



Department of  
Environmental  
Conservation

# **FINAL STATEMENT OF BASIS CORRECTIVE MEASURES SELECTION**

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

Site Wide Remedial Elements, Water Courses  
and Groundwater

Operable Units 01, 09, and 10

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

November 2021

PREPARED BY

DIVISION OF ENVIRONMENTAL REMEDIATION

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# DECLARATION STATEMENT – STATEMENT OF BASIS FINAL CORRECTIVE MEASURES SELECTION

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Bethlehem Steel (Tecumseh Redevelopment, Inc.)  
OU-01 – Site Wide Remedial Elements  
OU-09 – Water Courses, and  
OU-10 – Site Wide Groundwater  
State Superfund Project  
Lackawanna, Erie County  
Site No. 915009  
EPA ID No. NYD002134880  
November 2021

## **Statement of Purpose and Basis**

This document presents the final corrective measures for a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 373 (RCRA) and Part 375 (State Superfund) and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Numbers: 01, 09, and 10 of the Bethlehem Steel site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix A of this final Statement of Basis.

## **Description of Selected Remedy**

<b>SWMU</b>	<b>Selected Remedy</b>
OU-1 Sitewide Remedy	Management of nonhazardous contaminated materials in a Corrective Action Management Unit (CAMU) will be conducted on-site.

<b>SWMU</b>	<b>Selected Remedy</b>
OU-1 Sitewide Remedy (continued)	Cover system in areas where surface soil exceeds applicable soil cleanup objectives
OU-09 Water Courses	Complete excavation of sediment in Smokes Creek and restoration of the bank soils, dredging/excavation of sediment in the Gateway Metroport Ship Canal, and the South Return Water Trench
	Soil or waste exhibiting hazardous waste regulatory levels will be disposed off-site at a permitted hazardous waste disposal facility.
	Main Stem Enhancement at Smokes Creek
	Plugging and backfill of the North Return Water Trench
OU-10 Groundwater	Enhancements to the two on-site treatment systems (within the Acid Tar Pit and Benzol Plant areas)
	Monitoring program
	Contingency remedial action plan

### **New York State Department of Health Acceptance**

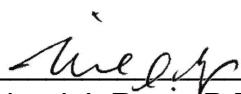
The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

### **Declaration**

The selected remedy is protective of human health and the environment, complies with state and federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

November 17, 2021

Date

  
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 Michael J. Ryan, P.E., Director  
 Division of Environmental Remediation

# FINAL STATEMENT OF BASIS

## CORRECTIVE MEASURES SELECTION

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

City of Lackawanna, Erie County

Site No. 915009

EPA ID No. NYD002134880

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### SECTION 1: INTRODUCTION

The New York State Department of Environmental Conservation (Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media (defined as soil, surface water, groundwater, sediment, and soil vapor). The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Statement of Basis (SB) identifies the selected remedy and discusses the reasons for selection of the remedy. This document includes a summary of the information that can be found in the site-related reports and documents.


The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment. The New York State Hazardous Waste Management Program (also known as the RCRA Program) requires corrective action for releases of hazardous waste and hazardous constituents to the environment. This facility is subject to both programs, and this remedy is consistent with the remedial requirements of both programs. This Statement of Basis under the RCRA program will also serve as the Record of Decision (ROD) under the State Superfund program. This document is a summary of the information that can be found in the site-related reports and documents.

## SECTION 2. CITIZEN PARTICIPATION

The Department sought input from the community on all final remedies. This was an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

NYSDEC Region 9 Office  
270 Michigan Avenue  
Buffalo, NY 14203  
Call 716-851-7220 for Appointment  
Mr. Stanley Radon

Lackawanna Public Library  
560 Ridge Road  
Lackawanna, NY 14218  
Call (716) 823-0630

Access the Statement of Basis and other project documents online through the DECinfo Locator: <https://gisservices-dev.dec.ny.gov/gis/dil/index.html?rs=915009> (Click the Excavator icon,  then click Document Folder Link)

A public comment period was held from May 5, 2021, through June 18, 2021.

A virtual public meeting was held on May 18, 2021, at 6:00 PM via Webex (virtual platform). At the meeting, the findings of the RCRA Facility Investigation (RFI) and the Corrective Measures Study (CMS) were presented, along with a summary of the proposed remedies. After the presentation, a question-and-answer period was held, during which verbal or written comments were received on the Draft Statement of Basis.

Written comments were received through June 18, 2021, by:

Stanley Radon  
NYS Department of Environmental Conservation  
Division of Environmental Remediation  
270 Michigan Avenue  
Buffalo, NY 14203  
[stanley.radon@dec.ny.gov](mailto:stanley.radon@dec.ny.gov)

The public was encouraged to review and comment on the proposed remedy. Comments are summarized and addressed in the Responsiveness Summary appended hereto (Appendix B).

### Receive Site Citizen Participation Information by Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information is distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and

Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at: <http://www.dec.ny.gov/chemical/61092.html>

### **SECTION 3. SITE DESCRIPTION AND HISTORY**

*Location-* The Bethlehem Steel Site is located in an urban area along the eastern shores of Lake Erie in the cities of Buffalo and Lackawanna, Erie County. The 489 acres of property are located along the west side of Route 5 comprise a significant portion of the former Bethlehem Steel Corporation Lackawanna facility.

*Site Features-* The site is an irregular parcel which extends from south of Smokes Creek to the Buffalo Outer Harbor on the north, and from the east end of Lake Erie to the Gateway Metroport Ship Canal (Ship Canal). The site has approximately 2 miles of shoreline along Lake Erie. Smokes Creek passes westward across the site where it discharges to Lake Erie. The Ship Canal, located toward the northern end of the site, extends approximately 3,000 feet southward into the site from the Buffalo Harbor. The western portion of the site was created by the placement of slag-fill materials from iron and steelmaking within an area that was formerly within the boundaries of Lake Erie. The site is mostly undeveloped, especially the western slag fill portion. Operable Unit 1 encompasses the 489-acre site and incorporates the overall site-wide remedy, including the CAMU and cover system. Operable Unit 9 covers the site water bodies, including Smokes Creek, the North and South Return Water Trenches, and the Ship Canal. Operable Unit 10 covers groundwater across the entire site except for the portions already addressed under previous remedial measures, and also covers any off-site impacts of groundwater from the site.

*Current Zoning and Land Use-* This site is currently zoned for industrial use and is used for slag reclamation, coal handling facilities, wood recycling facilities, and the site groundwater treatment plants. Renewable energy facilities have been constructed upon the site which were previously developed through the Brownfield Cleanup Program (BCP) (Site Nos. C915216 and C915217). These installations include 14 wind turbines (Steel Winds I and II) located along the Lake Erie shoreline, and two (2) large solar arrays present in the southeastern corner of the site. The majority of the land is vacant/undeveloped.

*Past Use of the Site-* The former Bethlehem Steel Corporation (BSC) property was used for iron and steel production since the beginning of the 20th century. Iron and steel-making operations were discontinued by the end of 1983, and by the mid-1990s, most of the steel-making facilities on the west side of Hamburg Turnpike (NYS Route 5) had been demolished. In September 2001, BSC's coke oven operation was terminated. While some

buildings remain, most structures have been razed. The western portion, which includes approximately 2 miles of Lake Erie waterfront, consists of a considerable area of manmade land (~440 acres) where iron and steel-making slag and plant wastes were disposed.

*Site Geology and Hydrogeology-* The predominant site feature is the wedge-shaped slag fill area that extends into Lake Erie. This area extends from the former lake shore an average of 1,300 feet westward, and now forms the eastern shoreline of Lake Erie. The site geology beneath the slag-fill layer consists of lake and glacial sediments overlying shale or limestone bedrock. Beneath the slag-fill there is, in order, a sand layer with occasional peat deposits, lake clay/silt deposits, and glacial till overlying shale or limestone bedrock.

The depth to groundwater is variable and depends upon the topography and can vary in depths ranging from about 10 feet to over 60 feet below ground surface. Groundwater generally flows toward Lake Erie, Smokes Creek, or the Ship Canal. Groundwater occurs within the fill and sand layers in the overburden and in the bedrock beneath the site.

*Operable Units/Solid Waste Management Unit (SWMU) Groups-* The site has been divided into operable units. An operable unit (OU) represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. A number of Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and two Hazardous Waste Management Units (HWMUs) in the Corrective Measures Study (CMS) area have been designated as OUs due to their proximity to each other, the similar composition of waste material, and/or similarity of remedy selection. To date, the following OUs have been designated for the Bethlehem Steel Site:

- **OU-01** (Site-Wide Remedial Program) consists of 489 acres on the western portion of the former Bethlehem Steel Corporation Lackawanna Facility. This unit encompasses 44 SWMUs and nine areas of concern (AOCs). Several SWMUs and AOCs have been addressed as separate OUs under Department approved Interim Remedial Measures (IRMs) or Expedited Corrective Measures (ECMs). Under a CMS, extensive groundwater, surface water, soil, sediment and waste characterizations has been completed.
- **OU-02** (Tar Decanter Pit, Blast Furnace Hot and Cold Wells, and Lime and Kish Landfill): OU-02 consists of SWMUs P-9 (Tar Decanter Pit), P-18A and P-18B (Blast Furnace Hot and Cold Wells), P-76 (Coke Oven Gas Line), and two AOCs (B and C) within S-18 (Lime and Kish Landfill R). The Tar Decanter Pit is located near the center of the coke oven area just west of the Ship Canal and is made of reinforced concrete measuring approximately 51 feet long, 37 feet wide, and 14.5

feet deep. The Tar Decanter Pit separated tar sludge from weak ammonia flushing liquor used to quench coke oven gases and was decommissioned and backfilled in 1960. The Blast Furnace Hot and Cold Wells are located at the southwest corner of the Ship Canal. The Hot Well is an irregular shape measuring approximately 130 feet across the longest section and 16 feet across the narrowest section. The Cold Well is rectangular, measuring 173 feet by 23 feet. Both wells are approximately 39 feet deep. The wells were operated from 1978 to 1983 and used to cool and recycle blast furnace scrubber water. The Lime and Kish Landfill comprises of approximately 2 acres located in the northwest portion of the site.

The landfill contained wastes generated from the Basic Oxygen Furnace (BOF) process consisting of lime dust and baghouse dust from iron transfer points called Kish. These SWMUs were found to be impacted primarily with elevated levels of benzene and lead. Waste from these SWMUs were excavated, treated, and consolidated within the OU-03 containment unit.

- **OU-03** (Acid Tar Pit): OU-03 is approximately 6 acres and consists of SWMUs S-11, S-21, S-22, and S-24 known as the Acid Tar Pit (ATP) Group. S-11, S-21, and S-22 are located south of Smokes Creek in the southeast corner of the CMS Area. S-24 is located just north of Smokes Creek west of the intersection of State Highways #9 and #11. SWMU S-11 measures approximately 1.4 acres and consists of various wastes generated from steel and coke making operations deposited from the 1950s through the early 1970s. The various wastes include drums containing petroleum wastes and solvents, open-hearth precipitator dust from exhaust gas treatment, and baghouse lime dust from the BOF process. SWMU S-21 consists of a pile of scrap melter precipitator dust 40 feet long, 40 feet wide, and 8 feet high. This dust, mostly consisting of iron oxides, was generated during the movement of scrap metal used in the BOF process and was collected with an electrostatic precipitator from 1978 to 1980 prior to disposal. SWMU S-22 measures approximately 1.4 acres and consists of spent carbonate solution, also called vacuum carbonate blowdown. The solution was used in the coking process to treat off-gas from the coke ovens prior to re-use as fuel. SWMU S-24 is believed to have been used for the disposal of agitator sludge, also known as acid tar sludge, and is oval shaped and approximately 1 acre in size. Sulfuric acid used to wash and separate impurities from benzene processing of coke oven off-gas was neutralized with caustic solution generating the agitator sludge. The SWMU was identified from a 1938 aerial photo and based on subsequent photos, believed to have been unused after 1950. These SWMUs were found to be impacted with elevated levels of metals and various organic compounds.
- **OU-04** (Coke Oven Area – Groundwater) consists of groundwater associated with an approximately 27-acre area along the western side of the Gateway Metroport



Ship Canal. OU-04 is not intended to address soil, soil vapor, or other environmental issues associated with the former Coke Oven Area. These other media will be addressed through a separate remedy decision(s) under a proposed statement of basis for this operable unit as appropriate. This area contains portions of the former coke oven area and SWMUs P-11 (former Benzol Plant) and P-11A ("old" former Benzol Plant). The Benzol Plants were used for the treatment and processing of liquid coke gas by-products. These SWMUs were found to be impacted with various organic compounds.

- **OU-05** (Slag Fill Area Zone 2, The Impoundments): OU-05 is approximately 74.4 acres and encompasses Slag Fill Area Zone 2 (SFA-2) with the exception of OU-03. OU-05 consists of steep slag bluffs located along the eastern shores of Lake Erie and the south shore of Smokes Creek. OU-05 is comprised of the SWMUs commonly referred to as The Impoundments (S-1, S-2, S-3, S-4, S-5, S-6, S-7/20, S-8, and S-27). The Impoundment SWMUs comprise approximately 21-acres and are primarily located in the western portion of OU-05. Disposal in the Impoundment SWMUs consisted of Water Quality Control Station sludges and dredge spoils from Smokes Creek. Areas outside the SWMUs are comprised of slag fill, access roads, and the aforementioned OU-03. OU-05 does not address groundwater. Groundwater is addressed under OU-10.
- **OU-06** (Former Petroleum Bulk Storage Sub-Area): OU-06 is approximately 116 acres located just north of Smokes Creek and encompasses SWMUs: P-8 Waste Oil Storage Tanks; S-10 Slag Quench Area J; P-74 (A, B, C, and D) Solid Fuel Mix Storage Piles; P-75 Tank Storage Area for No. 6 Fuel Oil and Petroleum Tar; and tar impacted slag AOC-H and AOC-I.
- **OU-07** (Coal/Coke/Ore Storage and Handling/Coke Plant and By-Products Processing): OU-07 is approximately 178 acres located just west of the Gateway Metroport Ship Canal and encompasses SWMUs: P-1 North Quench Water Pit; P-2 Arctic Quench Water Pit; P-3 Central Quench Water Pit; P-4 A Quench Water Pit; P-5 B Quench Water Pit; P-6 Lime Sludge Settling Basin; P-7 Abandoned Lime Sludge Settling Basin; P-10 Contaminated Soil Near Ball Mill; P-11 Benzol Plant Tank storage Area; P-11A Old Benzol Plant Tank Storage Area; P-12 Spill Cleanup Storage Area; S-19 Murphy's Mountain Landfill; S-25 Impoundment Under North End of Coal Pile; and S-26 Fill Area Near Coke Battery No. 8.
- **OU-08** (Slag Fill Area Zones 4 and 5 SWMU/AOC Group): OU-08 is approximately 113 acres located in the northwest portion of the site along Lake Erie and encompasses nine SWMUs: S-12 Asbestos Landfill L; S-13 Tar Sludge Surface Impoundment (HWMU 1A); S-14 General Rubble Landfill N; S-15 General Rubble Landfill O; S-16 Lime Stabilized Spent Pickle Liquor (SPL) Sludge Landfill (HWMU 1B); S-17 Vacuum Carbonate Blowdown Landfill Q; S-18 Lime Dust and Kish

Landfill R; S-23 Tar Pit Adjacent to Lime Stabilized SPL Sludge Landfill; and S-28 Drum Landfill. In addition, seven AOCs are also included within OU-08: AOCs-A is a lead-impacted areas within SWMU S-18; AOCs-B and -C were lead-impacted areas within SWMU S-18; AOC-D is a tar-impacted area north of SWMU S-23; AOC-E was a tar-impacted area north of SWMU S-14; AOC-F was a tar-impacted area in the Iron City Slag Reclamation area; and AOC-G was a tar-impacted area at Steel Winds II Wind Turbine 9 (WT-9).

- **OU-09** (Water Courses): OU-09 is comprised of four waterbodies, including Smokes Creek, the North Return Water Trench (NRWT), the South Return Water Trench (SRWT), and the Gateway Metroport Ship Canal. Approximately 8,500 feet of the eastern shoreline of Lake Erie borders the Bethlehem Steel Site and a primary focus of any remedial work is to reduce contaminant loading into Lake Erie. The portions of Smokes Creek and Lake Erie that are included within the site are both classified as Class C Fresh Waterbodies. The portion of Smokes Creek that runs through the site is approximately 5,500 feet, generally flowing east to west, bisecting the site and discharging into Lake Erie, except during significant storm events, wind surges, ice jams and Lake seiche events when the Creek temporarily flows in the reverse direction. For the purpose of the analytical data discussion, Smokes Creek is divided into two parts: the Upper Reach which extends from State Route 5 to the bridge on Site Highway 9, measuring approximately 3,900 feet; and the Lower Reach from the Site Highway 9 Bridge to Lake Erie. Smokes Creek and Lake Erie are located within the United States Environmental Protection Agency's (USEPA) Niagara River Area of Concern. The focus of the AOC with respect to OU-09 begins at the mouth of Smokes Creek and extends into Lake Erie, which includes the Buffalo Outer Harbor, as shown in Figure 2A
- **OU-10** (Groundwater): OU-10 covers groundwater across the entire site except for the portions already addressed under the OU-03 and OU-04 groundwater extraction and treatment systems. It also covers any off-site impacts of groundwater from the site.

This Statement of Basis is for OU-01 Site Wide Remedial Elements, OU-09 Water Courses and OU-10 Groundwater.

A site location map is attached as Figure 1. A facility-wide map depicting CMS sub-areas (solid waste management units, water courses and areas of concern) is attached as Figure 2, and a figure depicting operable units 5 through 8 is also attached (Figure 3). Figures 4 through 8 depict aspects of the remedy for OU-1. Figures 9-6, 9-7, and 9-8 and Figure 10-1 illustrate the remedies, respectively. The figures included in this document are enumerated in the following table:

Figure	Area of Interest
No. 1	Site Location Map
No. 2	Facility-wide CMS study areas
No. 2A	Operable Units Overview
No. 3	Site Wide Remedies
No. 3A	OUs5 thru OU8
No. 4	SWCAMU Alternative 2
No. 4A	SWCAMU Design
No. 5	Cover System Impoundments & SW-CAMU
No. 6	CAMU Liner Detail
No. 7	Revetment North-North Cross Section
No. 8	Revetment South-South Cross Section
No. 9-1A	Smokes Creek Upper Reach Data 1
No. 9-1B	Smokes Creek Upper Reach Data 2
No. 9-1C	Smokes Creek Upper Reach Data 3
No. 9-2	Smokes Creek Lower Reach Data
No. 9-3	Gateway Metroport Ship Canal Sediment Data
No. 9-4	NRWT Sediment Data
No. 9-5A	SRWT Sediment Data
No. 9-5B	SRWT Sediment Data
No. 9-6	Upper Reach Smokes Creek Removal Area
No. 9-7	Lower Reach Smokes Creek Removal Area
No. 9-8	Gateway Metroport Ship Canal Removal Area
No. 10-1	Site Wide Groundwater Remedy
No. 10-2	Groundwater Elevated pH
No. 10-3	Groundwater Benzene Exceedances

## **SECTION 4. LAND USE AND PHYSICAL SETTING**

The Department considered the current, intended, and reasonably anticipated future land use of the site and its surroundings while evaluating the remedies. For this site, alternatives that allow for industrial use of the site as described in Part 375-1.8(g), with portions that would allow for commercial use as part of the initiative to allow public access to the Lake Erie shoreline, were evaluated in addition to an alternative that would allow for unrestricted use of the site. Additionally, where appropriate, alternatives included environmental restoration to improve site habitat.

A comparison of the results of the RI against the appropriate standards, criteria, and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

## **SECTION 5. ENFORCEMENT STATUS**

The Bethlehem Steel site is subject to hazardous waste treatment, storage, and disposal facility (TSDF) permitting requirements under New York State (NYS) hazardous waste regulations (6 NYCRR Part 373) and has RCRA EPA ID No. NYD002134880. Under this regulatory program, Tecumseh is responsible for implementing Corrective Action to address releases to the environment from solid waste management units (SWMUs) and areas of concern (e.g., watercourses). On June 30, 2009, the Department and Tecumseh signed an Order on Consent (the “Order”) to complete a Corrective Measures Study (CMS) for the facility. On September 24, 2020 the Department, Tecumseh Redevelopment Inc., and ArcelorMittal USA LLC, Tecumseh’s parent corporation, signed an Order on Consent and Administrative Settlement (the “Order”) to complete comprehensive investigation; evaluation; and implementation of Corrective Measures/Remedial Actions, Closure and Post-Closure Care requirements of the site, to protect public health and the environment and to allow, when and where appropriate, the continued use of the site and its redevelopment by Tecumseh and/or third parties. Respondents’ outstanding and on-going substantive remediation obligations and/or financial assurance obligations under previous Orders, agreements, and authorizations survived and are binding and enforceable under this Order.

The property is also a site listed on the Department’s Registry of Inactive Hazardous Waste Disposal Sites (Site No. 915009-Former Bethlehem Steel) and is currently classified as a Class 2 site, as defined in 6 NYCRR Part 375 (significant threat to the public health or environment - action required). This Statement of Basis under the RCRA program will also serve as the Record of Decision (ROD) under the State Superfund

program. Outside of the RCRA site, portions of the former Bethlehem Steel property are also participating in the Brownfield Cleanup Program administered by the Department.

## **SECTION 6. SITE CONTAMINATION**

### **6.1 Summary of the Site Investigation**

A site investigation serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to public health and the environment.

A RCRA Facility Investigation (RFI) was initiated by Bethlehem Steel in 1990 and subsequently completed by Tecumseh in October 2004 (URS 2004). The investigation was intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site or leaving the site. The investigation reports on data gathered to determine if wastes containing hazardous substances were disposed at the site, and if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. The RFI investigated conditions on approximately 1,600 acres of former Bethlehem Steel property. Based on the RFI results, areas of the former Bethlehem Steel property were identified as needing remediation or further assessment. The 489 acres requiring additional remedial action comprise the site, while the remaining portions of the former Bethlehem Steel property are currently in the Brownfield Cleanup Program (BCP) and/or actively used for commercial and industrial purposes. After the RFI, Tecumseh conducted further investigation and assessment of remedial alternatives in a Corrective Measures Study (CMS) which resulted in a Final CMS Report (2019). A supplemental Comprehensive Groundwater Quality Report (2019) was also prepared that summarized and assessed the groundwater data collected during both the RFI and CMS. Investigation reports are available for review in the site document repository and pertinent results are summarized in section 6.3.

The analytical data collected includes data for OU-1, OU-9 and OU-10 was derived from samples of:

- soils
- sediments
- surface water
- solid and hazardous waste material contained in SWMUs/AOCs
- groundwater

**6.1.1 Standards, Criteria, and Guidance (SCGs)**

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs. Site-specific soil cleanup objectives for PAHs and arsenic are evaluated in Appendices C and F.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the site investigations were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibits A and B list the applicable SCGs in the footnotes. For a full listing of all SCGs see: <http://www.dec.ny.gov/regulations/61794.html>

**6.1.2 Investigation Results**

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below and in Exhibit A. Additionally, the site investigation reports contain a full discussion of the data. The contaminants of concern (COCs) identified at this site are:

Metals

Arsenic	Chromium	Mercury
Barium	Cyanide	Selenium
Cadmium	Lead	Silver

### Volatile Organic Compounds (VOCs)

Benzene	Toluene	1,2,4-Trichlorobenzene
Chlorobenzene	Trichloroethene	1,2,4-Trimethylbenzene
cis -1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1,1-Trichloroethane
Ethylbenzene	Vinyl chloride	1,2-Dichlorobenzene
Styrene	Xylene	
1,3,5-Trimethylbenzene		

### Semi-Volatile Organic Compounds (SVOCs)

Naphthalene	Polycyclic aromatic hydrocarbons (PAHs)
Phenolic Compounds	Biphenyl (1,1'-biphenyl)

### PCBs/Pesticides

Polychlorinated Biphenyls (PCBs)

The contaminants of concern exceed the applicable SCGs for the site for:

- soil
- sediments
- surface water
- groundwater

## **6.2 Interim and Final Corrective Measures**

### **6.2.1 Interim Corrective Measures**

Interim Corrective Measures (ICMs) are taken if, at any time during an investigation, it becomes apparent that corrective actions should be taken to immediately address the spread of contamination. The intent is to construct an ICM as close as possible to a component of a permanent system or final remedy.

The following ICMs have been completed at the site based on conditions observed during the RFI.

**OU-01A** (Smokes Creek Dredging, Lower Reach): An ICM was performed to address impacts observed in Smokes Creek surface water and sediment. Under a NYSDEC ICM consent order, the lower reach (last 2,600 feet) of Smokes Creek was dredged in 2008-2009, removing approximately 40,000 cubic yards of sediment, improving the hydraulic

capacity of the stream. Sediment was disposed in the Army Corps Confined Disposal Facility located near the site. Post-dredge sediment sampling data is being evaluated under OU-09. In a letter dated February 8, 2011, the Department confirmed that Tecumseh had satisfied the terms of the Smokes Creek ICM Work Plan as required by the Second Interim Order on Consent, File 03-73, and Tecumseh's obligations under the Order were terminated.

**OU-01B** (Coke Oven Gas Line Removal): An ICM was performed to address SWMU P-76, an underground 30-inch coke oven gas line discovered during infrastructure improvements to the site. The gas line consists of 30-inch diameter cast iron piping that was used to transport gas from the coke ovens to various process and treatment buildings. Sediment within the pipe was found to contain elevated levels of benzene and naphthalene. Approximately 910 feet of pipe were excavated, and an additional 200 feet of pipe were removed from exposed water crossings. Twenty cubic yards of sediment were removed and consolidated in OU-03. The cleaned piping was taken off-site for recycling. Approximately 135 feet of piping were cleaned and abandoned in place due to overlying infrastructure. A Construction Completion Report (CCR) was submitted on November 20, 2015.

**OU-01C** (Five Million Gallon Oil Storage Tank Removal): An ICM was performed to remove a 5-million-gallon storage tank in the former petroleum storage area that was used to store approximately 350,000 gallons of wastewater generated from various plant decommissioning activities. The wastewater was sent to the wastewater treatment facility at the Galvanizing Plant on the east side of NYS Route 5. The scrap metal was sent off-site for recycling. Approximately 87 tons of solid waste was removed and sent off-site for disposal. In a letter dated February 14, 2011, the Department confirmed that Tecumseh had satisfied the terms of the Order on Consent that required the treatment and discharge of wastewater and residual solids from the storage tank, and ultimately accepted the demolition and removal of the tank from Tecumseh's property, thus terminating Tecumseh's obligations under the Order.

**OU-01D** (Galvanizing Plant, SWMU P-73): An ICM was performed to address soils in the former drum storage area (P-73) and Flander's Field. The former drum storage area was used from the late 1940s through 1983 for the storage of lubricants, oils, grease, soap, and chemical additives. All stored materials were removed from the site in 1983. In anticipation of future development, the surface soils were excavated and staged in the area known as Flander's Field. In March of 2007, 1,135 tons of soil were disposed off-site in a sanitary landfill. A Closeout Report was submitted on December 7, 2007, and the Department subsequently issued a letter on January 2, 2008, stating that no further action was required for this SWMU.

**OU-04A** (Benzol Yard Interim Measure, SWMU P-11 Pump and Treat): This ICM was a groundwater and NAPL pump and treat system installed in the Benzol Yard (SWMU P-



11), located in the Coke Oven Area, near the south end of the Ship Canal. The system included multiple extraction wells, NAPL separation, air stripping of groundwater, and reinjection of treated water. This system began operating in 2005. A thermal oxidizer was initially used to treat vapor discharge from air stripper, but oxidizer use was discontinued due the reduced loading into the system. Between 2005 and 2018, this interim measure recovered over 36,000 pounds of contaminants. In 2019, the treatment building was dismantled, and the extraction wells and treatment system were incorporated into the final OU-04 groundwater remedy.

**OU-04B** (Benzol Yard Source Control): An ICM was performed to address source material located in the unsaturated soils and “smear zone” in the vicinity of SWMU P-11. A soil vapor extraction system was installed to collect and treat VOCs in 2019. The ICM will be managed in conjunction with the OU-04 remedy. Annual operation, maintenance and monitoring reports are submitted to the Department for review and evaluation. As of April 2020, this interim measure had recovered approximately 351 pounds of VOCs. A revised CCR was submitted on October 24, 2019, and approved by the Department on November 12, 2019.

## 6.2.2 Final Corrective Measures

Expedited corrective measures (ECMs), like ICMs, are remedial measures that are undertaken at one or more SWMUs before or during performance of a CMS in order to more promptly control or mitigate the release of hazardous constituents into the environment and/or to reduce the potential for human or biological exposure. Unlike ICMs, which may be short-term or intermediate remedies, ECMs are considered long-term final remedies. The ECM is considered a valuable tool to expedite the remedial process at high-priority SWMUs when the need for remedial action and/or the final remedy selection is readily apparent. Final corrective measures have been implemented or completed at OUs-02, -03, and -04, as detailed below:

**OU-02** (Tar Decanter Pit, Blast Furnace Hot and Cold Wells, and Lime and Kish Landfill): OU-02 consists of SWMUs P-9 (Tar Decanter Pit), P-18A and P-18B (Blast Furnace Hot and Cold Wells), P-76 (Coke Oven Gas Line), and two AOCs (B and C) within S-18 (Lime and Kish Landfill R). These SWMUs were found to be impacted primarily with elevated levels of benzene and lead. Wastes from these SWMUs were excavated, treated, and consolidated within the OU-03 containment unit. A revised CCR for OU-02 and OU-03 was submitted on July 26, 2016, and approved by the Department on August 12, 2016.

**OU-03** (Acid Tar Pit SWMU Expedited Corrective Measure): OU-03 is approximately 6 acres and consists of SWMUs S-11, S-21, S-22, and S-24 known as the Acid Tar Pit Group. S-11, S-21, and S-22 are located south of Smokes Creek in the southeast corner of the CMS Area. S-24 is located just north of Smokes Creek west of the intersection of Site Highways #9 and #11. SWMU S-11 measures approximately 1.4 acres and consists

of various wastes generated from steel and coke making operations deposited from the 1950s through the early 1970s. These SWMUs were found to be impacted with elevated levels of metals and various organic compounds that were migrating to Smokes Creek via groundwater discharge and surface water flow. A revised CCR for OU-02 and OU-03 was submitted on July 26, 2016, and approved by the Department on August 12, 2016.

A Consent Order to implement the Acid Tar Pit ECM was executed by Tecumseh and the Department on May 10, 2010. The remedy, completed between 2010 and 2015, included: site clearing, grading, and construction of a soil-bentonite slurry wall surrounding SWMUs S-11 and S-22 and keyed into the native glaciolacustrine silty-clay confining unit; excavation, transport, and consolidation of residuals from SWMUs S-21 and S-24, and other SWMUs/AOCs as detailed in OU-02 above, into the containment cell; placement of a multi-layer geosynthetic membrane, drainage, and vegetated soil RCRA final cover system; and construction of a groundwater/leachate collection, pretreatment, and conveyance system. The containment system physically isolates the solid SWMU/AOC waste/fill from the environment and contains the aqueous groundwater constituents immediately surrounding them by maintaining an inward hydraulic gradient. Groundwater/leachate from within the containment cell is removed by several pumped wells with on-site pretreatment consisting of oil/water separation, neutralization, air stripping of volatile organic constituents, and filtration followed by sewer conveyance to the Erie County Sewer District (ECSD) No. 6 publicly owned treatment works (POTW) in Lackawanna for final biological treatment and discharge to Smokes Creek. A revised CCR for OU-02 and OU-03 was submitted on July 26, 2016 and approved by the Department on August 12, 2016.

**OU-04** (Coke Oven Area – Groundwater): This OU consists of groundwater associated with an approximately 27-acre area along the western side of the Gateway Metroport Ship Canal. OU-04 is not intended to address soil, soil vapor, or other environmental issues associated with the former Coke Oven Area. These other media are addressed under OU-07. This area contains portions of the former coke oven area and SWMUs P-11 (former Benzol Plant) and P-11A (“old” former Benzol Plant). The Benzol Plants were used for the treatment and processing of liquid coke gas by-products. These SWMUs were found to be impacted with various organic compounds.

A Consent Order for Coke Oven Area Groundwater Corrective Action was executed in September 2017 calling for augmenting the existing 11 ICM groundwater pumping wells in the Benzol Yard (SWMU P-11) with an additional 14 pumping wells plus an additional 27 pumping wells in the northern portion of the OU-4 Area in and around the “Old” Benzol Yard (SWMU P-11A). The existing Benzol Yard ICM groundwater treatment system and south infiltration gallery (i.e., OU-04A) were decommissioned following construction and start-up of the new OU-04 groundwater treatment system in March 2019. The OU-04 groundwater treatment building contains two parallel treatment systems or “trains” with

the south groundwater treatment train consisting of an oil-water separator, bag filtration, and shallow tray air stripper; and an independent northern groundwater treatment train with a bag filter, a shallow tray air stripper, and a granular activated carbon adsorption system to treat the higher phenolic and naphthalene constituent concentrations. Treated groundwater is discharged back to the subsurface through infiltration galleries located adjacent to the treatment building in the west central portion of the OU. An amended CCR was submitted on August 13, 2019 and approved by the Department on September 11, 2019.

## **6.3 Summary of Environmental Assessment**

### **6.3.1 Nature and Extent of Contamination**

Groundwater, surface water, soil, and sediments were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, PCBs, and pesticides. Groundwater was also sampled for the emerging contaminants (ECs) 1,4-dioxane and per- and poly-fluoroalkyl substances (PFAS). Based upon investigations conducted to date, the primary contaminants of concern include VOCs, SVOCs, and metals for groundwater, SVOCs (i.e., phenolics and polycyclic aromatic hydrocarbons [PAHs]), PCBs, and various metals (i.e., arsenic, chromium, and mercury) for soil, PCBs and various metals for sediments, and PAHs and lead for surface water. Based upon current data, there is no off-site migration in surface water, groundwater, sediment, or soil.

#### **6.3.1.1 Surface Water**

The Gateway Metroport Ship Canal and Smokes Creek are defined as Class C fresh surface water bodies, meaning that their most suitable use is for fish, shellfish and wildlife propagation and survival. Samples were collected and compared against the NYS TOGS 1.1.1 and Ambient Water Quality Standards Part 703. There were no exceedances in the Gateway Metroport Ship Canal. In Smokes Creek, selenium and cyanide were found at a maximum concentration of 5.8 parts per billion (ppb) and 36 ppb in exceedance of Fresh Water Ambient Quality Standards of 4.6 ppb and 5.2 ppb, respectively. Additionally, one SVOC compound Bis(2-Ethylhexyl)phthalate was found in exceedance (0.6 ppb) at a maximum concentration of 24 ppb.

The Southern and Northern Return Water Trenches (SRWT and NRWT) do not have a specific NYSDEC waterbody classification as they are manmade. However, the SRWT currently serves an ecological role in fostering habitats for different fish and bird populations. Surface water samples were collected from the NRWT and SRWT and compared against the NYS Class C Stream Standards protection for fish propagation in Fresh Waters, Ambient Water Quality Standards, and TOGS 1.1.1. Samples collected from the NRWT contained certain VOCs and inorganic compounds; however, no

exceedances were identified. Samples collected from the SRWT contained cyanide at a maximum concentration of 119 ppb and mercury (total) at a maximum concentration of 0.7 ppb, exceeding the Fresh Water Ambient Water Quality Standards of 5.2 ppb and 0.0007 ppb, respectively. Currently, the North Return Water Trench is partially filled in with debris. A more detailed evaluation of the surface water data can be found in Exhibit A.

### **6.3.1.2 Groundwater**

Multiple VOCs, SVOCs, and metals exceed NYSDEC TOGS (1.1.1) Class GA groundwater standards. Data summarized in this section also include the March 2020 sampling event. VOC and SVOC compounds (namely BTEX and PAHs, respectively), exceed groundwater standards across the site. The maximum concentration of benzene (96,000 ppb) exceeds the standard of 1 ppb by almost five orders of magnitude at the easternmost portion of the site, adjacent to the Ship Canal. Maximum concentrations of toluene (5,800 ppb), ethylbenzene (880 ppb), and total xylene (2,360 ppb) exceed the standard of 5 ppb for each contaminant. The most notable SVOC exceedance in groundwater is phenolic compounds (total phenols) with a maximum concentration of 21,038 ppb (1 ppb groundwater standard) in DSA 2B – the southeastern portion of the site. Various other SVOCs exceeded applicable groundwater standards. For example, naphthalene (10 ppb standard; 12,000 ppb maximum) and 3- and 4-methylphenol (m,p.-cresol) (1 ppb standard; 4,000 ppb maximum) are the next two highest SVOC concentrations. Of the metals sampled, the following maximum metal concentrations exceeded their applicable standards: arsenic at 118 ppb (25 ppb standard), barium at 15,750 ppb (1,000 ppb standard), chromium at 260.6 ppb (50 ppb standard), cyanide at 6,440 ppb (200 ppb standard), magnesium at 749,000 (35,000 ppb standard), manganese at 111,900 ppb (300 ppb standard), selenium at 40.5 ppb (10 ppb standard), and sodium at 3,060,000 ppb (20,000 ppb standard). Additionally, the pH in groundwater exceeds the 12.5 threshold as a RCRA hazardous waste in several locations (DSA 2A, 4A, 4B). PCBs and pesticide 4,4' DDE analyzed in the most recent groundwater sampling event (March 2020) did not exceed standards of 0.09 ppb and 0.2 ppb, respectively. Lastly, emerging contaminants, 1,4-dioxane and PFAS were sampled across the site in March 2020. 1,4-dioxane was detected at a maximum concentration of 215 ppb, significantly above the State's 1 ppb screening level. PFAS compounds were detected above the State's screening level for PFOA and PFOS of 10 parts per trillion (ppt) for each with a maximum concentration of 134 ppt and 25.9 ppt, respectively. See Exhibit A for more detail.

### **6.3.1.3 Sediment**

Sediments in Smokes Creek, Gateway Metroport Ship Canal, and the South Return Water Trench were found to be impacted with SVOCs, PCBs, and metals in exceedance of NYSDEC Class C Sediment Guidance Values (SGVs), NYDEC Screening and Assessment of Contaminated Sediment (2014). If the concentration of a contaminant

exceeds the Class C SGV for a contaminant, there is a high potential for the sediments to be toxic to aquatic life.

### Smokes Creek

In the Upper Reach of Smokes Creek, the maximum concentrations of lead were detected at 1,370 parts per million (ppm), exceeding the Class C SGV of 130 ppm. Similarly, the maximum concentration of silver was detected at 11.8 ppm, exceeding the Class C (2.2 ppm) SGV. Individual SVOC compounds were detected below the Class A SGVs; however, total PAH-17 and total PAH-34; maximum concentrations were 55.5 ppm and 70.3 ppm, which exceed the Class C (35 ppm) SGV. As stated in the NYSDEC Sediment Guidance document, PAHs always occur in the environment as complex mixtures. While there are thousands of different PAHs, U.S. EPA (2003) identified 34 individual PAHs (18 specific non-alkylated compounds and 16 generic alkylated forms) that constitute “total” PAHs. Additionally, sediment samples collected from the Lower Reach of Smokes Creek contained a maximum concentration of lead at 837 ppm, exceeding the Class C SGV of 130 ppm. Silver was detected at a maximum concentration of 11.8 ppm, exceeding Class C SGV of 2.2 ppm. Mercury was detected at a maximum concentration of 0.86 ppm, exceeding Class A but not Class C SGVs of 0.2 and 1 ppm, respectively. Individual SVOC compounds were detected below Class A SGV, however total PAH concentrations were detected at 11.48 ppm, exceeding the Class A but not Class C SGVs of 4 ppm and 35 ppm, respectively. The maximum total PCB concentration was detected at 3.6 ppm, exceeding the Class C SGV (1 ppm).

### Gateway Metroport Ship Canal

Maximum concentrations of lead were detected at 663 ppm, exceeding the SGV for Class C (130 ppm). The maximum concentration of total PCBs (0.3360 ppm) detected exceeds the Class A SGV (0.10 ppm) but does not exceed the Class C SGV (1 ppm). Similarly, the maximum concentration of silver (1.2 ppm) detected exceeds Class A (1 ppm) but not Class C SGVs (2.2 ppm). The maximum concentration of mercury (1.61 ppm) exceeds both the Class A (0.2) and Class C (1 ppm) SGV. Finally, the maximum concentration of total PAH's (1,919 ppm) exceeds the Class C (35 ppm) SGV by two orders of magnitude.

### South Return Water Trench

For inorganic compounds, there were exceedances of Class C SGVs for arsenic, with a maximum concentration of 102 ppm exceeding Class C (33 ppm), (total) chromium with a maximum concentration of 212 ppm exceeding Class C (110 ppm), lead with a maximum concentration 1,010 ppm exceeding Class C (130 ppm), mercury with maximum concentration of 2.5 ppm exceeding Class C (2.5 ppm), nickel with a maximum concentration of 147 ppm exceeding Class C (49 ppm) and zinc with a maximum concentration of 3,410 ppm exceeding Class C (460 ppm). Total PCBs were detected at a maximum concentration of 0.189 ppm, exceeding the Class A SGV (0.100 ppb);

however, there were no exceedances of its Class C SGV (1 ppm). The total PAH- 34 maximum concentration (10.41 ppm) exceeds Class A (4 ppm) but not Class C (35 ppm) SGV.

#### North Return Water Trench

The maximum concentration of lead (909 ppm) was detected in exceedance of its Class C SGV (130 ppm). Mercury was detected at a maximum concentration (3.2 ppm) which exceeds the Class C (1.0 ppm) SGV. The maximum concentration of total PCBs (1.2 ppm) exceeds the Class C (1.0 ppm) SGV. There were detections of VOCs; however, they did not exceed Class A. One of the five sediment samples fall within the Class B SGV. These samples were collected in 2013 and the trench is already partially filled in.

#### *6.3.1.4 Soil*

Multiple VOCs, SVOCs, and metals exceed industrial or commercial use soil cleanup objectives (SCOs). Naphthalene was detected at a maximum concentration at 6,500 ppm exceeding the industrial use SCO of 1,000 ppm, arsenic was detected at a maximum concentration of 90.3 ppm exceeding the industrial use SCO of 16 ppm, mercury was detected at a maximum concentration of 10.5 ppm exceeding the industrial use SCO of 5.7 ppm, benzene was detected at a maximum concentration of 2,800 ppm exceeding the industrial use SCO of 89 ppm, benzo(a)pyrene was detected at a maximum concentration of 6.2 ppm exceeding the industrial use SCO of 1.1 ppm. Additionally, various compounds exceeded the protection of groundwater standards, including but not limited to arsenic, cadmium, mercury, cyanide, benzene, ethylbenzene, toluene, xylenes, methylene chloride and numerous SVOCs.

#### **6.3.2. Special Resources Impacted/Threatened:**

Water courses, such as Smokes Creek, pass through the site and flow into Lake Erie, which abuts the western edge of the site. The Department considers Smokes Creek as an important ecological corridor that connects upland areas to Lake Erie.

