RECORD OF DECISION

Operable Unit 2 of the
Semet Residue Ponds Subsite
of the Onondaga Lake Superfund Site

Town of Geddes, Onondaga County, New York

New York State Department of Environmental Conservation
and
United States Environmental Protection Agency
Region II
March 2019

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Semet Residue Ponds Subsite of the Onondaga Lake Superfund Site
Geddes, Onondaga County, New York
Superfund Site Identification Number: NYD986913580
Operable Unit: 27

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit (OU) 2[1] of the Semet Residue Ponds Subsite (Subsite) of the Onondaga Lake Superfund site, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting a remedy to address the contaminated Solvay waste/soil/fill materials associated with the Subsite. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Health was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f), and it concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances at the Subsite, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy includes the following components:

- Treatment via *in-situ* solidification/stabilization of Semet residue remaining at the Subsite that cannot be beneficially reused under the OU-1 remedy (*e.g.,* because of unacceptable sulfur or moisture content, insufficient heat content, and/or unacceptable soil/debris content). The treatment will consist of the addition of

[1] This is also being tracked in EPA's CERCLIS database as OU-27 of the Onondaga Lake National Priorities List site.

amendments (*e.g.,* Portland cement, cement kiln dust, lime kiln dust, blast furnace slag) to alter the physical characteristics of the Semet residue to a granular material;

- Installation of an impermeable geomembrane cap and, as necessary, 18 inches of clean soil/granular backfill to prevent unacceptable exposure risks in former pond and other Semet residue areas;
- Installation of a minimum one-foot thick soil cover (or maintained paved surfaces/buildings) in the Brushy Cleared Area and Lakeshore Area (as delineated in the Decision Summary) to be protective for both current and reasonably anticipated future land uses where shallow soil concentrations are above 6 NYCRR Part 375 Soil Cleanup Objectives for commercial use;
- Grading to support commercial and/or industrial development;
- Development and implementation of a Health and Safety Plan and a Community Air Monitoring Plan for all ground-intrusive activities;
- Continued maintenance and monitoring of the Willis-Semet Berm Improvement Interim Remedial Measure (IRM)[2], including monitoring to document that established criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or replanting/reseeding of vegetation, as necessary;
- Development and implementation of a Site Management Plan (SMP) that identifies use restrictions and engineering controls for the site, details the steps and media-specific requirements necessary to ensure that these controls remain in place and effective, and a long-term monitoring plan to assess the performance and effectiveness of the remedy; and
- Institutional controls in the form of environmental easements and/or restrictive covenants will be used to restrict the land use to commercial (including passive recreational)/industrial use, restrict groundwater use, and require that intrusive activities in areas where contamination remains, and vapor intrusion investigation and/or mitigation measures, are conducted, as appropriate, in accordance with the SMP.

The Subsite is part of a waste management area because the waste is a solid waste containing contaminants of concern and will meet the requirements for containment under the Resource Conservation and Recovery Act (RCRA), Subtitle D.[3] The vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than $1x10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than $1x10^{-5}$ cm/sec). The cover materials, in combination with the underlying Solvay waste/soil/fill material and continued operation and maintenance of the groundwater collection and treatment system for Subsite groundwater, will meet the requirements for containment under RCRA Subtitle D.

Contaminated shallow and intermediate groundwater outside of the hydraulic containment system at the shore of Onondaga Lake will be addressed as part of the Willis

[2] An "interim remedial measure" under New York State law parlance and a removal action under CERCLA are one and the same response action.

[3] A $1x10^{-5}$ centimeter per second (cm/sec) permeability rate is required under RCRA Subtitle D.

Avenue Subsite remedy because of the comingling of this groundwater between the two sites.

The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during the remedial design.

The cover system and vegetation enhancements will require routine maintenance and inspections to maintain cover integrity.

Fill material brought to the Subsite will need to meet the requirements for commercial use. Native species will be used for the vegetative component of covers.

Pavement, sidewalks, or structures, such as buildings, that are part of future development can serve as acceptable substitutes in areas where an impermeable geomembrane cap is required.

A portion of the Main Site Area (as described in the Decision Summary) is anticipated to be used for overflow parking for the New York State Fairgrounds, while an extension of the Onondaga County West Shore Trail ("Onondaga Loop the Lake" trail) will cross a portion of the Semet Lakeshore Area. The extent, thickness, and permeability of the covers will be revisited during the design phase and/or during site management, as necessary, if site uses change.

Principal threat waste, including stained Solvay wastes and Semet residue that could not be reused during implementation of the OU-1 remedy will be treated through *in-situ* solidification/stabilization.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy[4] and NYSDEC's Green Remediation Policy.[5] This will include consideration of green remediation technologies and practices.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1- Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621, because, as implemented, it satisfies the following: (1) it is protective of human health and the environment; (2) it meets a level of standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under the federal and State laws; (3) it is cost-effective; and (4) it utilizes permanent solutions and alternative

[4] See http://epa.gov/region2/superfund/green_remediation.
[5] See http://www.dec.ny.gov/docs/re-mediation_hudson_pdf/der31.pdf.

treatment technologies to the maximum extent practicable.

Part 2- Statutory Preference for Treatment

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or a justification for not satisfying the preference). Under the selected remedy, the mobility of remaining Semet residue material that is unsuitable for off-site thermal processing (*e.g.,* under the OU-1 remedy) will be reduced via solidification/stabilization. There are other areas of the Subsite where contaminated Semet residue materials are present as discontinuous thin zones at various depths with the Solvay waste. NYSDEC and EPA do not believe that treatment of these Semet residue materials is practicable or cost effective given their distribution and the volume of materials that are present.

Part 3- Five-Year Review Requirements

Because this remedy is anticipated to result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action and at five-year intervals thereafter, to ensure that the remedy remains protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for Operable Unit 2 of the Semet Residue Ponds Subsite.

- Contaminants of concern and their respective concentrations (see ROD, pages 6-12 and Appendix II, Tables 1 and 2);
- Baseline risk represented by the contaminants of concern (see ROD, pages 12-19, Tables 3a and 3b);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, Appendix II, Tables 1, 2 and 3);
- Manner of addressing source materials constituting principal threats (see ROD, pages 32-33);
- Potential land use that will be available at the Subsite as a result of the selected remedy (see ROD, page 12);
- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the selected remedy cost estimates are projected (see ROD, pages 24-25 and Appendix II, Table 4); and
- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, page 37-39).

AUTHORIZING SIGNATURES

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

3/19/19
Date

Angela Carpenter, Acting Director
Emergency and Remedial Response Division
EPA, Region 2

3.19.19
Date

RECORD OF DECISION FACT SHEET
EPA REGION II

Site

Site name:	Operable Unit 2 of the Semet Residue Ponds Subsite of Onondaga Lake Site
Subsite location:	Geddes, Onondaga County, New York
Site HRS score:	50.00
Listed on the NPL:	December 16, 1994

Record of Decision

Date signed:	March 19, 2019
Selected remedy:	*In-situ* treatment of targeted material *(e.g.,* remaining Semet material that could not be reused under the OU-1 remedy) and the installation of an enhanced engineered cover system where shallow soil exhibits concentrations above 6 NYCRR Part 375 Soil Cleanup Objectives for commercial use. In addition, the remedy includes the continuation of operation and maintenance of prior response actions that have been implemented at the Subsite, site grading, institutional controls, development of a Site Management Plan, periodic reviews, and long-term maintenance. The enhanced engineered cover system will require routine maintenance and inspections to maintain cover system integrity. The Subsite is part of a Waste Management Area because the waste is a solid waste that contains contaminants of concern and will meet the requirements for containment under Subtitle D of the Resource Conservation and Recovery Act (RCRA). Given the comingling of the shallow and intermediate groundwater with that of the adjacent Willis Avenue subsite, the shallow and intermediate groundwater outboard of the Waste Management Area for these two subsites will be addressed under the yet-to-be selected remedy for the Willis Avenue subsite
Capital cost:	$24 million
Annual operation and maintenance cost:	$42,500
Present-worth cost:	$24.6 million

Lead NYSDEC

Primary Contact:	Tracy Alan Smith, Project Manager, (518) 402-9676
Secondary Contact:	Donald Hesler, Section Chief, (518) 402-9676

Waste

Waste types:	Volatile organic compounds, semi-volatile organic compounds, and inorganics
Waste origin:	Disposal of wastes generated by the acid washing of coke light oil during the production of benzene, toluene, naphthalene, and xylene at a nearby BTX (Benzol) Plant.
Contaminated media:	Soil, Groundwater

DECISION SUMMARY

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Town of Geddes, Onondaga County, New York

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SUBSITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, the Onondaga Lake Site (Site) was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, the Site, which includes its tributaries and major upland hazardous waste sources that have contributed or are contributing contamination to the lake (the latter being referred to as subsites), was added to the U.S. Environmental Protection Agency's (EPA's) National Priorities List (NPL). This NPL listing means that the Site is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there has been a release of hazardous substances, pollutants, or contaminants as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).

