any applicable comprehensive community master plans or land use plans
- Land use of surrounding / adjacent areas
- Public comments
- Environmental justice concerns
- Federal or state land-use designations
- Population growth patterns
- Accessibility of existing infrastructure
- Proximity to culturally significant resources
- Proximity to natural resources
- Impacts to off-site groundwater
- Proximity to floodplains
- Geography and geology
- Current institutional controls applicable to the site

7.2.1.3 Modifying Criteria

Community Acceptance

In accordance with *DER-10*, community acceptance is evaluated as part of the final selection and approval of a remedy by NYSDEC. Comments submitted on the remedy during the public comment period are considered by NYSDEC for potential modifications to the remedy. As such, no evaluation of community acceptance of the alternatives is included in this Focused FS Report.

7.2.2 Individual Evaluation of Alternatives

Table 1 provides an analysis of the Remedial Alternatives described in Section 7.1 with respect to each of the evaluation criteria presented in Section 7.2. This analysis forms the basis for the comparative evaluation of alternatives provided in the following sections.

7.2.3 Comparative Evaluation of Alternatives

A comparative analysis between Remedial Alternatives is presented in the following sections. In order for an alternative to be considered for selection, the two Threshold Criteria must be met.

7.2.3.1 Overall Protection of Human Health and the Environment

Alternative 1 would not be protective of human health and the environment. Potential risks associated with contact with soil that exceeds the Commercial Use SCGs and groundwater that exceeds Class GA SCGs would be unmitigated.

Alternatives 2, 3A, and 3B would provide overall protection of human health and the environment as they would interrupt all direct potential exposure pathways and limit or eliminate migration of the materials that exceed the Commercial Use SCGs. Under these alternatives, future on-site workers would be protected by the site cover and by following the SMP and EWPs. Groundwater consumption would be prevented through the implementation of an environmental easement that would restrict the use of groundwater as a source of potable or process water. The environment would also be protected through the containment provided by the cover system.

Alternatives 3A and 3B would present minor short-term increased risks to human health and the environment as compared to Alternative 2 resulting from the excavation, handling, and transportation of materials that exceed the Commercial Use SCGs. However, the volume of materials to be excavated would be relatively low and any potential risks can be readily mitigated through measures such as air monitoring and compliance with Health, Safety and Environment Protection Plans.

7.2.3.2 Compliance with SCGs

Alternative 1 would not result in compliance with SCGs, as this alternative would not address site soils that exceed SCGs.

Alternatives 2, 3A, and 3B would comply with SCGs, as a site cover in combination with institutional controls would limit the potential exposure to the contaminated soil and groundwater that exceeds site SCGs through the interruption of exposure pathways.

7.2.3.3 Long-Term Effectiveness and Permanence

Alternative 1 would not provide long-term effectiveness or permanence.

Alternatives 2, 3A, and 3B would provide long-term effectiveness and permanence. Soil covers are a proven technology for providing long-term isolation of impacted media. Institutional controls and a long-term monitoring and maintenance plan would be detailed in the SMP and would be implemented to ensure long-term integrity of the cover system. Alternatives 3A and 3B would achieve additional long-term effectiveness and permanence through the removal of contaminated materials from the southern drainage ditch and creating a clean corridor, effectively eliminating potential concerns related to erosion of a cover within the drainage ditch. Breeze, coke, and/or coal in fill and ditch surface soils are likely the source of PAHs in ditch soils based on field observations. This material does not present a significant risk and can be effectively contained under the soil cover. Alternative 3B provides a slightly higher level of long-term effectiveness and permanence because excavated soils from the southern ditch that exceed 500 mg/kg total PAHs would be managed offsite either at a secure landfill, or consolidated under a cover at Site 110 or the BCP Site in an area with similar levels of contamination.

7.2.3.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 1 would not reduce the toxicity, mobility, or volume of impacted media through treatment.

Alternatives 2, 3A, and 3B would achieve a reduction in mobility of impacted soil through containment of contaminated materials beneath the cover system. Subsurface impacts that exceeded the Commercial Use SCGs and associated toxicity and mobility may attenuate slowly over time due to natural processes. A reduction in toxicity, mobility, or volume through treatment would not be achieved through any of the alternatives. There are no areas on Site 109 that would represent a principal threat or significant source that would be appropriate for treatment.

7.2.3.5 Short-Term Effectiveness

Alternative 1 would not provide short-term effectiveness in addressing potential risks presented by the site as no action would be taken to address these risks.

Alternatives 2, 3A, and 3B would provide short-term effectiveness. Under Alternatives 2, 3A, and 3B, the cover system can be constructed without the need for prolonged exposure to contaminated soils. Potential short-term risks resulting from construction activities would be effectively mitigated through use of trained construction personnel; implementation of Health, Safety, and Environment Protection Plans; implementation of a CAMP; and use of appropriate erosion control measures. All three alternatives could be implemented within one construction season following completion of the remedial design.

Alternatives 3A and 3B would present minor short-term increased risks to human health and the environment as compared to Alternative 2 resulting from the excavation, handling, and transportation of contaminated materials. However, the volume of materials to be excavated is relatively low and any potential risks can be readily mitigated through measures such as air monitoring and compliance with Health, Safety and Environment Protection Plans. Alternative 3B would present minor additional short-term risks associated with transport of material along public roads if material was disposed of at an off-site landfill.

7.2.3.6 Implementability

Alternative 1 is readily implementable.

Alternatives 2, 3A, and 3B are readily implementable, as the earthwork associated with construction of a soil cover and management of materials rely on conventional equipment and readily available material, and the design and procurement processes are relatively conventional.

7.2.3.7 Cost Effectiveness

In accordance with *DER-10*, estimates have been developed for the remedial action costs that would be required for the development and implementation of the Alternatives listed in **Section 7.1**. For each Alternative, these estimates account for:

- All direct and indirect capital and engineering costs, including labor, materials, equipment, etc.
- Costs associated with Institutional Controls that may be required for a remedy, including legal, administrative, and capital costs.
- Long-term costs associated with remedy monitoring and maintenance.
- Long-term monitoring and maintenance costs normalized to represent net present worth.

Cost estimates for the Alternatives listed in **Section 7.1** are presented in **Appendix A** and summarized in the table below. Based on engineering judgement and practices, several assumptions were made in estimating costs for each of the Remedial Alternatives under consideration, as documented in **Appendix A**.

Alternative	Description	Estimated Total Present Worth
1	No Action	$0
2	Soil Cover/Redevelopment and Institutional Controls	$4,628,000
3A	Soil Cover/Redevelopment and Institutional Controls with Excavation of Ditch Soils and On-Site Management	$4,825,000
3B	Soil Cover/Redevelopment and Institutional Controls with Excavation of Ditch Soils and Off-Site Management	$4,936,000

Cost effectiveness is not a measure of the cost, but of the overall effectiveness compared to the cost.

Alternative 1 would present no cost and no benefit.

Alternatives 2, 3A, and 3B are all relatively cost effective, as the cover system and institutional controls provide protection of human health and the environment with minimal invasive activities and utilize cost-effective technologies. Alternative 3A is slightly more expensive than Alternative 2 but provides potential greater long-term effectiveness through the relocation of materials from the southern drainage ditch and creating a clean corridor, effectively eliminating potential concerns related to erosion of a cover within the drainage ditch. Alternative 3B results in additional costs associated with off-site management of soils excavated from the ditch but provides a higher level of long-term effectiveness and permanence because excavated soils from the southern ditch that exceed 500 mg/kg total PAHs would be managed offsite either at a secure landfill, or consolidated under a cover at Site 110 or the BCP site in an area with similar levels of contamination. For cost estimating purposes, it is assumed that materials managed offsite would be disposed of in an approved landfill. If it is determined during design and following selection of the remedies for Site 110 and the BCP Site that management of this material at Site 110 or the BCP Site was appropriate, costs may be lower.

7.2.3.8 Land Use

Alternative 1 is not consistent with the anticipated future industrial and/or commercial redevelopment of the site. Alternatives 2, 3A, and 3B allow for the anticipated future industrial and/or commercial redevelopment of the site.

7.2.3.9 Community Acceptance

Community Acceptance is not addressed in this Focused FS Report. In accordance with *DER-10*, community acceptance is evaluated as part of the final selection and approval of a remedy by NYSDEC. Comments submitted on the remedy during the public comment period are considered by NYSDEC for potential modifications to the remedy.

SECTION 8 RECOMMENDED REMEDY

Based on the comparative analysis of Remedial Alternatives presented in **Section 7**, Alterative 3B (Soil Cover/Redevelopment and Institutional Controls with Excavation and Offsite Management of Ditch Soils) is the recommended remedy to address the potential risks associated with contaminated materials at Site 109. Alternative 3B would provide overall protection of human health and the environment and comply with SCGs. Through the implementation of institutional controls and installation of the cover system, this alternative would allow for CPOIs to continue to naturally attenuate while mitigating potential risks to human health and the environment. Alternative 3B is readily implementable, presents no significant short term risks during implementation, and is consistent with the anticipated industrial and/or commercial use of the site. Alternative 3B also provides long-term effectiveness using proven technologies and is cost-effective.

Excavation of impacted soils from the southern drainage ditch under Alternative 3B would create a clean corridor for surface water drainage, which would provide additional protection to human health and the environment as compared to Alternative 2 by effectively eliminating potential concerns related to erosion of a cover within the drainage ditch and minimize the potential for migration of impacted material after the completion of remedial activities. While more expensive than Alternative 2, the additional excavation maintains a high cost effectiveness while providing additional protection to human health and the environment. Alternative 3B results in additional costs associated with off-site management of soils excavated from the ditch but provides a higher level of long-term effectiveness and permanence because excavated soils from the southern ditch that exceed 500 mg/kg total PAHs would be managed offsite either at a secure landfill, or consolidated under a cover at Site 110 or the BCP Site in an area with similar levels of contamination.

Potential exposure pathways to contaminated soils would be interrupted with the installation of a cover system. Institutional controls would also be implemented to restrict exposure to the contaminated soils and groundwater. These controls would prevent site groundwater from being used as a drinking water source and would place controls on excavation and other construction work in the area.

The cover system would be developed and integrated with the redevelopment plans for the site and would include a combination of soil covers, asphalt or concrete paving, and buildings or structures. To allow for placement of the cover system and manage surface water flow, the site would be regraded, as necessary. This would include retention of the stormwater settling ponds and restoration of the drainage ditch along the south side of the site.

The soil cover would be a minimum of 12 inches thick. The process of constructing the cover would include clearing, grubbing, grading, and compaction of the subgrade. The soil cover would consist of one of two types:

1. Vegetated (three layers)
    - a demarcation layer of polyethylene sheeting, geogrid, geotextile fabric, or other discernable material
    - a 9-inch-thick layer of unclassified soil fill that meets the Commercial Use SCGs
    - 3 inches of topsoil that meets the Commercial Use SCGs
2. Gravel (two layers)
    - a demarcation layer of polyethylene sheeting, geogrid, or geotextile fabric
    - a 12-inch-thick layer of gravel fill that meets the requirements of *6 NYCRR Part 375-6.7d* (to be used in areas where redevelopment is anticipated within two years after the remedial action)

Earthen materials used for the cover would meet the Commercial Use SCGs.

As Site 109 is developed, roads, sidewalks, and parking areas may be placed in lieu of or to replace portions of the soil cover. Pavement, whether placed before or after the soil cover, would comply with the requirements of the Town of Tonawanda. The design of the drainage of all paved areas would be incorporated into the stormwater management plan for the site, and in accordance with local and state requirements.

It is anticipated that buildings and structures would be constructed on Site 109 as part of redevelopment. The foundations for structures planned before the soil cover is placed may be constructed before the soil cover is placed. These foundations, slabs, and associated underground utilities would be designed to function as or replace portions of the soil cover.

Surface water management during and following the remedial action is an important activity associated with Site 109 remediation. Any potential impacts to surface water at the site would be addressed by the cover system. The site would be graded prior to cover construction as necessary to promote appropriate surface water flow and management suitable for both a closed and a redeveloped property. The appropriate collection and control of runoff would limit the potential for erosion of the cover and conveyance of impacted soil.