#### **6.4 Summary of Human Exposure Pathways**

The site is partially fenced, gated and has signage which restricts public access. However, persons who enter the site could contact contaminants in the soil by walking on the site, digging or otherwise disturbing the soil. There are several surface water areas where persons may come in contact with contaminants on-site. People are not coming into contact with the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings,

is referred to as soil vapor intrusion. Because the site is undeveloped or used for outdoor industrial purposes the inhalation of site-related contaminants due to soil vapor intrusion does not represent a current concern.

## **6.5 Summary of the Remediation Objectives**

The objectives for the remedial program have been established through the remedy selection process in 6 NYCRR Parts 373 and 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives (RAOs) are:

### **Groundwater**

#### **RAOs for Public Health Protection**

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.

#### **RAOs for Environmental Protection**

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water on and off-site
- Remove the source of groundwater contamination.

### **Surface Water**

#### **RAOs for Public Health Protection**

- Prevent ingestion or direct contact with contaminated surface water.
- Prevent contact or inhalation of contaminants from impacted water bodies.
- Prevent surface water contamination which may result in fish advisories.

#### **RAOs for Environmental Protection**

- Restore surface water to ambient water quality criteria for the contaminant of concern.
- Prevent impacts to biota (plants/animals) from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the aquatic food chain.

## Soil

### **RAOs for Public Health Protection**

- Prevent ingestion or direct contact with contaminated soil.

### **RAOs for Environmental Protection**

- Prevent migration of contaminants that would result in groundwater, surface water or sediment contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

## Soil Vapor

### **RAOs for Public Health Protection**

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

## Sediment

### **RAOs for Public Health Protection**

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

### **RAOs for Environmental Protection**

- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

## **SECTION 7. SUMMARY OF THE SELECTED OU1, OU9, AND OU10 REMEDY**

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the



site, which are presented in Section 6.5. The criteria that will be used to determine if the remedial action objectives are being achieved are presented in Exhibit B. Potential remedial alternatives for the site were identified, screened and evaluated in the Corrective Measures Study (CMS) report and further evaluated by the Department in the development of the selected remedy.

A summary of the remedial alternatives that were considered for site-wide OU-1, OU-9 and OU-10 are presented in Exhibit C. Where applicable, cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit D.

The basis for the Department’s selected Corrective Measure is set forth in Exhibit E.

The selected remedy is referred to as the SW-CAMU with Sediment Removal in Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal, Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring and includes:

**OU-01/OU-09/OU-10**

<b>SWMU</b>	<b>Selected Remedy</b>
OU-1 Sitewide Remedy	Management of nonhazardous contaminated materials in a Corrective Action Management Unit (CAMU) will be conducted on-site.
	Cover system in areas where surface soil exceeds applicable soil cleanup objectives
OU-09 Water Courses	Complete excavation of sediment in Smokes Creek and restoration of the bank soils, dredging/excavation of sediment in the Gateway Metroport Ship Canal, and the South Return Water Trench
	Soil or waste exhibiting hazardous waste regulatory levels will be disposed off-site at a permitted hazardous waste disposal facility.
	Main Stem Enhancement at Smokes Creek
	Plugging and backfill of the North Return Water Trench

SWMU	Selected Remedy
OU-10 Groundwater	Enhancements to the two on-site treatment systems (within the Acid Tar Pit and Benzol Plant areas)
	Monitoring program
	Contingency remedial action plan

These components of the site-wide OU-1, OU-9 and OU-10 remedy are supplemented by specific remedies for other operable units referenced above.

The estimated present worth cost to implement the remedy is \$32,972,000. The cost to construct the remedy is estimated to be \$21,741,700 and the estimated average annual cost is \$350,00.

The elements of the Site-Wide, Water Courses and Groundwater Remedial Elements are as follows:

**1. Pre-Design Investigations (PDI)**

A PDI is required to aid in the design of the enhanced water treatment systems. Sufficient geotechnical information will be collected and pumping tests will be completed to determine extraction well radii of influence and installation locations to contain the contaminant plume and prevent discharge into surface water bodies. Sampling must also take place in SWMUs where waste extends into, or close to, the groundwater table (i.e., SWMUs S-04 and S-16) to verify these wastes are not contributing contaminants to groundwater. Additional well installations will likely be required. A Department approved PDI Work Plan for each OU is required.

A PDI will also be implemented for Smokes Creek and Gateway Metroport Ship Canal. This pre-design investigation will include, but is not limited to the following elements:

- Sediment sampling up to the mean high-water level to further delineate sediment requiring remediation;
- Hydrologic studies to accurately delineate the mean high-water level;
- An ecological investigation to further delineate the toxicity and mobility of contaminants in sediment;
- Geotechnical sampling to help support the remediation;
- Determining the location of any underground utilities or other obstructions that may impact dredging activities. This information would be utilized to either re-route these utilities outside the remediation or to accommodate their locations and future anticipated maintenance;

- Analysis of any tributaries or drainages contributing within the work area to determine if contaminated sediments are being transported into or out of the site. Stream profile forms would be documented for restoration of the stream following dredging activities;
- Surveying, including bathymetric as appropriate, the location of any additional soil or sediment sampling and underground utilities to support the remedial design and implementation of the remedy; and
- Waste characterization, pore water, hydrodynamic and sediment transport modeling, an ice impact study and an evaluation of the potential for scour.

## 2. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

### 3. Sustainable Restoration and Climate Resiliency Plan

A Sustainable Restoration and Climate Resiliency Plan is required, which includes at a minimum the following:

- An evaluation of the feasibility, location(s) of, and designs for on-site areas of habitat creation, restoration and enhancement that will include: structural, environmental and ecological enhancements to the on-site shoreline and surrounding area that will restore the Lackawanna lakeshore to a more natural state, soften the shoreline and provide stability of the slag-cliff face where needed. The development of such enhancements will be compatible with all final remedies and a vision for the planned future use of the site;
- Design, implement and maintain on-site areas that provide opportunities for public access;
- Restoration consistent with the Great Lakes Restoration Initiative or other regional master plans;
- Design, implement and maintain areas of habitat creation, restoration and enhancement that will include structural, environmental and ecological enhancements to the on-site shoreline and surrounding area that will restore the Lackawanna lakeshore to a more natural state, and soften the shoreline and provide stability of the slag-cliff face where needed and prevent the migration of contaminated materials to nearby waterbodies;
- Routine maintenance of the mouth of Smokes Creek for flood control and fish migration;
- Climate change vulnerability analyses and adaptation planning leading to increased remedy resilience including maintaining on-site habitats;
- Identifying potential hazards posed by climate change;
- Characterizing the remedy(s) exposure to those hazards;
- Characterizing the remedy(s) sensitivity to the hazards;
- Considering factors that may exacerbate remedy(s) exposure and sensitivity, such as the size of upstream water;
- Catchment, the size of adjacent floodplains, and land use in the floodplains;
- Identifying measures that potentially apply to the vulnerabilities in a range of weather/climate scenarios; and
- Selecting and implementing priority adaptation measures for the given remedy.

#### 4. Corrective Action Management Unit (CAMU)

If the technical requirements and timing described in this document are met, the management of non-hazardous contaminated materials in a Corrective Action Management Unit (CAMU) will be conducted on-site. If these conditions are not met, contaminated soil will be separated on-site into hazardous and non-hazardous contaminated materials and disposed of at an applicable permitted off-site facility or beneficially reused pursuant to a DEC beneficial use determination as set forth in 6 NYCRR Part 360, as approved by the Department, with the option of temporary on-site staging, with a preference towards beneficial use as commercial landfill daily cover and transport via rail.

This element would locate the Solid Waste Corrective Action Management Unit (SW-CAMU) within the footprint of SWMUs S-7 and S-20 (see Figure 5) which would serve as the containment cell for consolidation and final disposal of the solid wastes generated from the remediation of the other SWMUs (estimated to range from 27,000 CY to over 115,000 CY) as shown in Figure 2. The exact volume of waste placed in the SW-CAMU, will be further determined through the PDI. This waste/fill will be placed over the approximately 875,000 CY of waste/fill already contained in SFA Zone 2 utilizing a containment cell described in more detail below. The estimated range of SWMU waste/fill volume to be consolidated into the SW-CAMU is large because excavation quantities will vary according to the lateral and vertical extent of impacts as well as the amount of slag reclaimed from the SWMUs. In this alternative, the SWMU waste/fill to be consolidated into the SW-CAMU would be placed in an engineered containment cell that will fully encapsulate the relocated wastes and include a low-permeability geocomposite liner system (see Figure 5 and 6), leachate collection system (see Figure 5 and 6), and a low-permeability geocomposite cover system (refer to Figure 6). As such, the extent of the SW-CAMU will be approximately 4.3 acres. Figure 4 and 4a illustrates the SW-CAMU footprint and closure plan for the other impoundments under this alternative. The slope of the SW-CAMU final cover system would be 10% maximum and 4% minimum. A maximum slope of 25% would be allowed in coordination with public access developments.

Soil, sediment, or waste exhibiting hazardous waste regulatory levels will be disposed off-site at a permitted hazardous waste disposal facility or will be rendered non-hazardous and placed in the CAMU. The CAMU shall, to the extent practicable, minimize the land area of the facility upon which waste will remain in place after closure of the CAMU. The engineered cap will be designed, constructed and maintained in conformance with the substantive requirements of 6 NYCRR Part 360 solid waste regulations. The design of the CAMU will meet RCRA subtitle D – seismic design guidance for municipal solid waste landfill activities, as well as 40 CFR 258.15 Unstable Areas requirements. These requirements will apply to the entire waste

containment system, including liners, leachate collection systems, and surface water control systems. A work plan detailing aerial configuration, design, operation, treatment and closure/post closure requirements (including groundwater monitoring and corrective action) must be submitted to and approved by the Department.

## **5. Disposition of Excavated Material**

The disposition of excavated materials will be subject to a site-wide materials management plan.

The excavation material may be:

- a) The excavated materials will be sent off-site for disposal if it is found to be hazardous waste pursuant to NYCRR Part 371;
- b) If the waste is determined to be non-hazardous, the off-site disposal option will allow for the staging of material on-site (for up to 24 months) in accordance with 6NYCRR Part 373-2.19(d) and 40 CFR Section 264.5 and other applicable requirements to maximize the beneficial reuse of the remedial waste as daily cover at commercial landfills, provided the remedy selection authorizes such activity. If utilized, temporary soil pile(s) may not exceed 28 feet in height; and/or
- c) Placed in a CAMU to be constructed on the former Bethlehem Steel site property designed to meet all applicable rules and regulations, or if approved by the Department, staged while the CAMU is being constructed. To utilize a CAMU, a design must be completed and approved, and construction must begin within 24 months of this SB (or such other time frame as the Department agrees upon in writing) and be completed in accordance with a Department-approved schedule. If the CAMU is not constructed in accordance with the approved schedule the remedial wastes will be disposed of off-site.
- d) Material placed in the CAMU will consist of the excavated material from Smokes Creek, SRWT, Metroport Ship Canal, SWMUs in OU5, OU6, OU7 and OU8. Additional material may be placed within the CAMU if determined necessary during the PDI.

While the transportation mode will be determined during the remedial design, the Department's preferred mode of transportation is rail since it reduces truck traffic, reduces greenhouse gases, facilities are located near the site, and is in line with community comments.

## **6. Cover System**

A cover system will be required to allow for industrial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs), including material exhibiting elevated radiological readings, and for commercial (passive recreational) use in areas proposed to enhance public access where the upper one foot of exposed surface soil will exceed the applicable SCOs. The cover system will be a minimum of one foot of soil, with the upper six inches of soil of sufficient quality to maintain a vegetative layer, or an approved fill placed over a demarcation layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, new building foundations and associated building slabs. To the extent practical, areas with one foot of cover will be used to enhance habitat or be appropriately regraded to facilitate future use.

## **7. Sediment Dredging**

Sediment will be dredged and/or excavated at Smokes Creek (Figure 9-6 and 9-7) and Gateway Metroport Ship Canal (Figure 9-8) where sediments exceed Class A and Class C SGVs respectively. All sediments will be removed from the South Return Water Trench. Any remaining debris in the North Return Water Trench will be removed and backfilled in accordance with clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for industrial use. The extent of the dredged material will be determined through the PDI.

## **8. Waterbody Construction**

- a. Smokes Creek – Following dredging, Smokes Creek will be designed to improve hydraulic flow, reduce flooding, as per previous dredging activities conducted by the US Army Corps of Engineers (USACE), and provide climate resilience. Shoreline areas disturbed by the remedial effort be restored in accordance with the flood control easements and USACE requirements currently in place.
- b. The Smokes Creek riparian zone through the former Bethlehem Steel property will be enhanced through bank clean-up and stabilization for greater aquatic connectivity into the creek's headwaters of Smokes Creek that runs through the Bethlehem Steel site. All shoreline areas disturbed by the remedial effort be

restored in accordance with the flood control easements and USACE requirements currently in place.

- c. North Return Water Trench-The North Return Water Trench will be plugged and backfilled to establish design elevations. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) for industrial use will be brought in to establish the designed backfill placement and will meet the department's requirements for an industrial cover system.
- d. South Return Water Trench – Will be dredged and clean fill will be placed, meeting the requirements of 6 NYCRR Part 375-6.7(c) for commercial and passive recreational use.

## **9. Groundwater**

Enhancements to the two current groundwater extraction and treatment systems (located in the Acid Tar Pit and the Coke Oven/Benzol Plant areas) will be implemented to treat contaminants in groundwater across a larger area of the site and to ensure contaminated groundwater does not migrate off-site. Additional groundwater extraction wells will be designed and installed so that the capture zone is sufficient in intercepting and containing the groundwater contaminant plumes to stop further migration, particularly from discharging into surface water bodies. The extraction wells will be installed near the shorelines of Smokes Creek and Lake Erie and west of the Benzol Plant/Tank Farm, shown on Figure 10-1. The extraction system will create a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area and treated by the two on-site existing systems or construction of an additional groundwater treatment system. Further details of the enhanced modifications to the current extraction systems will be determined during the remedial design. Prior to the full implementation of this technology, studies will be conducted to more clearly define design parameters, including extraction well spacing.

Monitoring for contaminants of concern and degradation byproducts will be required in areas: (1) upgradient, downgradient, and within the treatment zone of the groundwater extraction wells; (2) upgradient and downgradient of any impacted groundwater; and (3) select off-site locations to ensure contaminant migration from the site is not occurring.

The operation of the remedial components will continue until RAOs have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.



## **10. Vapor Intrusion Evaluation**

All existing on-site buildings will be required to have a soil vapor intrusion evaluation completed within two years of the issuance of this Statement of Basis or as they become occupied. Any new buildings following the issuance of this statement of basis will also need to be evaluated for soil vapor intrusion. The evaluation will include a provision for implementing actions recommended to address exposures related to soil vapor intrusion.

## **11. Interim Groundwater Monitoring**

Groundwater will be periodically monitored for site-related contaminants (in areas outside the reach of the treatment systems and at groundwater monitoring wells across the entire site and possibly off-site, as determined by the Department) to assess the effectiveness of the treatment systems and monitor groundwater conditions during pre-design investigations, remedial design, and implementation of the remedies. Sampling frequency should account for seasonality until water table fluctuations and trend analyses are established as outlined in the future monitoring plan. Any reduction in the sampling frequency must be pre-approved by the Department. A monitoring report following each sampling event is required.

## **12. Remedial System Optimization**

After five years, or as determined by the Department, a groundwater optimization will be performed to evaluate the effectiveness of the treatment enhancements and the need for further improvements or expansion to the system(s). The nature and extent of contamination in areas where groundwater extraction has been shown to be ineffective (migration of contaminants to waterbodies or offsite, increasing trends of contaminants or other metrics as approved by the Department) will be immediately and thoroughly investigated pursuant to a work plan approved by the Department. Based on the investigation results and the Department's determination of the need for corrective measures, a Remedial Action Work Plan (RAWP) will be developed to further modify and/or expand the current treatment systems. Citizen Participation Plan (CPP) activities will continue through this process. The corrective measures may include source removal and/or the installation of additional treatment systems and extraction wells to limit plume migration and target significant groundwater exceedances. Any recommendations to reduce sampling frequency, analytical parameters, and/or treatment must be approved by the Department.

### **13. Financial Assurance**

Tecumseh Redevelopment, Inc., shall post financial assurance using one or more of the financial instruments specified in 6 NYCRR 373-2.8 in the amount of the cost projection for the remedy selected in any Statement of Basis(s). Financial assurance must include all remedial activities, closure and post-closure care for the site that have not been implemented.

### **14. Institutional Control**

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- Require the remedial party or site owner to complete and submit to the Department 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 industrial use as defined by Part 375-1.8(g) or commercial use as defined by Part 375-1.8(g) for passive recreational areas, although land use is subject to local zoning laws;
- Define and describe areas anticipated to be made available for passive recreational use;
- Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- Restrict the use of surface water for any other purposes besides passive recreational use; and
- Require compliance with the Department approved Site Management Plan.

### **15. Site Management Plan**

A Site Management Plan is required, which includes the following:

1. 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 following institutional and/or engineering controls remain in place and effective:

**Institutional Controls:** the financial assurance described in Paragraph 14 and the environmental easement described in Paragraph 16. Implementation of controls including notification of appropriate government agencies with authority for permitting potential future activities which could impact the implementation and effectiveness of the remedy.

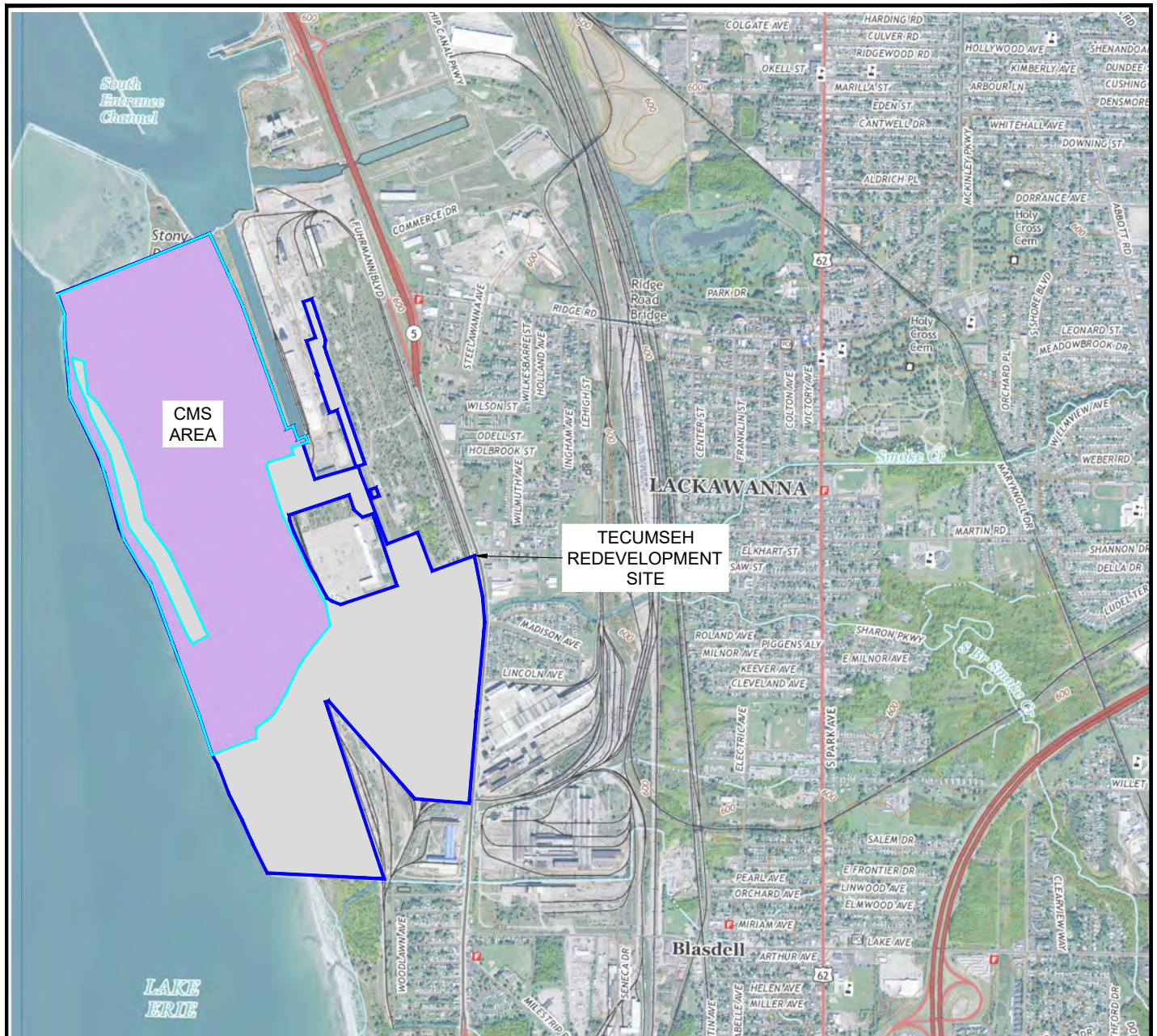
**Engineering Controls:** The Corrective Action Management Unit described in Paragraph 4, the cover system described in Paragraph 6, and the Enhanced Groundwater Extraction and Treatment discussed in Paragraph 9 above, including any subsequent modifications or additions deemed necessary by the Department. This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- A provision for further investigation and remediation should redevelopment occur or if the subsurface is otherwise made accessible. The nature and extent of contamination in areas where access was previously limited or unavailable will be immediately and thoroughly investigated pursuant to a plan approved by the Department. Based on the investigation results and the Department's determination of the need for a remedy, a Remedial Action Work Plan (RAWP) will be developed for the final remedy for the site, including removal and/or treatment of any source areas to the extent feasible. Citizen Participation Plan (CPP) activities will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment;
- With respect to areas anticipated to be made available for passive recreational use, the necessary institutional and engineering controls must be effectively implemented, maintained, monitored and enforced through the site management plan. These areas would require the top one foot of cover to meet the commercial soil cleanup objectives;
- Descriptions of the provisions of the environmental easement including any land use, groundwater and surface water use restrictions;
- A provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provisions for implementing actions recommended to address exposures related to soil vapor intrusion;
- A provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 6 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
- Provisions for the management and inspection of the identified engineering controls;
- A provision for conducting remedial system optimizations at least every five years;
- Maintaining site access controls and the Department notification; and

- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.
2. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan must include, but may not be limited to:
- Monitoring of soil, sediment and groundwater to assess the performance and effectiveness of the remedy;
  - Monitoring of bank soil, sediment and surface water (mass loading, discharge locations) within the mean highwater mark to assess the performance and effectiveness of the remedy;
  - Necessary requirements for monitoring the success for 5 years after remedial action and for needed restoration maintenance within the waterways. Specific monitoring requirements and success criteria will be determined during the remedial design;
  - A schedule of monitoring and frequency of submittals to the Department;
  - Monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.
3. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan must include, but is not limited to:
- Procedures for operating and maintaining the remedy;
  - Compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
  - Maintaining site access controls and Department notification; and
  - Providing the Department access to the site and O&M records.

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SCALE: 1 INCH = 2,500 FEET  
SCALE IN FEET  
(approximate)



**LEGEND:**

- TECUMSEH PROPERTY
- CMS AREA

BASE MAP USGS QUAD BUFFALO SE 2016

## FIGURE 1 SITE LOCATION MAP

CMS AREA - FORMER BETHLEHEM STEEL SITE  
LACKAWANNA, NEW YORK



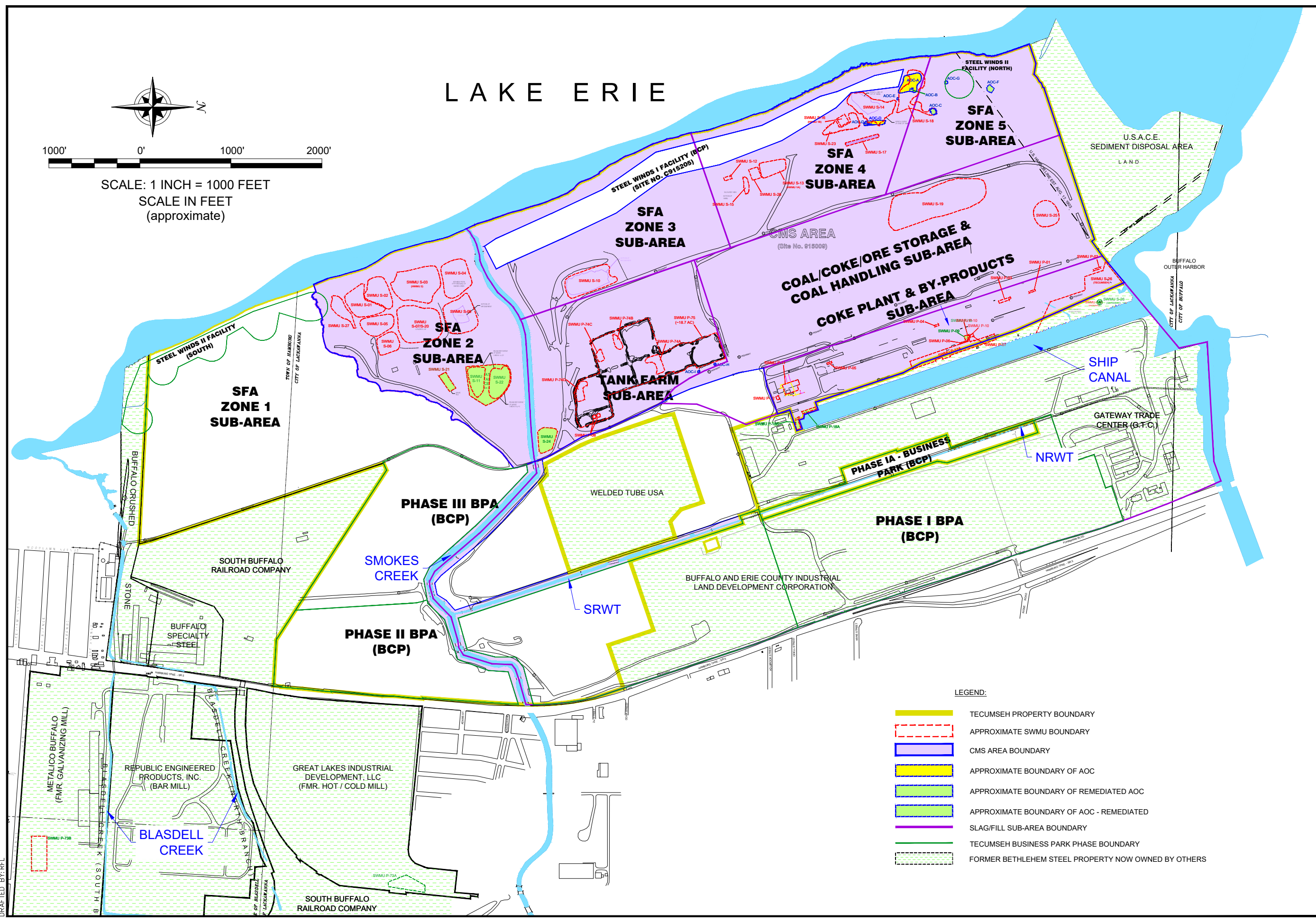
2558 HAMBURG TURNPIKE  
SUITE 300  
BUFFALO, NY 14218  
(716) 856-0635

PROJECT NO.: 0071-019-111

DATE: MAY 2019

DRAFTED BY: RFL

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DATE: MARCH, 2019  
DRAFTED BY: REL

**CMS SUB-AREAS W/ SWMUS, WATER COURSES  
& AOCs REQUIRING FURTHER ASSESSMENT**

CMS REPORT

CMS AREA - FORMER BETHLEHEM STEEL SITE  
LACKAWANNA, NEW YORK

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



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**FIGURE 2**



**LEGEND**

-  CMS Boundary (OU-01 & OU-10)
-  Steel Winds Boundary
-  OU-05
-  OU-06
-  OU-07
-  OU-08
-  OU-9 Boundaries



**Figure 2A**



**Bethlehem Steel Operable Units**

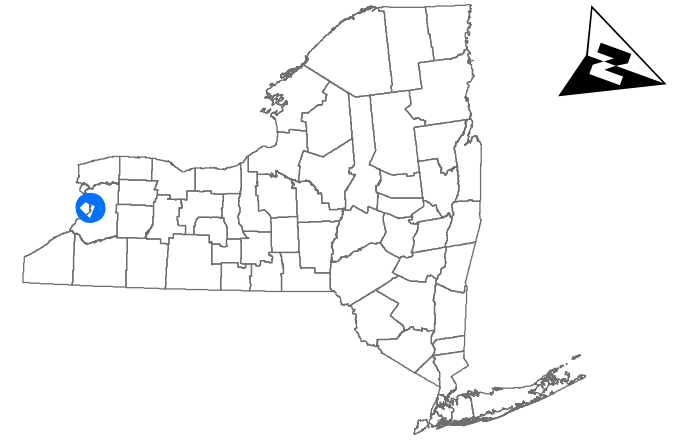
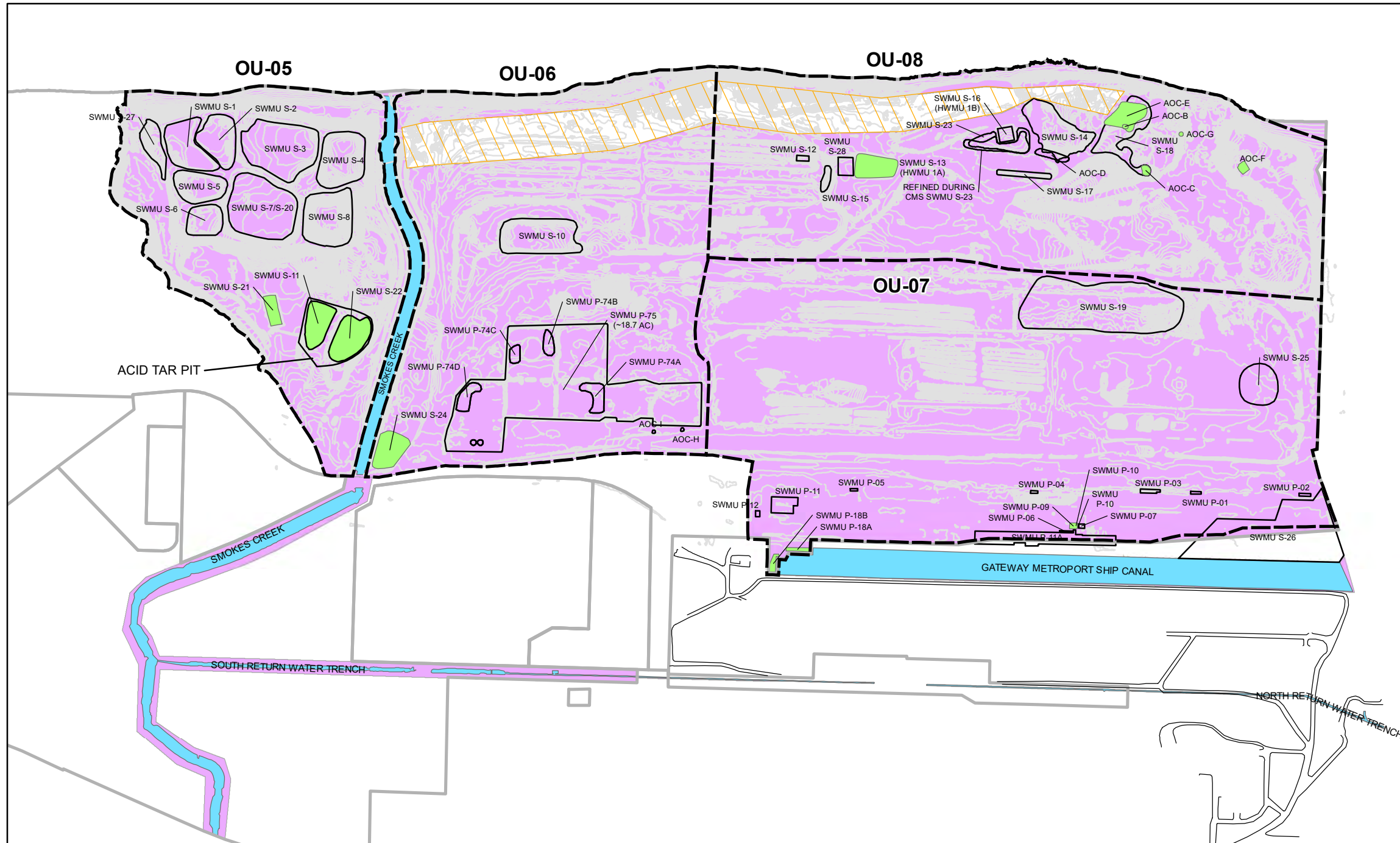
Tecumseh Redevelopment Site  
Lackawanna, New York



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

Plot Date: 2/26/2021 Plotted By: Sisson, Evan





- OU Boundaries
- ▨ Steel Winds Boundary
- ▭ Property Boundaries
- ▭ SWMU Boundaries
- SWMUs with Corrective Measures Implemented
- ▭ OU-9 Boundaries
- CMS Boundary (OU-01 & OU-10)

**Notes:**

- OU-01 - SITE WIDE
- OU-02 AOC-B, AOC-C, P-9, P-18A, P-18B, P-76
- OU-03 ACID TAR PIT SWMUs S-11, S-21, S-22 AND S-24
- OU-04 COKE OVEN BY-PRODUCTS SUB AREA GROUNDWATER
- OU-05 SFA ZONE 2 SWMUs
- OU-06 TANK FARM SWMUs
- OU-07 COKE OVEN BY-PRODUCT SWMUs
- OU-08 SFA ZONES 4 & 5
- OU-09 WATER COURSES
- OU-10 SITE-WIDE GROUNDWATER



**Figure 3**

Site Sub-Area	SWMUs	Estimated Acres	Estimated Depth (ft)	Estimated Slag/Fill Volume (CY) and Potential		
				SW-CAMU	Close In-Place	OFF-SITE TSDf / Slag/Scrap Reclaimed
SFA -Zone 2 SWMUs	S-1	1.87	27.0	81,500		
	S-2	1.62	36.8	96,200		
	S-3	3.72	20.0	120,000		
	S-4	2.44	38.1	150,000		
	S-5	1.46	22.9	54,000		
	S-6	0.99	41.5	66,300		
	S-7/20	<b>3.83</b>	45.8	283,000		
	S-8	2.7			None	
	S-27	0.86	17.3	24,000		

Site Sub-Area	SWMUs	Estimated Acres	Estimated Depth (ft)	Estimated Slag/Fill Volume (CY) and Potential		
				SW-CAMU	Close In-Place	OFF-SITE TSDf / Slag/Scrap Reclaimed
Coke Plant SWMUs	GROUP P-1 to P-6	0.2			None	
	P-7 & P-10	0.02	31.0	1,000		
	OU-4 (P-11, P-11A, & P12)	2.5			None	
	S-26	3.3			None	
North Coal Field SWMUs	S-19 (Murphy's Mountain Landfill AA)	8	4.0	10,000		41,000
	S-25	1.4			None	

Site Sub-Area	SWMUs	Estimated Acres	Estimated Depth (ft)	Estimated Slag/Fill Volume (CY) and Potential		
				SW-CAMU	Close In-Place	OFF-SITE TSDf / Slag/Scrap Reclaimed
SFA Zone 4 - SWMUs	S-12 (Asbestos Landfill L)	0.071	3.9	450		
	S-13 (HWMU-1A)	0.95	15.0	23,000		
	S-14 (General Rubble Landfill N)	2.51	14.1	16,000		41,000
	S-15 (General Rubble Landfill O)	0.15	4.1	1,000		
	S-16 (HWMU-1B) (Lime Stabilized Spent Pickle Liqueur Sludge)	0.25	14.9	6,000		
	S-17 (Vacuum Carbonate Blowdown Landfill Q)	0.2	3.1		1,000	
	S-18 (Lime Dust and Kish Landfill R) & AOC-A	2.24	1.2	4,200		
	S-28 (Drum Landfill)	0.29			None	
	S23 & AOC-D Tar pit	0.85	7.3	10,000		
	S-10 (Slag Quench Area J)	2.8			None	

Site Sub-Area	SWMUs	Estimated Acres	Estimated Depth (ft)	Estimated Slag/Fill Volume (CY) and Potential		
				SW-CAMU	Close In-Place	OFF-SITE TSDf / Slag/Scrap Reclaimed
Tank Farm SWMUs	Group P-8, 74, 75	18.7	2.4	70,000		1,800
SFA Zone 3 - SWMUs	S-10 (Slag Quench Area J)	2.8			None	



**Bethlehem Steel Operable Units**

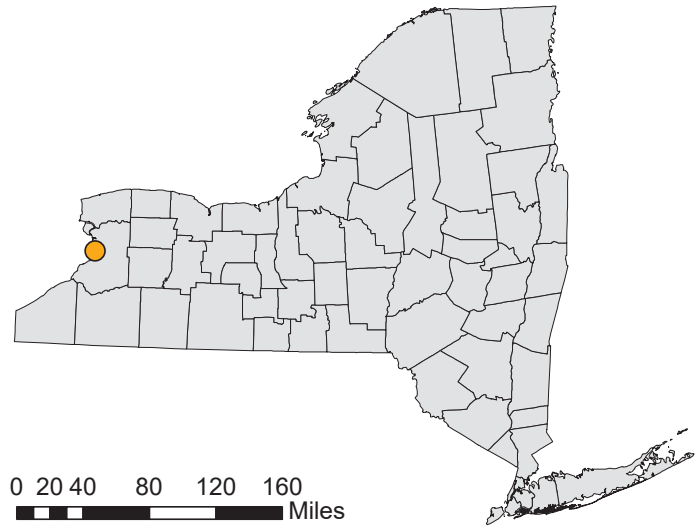
Tecumseh Redevelopment Site  
Lackawanna, New York



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

Plotted By: Sisson, Evan

Plot Date: 2/17/2021



**Legend**

- OU-05
- OU-06
- OU-07
- OU-08
- SteelWinds\_boundary



Region 9 Erie County  
City of Lackawanna

Tecumseh Redevelopment Inc.  
(Former Bethlehem Steel)  
#915009  
Operable Unit Designation Map

**Figure 3A**

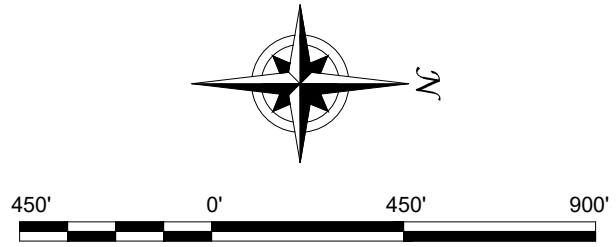
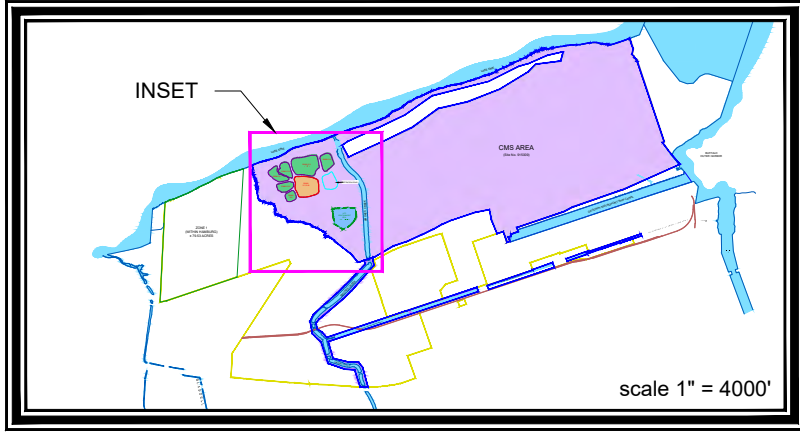




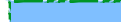


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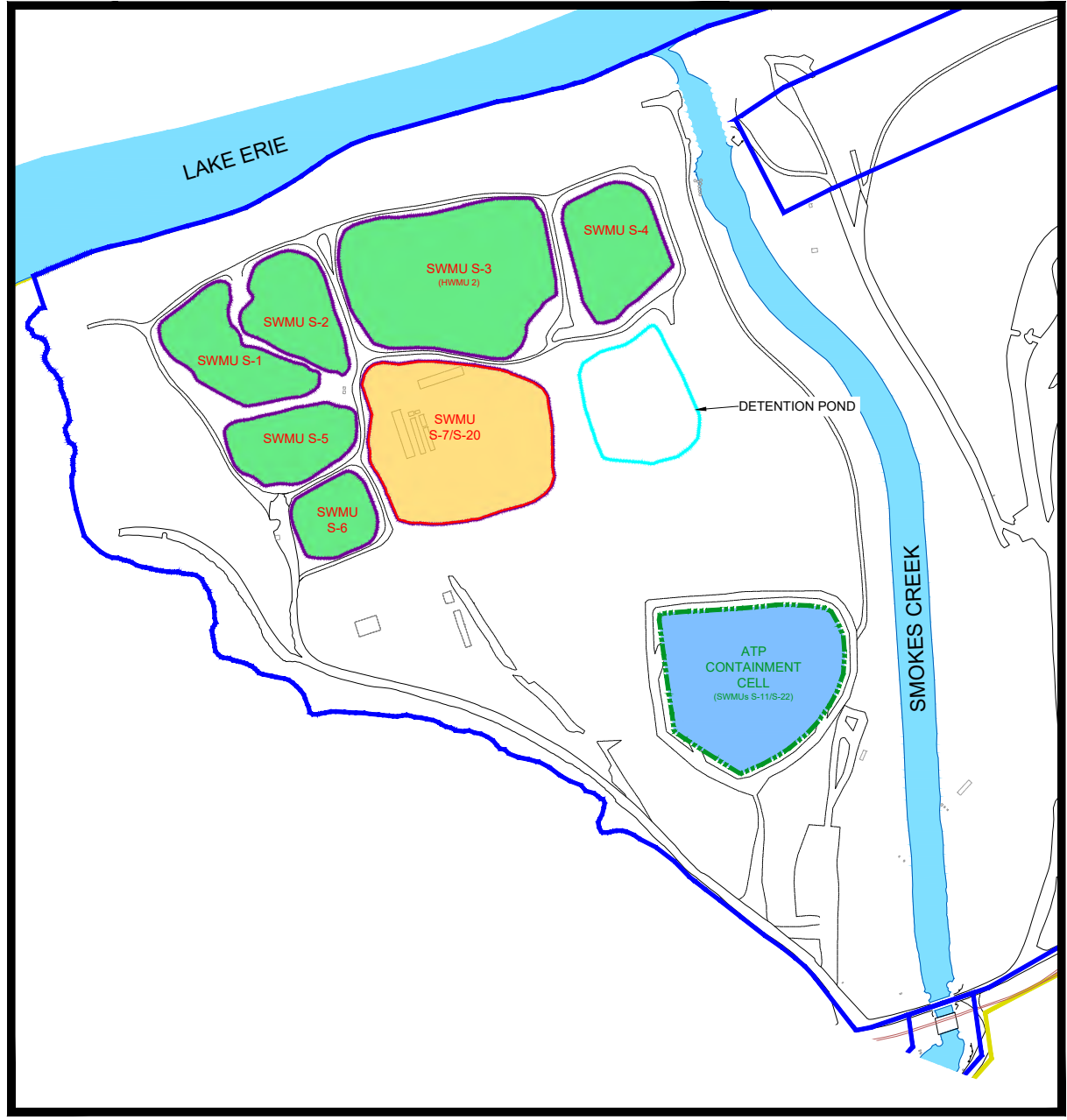
NYS GIS Program Office

SITE PLAN:



- LEGEND:
-  APPROXIMATE BOUNDARY OF SOLID WASTE CAMU
  -  APPROXIMATE BOUNDARY OF CLOSED IN-PLACE IMPOUNDMENT
  -  APPROXIMATE ATP SLURRY WALL ALIGNMENT
  -  CMS BOUNDARY
  -  TECUMSEH PROPERTY BOUNDARY

SFA ZONE 2 SW-CAMU ALTERNATE 2



SW-CAMU ALTERNATE 2

CMS REPORT  
CMS AREA - FORMER BETHLEHEM STEEL SITE  
LACKAWANNA, NEW YORK

PREPARED FOR  
TECUMSEH REDEVELOPMENT INC.