Because many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into several operable units (OUs) to manage the site-wide response actions. CERCLA's implementing federal regulations, known as the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at Section 300.5, defines an OU as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into several OUs, depending on the complexity of the problems associated with the site. OUs may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

The New York State Department of Environmental Conservation (NYSDEC) and EPA have, to date, organized the work for the Site[1] into 12 discrete subsites[2], one of which is the Semet Residue Ponds Subsite (hereinafter, Subsite). These subsites are considered by EPA to be OUs of the NPL site. In 1989, Honeywell International Inc. (Honeywell) and NYSDEC entered into an Administrative Consent Order (ACO) to conduct a remedial investigation/feasibility study (RI/FS).[3]

The Subsite is further divided into two OUs. OU-1 includes the removal of Semet residue for off-site beneficial reuse and containment of shallow and intermediate groundwater at the Subsite and OU-2 consists of material including the Semet residue and Solvay

[1] The Onondaga Lake Superfund Site's Superfund Site Identification Number is NYD986913580.
[2] NYSDEC is the lead agency and EPA is the support agency for 11 subsites; EPA is the lead agency for one subsite (see the "Scope and Role of Operable Unit" section below).
[3] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks. For OU-2, a Data Summary Document (DSD), which is similar to an RI report, was drafted. An FS identifies and evaluates remedial alternatives to address the contamination at a site.

waste/soil/fill that was not addressed by other actions. These other actions include the implementation of the OU-1 remedy that consists of Semet residue removal and beneficial reuse and the installation of groundwater collection and treatment systems, as documented in the ROD issued by NYSDEC and EPA for OU-1 in 2002 and an Explanation of Significant Differences (ESD) in 2017, which documented changes to the remedy selected in the 2002 ROD. Groundwater collection and treatment systems mitigate contaminated groundwater discharge to Onondaga Lake and Tributary 5A, with the collected groundwater being treated at the Willis Avenue Groundwater Treatment Plant (GWTP), as documented in the ROD issued by NYSDEC and EPA for OU-1 in 2002. The shallow and intermediate groundwater outside of the hydraulic containment system at the shore of Onondaga Lake is comingled with the shallow and intermediate groundwater migrating from the adjacent Willis Avenue subsite. Therefore, shallow and intermediate groundwater outside of the hydraulic containment system will be addressed as part of the Willis Avenue subsite. The remedial options for deep groundwater at this and adjacent subsites (*i.e.,* Wastebeds 1-8, Wastebed B/Harbor Brook, and Willis Avenue) are being evaluated and will be addressed separately as part of a more comprehensive regional OU.

The RI/FS for OU-2 of the Semet Residue Ponds Subsite (Subsite) has been completed. The selected remedy described in this Record of Decision (ROD) addresses Solvay waste[4]/soil/fill material at the Subsite.

The approximately 52-acre Subsite includes berms and fenced-in areas. The Subsite is located south of Onondaga Lake in Geddes, New York within an industrial setting (see Figure 1; figures can be found in Appendix I). The Subsite is bordered on the north and west by the Crucible Specialty Metals Corporation (Crucible), the Crucible Lake Pump site/Honeywell Onondaga Lake Visitor Center, and the Syracuse Metropolitan West Side Pump Station. It is bordered on the northeast by Onondaga Lake, on the west by railroad tracks and an industrial complex and on the southeast by the Willis Avenue subsite. There are no buildings present on the Subsite.

The Main Site Area includes the portion of the Subsite to the west of I-690 and State Fair Boulevard, while the Lakeshore Area includes the portion of the Subsite to the east of I-690 and State Fair Boulevard. The Lakeshore Area is situated on the northeast portion of the Subsite between the southern shore of Onondaga Lake and the west bound lane of I-690. The northwestern extent of the Lakeshore Area is defined by a gated entrance, and the southeastern extent is defined by the Willis Lakeshore Area. The Semet Lakeshore Area is bounded by an 8 foot (ft.) high chain link fence with a locked gate and Onondaga Lake. A portion of the Willis-Semet Hydraulic Containment System Interim

[4] Portions of the Subsite were historically used for the deposition of Solvay waste, an inert material consisting largely of calcium carbonate, calcium silicate, and magnesium hydroxide.

Remedial Measure (IRM)[5] was implemented in the Semet Lakeshore Area. The IRM consisted of the installation of the Semet barrier wall and associated groundwater collection system, construction of a low permeability cap over the groundwater collection system and restoration of the Lakeshore Area. Plantings included trees, shrubs and native grasses. In addition, an access road was constructed through the area.

An approximately 13-acre area designated as the Brushy Cleared Area (BCA) is located on the northeast portion of the Main Site Area. There are five man-made excavations located west of the BCA within Solvay waste, referred to as "ponds," formerly containing Semet residue that was removed for beneficial reuse in accordance with the OU-1 ROD and ESD. A site plan can be found on Figure 2.

SUBSITE HISTORY

Main Site Area

Before 1917, the area was a settling basin (wastebed) for Solvay waste and was known as "Solvay Wastebed A." From 1917 to 1970, Semet residue, a tarry, organic-based residue generated by the acid washing of coke light oil during the production of benzene, toluene, naphthalene, xylene, and "motor benzol" by Honeywell predecessor Allied Chemical Corporation (later AlliedSignal) at its former benzol, toluol, xylol (BTX) plant, was deposited in five bermed excavations in Wastebed A. The Semet residue ponds are in the western half of Wastebed A (see Figure 2). The ponds were constructed by dragline and bulldozer excavation of the Solvay waste. Nonengineered dikes encompassing the ponds were constructed from fill materials, including concrete rubble, old electrolytic cell parts, ashes, and bricks. A clay and gravel mixture was also observed in the berms during investigative work performed in 2002. There are also "Semet Material Areas" within the western half of Wastebed A that were used as material-handling areas during former operations.

Lakeshore Area

The Lakeshore Area was not used for production purposes; it was mainly used as a utility corridor or to access other Honeywell lakeshore properties. A sheet pile barrier wall and groundwater collection system were installed along the shoreline under the Semet/Willis Lakeshore Hydraulic Containment System IRM, which was identified as a component of the OU-1 remedy in the 2002 ROD.

[5] An "interim remedial measure" under New York State law parlance and a removal action under CERCLA are one and the same response action.

OU-1 Remedial Actions and Interim Remedial Measures

Various IRMs and OU-1 remedial actions have been implemented at the Subsite (see Figure 3) including:

- Semet Residue Removal and Reuse: As part of the OU-1 remedy, over 32,300 tons of Semet material was dewatered, as needed, and sent off-site to a Resource Conservation and Recovery Act (RCRA)-permitted thermal processing facility for beneficial reuse. A temporary fiber-based or cement-based spray cover was used for odor and emission control.

- Tributary 5A: As part of the OU-1 remedy, a shallow groundwater collection system was installed beneath Tributary 5A, a drainage ditch that discharges to Onondaga Lake, to prevent migration of groundwater to Onondaga Lake and Tributary 5A, as well as associated Subsite impacts to sediment and surface water. As part of this remedial action, sediment in Tributary 5A was removed and an isolation layer was installed. Groundwater collected by this system is treated at the Willis Avenue GWTP. Operation, maintenance, and monitoring of the groundwater remedy is ongoing.

- Willis-Semet Lakeshore Hydraulic Containment System IRM: To prevent the migration of contaminated shallow and intermediate groundwater to Onondaga Lake, the Willis-Semet Hydraulic Containment System IRM was installed between 2006 and 2007. The Semet portion of this IRM was part of the OU-1 remedy and consists of approximately 1,440 linear ft. of barrier wall and a groundwater collection system along the Onondaga Lake shoreline. Groundwater collected from this system is treated at the Willis Avenue GWTP. The Willis Avenue GWTP, installed in 2006 and upgraded three times since then, treats groundwater collected across Honeywell's subsites around Onondaga Lake. A low permeability cap was constructed over the groundwater collection trench to minimize infiltration of rainwater and surface water runoff into the trench. The cap material was placed in a 1 ft. lift followed by compaction. Restoration included the placement of topsoil over the low permeability cap and seeding. This work was completed in 2007. Additionally, restoration along the Semet Lakeshore Area consisted of the placement of topsoil over the existing riprap embankment and the establishment of a native plant community using upland and shoreline plantings and seeding. Plantings included trees, shrubs, and native grasses. Restoration along the Semet Lakeshore Area was performed in 2010. The Willis-Semet Hydraulic Containment System was identified as a component of the OU-1 remedy in the 2002 ROD.

- I-690 Storm Drainage System IRM: In addition to the above-mentioned OU-1 groundwater remedies, an additional groundwater IRM was implemented at the

Subsite. Groundwater discharging from the Subsite observed to be infiltrating into storm water sewers along State Fair Boulevard was mitigated in 2012 by the I-690 Storm Drainage System IRM (and the groundwater collection trench along State Fair Boulevard). Groundwater collected by this system is treated at the Willis Avenue GWTP.

- Willis-Semet Berm Improvements IRM: In 2012, berm material from select impacted areas was excavated and replaced with clean fill/topsoil prior to application of 6-inches of topsoil. In total, between 12 and 24 inches of clean fill and topsoil that met Unrestricted Use Soil Cleanup Objectives (SCOs) was placed. Native species (*e.g.,* grass, trees and shrubs) were introduced after the topsoil was applied.

As described in the "Staged Soil Pile" section later in this document, contaminated sediment and soils from the Tributary 5A remedial action and Willis-Semet Berm Improvements IRM were excavated and staged on the Main Site Area. Following consolidation, this pile was graded and seeded.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The *Semet Residue Ponds Site OU-2 Data Summary Document (DSD),* the *Semet Residue Ponds Site OU-2 Feasibility Study (FS)*, and a Proposed Plan, identifying a preferred alternative and the basis for the preference, were released to the public for comment on December 17, 2018. These documents were made available to the public via NYSDEC's website and at information repositories maintained at the Solvay Library, the Onondaga County Public Library, Atlantic States Legal Foundation, NYSDEC's Region 7 office located in Syracuse, New York, and the NYSDEC Division of Environmental Remediation's office located in Albany, New York. An NYSDEC listserv bulletin notifying the public of the availability of the above-referenced documents, the comment period start and completion dates, and the date of the public meeting was issued on December 17, 2018. A notice providing the same information was published in the *Onondaga County Eagle Observer* on December 19, 2018. The public comment period ran from December 17, 2018 to January 16, 2019.