There are two pre-existing ditches that run through the north and south portions of the site that currently effectively convey water on the property. The northern ditch may or may not be retained depending on final site grading. The southern ditch and related culverts are an integral part of the stormwater collection and conveyance system associated with the site and upgradient BCP Site and would be maintained/restored as part of the remediation. Soil within the southern drainage ditch with constituents that exceed sediment and ecological SCGs would be excavated and the ditch would be restored with clean fill to create a clean drainage corridor. Excavation of the soils within the ditch would limit the potential migration of impacted material after the completion of remedial activities. Based on the results of the Focused RI, it is assumed that the area requiring excavation would be 20 feet wide, following the path of the southern ditch, and 2 feet deep, resulting in approximately 1,200 cubic yards of excavated fill material. Prior to design and construction planning, a Pre-Design Investigation would be conducted to refine excavation areas and depths. Earthen materials used for restoration of the ditch would meet sediment and soil ecological SCGs.

Excavated soil from the ditch that exceed 500 mg/kg total PAHs would be management offsite. Options include placement and containment at Site 110 or the BCP Site, and disposal off-site at an approved landfill. The remainder of the excavated material would be placed on Site 109 and graded prior to installation of the demarcation layer and soil cover. The viability of management at Site 110 or the BCP Site of excavated soils that exceed 500 mg/kg total PAHs depends on the final remedy selected for Site 110 and the BCP Site. Therefore, the determination regarding how the material would be managed offsite would be determined during the detailed design following selection of the remedies for Site 110 and the BCP Site.

It is also assumed that the two concrete-lined settling ponds on Site 109 that receive surface water from the BCP Site would be retained. However, the existing pond was designed for the operating TCC Facility, where the majority of the site was covered with permeable surfaces, so the current design may not be appropriate with the planned redevelopment. If the ponds are replaced as part of redevelopment, the design of the retention basins would be dependent on the scope and configuration of the redevelopment. The design would also need to consider space constraints, as specific areas of the retention ponds are required for access, maintenance, and emergency outlets.

Any contact construction water generated during construction work would be (1) collected and treated by the central BCP Site System, (2) collected, treated to discharge limits established by the NYSDEC, and discharged in accordance with SPDES permit requirements, as outlined in *6 NYCRR Part 375*, or (3) discharged to surface water in compliance with a SPDES permit or a SPDES permit equivalency.

This alternative also includes monitoring and maintenance of the soil cover, which would, at a minimum, consist of:

- Periodic mowing
- Inspections to identify any damage to the cap, and repair of any damage.

This alternative includes implementation of an institutional control in the form of an environmental easement for Site 109 that would:

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

An SMP would be prepared that provides all future owners and operators of Site 109 with the required procedures and protocols to maintain the permanent and ongoing components of the remedial actions. Compliance with this document would be required for all future owners and operators of Site 109. The SMP would include the following:

- An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the institutional and engineering controls remain in place and effective.
- An EWP that details the provisions for management of future excavations in areas of remaining impacts.
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions.
- A provision that should a building foundation, building slab, pavement or utility be removed in the future, a cover system consistent with the commercial use would be placed in any area where the upper one foot of exposed surface soil exceeds the applicable SCG s.
- Provisions for the management and inspection of the identified engineering controls.
- Provisions for maintaining site access controls and NYSDEC notification.
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
- A Monitoring and Maintenance Plan to assess and ensure the performance and effectiveness of the remedy.
- A provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion.

The EWP is a component of the SMP and defines those procedures that must be followed for any intrusive excavation on Site 109 after the remedial actions are complete. The EWP covers, but is not limited to, PPE, air monitoring requirements, and materials management. The EWP would be required to be followed for any intrusive subsurface work at the Site 109 that may encounter remaining contamination beneath the soil cover, which may include, but it not limited to, installing new sidewalks, roads, utilities, foundations, and fence posts.

Based on the current anticipated activities, it is estimated that this alternative would take one construction season to complete. Actual construction duration could change, as design and construction planning would assess conditions and sequencing factors.

SECTION 9 REFERENCES

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TABLES

Honeywell

PARSONS

TABLE 1

INDIVIDUAL EVALUATION OF ALTERNATIVES

Alternative	Description	Threshold Criteria		Primary Balancing Criteria						Modifying Considerations
		Overall Protection of Human Health and the Environment	Compliance with SCGs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost Effectiveness	Land Use	Community Acceptance
1	No Action	Would not provide protection of human health and the environment.	Would not comply with SCGs.	Would not provide long-term effectiveness of permanence.	Would not reduce toxicity, mobility, or volume through treatment.	Would not provide short-term effectiveness, as no action would be taken to address risks.	Would be readily implementable.	Presents no cost and no benefit.	Would not allow for the anticipated future use of the site, as contamination would not be addressed.	To be determined.
2	Soil Cover/ Redevelopment and Institutional Controls	Would provide overall protection of human health and the environment by interrupting all direct potential exposure pathways on the site and limiting or eliminating migration of the contaminated materials. Site workers would be protected by following the SMP and EWPs. Groundwater consumption would be prevented through the implementation of an environmental easement that would restrict the use of groundwater as a source of potable or process water. The environment would be protected by the containment provided by the cover system.	Would comply with SCGs through the interruption of potential exposure pathways associated with any SCG exceedances.	The soil cover in conjunction with potential institutional controls and implementation of the long-term monitoring and maintenance plan would provide long-term effectiveness.	Would not reduce toxicity, mobility, or volume through treatment. No areas of significantly elevated contaminant concentrations that would represent a principal threat or significant source that would be appropriate for treatment are present. Subsurface contamination and associated toxicity and mobility may attenuate slowly over time due to natural processes. Mobility of surface contamination would be reduced through containment beneath the cover.	Would provide short term effectiveness. The cover system could be constructed without the need for prolonged exposure to contaminated soils. Site workers, the environment and potential offsite receptors would be protected during implementation by development of and compliance with Health, Safety and Environment Protection Plans, a CAMP, and use of appropriate erosion control measures.	Would be readily implementable. The earthmoving associated with construction of a cover system relies on conventional equipment and readily available materials. Design and procurement processes would be relatively conventional.	Cost effective. The cover system and institutional control would provide protection of human health and the environment with minimal invasive activities and use cost-effective technologies.	Would allow for the commercial or industrial redevelopment as planned for the site.	To be determined.

TABLE 1

INDIVIDUAL EVALUATION OF ALTERNATIVES

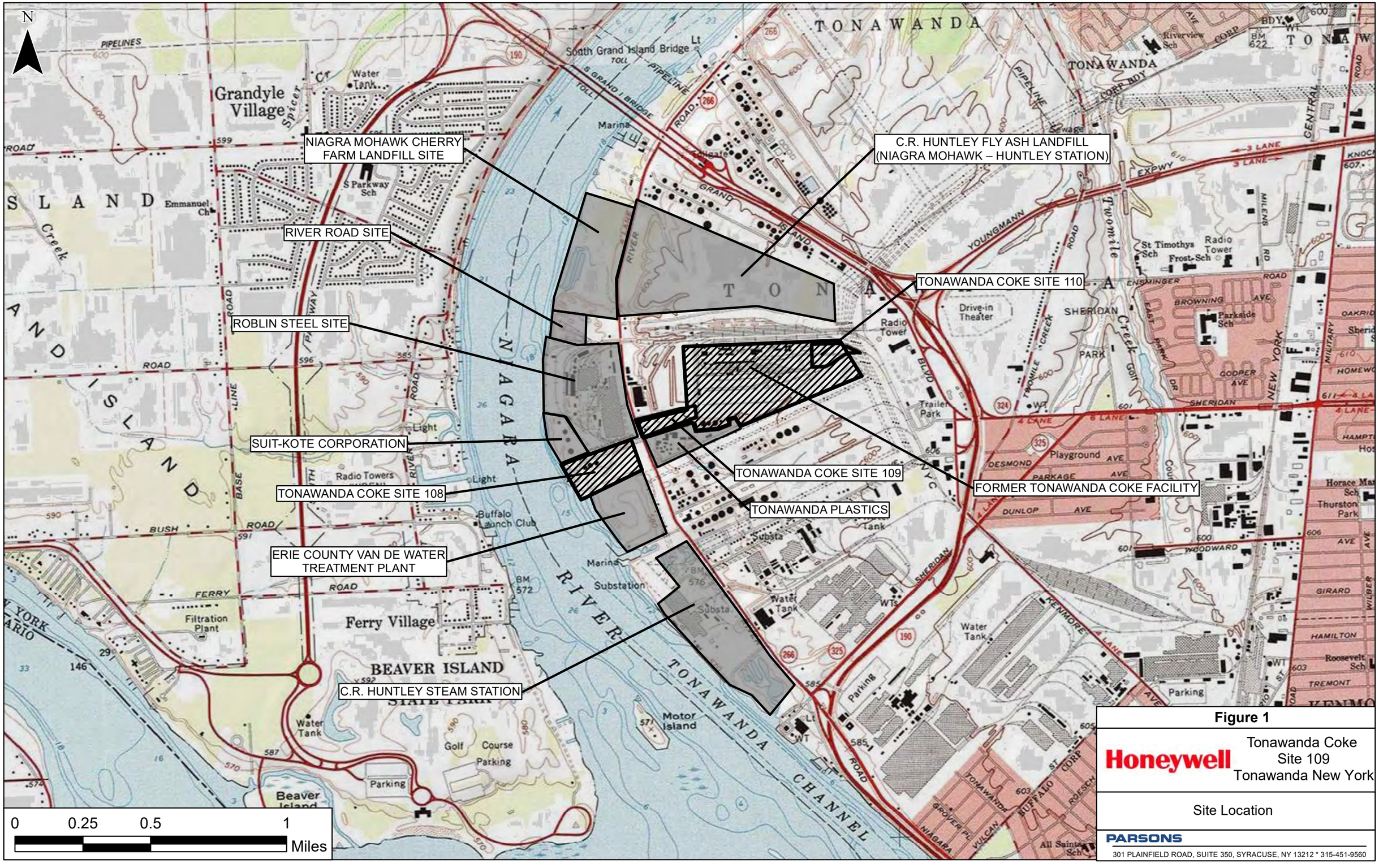
Alternative	Description	Threshold Criteria		Primary Balancing Criteria						Modifying Considerations
		Overall Protection of Human Health and the Environment	Compliance with SCGs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost Effectiveness	Land Use	Community Acceptance
3a	Soil Cover/ Redevelopment and Institutional Controls with Excavation of Ditch Soils and On-Site Management of Ditch Soils	Would provide overall protection of human health and the environment by interrupting all direct potential exposure pathways on the site and limiting or eliminating migration of the contaminated materials. Site workers would be protected by following the SMP and EWPs. Groundwater consumption would be prevented through the implementation of an environmental easement that would restrict the use of groundwater as a source of potable or process water. The environment would be protected by the containment provided by the cover system, and excavation of ditch soils.	Would comply with SCGs through the interruption of potential exposure pathways associated with any SCG exceedances.	The soil cover in conjunction with potential institutional controls and implementation of the long-term monitoring and maintenance plan would provide long-term effectiveness. Additional long-term effectiveness and permanence would be achieved through the removal of contaminated materials from the southern drainage ditch.	Would not reduce toxicity, mobility, or volume through treatment. No areas of significantly elevated contaminant concentrations that would represent a principal threat or significant source that would be appropriate for treatment are present. Subsurface contamination and associated toxicity and mobility may attenuate slowly over time due to natural processes. Mobility of surface contamination would be reduced through containment beneath the cover.	Would provide short term effectiveness. The cover system could be constructed without the need for prolonged exposure to contaminated soils. It could be implemented in one construction season following completion of the remedial design. There would be an increased risk resulting from the excavation, handling and transportation of contaminated materials resulting from excavation of ditch soils, however, site workers, the environment and potential off-site receptors would be protected during implementation by development of and compliance with Health, Safety and Environment Protection Plans , a CAMP, and use of appropriate erosion control measures.	Would be readily implementable. The earthmoving associated with construction of a cover system relies on conventional equipment and readily available materials. Design and procurement processes would be relatively conventional.	Cost effective. The cover system and institutional controls would provide protection of human health and the environment with minimal invasive activities and use cost-effective technologies. There are added costs associated with excavation of ditch soils; however, this would provide potential greater long-term effectiveness by elimination concerns related to erosion of the cover system within the drainage ditch.	Would allow for the commercial or industrial redevelopment as planned for the site.	To be determined.