FIGURE 4



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NO.	BY	DATE

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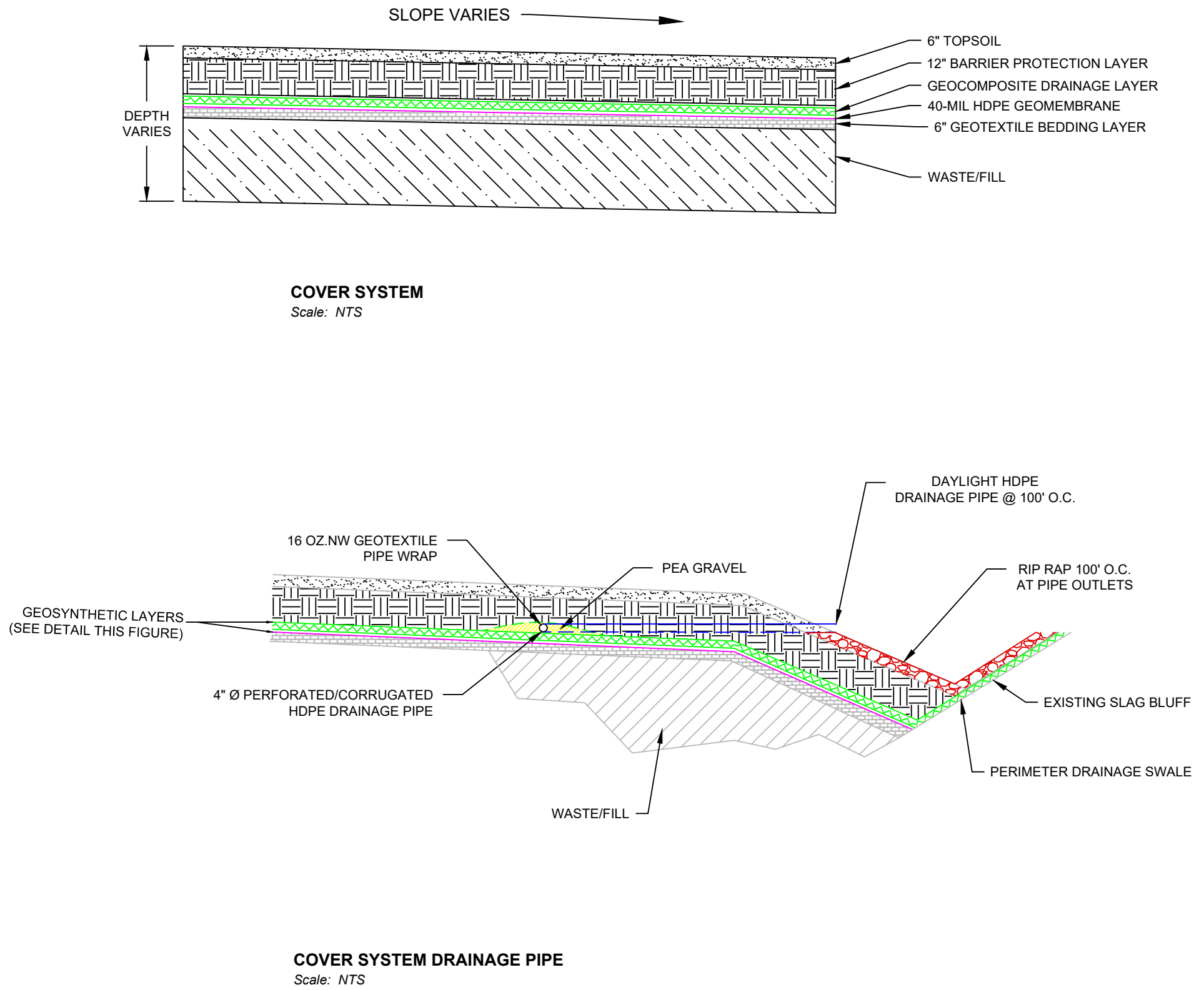
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DATE:	MAY 2019
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APPROVED BY:	PHW

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**SFA ZONE 2: RECOMMENDED IMPOUNDMENTS CLOSURE AND SW-CAMU PRELIMINARY GRADING PLAN**

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 TECUMSEH LACKAWANNA, SITE  
 LACKAWANNA, NEW YORK  
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**Figure 4A- SWMU CAMU DESIGN**



**COVER SYSTEM FOR IMPOUNDMENTS TO BE CLOSED IN PLACE AND FOR SW-CAMU**

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TECUMSEH REDEVELOPMENT SITE  
LACKAWANNA, NEW YORK

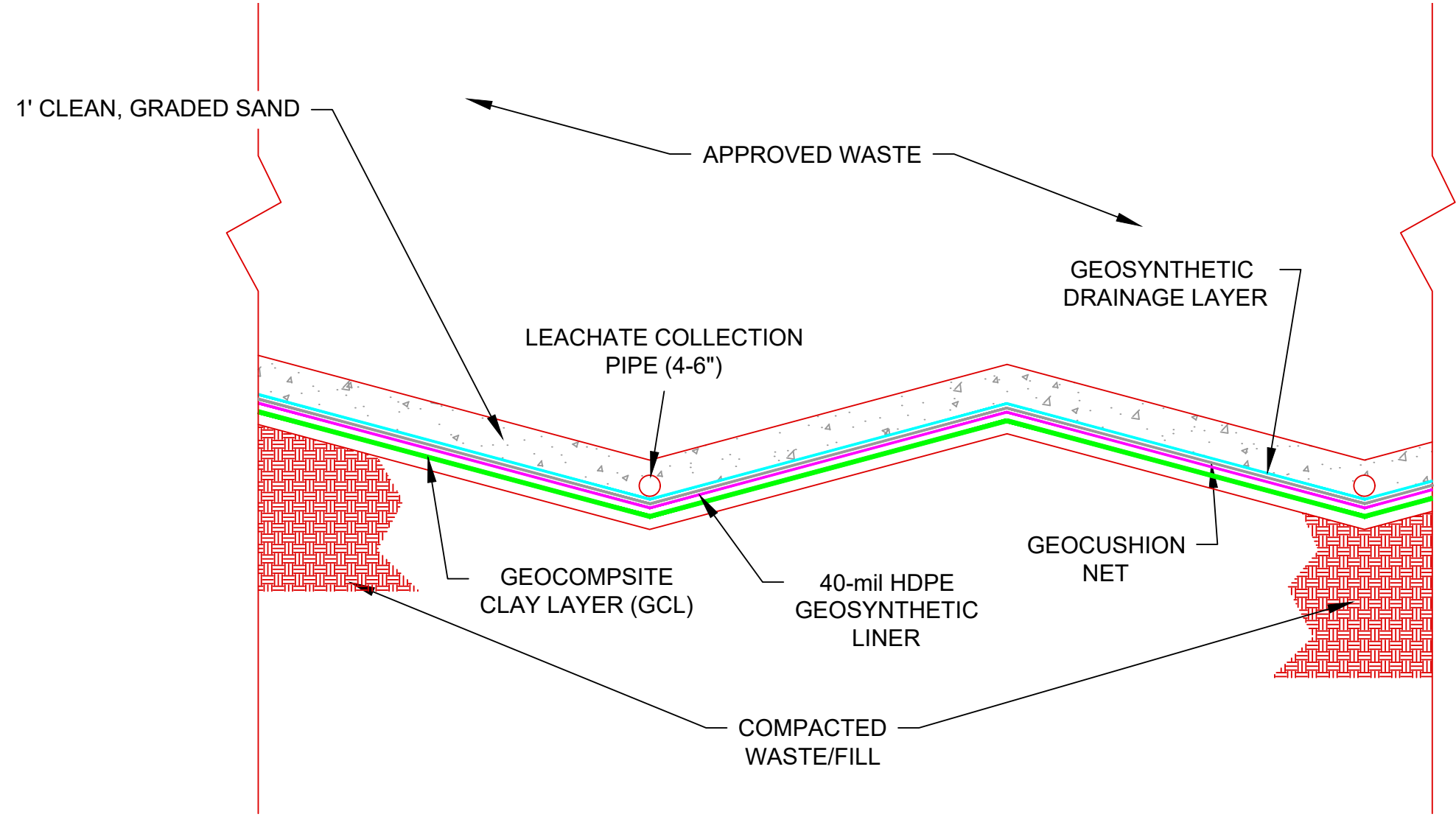
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**FIGURE 5**

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- LEGEND:**
- GEOSYNTHETIC DRAINAGE LAYER
  - GEONET
  - GEOSYNTHETIC LINER (40-MIL HDPE)
  - GEOCOMPOSITE CLAY LINER

**LINER SYSTEM AND LEACHATE  
CONCEPT DETAIL FOR SW-CAMU**

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TECUMSEH REDEVELOPMENT SITE  
LACKAWANNA, NEW YORK

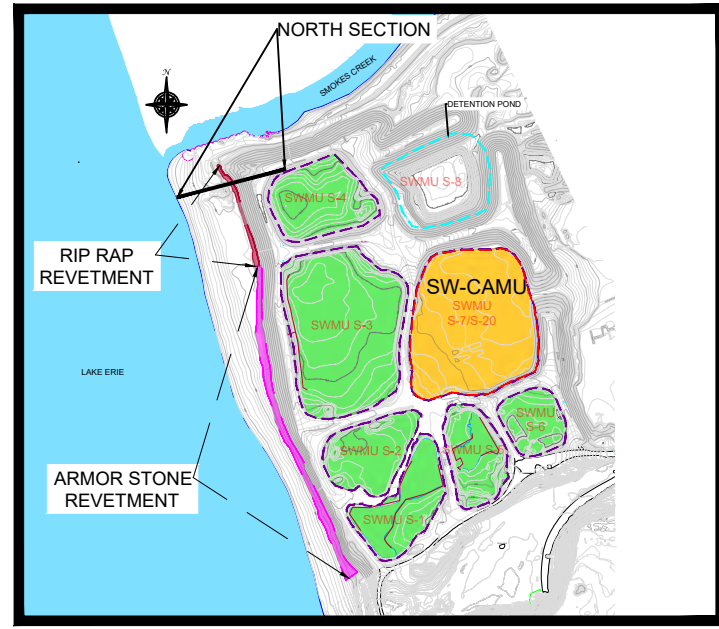
PREPARED FOR  
TECUMSEH REDEVELOPMENT LLC



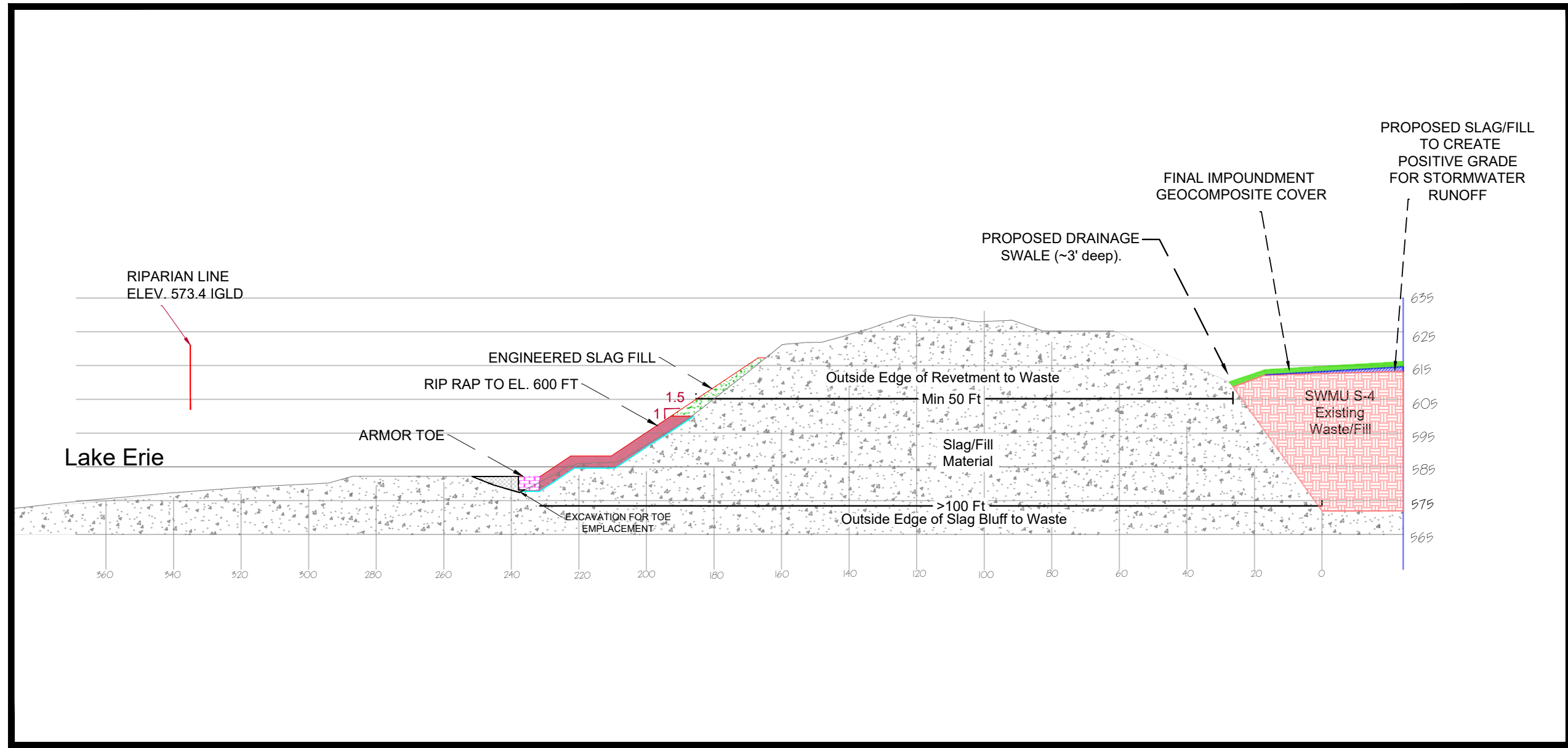
JOB NO.: 0071-019-111

**FIGURE 6**

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# NORTH SECTION



**WESTERN REVELTMENT  
NORTHERN SECTION**  
CMS REPORT  
TECUMSEH REDEVELOPMENT SITE  
LACKAWANNA, NEW YORK  
PREPARED FOR  
TECUMSEH REDEVELOPMENT INC.

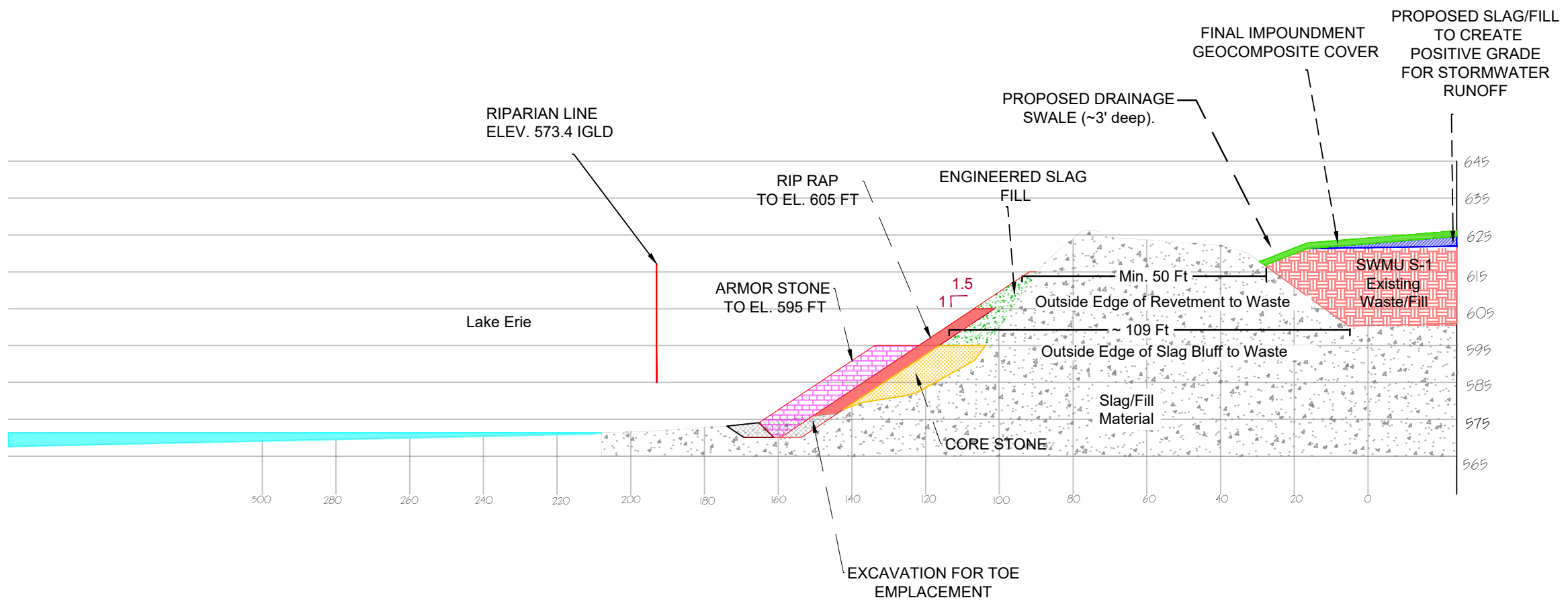
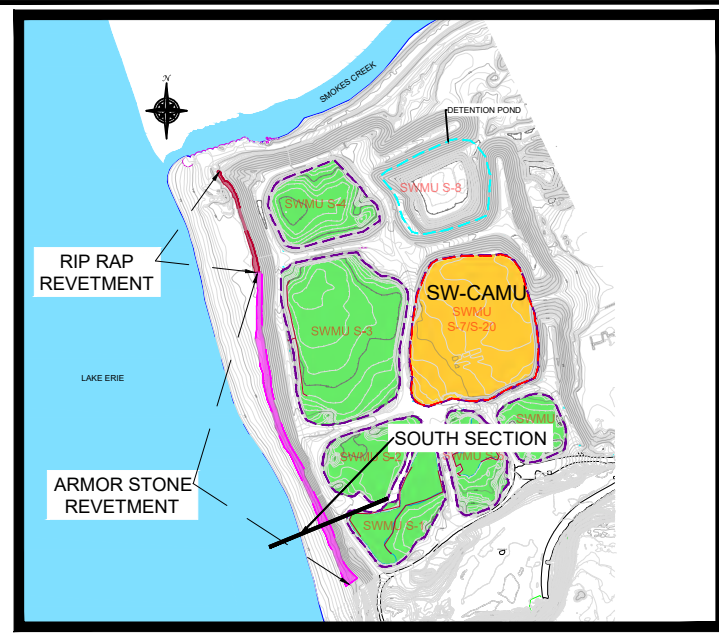


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**FIGURE 7**

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# SOUTH SECTION



**WESTERN REVETMENT  
SOUTHERN SECTION**  
CMS REPORT  
TECUMSEH REDEVELOPMENT SITE  
LACKAWANNA, NEW YORK  
PREPARED FOR  
TECUMSEH REDEVELOPMENT INC.



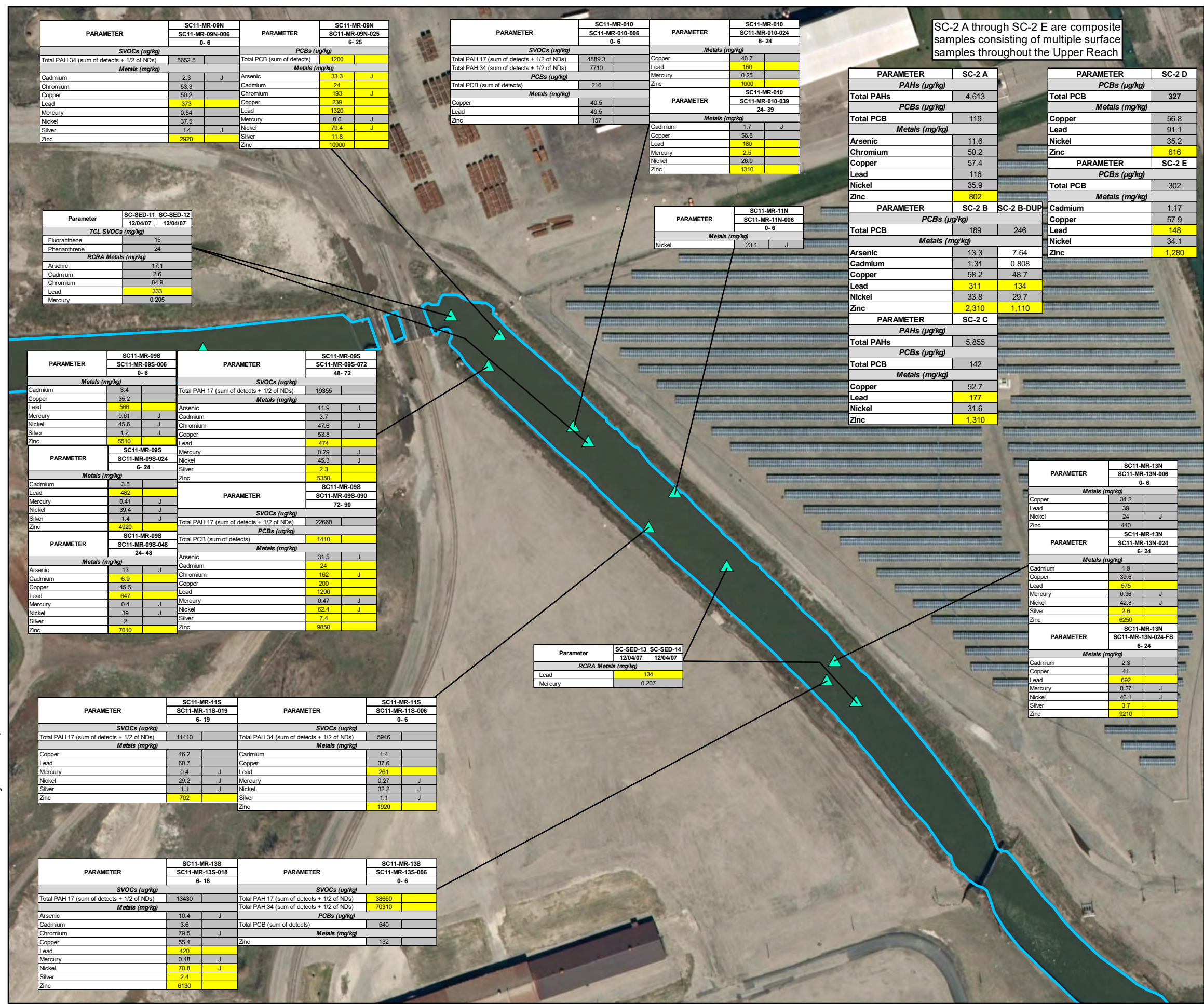
JOB NO.: 0071-019-111

**FIGURE 8**

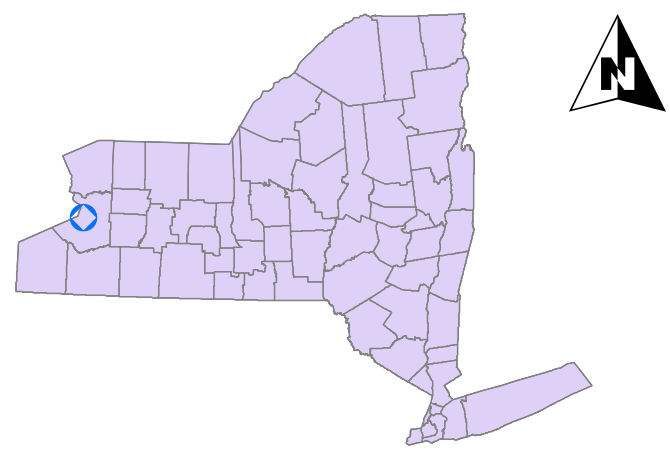
DISCLAIMER: PROPERTY OF BENCHMARK EES, PLLC. & TURNKEY ENVIRONMENTAL RESTORATION, LLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK EES, PLLC & TURNKEY ER, LLC.



Plotted By: Sisson, Evan  
Plot Date: 6/3/2020

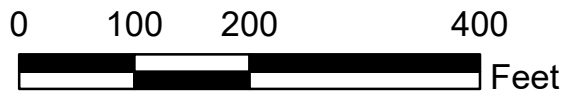


SC-2 A through SC-2 E are composite samples consisting of multiple surface samples throughout the Upper Reach



Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value  
 Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value

▲ Sediment Sample Locations  
— Waterway Boundary



**Figure 9-1A**

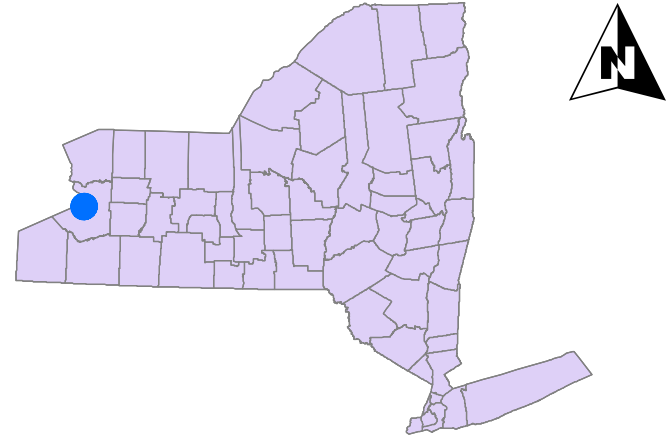
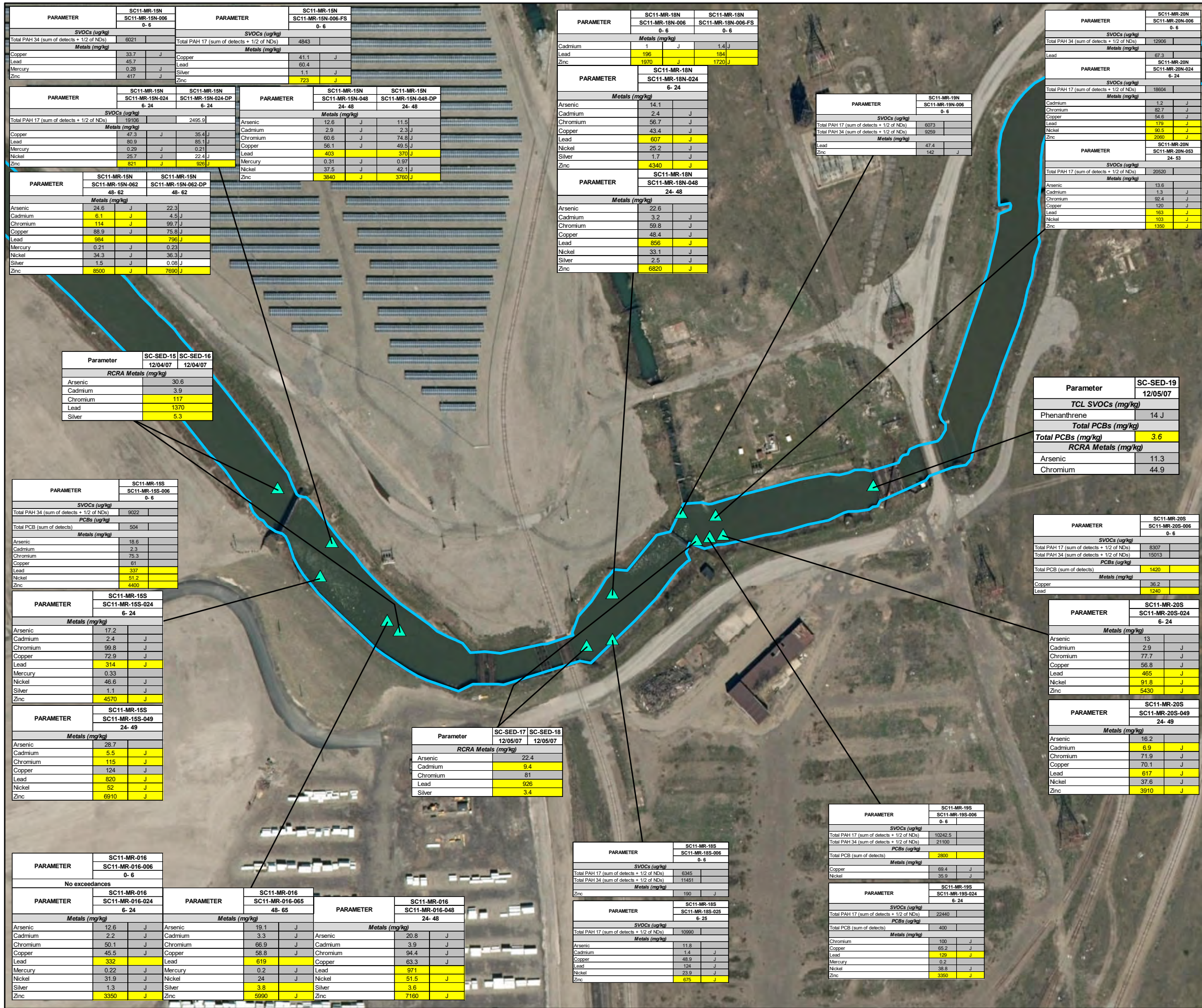


Smokes Creek Upper Reach Sediment Exceedances

Tecumseh Redevelopment Site

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

Plotted By: Sisson, Evan  
Plot Date: 6/3/2020



- Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
- Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
- ▲ Sediment Sample Locations
- Waterway Boundary



**Figure 9-1B**

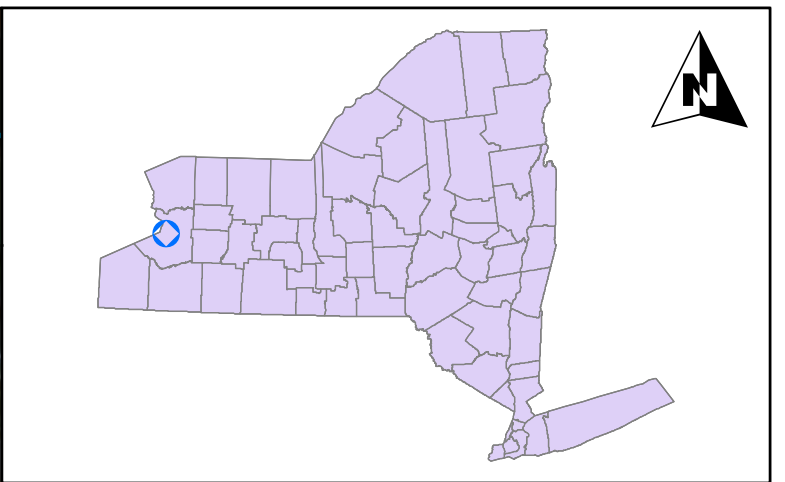
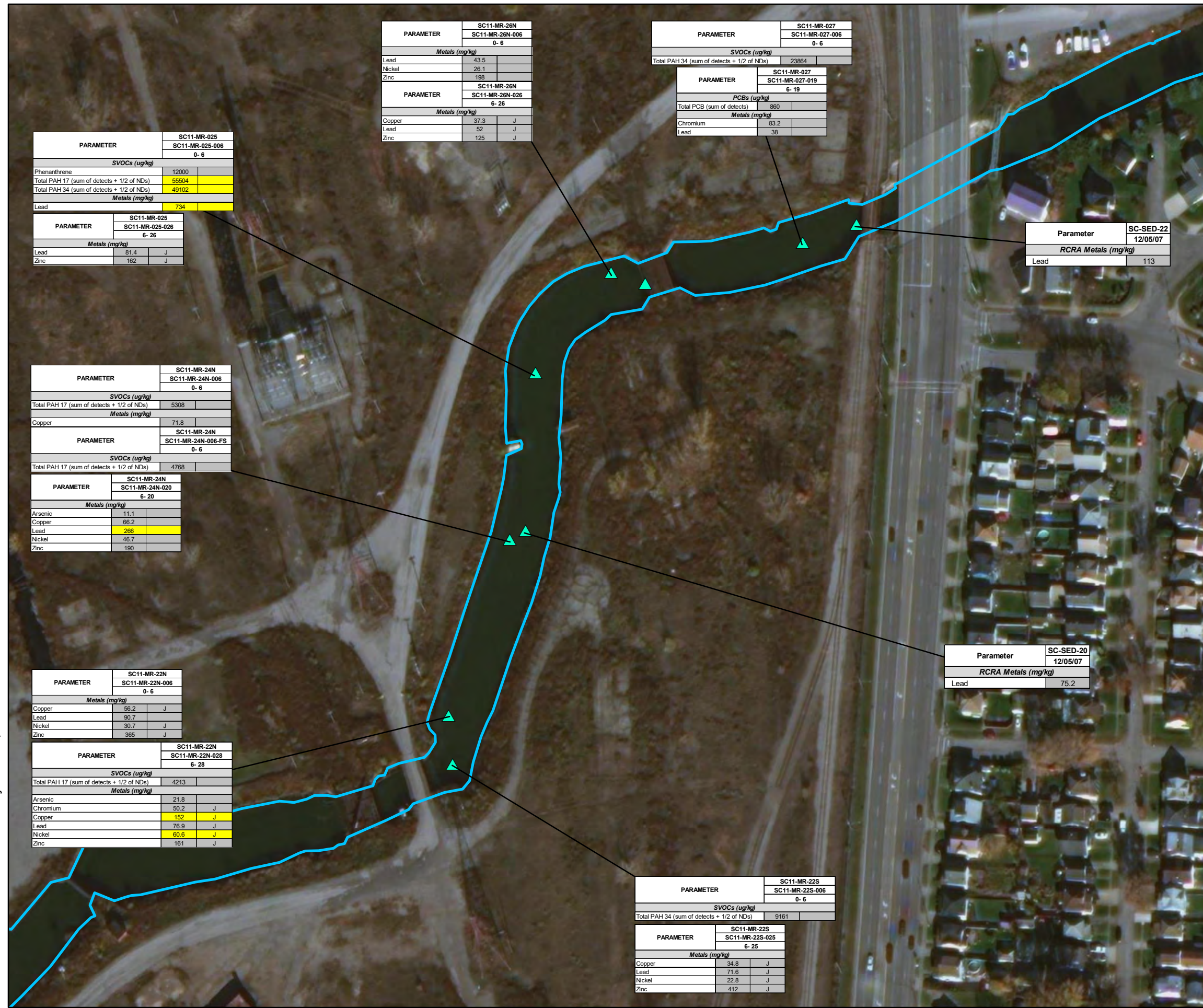






Smokes Creek Upper Reach Sediment Exceedances

Tecumseh Redevelopment Site


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

Plot Date: 3/26/2021 Plotted By: Sisson, Evan



	Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
	Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
	Sediment Sample Locations
	Waterway Boundary

0	75	150	300
			
Feet			

**Figure 9-1C**



Smokes Creek Upper Reach Sediment Exceedances

Tecumseh Redevelopment Site

PARAMETER		SC11-MR-025	SC11-MR-025-006
		0- 6	
<b>SVOCs (ug/kg)</b>			
Phenanthrene		12000	
Total PAH 17 (sum of detects + 1/2 of NDs)		55504	
Total PAH 34 (sum of detects + 1/2 of NDs)		49102	
<b>Metals (mg/kg)</b>			
Lead		734	

PARAMETER		SC11-MR-025	SC11-MR-025-026
		6- 26	
<b>Metals (mg/kg)</b>			
Lead		81.4	J
Zinc		162	J

PARAMETER		SC11-MR-24N	SC11-MR-24N-006
		0- 6	
<b>SVOCs (ug/kg)</b>			
Total PAH 17 (sum of detects + 1/2 of NDs)		5308	
<b>Metals (mg/kg)</b>			
Copper		71.8	

PARAMETER		SC11-MR-24N	SC11-MR-24N-006-FS
		0- 6	
<b>SVOCs (ug/kg)</b>			
Total PAH 17 (sum of detects + 1/2 of NDs)		4768	
<b>Metals (mg/kg)</b>			
Arsenic		11.1	
Copper		66.2	
Lead		265	
Nickel		46.7	
Zinc		190	

PARAMETER		SC11-MR-22N	SC11-MR-22N-006
		0- 6	
<b>Metals (mg/kg)</b>			
Copper		56.2	J
Lead		90.7	J
Nickel		30.7	J
Zinc		365	J

PARAMETER		SC11-MR-22N	SC11-MR-22N-028
		6- 28	
<b>SVOCs (ug/kg)</b>			
Total PAH 17 (sum of detects + 1/2 of NDs)		4213	
<b>Metals (mg/kg)</b>			
Arsenic		21.8	
Chromium		50.2	J
Copper		152	J
Lead		76.9	J
Nickel		60.6	J
Zinc		161	J

PARAMETER		SC11-MR-26N	SC11-MR-26N-006
		0- 6	
<b>Metals (mg/kg)</b>			
Lead		43.5	
Nickel		26.1	
Zinc		198	

PARAMETER		SC11-MR-027	SC11-MR-027-006
		0- 6	
<b>SVOCs (ug/kg)</b>			
Total PAH 34 (sum of detects + 1/2 of NDs)		23864	

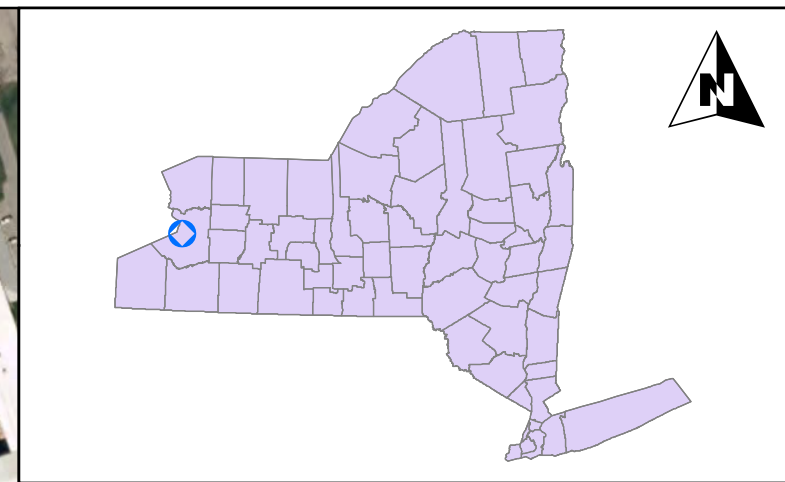
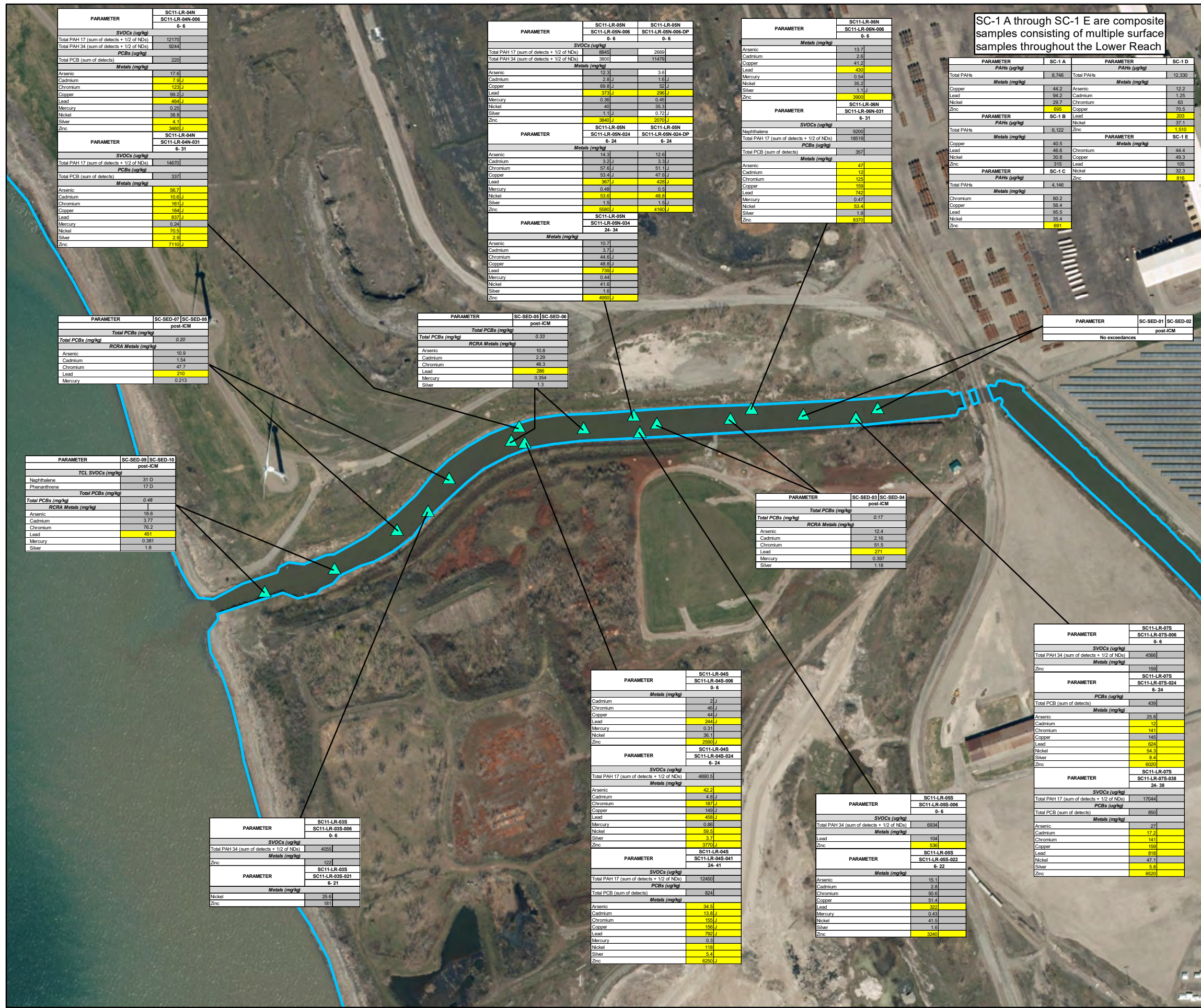
PARAMETER		SC11-MR-027	SC11-MR-027-019
		6- 19	
<b>PCBs (ug/kg)</b>			
Total PCB (sum of detects)		860	
<b>Metals (mg/kg)</b>			
Chromium		83.2	
Lead		38	

Parameter	SC-SED-22
	12/05/07
<b>RCRA Metals (mg/kg)</b>	
Lead	113

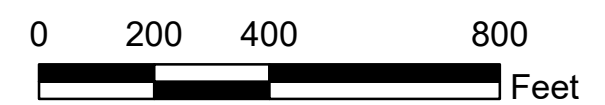
Parameter	SC-SED-20
	12/05/07
<b>RCRA Metals (mg/kg)</b>	
Lead	75.2