On January 9, 2019, NYSDEC conducted a public meeting to inform local officials and interested citizens about the Superfund process, present the Proposed Plan for the Subsite, including the preferred remedy, respond to questions, and accept comments. There were approximately 15 attendees. Responses to the questions and comments received at the public meeting and to comments submitted in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF OPERABLE UNIT

In addition to this Subsite, the following eleven other subsites are being addressed as part of the Onondaga Lake NPL site: Onondaga Lake Bottom; LCP Bridge Street; Geddes Brook/Ninemile Creek; Wastebed B/Harbor Brook; Willis Avenue; Wastebeds 1-8; General Motors (GM)-Inland Fisher Guide (IFG); Salina Landfill; Ley Creek PCB Dredgings; Lower Ley Creek; and Niagara-Mohawk Hiawatha Blvd.

Dredging and capping activities for the Onondaga Lake Bottom subsite commenced in 2012. Dredging and capping activities in the Lake were completed in 2014 and 2016, respectively. Habitat restoration activities associated with the Lake Bottom remedy were completed in 2017. The dredged material is being managed at a sediment consolidation area (SCA) constructed on a former Solvay wastebed, Wastebed 13. Construction activities at the SCA, which included the placement of an engineered cap, were completed in 2017. That subsite is undergoing long-term operation, maintenance, and monitoring.

Remedies have been fully implemented at the LCP Bridge Street, Geddes Brook/Ninemile Creek, Salina Landfill, and Ley Creek PCB Dredgings subsites. These subsites are undergoing long-term maintenance and monitoring. Remedial activities for portions of, or environmental media at, the Wastebed B/Harbor Brook, Wastebeds 1-8, GM-IFG and Niagara-Mohawk subsites have been completed or are in progress. Other portions of, or media at, these subsites are in the remedial design or RI/FS phase. The Lower Ley Creek subsite is in the remedial design phase. An RI/FS for the Willis Avenue subsite is near completion. The Wastebed B/Harbor Brook subsite is in the remedial design phase.

The scope of the action for this Subsite is to address the Solvay waste/soil/fill material and remaining Semet residue not addressed in the OU-1 remedial action. NYSDEC and EPA expect this remedy to be a final, comprehensive remedy for these materials. Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, the shallow/intermediate groundwater outside of the hydraulic containment system will be addressed as part of the Willis Avenue subsite. Deep groundwater will be evaluated and addressed separately as part of a regional OU.

SUMMARY OF SUBSITE CHARACTERISTICS

The RI activities that were conducted at the Semet Residue Ponds Subsite included geological and hydrogeological investigations and the collection of samples from the shallow soil (top two feet), subsurface soil (below two feet), groundwater, surface water, and sediment.

Based upon the results of the RI, the primary contaminants of concern (COCs) include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganics.

Groundwater, surface water, and sediment were either addressed under OU-1 or will be addressed separately (*i.e.,* shallow and intermediate groundwater under the Willis Avenue Subsite and deep groundwater as part of a regional unit).

Site Geology and Hydrogeology

The local geology consists of seven distinct layers including soil and fill material (including Solvay Waste) overlying the marl/peat, clay and silt, fine-grained sand and silt, sand with gravel, till, and bedrock.

The Subsite has three distinct groundwater zones, including:

- The shallow hydrogeologic unit which consists of anthropogenic fill/waste material;
- The intermediate hydrogeologic unit which consists of marl and peat material, underlain by a confining layer which includes the clay and silt unit; and
- The deep hydrogeologic unit which consists of fine-grained sand and silt and medium- to coarse-grained sand.

The depth to groundwater ranges from 5 to 15 ft. below ground surface (bgs). The elevation of the shallow zone ranges from a minimum elevation of approximately 350 ft. above mean sea level (amsl) along the lake shore to 405 ft. amsl at the center of the Main Site Area. The maximum thickness of this unit is approximately 45 ft. with an average thickness around 25 ft. The marl unit ranges from 345 ft. amsl to 365 ft. amsl. The maximum thickness of the marl is approximately 15 ft. near State Fair Boulevard and the average thickness is around 10 ft. The marl pinches out on the southern side of the Main Site Area and is not present below Tributary 5A. The deep zone ranges from 280 ft. amsl to 370 ft. amsl with the deep elevations being closer to Onondaga lake. This zone has a maximum thickness of approximately 50 ft. and an average thickness of approximately 25 ft. This layer pinches out moving away from the lake and appears to pinch out moving to the south towards Tributary 5A.

Shallow groundwater at the Subsite, which is influenced by Onondaga Lake and Tributary 5A, generally flows in a radial pattern. Intermediate groundwater is not influenced by Tributary 5A and generally flows toward Onondaga Lake. This groundwater flow is captured by the groundwater collection systems that have been installed.

There is an upward vertical gradient on the Lakeshore Area from the deep groundwater to the intermediate groundwater and Onondaga Lake; however, because of the low hydraulic conductivity of the silt and clay confining layer above the deep groundwater zone, there is little deep groundwater movement upward vertically through this confining layer to the intermediate groundwater and Onondaga Lake. The deep groundwater contains a naturally-occurring halite brine.

Results of the Remedial Investigation

As presented in the DSD, the analytical results for Solvay waste/soil/fill material at the Subsite were compared to the respective industrial and commercial land use SCOs that apply to the anticipated future land use (see Tables 1 and 2; tables can be found in Appendix II). In addition, for purposes of developing an alternative to evaluate pre-disposal conditions, the analytical results were compared to unrestricted land use SCOs. Based on these considerations, the nature and extent of the contamination, discussed below, is presented in the context of these land uses.

In addition to environmental sample collection and analysis at the Subsite, the extent of contamination in the area west of the BCA was evaluated using a technology known as Tar-Specific Green Optical Screening Tool (TarGOST®). The TarGOST® responses and associated analytical soils data are summarized in the 2010 *Operable Unit 1 Pre-Design Investigation* and included in the DSD.

Solvay Waste/Soil/Fill Material West of the BCA

The Semet residue ponds are located on the Main Site Area west of the BCA, and, as discussed above, the Semet residue has been removed for beneficial reuse to the maximum extent practicable. VOCs, SVOCs, pesticides and inorganics were detected in subsurface Solvay waste/soil/fill material in this area of the Subsite, and the analytical results were compared to the SCOs for Commercial, Industrial, and Unrestricted Uses. TarGOST® responses correlating to detected VOC concentrations were also observed in this area.

The analytical results comparison and TarGOST® responses are summarized as follows:

- ***VOCs:*** Benzene, toluene, ethylbenzene and xylene (BTEX) are the principal VOCs in the Solvay waste/soil/fill material with benzene generally having the highest VOC concentrations. VOC exceedances of Unrestricted Use SCOs were observed as deep as 40 ft. bgs, and VOC exceedances of Industrial Use SCOs and Commercial Use SCOs were noted as deep as 20 ft. bgs. Typically, benzene concentrations across the area west of the BCA exceeded Industrial Use and Commercial Use SCOs**.** Toluene and xylene frequently exceeded Commercial and Unrestricted Use SCOs with isolated Industrial Use SCO exceedances.

Ethylbenzene concentrations were infrequently observed above Unrestricted Use SCOs.

- ***SVOCs:*** SVOCs are present at concentrations that are generally comparable to the VOC concentrations. SVOC exceedances of Unrestricted Use SCOs were observed as deep as 40 ft. bgs. SVOC exceedances of Industrial Use SCOs and Commercial Use SCOs were noted as deep as 20 ft. bgs. Detected SVOCs include: 1,1'-biphenyl, dibenzofuran, 2-methylnaphthalene, naphthalene, phenol, and various other polycyclic aromatic hydrocarbons (PAHs). Naphthalene is the predominant SVOC. Of the SVOCs observed, naphthalene, benzo(a)pyrene, and dibenzofuran (at one sample location) had concentrations exceeding the Commercial Use SCOs. Naphthalene and benzo(a)pyrene concentrations also exceeded Industrial Use SCOs.
- ***Inorganic constituents:*** Mercury was detected above Unrestricted Use SCOs across the Subsite. Concentrations of mercury exceeding Commercial Use and Industrial Use SCOs were also observed at a lower frequency across the Subsite. Barium was observed at concentrations above Commercial Use SCOs at a single location.
- ***Pesticides and PCBs:*** The pesticide beta-BHC was detected at a concentration above its Industrial Use SCO in one sample. No polychlorinated biphenyls (PCBs) were detected in Subsite Solvay waste/soil/fill material samples.
- ***TarGOST® responses:*** TarGOST® responses varied across the area west of the BCA. High responses, generally correlating with detected VOC concentrations, were observed as deep as 25 ft. over much of this area. Observations deeper than 35 ft. were limited to fewer locations.

Solvay Waste/Soil/Fill Material in the BCA

VOCs, SVOCs, pesticides and inorganics were detected in subsurface Solvay waste/soil/fill material in the BCA. The analytical results were compared to the SCOs for commercial, industrial, and unrestricted uses as follows:

- ***VOCs and SVOCs:*** VOC and SVOC concentrations were below the SCOs.
- ***Inorganic constituents:*** Mercury concentrations exceeded Industrial Use and Unrestricted Use SCOs in soil at the BCA. The mercury exceedances were noted as deep as 3.5 ft.
- ***Pesticides and PCBs:*** Pesticides and PCBs were analyzed at one location. The concentration of beta-BHC was observed above the Industrial Use and Unrestricted Use SCOs at this location and PCBs were not detected.