TABLE 1

INDIVIDUAL EVALUATION OF ALTERNATIVES

Alternative	Description	Threshold Criteria		Primary Balancing Criteria						Modifying Considerations
		Overall Protection of Human Health and the Environment	Compliance with SCGs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost Effectiveness	Land Use	Community Acceptance
3b	Soil Cover/ Redevelopment and Institutional Controls with Excavation of Ditch Soils and Off-Site Management of Ditch Soils	Would provide overall protection of human health and the environment by interrupting all direct potential exposure pathways on the site and limiting or eliminating migration of the contaminated materials. Site workers would be protected by following the SMP and EWPs. Groundwater consumption would be prevented through the implementation of an environmental easement that would restrict the use of groundwater as a source of potable or process water. The environment would be protected by the containment provided by the cover system, and excavation of ditch soils.	Would comply with SCGs through the interruption of potential exposure pathways associated with any SCG exceedances.	The soil cover in conjunction with potential institutional controls and implementation of the long-term monitoring and maintenance plan would provide long-term effectiveness. Additional long-term effectiveness and permanence would be achieved through the removal of contaminated materials from the southern drainage ditch.	Would not reduce toxicity, mobility, or volume through treatment. No areas of significantly elevated contaminant concentrations that would represent a principal threat or significant source that would be appropriate for treatment are present. Subsurface contamination and associated toxicity and mobility may attenuate slowly over time due to natural processes. Mobility of surface contamination would be reduced through containment beneath the cover.	Would provide short term effectiveness. The cover system could be constructed without the need for prolonged exposure to contaminated soils. It could be implemented in one construction season following completion of the remedial design. There would be an increased risk resulting from the excavation, handling and transportation of contaminated materials resulting from excavation of ditch soils, however, site workers, the environment and potential off-site receptors would be protected during implementation by development of and compliance with Health, Safety and Environment Protection Plans , a CAMP, and use of appropriate erosion control measures. Short-term risk would be increased by the transportation of contaminated materials on public roads if offsite management of ditch soils was at an offsite landfill.	Would be readily implementable. The earthmoving associated with construction of a cover system relies on conventional equipment and readily available materials. Design and procurement processes would be relatively conventional.	Cost effective. The cover system and institutional controls would provide protection of human health and the environment with minimal invasive activities and use cost-effective technologies. There are added costs associated with off-site mamagement of excavated materials from the drainage ditch, however the alternative provides a higher level of long-term effectiveness and permanence because excavated soils from the southern ditch that exceed 500 mg/kg total PAHs would be managed offsite either at a secure landfill, or consolidated under a cover at Site 110 or the BCP site in an area with similar levels of contamination.	Allows for the commercial or industrial redevelopment as planned for the site.	To be determined.

FIGURES



Plotted By: Sisson, Evan

Plot Date: 3/21/2022

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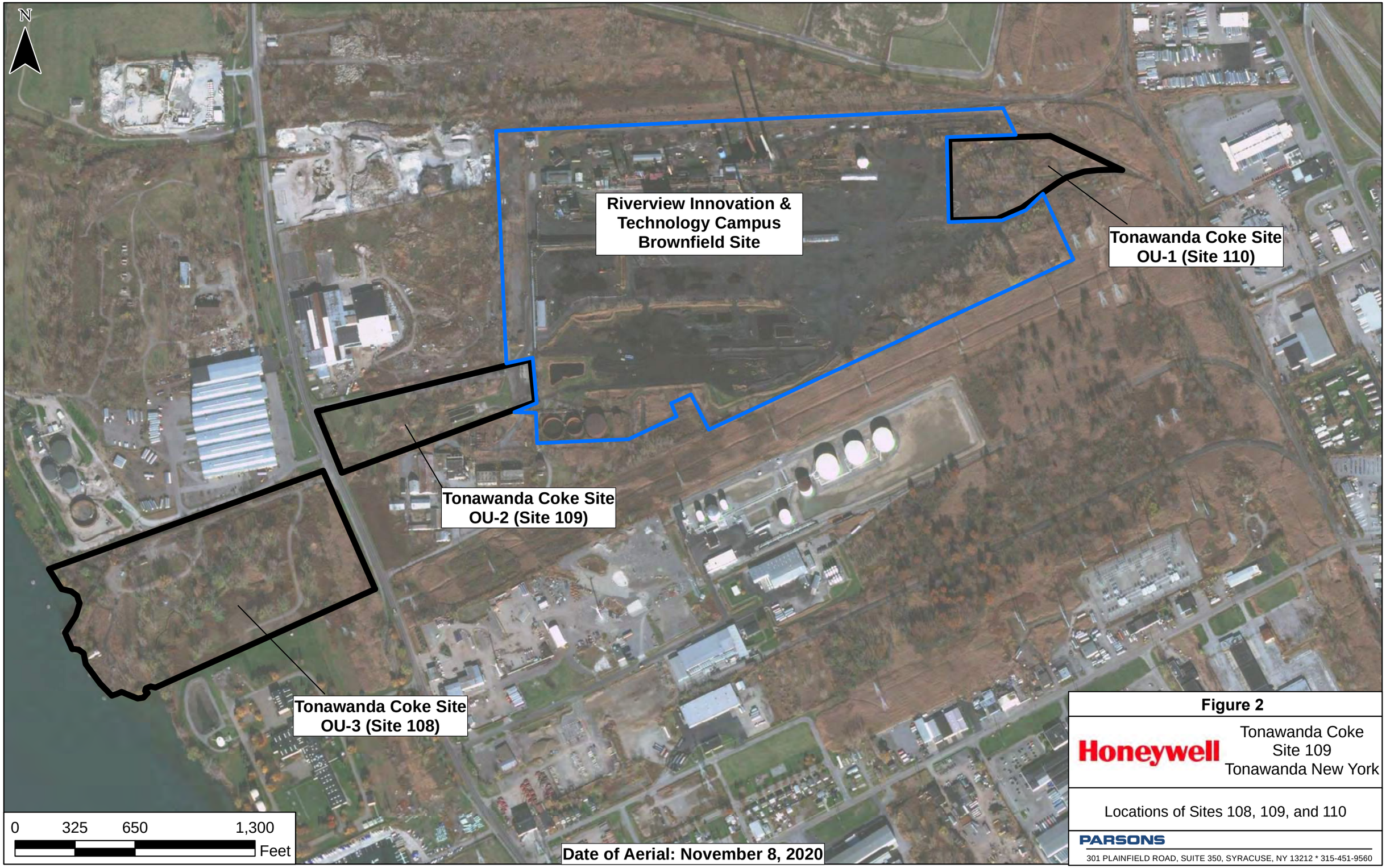
Figure 1

Honeywell

Tonawanda Coke
Site 109
Tonawanda New York

Site Location

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560



Plotted By: CS

Plot Date: 2/4/2022

Figure 2

Honeywell

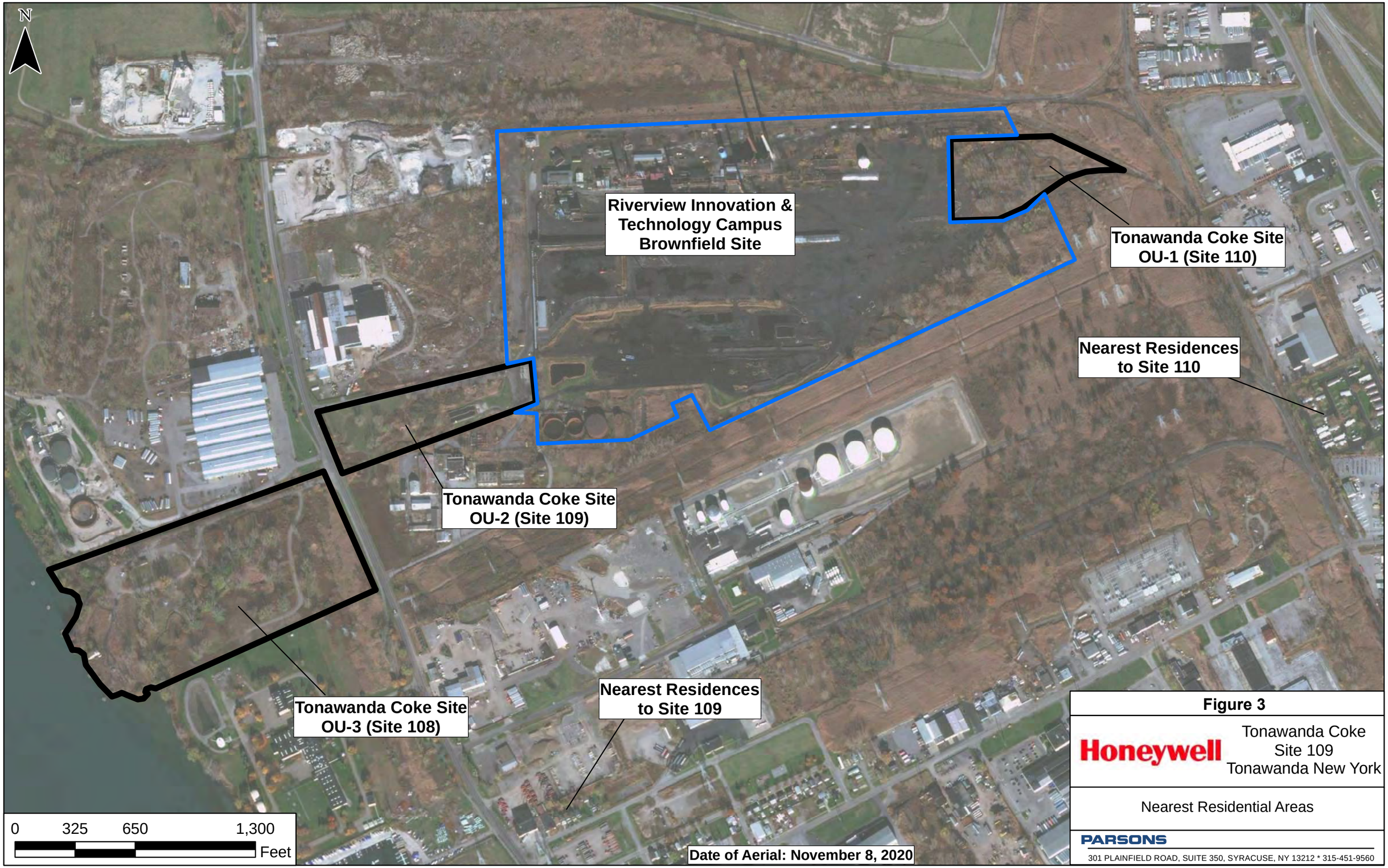
Tonawanda Coke Site 109
Tonawanda New York

Locations of Sites 108, 109, and 110

PARSONS

301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: Q:\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Tonawanda Site 109 and 110 Fig 2.mxd



Plotted By: CS

Plot Date: 3/29/2022

Figure 3

Honeywell

Tonawanda Coke Site 109 Tonawanda New York

Nearest Residential Areas

PARSONS

301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: Q:\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Tonawanda Site RI Report Fig 3.mxd

N

MW-4
TP-B
MW-01-2020
TP-06-2020
SS-8
TP-05-2020
SB-03-2020
MW-02-2020
SS-6
SS-9
Outfall-002
TP-D
MW17-89
TP-E
TP-03-2020
TP-A
SB-01-2020
TP-02-2020
Outfall-001
SS-10
TP-04-2020
TP-C
SB-02-2020
TP-01-2020
TP-01-2020A
SS-7
MW-03-2020
Outfall-004
SB-04-2020

2020/2021 Focused RI Test Pit
2020/2021 Focused RI Monitoring Well
2020/2021 Focused RI Soil Boring
BCP Site SWPPP Outfalls
Storm Culvert
Surface Drainage
Historical Surface Soil Location
Historical Test Pit Location
Historical Monitoring Well Location
Topographic Contour, 1' (NAVD88)
Property Boundary
Site Boundary

0 65 130 260
Feet

Plotted By: CS
Plot Date: 7/10/2023

Topographic survey was conducted January 2020

Date of Aerial: November 8, 2020

Figure 4

Honeywell

Tonawanda Coke
Site 109
Tonawanda New York

Site 109
Site Plan and Investigation Locations

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

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N

A

A'

B

B'

C

C'

MW-4

TP-B

MW-01-2020

TP-06-2020

TP-05-2020

SS-8

SB-03-2020

MW-02-2020

SS-6

SS-9

Outfall-002

SB-01-2020

TP-D

MW17-89

TP-E

TP-A

TP-03-2020

TP-02-2020

Outfall-001

SS-10

TP-04-2020

TP-C

TP-01-2020

TP-01-2020A

SB-02-2020

SS-7

MW-03-2020

Outfall-004

SB-04-2020

2020/2021 Focused RI Test Pit

2020/2021 Focused RI Monitoring Well

2020/2021 Focused RI Soil Boring

BCP Site SWPPP Outfalls

Storm Culvert

Surface Drainage

Historical Surface Soil Location

Historical Test Pit Location

Historical Monitoring Well Location

Topographic Contour, 1' (NAVD88)