PARAMETER		SC11-MR-22S	SC11-MR-22S-006
		0- 6	
<b>SVOCs (ug/kg)</b>			
Total PAH 34 (sum of detects + 1/2 of NDs)		9161	
<b>Metals (mg/kg)</b>			
Copper		34.8	J
Lead		71.6	J
Nickel		22.8	J
Zinc		412	J

Plotted By: Sisson, Evan  
Plot Date: 6/3/2020



- Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
- Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
- Sediment Sample Locations
- Waterway Boundary



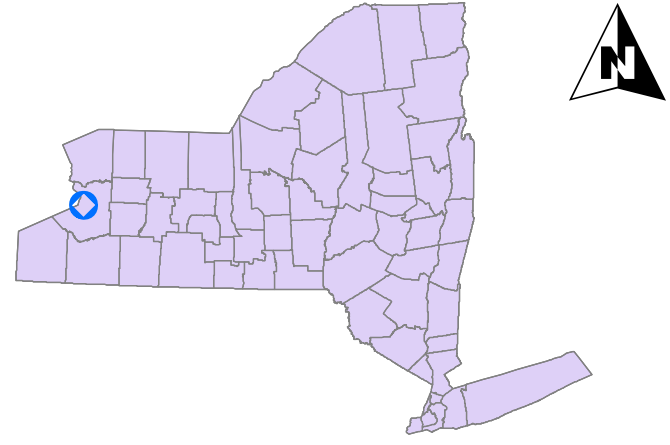
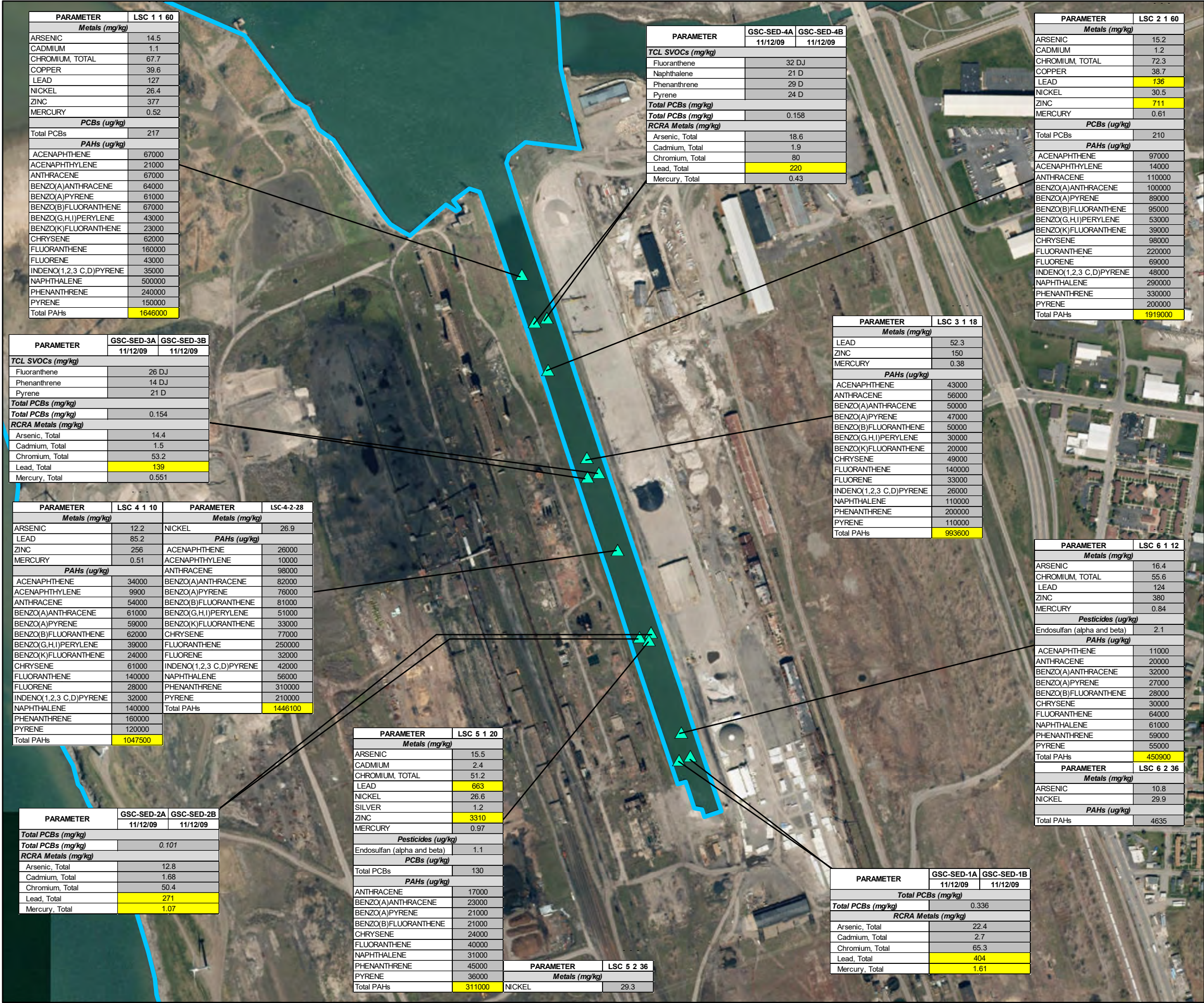
**Figure 9-2**



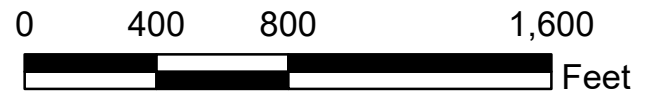
Smokes Creek Lower Reach Sediment Exceedances

Tecumseh Redevelopment Site

Plot Date: 6/5/2020  
Plotted By: Sisson, Evan



- Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
- Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
- Sediment Sample Locations
- Waterway Boundary



**Figure 9-3**

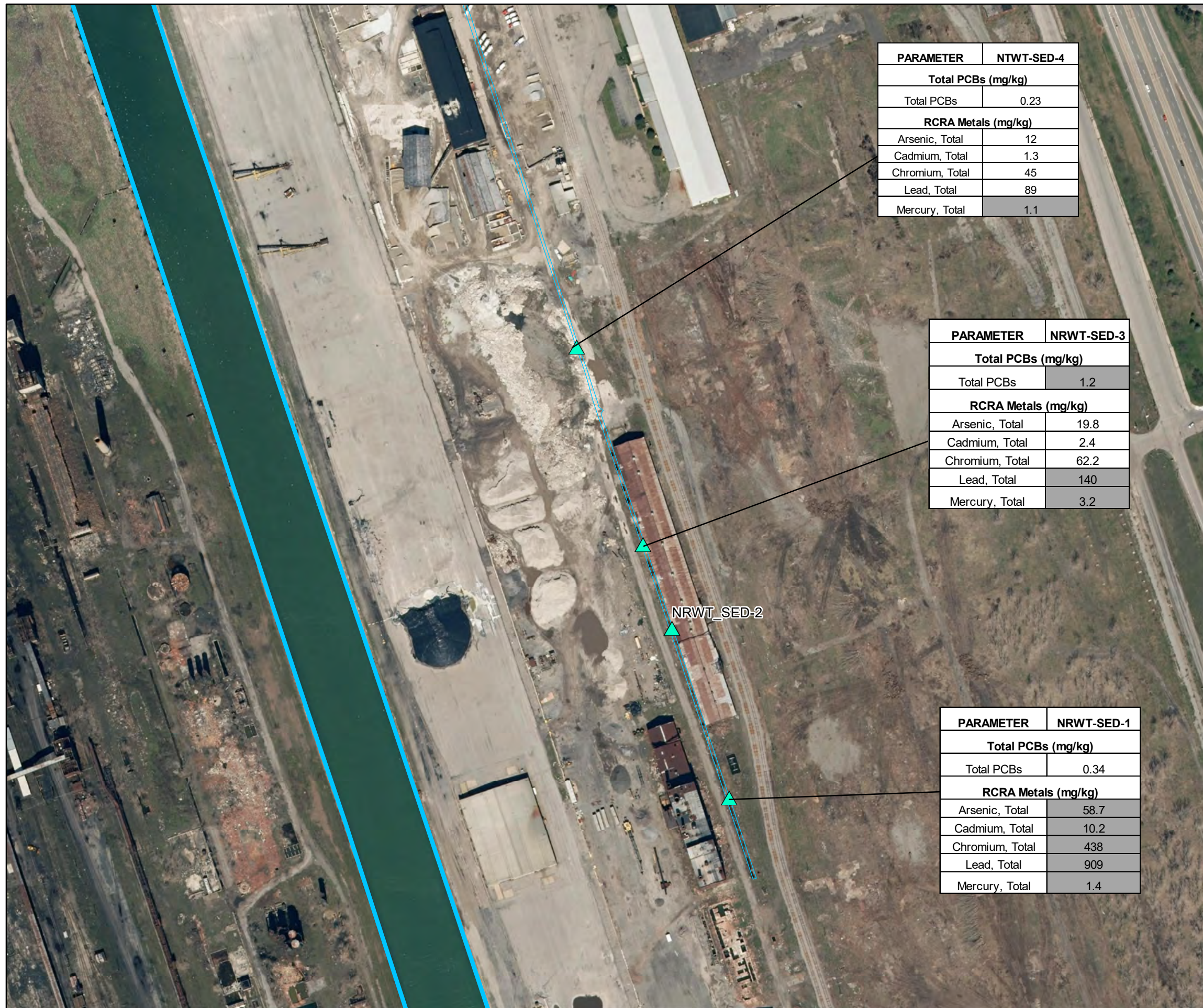


**Gateway Metroport Ship Canal  
Sediment Exceedances**

**Tecumseh Redevelopment Site**

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

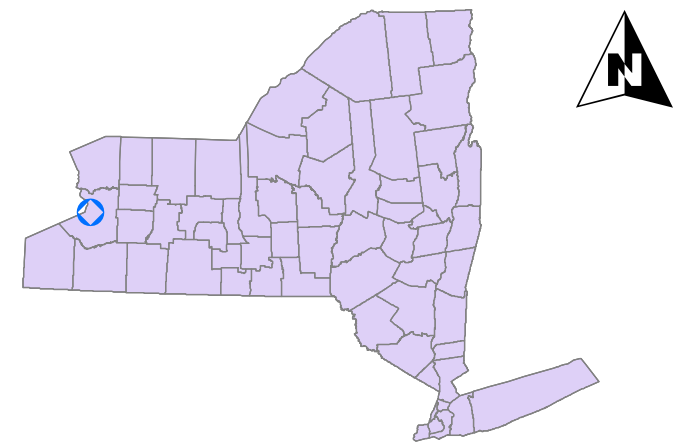
Plot Date: 6/5/2020  
Plotted By: Sisson, Evan



PARAMETER	NTWT-SED-4
<b>Total PCBs (mg/kg)</b>	
Total PCBs	0.23
<b>RCRA Metals (mg/kg)</b>	
Arsenic, Total	12
Cadmium, Total	1.3
Chromium, Total	45
Lead, Total	89
Mercury, Total	1.1

PARAMETER	NRWT-SED-3
<b>Total PCBs (mg/kg)</b>	
Total PCBs	1.2
<b>RCRA Metals (mg/kg)</b>	
Arsenic, Total	19.8
Cadmium, Total	2.4
Chromium, Total	62.2
Lead, Total	140
Mercury, Total	3.2

PARAMETER	NRWT-SED-1
<b>Total PCBs (mg/kg)</b>	
Total PCBs	0.34
<b>RCRA Metals (mg/kg)</b>	
Arsenic, Total	58.7
Cadmium, Total	10.2
Chromium, Total	438
Lead, Total	909
Mercury, Total	1.4



- Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
- Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
- Sediment Sample Locations
- Waterway Boundary



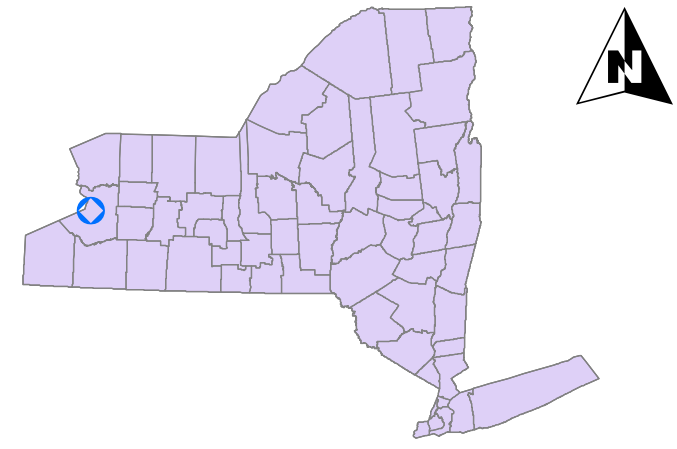
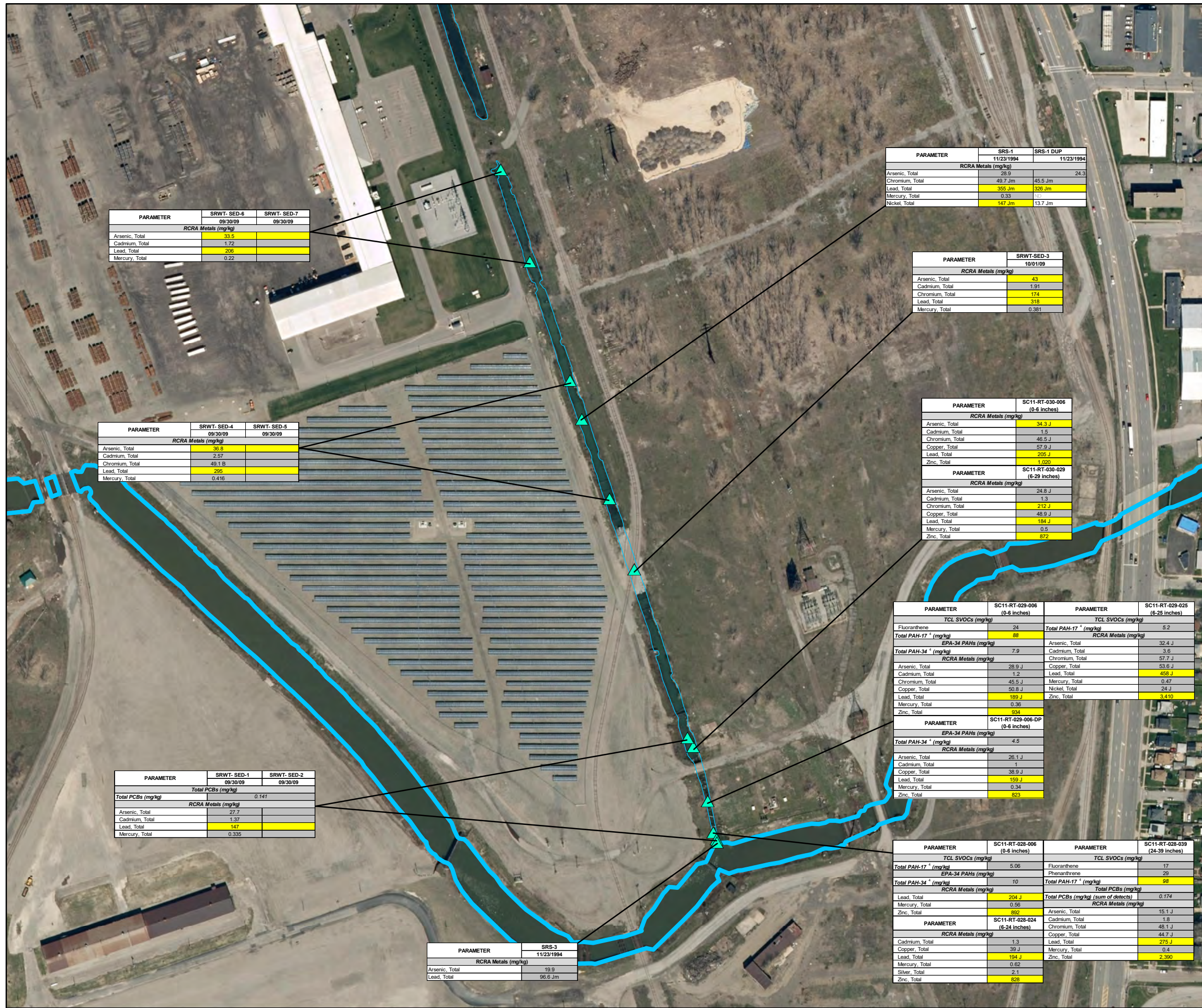
**Figure 9-4**



North Return Water Trench  
Sediment Exceedances

Tecumseh Redevelopment Site

Plot Date: 6/5/2020  
 Plotted By: Sisson, Evan



Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value  
 Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value  
 Sediment Sample Locations  
 Waterway Boundary

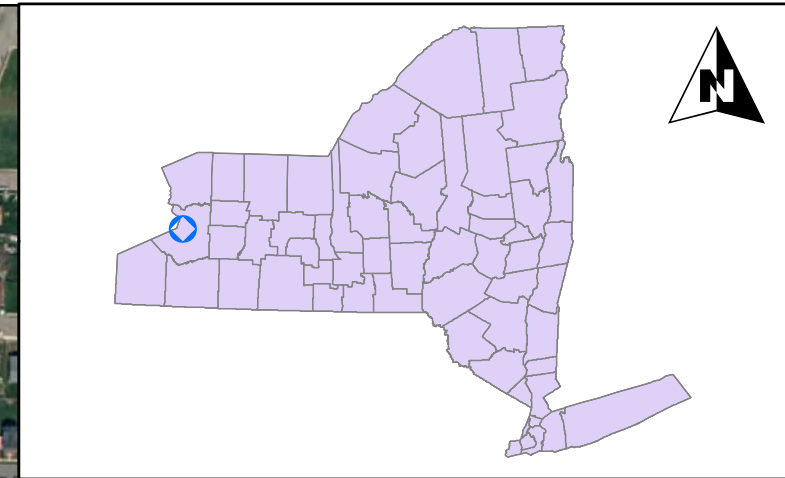


**Figure 9-5A**

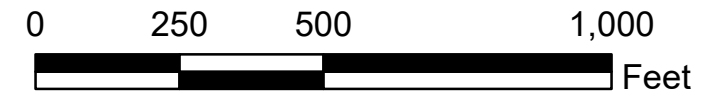


**South Return Water Trench  
 Sediment Exceedances**

**Tecumseh Redevelopment Site**



- Exceeds NYSDEC's Class A Freshwater Sediment Guidance Value
- Exceeds NYSDEC's Class C Freshwater Sediment Guidance Value
- Sediment Sample Locations
- Waterway Boundary



**Figure 9-5B**

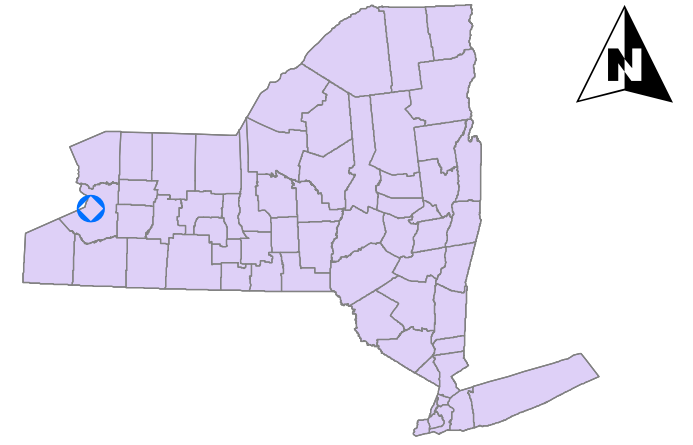
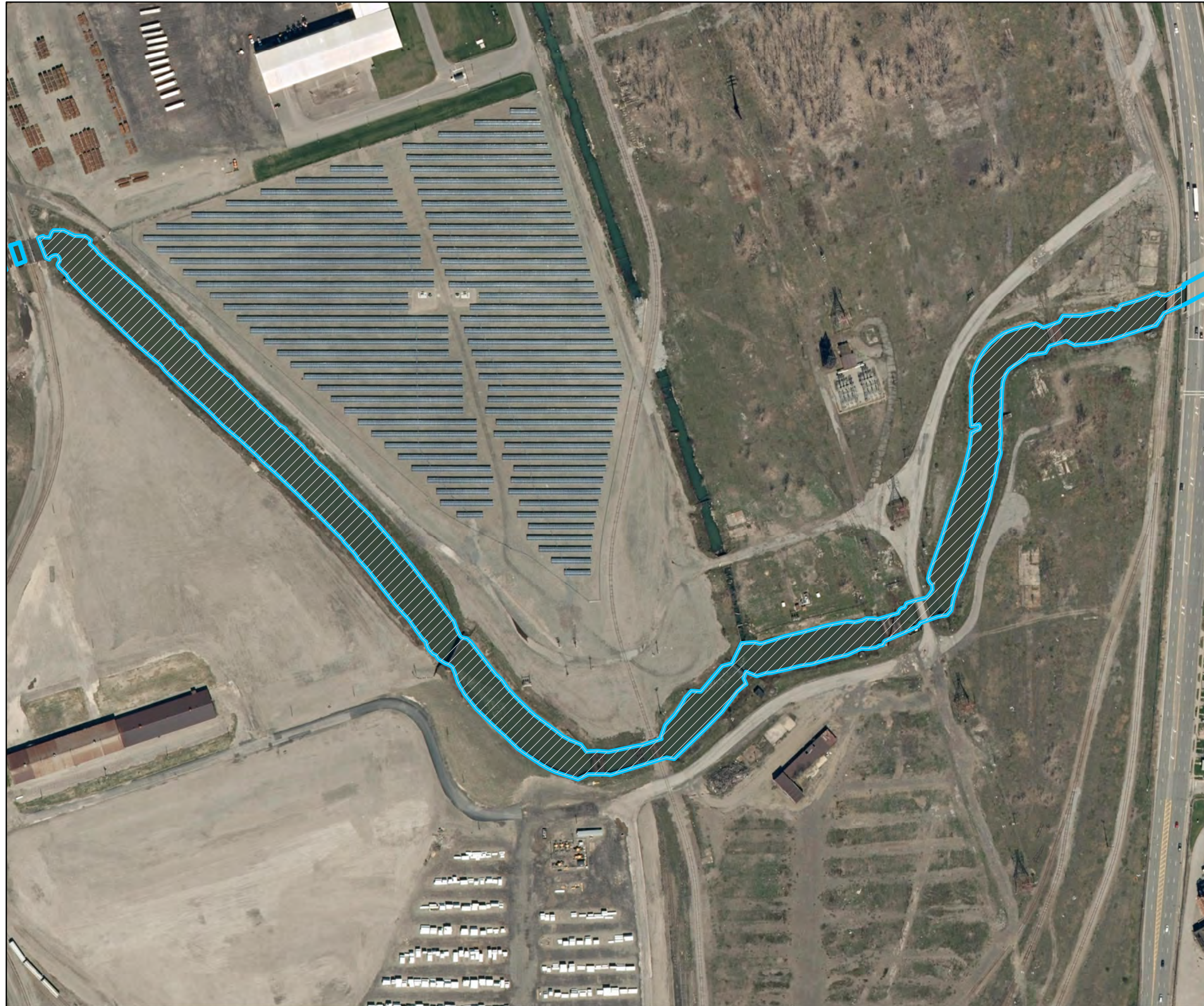




South Return Water Trench  
Sediment Exceedances

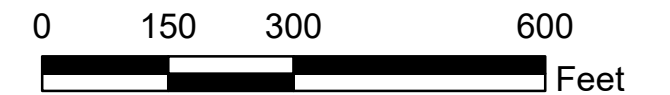
Tecumseh Redevelopment Site

Plotted By: Sisson, Evan  
Plot Date: 6/5/2020





 Removal Area (6.28 Acres)  
 Waterway Boundary



**Figure 9-6**



Smokes Creek Upper Reach Removal Area -  
Based on Class A Sediment Exceedances

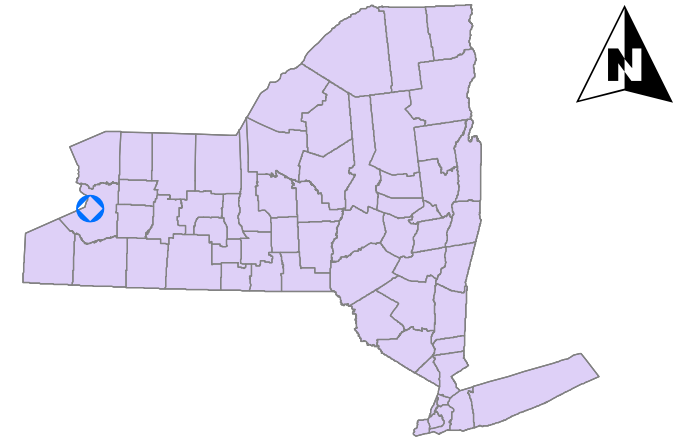
Tecumseh Redevelopment Site



**PARSONS**

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

Plotted By: Sisson, Evan

Plot Date: 6/3/2020



-  Removal Area (5.44 Acres)
-  Waterway Boundary



**Figure 9-7**



Smokes Creek Lower Reach Removal Area -  
Based on Class A Sediment Exceedances

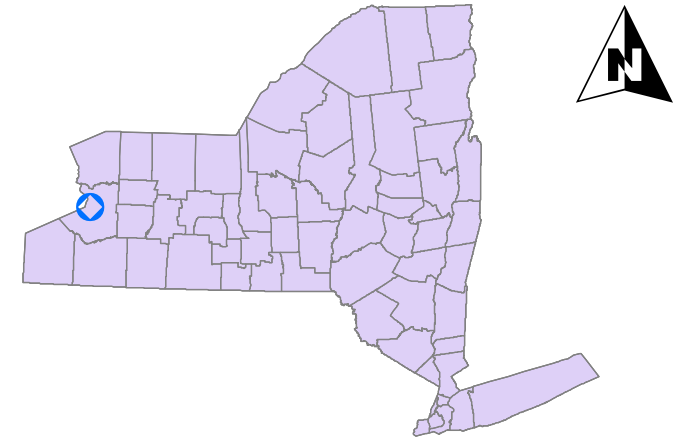
Tecumseh Redevelopment Site



**PARSONS**

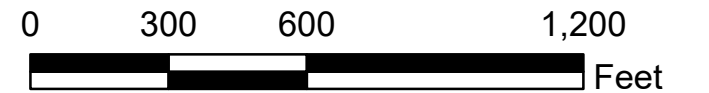
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 \* 315-451-9560

Plotted By: Sisson, Evan

Plot Date: 6/3/2020



 Removal Area (16.87 Acres)  
 Waterway Boundary



**Figure 9-8**



Gateway Metroport Ship Canal Removal Area  
- Based on Class C Sediment Exceedances

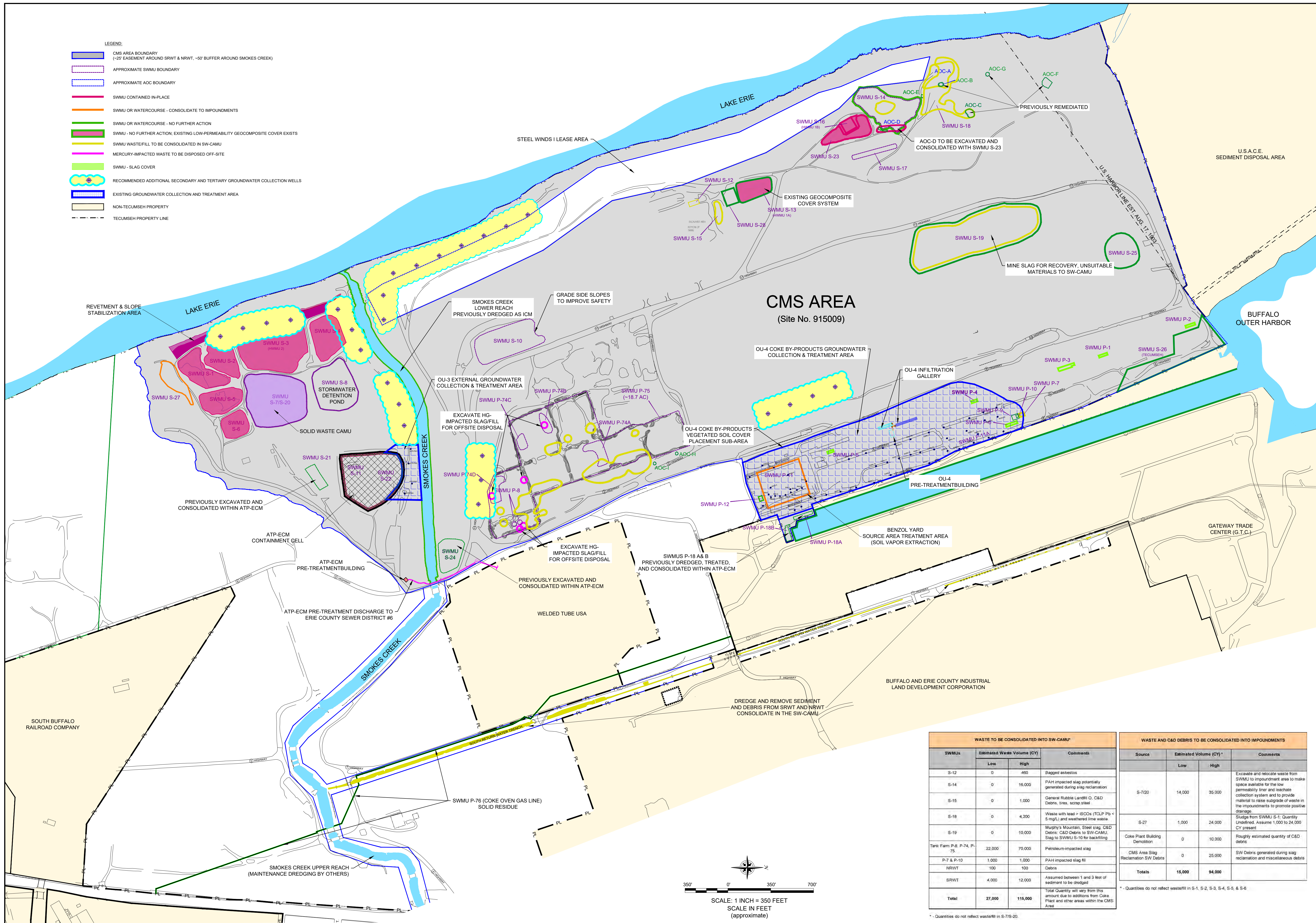
Tecumseh Redevelopment Site

**PARSONS**

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

Plotted By: Sisson, Evan

Plot Date: 6/5/2020



NO.	BY	DATE	REVISIONS

DRAWN BY: RFL	DATE: MAY 2019
CHECKED BY: LR	APPROVED BY: PHW

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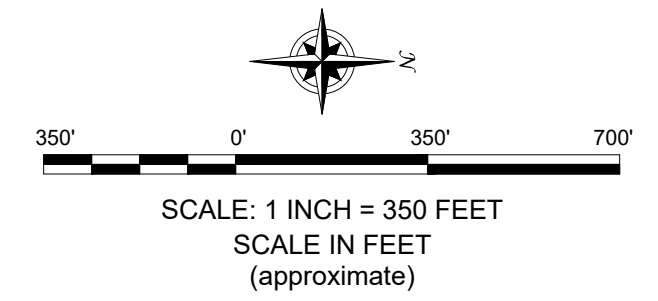
**CMS AREA RECOMMENDED CORRECTIVE ACTION PLAN SUMMARY**  
 CMS AREA - FORMER BETHLEHEM STEEL SITE  
 LACKAWANNA, NEW YORK  
 PREPARED FOR: TECUMSEH REDEVELOPMENT INC.

SWMU	Estimated Waste Volume (CY)*		Comments
	Low	High	
S-12	0	400	Bagged asbestos
S-14	0	16,000	PAH impacted slag potentially generated during slag reclamation
S-15	0	1,000	General Rubble Landfill C, C&D Debris, tires, scrap steel
S-18	0	4,200	Waste with lead > 1500 (TCLP Pb > 5 mg/L) and weathered lime waste
S-19	0	10,000	Murphy's Mountain, Steel slag, C&D Debris, C&D Debris to SW-CAMU, Slag to SWMU S-10 for backfilling
Tank Farm P-6, P-74, P-75	22,000	70,000	Petroleum-impacted slag
P-7 & P-10	1,000	1,000	PAH impacted slag fill
NRWT	100	100	Debris
SRWT	4,000	12,000	Assumed between 1 and 3 feet of sediment to be dredged
<b>Total</b>	<b>27,000</b>	<b>115,000</b>	Total Quantity will vary from this amount due to additions from Coke Plant and other areas within the CMS Area

Source	Estimated Volume (CY)*		Comments
	Low	High	
S-720	14,000	35,000	Excavate and relocate waste from SWMU to impoundment area to make space available for the low permeability liner and leachate collection system and to provide material to raise subgrade of waste in the impoundments to promote positive drainage
S-27	1,000	24,000	Sludge from SWMU S-1. Quantity Undefined. Assume 1,000 to 24,000 CY present
Coke Plant Building Demolition	0	10,000	Roughly estimated quantity of C&D debris
CMS Area Slag Reclamation SW Debris	0	25,000	SW Debris generated during slag reclamation and miscellaneous debris
<b>Totals</b>	<b>15,000</b>	<b>94,000</b>	

\* Quantities do not reflect waste fill in S-1, S-2, S-3, S-4, S-5, S-6 & S-6

\* Quantities do not reflect waste fill in S-7/S-20.



SEAL

Figure 10-1

# Bethlehem Steel (915009)

Lackawana, NY  
Statement of Basis OU1, 9 & 10

## Figure 10-2 Elevated pH

### Legend



Wells

### Field pH (S.U.)

- 7.0 - 11.0
- 11.0 - 12.5
- 12.5 - 14.0

Note: (1) Contours interpolated from April 2020 data. (2) Validated data from the April 2020 event is not included.



Department of  
Environmental  
Conservation



# Bethlehem Steel (915009)





Lackawana, NY  
Statement of Basis OU1, 9 & 10

## Figure 10-3 Benzene Exceedances

### Legend



#### Benzene (ppb)

-  1 - 10
-  10 - 100
-  100 - 1000
-  1000 - 10000

Note: (1) Contours interpolated from April 2020 data. (2) Validated data from the April 2020 event is not included.



Department of  
Environmental  
Conservation



# FINAL STATEMENT OF BASIS

## Exhibits A through E

---

Bethlehem Steel  
(Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

City of Lackawanna, Erie County

Site No. 915009

EPA ID No. NYD002134880

November 2021

- Exhibit A Nature and Extent of Contamination**
- **OU-9 Water Courses**
  - **OU-10 Site-Wide Groundwater**
- Exhibit B Summary of the Cleanup Objectives**
- Exhibit C Description of Corrective Measures Alternatives**
- **OU-9 Water Courses**
  - **OU-10 Site-Wide Groundwater**
- Exhibit D Corrective Measures Costs**
- **OU-9 Water Courses**
  - **OU-10 Site-Wide Groundwater**
- Exhibit E Summary of Selected Corrective Measures**
- **OU-9 Water Courses**
  - **OU-10 Site-Wide Groundwater**
-



## **EXHIBIT A**

### **NATURE AND EXTENT OF CONTAMINATION**

This section describes the findings of the RFI and CMS for environmental media that were evaluated. Samples were collected from environmental media to preliminarily characterize the nature and extent of contamination. The nature and extent of contamination is further described in the RFI and CMS report(s) and decision documents for the various operable units for the site.

The tables below summarize the findings of the investigations. The tables present the range of contamination found for site-related COCs. The tables compare COC concentrations against the applicable standards and guidance values for each medium.

#### **A1. Surface Water Data**

Surface water samples were collected from Smokes Creek, NRWT, SRWT, and the Gateway Metroport Ship Canal and compared against the NYS A(C), protection for fish propagation in Fresh Waters, Ambient Water Quality Standards (AWQS 6 NYCRR Part 703, Waterbody Class C and TOGS 1.1.1. In the North Return Water Trench and Gateway Metroport Ship Canal there were no AWQS exceedances. In the SRWT, both total mercury and total cyanide exceed the AWQS.

The surface water of Smokes Creek was collected and analyzed. Detections of VOCs, SVOCs, and inorganic compounds were found in the samples. Of the samples collected there were AWQS exceedance of one SVOC compound inorganic compounds (cyanide and selenium), as shown in Table 1.

The two samples collected from the NRWT were collected prior to 2011. Of the two samples collected, there were no AWQS exceedances for any contaminant. In 2011, samples were attempted to be collected out of the trench and it was found that most of the northern end of the trench covered by a slag/fill pile.

The SRWT is a 5,000-foot unlined open channel with an average depth of approximately 8 feet to 10 feet to the base of the channel. Water depths vary but are typically recorded at 1 foot to 3 feet. The northern portion is approximately 8 feet to 10 feet wide while the southern portion is approximately 30 feet across. The trench varies from being constructed with concrete and brick, sheet piled walls with an open bottom, to unsupported soil/slag/fill banks. 570 cubic yards of material were dredged from a small portion of the SRWT, in 2013, to install a culvert underneath the railroad. The SRWT discharge point is an identified SPDES Outfall and has monthly flow monitoring

requirements at the weir near the confluence of Smokes Creek and SRWT. Similar to Smokes Creek, flow in the SRWT can reverse direction during times of highwater elevation in the creek (i.e., high precipitation volumes or other extreme storm events). Surface water data for the North and South Return Water Trench were collected simultaneously with the post ICM 2009 sediment samples. Currently, the NRWT is partially filled in with other debris and besides runoff surface water is rarely observed in this area. Despite the SRWT and the NRWT not being classified as a waterbody, surface water samples that were taken were compared against NYSDEC AWQS for a Class C waterbody for the protection of fish propagation. Of the three surface water samples collected in the SRWT, only cyanide (total) and mercury exceeded their respective standards.

In 2007 surface water from the Gateway Metroport Ship Canal was collected and analyzed for TCL VOC, TCL SVOC, total metals, ammonia, hardness, chemical oxygen demand (COD), total alkalinity, total dissolved solids, total organic carbon (TOC). Surface water showed no AWQS exceedances.

**Table 1- Smokes Creek Surface Water**

<b>Parameter</b>	<b>Detected Range (ppb)<sup>1</sup></b>	<b>Class C Ambient Water Quality Standards (ppb)</b>	<b>Frequency Exceeding Ambient Water Quality Standards</b>
<b>TCL VOCs</b>			
Benzene <sup>2</sup>	ND <sup>5</sup> -3.3	10	0 of 20
Methylene chloride <sup>2</sup>	0.5-14	NS <sup>6</sup>	NS
Toluene <sup>3</sup>	ND-0.51	100	0 of 8
Xylenes, Total <sup>3</sup>	ND-0.66	65	0 of 8
<b>TCL SVOCs</b>			
Bis(2- Ethylhexyl)phthalate <sup>2</sup>	1.9-24	0.6	6 of 11
1,3-Dichlorobenzene	ND-0.1	5	0 of 9
Naphthalene <sup>3</sup>	0.4-1.7	13	0 of 11
Phenanthrene	0.44-0.47	5	0 of 4
<b>Inorganic Compounds</b>			
Arsenic, Total <sup>2</sup>	5.4-7.4	150	0 of 11
Barium, Total	27.8-50.2	NS	NS
Beryllium	0.3	NS	NS
Cadmium, Total <sup>4</sup>	ND-4.1	NS	NS
Selenium, Total <sup>2</sup>	ND-7.3	4.6	4 of 17
Cyanide <sup>2</sup>	ND-44	5.2	8 of 21

<sup>1</sup>ppb: parts per billion.

<sup>2</sup>New York State Class C Ambient Water Quality Standards from 6 NYCRR Part 703.

<sup>3</sup>New York State Class C Ambient Water Quality Guidance Values.

<sup>4</sup>New York State Class C Ambient Water Quality Standards based on unavailable general chemistry data (i.e., pH, temperature, hardness).

<sup>5</sup>New York State Class C Ambient Water Quality Standard not available for this substance.

<sup>6</sup> NS= No standard

<sup>7</sup> ND= Non-Detect

**Table 2- North Return Water Trench Surface Water**

<b>Parameter</b>	<b>Detected Range (ppb)<sup>1</sup></b>	<b>Class C, A(C) Fresh Water Ambient Water Quality Standards (ppb)</b>	<b>Frequency Exceeding Ambient Water Quality Standards</b>
<b>TCL VOCs</b>			
Benzene <sup>2</sup>	0.2	10	0 of 2
Methylene Chloride <sup>2</sup>	0.9-2.4	200	0 of 2
<b>Inorganic Compounds</b>			
Barium, Total <sup>3</sup>	340	NS <sup>5</sup>	NS
Calcium, Total	32,800	NS	NS
Calcium, Dissolved <sup>3</sup>	32,800	NS	NS
Chromium, Total <sup>4</sup>	12.4	NS	NS
Lead, Total <sup>4</sup>	3.2-62	NS	NS
Chloride <sup>3</sup>	30,300	NS	NS

<sup>1</sup>ppb: parts per billion.

<sup>2</sup>New York State Class C Ambient Water Quality Standards from 6 NYCRR Part 703.

<sup>3</sup>New York State Class C Ambient Water Quality Standard not available for this substance.

<sup>4</sup>New York State Class C Ambient Water Quality Standards based on unavailable general chemistry data (i.e., pH, temperature, hardness).

<sup>5</sup> NS- No standard

**Table 3- South Return Water Trench Surface Water**

<b>Parameter</b>	<b>Detected Range (ppb)<sup>1</sup></b>	<b>Class C Ambient Water Quality Standards (ppb)</b>	<b>Frequency Exceeding Ambient Water Quality Standards</b>
<b>TCL VOCs</b>			
Benzene <sup>2</sup>	0.2-0.68	10	0 of 4
<b>Inorganic Compounds</b>			
Barium, Total	39.2-75.2	NS <sup>3</sup>	NS
Mercury, Total <sup>2</sup>	0.5-0.7	0.0007	2 of 3
Chloride	11.6-119	NS	NS
Sulfate	91,800	NS	NS
Cyanide <sup>2</sup>	11.6-119	5.2	3 of 3

<sup>1</sup>ppb: parts per billion.

<sup>2</sup>New York State Class C Ambient Water Quality Standards from 6 NYCRR Part 703.

<sup>3</sup> NS- No standard

**Table 4- Gateway Metroport Ship Canal Surface Water**

<b>Parameter</b>	<b>Detected Range (ppb)<sup>1</sup></b>	<b>Class C Ambient Water Quality Standards (ppb)</b>	<b>Frequency Exceeding Ambient Water Quality Standards</b>
<b>TCL VOCs</b>			
Acetone	4.2-5.2	NS <sup>3</sup>	NS
Benzene <sup>2</sup>	1.7-1.8	10	0 of 2
<b>Inorganic Compounds</b>			
Calcium	33,300-34,600	NS	NS
Iron	360-370	NS	NS
Magnesium	8,000-8,200	NS	NS
Manganese	13-14	NS	NS
Potassium	1,800-2,000	NS	NS
Sodium	31,300-42,600	NS	NS

<sup>1</sup>ppb: parts per billion.

<sup>2</sup>New York State Class C Ambient Water Quality Standards from 6 NYCRR Part 703.