The BCA generally has several inches to 2 ft. of soil/fill material overlying Solvay waste, located on the portion of the Main Site Area where the Semet residue ponds are not present. The BCA has a vegetative cover of buckthorn, cottonwood, and aspens. Semet residue has not been observed in the BCA.

Staged Soil Pile

Approximately 20,000 cubic yards of contaminated sediment and soil excavated during the Tributary 5A remedial action and Willis-Semet Berm Improvements IRM were consolidated into a pile located on the Subsite. Characterization sampling and analysis were performed to document that the materials did not exceed hazardous waste characteristics (*e.g.,* Toxicity Characteristic Leaching Procedure testing). Data for these samples are included in the DSD. The findings are as follows:

- ***VOCs:*** VOC concentrations were below the SCOs.
- ***SVOCs:*** The PAHs benzo(a)anthracene and benzo(a)pyrene exceeded Industrial Use SCOs. The PAHs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeded Commercial Use SCOs. 1,2-dichlorobenzene and various other PAHs exceeded the Unrestricted Use SCOs.
- ***Inorganic constituents:*** Mercury concentrations exceeded Industrial Use, Commercial Use and Unrestricted Use SCOs.
- ***Pesticides and PCBs:*** Pesticides and PCBs were not analyzed.

Semet Related Materials

Stained Solvay wastes and Semet residue that cannot be reused (*e.g.,* because of unacceptable sulfur or moisture content, insufficient heat content and/or unacceptable soil/debris content) as part of the OU-1 remedy have been observed in soil borings and test pits advanced during the investigations and other remedial work performed at the Subsite. These materials are present in the western portion of the main Subsite area where the Semet residue was present. Some of these materials exhibit characteristics of principal threat waste. These areas are discussed in depth in the DSD and FS Reports.

Conclusions

Based on the DSD, other investigations, and the results of the risk assessments (described later in this document), the following conclusions have been drawn:

- COCs include BTEX, PAHs, phenolic compounds, and mercury.

- Stained Solvay waste and Semet residue-related materials are present in the western portion of Main Site Area.

Shallow and Intermediate Groundwater

VOCs, SVOCs and inorganic constituents were detected in the shallow groundwater at the Subsite. The organic compounds most frequently observed include BTEX, PAHs

(primarily naphthalene), phenol, and methylated phenols. The concentrations of total BTEX ranged from non-detect to 20,800 µg/L, while the concentrations of total PAHs ranged from non-detect to 189 µg/L. Based on groundwater sampling, the organic constituents exceeding the Class GA standards for shallow groundwater included:

- ***VOCs:*** BTEX and chlorobenzene
- ***SVOCs:*** Assorted PAHs, including naphthalene, dichlorobenzenes, phenol, and 2-methylphenol

VOCs, SVOCs, and inorganic constituents were detected in the intermediate groundwater at the Subsite. The organic compounds most frequently observed include BTEX, as well as naphthalene, and other PAHs. The concentrations of total BTEX ranged from non-detect to 64,580 µg/L, while concentrations of naphthalene ranged from non-detect to 2,130 µg/L. Phenol concentrations ranged from non-detect to 11,000 µg/L. Based on groundwater sampling, the organic constituents exceeding the Class GA standards for intermediate groundwater included:

- ***VOCs:*** BTEX and chlorobenzene
- ***SVOCs:*** naphthalene, phenol, methylated phenols, and dichlorobenzenes

The chlorobenzene and dichlorobenzenes were limited to the eastern portion of the Subsite adjacent to the Willis Avenue subsite.

Waste Management Area

The NCP preamble language sets forth the EPA's policy that, for groundwater, "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area (WMA) when waste is left in place." The NCP preamble also indicates that, in certain situations, it may be appropriate to address the contamination as one WMA for purposes of the groundwater point of compliance (POC). Therefore, groundwater POCs for meeting applicable or relevant and appropriate requirements (ARARs) are established at the WMA edge.

Because of the presence of historical fill materials (*e.g.,* Solvay waste) deposited at the Subsite, it is not anticipated that groundwater standards would be achievable at the Subsite within a reasonable timeframe. Therefore, the area will be treated as part of a WMA (see Figure 4) with the groundwater POC being the WMA boundary (*i.e.,* outside of the barrier wall). The material within the WMA includes Solvay waste comingled with hazardous substances that are COCs for the Subsite. The management of the waste within the WMA includes meeting RCRA municipal landfill capping requirements. In many areas, existing covers and/or Solvay waste/soil/fill material is expected to meet the $1x10^{-5}$ centimeter per second (cm/sec) permeability rate required under the RCRA Subtitle D standards. Buildings and asphalt parking lots are expected to achieve and

exceed the infiltration requirements. In areas where existing covers or Solvay waste/soil/fill material do not meet the standard, cover material will include materials needed to achieve the required infiltration rate requirements. The WMA boundary is conceptual and may be refined during remedial design.

Given the comingling of the shallow and intermediate groundwater with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater beyond the WMA POC for these two subsites will be addressed in the future under the remedy for the Willis Avenue subsite.

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

The Subsite is currently zoned for industrial use and is bounded by commercial and industrial properties. The current and reasonably anticipated future land uses for the Subsite are industrial and commercial (including passive recreational[6]). The anticipated future use of the Semet Lakeshore property (north of I-690) includes construction of paved roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future access to and use of the Southwest Lakeshore Area. It is reasonably anticipated that the portions of the property south of I-690 will continue to be used for either industrial or commercial purposes (*e.g.*, parking for the State Fair).

SUMMARY OF SUBSITE RISKS

As part of the RI process, quantitative risk assessments were conducted for the Subsite to estimate the risks to human health (under current and anticipated future land uses) and the environment. Baseline risk assessments, consisting of a baseline human health risk assessment (BHHRA), which evaluates potential risks to people, and a baseline ecological risk assessment (BERA), which evaluates potential risks to the environment. The purpose of these assessments is to analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken. The risk assessments for this Subsite (see associated BHHRA and BERA reports discussed below) are available in the information repositories discussed above in the “Highlights of Community

[6] Based on 6NYCRR Part 375 and NYSDEC’s *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10) passive recreation includes recreational uses with limited potential for soil contact (*e.g.,* artificial surface fields; outdoor tennis or basketball courts; other paved recreational facilities used for roller hockey, roller skating, shuffleboard, etc.; outdoor pools; indoor sports or recreational facilities; golf courses; and paved bike or walking paths).

Participation" section.

Human Health Risk Assessment

A BHHRA was conducted to estimate current and future effects of contaminants on human health. A BHHRA is an analysis of the potential adverse human health effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these exposures under current and anticipated future site uses. It provides the basis for taking an action and identifies the contaminants and exposure pathways that need to be addressed through implementation of the remedial action. This section of the ROD summarizes the results of the BHHRA for the Subsite.

The BHHRA, entitled *Revised Semet Ponds Site Soil/Fill Material Human Health Risk Assessment,* dated March 2017, is available in the Administrative Record file and repositories for this Subsite.

A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios, as follows:

Hazard Identification – uses the analytical data collected to identify the contaminants of potential concern (COPCs) for each medium, with consideration of a number of factors explained below.

Exposure Assessment – estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (*e.g.*, ingesting contaminated soil) by which humans are potentially exposed.

Toxicity Assessment – determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of effect (response).

Risk Characterization – summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations that exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1 x 10^{-6} to 1 x 10^{-4} or a Hazard Index greater than 1.0; contaminants at these concentrations are considered COCs and are typically those that will require remediation at a site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, analytical data collected during the RI is used to identify COPCs at the site in various media, such as soil, groundwater, surface water, and air based on factors such as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants, as well as their mobility and persistence.

Exposure Assessment

In this step, the different exposure scenarios and pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Cancer risks and noncancer hazard indices are calculated based on an estimate of the reasonable maximum exposure expected to occur under current and future conditions at a site. This exposure is defined as the highest exposure that is reasonably expected to occur at a site.

The exposure assessment identified potential human receptors based on a review of current and reasonably foreseeable future land use scenarios. Receptors evaluated in the BHHRA include future construction workers and future indoor/outdoor industrial workers. Exposure for future indoor/outdoor industrial workers was evaluated through incidental ingestion of, and dermal contact with, surface Solvay waste/soil/fill material (0-2 ft. bgs) and inhalation of ambient vapors and fugitive dust. Potential exposures were assumed to occur for the construction workers through incidental ingestion dermal contact, and inhalation of ambient vapors or fugitive dust from surface/subsurface Solvay waste/soil/fill material (0-10 ft. bgs). Although recreational users were not specifically evaluated, the outdoor worker pathway is expected to be protective of this receptor.

Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants can cause both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards because of exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were taken from the Integrated Risk Information System database, the Provisional Peer Reviewed Toxicity Database, or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values.

Risk Characterization

This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of a site's risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the inhalation unit risk, rather than the SF:

$$Risk = LADD \times SF$$

Where:

Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

The likelihood of an individual developing cancer is expressed as a probability that is usually expressed in scientific notation (such as 1×10^{-4}). For example, a 1×10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions described in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For noncancer health effects, a hazard index (HI) is calculated. The HI is determined based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is calculated by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as shown below.

$$HQ = Intake/RfD$$

Where:

HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)

RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e.*, chronic, subchronic, or acute).

The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

The key concept for a noncancer HI is that a "threshold level" (measured as an HI of 1.0) exists below which noncancer health effects are not expected to occur. The HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals that are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The cancer risks and noncancer hazard were estimated for each of the receptors identified above.