Property Boundary

Site Boundary

0 65 130 260

Feet

Plotted By: CS

Plot Date: 7/13/2023

Topographic survey was conducted January 2020

Date of Aerial: November 8, 2020

Figure 5

Honeywell

Tonawanda Coke
Site 109
Tonawanda New York

Site 109 Cross Section Locations

PARSONS

301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

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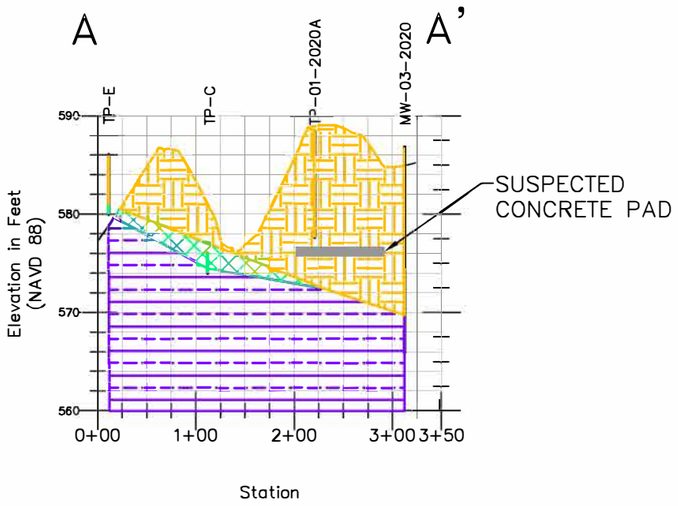

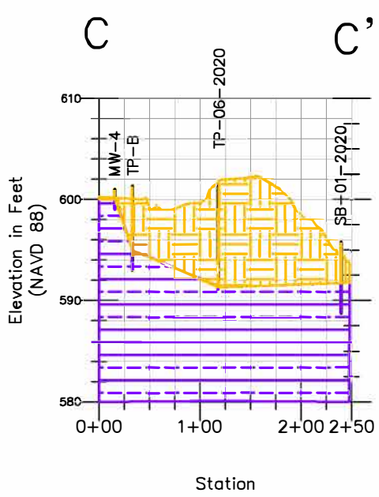

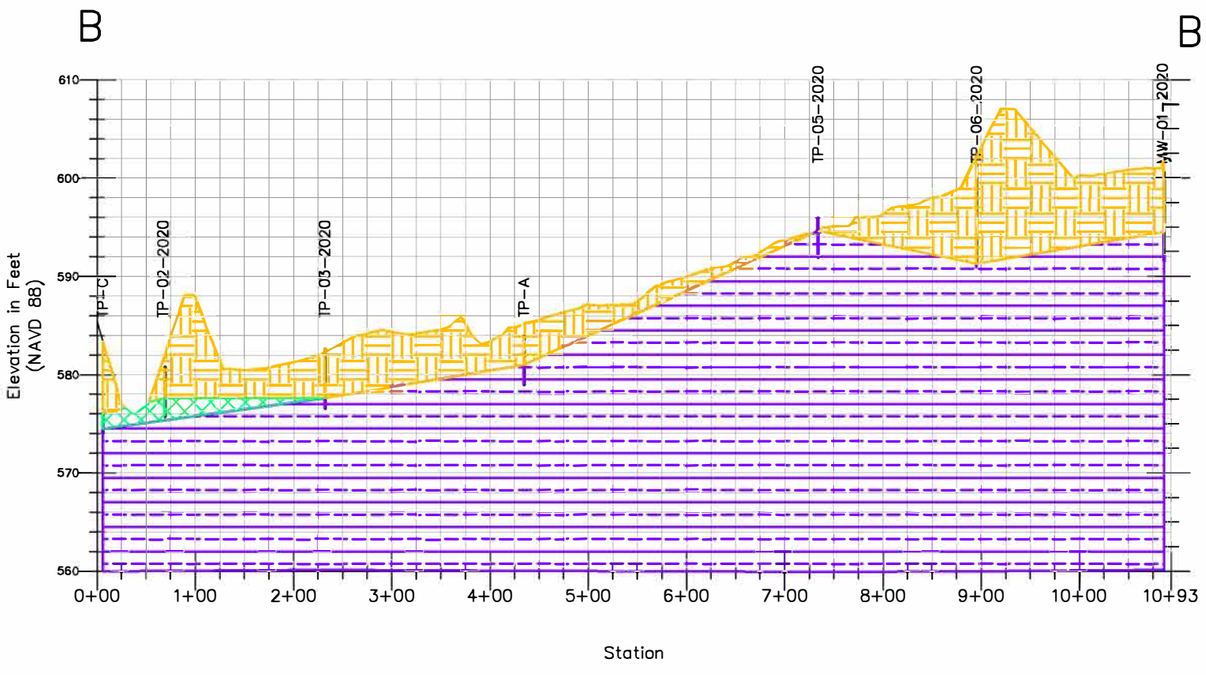

NOTE:

1. EXISTING GRADE FROM SITE SURVEY PERFORMED JANUARY 2020.
2. DISCREPANCIES IN GROUND SURFACE AT 2020/2021 FOCUSED RI INVESTIGATION (LOCATIONS ENDING IN –2020 OR –2021) ARE DUE TO LOCATIONS BEING OFFSET SLIGHTLY FROM THE TRANSECT. DISCREPANCIES IN GROUND SURFACE AT HISTORICAL LOCATIONS ARE DUE TO LOCATIONS BEING OFFSET FROM THE TRANSECT, AS WELL AS POTENTIAL INACCURACIES IN HISTORICAL SURVEY DATA.
3. SUSPECTED CONCRETE SLAB IN A–A'. TOP OF SUSPECTED CONCRETE SLAB CONCRETE IS SHOWN AT DEPTH OF REFUSAL IN TP–01–2020. SLAB DIMENSIONS ARE APPROXIMATED FROM (1967 DRAWING) AND DO NOT NECESSARILY REPRESENT ACTUAL SLAB LOCATION AND DIMENSIONS.

LEGEND:

SD–05–2020 SAMPLE ID

EXISTING GRADE (NOTE 1)

FILL

GRAY CLAY

REDDISH BROWN CLAY

15 0 15 30

SCALE: 1"=15'
Vertical

150 0 150 300

SCALE: 1"=150'
Horizontal

Vertical Exaggeration 10X

Figure 6

Honeywell

Tonawanda Coke
Site 109
Tonawanda, New York

Site 109 Geologic Cross Sections

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315–451–9560

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PLOT DATE: 7/13/2023 9:46 AM PLOTTED BY: RUSSO, JILL [US–US]

N

MW17-89
575.59

MW-02-2020
582.37

MW-01-2020
598.05

MW-03-2020
571.52

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598

Monitoring Well

606 Groundwater Elevation (ft NAVD88) 1 ft Contour

Groundwater Contour Line

Property Boundary

Site Boundary

0 80 160 320

Feet

Notes: 1. Groundwater elevations measured on 1/11/2021.
2. Eastern and southern contours considered groundwater elevations measured concurrently at the BCP Site and Tonawanda Plastics Site

Plotted By: CS

Plot Date: 2/14/2023

Figure 7

Honeywell

Tonawanda Coke
Site 109
Tonawanda New York

Site 109 Groundwater Contours
January 2021

PARSONS

301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

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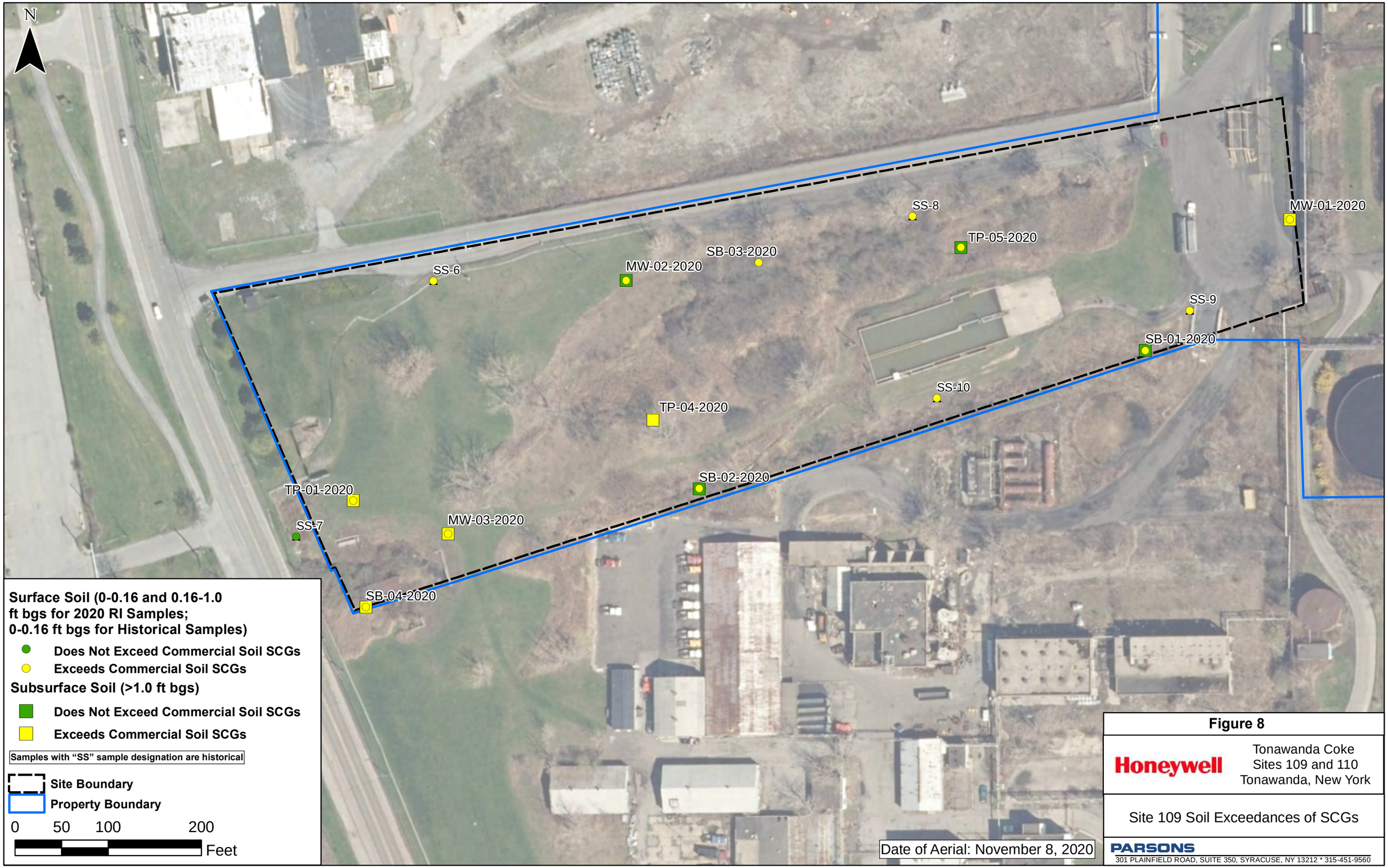