<sup>3</sup> NS- No standard

## **A2. Sediment Data**

Sediment data were compared to the NYSDEC Screening and Assessment of Contaminated Sediment freshwater guidance values of Class A and Class C criteria to determine the nature and extent of contamination within the creek sediments. The guidance document establishes concentration guidelines for three classes of sediment contamination defined as follows:

- Class A - Sediment concentrations in this class present little or no potential risk to aquatic life. This represents a pre-release condition that was evaluated under the RFI.
- Class B - Concentrations between the Class A and Class C thresholds present a reasonable probability of chronic toxicity to aquatic life. For this discussion, a “Class A exceedance” means that the sediment is categorized as Class B unless subsequent text explicitly indicates the material is Class C (concentration also exceeds the Class C threshold).
- Class C - Sediment concentrations in this class present a significant potential risk of acute toxicity to aquatic life.

Sediment samples were collected from Smokes Creek, North Return Water Trench, South Return Water Trench, and Gateway Metroport Ship Canal. These samples have been collected from several different depths (0-6”, 6”-12”, and 12”-24”) during several different sampling events throughout the years. Only the most recent data is included in this section, as sediment samples from Smokes Creek that were collected in June 2020 by USGS have not yet been analyzed and are therefore not included in this PRAP.

The data included in Tables 5 through 9 is a summary of the data from 2009, 2016, and 2017.

In 2008, Tecumseh completed an interim corrective measure (ICM) of dredging the Lower Reach of Smokes Creek to address hydraulic concerns. The 2009 sediment sample results represent the post-dredging conditions in this area. Pre- and post-ICM sediment samples were collected from the same 10 locations equidistant from each other. Adjacent cores were composited for SVOCs, PCBs, cyanide, total organic carbon (TOC), and metals analysis. In addition, discrete samples were collected from all 10 locations for VOC analysis. The Upper Reach of Smokes Creek was dredged by NYSDEC in 2007 for navigational purposes, and samples were collected in 2009.

Additionally, in 2017 Smokes Creek was sampled by USACE. Sample locations were divided into 10 sections (numbered 1-10), and each section was further divided into 5 subsections (labeled a-e), further described in Tables 5 and 6 and shown in Figures 9-1A, 9-1B, 9-1C, and 9-2.

The Gateway Ship Canal was sampled in November 2009, these samples were analyzed for TCL VOC, TCL SVOC, RCRA Metals, and TOC analysis. Additionally, in 2016 USACE sampled the Ship Canal at depths of 0-10", 0-12", 0-18", 0-20", 0-60", 10"-28", 12"-36" and 20"-36". From these two sampling events, 13 sediment samples were collected with exceedances of Class C SGV several inorganic compounds, VOCs, and SVOCs, PCBs related to past Bethlehem Steel activities, as further described in Table 7 and shown in Figure 9-8.

In 2006, four sediment samples were collected from the North Return Water Trench from the upper six inches. At the time, the surface water levels within the trench were approximately 1 foot to 8 feet below the surrounding groundwater table. Little to no water has been observed in the trench since 2011. The Northern-most opening to the trench is already covered with an encroaching slag/fill pile, mostly located on the BCP area. From the samples obtained, there have been past exceedances of inorganic compounds (Arsenic, Cadmium, Chromium (total), lead, and mercury) and PCBs, as further described in Table 7 and shown in Figure 9-4. Approximately 22 samples have been collected in the South Return Water Trench. In October 2009, during the implementation of the CMS work plan 17 composite samples were collected for TCL VOC, TCL SVOC, PCBs and RCRA metals plus cyanide. Organics, total PAHs, and total PCB compounds exceeded their respective SGVs. A more detailed breakdown of these exceedances is shown in Table 8 and Figures 9-5A and 9-5B show the collection locations of these samples.

Despite past navigational or hydraulic (flood reduction) dredging, creek sediments have been contaminated by Bethlehem Steel operations. Contaminants found above the Class A (Smokes Creek) and Class C (Ship Canal and SRWT) SGV and/or the industrial soil cleanup objectives are to be addressed by the remedy selection process.



**Table 5 – Smokes Creek Upper Reach Sediment**

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> (ppm)</b>	<b>Frequency Exceeding Class A</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
<b>TCL SVOCs</b>					
Fluoranthene	0.053-15	14.16	1 of 73	NS <sup>4</sup>	NS
Phenanthrene	0.033-24	11.94	3 of 73	NS	NS
Total PAH-17	0.3748-55.504	4	22 of 66	35	2 of 66
Total PAH-34	0.12155-70.31	4	14 of 25	35	2 of 25
<b>PCBs</b>					
Total PCBs	0.0055-3.6	0.1	10 of 73	1	5 of 73
<b>Inorganic Compounds</b>					
Arsenic	1.5-33.3	10	29 of 73	33	1 of 73
Cadmium	0.01-24	1	35 of 73	5	7 of 73
Chromium	5.7-193	43	29 of 73	110	5 of 73
Copper	10-239	32	50 of 66	150	3 of 66
Lead	12.3-1,370	36	63 of 73	130	41 of 73
Mercury	0.01-2.5	0.2	25 of 73	1	1 of 73
Nickel	7.2-103	23	44 of 66	49	10 of 66
Silver	0.07-11.8	1	22 of 73	2.2	11 of 73
Zinc	43.9-100,000	120	55 of 73	460	42 of 73

<sup>1</sup>ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.

<sup>2</sup>NYSDEC Freshwater SGVs – based on site specific 9.32% TOC.

<sup>3</sup>NYSDEC Class A Freshwater SGVs should be used for compounds that do not have a Class C SGV.

<sup>4</sup> NS= No standard

<sup>5</sup> ND= Not Detected.

**Table 6 – Smokes Creek Lower Reach Sediment**

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> (ppm)</b>	<b>Frequency Exceeding Class A</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
<b>TCL SVOCs</b>					
Naphthalene	0.02-31	7.7	2 of 29	NS <sup>4</sup>	NS
Phenanthrene	0.043-17	11.94	1 of 29	NS	NS
Total PAH-17	1.01-18.52	4	11 of 24	35	0 of 24
Total PAH-34	3.28-11.48	4	5 of 8	35	0 of 8
<b>PCBs</b>					
Total PCBs	0.067-0.85	0.1	10 of 29	1	0 of 29
<b>Inorganic Compounds</b>					
Arsenic	3.5-56.7	10	18 of 29	33	4 of 29
Cadmium	0.34-17.2	1	20 of 29	5	6 of 29
Chromium	11.9-187	43	19 of 29	110	7 of 29
Copper	22.4-184	32	20 of 24	150	4 of 24
Lead	25.8-837	36	25 of 29	130	20 of 29
Mercury	0.03-0.86	0.2	17 of 28	1	0 of 28
Nickel	15.5-118	23	21 of 24	49	6 of 24
Silver	0.16-8.4	1	16 of 29	2.2	6 of 29
Zinc	122-8,370	120	24 of 24	460	20 of 24

<sup>1</sup>ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.

<sup>2</sup>NYSDEC Freshwater SGVs – based on site specific 9.32% TOC.

<sup>3</sup>NYSDEC Class A Freshwater SGVs should be used for compounds that do not have a Class C SGV.

<sup>4</sup> NS= No standard

<sup>5</sup> ND= Not Detected.

**Table 7- North Return Water Trench Sediment**

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> / PAH SGVs (ppm)</b>	<b>Frequency Exceeding Class A / PAH SGVs</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
<b>TCL SVOCs</b>					
Acenaphthene	0.056-14	9.82	1 of 5	NS <sup>4</sup>	NS
Acenaphthylene	0.14-57	9.04	1 of 5	NS	NS
Anthracene	0.14-150	11.88	1 of 5	NS	NS
Benzo(a)anthracene	0.33-160	16.82	2 of 5	NS	NS
Benzo(a)pyrene	0.27-120	19.28	1 of 5	NS	NS
Benzo(b)fluoranthene	0.33-140	19.58	1 of 5	NS	NS
Benzo(ghi)perylene	0.19-59	21.9	1 of 5	NS	NS
Benzo(k)Fluoranthene	0.16-60	19.6	1 of 5	NS	NS
Chrysene	0.27-140	16.86	2 of 5	NS	NS
Fluoranthene	0.76-390	14.16	2 of 5	NS	NS
Fluorene	0.12-180	10.78	1 of 5	NS	NS
Indeno(1,2,3-cd)pyrene	0.18-68	22.3	1 of 5	NS	NS
Naphthalene	0.29-85	7.7	1 of 5	NS	NS
Phenanthrene	0.53-550	11.94	2 of 5	NS	NS
Pyrene	0.57-340	13.96	2 of 5	NS	NS
<b>PCBs</b>					
Total PCBs	0.225-1.2	0.1	3 of 3	1	1 of 3
<b>Inorganic Compounds</b>					
Arsenic	6.7-58.7	10	4 of 5	33	1 of 5
Cadmium	1.3-10.2	1	3 of 3	5	1 of 3
Chromium	21.2-438	43	3 of 5	110	1 of 5
Lead	74.7-909	36	5 of 5	130	2 of 5
Mercury	0.58-3.2	0.2	5 of 5	1	4 of 5

<sup>1</sup>ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.

<sup>2</sup>NYSDEC Freshwater SGVs – based on site specific 9.32% TOC.

<sup>3</sup>NYSDEC Class A Freshwater SGVs should be used for compounds that do not have a Class C SGV.

<sup>4</sup> NS= No standard

<sup>5</sup> ND= Not Detected.

**Table 8 –South Return Water Trench Sediment**

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> / PAH SGVs (ppm)</b>	<b>Frequency Exceeding Class A / PAH SGVs</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
<b>TCL SVOCs</b>					
Fluoranthene	0.56-24	14.16	4 of 22	NS <sup>4</sup>	NS
Phenanthrene	0.24-29	11.94	2 of 22	NS	NS
Total PAH-17	2.59-98.1	4	4 of 8	35	2 of 8
Total PAH-34	3.94-10.41	4	3 of 8	35	0 of 8
<b>PCBs</b>					
Total PCBs	0.054-0.189	0.1	4 of 17	1	0 of 17
<b>Inorganic Compounds</b>					
Arsenic	9.2-102	10	20 of 22	33	7 of 22
Chromium	19.3-212	43	13 of 22	110	3 of 22
Lead	96.6-1,010	36	22 of 22	130	21 of 22
Mercury	0.22-2.5	0.2	19 of 22	1	3 of 22
Nickel	13.5-147	23	3 of 13	49	1 of 13
Zinc	823-3,410	120	8 of 8	460	8 of 8

<sup>1</sup>ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.

<sup>2</sup>NYSDEC Freshwater SGVs – based on site specific 9.32% TOC.

<sup>3</sup>NYSDEC Class A Freshwater SGVs should be used for compounds that do not have a Class C SGV.

<sup>4</sup> NS= No standard

<sup>5</sup> ND= Not Detected.

**Table 9- Gateway Metroport Ship Canal Sediment**

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> / PAH SGVs (ppm)</b>	<b>Frequency Exceeding Class A / PAH SGVs</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
<b>TCL SVOCs</b>					
Acenaphthene	0.037-97	9.82	6 of 13	NS <sup>4</sup>	NS
Acenaphthylene	0.016-21	9.04	4 of 13	NS	NS
Anthracene	0.053-110	11.88	7 of 13	NS	NS
Benzo(a)anthracene	0.075-100	16.82	7 of 13	NS	NS
Benzo(a)pyrene	0.062-89	19.28	7 of 13	NS	NS
Benzo(b)fluoranthene	0.064-95	19.58	7 of 13	NS	NS
Benzo(ghi)perylene	0.042-53	21.9	5 of 13	NS	NS
Benzo(k)Fluoranthene	0.027-39	19.6	5 of 13	NS	NS
Chrysene	0.097-98	16.86	7 of 13	NS	NS
Fluoranthene	0.15-250	14.16	9 of 13	NS	NS
Fluorene	0.03-69	10.78	5 of 13	NS	NS
Indeno(1,2,3-cd) pyrene	0.036-48	22.3	5 of 13	NS	NS
Naphthalene	0.65-500	7.7	8 of 13	NS	NS
Phenanthrene	0.15-330	11.94	9 of 13	NS	NS
Pyrene	0.11-210	13.96	9 of 13	NS	NS
Total PAHs	1.645-1,919	4	12 of 13	35	11 of 13
<b>Pesticides</b>					
Endosulfan (alpha and beta)	0.0011-0.0021	0.001	2 of 9	0.02	0 of 9
<b>PCBs</b>					
Total PCBs	0.00067-0.336	0.1	7 of 13	1	0 of 13
<b>Inorganic Compounds</b>					
Arsenic	7-22.4	10	10 of 13	33	0 of 13
Cadmium	0.17-2.7	1	7 of 13	5	0 of 13
Chromium	18.6-80	43	8 of 13	110	0 of 13
Copper	21.5-39.6	32	2 of 9	150	0 of 9
Lead	18.4-663	36	10 of 13	130	6 of 13

<b>Parameter</b>	<b>Detected Range (ppm)<sup>1</sup></b>	<b>Class A SGVs<sup>2</sup> / PAH SGVs (ppm)</b>	<b>Frequency Exceeding Class A / PAH SGVs</b>	<b>Class C SGVs<sup>3</sup> (ppm)</b>	<b>Frequency Exceeding Class C SGVs</b>
Mercury	0.013-1.61	0.2	10 of 13	1	2 of 13
Nickel	16.8-30.5	23	6 of 9	49	0 of 9
Silver	0.064-1.2	1	1 of 9	2.2	0 of 9
Zinc	72.3-3,310	120	6 of 9	460	2 of 9

<sup>1</sup>ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.

<sup>2</sup>NYSDEC Freshwater SGVs – based on site specific 9.32% TOC.

<sup>3</sup>NYSDEC Class A Freshwater SGVs should be used for compounds that do not have a Class C SGV.

<sup>4</sup>NS= No standard

<sup>5</sup>ND= Not Detected.

### **A3. Groundwater**

Groundwater samples have been collected from overburden and bedrock wells across the site, targeting various portions of the underlying geology (i.e., slag/fill, dredge soils, sand, peat, clay, bedrock). As groundwater data has been collected for more than 20 years, only data from the past 5 years is presented and discussed within this section to describe current site conditions. A full summary of data can be found in the CMS Report (May 2019) and other historical reports.

The results indicate that contamination in the overburden is extensive and exceeds SCGs for VOCs, SVOCs, and metals. Several locations across the northern and western areas of the site have elevated pH (>12.5) in groundwater (see Figure 10-2). Contaminant levels in bedrock groundwater also exceeded SCGs for VOCs, SVOCs, and metals in select locations. A summary of the detected results that exceed applicable SCGs is presented in Table 10. A contour map of benzene (Figure 10-3) illustrates general COC exceedances across the site from the most recent groundwater sampling event in 2020.

Ethylbenzene, toluene, and xylene exceedances are primarily located near the Benzol Plant, southwest of the Ship Canal. Benzene exceedances, however, are also located in the northern and southern areas of the site (see Figure 10-3). Generally, the highest exceedances of phenols and metals are in the south. PAH exceedances are located across the site.

Two sampling events (2018 and 2020) analyzed the full suite of emerging contaminants in groundwater. For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 0.134 and 0.0259 parts per billion (ppb), respectively, exceeding the State's 0.010 ppb maximum screening value for groundwater for each. The majority of PFAS exceedances are located in DSA-2A, DSA-2B, DSA-4A and DSA-5.

Groundwater samples analyzed for 1,4-dioxane had a maximum concentration of 215 ppb, significantly higher the screening value of 1 ppb in groundwater-. Exceedances of 1,4-dioxane are found within DSA-2A and DSA-2B.

**Table 10 – Site-Wide Groundwater**

<b>Detected Constituents</b>	<b>Concentration Range Detected (ppb)<sup>1</sup></b>	<b>SCG<sup>2</sup> (ppb)</b>	<b>Frequency Exceeding SCG</b>
<b>VOCs</b>			
1,1 Dichloroethane	ND-7.6	5	2/132
1,4 Dioxane	ND-215	1	8/43
1,2,4-Trichlorobenzene	ND-16	5	1/101
1,2,4-Trimethylbenzene	ND-240	5	12/121
1,2-Dichlorobenzene	ND-26	3	2/100
1,2-Dichloroethane	ND-180	0.6	13/117
1,3,5-Trimethylbenzene	ND-220	5	9/121
Acetone	ND-190	50	3/158
Benzene	ND-96,000	1	115/181
Carbon Disulfide	ND-480	60	2/156
Chlorobenzene	ND-49	5	1/84
Chloromethane (Methyl chloride)	ND-13	5	2/93
cis-1,2-Dichloroethene	ND-18	5	4/110
Ethylbenzene	ND-880	5	17/174
Isopropylbenzene	ND-5.5	5	1/174
Styrene	ND-410	5	8/139
Toluene	ND-5,800	5	33/180
trans-1,2-Dichloroethene	ND-15	5	4/105
Trichloroethene	ND-8.5	5	4/117
Vinyl Chloride	ND-3.4	2	2/117
Xylenes, m/p	ND-1,500	5	30/129
Xylenes, o	ND-570	5	21/129
Xylenes, Total	ND-2,360	5	52/178
<b>SVOCs</b>			
2,4-Dimethylphenol	ND-420	1	24/138
2-Methylphenol (o-Cresol)	ND-410	1	3/121
2-Nitrophenol	ND-260	1	1/53
3- & 4-Methylphenol (m- & p-Cresol)	ND-4,000	1	54/140
4-Nitrophenol	ND-210	1	1/55
Acenaphthene	ND-210	20	8/167



<b>Detected Constituents</b>	<b>Concentration Range Detected (ppb)<sup>1</sup></b>	<b>SCG<sup>2</sup> (ppb)</b>	<b>Frequency Exceeding SCG</b>
Benzo(a)anthracene	ND-17	0.002	66/167
Benzo(a)pyrene	ND-12	0.002	34/167
Benzo(b)fluoranthene	ND-14	0.002	37/167
Benzo(k)fluoranthene	ND-5.3	0.002	45/167
Biphenyl (1,1'-biphenyl)	ND-68	5	15/161
Bis(2-Ethylhexyl) Phthalate	ND-98	5	6/165
Chrysene	ND-14	0.002	60/167
Fluorene	ND-150	50	7/170
Indeno(1,2,3-cd)Pyrene	ND-6.7	0.002	35/167
Naphthalene	ND-12,000	10	65/182
Pentachlorophenol	ND-2.1	1	5/150
Phenanthrene	ND-170	50	6/170
Phenol	ND-17,000	1	43/139
Total Recoverable Phenolics	ND-190	1	24/27
Phenolic compounds (total phenols)	ND-21,000	1	67/143
<b>PCBs/Pesticides</b>			
Total PCBs	ND-0.068	0.09	0/35
4,4'-DDE	ND-0.006	0.2	0/52
<b>Metals</b>			
Antimony	ND-3.65	3	4/25
Antimony (Dissolved)	ND-5.84	3	1/4
Arsenic	0.22-128	25	4/72
Arsenic (Dissolved)	2.9-128	25	1/7
Barium	13.99-15,750	1,000	8/83
Barium (Dissolved)	16.22-17,980	1,000	4/15
Chromium, Total	0.18-260.6	50	4/74
Chromium (Dissolved)	0.24-166.2	50	2/7
Cyanide	2-6,440	200	18/51
Magnesium, Total	ND-749,000	35,000	16/54
Magnesium (Dissolved)	ND-78,400	35,000	3/4
Manganese, Total	0.48-111,900	300	10/54
Selenium, Total	ND-40.5	10	4/51

<b>Detected Constituents</b>	<b>Concentration Range Detected (ppb)<sup>1</sup></b>	<b>SCG<sup>2</sup> (ppb)</b>	<b>Frequency Exceeding SCG</b>
Selenium (Dissolved)	ND-16.4	10	1/4
Sodium, Total	8,480-3,060,000	20,000	47/55
Sodium (Dissolved)	4,990-365,000	20,000	2/3
<b>pH (pH units)</b>			
Elevated pH	4.48-13.31	12.5	13/193
<b>Perfluorinated Compounds<sup>3</sup></b>			
Perfluoropentanoic Acid (PFPeA)	ND-0.249	0.1	4/31
Perfluorohexanoic Acid (PFHxA)	ND-0.143	0.1	3/31
Perfluorooctanoic Acid (PFOA)	ND-0.134	0.01	12/31
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND-0.375	0.1	1/31
Perfluorooctanesulfonic Acid (PFOS)	ND-0.0259	0.01	6/31
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND-0.134	0.1	1/31

<sup>1</sup>ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water. ND= Not Detected.

<sup>2</sup>SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5) except for 1,4-dioxane and perfluorinated compounds, which are compared to the NYSDEC screening levels.

<sup>3</sup>Further assessment is warranted if any other individual perfluorinated compound (not PFOA or PFOS) is detected in water at or above 0.1 ppb; or if the total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 0.5 ppb.

The primary groundwater contaminants are benzene, ethylbenzene, toluene, xylene, 2,4-dimethylphenol, 3- & 4-methylphenol (m- & p-cresol), benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, biphenyl, chrysene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, total recoverable phenolics, arsenic, barium, chromium, and cyanide . These compounds are associated with past industrial operations at the site.

Based on the last five years of data and historical industrial operations at the site, contaminants that exceed the groundwater standards will be addressed by the remedy selection process.

Emerging contaminants, 1,4-dioxane and perfluorinated compounds, are co-mingled with the site-wide groundwater plume. Therefore, emerging contaminants will not drive the remediation of groundwater, but will be evaluated during the treatment system design.

## EXHIBIT B SUMMARY OF THE CLEANUP OBJECTIVES

The goal for the corrective measure program is to achieve restricted (industrial) use of the site (and commercial use in select areas where the anticipated use is recreational activity) and to restore groundwater quality to meet applicable SCGs, to the extent feasible. At a minimum, the corrective measures shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at this facility through the proper application of scientific and engineering principles.

The established cleanup objectives at this site are:

Compound	Soil Cleanup Objective <sup>1</sup> (ppm or mg/kg)	Groundwater Cleanup Objective <sup>2</sup> (ppb or ug/L)	SCG <sup>3</sup> Class A (ppm)	SCG <sup>4</sup> Class C (ppm)
<b>VOCs</b>				
Benzene	89/0.06	1	0.53	1.9
Chlorobenzene	1,000/1.1	5	0.20	1.7
1,2-Dichlorobenzene	1,000/1.1	3	0.28	2.5
Cis-1,2-Dichloroethene	1,000/0.25	5	NS	NS
Trans-1,2-Dichloroethene	1,000/0.19	5	1.2	11.0
Ethylbenzene	780/1	5	0.43	3.7
Styrene	NV/NV	5	NS	NS
Toluene	500/0.7	5	0.93	4.5
1,2,4-Trichlorobenzene	NV/NV	5	35	55
Trichloroethene	400/0.47	5	1.8	8.6
1,1,1- Trichloroethane	1,000/0.68	NS	1.9	3.5
1,2,4-Trimethylbenzene	380/3.6	5	3.4	30
1,3,5-Trimethylbenzene	380/8.4	5	NS	NS
Vinyl Chloride	27/0.02	2	NS	NS
Xylenes, total	1,000/1.6	5	.590	5.2
<b>SVOCs</b>				
Acenaphthene	1,000/98	20	NS	NS
Benzo(a)anthracene	11/1	0.002	NS	NS

Compound	Soil Cleanup Objective <sup>1</sup> (ppm or mg/kg)	Groundwater Cleanup Objective <sup>2</sup> (ppb or ug/L)	SCG <sup>3</sup> Class A (ppm)	SCG <sup>4</sup> Class C (ppm)
Benzo(a)pyrene	1.1/22	ND	NS	NS
Benzo(b)fluoranthene	11/1.7	0.002	NS	NS
Benzo(k) fluoranthene	110/1.7	0.002	NS	NS
Biphenyl (1,1'-biphenyl)	NV/NV	5	NS	NS
Bis(2-ethylhexyl)phthalate	NV/435	5	NS	NS
Chrysene	110/1	0.002	NS	NS
2,4-Dimethylphenol	NV/NV	1	NS	NS
Indeno(1,2,3-cd)pyrene	11/8.2	0.002	NS	NS
2-Methylphenol	1,000/0.33	1	NS	NS
4-Methylphenol	1,000/0.33	1	NS	NS
Naphthalene	1,000/12	10	NS	NS
Phenol	1,000/0.33	1	NS	NS
Total PAHs	5003	NV	4	35
<b>PFAS</b>				
Perfluorooctanoic acid (PFOA) <sup>5</sup>	0.6/0.0011	0.01	NS	NS
Perfluorooctanesulfonic acid (PFOS) <sup>5</sup>	0.44/0.0037	0.01	NS	NS
<b>Metals</b>				
Arsenic	16/16	25	10	33
Barium	10,000/820	1,000	NS	NS
Cadmium	60/7.5	5	1	5
Chromium	800/19	50	43	110
Cyanide	10,000/40	200	NS	NS
Lead	3,900/450	25	36	130
Mercury, total	5.7/0.73	0.7	0.2	1
Selenium	6,800/4	10	NS	NS
Silver	6,800/8.3	0.1	1	2.2
<b>PCBs/Pesticides</b>				
Total PCBs	25/3.2	0.09	0.1	1

1. 6NYCRR Part 375: Industrial Soil Cleanup Objectives (ISCOs)/Protection of Groundwater SCOs.

2. SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs)

- 1.1.1), 6 NYCRR Part 703 - Surface Water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).
3. SCG: Class A- The Department's Screening and Assessment of Contaminated Sediment (June 2014).
  4. SCG: Class C- The Department's Screening and Assessment of Contaminated Sediment (June 2014).
  5. Further assessment is warranted if any other individual perfluorinated compound (not PFOA or PFOS) is detected in water at or above 0.100 ug/L; or if the total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 0.500 ug/L. Based upon Sampling, Analysis, and Assessment of Per and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs (January 2021).

ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil. ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water. ppt: parts per trillion, which is equivalent to nanograms per liter, ng/L, in water.

ND = Not Detected.

NV = No Value.

NS= No Standard.

## EXHIBIT C DESCRIPTION OF REMEDIAL ALTERNATIVES

### Common Elements of Corrective Remedial Alternatives Evaluated by DEC

Each of the remedial alternatives evaluated by the Department, with the exception of Alternative 1 – No Further Action and Alternative 2 – No Further Action with Site Management, rely on the same common elements to address the site. The primary component of the site remedial plan is the consolidation and containment of materials in a corrective action management unit (CAMU), including closure in place of select solid waste management units (SWMUs) and proper disposition of materials unsuitable for placement within the CAMU. The common elements for the entire site include remedial design with appropriate pre-design investigations to ensure a comprehensive remedy, provisions for sustainable restoration and climate resiliency to ensure the long-term effectiveness of the remedial program. Other elements include earthwork (excavation and backfill) to remove the potential for ongoing releases to the environment, provide access to materials requiring remediation and to allow for protective institutional and engineering controls (environmental easement, cover system and site management plan) to be implemented. Financial assurance is also required.

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

#### Alternative 1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

*Present Worth:* ..... \$0  
*Capital Cost:* ..... \$0  
*Annual Costs:* ..... \$0

#### Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of a portion of the site completed by interim corrective measures. This alternative leaves the sediment in its present condition, no construction of the CAMU, and the sediment and surface waters at the Ship Canal, Smokes Creek, SWRT, and NWRT as well as site-wide

groundwater will be monitored for site related contamination. Additionally, site perimeter controls and access points would be installed, and warning signage posted. This alternative maintains engineering controls, which were part of the IRM(s), OU-4 GW & Soil Vapor Extraction, and Hazardous Waste Management Unit 1A, and includes institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site after the IRMs.

<i>Capital Cost</i> .....	\$250,000
<i>Site Management Present Worth</i> .....	\$8,175,500
<i>Annual Costs (Years 1-30)</i> .....	\$250,000

**Alternative 3: Restoration to Pre-Disposal or Unrestricted Conditions for Groundwater and Waterbodies**

This alternative includes the complete excavation of all sediment that exceeds the Class A sediment SCGs in Smokes Creek, South Return Water Trench and Ship Canal. Excavation is a common remedy used to remove contaminated sediments and is effective at eliminating exposure and preventing transport of contaminants.

Verification samples will be collected following sediment removal to confirm that all contaminated sediment has been removed. All excavated sediment would be dewatered at a facility constructed at the site before being transported to approved off-site disposal facilities or placed in the CAMU created on-site.

Following excavation, the waterbodies will be restored, to the extent possible, to their original grades with material similar to the existing substrate. A restoration plan would be developed during design and will meet the substantive requirements of Article 15 USACE and 6 NYCRR Part 608.

This alternative would also include the Smokes Creek Main Stem Enhancement and plugging and backfilling of the North Return Water Trench.

For groundwater, pre-disposal conditions are unobtainable as the entire site is built on slag/fill and dredged sand materials. Therefore, this alternative would target soil source removal to restore the groundwater aquifer to below TOGS 1.1.1 standards and allow for unrestricted use. This alternative would include source removal of the slag/fill layer underneath the entire site which would resolve groundwater contamination. The excavation and off-site disposal of all waste and soil contamination above the unrestricted soil cleanup objectives is estimated to be significantly greater than 1,500,000 tons (approximate volume of all solid waste management units). The remedy will not rely on institutional or engineering controls to prevent future exposure after 10 years of groundwater monitoring have demonstrated applicable standards are met. Under this assumption, there is no Site Management, no restrictions, and no periodic review. The annual costs associated with this remedy include groundwater monitoring until applicable



standards are met (estimated 10 years). The only capital cost addresses source material removal. Due to size of the site, the substantial volume to be excavated for this alternative, and uncertainties regarding disposal options and requirements, estimated capital costs are conceptual and may be considerably underestimated.

*Present Worth:* ..... \$206,179,000  
*Capital Cost:*..... \$206,179,000  
*Annual Costs:*..... \$0

**Alternative 4: SW-CAMU with Sediment Removal in Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal, Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring.**

This alternative includes the SW-CAMU evaluated in Appendix D and F. If the technical requirements and timing described in this document are met, the management of nonhazardous contaminated materials in a Corrective Action Management Unit (CAMU) will be conducted on-site. Soil or waste exhibiting hazardous waste regulatory levels will be disposed off-site at a permitted hazardous waste disposal facility. The CAMU shall, to the extent practicable, minimize the land area of the facility upon which waste will remain in place after closure of the CAMU.

This alternative consists of the complete excavation of sediment from Smokes Creek and restoration of the bank soils, Gateway Metroport Ship Canal, and the SRWT. Excavation is a common remedy used to remove contaminated sediments and is effective at eliminating exposure and preventing transport of contaminants. Due to the continuous flow of water, flows will need to be managed during excavation activities.

Verification samples will be collected following sediment removal to confirm that all contaminated sediment has been removed. All excavated sediment will be dewatered at a facility constructed at the site before being transported to approved off-site disposal facilities or placed in the CAMU created. A restoration plan will be developed during design and will meet the substantive requirements of Article 15 USACE and 6 NYCRR Part 608. This alternative would also include the Smokes Creek Main Stem Enhancement, and the plugging and backfill of the North Return Water Trench.

For groundwater, this alternative includes a pre-design investigation, enhancements to the two on-site treatment systems (within the Acid Tar Pit and Benzol Plant areas), a monitoring program, and a contingency remedial action plan. Site management activities will occur for 30 years or as determined by the Department.

Details regarding the enhancements to the existing treatment systems will be determined in the pre-design investigation and remedial design component of the alternative. However, the installation of 26 additional extraction wells and corresponding infrastructure will expand the capture zone of the current extraction systems. The added

volume of contaminated groundwater entering the treatment systems will likely warrant several upgrades to each system and will require updates to the Operation and Maintenance Manual to reflect new site engineering controls.

Groundwater will be monitored for site-related contaminants to assess the effectiveness of the treatment systems. Sampling frequency will occur quarterly (for an estimated 90 wells) to account for seasonality, for the first five years and then annually thereafter, or as approved by the Department. As quarterly sampling will occur on a short-term basis, the annual cost estimate only reflects annual sampling. However, the present worth includes quarterly sampling for five years.

Optimization investigations and reports will occur every five years, or as determined by the Department, to evaluate the effectiveness of the treatment enhancements and the need for corrective measures to further improve or expand the system(s). If corrective measures are determined to be necessary, a provision for further investigation and remediation is required under a Remedial Action Work Plan (RAWP), which must be approved by the Department before implementation. This provision includes further delineation of the nature and extent of groundwater contamination, evaluation of the ineffective treatment system(s), and proposed recommendations to address the remaining contamination significantly exceeding groundwater standards. Remedial actions may require additional extraction well and/or treatment system installations to address the ineffectiveness of the upgraded treatment systems.

The alternative also includes institutional controls in the form of an environmental easement, Site Management Plan, groundwater use restriction, site use restriction, excavation plan and, if necessary, further evaluation of soil vapor intrusion.

*Present Worth:* ..... \$32,972,000  
*Capital Cost:*..... \$21,741,700  
*Annual Costs:*..... \$350,000

**Alternative 5: Off-site disposal with Restoration to Class A SGV (Smokes Creek and South Return Water Trench), Class C SGVs (Ship Canal), Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring**

This alternative is the same as Alternative 4 except the on-site consolidation CAMU is replaced with off-site disposal. It is important to note that the total cost for offsite removal based upon all of the operable units is estimated to be approximately \$200,000,000 rendering off-site disposal unfeasible. The numbers below are the cost estimate for OU1, OU09, and OU10.

*Present Worth Cost:*..... \$68,657,000  
*Capital Cost:*..... \$57,430,700  
*Annual Cost:*..... \$375,000

## Exhibit D

### CORRECTIVE MEASURE ALTERNATIVE COSTS

Corrective Measure	Capital Cost (\$)	Annual Costs (\$)	Total Present Worth (\$)
Alternative 1: No Further Action	<i>0</i>	<i>0</i>	<i>0</i>
Alternative 2: No Further Action with Site Management	<i>\$250,000</i>	<i>\$272,517</i>	<i>\$8,425,500</i>
Alternative 3: Restoration to Pre-disposal or Unrestricted Conditions	<i>\$206,179,000</i>	<i>0</i>	<i>\$206,179,000</i>
Alternative 4: SW-CAMU with Dredging of Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal, Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring*	<i>\$21,741,700</i>	<i>\$350,00</i>	<i>\$32,972,000</i>
Alternative 5: Off-site disposal** with Dredging of Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal, Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring*	<i>\$57,430,700</i>	<i>\$11,230,300</i>	<i>\$68,657,000</i>

\*Excluding the implementation of a contingency remedial action.

\*\*Off-site disposal cost estimates do not account for the ~\$19 million additional off-site disposal costs associated with other operable units across the site.

## **EXHIBIT E**

### **SUMMARY OF THE SELECTED FINAL CORRECTIVE MEASURE(S)**

The Department has identified the following remedy as the final corrective measures for this site:

*Alternative 4: SW-CAMU with Sediment Removal in Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal, Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring.*

The Department's basis for selection of Alternative 4 is summarized below.

#### **Common Elements of Corrective Measures Alternatives Evaluated by DEC**

Each of the remedial alternatives evaluated by the Department, with the exception of Alternative 1 – No Further Action and Alternative 2 – No Further Action with Site Management, rely on the same common elements to address the site.

The primary component of the site remedial plan the Department has selected is the consolidation and containment of materials in a corrective action management unit (CAMU), including closure in place of select solid waste management units (SWMUs) and proper disposition of materials unsuitable for placement within the CAMU. The remedial elements for the entire site include remedial design with appropriate pre-design investigations to ensure a comprehensive remedy, provisions for sustainable restoration and climate resiliency to ensure the long-term effectiveness of the remedial program. Other elements include demolition and earthwork (excavation and backfill) to remove the potential for ongoing releases to the environment, provide access to materials requiring remediation and to allow for protective institutional and engineering controls (environmental easement, cover system and site management plan) to be implemented. Financial assurance is also required. The Department believes these common elements are the foundation of a cost-effective remedy which will be fully protective of human health and the environment, complies with statutory and regulatory standards, and is implementable and will be effective long term.

The Department has selected Alternative 4 – SW-CAMU with Dredging of Smokes Creek, South Return Water Trench and Gateway Metroport Ship Canal; Plugging, Excavation and Backfilling the North Return Water Trench; Enhanced Groundwater Treatment Systems with Monitoring as the final corrective measure. The North Return Water Trench will be plugged and backfilled. To the extent practicable and within the constraints of Section 8, disposal of excavated/dredged material will be placed in the on-site CAMU. This

alternative also adds enhancements to the existing treatment systems with continued monitoring to address groundwater exceedances of TOGs 1.1.1 standards across the site. If the Department determines after five years of operation that standards will not be met, corrective measures, including a Remedial Action Work Plan (RAWP), are required to further investigate and remediate the remaining contamination.

### **Basis for Selection**

The selected final corrective measures are based on the following: recent groundwater sampling; the results of the RFI and CMS; the lack of a previous comprehensive environmental cleanup at the site (only navigational or hydraulic flood reduction dredging); and that the site soil, groundwater, surface water and sediments have been contaminated by historical Bethlehem Steel and Tecumseh operations. Appendix D provides an evaluation of transportation and disposal, including onsite disposal in a SW-CAMU.

### **Threshold Criteria**

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

#### **1. Protection of Human Health and the Environment.**

This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternatives 1 and 2 (No Further Action/No Further Action with Site Management) do not satisfy this criterion as soil and sediment exceeding SGVs/SCGs remain on-site and continue to present a significant threat to public health and the environment. Neither Alternative 1 (No Further Action) nor Alternative 2 (No Further Action with Site Management) provide any protection to public health and the environment in a reasonable timeframe for groundwater and it is unlikely that full restoration of groundwater resources would be achieved. Furthermore, the No Action alternatives (Alternatives 1 and 2) do not address transport mechanisms such as erosion and loading from seeps, which allow contaminated slag to remain a potential source of contamination to the waterbodies, and for contaminated sediment to continue to migrate downstream. As Alternatives 1 and 2 are not fully protective of public health and the environment they are not considered for implementation at the site.

Alternatives 3, 4, and 5 best satisfy this criterion by removing all sediment that exceeds the New York State SGVs/SCGs for sediment, consolidating or removing waste, installing a site cover, and providing protection to public health and the environment in a reasonable timeframe for groundwater. Alternative 3 fulfills this criterion by removing the contaminants exceeding applicable SCGs. Alternative 4 and 5 fulfill this criterion by closing off the soil/sediment exposure pathway; and thereby preventing human contact

with remaining contamination. Dredging in Smokes Creek and the South Return Water Trench would mean remaining sediment would present no potential for risk to aquatic life or wildlife. Additionally, Alternatives 4 and 5 prevent human exposure with groundwater contamination through plume containment via expanding the existing treatment systems and institutional controls (groundwater use restrictions).

## 2. Compliance with SGVs/SCGs.

Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 3 (Removal to meet pre-disposal or unrestricted conditions) satisfies this criterion by removing all sediment that exceeds the sediment Class A SGVs and all soil that exceeds unrestricted SCOs. Alternatives 4 and 5 also satisfy this criterion through the installation of a site cover that meets the SCOs for the anticipated uses of the site. For groundwater, Alternative 3 complies with this criterion as it would likely reduce contaminant concentrations below groundwater SCGs, preventing restrictions on future groundwater use. Alternatives 4 and 5 also met this criterion by treating and containing hot spots of contamination in groundwater to below SCGs, to the extent practicable. Alternatives 3, 4 and 5 prevent contaminants from discharging into and contaminating nearby surface water bodies, thereby addressing surface water SCGs. Action-Specific SGVs/SCGs for these alternatives would be associated with dust and odor control, erosion and sediment control, transportation and disposal of remediation wastes, and stream restoration. These alternatives would maintain current flood plain storage capacity. As Alternatives 3, 4, and 5 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy.

## **Balancing Criteria**

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

## 3. Long-Term Effectiveness and Permanence.

This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 3 best satisfies this criterion by removing all sediment that exceeds the class A sediment SCGs and all soils that exceeds unrestricted SCOs. Complete soil and sediment removal could eliminate the need for long term monitoring and maintenance.

However, Alternative 3 would rely on natural attenuation processes to restore the contaminated aquifer. Therefore, due to the unreasonable amount of time required to restore the aquifer, this alternative would not be an effective long-term remedy. Alternatives 4 and 5 also satisfy this criterion but would require long-term monitoring and maintenance to ensure its long-term effectiveness. Both disposal options would provide similar levels of acceptable long-term effectiveness and permanence. Consolidation of the material at the CAMU, or at an approved commercial facility would result in the permanent containment of contaminated soils and floodplain soils/sediments. Bank soil along Smokes Creek, will be evaluated in Alternatives 4 and 5 through the PDI. The PDI will determine the extent of any bank soil removal.

For groundwater, Alternative 3 best satisfies this criterion as it would remove all major source material currently present, thereby eliminating the need for engineering or institutional controls. Alternatives 4 and 5 require an engineering control (extraction and treatment of groundwater) and institutional controls (environmental easement, groundwater use restriction, monitoring plan, Site Management Plan). These controls would be an effective means of managing residual contamination. Furthermore, the contingency for additional modifications/expansion to the treatment systems in Alternatives 4 and 5 would increase the reliability and long-term effectiveness of the remedy.

#### 4. Reduction of Toxicity, Mobility or Volume.

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 3, 4 and 5 all satisfy this criterion by removing some or all sediment or soil that exceeds the class A sediment SCGs or industrial SCOs, respectively. The mobility of contaminants is reduced under all three of these alternatives. Consolidation within the containment system at the CAMU, or removal to a commercial facility off-site would reduce the mobility of COCs, potentially through treatment to remove hazardous characteristics. The reduction in mobility would be the same for consolidation at the CAMU, and removal to an approved commercial facility.

Similarly, for groundwater these three alternatives satisfy this criterion by removing the major areas of source material and treating the groundwater, respectively. Alternative 3 permanently reduces contaminant mobility and volume and does not require additional components, although this reduction would likely take an unreasonable amount of time to achieve through natural attenuation. Alternatives 4 and 5 would significantly reduce mobility, and volume of contaminants through active groundwater treatment and would consistently meet this criterion.

## 5. Short-Term Impacts and Effectiveness.

The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

For sediments, the time needed to complete the remediation is the shortest for Alternative 3. Alternatives 4 and 5 are comparable in short term effectiveness. Consolidation and containment at the CAMU would provide the highest level of short-term effectiveness. The dominant short-term impact of off-site disposal of excavated sediments and soils is truck traffic, which presents potential issues for noise, dust/exhaust, traffic congestion, and safety concerns for the local community. For consolidation and containment onsite, truck traffic would be generally routed along onsite haul roads from the location of the dredging/excavation activities at the site via easily constructed/accessible non-residential roads suitable for truck traffic. Therefore, this disposal option would have limited direct impact on the local community since the haul route(s) would be short and no residential roads would be used. The remaining alternatives pose increased short-term risks to the public during excavation, dredging, grading, treatment, and other site activities through the generation of dust and water quality impacts at point of dredging; these effects can be reduced through the implementation of standard dust and turbidity mitigation construction practices. To minimize potential short-term impacts, the area would be secured, and access would be restricted to authorized personnel only. Workers can potentially be exposed to contaminated media during excavation and/or treatment activities involved. Risks can be minimized by implementing health and safety procedures and preventive measures including the use of appropriate personal protective equipment. All site workers would be OSHA certified and would be instructed to follow OSHA protocols.