The calculated total excess lifetime cancer risk for all COPCs and exposure routes for the indoor/outdoor industrial worker is 2×10^{-3}, which is above the acceptable regulatory range of 1×10^{-4} to 1×10^{-6}. Unacceptable carcinogenic risks are primarily driven by inhalation of benzene and naphthalene in surface Solvay waste/soil/fill materials. The calculated non-cancer HI for all COPCs and exposure routes is 30, which exceeds the regulatory threshold of 1. The unacceptable hazard is driven by exposure via inhalation of naphthalene and benzene originating from surface Solvay waste/soil/fill materials.

The calculated total excess lifetime cancer risk for all COPCs and exposure routes for the construction worker is within the acceptable regulatory range of 1×10^{-4} to 1×10^{-6}. The calculated non-cancer HI for all COPCs and exposure routes is above the regulatory threshold of 1. Unacceptable hazard is driven by incidental ingestion of benzene in surface/subsurface Solvay waste/soil/fill materials and by inhalation of benzene, naphthalene, and 1,2,4-trimethylbenzene in surface/subsurface Solvay waste/soil/fill material.

A complete summary of all chemicals with cancer risk and noncancer hazards above acceptable levels can be found in Tables 3a and 3b.

Uncertainty in the Risk Assessment

The process of evaluating human health cancer risks and noncancer health hazards involves multiple steps. Inherent in each step of the process are uncertainties that ultimately affect the final risks and hazards. Important site-specific sources of uncertainty are identified for each of the steps in the four-step risk process below.

Uncertainties in Hazard Identification

There is always uncertainty involved in the estimation of chemical concentrations present at a site. Errors in the analytical data may stem from errors inherent in sampling and/or laboratory procedures. While the datasets for this subsite are robust, environmental samples are variable, and the potential exists that these datasets might not accurately represent reasonable maximum concentrations. There is a low potential that the risks may be overestimated or underestimated.

It should be noted that, of the samples used to evaluate exposures and risks in this BHHRA, a total of three surface soil samples were analyzed for PCBs (as Aroclors). PCBs were not detected in these samples; however, the sample detection limits for these compounds were elevated. Based on these results, there is uncertainty associated with the potential hazards and risks posed by PCBs in this BHHRA given the low number of soil samples in which PCBs were analyzed and the elevated sample detection limits for these compounds.

Uncertainties in Exposure Assessment

There are two major areas of uncertainty associated with exposure parameter estimation. The first relates to the estimation of exposure point concentrations (EPCs). The second relates to parameter values used to estimate chemical intake (*e.g.,* ingestion rate, exposure frequency). The EPC estimates are influenced by the likelihood the dataset, in fact, fully characterizes the contamination at the site. The datasets for this Subsite are robust, so the potential for overestimating or underestimating risk is low. Many of the exposure parameters used in the BHHRA are based on studies that evaluated worker practices, and the conclusions of these studies have been presented in peer-reviewed EPA guidance. Exposure parameters that could not be identified in the literature were selected using best professional judgement.

Uncertainties in Toxicity Assessment

A potential significant source of uncertainty is inherent in the derivation of the EPA toxicity criteria *(i.e.,* RfDs, RfCs, SFs). Although these toxicity criteria have been extensively reviewed and peer-reviewed, there is a medium potential that uncertainty factors applied during their derivation may result in overestimation or underestimation of

risk. Additionally, there are many contaminants for which no toxicity values are available and therefore they are not quantitatively evaluated in the BHHRA. There is a significant potential for underestimation because of this lack of toxicity information.

Uncertainties in Risk Characterization

When all the uncertainties from each of the previous three steps are added, uncertainties are compounded. Since it is unknown whether many of the uncertainties result in an overestimation or underestimation of risk, the overall impact of these uncertainties is unquantifiable. However, some of the uncertainties, such as the lack of toxicity information, will likely result in an overall underestimation of risk.

Baseline Ecological Risk Assessment

Surface Solvay waste/soil/fill material data were screened against values protective of terrestrial plants, invertebrates, birds, and mammals. Inorganics, one pesticide, SVOCs, and VOCs were retained because of exceedances of screening values, their potential to bioaccumulate, or the absence of screening values.

Ecological HQs were calculated for six wildlife species (American robin, northern short-tailed shrew, mourning dove, eastern cottontail rabbit, red-tailed hawk, and red fox) representing distinct trophic level receptors that may be exposed to contaminants of ecological concern (COECs) in Subsite surface Solvay waste/soil/fill material. Based on food chain modeling using average and upper-bound surface soil concentrations of COECs coupled with exposure assumptions under both conservative and refined scenarios, potentially unacceptable risks to ecological receptors were identified at the Subsite. Under both the refined and the conservative modeling scenarios, risks were lower for the red-tailed hawk and red fox (wide-ranging wildlife receptors) relative to the American robin and short-tailed shrew. Because of its small size, high ingestion rate, and small home range, the highest HQs were calculated for the short-tailed shrew. Elevated risks under both conservative and refined exposure scenarios were attributable mainly to metals and SVOCs, which were detected more frequently and had a greater frequency of HQs exceeding the threshold of 1, relative to pesticides and VOCs. There is some uncertainty associated with the risks attributable to select COECs (*i.e.,* some VOCs) in Subsite surface Solvay waste/soil/fill material given the absence of comparative toxicity values for these chemicals.

Based on the exceedances of COEC concentrations in surface Solvay waste/soil/fill material and calculated food chain HQs exceeding 1 for terrestrial avian and mammal wildlife receptors, control of exposures is warranted to provide adequate protection for current and future wildlife at the Subsite. It should be noted that while a BERA was performed at the Subsite, the reasonably anticipated future use for the Subsite will be industrial, commercial, or recreational use, which is not suitable or ideal habitat for

ecological receptors. A full discussion of the ecological risk evaluation and conclusions is presented in the *Semet Ponds Site Revised Soil/Fill Material Ecological Risk Assessment* report dated February 2017.

Summary of Human Health and Ecological Risks

The results of the BHHRA indicate that the contaminated Solvay waste/soil/fill material presents a current and/or potential future unacceptable exposure risk and the BERA indicates that the contaminated soils pose an unacceptable exposure risk. While some of the risks associated with contaminated Solvay waste/soil/fill material have been mitigated in part by the OU-1 remedial actions and IRMs that have been implemented, the calculated risks remain unacceptable. Although the indoor air pathway was not evaluated, measures may be included in the design and construction of buildings at the Subsite to mitigate the potential for exposure to constituents that may be present in soil vapor. Such measures may include an active sub-slab depressurization system, use of a vapor barrier or the installation of a venting system.

Basis for Action

Based upon the results of the RI and the risk assessments, EPA and NYSDEC have determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as ARARs, to-be-considered (TBC) guidance, and site-specific, risk-based levels established using the risk assessments. The following RAOs have been established for the Subsite:

- Prevent, or reduce to the extent practicable, ingestion/direct contact with contaminated Solvay waste/soil/fill material to be protective under the current and reasonably anticipated future land uses.
- Prevent, or reduce to the extent practicable, inhalation of or exposure to contaminants volatilizing from contaminated Solvay waste/soil/fill material and groundwater, and unacceptable inhalation threat associated with soil vapor.
- Prevent, or reduce to the extent practicable, the release of Subsite-related contaminants to groundwater, surface water and sediment that may cause unacceptable adverse effects on shallow and intermediate groundwater, surface water or sediment quality in Tributary 5A and Onondaga Lake.

NYSDEC SCOs have been identified as remediation goals for soil to attain these RAOs. SCOs are risk-based criteria that have been developed by the State following methods consistent with EPA's methods/protocols/guidance, and these objectives are set at levels consistent with EPA's acceptable levels of risk that are protective of human health, ecological exposure, or the groundwater depending upon the existing and anticipated future use of the Subsite. While the land use of the Subsite has historically been industrial, current and anticipated future uses of some areas could include commercial use and recreational uses.

Given the comingling of the shallow and intermediate groundwater outside of the hydraulic containment system with that of the adjacent Willis Avenue subsite groundwater, shallow and intermediate groundwater at and beyond the POC will be addressed as part of the Willis Avenue subsite and therefore is not addressed in the remedy for this OU. Groundwater remedial goals are the New York State Ambient Water Quality Standards. Prior remedial activities and IRMs to address surface water and sediment have eliminated exposure to these media and maintenance of the remedial actions and IRMs are expected to achieve the RAO.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4).

Based on anticipated future development of the Subsite, expectations of the reasonably-anticipated future land use, as described above, were considered in the FS to facilitate the development of remedial alternatives. The reasonably anticipated land use includes passive recreational use for the Lakeshore Area and industrial/commercial use and/or to provide additional State Fair parking on the Main Site Area.

Alternatives 2 through 4 include the continuation of the operation and maintenance (O&M) for the IRMs that have been implemented at the Subsite. Maintenance for the IRMs would include monitoring to ensure that the response actions remain protective and/or to identify whether there is a need for corrective action(s). Corrective actions for

covers may consist of cover repair in areas of disturbance or re-application of vegetation in areas of non-survivorship.[7]

Because Alternatives 1-4 would result in contaminants remaining at the Subsite above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that, under any of these Alternatives, the Subsite would need to be reviewed at least once every five years, pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), to ensure the remedy remains protective. This is a statutory requirement that is independent of the remedy requirements described in these Alternatives.

The remedial alternatives are as follows:

Alternative 1 - No Further Action

A "no action" alternative is required to be considered under the NCP and NYSDEC's *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10) and serves as a benchmark for the evaluation of action alternatives. This alternative provides for an assessment of the environmental conditions if no further remedial actions are implemented.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0

Alternative 2 – Cover System

Alternative 2 includes the placement of a cover system based on potential chemical-specific ARARs and reasonably-anticipated future land uses at the Subsite for commercial use. This alternative also includes the continuation of O&M of the IRMs that have been implemented at the Subsite, site grading, institutional controls, development of a site management plan (SMP), and periodic reviews.