Figure 8

Honeywell

Tonawanda Coke
Sites 109 and 110
Tonawanda, New York

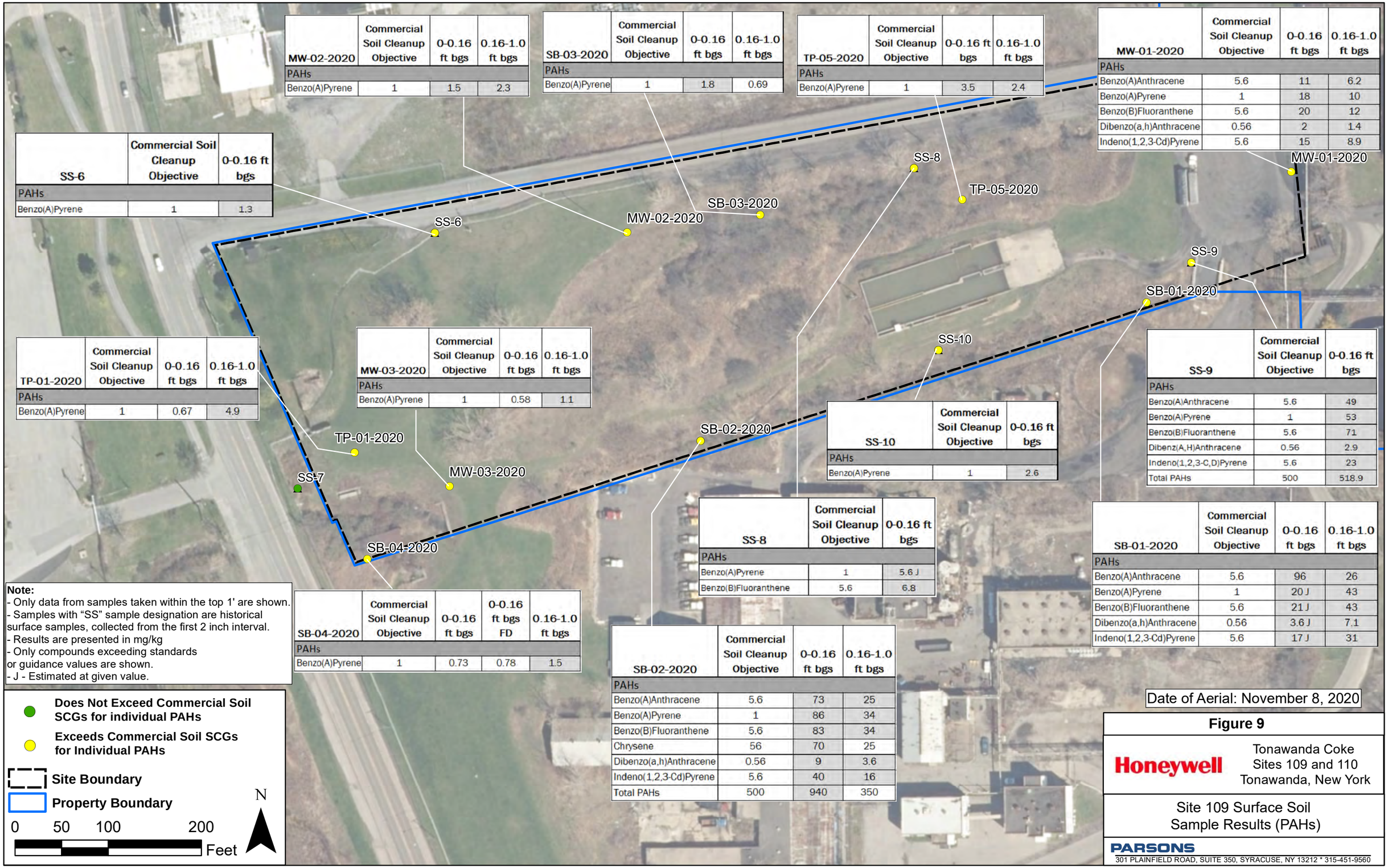
Site 109 Soil Exceedances of SCGs

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Plotted By: J. Domanski

Plot Date: 10/23/2023

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Rev03 - RI\Tonawanda Site 109 RI Report Fig 13 Soil SCGs_Rev3.mxd



MW-02-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Pyrene	1	1.5	2.3

SB-03-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Pyrene	1	1.8	0.69

TP-05-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Pyrene	1	3.5	2.4

MW-01-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Anthracene	5.6	11	6.2
Benzo(A)Pyrene	1	18	10
Benzo(B)Fluoranthene	5.6	20	12
Dibenzo(a,h)Anthracene	0.56	2	1.4
Indeno(1,2,3-Cd)Pyrene	5.6	15	8.9

SS-6	Commercial Soil Cleanup Objective	0-0.16 ft bgs
PAHs		
Benzo(A)Pyrene	1	1.3

TP-01-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Pyrene	1	0.67	4.9

MW-03-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Pyrene	1	0.58	1.1

SS-10	Commercial Soil Cleanup Objective	0-0.16 ft bgs
PAHs		
Benzo(A)Pyrene	1	2.6

SS-9	Commercial Soil Cleanup Objective	0-0.16 ft bgs
PAHs		
Benzo(A)Anthracene	5.6	49
Benzo(A)Pyrene	1	53
Benzo(B)Fluoranthene	5.6	71
Dibenz(A,H)Anthracene	0.56	2.9
Indeno(1,2,3-C,D)Pyrene	5.6	23
Total PAHs	500	518.9

SS-8	Commercial Soil Cleanup Objective	0-0.16 ft bgs
PAHs		
Benzo(A)Pyrene	1	5.6 J
Benzo(B)Fluoranthene	5.6	6.8

SB-01-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Anthracene	5.6	96	26
Benzo(A)Pyrene	1	20 J	43
Benzo(B)Fluoranthene	5.6	21 J	43
Dibenzo(a,h)Anthracene	0.56	3.6 J	7.1
Indeno(1,2,3-Cd)Pyrene	5.6	17 J	31

SB-02-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0.16-1.0 ft bgs
PAHs			
Benzo(A)Anthracene	5.6	73	25
Benzo(A)Pyrene	1	86	34
Benzo(B)Fluoranthene	5.6	83	34
Chrysene	56	70	25
Dibenzo(a,h)Anthracene	0.56	9	3.6
Indeno(1,2,3-Cd)Pyrene	5.6	40	16
Total PAHs	500	940	350

SB-04-2020	Commercial Soil Cleanup Objective	0-0.16 ft bgs	0-0.16 ft bgs FD	0.16-1.0 ft bgs
PAHs				
Benzo(A)Pyrene	1	0.73	0.78	1.5

Note:
- Only data from samples taken within the top 1' are shown.
- Samples with "SS" sample designation are historical surface samples, collected from the first 2 inch interval.
- Results are presented in mg/kg
- Only compounds exceeding standards or guidance values are shown.
- J - Estimated at given value.

Does Not Exceed Commercial Soil SCGs for individual PAHs

Exceeds Commercial Soil SCGs for Individual PAHs

Site Boundary

Property Boundary

0 50 100 200 Feet

N

Date of Aerial: November 8, 2020

Figure 9

Honeywell

Tonawanda Coke
Sites 109 and 110
Tonawanda, New York

Site 109 Surface Soil
Sample Results (PAHs)

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Plotted By: J. Domanski

Plot Date: 10/23/2023

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Rev03 - RI\Tonawanda Site 109 RI Report Fig 14 Soil PAH_Rev3.mxd

MW-01-2020	Commercial Soil Cleanup Objective	3.0-4.0 ft bgs
PAHs		
Benzo(A)Pyrene	1	9.3
Benzo(B)Fluoranthene	5.6	9.4
Dibenzo(a,h)Anthracene	0.56	1.3
Indeno(1,2,3-Cd)Pyrene	5.6	7.5

MW-01-2020

TP-05-2020

No Exceedances

MW-02-2020

No Exceedances

SB-01-2020

No Exceedances

TP-04-2020

TP-01-2020	Commercial Soil Cleanup Objective	2.0-3.0 ft bgs	10.0-10.6 ft bgs
PAHs			
Benzo(A)Anthracene	5.6	0.53	7.5
Benzo(A)Pyrene	1	0.73	9.2
Benzo(B)Fluoranthene	5.6	0.84	9.3
Dibenzo(a,h)Anthracene	0.56	0.11	0.91
Indeno(1,2,3-Cd)Pyrene	5.6	0.45	6.2

TP-01-2020

SB-02-2020

No Exceedances

TP-04-2020	Commercial Soil Cleanup Objective	2.5-3.0 ft bgs
PAHs		
Benzo(A)Pyrene	1	4.3

MW-03-2020

MW-03-2020	Commercial Soil Cleanup Objective	8.0-10.0 ft bgs
PAHs		
Benzo(A)Pyrene	1	1.7

SB-04-2020

SB-04-2020	Commercial Soil Cleanup Objective	3.0-4.0 ft bgs
PAHs		
Benzo(A)Pyrene	1	2.1

Note:
- Only data from samples taken below the top 1' are shown.
- Results are presented in mg/kg
- Only compounds exceeding standards or guidance values are shown.
- J - Estimated at given value.

Does Not Exceed Commercial Soil SCGs for Individual PAHs

Exceeds Commercial Soil SCGs for Individual PAHs

Site Boundary

Property Boundary

N

0 50 100 200 Feet

Date of Aerial: November 8, 2020

Figure 10

Honeywell

Tonawanda Coke
Sites 109 and 110
Tonawanda, New York

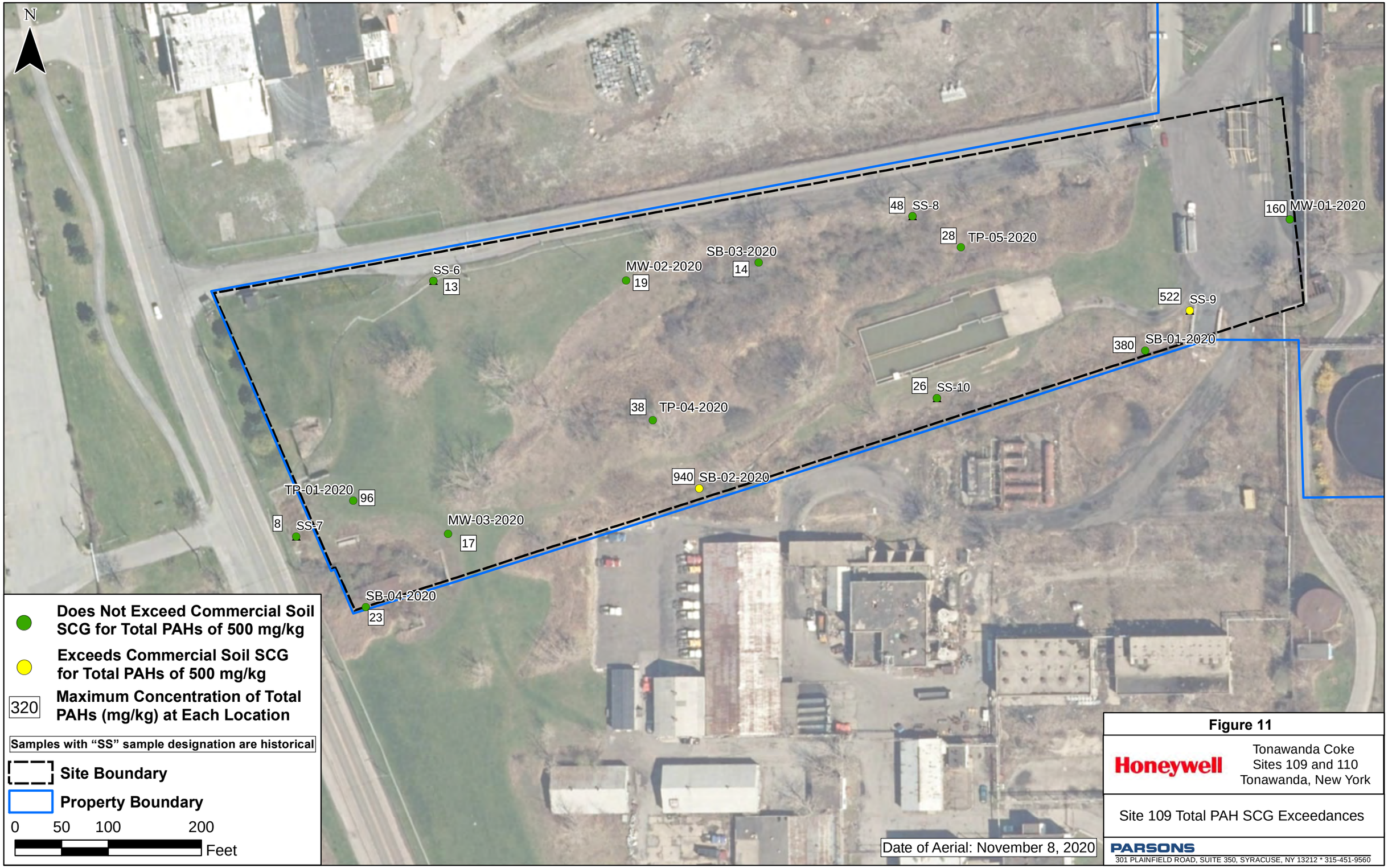
Site 109 Subsurface Soil
Sample Results (PAHs)

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Plotted By: J. Domanski

Plot Date: 10/19/2023

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Rev03 - RI\Tonawanda Site 109 RI Report Fig 15 Subsurface PAH_Rev3.mxd