For groundwater, Alternatives 4 and 5 best meet this criterion due to a shorter construction period. Alternative 3 creates the largest disruption in the community, workers, and the environment due to the long, invasive nature of the construction and implementation period. During this period, the site and surrounding community would be subject to extensive noise and traffic impacts, along with the potential for dust and vapor emissions. Whereas Alternative 3 would take decades (estimated at 70 years) to complete based on the large volume of contaminated materials, Alternatives 4 and 5 only require up to seven construction seasons to implement and would significantly limit any disruption to the surrounding community. The CAMU will be operated (open) for a period of 5-6 years to allow for consolidation of SWMUs waste/fills, followed by final cover construction in year 7. Impact to the community will be limited as community air monitoring will be completed, and dust suppression and typical landfill construction and operation techniques will be employed. Off-site truck traffic will increase due to the need



to import soil and other materials (~2,000 truckloads) for the final cover system. In addition to the relatively short construction phase, the short-term effectiveness of Alternatives 4 and 5 surpasses that of Alternative 3, which would require years of monitoring before contaminants demonstrate levels consistently below standards through natural attenuation. Alternatives 4 and 5 have localized impacts in the areas of extraction well installation and treatment system upgrades while Alternative 3 would impact a far larger area during implementation.

Overall, Alternatives 4 and 5 involve consolidation or offsite disposal of materials with treatment to remove hazardous characteristics and the use of engineering and institutional controls including clean covers, an easement and long-term site management which has been demonstrated to be highly effective at protecting human health and the environment at remediated sites across New York State.

## 6. Implementability.

The technical and administrative feasibilities of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

For sediments, Alternatives 3, 4 and 5 are implementable as there is ample availability of remedial contractors and equipment to complete the excavation/dredging activities. There would be some technical issues with implementation; associated primarily with access, stream diversion/dewatering, as well as the excavation, and restoration within Smokes Creek. State or federal regulations for construction within a flood plain may complicate implementation of this alternative. In addition, the earthwork and transportation technologies necessary for the implementation of these alternatives are proven and reliable. The sediment is expected to have low bearing capacity, due to the saturated and fine-grained nature of the sediment may need to be stabilized prior to offsite disposal or placement in the CAMU. Both disposal options are readily implementable, technically and administratively. However, due to the shorter travel distances involved, consolidation at the on-site containment system at the CAMU is more implementable than consolidation at an off-site commercial facility.

For groundwater, the execution of Alternatives 4 and 5 are feasible as there is available conventional technology and materials to implement installation of extraction wells and update treatment systems. As there are existing treatment systems on-site, it would be seamless to monitor additional wells to measure the effectiveness of reducing toxicity and mobility in groundwater. Alternative 3, however, would be extremely difficult to implement due to the large volume of soil and accessibility of these locations. The administrative and construction effort needed to remove all solid waste management units would be very

disruptive to nearby residences and businesses, and the transportation of exorbitant volume of waste would impact the community for a much longer timeframe.

### 7. Cost-Effectiveness.

Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

Alternative 4 has the lowest cost, followed by Alternative 5. Both alternatives require long-term monitoring and maintenance to ensure their long-term effectiveness and have the potential for implementability issues that could increase the capital cost of these alternatives. It is important to note that although Alternative 5 costs are estimated at \$619,000 higher when compared to Alternative 4, Alternative 5 does not take into account roughly \$19 million additional costs that would be required for additional off-site disposal under separate operable units. Alternative 3 has the highest cost because removal to pre-disposal conditions would require the largest quantity of sediment and material to be removed from all four of the waterbodies and underneath the site. There are major issues with the implementability of this alternative, which results in an infeasible present worth. Therefore, Alternative 4 has the best balance between cost and effectiveness.

### 8. Land Use.

When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Surface water from Smokes Creek flows directly into Lake Erie, which is used for recreational use. The waterbodies are not subject to redevelopment. For groundwater, Alternative 3 would allow for unrestricted use of the groundwater, regardless of future land use; however, this alternative is infeasible as described in the aforementioned criteria. Therefore, Alternative 4 or 5 would best meet this criterion as each allows for the reasonably anticipated land use for this site, a combination of industrial or commercial and passive recreational uses.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

### 9. Community Acceptance.

Concerns of the community regarding the investigation, the evaluation of alternatives, and the proposed Statement of Basis are evaluated. A responsiveness summary has been

prepared that describes public comments received and the manner in which the Department will address the concerns raised (Appendix B).

Alternative 4 has been selected because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion. This alternative would allow for public access to Smokes Creek. Based upon the above analysis, consolidation and containment at the CAMU is the preferred disposal option. This preference is based on consideration of the primary and balancing criteria and the cost disparity between consolidation locally and at a commercial facility. On-site management at the CAMU would be a proven and reliable technology for waste management.

# FINAL STATEMENT OF BASIS

## Appendices A through F

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Bethlehem Steel  
(Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements  
OU-09 – Water Courses, and  
OU-10 – Site Wide Groundwater

City of Lackawanna, Erie County  
Site No. 915009  
EPA ID No. NYD002134880

November 2021

- Appendix A Administrative Record**
- Appendix B Responsiveness Summary**
- Appendix C Soil Cleanup Objectives (SCO) Discussion**
- Appendix D Evaluation of Transport and Disposal**
- Appendix E CAMU Minimum Design Standards**
- Appendix F Review of Other States' Arsenic Remedial Goals**

# **APPENDIX A**

## **Administrative Record**

# ADMINISTRATIVE RECORD

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

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Canada and the United States of America. 1987. Niagara River Area of Concern (AOC), *Agreement between Canada and the United States of America on Great Lakes Water Quality, 1978*, done at Ottawa on 22 November 1978, as amended on October 16, 1983, and on November 18, 1987.

City of Lackawanna. 2016. *Comprehensive Plan Update*. July 6, 2016.

City of Lackawanna. 2018. *Local Waterfront Revitalization Program, Preliminary Draft*. May 2018.

National Oceanic and Atmospheric Administration (NOAA). 2013. *Great Lakes Coastal Resilience Planning Guide*. Collaborative effort of the NOAA Digital Coast partnership and additional community-based partners from the Great Lakes. <https://coast.noaa.gov/digitalcoast/training/gl-resilience.html>

*NOAA and the Coastal States Organization program to identify the most critical coastal habitat projects and data needs in each of the eight Great Lakes states, 2019.*

New York State Department of Environmental Conservation (NYSDEC). 1998. *Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. June 1998.

NYSDEC. 2009. *Order on Consent – File No. 03-73: Corrective Measures Study*. June 2009.

*September 24, 2020, the Department and Tecumseh signed an Order on Consent (the “Order”) to complete comprehensive investigation; evaluation; and implementation of Corrective Measures/Remedial Actions, Closure and Post-Closure Care requirements of the Site to protect public health and the environment*

*and to allow, when and where appropriate, the continued use of the Site and its redevelopment by Tecumseh and/or third parties.*

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NYSDEC. 2014. *New York's Great Lakes Basin: Interim Action Agenda*. Coordinated by New York State Department of Environmental Conservation Great Lakes Watershed Program In partnership with state and federal agencies, municipalities, academic institutions, non-profits, and community partners throughout NYS's Great Lakes basin. July 2014.

*NYSDEC's Great Lakes Program, including Great Lakes Regional Collaboration Strategy, Be Green in the Great Lakes Project, Great Lakes Action Agenda, and Lakewide Action and Management Plans, ongoing initiatives.*

NYSDEC. 2021a. *Proposed Statement of Basis Corrective Measures Selection: Bethlehem Steel Operable Units One (OU-01) Sitewide Remedial Elements, Operable Unit Nine (OU-09) Water Courses, and Operable Unit 10 (OU-10) Sitewide Groundwater, Site No. 915009, EPA ID No. NYD002134880, Lackawanna, Erie County*. May 5, 2021.

NYSDEC. 2021b. *Proposed Statement of Basis Proposed Remedy Operable Unit Five (OU-05) Slag Fill Zone 2 and OU08: Slag Fill Area - Zones 4 and 5 SWMU/AOC Group, Site No. 915009, EPA ID No. NYD002134880, Lackawanna, Erie County*. May 5, 2021.

NYSDEC. 2021c. *Proposed Statement of Basis Proposed Remedy OU-06 Former Petroleum Bulk Storage Sub-Area and OU-07 Coal, Coke and Ore Handling and Storage Sub-Area, and Coke Plant and By-Products Facility Sub-Area, Site No. 915009, EPA ID No. NYD002134880, Lackawanna, Erie County*. May 5, 2021

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Tecumseh Redevelopment, Inc. 2004. *RCRA Facility Investigation (RFI) Report for the Former Bethlehem Steel Corporation Facility, Lackawanna, New York, Parts I through VII*. October 2004.



- TurnKey Environmental Restoration, LLC, in association with Benchmark Environmental Engineering and Science, PLLC (TK-BM). 1994. *Groundwater Monitoring, Sampling, and Analysis Plan For HWMU-1 and HWMU-2*. March 1994, revised May 2009 and December 2017.
- TK-BM. 2009. *Corrective Measures Study Work Plan, Tecumseh Redevelopment Site, Lackawanna, New York*. May 2009.
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- TK-BM. 2014. *Comprehensive Groundwater Quality Assessment Report. Tecumseh Redevelopment CMS Area, Lackawanna, New York*. May 2014.
- TK-BM. 2019. *Hazardous Waste Management Units (HWMUs) 1 and 2 2019 Annual Groundwater Quality Monitoring Report. Tecumseh Redevelopment CMS Area, Lackawanna, New York*. November 2019.
- TK-BM. 2020. *ATP SWMU Group ECM Annual Monitoring and Maintenance Summary Report. Tecumseh Redevelopment Inc. Lackawanna, New York*. May 2020.
- U.S. Army Corps of Engineers. 2013. *Project Modifications for Improvement of the Environment*, Section 1135 of the 1986 Water Resources Development Act, as amended (P.L. 99-662), Scoping Information, May 7, 2013.
- U.S. Environmental Protection Agency (USEPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA I540IG-891004).
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**APPENDIX B  
RESPONSIVENESS SUMMARY**

# RESPONSIVENESS SUMMARY

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

Operable Units 1, 5, 6, 7, 8, 9 and 10  
Resource Conservation and Recovery Act/State Superfund Project

Site No. 915009  
EPA ID No. NYD002134880

City of Lackawanna, Erie County

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The proposed Statements of Basis for the Bethlehem Steel site were prepared by the New York State Department of Environmental Conservation (the Department, or NYSDEC) in consultation with the New York State Department of Health (NYSDOH). The Statements of Basis outlined the remedial measures proposed for the Bethlehem Steel site for the contaminated soil, groundwater, watercourses and soil vapor on-site and off-site, the demolition of dangerous or unusable structures on-site, and the creation of public access.

The release of the proposed Statements of Basis (SB) was announced by sending a notice to the public contact list and informing the public of the opportunity to comment on the proposed amended remedy.

To limit the community spread of COVID-19, Governor Cuomo issued Executive Order 202.15 suspending in-person public meetings relating to proposed site remedies. Accordingly, a virtual public meeting was conducted on May 18, 2021. As part of its commitment to provide the public with ample opportunity to give input on the proposed remedies, the Department encouraged the public to provide comments either electronically or by mail to the Department's Project Manager, during the 45-day public comment period. The public comment period for the Proposed Amendment ended on June 18, 2021.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

**COMMENT 1:** The Erie County Department of Environment and Planning has reviewed the NYSDEC and New York State Department of Health Draft Statements of Basis (SB)

regarding the proposed remedy at the former Bethlehem Steel site in Lackawanna, dated May 5, 2021. Erie County is supportive of the site's remediation and transformation into a development ready site. The County along with partners at the City, State and Federal government have invested millions into the pre-development work and construction of roads and utility infrastructure to attract economic development to the Buffalo Erie County Industrial and Land Development Corporation (ILDC) owned parcels contiguous to the subject site. Erie County will continue to work collaboratively with current stakeholders as well as NYSDEC and Tecumseh to expand redevelopment within the Bethlehem Site.

The County's commitment to the redevelopment of sections of the former Bethlehem Steel site currently, and soon to be, in ILDC ownership is setting the stage for the redevelopment of other areas in Tecumseh ownership for economic development. The County desires that the parcels subject to the proposed remedy be made development ready to reduce the costs of future redevelopment, increase the likelihood the sites will be redeveloped and accelerate the site's productive re-use creating jobs and advancing regional economic development. Towards this end, Erie County appreciates NYSDEC's willingness to allow for consolidation of non-hazardous materials in an approved on-site Corrective Action Management Unit (CAMU) as this will facilitate the remediation and ultimate return of the site to productive reuse.

For over 100 years, City of Lackawanna residents lacked public access to their waterfront. The inclusion of both the proposed Shoreline Trail extension through the Tecumseh property and the proposed open space area at the delta of the Smokes Creek within the proposed remedy is supported by the County and consistent with multiple public planning efforts which have long called for public access to the City of Lackawanna waterfront.

To date, Erie County has had positive discussions with Tecumseh regarding the extension of the Shoreline Trail from Dona Street to Woodlawn Beach State Park, traversing Tecumseh property. Going forward, Erie County is committed to working with Tecumseh and NYSDEC on resolving key issues, responsibilities, and liability so that the vision of connecting the Shoreline Trail to the Lake Erie waterfront in the City of Lackawanna can become a reality. Coming to Agreement with Tecumseh and NYSDEC on acceptable operations, management, safety, and security responsibilities for these public recreational areas will be critical.

Erie County also is supportive of the proposed ecological and habitat restoration along Smokes Creek.

Implementation of the proposed site remedy as described in the SB would be a positive

step towards advancing the remediation of the site to address human health, restore the environment and promote economic and community development. The redevelopment will reconnect the community with its waterfront through new public access areas and create a site which is ready for private investment. Erie County is committed to continuing to work with the NYSDEC, Tecumseh, and City of Lackawanna on resolving key issues in the implementation of public access to the community's waterfront.

**RESPONSE 1:** Acknowledged. The Department appreciates the support and looks forward to working with stakeholders on this important remedial project.

**COMMENT 2:** The Buffalo and Erie County Industrial Land Development Corporation (ILDC) is redeveloping approx. 150 acres of the former Bethlehem Steel site and is in the process of purchasing an additional 90 acres of the site. As part of that effort the ILDC developed a masterplan and issued a GEIS for the site which outlines the redevelopment of business parks 1 and 2 as defined by the NYS Brownfield Cleanup Program. The plan outlines the road, utility corridors and parcel layout for the development of an Advanced Manufacturing Park on the former Bethlehem Steel site. In addition, the plan includes identifying corridors and constructing extensions to the Shoreline Trail to provide recreational opportunities for residents of the region within the proposed park.

As owner of a contiguous site the ILDC has reviewed and supports the remediation plan as outlined in the Draft Statements of Basis. The plan complements and supports the ILDC's efforts to create shovel ready sites for redevelopment and provides access and amenities to the public. With our partners the ILDC has and will be investing millions of dollars to construct the infrastructure necessary for redevelopment of the site which has laid dormant for decades. Key to that effort is the continued remediation of the overall site to set the stage for public and private investment.

The proposed Corrective Action Management Unit (CAMU) is a positive step towards ensuring a safe and economic method of cleaning up the site. The ILDC supports this effort and encourages Tecumseh and NYSEDC to continue to work together to remediate the site. It is imperative that the cleanup is completed through this plan and those burdens are not passed on to future owners, which would severely limit the redevelopment potential of the site. The utilization of the CAMU represents a significant cleanup cost savings, which as outlined in the plan will allow for the site to be remediated and be "development ready".

Throughout the ILDC's master planning process for the Advanced Manufacturing Park the issue of access to the Lake Erie shoreline and the Smokes Creek corridor were prominent comments received from the public and key stakeholders. Working with our

partners, the ILDC and Erie County completed a section of the Shoreline Trail along the eastern border of the property and is working on plans to extend the trail to Woodlawn Beach State Park.

The greenspace area proposed in the plan for the mouth of Smokes Creek and the Smokes Creek corridor aligns and compliments the current plans for the routing and extension of the Shoreline

Trail. The ILDC strongly supports this effort and has been working collaboratively with both Tecumseh Redevelopment and NYSDEC officials to advance public access opportunities on the site. The inclusion of public access opportunities in the plan represents a unique opportunity to reconnect the City of Lackawanna and its residents to the waterfront which they have not had in over 100 years.

Implementation of the proposed remediation plan would be positive step in the redevelopment and future of the former Bethlehem Steel site. The ILDC looks forward to working with all parties in implementing this plan and restoring the site to productive use.

**RESPONSE 2:** Acknowledged. The Department appreciates the support and looks forward to working with stakeholders on this important remedial project.

**COMMENT 3:** The City of Lackawanna Department of Development submitted: We appreciate that the State's Corrective Measures Remedial Action Plan, presented to the public for comment on May 18th, 2021, now substantially addresses our concerns, previously raised as Objections to the earlier Preferred Remedial Alternative submitted by the site owner in 2015.

A safe remediation of the whole of the site, within a reasonable time frame, with sufficient financial security in place, and then its return to productive re-use, remains of critical importance to the City of Lackawanna. This is because the former Bethlehem Site both occupies the City's waterfront (which was substantially altered to serve the former industry), and the land mass of the former Bethlehem Site comprises approximately 1/3 of the City's land mass. The combined loss of productive use of the lands around which the City's infrastructure was built, for over 40 years, has had a severe impact on the local community's ability to rebuild itself.

We had originally objected to the substantial solid waste management containment unit south of the mouth of Smoke's Creek, however the current plan, when implemented in accordance with the Order on Consent executed on September 24th, 2020 does hold the potential to create a regional amenity as mitigation to the imposition of the containment cell. We appreciate the Consent Order does include a public private

partnership to provide shoreline access to the community, and the current Site ownership team has provided a very substantial base plan for shoreline trails, and a passive park along an area of the waterfront, and that they have also been facilitating the creation, and extension of the Shoreline Trail. The site's recreational amenities for the enjoyment of nature, add value to the remainder of the site, and greatly benefits the surrounding community.

Our primary remaining areas of concern are that the complete remediation of areas where there are buried sources of contamination be completed while the CAMU is open. To ensure this will be looking to see that the final Remedial Action Plan have an objective enforceable time frame for completion, with adequate security to prevent the public benefits of the CAMU being allowed. from becoming illusory.

We do greatly appreciate the recent efforts of all to respond to the public's concerns, by providing a plan that helps a community to recover from the extreme blight and hardship created by the collapse of the industry their land, and population, had been dedicated to supporting.

Thank you for your efforts, and to the current Tecumseh team, and their parent company, which has provided substantial improvements to earlier plans, as a base for a more complete remedial alternative plan. We look forward to working with all to facilitate completion of the plan.

**RESPONSE 3:** Acknowledged. The Department appreciates the support and looks forward to working with stakeholders on this important remedial project.

## **TECUMSEH COMMENTS ON NYSDEC PROPOSED STATEMENT OF BASIS CORRECTIVE MEASURES SELECTION**

**COMMENT 4:** The following comments are being provided to the New York State Department of Environmental Conservation (NYSDEC or Department) on the proposed Statements of Basis (PSBs) issued by the Department on May 5, 2021 related to proposed selection of corrective measures on and adjacent to a 489-acre portion of the former Bethlehem Steel site (the Site). The following comments are offered on behalf of Tecumseh Redevelopment Inc. (Tecumseh), the current owner of the Site and Respondent in the Order on Consent and Administrative Settlement with the Department effective September 24, 2020 (the Remedy Implementation Order, or the Order) that provides the framework for Tecumseh's continued cleanup of the former Bethlehem Steel Corporation (BSC or Bethlehem Steel) Site under the New York State Inactive Hazardous Waste Disposal Site Remedial Program (the State Superfund Program) and

the New York State Hazardous Waste Management Program (the RCRA Program).

The following comments were prepared by Tecumseh with its technical consultants, Benchmark Civil/Environmental Engineers & Geologists, PLLC and TurnKey Environmental Restoration, LLC (Benchmark-TurnKey) consistent with the Remedy Implementation Order and with NYSDEC-issued Fact Sheets and invitations for public comment. Benchmark-TurnKey, headquartered in Lackawanna, performed all the environmental investigations; designed and implemented all interim and final remedial measures; and operated and monitored all remedial systems on the Site since 2003 when Tecumseh purchased the Site and certain surrounding property from Bethlehem Steel through a bankruptcy court proceeding. As such, Tecumseh and its team individually have nearly two decades of site-specific knowledge and experience regarding: the nature and extent of historic and current contamination; geology and hydrogeology; the applicable regulatory requirements; Tecumseh's legal obligations as an innocent land owner; status and performance of remedial actions and systems on the property; as well as other nearby environmental conditions in Western New York and on adjacent lands currently and formerly owned by Tecumseh and cleaned up or being cleaned up under the Department's Brownfield Cleanup Program (BCP). Tecumseh and the technical team prepared the Corrective Measures Study (CMS) Report and Comprehensive Groundwater Quality Studies accepted by the Department as final in August 2019 "as the foundation for developing remedies for operable unit areas".

#### Summary of Tecumseh's Remedial Accomplishments to Date

We note that neither the PSBs nor the Department's public presentation on May 18, 2021 include discussion of the substantial progress by Tecumseh to date to investigate and thoroughly characterize the nature and extent of contamination on the Site; design and implement five interim corrective measures (ICMs), an expedited final corrective measure for the Acid Tar Pits (ATP) Solid Waste Management Unit (SWMU) group, three final corrective measures for Operable Units (OUs)-02, -03, and -04 that collectively addressed 18 SWMUs, Areas of Concern (AOCs), and water bodies; continue to operate, maintain, and monitor those remedies; remove wastes and transformers, abate asbestos, and demolish structures on the Site; voluntarily enroll approximately 437 acres of Tecumseh property adjacent to the Site in the New York BCP and then complete the investigation, cleanup, sale/lease, and redevelopment, by other private entities, of commercial wind and solar electric generation and manufacturing facilities on approximately 195 acres.

The PSBs do not mention the significant remedial progress achieved on Site by Tecumseh in improving water quality in Smokes Creek by dredging the most contaminated sediment from the lower reach of Smokes Creek and eliminating the



source of contamination to the Creek from the ATP SWMU Group; substantially improving groundwater quality in OU-04, OU-05, OU-06, and OU-07 through waste removal, stabilization, and consolidation and through implementation of extensive groundwater pump and treat systems.

In summary, Tecumseh has spent the last 18 years and many millions of dollars on the investigation and remediation of contamination at this Site and on adjacent Tecumseh property – contamination that it did not cause.

**RESPONSE 4:** Noted as Tecumseh’s opinion.

**COMMENT 5:** Overview of Tecumseh’s Technical Comments

*Summary of Tecumseh’s position regarding the Department’s proposed remedies.* Most of the SWMU-specific Department-proposed remedies are generally consistent with the recommended corrective measures in the Final CMS Report, which we concur with and will implement. This is particularly true for OUs-05, -06, -07, and -08, with only a few associated remedial elements addressed herein. Most of the comments herein apply to the site-wide remedial measures presented in OU-1 and water course remedies in OU-9 that are not consistent with and are unnecessary additions to the recommended corrective measures presented in the Final CMS Report, which was developed for both protection of public health and the environment. These Department-proposed additional remedies are the focus of our comments, and in Tecumseh’s view the Department’s additional proposed remedies fall into the categories that (i) are not necessarily the legal responsibility of Tecumseh to implement; (ii) do not adequately consider Site-specific conditions, current, and/or reasonably anticipated future uses; (iii) are unnecessary for the protection of public health or the environment; (iv) have not been appropriately evaluated against reasonable alternatives including the no further action alternative; (v) do not have detailed cost estimates for implementation, maintenance, and for financial assurance purposes; and/or (vi) have not been appropriately evaluated against selection criteria in accordance with the Department’s own regulations (at 6NYCRR section 375-1.8(f)) and policy (Chapter 4, Remedy Selection, in DER-10/Technical Guidance for Site Investigation and Remediation).

Specifically, with respect to the last point, the additional remedies that the Department is proposing beyond the remedies recommended in the CMS Report generally:

- Are unnecessary for protection of public health and the environment (see section 375-1.8(f), factor 1 -- one of the two threshold factors and the most important of the nine factors);

- Are unnecessary to achieve conformance with applicable standards, criteria, and guidance (see section 375-1.8(f), factor 2 -- the other threshold factor);
- Are functionally equivalent with respect to two of the seven balancing factors in section 375-1.8(f) as compared to Tecumseh's proposed remedies, with no substantial reduction of long-term effectiveness (balancing factor 3) or toxicity, mobility or volume (balancing factor 4);
- May have greater short-term impacts (balancing factor 5), be more difficult to implement (balancing factor 6), and are less consistent with current and reasonably anticipated future land uses (balancing factor 8); and
- Are significantly more costly and are therefore less cost-effective than Tecumseh's proposed remedies (see section 375-1.8(f), balancing factor 7).

Given that the Department's additional proposed remedies are unnecessary to meet threshold criteria; are generally no better than and in some cases are worse than the CMS recommended remedies considering several balancing factors; are more difficult to implement; and are significantly less cost-effective than the CMS-recommended remedies, choosing them appears to be a flawed and unbalanced remedy selection process that deviates from the Department's regulations and policy.

#### Summary of Tecumseh's Position Regarding the Department's Over-Generalization and Mischaracterization of Sampling Data and the Nature/Extent of Contamination

In Tecumseh's view, the Department has oversimplified the nature and extent of contamination on the Site with "broad brush" statements that erroneously create the impression that widespread contamination exists across the entire Site with the same contaminants present at high concentrations in all environmental media (soil, waste, slag, sediment, surface water, and groundwater). However, the CMS data shows much more scattered, localized contamination specific to defined SWMUs and in different environmental media in different OUs and SWMUs. The Department's presentation skews the data to the highest readings out of many thousands of analyses by giving equal weight to RFI data collected over three decades ago instead of relying on the more recent CMS data that much more accurately reflects current or near current environmental conditions, which have significantly improved across most of the Site due to remedial measures and natural attenuation. The Department's presentation of the data regarding the nature and extent of contamination thus creates an exaggerated perception of the potential threat that the Site may pose to public health and the environment. As examples: nine DEC-listed chlorinated volatile organic compounds (VOCs) are only present above groundwater quality standards in a handful of wells

related to two or three SWMUs; and polychlorinated biphenyls (PCBs) are present only in a couple of isolated soil samples proximate to a few former PCB transformers and are generally not present in surface water, groundwater, sediment on the Site. We chose not to provide more extensive comments on this subject except where directly related to Department-proposed remedial elements that we view as unnecessary.

**RESPONSE 5:** These concerns are addressed in responses below where they relate to specific Department-proposed remedial elements.

**COMMENT 6:** Organization of Tecumseh’s Technical Comments

The organization of our comments is by Operable Unit as grouped in the three PSBs or Proposed Remedial Action Plans (PRAPs), then by SWMUs, water course, and/or remedial elements as presented in the PSBs.

**RESPONSE 6:** Noted.

**COMMENT 7:** Summary of the Legal Background and Tecumseh’s Position Regarding Liability for Off-Site Contamination

At the outset, it is important to note that Tecumseh is an innocent landowner that (i) never operated the Site, (ii) never released or disposed wastes onto the Site or into or onto adjacent areas, and (iii) acquired the Site from BSC via bankruptcy proceedings that provided Tecumseh with certain liability protections with respect to off-site contamination. Accordingly, we are providing the following high-level legal summary to support Tecumseh’s position that it does not have liability for off-site contamination, including the contamination in the off-site Gateway Metroport Canal (Canal) and the off-site portion of SWMU S-26.

These issues are discussed in detail in Exhibit A, Legal Background and Tecumseh’s Position Regarding Liability for Off-Site Contamination.

- As an initial matter, the Remedy Implementation Order does not independently establish the extent of Tecumseh’s liability, if any, for off-site contamination. Rather, the Order provides the framework for the conduct of Tecumseh’s cleanup obligations under the State Superfund Program and the RCRA Program with respect to the Site and off-site areas only if and to the extent Tecumseh has legal liability.
- With respect to any off-site contamination that occurred before Tecumseh acquired the Site in 2003, the Asset Purchase Agreement (APA) with Bethlehem Steel and the Bankruptcy Court order approving same clearly establish that

Tecumseh does not have liability. Directly on-point case law involving a nearly identical fact pattern and the very same APA, Bankruptcy Court order, and bankruptcy principles supports this position.

- With respect to any off-site contamination that occurred after Tecumseh acquired the Site in 2003, the Department has not established any basis for Tecumseh's legal responsibility under the State Superfund Program or the RCRA Program. Furthermore, the Department would also need to satisfy basic due process and procedural requirements under those cleanup programs to properly establish that Tecumseh has legal liability for any such off-site contamination.

**RESPONSE 7:** The proposed Statements of Basis are remedy selections for the site based on investigation findings and, based on those findings, how the threats posed can be best addressed. Any potential liability for implementation is a question that would be addressed outside of the NYSDEC's selection of remedies for the site. Accordingly, Tecumseh's Summary of the Legal Background and Tecumseh's Position Regarding Liability for Off-Site Contamination discussed above and in Exhibit A have not been responded to in this Responsiveness Summary.

### **DEPARTMENT-PROPOSED OU-1 (SITE-WIDE), OU-9 (WATER BODIES), AND OU-10 (GROUNDWATER) REMEDIES**

#### **COMMENT 8: Gateway Metroport Canal Sediment Contamination and Proposed Dredging Remedy**

The Gateway Metroport Canal (Canal) was constructed by the Lackawanna Iron and Steel Company between 1901 and 1903; operated by BSC from 1922 to 1985; and sold to Gateway Trade Center, Inc. (Gateway) and operated thereafter as the Gateway Metroport Canal and the Port of Buffalo since 1985. As discussed in detail below and in Exhibit A:

- Tecumseh never owned or operated the Canal or land surrounding it (and therefore the Canal is off-site).
- The contaminants in the sediment did not migrate to the Canal from Tecumseh property during its ownership.

Thus, Tecumseh's position is that it does not have liability for further investigation or dredging of sediment in the Canal.

With respect to the specific environmental conditions that are apparently the basis for

the Department's proposed dredging remedy, the maximum concentrations of contaminants in Canal sediment cited by the Department as exceeding Class C sediment guidance values (SGVs) were lead, silver, mercury, and total polycyclic aromatic hydrocarbons (PAHs). These contaminants are not even defined as "contaminants of interest" in groundwater on the Tecumseh property nearest to the Canal in the Coke Plant and Coke Plant By-Product Area as they are generally not present at elevated concentrations relative to groundwater quality standards nor mobile in the groundwater. Therefore, the groundwater data does not support the conclusion that migration via groundwater from Tecumseh property into the Canal is the source of the metal and PAH contaminants in the sediment.

Furthermore, the conditions at the Site do not support the conclusion that these metals and PAH contaminants were discharged to the Canal via surface water transport from Tecumseh property, as there are no point source storm water discharges and no direct storm water runoff to the Canal from the Tecumseh property west and south of the Canal. The much more likely storm water transport mechanism for these contaminants is runoff from the paved docks of the Gateway Metroport on the east side of the Canal where massive quantities of coal, coke, and petroleum coke have for decades and continue to be stored and handled.

A possible on-going source of the PAHs is from the diesel-powered lake freighters that frequent the Port as well as the many diesel-powered heavy machinery (e.g., cranes, wheel loaders, dozers, forklifts, and trucks) that are operated and fueled on the Port docks by Gateway and its contractors and tenants.

Historical atmospheric transport and deposition of particulate emissions from the coke ovens is another possible source of the PAH and possibly mercury impacts in the Canal, because of prior operation of the coke plant from the early 1900s until 2001. More recently, wind-blown atmospheric transport and deposition of fine coke and coal particulates from handling and open storage of massive amounts of these commodities on the docks of Gateway Metroport are also a more likely potential source of these sediment contaminants. None of these Canal sediment impacts are Tecumseh's responsibility.

**RESPONSE 8:** See Response 7 with regards to liability concerns. The Department disagrees with the second bullet "The contaminants in the sediment did not migrate to the Canal from the Tecumseh property during its ownership.". While it is acknowledged that other potential sources may exist in the Ship Canal, as Tecumseh stated in its August 2019 OM&M workplan for the OU-4 groundwater, "The primary performance objective for the groundwater corrective measure is to mitigate potential off-site groundwater contaminant migration from the Coke Plant By-Product Sub-Area toward

the adjacent Gateway Metroport Ship Canal.” As reported in the January 2019 sampling report, several monitoring wells within the area discharging to the Ship Canal exhibited exceedances of groundwater quality standards for PAHs. Additionally, the 2004 Final RCRA Facility Investigation Report (RFI) reported groundwater exceedances of multiple PAH compounds by one or two orders of magnitude.

Additionally, as referenced in the 2004 RFI report, on the northern end of the Ship Canal, within Tecumseh’s property, there is an old channel associated with a SPDES discharge area. This discharge area potentially acts as a migratory pathway for contamination and needs to be further investigated during the pre-design investigation (PDI). Soil contamination, outside of the RCRA interim correction measures areas, has not been fully delineated and therefore cannot be eliminated as a potential migratory pathway for contamination found in the ship canal.

**COMMENT 9A: Smokes Creek Sediment Dredging and Waterbody Construction**

The Department has not established — and the available data and facts do not support the conclusion — that further dredging of Smokes Creek is required to protect public health or the environment. The Department should therefore re-evaluate its position regarding the necessity of the proposed dredging and provide Tecumseh and the public with all relevant data regarding sediment sampling in Smokes Creek.

For example, the PRAP should describe the 2015 dredging performed by NYSDEC of the Upper Reach and provide post-dredging sampling data as the Department required of Tecumseh to do following ICM dredging of the Lower Reach in 2009. Moreover, it is reasonable to expect that there has been significant sediment deposition in both the Upper and Lower Reaches of the Creek, since last dredged in 2015 and 2009, respectively. Characterization of this recently deposited sediment is necessary prior to determining if further environmental dredging is necessary, and if so, to what extent. In addition, if dredging is warranted, the estimated quantities of dredged spoils to be removed will need to be established before reasonable, detailed remedial cost estimates can be developed to serve as the basis for any required financial assurance.

Furthermore, per NYSDEC’s 2014 sediment screening guidance, performance of toxicity testing and benthic community analysis is required to assess whether the sediments are in fact toxic and require dredging.

As noted above, the Department should provide Tecumseh and the public with all relevant data regarding sediment sampling in Smokes Creek. Another example of this omission is on page 37 of the PSB, which states *“Only the most recent data is included in this section, as sediment samples from Smokes Creek that were collected in June*

2020 by USGS have not yet been analyzed and are therefore not included in this PRAP.” This data should be available and provided.

**COMMENT 9B:** Smokes Creek Sediment Dredging and Waterbody Construction

With respect to non-remedial streambank enhancements in the Smokes Creek riparian zone discussed in the PSB, the Department should note that Tecumseh’s obligation under the Remedy Implementation Order is limited to evaluating the feasibility, location(s) of and designs for such structural, environmental, and ecological enhancements (see Remedy Implementation Order at Section 13). Tecumseh will cooperate with the Department and other public entities with respect to evaluating and planning for such enhancements, but Tecumseh does not have an obligation to implement or fund the enhancements as proposed by the Department. Consistent with its commitment to work collaboratively with public entities with respect to the evaluation of non-remedial improvements and public access, Tecumseh has reached out to Erie County to garner input and insight from the County regarding its views on these matters.

In addition, the PSB states (see Section 7, Item 8 on page 26) “*Following dredging, Smokes Creek will be designed to improve hydraulic flow, reduce flooding*”. Tecumseh is not aware that the need for such hydraulic improvements has been established and Tecumseh has not seen any data supporting that conclusion. Regardless, such floodway improvements should not be the subject of this PSB and are not necessarily Tecumseh’s responsibility to implement. If hydraulic floodway improvements are necessary, they should be designed prior to dredging, not after. Furthermore, the nature and extent of these proposed floodway improvements must be clearly delineated to define the quantities and nature of sediment to be removed as these factors will significantly impact the cost of the work.

**RESPONSE 9A:** The Department disagrees with the statement, “The Department has not established -- and the available data and facts do not support the conclusion – that further dredging of Smokes Creek is required to protect public health or the environment. The Department should therefore re-evaluate its position regarding the necessity of the proposed dredging”. Based upon the NYS Sediment Screening Guidance, “Screening refers to the action of comparing the concentration of contaminants in a sample to a set of numeric screening values, known as Sediment Guidance Values (SGVs). The SGVs identify thresholds for various contaminant concentrations in sediments that can be used as a basic screening tool to identify potential risk to aquatic life. Given no information other than the concentration of a contaminant in sediment, these values allow for a reasonable assessment of the potential for the contaminants to be harmful to aquatic life.” Knowing the concentration of a contaminant in sediment allows a reasonable assessment to be made about the potential for the contaminant(s) to be harmful to

aquatic life. Since no toxicity testing has been conducted within Smokes Creek, the data provided to the department through various sampling events suffices as evidence to support the remedy proposed in the statement of basis. The Department agrees that additional data, including toxicity testing, must be collected during a PDI. Prior to the testing, a work plan must be submitted and approved by the Department, including the Division of Fish and Wildlife.

The decision to include only the most recent data collected in the Statement of Basis (e.g., post-2009 in the Lower Reach and post-2007 in the Upper Reach) versus including all historical data for Smokes Creek was to allow for ease of review for the public and because much of the sediment sampled during earlier sampling events may have been removed from Smokes Creek during ongoing maintenance dredging. The data that has been collected over the years is located on the DECinfo locator page (<https://www.dec.ny.gov/data/DecDocs/915009/>). The USGS data, that was collected June in 2020, is currently undergoing data validation and will be posted on the DECinfo locator webpage by Spring 2022.

**RESPONSE 9B:** As part of the remedial design, a climate vulnerability assessment must be conducted. Additionally, Tecumseh must assess the hydraulic capacity of Smokes Creek and its ability to protect the remedy in the future. Based upon past sediment build up events, it is likely that hydraulic dredging will need to be implemented regularly to protect the remedy implemented (e.g., protect the CAMU area, erosion control and ensure that any contaminated sediments left behind do not migrate). Additionally, as stated in the Statement of Basis, Smokes Creek has been historically dredged periodically for hydraulic purposes, this includes but is not limited to preventing flooding in upstream areas and to remove sediment build up at the mouth of the Creek. The last dredging event was completed by Tecumseh in the Winter of 2021. Given the cost and effort associated with long-term maintenance dredging of Smokes Creek to maintain hydraulic capacity, it is appropriate to incorporate a long-term solution for hydraulic capacity as part of this remediation. The Department notes that “non-remedial/streambank enhancements in the Smokes Creek riparian zone will be implemented and funded by others with the cooperation of Tecumseh to evaluate and plan for such enhancements.”

**COMMENT 10: Cover System**

The CMS Report recommended approach for the cover system, specifically its geographic scope and the timing of implementation, satisfies the two threshold selection criteria in 375-1.8(f): it is protective of public health and the environment, and it satisfies the applicable standards, criteria, and guidance. As compared to the Department’s proposed cover system -- which includes unnecessarily broad geographic coverage and



timing elements that make it impractical and wasteful – the CMS Report recommended approach is as good or better with respect to the balancing selection criteria in 375-1.8(f). Most notably, the CMS Report approach is more easily implementable, more practical, and much more cost-effective.

We note that the DEC’s characterization of Site soils (see pg. 18 of the PSB), which serves as the basis for the Department’s proposed remedy, is overly simplistic, positively biased, and does not align with the actual comprehensive data as presented in the CMS Report. The Department uses only the maximum concentrations of waste/fill sampled within the boundaries of discrete SWMUs apparently to justify covering the entire 489-acre Site with 12 inches of “clean” off-site soil. This is a significant mischaracterization, since the surface area of the SWMUs in OUs-06, -07, and -08 represents only about 5-10 % of the land area. Very few, if any, surface soil samples were collected from the much larger areas outside the SWMUs in these OUs.

As most of the SWMUs will either be excavated and consolidated into the CAMU, disposed off-site, or covered in place following implementation of those proposed remedies, there will be extremely limited potential exposures on the site to the contaminated waste/fill. The surface soil/slag remaining after implementation of the proposed SWMU remedies and following completion of slag reclamation to final grades should then be sampled and tested to determine what, if any, soil cover may be needed in each portion of each OU at that time. An exception is OU-05 that will receive a minimum of 12 inches of soil cover consistent with paragraph 6 on page 25 of the PSB. Soil cover on the remainder of the Site, if and where required, should be consistent with reasonable and appropriate planned use (primarily heavy industrial and multi-modal in OUs-06, -07, and -08), based on surface soil/slag sampling and analyses performed after remediation, slag reclamation, and final site grading is completed, and placed during redevelopment of portions of the Site around buildings, pavement, and other hardscape for appropriate storm water management.

It is further proposed that 12 inches of processed Beneficial Use Determination (BUD)-approved slag reclaimed from the Site, like that used and approved by the Department on over 100-acres of the adjacent BCP portion of the Tecumseh property, be considered as an alternative to soil for final cover.

**RESPONSE 10:** The proposed Statements of Basis do not require placement of a cover over the entire 489-acre site; rather, only areas that exhibit exceedances of the commercial or industrial soil cleanup objectives in surface soils will be required to receive a cover. The remedies include a PDI, which will include, but is not limited to, additional soil sampling to determine the extent of areas where the upper one foot of exposed surface soil exceeds commercial or industrial soil cleanup objectives. Sampling results

will determine where a site cover is needed to allow for commercial or industrial use of the site. Workplan(s) for the PDI and cover system construction, including an appropriate schedule, shall be submitted to, and approved by the Department prior to investigation and/or installation. The status of future slag reclamation activities at the Tecumseh site is currently under Department review and will be addressed in the review and approval of the remedial workplan(s).

**COMMENT 11: Soil Cleanup Objectives**

The Department fails to consider the use of an appropriate, already-approved Site-specific action level (SSAL) for arsenic, which should form the as is for decisions about the need for placement of soil cover. According to the PRAP, *“the Department cannot accept Tecumseh’s site-specific proposed SCO for arsenic (118 ppm) since it substantially underestimates potential arsenic human health risks and is therefore not appropriate for use in making risk management and remedial decisions. However, the Department considers the arsenic risk assessments performed by NYSDOH in conjunction with the NYS Soil Cleanup Objectives (16 ppm for commercial use) to be appropriately site-specific in terms of addressing arsenic exposures in the Lackawanna community and appropriately conservative with regard to the assumptions used to characterize those exposures. The proposed remedy is based on SCOs included in 6NYCRR Part 375-6 which are supported by the NYSDOH SCO risk assessments and the use of a background-based arsenic remedial goal.”* Appendix D of the PRAP presents arsenic remedial goals in other states, indicating that soil cleanup levels are state-specific with most based upon background concentrations, to provide justification for its industrial soil cleanup objective (SCO) of 16 ppm. We disagree with the Department’s position on this point for the following reasons.

- From the October 2006 Assessment of Public Comment on the Draft 6 NYCRR Part 375 Environmental Remediation Programs:

**PART A: COMMENTS ON PART 375 GENERALLY**

COMMENT: A comment noted site background levels in heavily urban or industrialized areas may exceed the SCO cleanup levels in the tables requiring owners of “contaminated” sites to reduce exposures to surface soils simply because the levels have been determined by investigation while allowing owners of non-brownfield sites, where background levels likely exceed the SCO, to pursue their projects without investigation or remediation. The Department should allow site owners to develop site specific cleanup standards based on site background levels provided the owner can demonstrate that the higher levels truly represent background conditions.