As necessary, grading would be conducted to support commercial and/or industrial development and would consist of backfilling of the emptied Semet residue ponds. The staged soil pile located on the BCA would be reused as backfill during grading. Following grading, a minimum 1-ft. thick soil/granular cover (or maintained paved surfaces and

[7] The annual O&M cost estimates associated with O&M of the IRM elements cited here in this document are included in the cost estimates for each of the action alternatives other than Alternative 1.

buildings) would be placed to minimize erosion and mitigate potentially unacceptable exposure of human receptors to constituents exceeding Commercial Use SCOs in the surface Solvay waste/soil/fill material. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design. Sampling would be performed to identify the appropriate cover thickness and limits. Design of the cover system would take into consideration development plans that are available for the Subsite at that time. A minimum 1-ft. thick soil/granular cover would be needed at the Semet Lakeshore Area. Further evaluation of Semet residue seep areas and Semet Lakeshore Area existing cover thickness would be performed during the design. Any fill material brought to the Subsite would need to meet the requirements for the identified Subsite use as set forth in 6 NYCRR Part 375-6.7(d). Native species would be used for the vegetative component of the cover system, as appropriate. Structures, such as buildings, pavement, or sidewalks, as part of future development, could also serve as acceptable substitutes for the cover either at implementation of the remedy or at a future time.

A portion of the Main Site Area is anticipated to be used for overflow parking for the New York State Fairgrounds, and an extension of the Onondaga County West Shore Trail will cross a portion of the Semet Lakeshore Area. Because Subsite development plans for the remaining portions of the Subsite have not been determined, the boundaries of the covers are conceptual and presented solely for cost-estimation purposes. The extent, thickness, and permeability of the covers would be revisited during the design and/or during site management if Subsite uses change, as necessary. The conceptual extent of the cover system is depicted on Figure 5.

As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1×10^{-5} cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1×10^{-5} cm/sec). The proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D, which would be an ARAR for this action.

Prior to pond backfilling activities, an assessment of the need to address the remaining Semet residue[8] that could potentially contribute to seepage during or following construction activities would be performed. The effectiveness and implementability of utilizing passive recovery wells to minimize or monitor the potential for future Semet residue seeps would be evaluated as part of a pre-design investigation. Should passive recovery of Semet residue be deemed necessary, effective, and implementable, it would be included in the remedial design. Recovered Semet residue would be transported for

[8] As discussed in more detail in Alternative 4, following the completion of the OU-1 remedy, there will be Semet residue remaining that is unsuitable for off-site thermal processing for beneficial reuse.

disposal off-site.

Institutional controls in the form of environmental easements and/or restrictive covenants would be used to limit land use to commercial (including passive recreational) or industrial, as appropriate, prevent the use of groundwater without approved treatment, and require that any intrusive activities in areas where contamination remains be conducted in accordance with an SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies institutional and engineering controls (*i.e.,* environmental easement and/or restrictive covenants, cover systems) for the Subsite and details the following steps and media-specific requirements necessary to ensure that they remain in place and are effective:

    - excavation plan that details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions;
    - provision that future on-site buildings should be evaluated for the potential for vapor intrusion and may include vapor intrusion sampling and/or installation of mitigation measures, if necessary;
    - Subsite access and NYSDEC notification; and
    - periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during the design.

An O&M Plan that identifies the O&M requirements of the engineering controls would be necessary.

The estimated construction time for this alternative is one year. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$10,900,000
Annual O&M Costs:	$42,500
Present-Worth Cost:	$11,500,000

Alternative 3 – Enhanced Engineered Cover System

Alternative 3 includes each of the elements of Alternative 2 except that this alternative includes the placement of an enhanced engineered cover system in the former Semet

residue pond areas west of the BCA in lieu of the cover system described under Alternative 2.

The enhanced cover system over the area west of the BCA would include an 18-inch thick soil/granular cover (or maintained paved surfaces), as necessary, incorporating a geomembrane cap for the purposes of mitigating potentially unacceptable exposure risks and surface erosion in support of the reasonably-anticipated future use of the Subsite and its surroundings. This geomembrane cap would also address the potential mobility of the remaining Semet residue. The minimum 18-inches of soil/granular cover or other applicable cover materials would be needed for protection of the geomembrane cap (*e.g.,* from puncture, etc.). The cover system would also include an engineered component to enhance structural stability, ranging from geofabric to geogrid depending on the needs of the final cover system uses.

In areas where a geomembrane cap would not be installed, a minimum one-foot cover would be placed. In these areas the need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design, and sampling would be performed to identify the appropriate cover thickness and limits. The extent, thickness, and permeability of the covers would be revisited during the design phase and/or during site management if Subsite uses change, as necessary. The conceptual extent of the cover system is depicted on Figure 6.

The estimated construction time of this alternative is two years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$22,600,000
Annual O&M Costs:	$42,500
Present-Worth Cost:	$23,200,000

Alternative 4 – *In-Situ* Treatment of Targeted Material and Enhanced Engineered Cover System

Alternative 4 includes each element of Alternative 3 except *in-situ* (*i.e.,* in-place) treatment of targeted materials would be performed instead of potential passive recovery of Semet residue. Following the completion of the implementation of the OU-1 Semet residue remedy, (*i.e.,* removal of Semet residue to the maximum extent practicable for beneficial reuse in accordance with the 2002 ROD and 2017 ESD), there will be Semet residue remaining that is unsuitable for off-site thermal processing for beneficial reuse. Semet residue unsuitable for off-site thermal processing under the OU-1 remedy exhibits (a) unacceptable sulfur or moisture content, (b) insufficient heat content, and/or (c) unacceptable soil/debris content. Any remaining Semet residue that cannot be

beneficially reused and that contains a free aqueous phase would be treated *in-situ* by solidification/stabilization. Specifically, the treatment would consist of the addition of amendments (*e.g.*, Portland cement, cement kiln dust, lime kiln dust, blast furnace slag) to alter the physical characteristics to a granular material. The estimated volume of this targeted unsuitable material is approximately 7,000 cubic yards. The approximate area of *in-situ* targeted treatment is illustrated on Figure 7.

The estimated construction time of this alternative is two years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$24,000,000
Annual O&M Costs:	$42,500
Present-Worth Cost:	$24,600,000

Alternative 5 – Removal

Alternative 5 includes mechanical excavation of Solvay waste/soil/fill material exhibiting concentrations above Unrestricted Use SCOs.[9] Excavated Solvay waste/soil/fill material would be transported off-site for management and/or disposal.

This alternative is intended to evaluate restoration to pre-disposal conditions through full removal and replacement of Solvay waste/soil/fill material at the Subsite that exhibit concentrations above Unrestricted Use SCOs. Based on existing data, removal to depths of 5 ft. in the BCA and up to 25 ft. west of the BCA are assumed. Removal depths of up to 20 ft. in the Semet Lakeshore Area and I-690/State Fair Boulevard were assumed. Removal depths would be confirmed based upon either pre-construction or post excavation sampling. For cost estimation purposes, it was assumed that Solvay waste/soil/fill material would be removed from the existing grade to the top of marl (a native material); approximately a 5 ft. thickness would be removed from the BCA area, and generally between 10 and 25 ft. thickness would be removed from the area west of the BCA, and between 10 and 20 ft. for the Semet Lakeshore Area and beneath I-690/State Fair Boulevard. Based on these approximate depths, the total volume of Solvay waste/soil/fill material to be excavated in Alternative 5 is estimated at approximately 1.42 million cubic yards *in-situ*, with an additional 20,000 cubic yards to be removed from the material staged on the BCA. Sloping techniques, benching, and/or engineering structures (*e.g.,* sheet piling) would be necessary during excavation to maintain stability of excavation walls. Excavation activities are also anticipated to impact the adjacent Tributary 5A remedial action. Excavated material would be managed off-

[9] A partial removal alternative was not evaluated since, in addition to similar short-term impacts as Alternative 5, groundwater collection and treatment and, potentially, cover systems would still be necessary, negating much of the benefit from the partial removal of contamination.

site in accordance with applicable waste management regulations.

Clean backfill would be transported via trucks from off-site borrow sources to the Subsite for restoration. Given the elevated grade of the BCA and area west of the BCA, backfill would be placed to match surrounding grade features, such as State Fair Boulevard, the railroad elevation, and to restore the Tributary 5A bank. For cost estimation purposes, it is assumed that backfill thicknesses would range between 2 and 20 ft., resulting in approximately 1.29 million cubic yards to restore excavated areas to elevations approximately ranging from 368 to 376 ft. amsl. Excavated areas would be restored and vegetated consistent with plans developed based on anticipated future site use.

The conceptual extent of excavation for this alternative is depicted on Figure 8.

The estimated construction time of this alternative is six to nine years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$977,000,000
Annual O&M Costs:	$28,000
Present-Worth Cost:	$977,000,000

COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis required under the NCP consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet to be eligible for selection as a remedy. The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria involve the assessment of factors between alternatives so that the best option will be chosen given site-specific data and conditions. The final criteria, criteria 8 and 9, are known as "modifying criteria." Community and support agency acceptance are factors that are assessed by reviewing comments received during the public comment period, including any new information made available after publication of the proposed plan that may significantly changes basic features of the remedy with respect to scope, performance, or cost.