Plotted By: CS

Plot Date: 8/30/2023

Figure 11

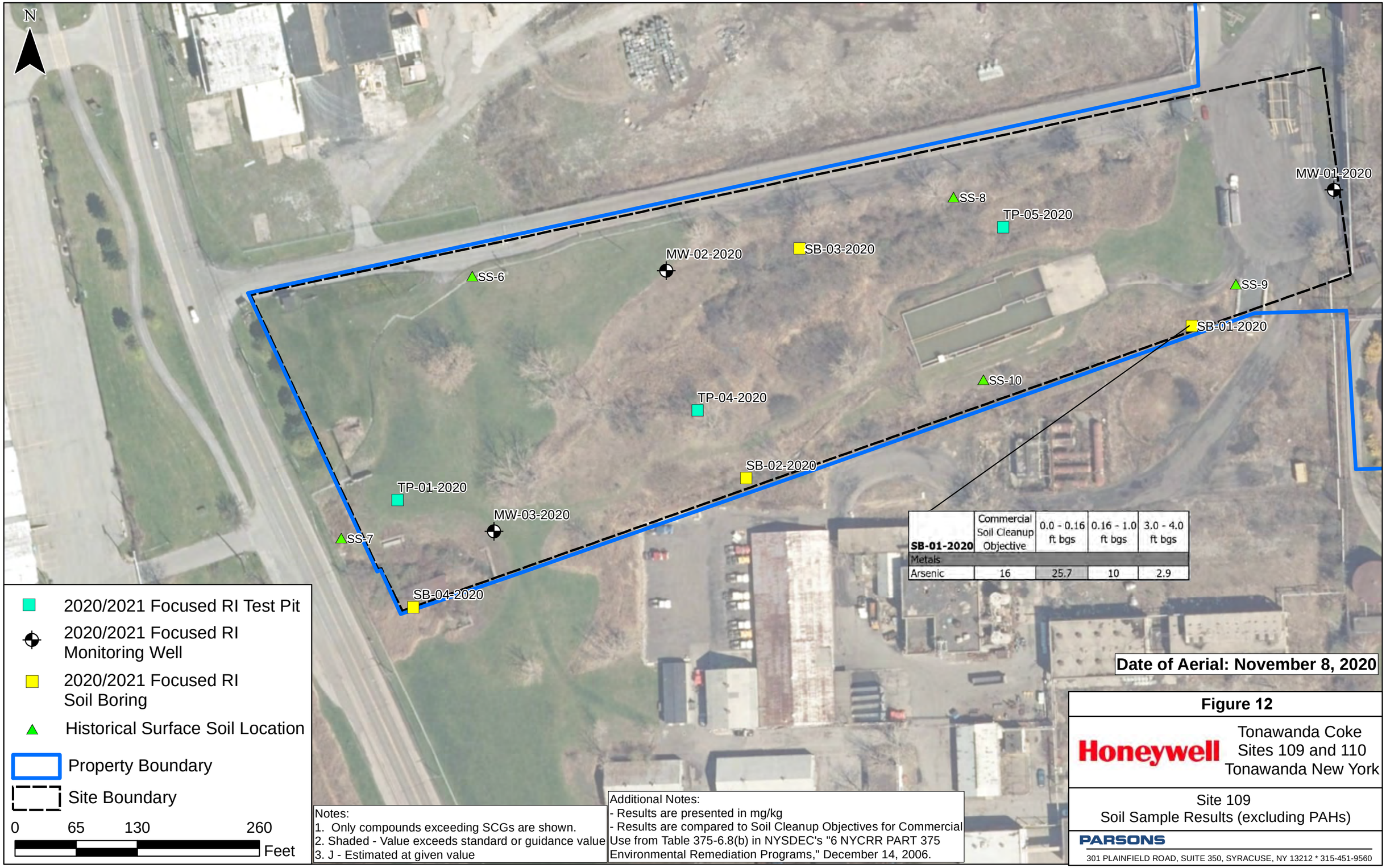
Honeywell

Tonawanda Coke
Sites 109 and 110
Tonawanda, New York

Site 109 Total PAH SCG Exceedances

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Rev03 - RI\Tonawanda Site 109 RI Report Fig 16 Total PAH_Rev3.mxd



SB-01-2020	Commercial Soil Cleanup Objective	0.0 - 0.16 ft bgs	0.16 - 1.0 ft bgs	3.0 - 4.0 ft bgs
Metals				
Arsenic	16	25.7	10	2.9

Notes:
1. Only compounds exceeding SCGs are shown.
2. Shaded - Value exceeds standard or guidance value
3. J - Estimated at given value

Additional Notes:
- Results are presented in mg/kg
- Results are compared to Soil Cleanup Objectives for Commercial Use from Table 375-6.8(b) in NYSDEC's "6 NYCRR PART 375 Environmental Remediation Programs," December 14, 2006.

Date of Aerial: November 8, 2020

Figure 12

Honeywell

Tonawanda Coke
Sites 109 and 110
Tonawanda New York

Site 109
Soil Sample Results (excluding PAHs)

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Plotted By: J. Domanski
Plot Date: 10/23/2023

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Rev03 - RI\Tonawanda Site 109 RI Report Fig 17 Soil Samples_Rev3.mxd

N

MW-17-89	Class GA Groundwater Quality SCG	6/26/1989 (Total)	6/26/1989 (Dissolved)	6/27/1989	12/15/1989	12/30/2020 (Total)	9/21/2021 (Total)	9/21/2021 (Dissolved)
Metals								
Iron	300	5330	3300	NA	NA	1020	1810	1800
Magnesium	35000	56100 J	58600 J	NA	NA	28700	29700	29000
Manganese	300	847	1050	NA	NA	632	823	811
Sodium	20000	137000	142000	NA	NA	82900	82600	81700
Cyanide								
Cyanide, Total	200	NA	NA	138	270	42	40	38

MW-02-2020	Class GA Groundwater Quality SCG	12/31/2020 (Total)	9/24/2021 (Total)	9/24/2021 (Dissolved)
Metals				
Iron	300	373	100 U	61.4 J
Magnesium	35000	13900	159000	156000
Sodium	20000	31900	87400	86500
PCBs				
Aroclor-1248	.09	0.091	0.05 U	0.05 U

MW-4	Class GA Groundwater Quality SCG	11/1/1985	8/1/1986	10/11/1989	12/15/1989
Semivolatiles					
Chrysene	0.002	88	NA	3 U	3 U

MW-01-2020	Class GA Groundwater Quality SCG	12/31/2020 (Total)	9/24/2021 (Total)	9/24/2021 (Dissolved)
Metals				
Antimony	3	60 U	60 U	10.5 J
Magnesium	35000	83300	12600	15800
Sodium	20000	467000	245000	264000
Thallium	0.5	9 J	10 U	10 U
Semivolatiles				
Benzo(A)Anthracene	.002	0.27	0.2 U	0.19 U
Benzo(B)Fluoranthene	.002	0.38	0.2 U	0.19 U
Benzo(K)Fluoranthene	.002	0.16 J	0.2 U	0.19 U
Chrysene	.002	0.24	0.2 U	0.19 U

MW-03-2020	Class GA Groundwater Quality SCG	12/31/2020 (Total)	9/24/2021 (Total)	9/24/2021 (Dissolved)
Metals				
Iron	300	No exceedances for VOCs, SVOCs, or PFAS. Not analyzed for metals, PCBs, pesticides, or cyanide due to low productivity.	2200	1990
Magnesium	35000		414000	514000
Manganese	300		377	688
Sodium	20000		193000	191000
Thallium	0.5		9 J	13.1

MW17-89

MW-02-2020

MW-03-2020

MW-4

MW-01-2020

Historical Monitoring Well Location

New (2020) Monitoring Well Location

Site Boundary

Property Boundary

0 70 140 280 Feet

Notes:
1. Only compounds exceeding standards or guidance values are shown.
2. U - Compound not detected at provided detection limit
3. J - Estimated at given value
4. NA - Compound not analyzed
5. Results are presented in ug/L
6. Results are compared to NYSDEC Class GA Groundwater Quality Standards and Guidance Values under TOGS 1.1.1
7. Shaded values indicate concentrations in excess of NYSDEC Class GA Groundwater Quality Standards and Guidance Values under TOGS 1.1.1

Date of Aerial: November 8, 2020

Figure 13

Honeywell

Tonawanda Coke
Site 109
Tonawanda, New York

Site 109 Groundwater Sample Results

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Plotted By: J. Domanski

Plot Date: 10/2/2023

Document Path: Q:\GIS\Hon_Syracuse\Tonawanda Coke\Tonawanda Site 109 Groundwater Sample Results.mxd

Primary Sources and Release Mechanisms	Secondary Sources	Exposure Media	Exposure Routes	Human Receptors - Current Use		Human Receptors - Future Use		
				Site Workers	Off-Site Workers	Site Workers	Office Employees	Off-Site Workers
On-Site Impacted Soil/Fill	Leaching	Groundwater	Groundwater	Incidental Ingestion	✓	---	✓	---	---
				Direct Contact	✓	---	✓	---	---
				Vapor Intrustion	---	---	---	---	---
	Fugitive Dust	Air	Air	Inhalation	✓	---	✓	---	---
	Erosion / Runoff via Drainage Ditch and Overland Runoff during Storm Events	On-Site Soil	Surface Soil (0-1 ft bgs)	Incidential Ingestion	✓	---	✓	---	---
				Direct Contact	✓	---	✓	---	---
		On-Site Ditch Soil	Subsurface Soil (>1 ft bgs)	Incidential Ingestion	✓	---	✓	---	---
				Direct Contact	✓	---	✓	---	---

✓ = Complete or potentially complete human health exposure pathway
--- = Exposure pathway not complete for the indicated receptor

Notes:
bgs - below ground surface
⟶ = Direct Pathway
Groundwater is not currently used at the site or at adjacent offsite areas due to extensive urban development and environmental easements, and is not anticipated to be used in the future. For these reasons, a drinking water pathway was not identified as a current or future exposure pathway.

Plot Date: 3/13/2023 Plotted By: CS

Figure 14

Honeywell

Tonawanda Coke
Site 109
Tonawanda, New York

Site 109 Qualitative Human Health Exposure Assessment

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: Q:\GIS\Hon_Syracuse\Tonawanda Coke\Tonawanda Site 109 Exposure Assessment.mxd

N

Outfall-001

Outfall-002

Outfall-004

BCP Site SWPPP Outfalls

Storm Culvert

Drainage Ditch

Soil Cover

Property Boundary

Site Boundary

0 65 130 260

Feet

Note:
- The northern drainage ditch may or may not be retained under this alternative depending on final site grading.

Plotted By: J. Domanski

Plot Date: 7/11/2023

Figure 15

Honeywell

Tonawanda Coke
Site 109
Tonawanda, New York

Site 109 Remedial Alternative 2

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Site 109 FS\Tonawanda Site 109 FS Report Fig 13 Alt 2.mxd

N

Outfall-001

Outfall-002

Outfall-004

BCP Site SWPPP Outfalls

Storm Culvert

Drainage Ditch

Soil Cover

Excavation Area

Property Boundary

Site Boundary

0 65 130 260

Feet

Note:
- The northern drainage ditch may or may not be retained under this alternative depending on final site grading.

Plotted By: J. Domanski

Plot Date: 7/11/2023

Figure 16

Honeywell

Tonawanda Coke
Site 109
Tonawanda, New York

Site 109 Remedial Alternative 3

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Document Path: \\nysyr04fs01\PrjData\GIS\Hon_Syracuse\Tonawanda Coke\MXDs\Site 109 and 110\Site 109 FS\Tonawanda Site 109 FS Report Fig 14 Alt 3.mxd

APPENDIX A - ALTERNATIVE COST ESTIMATES

TONAWANDA COKE SITE 109
COST ESTIMATING ASSUMPTIONS
JULY 2023

Below is a summary of the scope of work and construction cost estimating assumptions associated with the alternatives being evaluated as part of the Focused Feasibility Study (FS) for Tonawanda Coke Site 109. The alternatives being evaluated are:

- Alternative 1: No action (Assumed no cost)
- Alternative 2: Soil Cover/Redevelopment
- Alternative 3: Soil Cover/Redevelopment with Excavation of Ditch Soils
  - Alternative 3A: Onsite Management of Ditch Soils
  - Alternative 3B: Off-site Disposal of Ditch Soils

Soil Cover/Redevelopment

To interrupt contact exposure pathways to contaminated soils, a cover system would be installed on Site 109 under Alternatives 2, 3A, and 3B. Institutional controls would also be implemented to restrict exposure to the contaminated soils and groundwater under Alternatives 2, 3A, and 3B. The institutional controls would prevent site groundwater from being used as a drinking water source, and would place controls on excavation and other construction work in the area to limit exposure to contaminated soils.