RESPONSE: The proposed rule provides for the consideration of site background in each of the three remedial programs subject to these regulations. The use of background is set forth for the State Superfund Program (SSF), Brownfield Cleanup Program (BCP), and the Environmental Restoration Program (ERP) and is completely consistent with past practice. Site background levels will be determined through the application of Department guidance. The Department does not consider soils exhibiting levels less than background to be contaminated from activities at the site. The remedial program normally does not set cleanup levels below anthropogenic background concentrations. This is consistent with the United States Environmental Protection Agency's (USEPA) approach to cleanups and background.

- The SSAL for arsenic of 118 parts per million (ppm) has already been approved by NYSDEC for hundreds of acres of adjacent land in the BCP. In 2012, the Department approved the arsenic SSAL of 118 ppm for the Tecumseh Phase II BCP Site and that SSAL has since been used to drive “hotspot” removal of soil/slag/fill on all 35 Tecumseh BCP Sites on over 400 acres adjacent to the Site. Most recently, this SSAL was used for the Phase IA Business Park remediation in preparation for construction of the sugar refinery. The approved remedy on all Tecumseh Business Park BCP Sites was arsenic hotspot removal (>118 ppm) with deferred cover system placement during redevelopment. The NYSDEC Protection of Groundwater SCO for arsenic of 16 ppm may be an appropriate soil/fill SCO where soluble arsenic concentration in nearby groundwater is above the NYSDEC Class GA Groundwater Quality Standard (GWQS) of 25 ug/L; however, this is not the case on the CMS Area.
- As presented in Appendix P of the May 2019 CMS Report, arsenic is ubiquitous, with urban background soils in New York State frequently containing concentrations above the industrial SCO of 16 ppm, particularly at active and former industrial properties characterized by historic slag/fill deposition and coal burning. Accordingly, comparison of the arsenic data to site-specific background or average concentrations is considered appropriate for this Site.
- To determine the Site background concentration, all surface (0-2 fbg) soil/fill arsenic data for the Phase II Business Park Area was tabulated and the 95% upper confidence limit (95% UCL) on the mean was calculated. Based on this analysis and further discussions with the NYSDEC, a site-specific SCO of 118 ppm (twice the 95% UCL) was established as the screening criteria for hotspot identification.
- Referencing Comment #60 in the Department's January 19, 2012 comment letter

on the May 2011 Remedial Investigation/Alternatives Analysis (RI/AA) Report prepared for the Tecumseh Phase II Business Park Site, *“Elevated arsenic concentrations above the commercial SCOs are ubiquitous at the Tecumseh Phase II Business Park. The mean arsenic is 41.9 ppm and 95% Upper Confidence Level (UCL) above the mean is 59.1 ppm. Arsenic only exceeds 100 ppm in eight of 65 total samples. Twice the 95% UCL is 118.2 ppm. Since only six samples exceed twice the 95% UCL, 5 times the 95% UCL is not appropriate for use as hotspot identification or an action level. Rather, decisions as to hotspot delineation or actionable source removal area are more appropriately twice the 95% UCL or 118.2 ppm. This number is consistent with NYSDEC’s stance on hotspot delineation and potential removal in Tecumseh Phase I, the Railroad Relocation IRM and, most recently, the Tecumseh Phase III Business Park RI/AAR comments. Instances where this value is exceeded must be delineated and addressed accordingly.”*

- Tecumseh agrees that elevated arsenic is ubiquitous across the Site and has proposed to use an SSAL of 118 ppm as the criteria for identifying arsenic hotspot areas in the CMS Area, consistent with the Department-approved site-specific criteria used on the adjacent Business Park BCP parcels. None of the soil/fill samples collected on the CMS Site and analyzed for arsenic have exceeded this concentration of 118 ppm. However, if future sampling for arsenic in surface slag fill exceeds this proposed hotspot concentration, the slag/fill will be excavated and disposed in the SW-CAMU, when operational, or off-site at a permitted RCRA Subtitle D sanitary landfill.
- The primary pathway of potential exposure to inorganic arsenic at the former Bethlehem Steel site is inhalation of suspended soil particles (called particulates). Part 375 allows for alteration of the arsenic SCO for this exposure pathway. Table 5.3.6-1(e) of the 2006 TSD states that the carcinogenic SCOs for inhalation of arsenic are 13,000 ppm for commercial and 27,000 ppm for industrial. The arsenic industrial SCO was obtained by combining all potential exposure pathways (i.e., ingestion, dermal, and inhalation). It is understood that allowing elevated arsenic levels to remain uncovered for extended periods of time may be problematic where fate and transport mechanisms suggest potential for migration; however, the CMS Area has established vegetation where slag reclamation is not active and is not accessible to the public thereby eliminating exposure potential.

**RESPONSE 11:** The Department has reevaluated the derivation of the 118 ppm arsenic SSAL and believes that it is no longer appropriate. In Appendix P of the May 2019 CMS Report submittal, Tecumseh presented arsenic concentration data for over 300 surficial (generally 0-2 feet below ground surface) soil/fill samples obtained during various

investigations that have been performed on portions of the Tecumseh Site. Although discussion of the statistical analysis of the data was removed (as compared to the 2014 CMS report submittal), the average concentration of these arsenic data was 29 ppm, with a standard deviation of 33.5. It should be noted that the mean concentration of this surficial soil/fill sample data may be biased high (i.e., not representative of background conditions) because the soil sampling was likely focused on areas of suspected contamination. The proposed 118 ppm arsenic SSAL is approximately 3 standard deviations above the mean, which is why Tecumseh even noted that “None of the soil/fill samples collected on the CMS Site and analyzed for arsenic have exceeded this concentration of 118 ppm” (Appendix P of the May 2019 CMS Report submittal). The 118 ppm SSAL is also over 7 times the Part 375 SCO of 16 ppm for arsenic, which raises significant concerns as to its protectiveness.

Part 375 SCOs for metals are based upon rural background levels, although site-specific background levels can be developed for approval through the application of Department guidance. However, the procedures used to derive the background levels for arsenic in the vicinity of the Tecumseh CMS site were not developed in accordance with Department guidance documents (i.e., CP-51). The vast majority of the Tecumseh property east of the Hamburg Turnpike (NYS Route 5) was built from steel-making wastes and was heavily impacted by almost 100 years of steel-making operations. The samples used to assess background arsenic concentrations were collected solely on the Tecumseh property from man-made slag/fill material—they serve to define the mean arsenic concentration in surficial wastes at the site. No investigation was done to collect samples from offsite native soils to establish local arsenic concentrations and to demonstrate that arsenic levels at the Tecumseh site are truly consistent with local background arsenic levels.

Department guidance permits re-calculating soil cleanup objectives (SCOs) included in regulation in consideration of certain site-specific parameters, subject to approval by the Department. The parameter values that may be altered using site-specific information are those used in the calculation of SCOs for inhalation and protection of groundwater, and for protection of ecological resources from bio accumulative contaminants. For the protection of public health SCOs for the inhalation pathway, several parameters used in the calculations of the particulate inhalation and volatile inhalation pathways can be modified using site-specific information; however, no site-specific data was collected or presented for these parameters to modify the arsenic SCO. Additionally, the proposed SSAL is not appropriate for evaluation of direct contact or ingestion pathways. The cover system will need to meet commercial/industrial SCOs (16 ppm) to be protective.

For the protection of ecological resources SCOs, SCO values based on food chain

bioaccumulation may be modified by substituting site-specific measurements of soil organic carbon; however, no site-specific soil organic carbon data was collected or presented to modify the arsenic SCO. For the protection of groundwater SCOs, site-specific information may be used to identify a site-specific value for the fraction of organic carbon ( $f_{oc}$ ) parameter used in the SCO calculation; once again, no site-specific fraction of organic carbon data was collected or presented to modify the arsenic SCOs. Arsenic has been detected in CMS area groundwater samples at concentrations above its NYSDEC Class GA Groundwater Quality Standard (GWQS) of 25 parts per billion (ppb); see Tables 4-31 through 4-36 in the May 2019 CMS Report submittal.

**COMMENT 12: Remedial Action Objectives**

Groundwater: Restoring groundwater to “pre-disposal/pre-release conditions” is not necessary to protect public health and the environment and is not possible to define or achieve due to the presence of massive quantities of dredged spoils deposited by the US Army Corps of Engineers beneath the Bethlehem Steel slag fill across much of the Site.

Surface Water: Restoring surface water in Smokes Creek to ambient water quality via remedial actions at the Site is not possible given the multiple point source wastewater and storm water discharges to the upper reach as well as multiple upstream point-source discharges and non-point sources of contaminants.

Sediment: Restoring sediment in Smokes Creek to “pre-release/background conditions” via remedial actions at the Site is not possible given the continuing releases of contaminants from multiple up-stream sources.

**RESPONSE 12:** The remedies in the Statement of Basis were selected based on their ability to satisfy the threshold criteria and provide the best balance of the balancing criterion (see Exhibit E). The statutory or regulatory remedial action goals, including restoration to pre-release conditions, for remedial actions undertaken pursuant to DER-10, Technical Guidance for Site Investigation and Remediation, are set forth in the applicable regulations identified in DER-10 Section 1.2 and apply to this site.

**COMMENT 13: NRWT & SRWT**

The North Return Water Trench (NRWT) and South Return Water Trench (SRWT) within the boundaries of the Tecumseh Phase IA BCP Site will be remediated pursuant to a separate Order on Consent. The following comments are for the remainder of the SRWT south of Times Square.

The SRWT does not have a specific NYSDEC waterbody classification as it is manmade;

however, surface water samples collected from the SRWT were compared against the NYS Class C Stream Standards protection for fish propagation in Fresh Waters, Ambient Water Quality Standards, and TOGS 1.1.1, which is inappropriate in Tecumseh's opinion. The standards at 6NYCRR Part 701 do not have an appropriate classification for a manmade storm water conveyance. If the Class C standard A(C) [aquatic(chronic)] is being referenced for cyanide then the mercury standard should also be Class C standard type A(C), which is 0.77 ppb. The maximum total mercury concentration of 0.7 ppb is below this standard; a dissolved mercury concentration would be lower. The maximum total cyanide concentration of 119 ppb cannot be compared to the free cyanide Class C standard of 22 ppb. Free cyanide is the form of cyanide that is bioavailable and known for its toxic effect on organisms. Surface water samples would need to be analyzed for free cyanide and dissolved mercury.

Per NYSDEC's 2014 sediment screening guidance, we propose to perform toxicity testing and benthic community analysis to assess whether the sediments are in fact toxic and require dredging. The site-specific TOC will be determined for use in revising the SGVs. Direct measurements of sediment impairment will be performed; specifically, toxicity testing and benthic community analyses. The "weight of evidence" approach will be used to interpret conflicting results; specifically, the Sediment Quality Triad decision matrix (Table 4 of the 2014 guidance), which will be used to determine what, if any, corrective actions are required in the SRWT. If and where sediment removal from the SRWT is determined necessary, we propose that the excavated sediment be dewatered and placed in the CAMU.

**RESPONSE 13:**

See Response 9 as it applies here since SRWT is a tributary of Smokes Creek.

The Department acknowledges that the portion of the NRWT that falls within the boundaries of the business park will be conducted under a separate consent order however as part of that remediation DEC requires a construction completion report detailing the actions taken.

**COMMENT 14: Groundwater Quality and Groundwater Monitoring**

In paragraph 11 (pg. 27) the Department proposes interim groundwater monitoring

*"across the entire site and possibly off-site.....to assess the effectiveness of the treatment systems and monitor groundwater conditions during pre-design investigations, remedial design, and implementation of the remedies."*

Such proposed interim groundwater monitoring is unnecessary to design and implement

the proposed remedies and is contrary to the Remedy Implementation Order which states (Section II. G.) “*the Department agrees that additional investigation, evaluation or corrective measures studies will only be required if the Department determines that there is inadequate information to design remedial alternatives for any SWMU, AOC, waterbody or OU.*” Multiple rounds of comprehensive Site-wide groundwater quality sampling and analysis as recently as 2020 have adequately established current or baseline groundwater quality to design and implement the proposed remedies. Other than the continuation of currently established annual monitoring for HWMU-1, HWMU-2, ATP, and OU-4, we propose no additional interim groundwater monitoring. Longterm post-remediation groundwater monitoring should begin upon completion of final remedies in OUs as further described in this section.

One of the RAOs for Groundwater is to “*Restore groundwater aquifer to pre-disposal/prerelease conditions to the extent practicable.*” The Department should explain and define how the impacts of US Army Corps of Engineers (USACE) dredge spoils are taken into consideration in the definition of pre-disposal/pre-release conditions. This is an important consideration because the Department expects operation of remedial systems to continue until RAOs have been achieved or the Department determines that continued operation is technically impracticable or not feasible.

As discussed in the 2019 CMS Report, historical documents indicate the USACE deposited massive volumes of contaminated dredge spoils in the near-shore open waters of Lake Erie off the former original Bethlehem Steel shoreline from circa 1900 to 1949 with the explicit authorization and approval by the State of New York. After the USACE’s dumping of dredged spoils, Bethlehem Steel filled near-shore areas of Lake Erie with massive volumes of slag that was deposited on the Lake bottom (on top of the USACE dredged spoils) to create virtually all the land that comprises the 489-acre Site. (Bethlehem Steel’s filling was also done with the explicit authorization and approval of the State of New York.) Thus, the USACE dredge spoils were intermingled with the native sand deposits beneath and adjacent to the slag/fill in the western portion of the CMS Area. The dredge spoils are contaminated with elevated levels of many of the same compounds of concerns detected in the SWMUs, including SVOCs, VOCs, and heavy metals. Due to the saturated condition of the dredge spoils, their proximity to Lake Erie, and the type and level of contamination, this material warrants special consideration as a source of groundwater contamination at the Site and as a potential source of surface water contamination off-site.

Most of the highest groundwater concentrations presented in the PRAP are within active pump and treat areas of known contamination; therefore, they do not reflect the remaining groundwater impacts to be addressed by this PRAP. Presenting a range and



average concentrations within areas not influenced by a collection and treatment system would more accurately represent the groundwater impacts to be addressed by the proposed remedy.

Total recoverable phenolics should be removed from Table 10 and the discussion in Exhibit A of the PSB. The Department stated in its February 7, 2019 letter commenting on the 2018 Annual Groundwater Quality Monitoring Report for HWMUs 1 and 2 that *The Department concurs with your assessment that the current TRP analytical method (EPA Method 9066 - colorimetric method) has limitations and is probably inappropriate for characterization of phenolic compounds in groundwater. DER-10 [paragraph 2.1(b)5] indicates that 'gas chromatography methods with a mass spectrometer detector system must be used for analysis of semi-volatile contaminants.'* Tecumseh and the Department agreed this is an inappropriate analytical method and groundwater samples are to be analyzed for phenolic compounds using EPA Method 8270.

Exhibit C of the PSB (see pages 53 and 54) states for Alternative 4 (Department proposed remedy) *"Groundwater will be monitored for site related contaminants to assess the effectiveness of the treatment systems. Sampling frequency will occur quarterly (for an estimated 90 wells....for the first 5 years then annually thereafter."* Monitoring at this scale and frequency is unnecessary and is not cost-effective, with an estimated 30-year analytical cost of approximately \$7.3 million (excluding labor costs for sampling and reporting). Instead, we propose annual monitoring to begin in each OU upon substantial completion of remedy implementation as it has clearly been established from post-remediation groundwater quality monitoring of OU-4 and the ATP-ECM that groundwater quality changes very slowly due to groundwater velocities of only several feet annually. Furthermore, as summarized in attached Table 1, we propose to use 38 wells to monitor critical downgradient perimeter locations annually and another 37 wells to monitor less critical interior or upgradient locations every five years. The CMS demonstrated that generally, groundwater quality in the shallow slag/fill horizon is not substantially different than in deeper slag/fill or sand horizons. Therefore, we propose to monitor only the uppermost saturated zone and eliminate the deeper wells at each monitoring location. Our proposed list of monitoring wells and OU-specific sampling parameters, as summarized in attached Table 1, contains all the parameters present in each monitoring location that are present above groundwater quality standards. Our proposed long-term monitoring plan as summarized in Table 1 is equally effective to monitor the long-term effectiveness of remedies; conserves labor, transportation fuel, laboratory capacity, paper, and other natural resources; and saves approximately \$6.4 million in unnecessary analytical costs as well as an additional undefined amount of sampling and reporting labor and expenses.

**RESPONSE 14:** The Department disagrees with Tecumseh’s statement that groundwater data to date has “adequately established current or baseline groundwater quality to design and implement the proposed remedies”. Data gaps have been identified by the Department that must be addressed through a Department approved groundwater monitoring plan to ensure an effective remedial design and protective remedy after system startup.

As previously noted in the Department’s Final Draft CMS Report comment letter, dated December 11, 2018, due to the uncertain, undocumented nature of the former Bethlehem Steel Corporation (BSC) dumping of industrial wastes into Lake Erie, attempting to sort and separate the impacts of BSC wastes from any perceived USACE dredge spoil impacts are: (1) impracticable without a considerable expenditure of time and money to characterize the deposits in the CMS area on a micro-scale and (2) unproductive as analytical data (CMS Table 4-2) for the dredge spoils do not substantiate that they have significantly elevated concentrations of BTEX or metals, or even SVOCs. These dredge spoil samples meet the “Site Specific Soil/Fill Cleanup Objectives” listed in the Soil Fill/Management Plan (CMS Appendix D) and would be permitted to remain on site without cleanup. Furthermore, the most contaminated dredge spoil sample results are orders of magnitude lower than the most contaminated slag/fill sample results (see CMS Appendix N and various CMS Section 4 tables), particularly for total PAHs. Thus, groundwater contaminants of concern more likely originated from the overlying slag/fill unit, upgradient source areas, or concentrated wastes disposed by BSC directly on top of the sand/USACE dredge spoils unit prior to the slag/fill disposal. Nevertheless, periodic evaluation of the remedial progress made at achieving RAOs will be made by the Department by reviewing and comparing site-wide dredge spoil (soil and groundwater) results to applicable standards. Dredge spoil impacts in groundwater will be closely monitored by wells located near the USACE dredge spoils.

The OU1, 9, and 10 SB addresses site-wide groundwater exceedances, which includes areas with active treatment systems. The current on-site treatment systems have been noted in the appropriate SB section(s). However, groundwater data (see Exhibit A and Figure 10-3) demonstrate that exceedances occur outside the treatment target areas that must be addressed by the proposed remedy.

The discussion and evaluation of contamination present in site-wide groundwater in Exhibit A and Table 10 of the OU1, 9, and 10 SB is based upon data presented in Tecumseh’s CMS Report, supplemented with data from the recent 2020 groundwater sampling event. EPA Method 9066 (colorimetric method) was utilized by Tecumseh and others in the past for analysis of Total Recoverable Phenolics in groundwater samples, and this data represents a valuable historical record for evaluation of the relative

concentrations of phenolic compounds in site-wide groundwater. The recently agreed upon change to EPA Method 8270 for analysis of phenolic compounds in groundwater does not negate evaluation of the available historical analytical data collected via a different analytical method.

The Department does not consider the proposed sample frequency for Alternative 4 unnecessary as data gaps have been identified. Not only has seasonal variation not been investigated, but a comprehensive groundwater sampling event (that includes both a consistent site-wide monitoring well and analyte list) has not been conducted, nor repeated for comparison of contaminant trends overtime to assess groundwater quality. Additionally, note that the \$7.3 million cost estimate presented in the comment above for analytical costs associated with ongoing groundwater monitoring appears to be significantly higher than both Tecumseh's cost estimates as presented in Appendix Q of the CMS Report and the Department's independent cost estimates.

**COMMENT 15: Monitoring Requirements of the Site Management Plan**

Paragraph 2 of the discussion of the proposed Site Management Plan (see pages 29 and 30 of the PSB) requires monitoring of soil, bank soil, sediment, groundwater, and surface water (mass loading, discharge locations) within the mean high-water mark to assess the performance and effectiveness of the remedy. Such post-remedial investigations are costly, unnecessary to assess the effectiveness of the remedies, and inconsistent with Section II.G of the Remedy Implementation Order that states “the Department agrees that additional investigation, evaluation or corrective measures studies will only be required if the Department determines that there is inadequate information to design remedial alternatives for any SWMU, AOC, waterbody or OU.”

**RESPONSE 15:** Tecumseh incorrectly compares “additional investigation, evaluation or corrective measures studies” to address inadequate information (data gaps) needed to design remedial alternatives with long-term monitoring of the site to ensure the continued protectiveness of the implemented remedies. Site Management is a comprehensive approach that serves as the basis for maintaining the protection of public health and the environment through monitoring and the continued operation and maintenance of completed remedial actions and engineering controls as well as the maintenance and enforcement of institutional controls. The site management requirements are needed to support the establishment and long-term monitoring and maintenance of the remedies, which include on-site management of wastes in a corrective action management unit (CAMU).

**COMMENT 16: SW-CAMU**

The two-year start of the construction window for the CAMU should run from the Department's approval of the final design plans, not from the Department's issuance of the final Statement of Basis.

Maximum slope should be 25% per the Department's Part 360 regulations for landfills, not as "allowed in coordination with public access developments," since the design and construction of the public access improvements will likely not occur until after the design and construction of the CAMU.

**RESPONSE 16:** To utilize a CAMU, construction must begin within 24 months of the release of this SB (or such other time frame as the Department agrees upon in writing) and be completed in accordance with a Department approved schedule. If the CAMU is not constructed in accordance with the approved schedule the remedial wastes must be disposed of off-site.

With respect to allowable slopes and coordination with public access developments, the Department is concerned that the timing proposed by Tecumseh to design the public access improvements after the design and construction of the CAMU may unnecessarily preclude the improvements desired by community stakeholders. The Department agrees to consider slopes up to the Part 360 maximum slope provided that discussions related to potential public access improvements are timely (prior to or concurrent with remedial design decisions which may impact access). The final maximum slope must be approved by the Department in writing.

**COMMENT 17:** Financial Assurance

Section 7, paragraph 13 of the PSB requires Tecumseh to post financial assurance in the amount of the cost projection for the remedies selected in any Statement of Basis. Consistent with the framework in the Remedy Implementation Order and the financial assurance requirements in 6NYCRR 373-2.8, the amount of the financial assurance should be based on a "detailed written estimate" of the costs of the remedies selected in the final SBs -- not any generic cost estimates developed for the SBs. Detailed cost estimates totaling \$32.4 million for the corrective measures recommended for implementation in the Final CMS Report were already provided. Many of the recommended corrective measures in the final CMS are generally consistent with the PSBs for OU-05, -06, -07, and -08. The differences in costs relate primarily to OU-01, -09 and -10 for which the Department has not provided detailed cost estimates; this is the focus of these comments. Financial assurance must be based on probable and estimable detailed costs developed by Tecumseh for final remedies in the final SBs for which Tecumseh is legally responsible to implement.

Financial assurance to be provided by Tecumseh should only be required for remedies that are Tecumseh's responsibility to implement and maintain. For example, Tecumseh's position is that the Department-proposed dredging of the Gateway Metroport Canal is not Tecumseh's responsibility, and therefore should not be included in Tecumseh's financial assurance requirements.

Financial assurance to be provided by Tecumseh should initially only be required for remedies where the need for, the extent of, and the estimated costs can be defined. For example, the need for, extent of, and the estimated cost of dredging in Smokes Creek and the SRWT have not yet been clearly defined and therefore should not be included in Tecumseh's initial financial assurance. Similarly, the need for, extent of, and cost of soil or other cover have yet to be defined and therefore should not be included in the initial financial assurance.

Financial assurance should be established within 60 days after final remedy selection (per the Remedy Implementation Order) and after full disclosure of any detailed cost estimates prepared by the Department for Tecumseh's review, or should otherwise be based on Tecumseh's Department-approved estimates in the CMS Report. Financial assurance should be reviewed and updated annually to reflect remedial construction completed, changed future values of OM&M, as well as updated cost estimates based on remedial designs and Work Plans.

**RESPONSE 17:** See Response 7 with regards to liability concerns. The Department agrees that financial assurance provided by Tecumseh should be established within 60 days after final remedy selection (per the Remedy Implementation Order) and after full disclosure of any detailed cost estimates prepared by the Department for Tecumseh's review. Financial assurance will be reviewed and updated annually to reflect remedial construction completed, changed future values of OM&M, as well as updated cost estimates based on remedial designs and Work Plans submitted by Tecumseh for the Department's review and approval.

## **DEPARTMENT-PROPOSED OU-5 (SLAG FILL AREA ZONE 2) & OU-8 (SLAG FILL AREA ZONES 4 & 5) REMEDIES**

### **Comment 18: Pre-Design Investigation (PDI)**

We propose to delay the PDI of surface soil/fill until after SWMU wastes are fully excavated (i.e., post excavation sampling) and until slag reclamation activities and final grading in OU-8 are complete.

**Response 18:** Some pre-design soil/fill sampling will be necessary to refine the nature and extent of contamination at some OU-8 SWMUs to help clarify potential limits of excavation and to better estimate volumes. Delaying the OU-8 surficial soil/fill characterization until excavation activities and final grading in OU-8 are complete would be a reasonable proposal for inclusion in project work plans prepared for the Department's review and approval after the remedy is finalized. The status of future slag reclamation activities at the Tecumseh site is currently under Department review and will be addressed in the review and approval of the remedial workplan(s).

**Comment 19:** Off-Site Transportation of Waste

Rail for off-site transportation of waste/fill should only be considered where quantities are sufficient to be cost-effective and this will not create schedule delays. Compared to truck hauling, rail loading creates more short-term impacts from double handling wastes and stockpiling wastes between rail car deliveries.

**Response 19:** Acknowledged. Methods for off-site transportation may be proposed in project work plans prepared for the Department's review and approval after the remedy is finalized.

**Comment 20:** Stormwater Management

The PSB states that "*stormwater controls will be implemented to minimize infiltration in and around the capped SWMUs and CAMU. Stormwater controls implemented in the OU-05 SWMU S-8 boundary (or other designated areas) will be designed to minimize infiltration, retain stormwater, and discharge in a controlled manner...*" We propose to install an engineered stone or slag product in the bottom and sides of SWMU S-8 to promote infiltrating "clean" stormwater runoff from the CAMU and impoundments final vegetated soil cover systems. The infiltration of clean storm water into the groundwater will off-set the reduction of groundwater infiltration from the cover system, improve groundwater quality beneath SFA-Zone 2, and reduce flood flows in Smokes Creek.

**Response 20:** Stormwater controls will be evaluated as part of the Remedial Design Process to ensure the proposed controls minimize infiltration, retain stormwater, and discharge in controlled manner that is protective of the environment. The need to treat stormwater prior to discharge will be evaluated as part of this process.

## **DEPARTMENT-PROPOSED OU-6 (FORMER TANK FARM SUB-AREA) AND OU-7 (FORMER COAL, COKE AND ORE HANDLING AND COKE PLANT SUB-AREAS) REMEDIES**

Tecumseh generally agrees with all proposed remedies and remedial elements except for the following:

### Demolition

**Comment 21:** As the property owner, Tecumseh (not third parties) should determine which buildings and structures are to be razed to ground level and which will remain for potential use or reuse consistent with existing use, reasonably anticipated future uses and zoning, and Tecumseh's plans for the Site. Such demolition should also occur before placement of soil or other cover deemed appropriate.

**Response 21:** The Department agrees that Tecumseh is in a good position to evaluate the potential for individual structure rehabilitation. However, those structures which are inarguably beyond repair, or undevelopable for commercial or industrial purposes, or which the City of Lackawanna determines to be unsalvageable, inconsistent with zoning or a hazard to human health, the environment, or the aesthetic of the City's redevelopment plan (e.g., the former coke batteries, which have been partially razed, and stacks), must be razed without further delay according to State and local laws, including the City of Lackawanna Code that requires that "[a]ll demolition work to be performed under this chapter shall include the demolition and removal of all buildings, structures above and below grade level, above- and below-ground storage tanks, underground tunnels, floors and appurtenances thereto and foundations removed to virgin soil. No partial removal or partial demolition of any structure and its components may take place without the written approval of the Director of Development. All demolition work shall include the following:**(1)** Removal of all old materials and rubbish of every description from the site of the demolition work, including all basements and/or cellars.**(2)** All foundations, concrete floors located in basements, sub-basements, cellars, boiler rooms and crawl spaces, etc., shall be broken, removed and dispensed of in conformance with this chapter (i.e., code) requirements. Those areas made accessible by demolition activities shall be immediately investigated to determine potential source areas and next steps in Tecumseh's remedial effort. After potential source area identification and removal/treatment (if applicable), the Department agrees that appropriate cover should be established.

### Cover System

**Comment 22:** The priority should be to place a cover system over OU-04 following any

demolition in the coke by-products sub-area to reduce storm water infiltration and thereby reduce and maintain collected and treated groundwater volumes.

**Response 22:** Before placing a cover system over OU-04, Tecumseh must complete soil/fill exploratory investigations in the OU-04 area (and throughout OU-07) to determine the presence of grossly contaminated material or material exceeding applicable SCOs. Once the investigation has been completed and the soil/fill in the OU-04 area has been remediated to the Department's satisfaction, Tecumseh may propose adding an impervious cap to the OU-04 groundwater collection area to improve the efficiency and effectiveness of the previously selected groundwater remedy. Such a cap should be consistent with future potential use and must not impede the implementation of adjacent or future remedies. A workplan for cover system construction shall be submitted to and approved by the Department prior to installation.

**Comment 23:** Soil cover elsewhere on the Site should be deferred until all groundwater remedies are in place and reuse or redevelopment is underway or has already occurred in each sub-area. By doing so, the cover system would not need to be removed, stockpiled, and replaced, and better, more permanent surface grading and storm water controls could be incorporated into the cover system design, consistent with the greater runoff from paving and building roofs from future redevelopment. Also see OU-01 comments above on soil cover and soil cleanup objectives.

**Response 23:** Tecumseh must implement a PDI to fill data gaps and inform the remedial designs, including determining the extent of site areas where the upper one foot of exposed surface soil exceeds applicable soil cleanup objectives (SCOs). Tecumseh shall expeditiously implement a cover system across areas of the site where a cover system is necessary to meet the requirements of the identified use (e.g., Industrial use in OU-07) and SCOs as set forth in 6 NYCRR Part 375-6.7(d). All OUs are to be addressed and preference should not be given to those OUs with established remedial systems. Additional installation of groundwater collection equipment and piping will be an inconsequential percentage of the total area requiring cover and therefore not a sufficient rationale to delay establishment of the cover system(s). Further, Tecumseh can and should make every effort to establish topography and grading to responsibly control and convey storm water consistent with the reasonably anticipated final configuration or use of the site.

#### Proposed Remedy for SWMUs P-01 through P-06

**Comment 24:** The proposed remedy for SWMUs P-01 through P-06 calls for residual solids to be removed and the concrete quench pits to be backfilled to grade with material meeting industrial cover requirements. The test data shows that the residual materials



meet the industrial SCOs and SSALs. The CMS called for these materials to remain in the pits. Removal of the residual materials before backfilling is unnecessary given that the residual solids meet the industrial SCOs.

**Response 24:** Out of an abundance of caution and considering the long operational history and potential for uncharacterized liquids and sediments in the pits and vaults, the Department is directing the removal of all liquid and clean out of all material present in the pits and vaults prior to breaking and backfilling in order to ensure source materials are addressed. Elevated groundwater contaminant concentrations detected at piezometer OU4PZ-6, believed to have been installed in the backfill of a former concrete Tar Decanter Sludge Pit (SWMU P-9) that was remediated as part of OU-2, illustrate that compartmentalized contamination can remain even after residuals are removed from underground concrete vaults (see *Summary Report Supplemental Work Plan for Operable Unit No. 4 (OU-4)* by TurnKey Environmental Restoration, LLC, February 5, 2021). Thus, the requirement to remove remaining liquid and sediment residuals prior to breaking up subsurface concrete foundations (which is required by the City of Lackawanna Building Codes).

#### SWMU S-26

**Comment 25:** SWMU S-26 is an approximately 7.5-acre area located adjacent to and northwest of the Canal generally occupying the area between former Coke Oven Battery Nos. 7 and 8 and the Canal. The Unit is split between two properties: approximately 3.3 acres (SWMU S-26 T) on the Tecumseh Site and 4.2 acres (SWMU S-26G) on the adjacent Gateway property as shown on Figure 1 with boring and monitoring well locations. Gateway purchased this portion of the property in 1985 from Bethlehem Steel along with the Canal. As such, Tecumseh never owned or contributed to the contamination existing on Gateway's property (i.e., SWMU S-26G). See Exhibit A, Legal Background and Tecumseh's Position Regarding Liability for Off-Site Contamination, for detailed discussion of Tecumseh's position with respect to SWMU S-26G.

Soil/fill in SWMU S-26T is primarily slag with coke fines, coal, brick, and other miscellaneous fill extending to a depth of 12 to more than 20 feet below ground surface (fbgs). Only boring S26-B-03 identified the presence of coal-tar at a depth of 4 to 7 fbgs. This boring was drilled and sampled proximate to an existing 60-inch diameter Industrial Water System pipeline that provides fire protection and cooling water for Republic Engineered Products (bar mill), Great Lakes Industrial Development (located in the former ArcelorMittal Cold Mill) and Metalico (located in the former ArcelorMittal Galvanizing Mill) off the Tecumseh property on the east side of Route 5. Beneath the soil/fill is an interbedded native soil/sediment unit of clayey silt and silty sand (occasionally with intermingled peat) underlain by a silty clay confining unit.

The analytical results from subsurface soil/fill samples obtained within the limits of S26T indicate semi-volatile organic compounds (SVOCs; primarily PAHs) as the only compounds exceeding their respective NYSDEC Part 375 industrial SCO with total PAH concentrations ranging between 0.35 and 2,900 mg/kg; excluding results from boring S26-B3. Results from boring S26-B-3 (6-8 fbgs) indicate that although coal tar is present (with total PAHs of 240,000 mg/kg), it is limited in vertical extent to that interval as evidenced by significantly reduced concentrations with depth; the soil/fill sample collected from 10-12 fbgs in this boring contained total PAHs of 2,200 mg/kg and a composite sample from 14 to 30 fbgs contained only 7.2 mg/kg total PAHs. The tar impacts at S26-B-03 are also limited in horizontal extent as evidenced by surrounding soil/fill samples collected from borings S26-B04, SB26-B-06, and SB26-B-07 with reported PAH concentrations two orders of magnitude less than S26-B-03. Although arsenic was the only metal detected above the Part 375 industrial SCO (S26-B-3 at 6 to 8 fbgs), the concentration of 40 mg/kg is well below the proposed site-specific SCO of 118 mg/kg.

Slag/fill groundwater from this area, represented by samples collected from wells MWN-07 and MWN-52A, contains no exceedances of the GWQSSs for VOCs. While PAHs were detected in groundwater at concentrations exceeding GWQSSs, these compounds are not considered mobile in groundwater.

Based on the foregoing, the CMS-recommended corrective measure that Tecumseh supports for SWMU S-26T is close in-place with the addition of a cover system on Tecumseh property consistent with the site-wide cover system, where deemed appropriate. That alternative remedy is equally protective of public health and the environment; equally compliant with SGVs/SCGs; is more cost-effective; is more easily implemented; has less short-term impacts; and is equally compliant with all the other balancing criteria. Tecumseh does not propose to implement any portion of the SWMU S-26 remedy on Gateway property (S-26G) as Tecumseh is not legally responsible for off-site contamination there, as set forth in detail in Exhibit A.

**Response 25:** See Response 7 with regard to liability concerns. The Department does not agree with Tecumseh's conclusions or rationale for closing the OU in place; empirical and anecdotal evidence suggests source material may be present. As detailed in Tecumseh's comment, the presence of coal tar has been documented at boring S26-B-3 in addition to analytical data showing the coincidental impact of PAHs to groundwater. Tecumseh shall investigate S-26 and remove grossly contaminated material or material exceeding applicable SCOs.

## COMMENTS RECEIVED BY THE DEPARTMENT DURING THE VIRTUAL PUBLIC MEETING

**Comment 26:** What might have accounted for the higher 2017 concentration of benzene at the ATP?

**Response 26:** This is unknown, however with pre-design investigations and long-term monitoring requirements in the Statement(s) of Basis, the Department believes benzene contamination at the site will be adequately addressed by implementation of the remedies.

**Comment 27:** Should toilet facilities be provided at parking areas for bike trail users and walking visitors to the shore near Smokes Creek?

**Response 27:** Issues such as this will be decided in the future by a public/private collaboration between Tecumseh, the Department, and other public entities.

**Comment 28:** Is there an ecological risk assessment being performed at Lake Erie?

**Response 28:** A risk assessment was completed during the RFI (human health and ecological risk assessments) in October 2004, a more robust risk assessment will be completed by Tecumseh during the PDI.

**Comment 29:** When will it be clear what exactly Tecumseh is committed to?

**Response 29:** Tecumseh is committed to complying with the Order on Consent (legal agreement) executed in September 2020, which requires cleanup and public access. The SBs memorialize the remedies selected and will allow Tecumseh to develop more concrete plans. With the issuance of the SBs, Tecumseh can commence work finalizing design plans, subject to Department approval, to implement the required remedies. Implementation/remediation will take several years. Tecumseh will be required to submit a schedule for completion of the work for the Department's review and approval.

**Comment 30:** In the area on the east side of Route 5, north of the galvanize mill where there was a fire a few years ago, does Tecumseh own that area and is remediation required? Another commenter added – believes Great Lakes Steel owns this property.

**Response 30:** This property is not owned by Tecumseh nor is a part of the Bethlehem Steel site. However, a portion of the tax parcel was accepted into the BCP in June 2021 (2800 Hamburg Turnpike Site, Site No. C915371) and will be addressed by the Applicant through the BCP.

**Comment 31:** How long will it take for the public to have access to the Bethlehem site area?

**Response 31:** With the issuance of the SBs, Tecumseh can commence pre-design investigations and remedial design work, but it will be at least several years before public access in OU-5 occurs. However, bike path access may occur sooner based on Erie County's selected path forward.

**Comment 32:** With rising Lake Erie levels and the potential for increased precipitation with climate change– was this taken into consideration when designing/selecting remedy along Smokes Creek and the Lake Erie shoreline?

**Response 32:** Yes, the Department considers climate resiliency when developing all remedies. See Response 8 regarding Smokes Creek.

**Comment 33:** When is the sitewide groundwater (OU-10) corrective measures study to be completed?

**Response 33:** The Corrective Measures Study has been completed. With the issuance of the SB, pre-design investigations and remedial design of the OU-10 remedy can begin. Tecumseh will be required to submit plans and a schedule for implementation of the remediation work for the Department's review and approval.

**Comment 34:** Can we get a copy of the slide presentation?

**Response 34:** The slide presentation has been posted to the website.

**Comment 35:** What are the chemicals of emerging concern that are being looked at?

**Response 35:** Per- and Polyfluoroalkyl Substances (PFAS) and 1,4-dioxane. These are often associated with solvents and various processes; they are being found at sites across New York State.

**Comment 36:** Can the Department please comment about the area directly offshore into the Lake from the remediation area – could there ever be a marina there, for example?

**Response 36:** This would need to be evaluated as part of the future use of the site following remediation and is beyond the remedy selection process.

**Comment 37:** Has a remedial plan and contractor been chosen?

**Response 37:** The Department proposed a remedial plan in the Statements of Basis. Tecumseh is conducting remediation as a private party and would complete predesign

investigation/remedial design work and select a Contractor.

**Comment 38:** What is the plan if unexpected contamination is found?

**Response 38:** Tecumseh would be responsible for delineating the nature and extent of the contamination in a pre-design investigation and incorporating this information into the remedial design.

## **APPENDIX C**

### **Soil Cleanup Objectives (SCO) Discussion**

# SOIL CLEANUP OBJECTIVES (SCO) DISCUSSION

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

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The Department may approve a remedial program for soil that:

- (i) Utilizes different soil cleanup objectives between different areas of a site, provided such areas can be defined and described in the environmental easement and the necessary institutional and engineering controls can be effectively implemented, maintained, monitored and enforced through the site management plan;
- (ii) Considers site specific background concentrations, including the location of a site in areas of historic fill, in the development of the remedy; and/or
- (iii) Achieves a cleanup which is more stringent than the current, intended and reasonably anticipated future land uses of the site and its surroundings.

Tecumseh has proposed site-specific action limits for arsenic (118 ppm) and total PAHs (500 ppm) in soil. Elevated arsenic and PAH concentrations are ubiquitous across the site due to historic slag/fill deposition, coal burning for coke production, and other steel-making operations.

Site-specific SCOs have been developed for PAHs in fill that may be covered in-place. Fill concentrations that exceed the NYSDEC Part 375-6.8(b) Industrial SCOs as well as the Protection of Groundwater SCOs but meet the site-specific SCOs for total PAHs may remain in-place beneath an appropriate cover provided the total PAH concentration is less than 500 mg/kg and the waste waste/fill is not grossly impacted. Part 375 says “Grossly contaminated media” means soil, sediment, surface water or groundwater that contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2 (ac), which is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis. For purposes of this provision, subsurface soil shall mean the soil beneath permanent structures, pavement, or similar cover systems; or at least one foot of soil cover (which must meet the applicable SCOs). Institutional controls (e.g., an

environmental easement) along with a site management plan will be required when this soil cleanup level is employed at a site. This cleanup level is determined to be feasible and protective based on DEC's experience in its various remedial programs.

The Department's October 21, 2010, Final Soil Cleanup Guidance (CP-51) provides for the following:

**H. Subsurface Soil Cleanup for Total Polycyclic Aromatic Hydrocarbons:** For non-residential use sites (i.e., commercial or industrial use sites) where the Ecological SCOs are not applicable, NYSDEC may approve a remedial program that achieves a soil cleanup level of 500 parts per million (ppm) for total PAHs (i.e., Base-Neutral SVOCs) for all subsurface soil. The 500-ppm soil cleanup level is in lieu of achieving all the PAH-specific SCOs in 6 NYCRR 375-6. For purposes of this provision, subsurface soil shall mean the soil beneath permanent structures, pavement, or similar cover systems; or at least one foot of soil cover (which must meet the applicable SCOs). Institutional controls (e.g., an environmental easement) along with a Site Management Plan will be required when this soil cleanup level is employed at a site. This cleanup level is determined to be feasible and protective based on the Department's experience in its various remedial programs. This approach has existed in TAGM 4046 since it was first issued in 1992.

In determining the remedial goal for arsenic and other soil contaminants, the Department considered applicable laws, regulations, policies, and guidance including but not necessarily limited to:

- USEPA 40 CFR § 265
- NYSDEC 6 NYCRR Part 373
- NYSDEC ECL Article 27, Title 9
- NYSDEC ECL Article 27, Title 13
- NYSDEC 6 NYCRR Part 375-6, which provides soil cleanup objectives (SCOs) – see note 1 below
- NYSDEC and NYSDOH's Technical Support Document (TSD)<sup>4</sup> for the SCOs – see note 2 below
- NYSDEC Commissioner's Policy #51 (CP-51) – Soil Cleanup Guidance, issued October 21, 2010.5 – see note 3 below
- NYSDEC's Guidance Document, DER-10 – Technical Guidance for Site Investigation and Remediation – see note 4 below

The Department also looked at other available information and multiple lines of evidence in arriving at the remedial goal such as:

- Arsenic standards in 14 other states (see Appendix F).