The evaluation criteria in more detail are as follows:

1. Overall protection of human health and the environment determines whether an

alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with ARARs evaluates whether the alternative would meet all the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the Subsite or provide grounds for invoking a waiver.
3. Long-term effectiveness and permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
4. Reduction of toxicity, mobility, or volume through treatment considers the anticipated performance of the treatment technologies that an alternative may employ.
5. Short-term effectiveness considers the period needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation.
6. Implementability is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services.
7. Cost includes estimated capital and annual operation and maintenance costs, as well as present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
8. State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the selected response measure.
9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment. Alternatives 2 through 5 would be protective of human health and the environment through cover systems, removal, *in-situ* treatment, and/or site management.

Alternative 1 would not meet the RAOs. Alternatives 2 through 5 would address RAOs and would be consistent with current, intended, and reasonably anticipated future use of the Subsite upon implementation of the remedies. Alternatives 3 and 4, through the enhanced cover, provide greater protectiveness than Alternative 2. Alternatives 2, 3, and 4 provide adequate and reliable protection of human health and the environment without the risks to workers/community/environment and environmental footprint associated with Alternative 5. These added impacts are further described below under the effectiveness and implementability criteria.

Compliance with ARARS

Chemical-, location-, and action-specific ARARs were identified in the FS. Consistent with the NCP preamble that indicates that for groundwater "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place," attainment of chemical-specific groundwater ARARs is at the edge of a WMA. Thus, the POC (*e.g.,* outside the barrier wall) for this Subsite is at the WMA edge and would be addressed in conjunction with the Willis Avenue subsite remedy. The Subsite is considered part of a WMA because the Solvay waste is a solid waste containing site-related contaminants and would meet the requirements for containment under RCRA Subtitle D, which would be an action-specific ARAR under Alternatives 2 through 4. As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1×10^{-5} cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1×10^{-5} cm/sec). The proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for the Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Alternative 1 does not actively address chemical-specific ARARs relative to potential erosion of, or exposure to, Solvay waste/soil/fill material. For Alternatives 2 through 4, chemical-specific ARARs are addressed by limiting potential for exposures to Solvay waste/soil/fill material exceeding chemical-specific ARARs using cover systems, an SMP, and institutional controls. Alternative 5 addresses chemical-specific ARARs through removal of Solvay waste/soil/fill material.

There are no action- or location-specific ARARs identified for Alternative 1. Construction methods and safety procedures would be implemented to adhere to the location- and action-specific ARARs identified for Alternatives 2 through 5. Specifically, institutional controls would be implemented in Alternatives 2 through 5 in conformance with NYSDEC's guidance DER-33[10] and EPA guidance.[11] The cover systems would be implemented in conformance with NYSDEC's guidance DER-10.[12] Procedures would be implemented to adhere to the location-specific ARARs related to federal and state requirements for cultural, archeological, and historical resources. With respect to action-specific ARARs, the proposed cover systems and excavation activities would be conducted consistent with applicable standards; earth moving/excavation activities would be conducted consistent with air quality standards; transportation and disposal activities would be conducted in accordance with applicable state and federal requirements (including land disposal restrictions), by licensed and permitted haulers.

[10] See https://www.dec.ny.gov/docs/remediation_hudson_pdf/der33.pdf.
[11] See https://www.epa.gov/superfund/superfund-institutional-controls-guidance-and-policy.
[12] See https://www.dec.ny.gov/regulations/67386.html.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating potential exposure to contaminants. Thus, with respect to the magnitude of residual risk, potentially unacceptable human health risks associated with Solvay waste/soil/fill material exceeding SCOs would remain under Alternative 1. For Alternatives 2 and 3, the passive recovery of Semet residue, if any, would provide added control of potential risks associated with potential for Semet residue seeps. The low permeability cover systems under Alternatives 3 and 4 would more effectively address the potential migration of contaminants than the soil cover under Alternative 2. Potentially unacceptable human health risks attributed to Solvay waste/soil/fill material exceeding ARARs would be addressed in Alternatives 2 through 4 through cover systems, institutional controls, an SMP, and periodic reviews. The removal of Solvay waste/soil/fill material in Alternative 5 does not result in added long-term effectiveness relative to addressing potential human health risks.

Reduction in Toxicity, Mobility, or Volume Through Treatment

There would be no reduction in toxicity, mobility, or volume in Solvay waste/soil/fill material through treatment provided in Alternative 1. Alternatives 2 and 3 would result in a reduction in mobility (*i.e.*, erosion) of Subsite-related contaminants in Solvay waste/soil/fill material through the placement of cover systems. Alternative 4 would provide for reduction in mobility through an enhanced engineered cover system, and it would also stabilize certain targeted materials through *in-situ* treatment. Alternative 5 would provide for reduction in mobility through removal. While Alternatives 2, 3, and 5 would provide reduction in mobility of contaminants through containment or removal, the reduction would not be through treatment.

Short-Term Effectiveness

Alternative 1 does not include physical measures in areas of contamination and, therefore, would not present potential adverse impacts to remediation workers or the community associated with implementation. Because of the increased quantity of materials that would be managed associated with Alternatives 2 through 5, there would be increased potential impacts to workers and the community. The risks to remediation workers and nearby residents under these alternatives would be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Impacts to the community resulting from the construction under Alternatives 2, 3 and 4 would primarily be a result of increased truck traffic and increased noise for the duration of the construction. Alternative 5 would result in significantly more truck traffic and related noise. Alternative 5 would require the off-site transport of approximately 70

truckloads per day (for six to nine years), of contaminated material that would potentially adversely affect local traffic and may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude would be anticipated to result in significant adverse effects on the infrastructure of the roadways themselves.

Because no actions would be performed under Alternative 1, there would be no implementation time. It is anticipated that Alternative 2 would require one construction season to implement. It is estimated that Alternatives 3 and 4 would require two construction seasons. Alternative 5 is anticipated to take six to nine construction seasons to implement.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. Alternatives 2 through 4 can be readily constructed and operated; the materials necessary for the construction of these alternatives are reasonably available. The necessary equipment and specialists would be available for these alternatives. O&M of the effectiveness of Alternatives 2 through 4 would be accomplished through cover system inspections and maintenance to verify continued cover integrity, visual signs of erosion, and the condition of the cover. Alternatives 2 through 5 would require coordination with other agencies, including NYSDEC, the New York State Department of Transportation, New York State Department of Health (NYSDOH), and EPA.

The excavation and off-site management of an estimated 1,420,000 cubic yards of Solvay waste/soil/fill material associated with Alternative 5 would be substantially more difficult to implement than the cover placement contemplated in Alternatives 2 and 3 or cover and *in-situ* targeted treatment in Alternative 4. Specifically, there would be significant implementability limitations associated with excavation, transportation, and obtaining appropriate disposal capacity for this large of a volume of material.

In addition, Alternative 5 would include challenging construction water management and slope stability concerns. Construction water management would be significant during excavation because large volumes would require management related to the presence of excavations proximate to Tributary 5A. Construction water treatment capacity would not be available at the Willis Avenue GWTP; therefore, another treatment system would need to be constructed. Because of the presence of active railroads, excavation proximate to them would be limited. Excavations along the Lakeshore proximate to the groundwater collection system would further limit implementability of Alternative 5, relative to the potential for damage or need to replace the barrier wall and collection system. Based on a daily production rate of 1,000 cubic yards per day for 10 months of the year, it is estimated that up to approximately 240,000 cubic yards of material would

be shipped off-site each year in 16,800 truckloads (70 truckloads per day) with an approximately equivalent number of trips being required for restoration. During a 10-hour work day, this would equate to approximately 1 truck entering or leaving the Subsite every 4 minutes for a period of six to nine years. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude would result in significant adverse effects on the conditions of roadways.

Cost

The estimated present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period. (Although O&M would continue as needed beyond the thirty-year period, thirty years is the typical period used when estimating costs for a comparative analysis.)

The estimated capital, annual O&M, and present-worth costs using a 7% discount factor for each of the alternatives are presented in the table below.

Alternatives	Capital	Annual O&M	Total Present Worth
1 – No Further Action	$0	$0	$0
2 – Cover System	$10.9 million	$42,500	$11.5 million
3 – Enhanced Engineered Cover System	$22.6 million	$42,500	$23.2 million
4 – *In-Situ* Treatment of Targeted Material and Enhanced Engineered Cover System	$24 million	$42,500	$24.6 million
5 – Removal	$977 million	$28,000	$977 million

State Acceptance

NYSDEC is the lead agency for this Subsite. EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, to satisfy this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence can be found in Appendix

IV.

Community Acceptance

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which can be found in Appendix V.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site, wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or will present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using those remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Stained Solvay wastes and Semet residue that could not be reused (*e.g.,* because of unacceptable sulfur or moisture content, insufficient heat content and/or unacceptable soil/debris content) have been encountered in soil borings and test pits during implementation of the OU-1 remedy. These materials are present in the western portion of the Main Site Area where the Semet residue was present. Some of these materials exhibit characteristics of principal threat waste.

Alternatives 2 and 3 include an assessment to evaluate the effectiveness and implementability of passive recovery wells that could collect Semet residue. Any collected Semet residue would be shipped off-site to a permitted facility for treatment/disposal. Under Alternative 4, the Semet residue related materials would be addressed by *in-situ* treatment to reduce the mobility of the contaminants. Under Alternative 5, these materials would all be removed.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the

alternatives, and public comments, NYSDEC and EPA have determined that Alternative 4, *In-Situ* Treatment of Targeted Material and Enhanced Engineered Cover System, best satisfies the requirements of CERCLA Section 121, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, set forth at 40 CFR § 300.430(e)(9).