The cover system would be developed and integrated with the redevelopment plans for the site and may include a combination of soil covers, asphalt or concrete paving, and buildings or structures. To allow for placement of the cover system, the site would be regraded as necessary. This would include retention of the stormwater settling ponds and restoration of the drainage ditch along the south side of the site.

The soil cover would be a minimum of 12-inches thick. The process of constructing the cover includes, clearing, grubbing, grading and compaction of the subgrade. The soil cover would consist of one of two types;

1. Vegetated (three layers)
   a. a demarcation layer of polyethylene sheeting, geogrid, geotextile fabric, or other discernable material
   b. a 9-inch-thick layer of unclassified soil fill that meets the Commercial Use SCGs
   c. 3 inches of topsoil that meets the Commercial Use SCGs
2. Gravel (two layers)
   a. a demarcation layer of polyethylene sheeting, geogrid, or geotextile fabric
   b. a 12-inch-thick layer of gravel fill that meets the requirements of *6 NYCRR Part 375-6.7d* (to be used in areas where redevelopment is anticipated within two years after the remedial action)

For FS cost estimating purposes, it is assumed that the Type 1 cover would be installed across the entire site.

The site would be graded prior to cover construction as necessary to promote appropriate surface water flow and management suitable for both a closed and a redeveloped property. For FS cost-estimating purposes, it is assumed that only minor site grading would be completed as needed to promote surface water flow and cover installation. The appropriate collection and control of runoff would limit the potential for erosion of the cover and conveyance of impacted soil.

There are two pre-existing ditches that run through the north and south portions of the site that currently effectively convey water on the property. The northern ditch may or may not be retained depending on final site

grading. The southern ditch and related culverts are an integral part of the stormwater collection and conveyance system associated with the site and upgradient brownfields site and would be maintained/restored as part of the remediation. Ditch sections with relatively flat grades can be vegetated while steeper and frequently submerged sections may be lined with more erosion resistant materials. Earthen materials used for restoration of the ditch would meet sediment and soil ecological standards, criteria, and guidelines (SCGs). It is also assumed that the two concrete-lined settling/skimming ponds/lagoons on Site 109 that receive surface water from the BF site would be retained.

Excavation of Ditch Soils

Impacted soil in the southern ditch that exceeds sediment and ecological SCGs would be removed under Alternatives 3A and 3B to create a clean drainage corridor. Based on RI sampling results, it is assumed for cost estimating purposes that an average of two feet of soil would be removed over the entire area of the ditch (~1200 cy).

To support the excavation activities, a construction laydown area would be necessary, including sufficient space for the stockpiling of excavated material, as well as stockpiling of backfill materials.

Prior to excavation, piping will be installed at the outfall locations in the drainage ditch to allow the flow of water to bypass the excavation area and discharged in accordance with NPDES Permit requirements. Additional construction water is not expected to be generated during excavation activities.

Following the completion of excavation activities, the excavated areas would be backfilled with clean fill material, and restored to an appropriate elevation to allow for the installation of the soil cover.

On-Site Management of Ditch Soils

For Alternative 3A, all 1200 cy of excavated ditch soils would be placed on Site 109 and graded prior to installation of the demarcation layer and soil cover.

Off-Site Management of Ditch Soils

For Alternative 3B, excavated soils that exceed the soil SCG of 500 ppm total PAHs would be disposed of off-site at an approved landfill, while the remainder would be placed on Site 109 and graded prior to installation of the demarcation layer and soil cover. Based on the RI results, it is assumed that 25% of the soil (300 CY) would be disposed of offsite. Based on site analytical data collected during the RI, it has been assumed that excavated material would be non-hazardous for the purpose of disposal.

Assumptions

Below is a list of assumptions that were made for the purposes of FS-level cost estimation.

- The total area of the site is approximately 7.5 acres. The area of the existing settling pond that will be retained is approximately 0.3 acres. Therefore, the total area over which a cover will be placed is approximately 7.2 acres.
- The 28,600 sf (~0.65 acres) paved surface on the easter side of Site 109 would not be suitable for use as part of the cover system. The pavement would be removed and sent to an offsite recycling facility.
- The cover will consist of three layers: a demarcation layer of polyethylene sheeting or geotextile fabric or other discernable material, a 9-inch-thick layer of unclassified soil fill and 3-inches of topsoil. The estimate includes an additional 10% to account for overplacement.
- Following cover placement it will be seeded.
- Material requiring excavation and disposal is non-hazardous.

- Trucks and equipment necessary for the excavation and management of soil materials would be readily available.
- Existing culverts would not require removal and would be retained.
- Cement footings associated with the former overhead conveyor would not be removed under Alternative 2, but would be removed under Alternatives 3A and 3B.
- Minor structures requiring removal prior to cover placement consist of asphalt paving, truck scale pads, pond pads, bin walls, building at southwest corner of site and demolition of foundations in ditch line (for Alternative 3B, Assumes 27 foundations per GoogleEarth April 2006 aerial photograph) .
- Cover soil and backfill materials would be readily available.
- No additional monitoring wells would be required after remedial activities are complete.
- Groundwater is intermittently perched. Construction water management would be minimal.
- Excavated materials weigh 1.7 tons/cy.
- Labor rates assumed to be union.
- Equipment rental rates, labor rates, and production rates are based on Parsons experience on similar projects and Parsons' Rental National Account Agreement with Caterpillar Inc. (rates valid thru May 31, 2023).
- Transportation and disposal costs for excavated ditch sediments that exceed 500 ppm total PAHs that will be disposed of offsite assume disposal at a local landfill as non-hazardous material.
- The estimate includes a 30% contingency.
- The estimate includes 12% of capital costs to cover project management and remedial design, and 6% of capital costs to cover construction management, consistent with recommendations in A Guide to Developing and Documenting Cost Estimates During the Feasibility Study (USEPA, July 2000). It is assumed this would also cover any costs associated with implementation of the required institutional controls.
- Air monitoring would be conducted consistent with the requirements of the NYSDEC Community Air Monitoring Plan during intrusive activities.
- Work would be completed within one construction season.
- The cost estimates are in current 2023 dollars.
- This is a Class 4 cost estimate with an anticipated accuracy of +50%, -30%.

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TABLE 1
ESTIMATED COSTS FOR TONAWANDA COKE SITE 109 REMEDIAL ALTERNATIVES
TONAWANDA COKE SITE 109 FEASIBILITY STUDY
TONAWANDA, NEW YORK

Alternative	Description	Capital Cost	Present Value of O&M Cost	Estimated Total Present Worth (1)
1	No Action	$ -	$ -	$ -
2	Site Cover/Redevelopment	$ 4,000,000	$ 628,000	$ 4,628,000
3A	Site Cover/Redevelopment/Ditch Excavation/Onsite Management	$ 4,197,000	$ 628,000	$ 4,825,000
3B	Site Cover/Redevelopment/Ditch Excavation/Offsite Disposal	$ 4,308,000	$ 628,000	$ 4,936,000

Notes:

(1) Cost estimates are developed at a FS level for comparative evaluation of alternative, level of accuracy is +50% / -30%.

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TABLE 2
TONAWANDA COKE SITE 109
ALTERNATIVE 2 - SITE COVER/REDEVELOPENT

Site: **Site 109**	Project title:
Location: **Tonawanda, NY**	**Alternative 2 - Site Cover/Redevelopment**
Phase: **Feasibility Study; +50%/-30% accuracy**	
Base Year: **2023**	
Date: **July, 2023**	

CAPITAL COSTS

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
DIRECT CONSTRUCTION COSTS					
1.00	General Conditions	16	Weeks	$8,576	$137,219
2.00	Staging/Decon Area	1	LS	$43,958	$43,958
2.01	Temporary Erosion and Sediment Control	1	LS	$19,201	$19,201
2.02	Clearing	1	LS	$45,000	$45,000
2.03	Pre Survey and Utility Investigation	1	LS	$24,500	$24,500
2.04	QA/QC Testing	1	LS	$30,700	$30,700
2.05	Fence Removal and Install	1	LS	$35,400	$35,400
2.06	Dewatering for Drainage Swale	1	LS	$39,181	$39,181
3.00	Structure Demolition	1	LS	$28,012	$28,012
4.00	Demarcation Layer	1	LS	$99,752	$99,752
4.01	Grading for Soil Cover	1	LS	$127,514	$127,514
4.02	Imported General Fill	1	LS	$806,425	$806,425
4.03	Topsoil	1	LS	$325,400	$325,400
4.04	Seeding	1	LS	$30,094	$30,094
5.00	Asphalt (T&D)	1	LS	$51,480	$51,480
	Sales Tax (8% on equipment, materials and subcontractors)				$116,601
SUBTOTAL DIRECT CONSTRUCTION COSTS					**$1,960,436**
OTHER CAPITAL COSTS					
1. Contingency (% of direct construction costs)		30%	%		$588,131
2. Contractor CM/PM		13%	%		$331,314
3. Contractor Markup		20%	%		$509,713
4. Project Management & Remedial Design		12%	%		$406,751
5. Construction Management		6%	%		$203,376
SUBTOTAL OTHER CAPITAL COSTS					**$2,039,285**
TOTAL CAPITAL COSTS					**$4,000,000**

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TABLE 2 (CONTINUED)
TONAWANDA COKE SITE 109
ALTERNATIVE 2 - SITE COVER/REDEVELOPENT

ANNUAL OPERATION, MAINTENANCE, AND MONITORING COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1. Inspection, Minor Repairs, PM, and Reporting	1	LS	$20,000	$20,000
2.Mowing	2	LS	$1,100	$2,200
3. Groundwater Monitoring	1	LS	$20,000	$20,000
SUBTOTAL ANNUAL O&M COSTS				**$42,200**
4. Contingency (% of subtotal)	20%			$8,440
TOTAL ANNUAL O&M COSTS				**$50,640**

PERIODIC COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
TOTAL PERIODIC COSTS				**$0**

PRESENT VALUE ANALYSIS					
COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE
Capital Cost	0	$4,000,000	$4,000,000	1.000	$4,000,000
Annual OM&M Cost	1-30	$1,519,200	$50,640	12.409	$628,000
TOTAL PRESENT VALUE OF ALTERNATIVE					**$4,628,000**

Notes:
1. Period of analysis is equivalent to the estimated project duration.
2. Present value of alternative is rounded to the nearest $1,000.