The Department cannot accept Tecumseh's site-specific proposed SCO for arsenic (118 ppm) since it substantially underestimates potential arsenic human health risks and is therefore not appropriate for use in making risk management and remedial decisions. However, the Department considers the arsenic risk assessments performed by NYSDOH in conjunction with the NYS Soil Cleanup Objectives (16 ppm for commercial use) to be appropriately site-specific in terms of addressing arsenic exposures in the Lackawanna community and appropriately conservative with regard to the assumptions used to characterize those exposures. The selected remedy is based on SCOs included in 6 NYCRR Part 375-6 which are supported by the NYSDOH SCO risk assessments and the use of a background-based arsenic remedial goal.

Notes:

1. NYSDEC's SCOs are presented in tables under Subpart 375-6.8 of the regulations and can be viewed at: <http://www.dec.ny.gov/regs/15507.html#15513>
2. NYSDEC's TSD for the SCOs can be viewed at: [http://www.dec.ny.gov/docs/remediation\\_hudson\\_pdf/techsuppdoc.pdf](http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf)
3. NYSDEC CP – 51 can be viewed at: [http://www.dec.ny.gov/docs/remediation\\_hudson\\_pdf/cpsoil.pdf](http://www.dec.ny.gov/docs/remediation_hudson_pdf/cpsoil.pdf)
4. NYSDEC's DER-10 guidance can be viewed at: [http://www.dec.ny.gov/docs/remediation\\_hudson\\_pdf/der10.pdf](http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf)

With respect to areas anticipated to be made available for passive recreational use, the Department requires such areas be defined and described in the environmental easement and the necessary institutional and engineering controls be effectively implemented, maintained, monitored and enforced through the site management plan. These areas would require the top one foot to meet the industrial (or commercial in areas proposed for passive recreational use) soil cleanup objectives.

## **APPENDIX D**

### **Evaluation of Transport and Disposal**

# EVALUATION OF TRANSPORT AND DISPOSAL

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

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## **1.0 Presentation of Transport and Disposition Options**

The CMS provided the following transport/disposal options for the remedial wastes from the site:

A. Off-site Disposal: The off-site disposal options in the Corrective Measures Study (CMS) were:

- Commercial Landfill - Off-site disposal of remedial materials as non-hazardous waste at appropriate commercial landfill(s) which meet all applicable rules and regulations for such disposal. Any hazardous waste will be disposed at a permitted hazardous waste disposal facility.
- Beneficial Reuse at a Commercial Landfill - Beneficial reuse of remedial soils as daily landfill cover at appropriate off-site commercial landfill(s) which meet all applicable rules and regulations, including those related to material exhibiting elevated radiological readings.

The transport options for off-site disposal are:

- Transport by truck directly from the excavation to the commercial landfill.
- Transport by truck to a portion of the facility for temporary storage (i.e., staging) followed by loading into larger trucks for transport to the commercial landfill.
- Transport by truck to a portion of the facility for temporary storage (i.e., staging) followed by loading into rail cars for transport to the commercial landfill.

B. On-site Disposal: The Alternative 1 solid waste CAMU presented in the 2019 CMS is roughly based on the solid waste CAMU presented in the CAMU Application that submitted to Department by Bethlehem Steel on November 16, 2000 (CMS Appendix A). The CAMU Application was deemed by the Department, to be substantially complete for the purposes of grandfathering under the 1993

regulations. The Alternative 1 CAMU design presented in the 2019 CMS Report, proposed coalescing all the OU-5 impoundments under a contiguous 24.1-acre cover system that would drain to a future stormwater pond located in empty SWMU S-8. The addition of a liner and leachate collection system to the Alternative 1 CAMU design would result in construction costs that are higher than those presented in Appendix Q of the 2019 CMS Report.

Tecumseh's other proposed on-site disposal option (Alternative 2) presented in the 2019 Corrective Measures Study consists of constructing an engineered CAMU ) located at the southern portion of the Facility to receive the remedial materials for permanent disposal with the conditions that no free liquids would exist in materials to be placed, solidification/stabilization would occur to render materials non-hazardous or to meet compaction requirements, and all provisions of this statement of basis are adhered to. The CAMU would be constructed in accordance with RCRA regulations with a maximum bluff elevation of 650 feet at its highest point and a maximum footprint (i.e., area at its base) of approximately 24 acres. The existing slag bluffs shall have a maximum slope of 1.5H:1V and be pulled back such that a minimum separation distance of 50 feet exists from the waste to the outside edge of bluff. Tecumseh proposed construction of a regulatory required liner, leachate collection system, and a final cover system consisting of geotextile/geomembrane, barrier protection layer and vegetated topsoil layer. Tecumseh also proposed to leave the Interim Corrective Measure wastes in place to be incorporated into the new CAMU. For the entire CAMU Tecumseh proposed to construct an engineered cover system consisting of natural and geosynthetic components with grasses and shrubs on its surface conducive to wildlife habitat and potential passive recreational uses such as hiking and wildlife observation. Tecumseh's proposal also called for trees to be planted at select locations along the perimeter of the CAMU. A system of perimeter drainage swales and culvert pipes will be designed to convey stormwater runoff from the CAMU to a detention basin where storm water peak runoff flows will be stored, equalized, and released from the retention/detention ponds in a controlled and reduced manner. Strict nuisance controls to minimize noise, odor, fugitive dust, turbidity, traffic and other potential impacts on the community will be required. Daily cover material or appropriate physical covers will be required to be placed at the end of each workday as an engineering control during the filling of the CAMU.

## **2.0 Department's Evaluation of Transport and Disposition Options**

This evaluation focuses on comparing the major options of off-site and on-site disposal. It also includes some discussion of off-site beneficial use and transport options. The seven evaluation criteria used to analyze these options are:

- Technical
- Environmental
- Human Health
- Institutional
- Green Remediation Practices
- Cost
- Community/Property Owner Acceptance

Below is DEC's evaluation of the disposal options based on these criteria:

## **2.1 Technical**

The technical criterion requires the disposal options to be evaluated with respect to performance, reliability, implementability, and safety. The performance and reliability evaluation examine the effectiveness of the disposal options in reducing unacceptable risks and its demonstrated ability to maintain that effectiveness over time. The implementability evaluation examines the engineering and construction-related tasks necessary to carry out the disposal and any obstacles associated with the disposal option that might delay or lengthen implementation of the selected remedy. The safety evaluation examines potential safety risks to workers and community members that might be associated with the disposal options.

### *2.1.1 Performance and Reliability*

One important aspect of performance and reliability in terms of disposal is how well the disposal unit prevents migration of contaminants long-term. Both the on-site disposal option and the offsite commercial landfill option offer a number of features which are designed to prevent future contaminant migration. It can be assumed with a high degree of confidence that remedial materials sent for off-site disposal will be received by a modern commercial landfill that is constructed with one or more liners and with systems to collect leachate containing waste contaminants.

The on-site CAMU which Tecumseh proposed is lined since it would be a new disposal area. The CAMU must be located within the facility under the control of the owner or operator where the waste to be managed in the CAMU originated. The location of the CAMU meets this requirement. Wastes to be disposed in the CAMU must be "CAMU-eligible wastes" (see Appendix E) There are several ways to enhance the reliability of the on-site disposal option.

1. Require a liner for all disposal areas. The requirement for a liner would be predicated on the concentrations and leachability of the waste going into the CAMU.

2. Testing the soil and setting concentration limits. Previous testing has indicated that the arsenic-contaminated soil does not have the propensity to leach arsenic or other contaminants into the groundwater. In addition, a maximum soil concentration would be set for on-site disposal. The CAMU shall use, when appropriate, treatment technologies (including innovative technologies) to enhance the long-term effectiveness of the CAMU by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU. The CAMU will be designed to incorporate proven and innovative treatment technologies (such as soil washing, stabilization, or solidification) to significantly reduce the toxicity and mobility of remediation waste prior to placement into the on-site cell.
3. Proper construction and maintenance of the CAMU cap. A well-built cap would prevent runoff from being contaminated and prevent soil from eroding. A properly built and maintained CAMU would be very effective and reliable at containing and isolating the waste long-term.
4. The remedial design could make provisions to reduce infiltration through the berms and roads by extending cap membranes up berm slopes in effect lining the perimeter drainage swales and covering the berms and roads with low permeability materials. Prior to performing a detailed remedial design, a pre-design investigation should be performed that includes additional chemical and geotechnical sampling of berms and roads surrounding the SWMUs. The information gained from the pre-design should verify that uncovered surfaces are suitable for passive recreational use and minimize the potential for water to percolate through waste materials.

Therefore, the CAMU would facilitate the implementation of reliable, effective, protective, and cost-effective remedy. The CAMU consists of on-site staging, treatment, and containment capabilities for hazardous remediation wastes. On-site, permanent waste containment will allow for cost-effective and controlled management of hazardous remediation wastes.

### *2.1.2 Implementability*

The off-site disposal option has some problems which could affect implementation; however, they appear to be easily reconcilable. For example, the off-site option can cause implementation delays attributable to a lack of available long-haul transport vehicles and/or scheduling limitations with receiving commercial landfills. However, this is easily rectified through the use of on-site temporary staging of remedial soils prior to final off-site disposition. Such staging would allow remediation to continue without any delays due to logistical transport or disposal problems that might occur; however, it would require double handling of contaminated soils.

With respect to the on-site disposal option, the DEC has identified several issues that could cause a delay in remedy implementation.

SWMUs S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-20 and S-27 occupy the area of the Facility where Tecumseh proposed to construct the CAMU. The RCRA Facility Investigation (RFI) conducted with respect to these SWMUs has identified both soil and groundwater contamination in this area, and enhancement of groundwater collection and treatment would be a requirement of the CAMU.

Both 2019 CMS Alternatives 1 and 2 propose that SWMU S-8 be used as a stormwater detention basin following cap construction, with the intent that most of the stormwater directed to this basin would infiltrate the bottom and sides of the basin and that excess stormwater would be discharged to Smokes Creek or SFA Zone 1 during extreme precipitation events. Use of this area may be acceptable for detaining and storing stormwater; however, there would be problems associated with its use for stormwater infiltration. For examples: focused infiltration could lead to increased groundwater flow through contaminated areas; raising the groundwater table in this area could reduce the stability of the slope along the south shore of Smokes Creek; and increasing groundwater flow in this area could in turn increase the amount of pumping needed at the nearby Acid Tar Pit Expedited Corrective Measure (ATP-ECM) groundwater extraction system and the groundwater extraction wells in OU-5 as part of the site-wide groundwater remedy. An enhanced treatment system remedial element has been included to address this concern.

The 2019 CMS Alternative 2 design locates the CAMU in SWMU S-7/20, with SWMUs S-1 through S-6 and the recommended Alternative 2 CAMU design that have implications both for environmental protectiveness and for cost. The grading plan presented for Alternative 2 on CMS Figure 4a appears to include as little regrading and fill as possible in order to meet minimum slopes for closure in place of SWMUs S-1 through S-6. Under this grading scheme, most of these SWMUs will have top of waste elevations below at least some of the surrounding roads and berms, which may have implications for the design of stormwater infrastructure. Ultimately, the grading in this area is required to be re-designed as part of the remedial design to address this concern.

Location of a CAMU at an alternate on-site location may be another option which would avoid the above complications. The CAMU would include uncontaminated areas of the facility, only if such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility. However, the CAMU must, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure, by consolidating remediation waste from multiple areas into one centralized location which minimizes the land area of the facility at which wastes will remain in place after closure.

Also, the remedy which will include a schedule for completion of construction of the CAMU, will not allow for the soil removal to be delayed because of lack of on-site disposal capacity. To utilize a CAMU, construction must begin within 24 months of the final SB (or such other time frame as the DEC agrees upon in writing) and be completed in accordance with a Department-approved schedule. The CAMU would expedite the timing of remedial activity implementation, since the CAMU will allow multiple areas of contamination to be remediated and co-located within a centralized location, thus expediting the corrective action process. If the CAMU is not constructed in accordance with the approved schedule the remedial wastes will be disposed of offsite.

### **2.1.3 Safety**

There are safety issues related to both on-site and off-site disposal options. The off-site option involves transporting remedial soils over greater distances, either by truck or rail, than would be necessary for the on-site option, which inherently increases the potential for a vehicle accident which might release contaminated materials. It would also require handling the soil twice, first to stage it onsite and then to pick it up and move it offsite which somewhat increases the accident potential. The on-site option entails construction, operation and closure of a CAMU which creates a construction accident potential that is not present with respect to the off-site option. Waste management activities associated with the CAMU would not create unacceptable risks to humans or to the environment resulting from exposure to hazardous wastes or hazardous constituents. The CAMU is located in a remote area, from which most of the waste will originate. On-site management of hazardous remediation waste will reduce risks associated with off-site transport. The waste will be treated to decrease or eliminate the hazardous constituents before being placed in an on-site containment engineered cell. While each option may have safety issues, the Department considers the on-site option to be slightly better than the off-site option in terms of safety.

In summary, the on-site disposal option is considered slightly less favorable than the off-site disposal with respect to performance and reliability, equal with respect to implementability, and slightly better than the off-site option with respect to safety. From an overall perspective, the Department considers the on-site disposal option for the remedial wastes to be comparable to the off-site option with respect to the Technical criterion.

## **2.2 Environmental**

The environmental criterion requires disposal options to be evaluated with respect to potential long-term impacts on the environment. The design of the cover system for the on-site CAMU is essentially equivalent to the typical cover designs utilized at off-site solid waste disposal facilities, making the covers essentially equal in terms of environmental protection against surface water contamination. However, as previously stated above,



remedial wastes existing in SWMUs S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-20 and S-27, where the CAMU would be constructed on top of existing in place materials would be unlined and would rely on groundwater extraction systems to minimize contamination to environmental media caused by contaminants leached from the disposed remedial waste. In comparison, most, if not all modern off-site commercial disposal facilities are single if not double-lined with leachate collection systems. Such liners and collection systems are widely regarded as superior over groundwater extraction systems in terms of environmental protection. Since materials that leach levels of metals that would impact groundwater would not be allowed in the CAMU, whether or not a portion of the CAMU is lined or unlined is no longer a deciding factor.

Areas within the CAMU, where wastes will remain in place after closure of the CAMU, will be managed and contained so as to minimize future releases, to the extent practicable. All hazardous remediation waste, except the debris, will be treated to meet specific treatment standards prior to being placed in the on-site containment cell. Debris and treated wastes not meeting treatment standards will be stabilized in containers before being transferred to the on-site containment cell. The containment cell will be designed with a groundwater monitoring system to monitor the cell either during operation or the post closure period.

There are several benefits to managing materials in one location in the CAMU, including that the overall area containing waste throughout the site would be reduced, the waste would be better contained and subject to more substantial engineering controls than at present, and that closure of the impoundments could open up this area to public access or habitat improvements.

From an overall perspective, the Department considers the on-site disposal option to be comparable to the off-site option with respect to the environmental criterion.

## **2.3 Human health**

The human health criterion requires disposal options to be evaluated based on their protection against short- and long-term exposures to contaminants present in remedial soils.

Both on-site 2019 CMS Alternative 1: Grandfathered SW-CAMU and Alternative 2: Close In-Place SWMUs S-1, S-2, S-3, S-4, S-5, S-6 and Reduced SW-CAMU Footprint Enhanced with Base Liner and Leachate Collection System would improve protectiveness to human health and the environment by placing sitewide waste materials within a lined CAMU with a membrane cover. Both CAMU alternatives provide for the construction of a revetment to protect the OU-5 shoreline.

### ***2.3.1 Short-Term Exposures***

Both on-site and off-site disposal options involve similar methods of remedial soil placement in their respective disposal units with similar precautions taken during such placement designed to prevent short-term exposures to workers and the general public (e.g., personnel protection equipment, dust suppression, etc.). Since the on-site CAMU will be located in an area of the facility that is not in proximity to any nearby commercial spaces which are occupied (or will be occupied in the near future), similar for the case of the typical commercial landfill that is often more remotely located, it may pose a similar short-term human exposure potential to that posed by a commercial landfill. However, the fact that the off-site disposal option requires more waste transportation putting remedial soils in close proximity to offsite areas along the truck or rail transport routes must be considered as well. As a result, the Department considers the off-site option as having a higher short-term human exposure potential than the on- site option.

### ***2.3.2 Long-Term Exposures***

As stated above, both the on-site and off-site disposal options involve disposal units which have similar cover system designs. Therefore, they are considered by the Department as offering similar protection against direct human exposure from a long-term perspective.

In summary, the Department considers the on-site option to be somewhat more protective with respect to the human health criterion.

## **2.4 Institutional**

The institutional criterion requires disposal options to be evaluated with respect to federal, state and local laws, ordinances, regulations, standards, criteria and guidance. Both the on-site CAMU and off-site commercial landfills are allowable under current federal and state laws and regulations. Each has similar processes for obtaining permits or approvals from appropriate federal or state regulatory agencies. Therefore, the on- site and off-site disposal options appear similar with respect to conformance to federal and state laws/regulations. However, the on-site CAMU may not follow local ordinances. Based on the current Town of Lackawanna Zoning Map, the facility is zoned as a “Commercial/Industrial” district. A zoning variance or other approval may need to be obtained from the City government for an on-site CAMU at the proposed location, as applicable. Or it may be possible for a CAMU to be placed at a different location on site. Due to this uncertainty, the Department considers the off-site disposal option to be slightly more favorable than the on-site option with respect to the institutional criterion.

## **2.5 Green Remediation Practices**

The green remediation practices criterion requires disposal options to be evaluated for consistency with USEPA’s and DEC’s Green Remediation concepts and strategies

including land conservation, resource/material consumption, soil conservation, and reduction of greenhouse gases and other air emissions. The on-site and offsite disposal options are evaluated below with respect to each of these green remediation concepts and strategies:

#### *2.5.1 Land Conservation*

The on-site CAMU would occupy approximately 24 acres of land in a southern area of the facility. Past environmental investigations have indicated that this area includes remedial wastes existing in SWMUs S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-20 and S-27. Therefore, on-site disposal is considered by the Department as equivalent compared to off-site disposal in terms of land conservation since the area already has remedial wastes, which would be properly managed in the proposal.

#### *2.5.2 Resource/Material Consumption*

The on-site disposal option, as proposed by Tecumseh, would require the usage of natural resources and geosynthetic materials to construct the liner and leachate collection system under the on-site CAMU and a final cover over the entire CAMU. Off-site commercial landfills use these same resources/materials for construction of their liner and cover systems. Therefore, the Department considers off-site disposal and on-site disposal to be comparable in terms of reducing resource/material consumption.

#### *2.5.3 Soil Conservation*

The off-site option allows for the beneficial use of some, or possibly all, remedial soils as daily cover for commercial solid waste landfills. It is reasonably anticipated that the nature of these nonhazardous remedial soils (e.g., gradable soils with generally moderate levels of contamination) will make them a viable substitute for “clean” soils which are often used as daily cover for municipal wastes in commercial landfills. While Tecumseh has estimated that 25% of the remedial soils could be beneficially used in this manner, a much higher percentage of beneficial use could result from proper use of on-site staging of remedial soils, as explained in more detail below under the “cost” criterion. Regardless of what percentage of the remedial soils are able to be beneficially re-used, the off-site option allows for the conservation of a significant volume of “clean” soil resources that would otherwise be required for daily cover at municipal landfill facilities. However, consistent with Green Remediation practices, the Department would still allow the less contaminated soils to be beneficially used as commercial landfill daily cover if the on-site option were chosen. Therefore, the Department considers the off-site and on-site disposal options to be comparable in terms of soil conservation.

#### *2.5.4 Reduction of Greenhouse Gases and Other Air Emissions*

In terms of greenhouse gas generation and other air emissions, the Department believes that off-site disposal would produce more emissions due to the significant additional transport of remedial soils involved in the off-site option (i.e., added emissions from truck

or rail transport to offsite commercial landfills). However, a number of factors must be considered before making such a conclusion. Some of these factors are discussed below:

- An on-site disposal option entails the use of heavy equipment to construct the liner and cover systems for the on-site CAMU, and as a result produces an additional volume of air emissions.
- An off-site disposal option would require double handling of remedial soils on-site, resulting in an additional volume of air emissions.
- The mass of air emissions associated with the additional transport of remedial soils under the off-site option is also related to the mode of transport being employed. A 2009 report issued by the “Federal Railroad Administration” (see link below) indicates, as do other information sources, that shipment by rail is in most cases, is more fuel efficient than shipment by truck, and therefore often produces less air emissions. This is especially true for shipment distances over 300 miles where the reduction in fuel consumption and corresponding reduction in air emissions from rail versus truck becomes substantial. Therefore, maximizing transport of remedial soils by rail where the distance between the Bethlehem Steel site and the commercial landfill is over 300 miles can significantly reduce the additional air emissions associated with the off-site option. These additional emissions can be further reduced if commercial facilities that can directly accept rail shipments are utilized, as opposed to those which would require a rail to truck transfer to complete transport to the landfill. This study referenced below provides a comparative evaluation of rail and truck fuel efficiency on corridors and services in which both modes compete. For the purposes of this study, competitive movements are defined as those of the same commodity having the same (or proximate) origin and destination (O-D) pairs. This study also provides an analysis of past and future trends of rail and truck fuel efficiency. [http://www.fra.dot.gov/Downloads/Comparative\\_Evaluation\\_Rail\\_Truck\\_Fuel\\_Efficiency.pdf](http://www.fra.dot.gov/Downloads/Comparative_Evaluation_Rail_Truck_Fuel_Efficiency.pdf)
- The volume of air emissions associated with the additional transport of remedial soils under the off-site option is directly related to the distance between the site and the commercial landfill facility. Based on Tecumseh’s Draft CMS Report, there may be existing commercial landfills within a short distance of the facility (under 100 miles). Utilization of such facilities will substantially reduce the additional air emissions associated with off-site transport of remedial soils.

It must be understood that neither this document nor Tecumseh’s Draft CMS Report contain a detailed quantitative analysis of air emissions for both on-site and off-site disposal options, and that without such an analysis it is impossible to definitively conclude which option will produce the smaller volume of greenhouse gases and other air

emissions. However, based on the Department's qualitative evaluation, the additional air emissions assumed to be attributable to the off-site option are expected to be substantially more than those produced by on-site disposal.

In summary, the off-site option is considered equivalent to the on-site disposal option in terms of land conservation while the on-site option is superior in terms of Greenhouse Gas Emissions. The two options are comparable in terms of resource/material consumption and soil conservation. Therefore, from an overall perspective, the Department considers the on-site option to be favorable to the off-site option with respect to the greenremediation practices criterion.

## **2.6 Cost**

The cost criterion requires each disposal option to be evaluated with respect to the capital, engineering, and any long-term costs (e.g., inspection, monitoring, and maintenance) associated with the final disposition of remedial soils. The cost estimates contained in Tecumseh's CMS Report indicate the cost of on-site disposal to be approximately \$18.8 million and off-site disposal (including transportation) to be approximately \$130 million, based on the volume of remedial wastes generated by implementing the Department's remedy. However, the Department performed an independent cost assessment for the offsite disposal alternative, including assessment of the CMS waste volume estimates, evaluation of disposal requirements based on waste characteristics, and independent development of disposal pricing and considers that these Tecumseh cost estimates make certain assumptions and fail to adequately consider certain factors that may serve to underestimate on-site costs and overestimate off-site costs. Some of these possible under and overestimations are described below:

- With respect to on-site disposal, the Department does not agree with all of Tecumseh's projected costs associated with on-site CAMU construction, operation, closure, and post-closure care and maintenance. This is especially true with regard to the cost associated with the long-term care of such a disposal unit which would likely have to continue in perpetuity. The Department considers the assumptions used by Tecumseh to calculate the "present worth" of long-term care as flawed in terms of the anticipated rate of return and an inadequate accounting for inflation among other things. For these and other reasons, Tecumseh's estimate may have under-estimated the true costs of on-site disposal.
- Tecumseh's estimate for off-site disposal also assumes that 100% of the remedial soils would be transported by truck to the off-site commercial disposal facility. However, the costs of transport by rail for distances over 300 miles is often substantially less than the costs of truck transport (<http://mechdb.com/index.php/File:Railvstruck.png>). Therefore, transporting remedial soils by rail at such distances would reduce the cost of off-site disposal.

- Tecumseh’s CAMU grading scheme likely underestimates the amount of regrading needed (does not include regrading along Smokes Creek).

The Alternative 1 CAMU construction cost Appendix Q of the 2019 CMS report did not accurately account for the volume of berm slag that would need to be excavated to construct a 24.1-acre contiguous cover and did not provide any cost to construct a geo-composite liner and leachate collection system. When these important construction elements are accounted for, the construction costs for Alternative 1 (\$15,088,000) become approximately 30% higher (\$3,452,000) than the construction cost for Tecumseh’s recommended Alternative 2 CAMU (\$11,66,000).

Given the absence of data substantiating that the soils and wastes on-site qualify as technologically enhanced naturally occurring radioactive material wastes as presented in Appendix Q are likely overestimated site wide, characteristics such as high specific energy (BTU/lb) and the presence of high and potentially hazardous levels of such COCs as benzene, mercury, and lead are more likely to impose disposal restrictions on excavated soils and wastes from the Tecumseh site. In particular, waste with high specific energy or those characteristically hazardous for benzene (D018) may require thermal treatment or incineration rather than land disposal. This requirement for incineration may serve to increase costs for off-site disposal beyond those presented in Appendix F for wastes from certain SWMUs, including P-75, S-16, and S-23 that may exhibit these characteristics. Incinerators typically have limited capacity based both on waste volume and waste composition (e.g., specific energy value), so a requirement for incineration may also serve to complicate offsite disposal by limiting the volume of waste that can be sent offsite at a time, or by requiring wastes to be sent to multiple locations in order to keep pace with the volume generated.

Some of the off-site disposal quantities also seem to be either under- or overestimated as presented in Appendices E and Q. The total off-site disposal quantity presented in Appendix F may be overestimated since it includes several SWMUs, including P-9, P-18a/b, S-13, and S-21 that have already undergone remediation and have had their wastes incorporated into closed, permitted landfills. Alternatively, several SWMUs appear to not yet be fully delineated, which may result in their disposal costs being underestimated. These include S- 23 and AOC-D, which as discussed above were not vertically delineated during the test pitting work in 2011, and which in the case of AOC-D was not completely horizontally delineated either due to tar impacts appearing to continue beneath SWMU S-14. The mercury-impacted waste in S-17 has also not been fully delineated or characterized. The mercury ISCO exceedance is attributed in the CMS to a broken thermometer; however, Appendix Q assumes that 1,000 yds<sup>3</sup> of mercury-contaminated waste is present. Given that mercury contamination may restrict land disposal options, additional characterization will be performed during the remedial action for S-17.

In summary, based on the above, it is likely that the disparity between on-site versus off-site costs is less than indicated by the Tecumseh estimates, though it is still expected to be substantial. However, since assumptions such as the volume of soil beneficially re-used are highly speculative, it must be conservatively assumed that off-site disposal will be higher than on-site disposal. Therefore, the DEC considers the on-site disposal option to be more favorable than the off-site option with respect to the cost criterion.

## **2.7 Community Acceptance**

Disposal options are to be evaluated based on the degree to which they are acceptable to the community.

Implementation of the CAMU is anticipated to include opportunities (which are further described in the paragraphs that follow) for:

- Public access to Lake Erie;
- Habitat creation, restoration and enhancement;
- Additional opportunities for redevelopment involving the combination of road, rail and water transportation routes;
- Opportunities for public recreation; and
- Shoreline which is appropriately reconfigured to provide stability and lake access through a combination of such techniques as regrading, ecologically enhanced revetments, breakwaters or jetties, beach restoration, nature-based living shoreline or other approaches to soften the lakeshore impacted by past operations of the facility.

Rather than constructing the CAMU as a single mound, undulations and more natural grading could be incorporated into the CAMU design, although this would represent a more significant grading effort than construction of a single mound, or of construction of seven individual SWMU covers as presented in Alternative 2. This would allow for construction of natural-appearing landforms were previously submitted to the Department, which shall be considered in the final design.

The City of Lackawanna and its citizens have previously expressed a strong desire for public accessibility to Lake Erie. There is precedent for incorporating public access into former landfills. The Staten Island, New York, Fresh Kills Park master plan could be referenced as a model for how this has been done successfully in New York. Additionally, several design concepts included in the landform grading reference materials previously provided to the Department could also be retained. These references include concepts such as the incorporation of natural grading techniques and revegetation concepts which could provide for a post-closure project which more closely mimics natural features and formations, enhancing the public access experience.

Through relatively common CAMU design strategies and concepts, the incorporation of nature trails that could be utilized for walking, running, and/or snowshoeing could be incorporated into the design (with the approval of Tecumseh). Additionally, the vantage point of Lake Erie from the top of the CAMU area would likely provide for a desirable hiking destination for the City of Lackawanna. The construction of a viewing/observation area at the apex of the CAMU would provide for this vantage point (with the approval of Tecumseh). The potential for additional elements for public (i.e., passive recreation protective of human health such as educational kiosk displays, dog park/trails, playground/sports fields, canoe launch) will be discussed with the community for their input and referenced in a community participation plan.

The shoreline of Lake Erie may likely be a tempting destination for people visiting the public access features of the site. Since the metal, slag, and debris found along the shoreline would pose a significant health and safety risk to anyone in the area, it is recommended that this area be evaluated for a public access plan assess means of deterring people from the shoreline area and/or softening the shoreline to provide gentler slopes, reduce erosion and minimize physical hazards posed by slag.

Based on the input received from the affected community as indicated above, the department will evaluate the on-site and off-site options and determine its preference with respect to the community acceptance criterion.

## **2.8 Summary of Disposal Option Evaluation**

A review of the department's evaluation of disposal options with respect to the seven (7) criteria indicates that on-site disposition of remedial soils with a preference towards beneficial re-use is: the more favorable option in terms of the green remediation practices and cost criteria; equal to off-site disposal in terms of the technical, environmental, and human health criteria; and slightly less favorable than off-site disposal for the institutional criteria.

Therefore, pending input from the affected community, from an overall perspective, the Department considers the on-site CAMU option for remedial wastes with emphasis on encouraging beneficial use and the off-site option as being very comparable and both acceptable.

## **3.0 Elements of the Transport and Disposition of Wastes Portion of Remedy**

The following are the elements of the remedy's options for transport and disposition of remedial wastes that will be generated by implementation of the remedy:

- The option for on-site disposal is available if doing so does not substantially delay implementation of the remedy. If the conditions for on-site disposal are not met, off-site disposition of remedial wastes at a commercial land disposal facility, or



facilities, with the proper Permits and/or authorizations to accept such soils will be required;

- The DEC encourages maximizing the volume of remedial soils which are beneficially re-used as daily cover at commercial landfills to the greatest extent practical for either the on-site or off-site disposal options, to provide for a more “green” and less costly soil disposition;
- For the off-site disposal option, the use of on-site temporary staging within the Facility area in accordance with a plan approved by the Department and consistent with 6 NYCRR 373-2.19(e) of the DEC regulations is allowed. The plan will set a time limit for temporary storage, the maximum volume of remedial soils that can be present at the site at any one time, as well as limits on the area, height, and slopes of the temporary unit. Such staging will help ensure the expeditious cleanup of properties and help to maximize the volume of remedial soil sent off-site for beneficial re-use as daily cover;
- For any remedial soils transported off-site, the use of rail to transport remedial soils is encouraged, especially for transport to any commercial landfill which is over 300 miles from the facility.

## **APPENDIX E**

### **CAMU Minimum Design Standards**

#### **CAMU-Eligible Waste**

# CAMU MINIMUM DESIGN STANDARDS

## CAMU-ELIGIBLE WASTE

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

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### **CAMU-Eligible Waste**

- (a) All solid and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris that contain listed hazardous wastes or that themselves exhibit a hazardous characteristic and are managed for implementing cleanup. Prior to placement in the CAMU, hazardous wastes must be appropriately treated to either meet the applicable treatment standard or eliminate the hazardous characteristic.
- (b) As-generated wastes (either hazardous or non-hazardous) from ongoing industrial operations at a site are not CAMU-eligible wastes.
- (c) Wastes that would otherwise meet the description in (a) are not “CAMU-Eligible Wastes” where:
  - (1) the wastes are hazardous wastes found during cleanup in intact or substantially intact containers, tanks, or other non-land-based units, unless:
    - (i) the wastes are first placed in the tanks, containers or non-land-based units as part of cleanup, or
    - (ii) the containers are excavated during the course of cleanup; or
  - (2) the Department exercises the discretion to prohibit the wastes from management in a CAMU.
- (d) Notwithstanding (a), where appropriate, as-generated non-hazardous waste may be placed in a CAMU where such waste is being used to facilitate treatment or the performance of the CAMU.

## **Prohibition Against Placing Liquids in the CAMU**

- (a) The placement of bulk or noncontainerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not absorbents have been added) in the CAMU is prohibited except where placement of such wastes facilitates the remedy selected for the waste.
- (b) The requirements in §264.314(d) for placement of containers holding free liquids in landfills apply to placement in the CAMU except where placement facilitates the remedy selected for the waste.
- (c) The placement of any liquid which is not a hazardous waste in the CAMU is prohibited unless:
  - (i) such placement facilitates the remedy selected for the waste; or
  - (ii) a demonstration is made pursuant to §264.314(f).

\* Consistent with the long-standing approach for landfills, liquids should generally not be placed in the CAMU. However, there will be instances where it is appropriate to place liquids or wastes containing liquids in the CAMU to facilitate the remedy selected for the waste. Liquids might be introduced into the CAMU, for example, during dewatering of sludges or sediments, to facilitate bioremediation, for soil washing or solvent extraction technologies, for dust suppression.

## **Treatment Standards for Waste Placed in the CAMU**

Waste that contains principal hazardous constituents must meet treatment standards determined in accordance with paragraph (a) or (b) below:

- (a) Treatment standards for wastes placed in CAMUs.
  - 1) For non-metals, treatment must achieve 90 percent reduction in total principal hazardous constituent concentrations, except as provided by paragraph (3) of this section.
  - 2) For metals, treatment must achieve 90 percent reduction in principal hazardous constituent concentrations as measured in leachate from the treated waste or media (tested according to the TCLP) or 90 percent reduction in total constituent concentrations (when a metal removal treatment technology is used), except as provided by paragraph 3 of this section.
  - 3) When treatment of any principal hazardous constituent to a 90 percent reduction standard would result in a concentration less than 10 times the Universal Treatment Standard for that constituent, treatment to achieve constituent concentrations less than 10 times the Universal Treatment

Standard is not required. Universal Treatment Standards are identified in 40 CFR §268.48 Table UTS.

- 4) For waste exhibiting the hazardous characteristic of ignitability, corrosivity or reactivity, the waste must also be treated to eliminate these characteristics.
- 5) For debris, the debris must be treated in accordance with 40 CFR §268.45 or by methods or to levels established under paragraph (a) or (b) of this section.

**The CAMU into which wastes are placed must be designed in accordance with the following:**

(a) Liners

The CAMU must include a composite liner and a leachate collection system that is designed and constructed to maintain less than a 30-cm depth of leachate over the liner. For purposes of this section, composite liner means a system consisting of two components; the upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than  $1 \times 10^{-7}$  cm/sec. FML components consisting of high-density polyethylene (HDPE) must be at least 60 mil thick. The FML component must be installed in direct and uniform contact with the compacted soil component; and

(b) Cap

At final closure of the CAMU, the owner or operator must cover the CAMU with a final cover designed and constructed to meet the following performance criteria:

- A. Provide long-term minimization of migration of liquids through the closed unit;
- B. Function with minimum maintenance;
- C. Promote drainage and minimize erosion or abrasion of the cover;
- D. Accommodate settling and subsidence so that the cover's integrity is maintained;
- E. Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present; and
- F. Other post-closure requirements necessary to protect human health and the environment will include monitoring, and maintenance activities to ensure the integrity of the CAMU, including the final cover, in perpetuity.

## **Groundwater Monitoring and Corrective Action**

the CAMU must include the following:

Requirements for ground water monitoring and corrective action that are sufficient to:

- (i) Continue to detect and to characterize the nature, extent, concentration, direction and movement of existing releases of hazardous constituents in ground water from sources located within the CAMU;
- (ii) Detect and subsequently characterize releases of hazardous constituents to ground water that may occur from areas of the CAMU in which wastes will remain in place after closure of the CAMU; and
- (iii) Require notification and corrective action, as necessary to protect human health and the environment, for releases to groundwater from the CAMU.

### **Site specific design issues to be resolved during pre-design investigation and/or remedial design:**

- The existing side slopes in SWMU S-7/S-20 are steeper than 2H:1V (Figure 4a). Either the side slopes will need to be flattened or special considerations will be needed during design to line the steep slopes. Further, the CAMU is to have only one cell and it may take time to fill the cell as the remedial work is performed. If the side slopes are not flattened, special considerations will be needed during design to place and maintain the 1' clean graded sand in place atop the bottom liner system.
- The proposed grading plan indicates top of CAMU perimeter berm at El. 630' (Figure 4a). Assuming base elevations as El. 620' to El. 625' (top of bottom liner system), the storage volume up to the top of perimeter berm is approximately 50,000-60,000 cubic yards. Considering the wide range for the volume of waste that will be consolidated in the CAMU, two very different final grade outcomes are possible as discussed below. CAMU design needs to maintain flexibility for both the outcomes.
  - Volume of waste that needs to be consolidated in the CAMU is towards the higher end of the estimated range resulting in final waste grade above the top of perimeter berm. In this scenario, perimeter ditch/swale will need to be designed to effectively manage leachate during operating life of the CAMU and to manage clean storm water post-construction.
  - Volume of waste that needs to be consolidated in the CAMU is towards the lower end of the estimated range resulting in final waste grade below the top of perimeter berm. In this scenario, special considerations will be needed during design to manage storm water post-construction.

- Considering the typical short working window (April through November), it is possible that only small amount of waste is disposed in the CAMU in the first year or two after construction of the cell. This possibility should be considered during
- the development of the waste disposal plan to minimize and effectively manage the leachate generated in the CAMU.
- The storm water system will be designed for a 25-year 24-hour event. The CAMU and other impoundments are expected to exist for several decades post-closure. As a minimum, ensure that the CAMU design can sustain a 100-year 24-hour event without damage to the designed systems.
- The final surface above the perimeter berm (above El. 630') is indicated to have a slope of 4% to 10%. If the volume of waste to be consolidated in the CAMU increases significantly, then the slopes may need to be steepened to accommodate the waste. The geosynthetic drainage composite (GDC) will only occur around the perimeter and 25' up the side slope. If final slopes are steepened, then GDC will need to be installed on the entire slope (crest to toe of side slope).
- The design proposes removal of sludge and mill scale from the footprint of the CAMU. If the materials left behind within the footprint are likely to settle under the waste loading, then the leachate collection system should be designed to accommodate the expected settlements.
- Considerable gradings will occur in the S-8 area. Installing outlet discharge prior to completing grading near the NE corner of the CAMU may be necessary.

**Corrective Measures Study, Appendix S: Subsurface Exploration, Geotechnical Engineering Evaluation and Coastal Engineering Services.**

The following will need to be addressed during the pre-design investigation and/or remedial design:

- Additional analyses be conducted with seasonal high elevations of groundwater that consider the elevation of groundwater in monitoring wells as well as the water elevation in Lake Erie.
- It is recommended the stability analyses are conducted with the “optimization” option in the Slope/W software used by GEI (2013).
- It is recommended that an additional loading case be added to the analysis that demonstrates the stability of the slopes in the long term in static loading condition.
- It is recommended that the selected earthquake loading and liquefaction triggering analysis be revised using ground motion based on the latest Coterminous US Edition of the USGS hazard map.

**APPENDIX F**  
**REVIEW OF OTHER STATES' ARSENIC REMEDIAL GOALS**



# REVIEW OF OTHER STATES' ARSENIC REMEDIAL GOALS

Bethlehem Steel (Tecumseh Redevelopment, Inc.)

OU-01 – Site Wide Remedial Elements

OU-09 – Water Courses, and

OU-10 – Site Wide Groundwater

Site No. 915009

EPA ID No. NYD002134880

City of Lackawanna, Erie County

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The DEC reviewed the arsenic cleanup levels in numerous other states. Over the past 20 years there have been various attempts to unify soil remediation cleanup standards across the U.S. The EPA has not established standard action levels for soil which trigger cleanup actions. In reviewing arsenic remedial goals and Records of Decision (RODs) in the Superfund program for sites across the U.S., there has been substantial variability in remedial goals and the nature of each site is important in explaining the difference. For example, in EPA Region 2 (NY and NJ) most of the decisions were either based on background or residential risk analyses (a majority of these were around 20 ppm). In EPA Regions 8, 9, and 10 combined (CO, MT, UT, AZ, CA, and AK), there were substantially more industrial decisions resulting in higher cleanup values (200 ppm and higher) at these sites. In addition, some States have established cleanup levels for arsenic in soil for a residential setting.

Out of 17 states responding to a 1998 survey conducted by the Association for the Environmental Health of Soils, 16 have established arsenic cleanup levels ranging from 0.4 ppm to 20.0 ppm; most are based on background levels. Established levels in New York (16.0 ppm) and New Jersey (20.0 ppm) are based on background. Colorado is the only state responding to the survey which allows 40-250 ppm based on site-specific considerations. There are many factors to consider when determining a cleanup number for any constituent, including arsenic. Therefore, remedial decisions or arsenic cleanup levels for any particular site should not be interpreted as necessarily applicable to Lackawanna since factors which are unique to each site are often involved in remedy selection.

The DEC recently reviewed current cleanup levels in 14 states and found that the 16-ppm cleanup value for this site is higher than or equal to the state-wide calculated health based cleanup value in almost all reviewed states for residential use and 11 out of the 14 reviewed states for all other uses. Following is a summary of that review:

STATE	USE	CLEANUP LEVEL (in parts per million)
Arizona	All Uses	1
Connecticut	All Uses	10
Delaware	Restricted Use/Non-Critical Water	4
Florida	Residential	2.1
	Commercial/Industrial	12
Iowa	All Uses	1
Kansas	Residential	11.3
	Non-Residential	38
Maryland	Residential	0.43
	Non-Residential	1.9
Maine	Residential	0.14
	Other Uses	0.42 – 4.2
Massachusetts	All Uses (S-1, S-2 and S-3)	20
Mississippi	Unrestricted	0.426
	Restricted	3.82
New Jersey	All Uses	1
New York	All Uses	16
	Protection of Ecological Resources	13
Oregon	Urban Residential	0.3
	Other Uses	1 – 370
Pennsylvania	Residential	12
	Non-Residential (0 - 2' and 2' – 15')	53 – 190,000
Rhode Island	All Uses	7

Natural background arsenic concentrations in the U.S. soil are based on research conducted by the U.S. Geological Survey (USGS). The concentration of arsenic in U.S. natural background samples ranged up to 97.0 ppm with an average of 7.2 ppm.

The DEC had previously conducted a *statewide* rural background study and determined the background level of arsenic. That study determined that the background level for arsenic was 16 ppm. The Technical Support Document (TSD) expressly reviewed the background level of arsenic and the various studies in NYS relative to this issue and expressly discussed the arsenical pesticide use in parts of New York State. (See *TSD*, page 301 - 302) The TSD considered five studies conducted in NYS relative to arsenic which indicated arsenic concentrations ranging from 14.1 ppm to 19.1 ppm. Based on these background levels the 6NYCRR Part 375 and CP-51 soil cleanup objective was set at 16 ppm.