PRESENT VALUE CALCULATION			Annual Discount Factor =		7.0%	
YEAR	CAPITAL COSTS	ANNUAL O&M COSTS	PERIODIC COSTS	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT VALUE
0	$4,000,000	$0	$0	$4,000,000	1.000	$4,000,000
1	$0	$50,640	$0	$50,640	0.935	$47,327
2	$0	$50,640	$0	$50,640	0.873	$44,231
3	$0	$50,640	$0	$50,640	0.816	$41,337
4	$0	$50,640	$0	$50,640	0.763	$38,633
5	$0	$50,640	$0	$50,640	0.713	$36,106
6	$0	$50,640	$0	$50,640	0.666	$33,744
7	$0	$50,640	$0	$50,640	0.623	$31,536
8	$0	$50,640	$0	$50,640	0.582	$29,473
9	$0	$50,640	$0	$50,640	0.544	$27,545
10	$0	$50,640	$0	$50,640	0.508	$25,743
11	$0	$50,640	$0	$50,640	0.475	$24,059
12	$0	$50,640	$0	$50,640	0.444	$22,485
13	$0	$50,640	$0	$50,640	0.415	$21,014
14	$0	$50,640	$0	$50,640	0.388	$19,639
15	$0	$50,640	$0	$50,640	0.362	$18,354
16	$0	$50,640	$0	$50,640	0.339	$17,154
17	$0	$50,640	$0	$50,640	0.317	$16,031
18	$0	$50,640	$0	$50,640	0.296	$14,983
19	$0	$50,640	$0	$50,640	0.277	$14,002
20	$0	$50,640	$0	$50,640	0.258	$13,086
21	$0	$50,640	$0	$50,640	0.242	$12,230
22	$0	$50,640	$0	$50,640	0.226	$11,430
23	$0	$50,640	$0	$50,640	0.211	$10,682
24	$0	$50,640	$0	$50,640	0.197	$9,984
25	$0	$50,640	$0	$50,640	0.184	$9,330
26	$0	$50,640	$0	$50,640	0.172	$8,720
27	$0	$50,640	$0	$50,640	0.161	$8,150
28	$0	$50,640	$0	$50,640	0.150	$7,616
29	$0	$50,640	$0	$50,640	0.141	$7,118
30	$0	$50,640	$0	$50,640	0.131	$6,652
TOTAL	$0	$1,367,000	$0	$1,367,000	—	$4,629,000

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PARSONS

TABLE 3

TONAWANDA COKE SITE 109

ALTERNATIVE 3A - SITE COVER/REDEVELOPENT/DITCH EXCAVATION/ONSITE MANAGEMENT

Site: **Site 109** Location: **Tonawanda, NY** Phase: **Feasibility Study; +50%/-30% accuracy** Base Year: **2023** Date: **July, 2023**	Project title: **Alternative 3A - Site Cover/Redevelopment/Ditch Excavation/Onsite Management**

CAPITAL COSTS

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
DIRECT CONSTRUCTION COSTS					
1.00	General Conditions	18	Weeks	$8,480	$152,644
2.00	Staging/Decon Area	1	LS	$43,958	$43,958
2.01	Temporary Erosion and Sediment Control	1	LS	$19,201	$19,201
2.02	Clearing	1	LS	$45,000	$45,000
2.03	Pre Survey and Utility Investigation	1	LS	$24,500	$24,500
2.04	QA/QC Testing	1	LS	$30,700	$30,700
2.05	Fence Removal and Install	1	LS	$35,400	$35,400
2.06	Dewatering for Drainage Swale	1	LS	$39,181	$39,181
3.00	Structure Demolition	1	LS	$50,572	$50,572
4.00	Demarcation Layer	1	LS	$99,752	$99,752
4.01	Grading for Soil Cover	1	LS	$133,718	$133,718
4.02	Imported General Fill	1	LS	$853,649	$853,649
4.03	Topsoil	1	LS	$325,400	$325,400
4.04	Seeding	1	LS	$30,094	$30,094
5.00	Asphalt (T&D)	1	LS	$51,480	$51,480
5.00	Transportation & Disposal (T&D)	1	LS		$0
	Sales Tax (8% on equipment, materials and subcontractors)				$122,087
SUBTOTAL DIRECT CONSTRUCTION COSTS					**$2,057,336**
OTHER CAPITAL COSTS					
1. Contingency (% of direct construction costs)		30%	%		$617,201
2. Contractor CM/PM		13%	%		$347,690
3. Contractor Markup		20%	%		$534,907
4. Project Management & Remedial Design		12%	%		$426,856
5. Construction Management		6%	%		$213,428
SUBTOTAL OTHER CAPITAL COSTS					**$2,140,082**
TOTAL CAPITAL COSTS					**$4,197,000**

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PARSONS

TABLE 3 (CONTINUED)

TONAWANDA COKE SITE 109

ALTERNATIVE 3A - SITE COVER/REDEVELOPENT/DITCH EXCAVATION/ONSITE MANAGEMENT

ANNUAL OPERATION, MAINTENANCE, AND MONITORING COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1. Inspection, Minor Repairs, PM, and Reporting	1	LS	$20,000	$20,000
2.Mowing	2	LS	$1,100	$2,200
3. Groundwater Monitoring	1	LS	$20,000	$20,000
SUBTOTAL ANNUAL O&M COSTS				**$42,200**
4. Contingency (% of subtotal)	20%			$8,440
TOTAL ANNUAL O&M COSTS				**$50,640**

PERIODIC COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
TOTAL PERIODIC COSTS				#REF!

PRESENT VALUE ANALYSIS					
COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE
Capital Cost	0	$4,197,000	$4,197,000	1.000	$4,197,000
Annual OM&M Cost	1-30	$1,519,200	$50,640	12.409	$628,000
TOTAL PRESENT VALUE OF ALTERNATIVE					**$4,825,000**

Notes:
1. Period of analysis is equivalent to the estimated project duration.
2. Present value of alternative is rounded to the nearest $1,000.

PRESENT VALUE CALCULATION			Annual Discount Factor =		7.0%	
YEAR	CAPITAL COSTS	ANNUAL O&M COSTS	PERIODIC COSTS	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT VALUE
0	$4,197,000	$0	$0	$4,197,000	1.000	$4,197,000
1	$0	$50,640	#REF!	#REF!	0.935	#REF!
2	$0	$50,640	$0	$50,640	0.873	$44,231
3	$0	$50,640	#REF!	#REF!	0.816	#REF!
4	$0	$50,640	$0	$50,640	0.763	$38,633
5	$0	$50,640	#REF!	#REF!	0.713	#REF!
6	$0	$50,640	$0	$50,640	0.666	$33,744
7	$0	$50,640	$0	$50,640	0.623	$31,536
8	$0	$50,640	$0	$50,640	0.582	$29,473
9	$0	$50,640	$0	$50,640	0.544	$27,545
10	$0	$50,640	#REF!	#REF!	0.508	#REF!
11	$0	$50,640	$0	$50,640	0.475	$24,059
12	$0	$50,640	$0	$50,640	0.444	$22,485
13	$0	$50,640	$0	$50,640	0.415	$21,014
14	$0	$50,640	$0	$50,640	0.388	$19,639
15	$0	$50,640	$0	$50,640	0.362	$18,354
16	$0	$50,640	$0	$50,640	0.339	$17,154
17	$0	$50,640	$0	$50,640	0.317	$16,031
18	$0	$50,640	$0	$50,640	0.296	$14,983
19	$0	$50,640	$0	$50,640	0.277	$14,002
20	$0	$50,640	#REF!	#REF!	0.258	#REF!
21	$0	$50,640	$0	$50,640	0.242	$12,230
22	$0	$50,640	$0	$50,640	0.226	$11,430
23	$0	$50,640	$0	$50,640	0.211	$10,682
24	$0	$50,640	$0	$50,640	0.197	$9,984
25	$0	$50,640	$0	$50,640	0.184	$9,330
26	$0	$50,640	$0	$50,640	0.172	$8,720
27	$0	$50,640	$0	$50,640	0.161	$8,150
28	$0	$50,640	$0	$50,640	0.150	$7,616
29	$0	$50,640	$0	$50,640	0.141	$7,118
30	$0	$50,640	#REF!	#REF!	0.131	#REF!
TOTAL	$0	$1,367,000	#REF!	#REF!	—	#REF!

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PARSONS

TABLE 4

TONAWANDA COKE SITE 109

ALTERNATIVE 3B - SITE COVER/REDEVELOPENT/DITCH EXCAVATION/OFFSITE DISPOSAL

Site: **Site 109** Location: **Tonawanda, NY** Phase: **Feasibility Study; +50%/-30% accuracy** Base Year: **2023** Date: **July, 2023**	Project title: **Alternative 3B - Site Cover/Redevelopment/Ditch Excavation/Offsite Disposal**

CAPITAL COSTS

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
DIRECT CONSTRUCTION COSTS					
1.00	Field and General Conditions	18	Weeks	$8,480	$152,644
2.00	Staging/Decon Area	1	LS	$43,958	$43,958
2.01	Temporary Erosion and Sediment Control	1	LS	$19,201	$19,201
2.02	Clearing	1	LS	$45,000	$45,000
2.03	Pre Survey and Utility Investigation	1	LS	$24,500	$24,500
2.04	QA/QC Testing	1	LS	$30,700	$30,700
2.05	Fence Removal and Install	1	LS	$35,400	$35,400
2.06	Dewatering for Drainage Swale	1	LS	$39,181	$39,181
3.00	Structure Demolition	1	LS	$50,572	$50,572
4.00	Demarcation Layer	1	LS	$99,752	$99,752
4.01	Grading for Soil Cover	1	LS	$133,718	$133,718
4.02	Imported General Fill	1	LS	$853,649	$853,649
4.03	Topsoil	1	LS	$325,400	$325,400
4.04	Seeding	1	LS	$30,094	$30,094
5.00	Transportation & Disposal (T&D)	1	LS	$50,235	$50,235
5.01	Asphalt (T&D)	1	LS	$51,480	$51,480
	Sales Tax (8% on equipment, materials and subcontractors)				$126,106
SUBTOTAL DIRECT CONSTRUCTION COSTS					**$2,111,589**
OTHER CAPITAL COSTS					
1. Contingency (% of direct construction costs)		30%	%		$633,477
2. Contractor CM/PM		13%	%		$356,859
3. Contractor Markup		20%	%		$549,013
4. Project Management & Remedial Design		12%	%		$438,113
5. Construction Management		6%	%		$219,056
SUBTOTAL OTHER CAPITAL COSTS					**$2,196,518**
TOTAL CAPITAL COSTS					**$4,308,000**

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PARSONS

TABLE 4 (CONTINUED)

TONAWANDA COKE SITE 109

ALTERNATIVE 3B - SITE COVER/REDEVELOPENT/DITCH EXCAVATION/OFFSITE DISPOSAL

ANNUAL OPERATION, MAINTENANCE, AND MONITORING COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
1. Inspection, Minor Repairs, PM, and Reporting	1	LS	$20,000	$20,000
2.Mowing	2	LS	$1,100	$2,200
3. Groundwater Monitoring	1	LS	$20,000	$20,000
SUBTOTAL ANNUAL O&M COSTS				**$42,200**
4. Contingency (% of subtotal)	20%			$8,440
TOTAL ANNUAL O&M COSTS				**$50,640**

PERIODIC COSTS				
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST
TOTAL PERIODIC COSTS				#REF!

PRESENT VALUE ANALYSIS					
COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE
Capital Cost	0	$4,308,000	$4,308,000	1.000	$4,308,000
Annual OM&M Cost	1-30	$1,519,200	$50,640	12.409	$628,000
TOTAL PRESENT VALUE OF ALTERNATIVE					**$4,936,000**

Notes:
1. Period of analysis is equivalent to the estimated project duration.
2. Present value of alternative is rounded to the nearest $1,000.

PRESENT VALUE CALCULATION			Annual Discount Factor =		7.0%	
YEAR	CAPITAL COSTS	ANNUAL O&M COSTS	PERIODIC COSTS	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT VALUE
0	$4,308,000	$0	$0	$4,308,000	1.000	$4,308,000
1	$0	$50,640	#REF!	#REF!	0.935	#REF!
2	$0	$50,640	$0	$50,640	0.873	$44,231
3	$0	$50,640	#REF!	#REF!	0.816	#REF!
4	$0	$50,640	$0	$50,640	0.763	$38,633
5	$0	$50,640	#REF!	#REF!	0.713	#REF!
6	$0	$50,640	$0	$50,640	0.666	$33,744
7	$0	$50,640	$0	$50,640	0.623	$31,536
8	$0	$50,640	$0	$50,640	0.582	$29,473
9	$0	$50,640	$0	$50,640	0.544	$27,545
10	$0	$50,640	#REF!	#REF!	0.508	#REF!
11	$0	$50,640	$0	$50,640	0.475	$24,059
12	$0	$50,640	$0	$50,640	0.444	$22,485
13	$0	$50,640	$0	$50,640	0.415	$21,014
14	$0	$50,640	$0	$50,640	0.388	$19,639
15	$0	$50,640	$0	$50,640	0.362	$18,354
16	$0	$50,640	$0	$50,640	0.339	$17,154
17	$0	$50,640	$0	$50,640	0.317	$16,031
18	$0	$50,640	$0	$50,640	0.296	$14,983
19	$0	$50,640	$0	$50,640	0.277	$14,002
20	$0	$50,640	#REF!	#REF!	0.258	#REF!
21	$0	$50,640	$0	$50,640	0.242	$12,230
22	$0	$50,640	$0	$50,640	0.226	$11,430
23	$0	$50,640	$0	$50,640	0.211	$10,682
24	$0	$50,640	$0	$50,640	0.197	$9,984
25	$0	$50,640	$0	$50,640	0.184	$9,330
26	$0	$50,640	$0	$50,640	0.172	$8,720
27	$0	$50,640	$0	$50,640	0.161	$8,150
28	$0	$50,640	$0	$50,640	0.150	$7,616
29	$0	$50,640	$0	$50,640	0.141	$7,118
30	$0	$50,640	#REF!	#REF!	0.131	#REF!
TOTAL	$0	$1,367,000	#REF!	#REF!	—	#REF!