Alternatives 2 through 5 would be protective of human health and the environment and would address the RAOs; however, Alternative 5 would be extremely difficult and much more costly to implement than Alternatives 2, 3, and 4. In addition, Alternative 5 would present greater short-term impacts to the community and take longer to implement than Alternatives 2, 3, and 4. Relative to Alternative 2, Alternatives 3 and 4 would provide added effectiveness and permanence by incorporating enhanced covers that would provide added isolation from Solvay waste/soil/fill material at the Subsite. Alternative 4 would also include *in-situ* treatment of targeted material and, therefore, would better address principal threat waste at the Subsite than Alternative 3. While Alternative 4 costs marginally more than Alternative 3, given the added degree of protectiveness that Alternative 4 provides, it would be more cost-effective than Alternative 3.

Based on the information currently available, NYSDEC and EPA have concluded that Alternative 4, the selected alternative, meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. NYSDEC and EPA anticipate that Alternative 4 will satisfy the following statutory requirements of CERCLA §121(b): it will (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element (or justify not meeting the preference).

NYSDEC and EPA have determined that the selected remedy is protective of human health and the environment, can be readily constructed and operated, presents minimal potential short-term impacts to workers and the community, and is cost-effective. The selected remedy utilizes permanent solutions, alternative treatment technologies, and resource-recovery technologies to the maximum extent practicable.

Description of the Selected Remedy

The selected remedy, Alternative 4, includes the following components:

- Treatment via *in-situ* solidification/stabilization of Semet residue remaining at the Subsite that could not be beneficially reused under the OU-1 remedy (*e.g.,* because of unacceptable sulfur or moisture content, insufficient heat content, and/or unacceptable soil/debris content). The treatment will consist of the addition of amendments (*e.g.,* Portland cement, cement kiln dust, lime kiln dust,

blast furnace slag) to alter the physical characteristics to a granular material;

- Installation of an impermeable geomembrane cap and as necessary, 18-inches of clean soil/granular backfill to prevent unacceptable exposure risks in former pond and other Semet residue areas;
- Installation of a minimum one-foot thick soil cover (or maintained paved surfaces/buildings) in the BCA and the Lakeshore Area to be protective for both current and reasonably anticipated future land uses where shallow soil concentrations are above SCOs for commercial use;
- Grading to support commercial and/or industrial development;
- Development and implementation of a Health and Safety Plan and a Community Air Monitoring Plan for all ground-intrusive activities;
- Continued maintenance and monitoring of the Willis-Semet Berm Improvement IRM including monitoring to document that established criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or replanting/reseeding of vegetation, as necessary; and
- Development and implementation of an SMP that identifies use restrictions and engineering controls for the site, details the steps and media-specific requirements necessary to ensure that these controls remain in place and effective, and a long-term monitoring plan to assess the performance and effectiveness of the remedy.

Institutional controls in the form of environmental easements and/or restrictive covenants would be used to limit land use to commercial (including passive recreational) or industrial, as appropriate, prevent the use of groundwater without approved treatment, and require that any intrusive activities in areas where contamination remains be conducted in accordance with an SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies institutional and engineering controls (*i.e.,* environmental easement and/or restrictive covenants, cover systems) for the Subsite and details the following steps and media-specific requirements necessary to ensure that they remain in place and are effective:

    - excavation plan that details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions;
    - provision that future on-site buildings should be evaluated for the potential for vapor intrusion and may include vapor intrusion sampling and/or installation of mitigation measures, if necessary;
    - Subsite access and NYSDEC notification; and
    - periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during the design.

An O&M Plan that identifies the O&M requirements of the engineering controls will be necessary. O&M will include monitoring to determine if success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or reapplication of vegetation in areas of non-survivorship.[13] Continued maintenance of the Willis-Semet Berm Improvement IRM will also be performed as part of this remedy.

The Subsite is part of a WMA because the Solvay waste is a solid waste containing site-related contaminants and will meet the requirements for containment under RCRA Subtitle D. The vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1×10^{-5} cm/sec. The existing or proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for Subsite groundwater are to be designed to meet the requirements for containment under RCRA Subtitle D.

Given the comingling of the shallow and intermediate groundwater outside of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater at and beyond the POC will be addressed as part of the Willis Avenue subsite.

Following the removal of a certain volume of the Semet residue under the OU-1 remedy, there is Semet residue remaining at the Subsite that is unsuitable for off-site thermal processing for beneficial reuse because it exhibits unacceptable sulfur or moisture content, insufficient heat content, and/or exhibits unacceptable soil/debris content, as documented in demonstration reports. The remaining Semet residue that could not be beneficially reused and may contain a free aqueous phase will be treated *in-situ* by solidification/stabilization. Specifically, the treatment will consist of the addition of amendments (*e.g.*, Portland cement, cement kiln dust, lime kiln dust, blast furnace slag) to alter the physical characteristics to a granular material.

A portion of the Main Site Area is anticipated to be used for overflow parking for the New York State Fairgrounds, while an extension of the Onondaga County West Shore Trail will cross a portion of the Semet Lakeshore Area. Design of the cover will take into consideration these development plans as well as any others that are available for the Subsite at the time of design. A minimum 1-ft. thick soil/granular cover would be needed at the Semet Lakeshore Area. Further evaluation of Semet residue seep areas and Semet Lakeshore Area existing cover thickness will be performed during the design. The

[13] The annual O&M cost estimates associated with monitoring of the vegetative cover and for maintenance of the vegetative cover are included in the cost estimates.

extent, thickness, and permeability of the covers will be revisited during site management, if site uses change, as necessary. The cover systems will require routine O&M including inspections to maintain their integrity. The conceptual extent of the cover system is depicted on Figure 7.

The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during the remedial design.

Fill material brought to the Subsite will need to meet the requirements for the identified Subsite use (commercial). Native species will be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix that is native to New York State and selected for its ability to attain relatively high growth rates and ecological function.

Pavement, sidewalks, or structures, such as buildings, that are included as part of any future development, may serve as acceptable substitutes for any of the cover types described above.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31,[14] and EPA Region 2's Clean and Green Policy[15] will be considered for the selected remedy to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or O&M of the remedy
- Reduction in vehicle idling, including both on- and off-road vehicles and construction equipment during construction and/or O&M of the remedy
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.,* less mowing), and/or be integrated with the planned use of the property
- Beneficial reuse of material that would otherwise be considered a waste
- Use of Ultra Low Sulfur Diesel.

Because the selected remedy will result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years, pursuant to CERCLA Section 121(c), 42 U.S.C.§ 9621(c), to ensure the remedy remains protective. This is a statutory requirement that is independent of the remedy requirements described in the selected remedy.

[14] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.
[15] See http://epa.gov/region2/superfund/green_remediation.

Summary of the Estimated Remedy Costs

The estimated capital cost of the selected remedy is $24 million; the annual O&M is $42,500; and the total present-worth cost (using a 7% discount rate) is $24.6 million. Table 8 provides the basis for the cost estimates for Alternative 4.

It should be noted that these cost estimates are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes to the cost estimate may occur as a result of new information and data collected during the design of the remedy.

Expected Outcomes of the Selected Remedy

The results of the BHHRA indicate that the contaminated Solvay waste/soil/fill presents current and/or potential future unacceptable exposure risk to humans, and BERA indicates that the contaminated Solvay waste/soil/fill poses an unacceptable ecological exposure risk.

The State of New York, Onondaga County, and the City of Syracuse have jointly sponsored the preparation of a land-use master plan to guide future development of the Onondaga Lake area (Syracuse-Onondaga County Planning Agency, 1998). The primary objective of land-use planning efforts is to enhance the quality of the Onondaga Lake area for recreational and commercial uses. Implementation of this remedy and other response actions will aid this long-term planning effort by addressing concerns related to human exposure to contaminated sediments, soils, and surface water.

Under the selected remedy, potential risks to human health and the environment will be reduced to acceptable levels. Remediation goals for the COCs are presented in Tables 1 and 2. Remediation goals for surface soil will be met following construction and implementation of appropriate institutional controls (*e.g.,* approximately 2 years).

Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater at and beyond the POC will be addressed as part of the Willis Avenue subsite. Remedial actions and IRMs to address surface water and sediment have eliminated exposure to these media and maintenance of the remedial actions and IRMs are expected to achieve the RAO.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, selected remedies must be protective of

human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, NYSDEC and EPA have determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The results of the risk assessments indicate that, if no action is taken, the Subsite poses an unacceptable ecological and human health risk.

The selected remedy will reduce exposure levels to protective levels or to within EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogenic risk and below the HI of 1 for noncarcinogens. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot be mitigated. The selected remedy will be protective of human health and the environment in that the *in-situ* treatment and subsequent construction of cover systems over contaminated soil will preclude potential human exposure to contamination in soil. Combined with institutional controls, the selected remedy will provide protectiveness of human health and the environment over both the short- and long-term.

Compliance with ARARs and Other Environmental Criteria

The selected remedy will comply with the location-, chemical- and action-specific ARARs identified. The ARARs, TBCs, and other guidelines for the selected remedy are provided in Table 5.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of the following: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective and will achieve the cleanup levels in the same amount of time in comparison to the costlier alternatives.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the

present-worth cost analysis, annual O&M costs were calculated for the estimated life of the alternatives and related monitoring using a seven percent discount rate and a 30-year interval. The estimated capital, annual O&M, and total present-worth costs for the selected remedy are $24 million, $42,500; and $24.6 million, respectively.

Alternatives 2 through 5 would be protective of human health and the environment and would address the RAOs. However, Alternative 5 would be significantly more difficult to implement, would present significant short-term impacts, and would be the least cost-effective means of achieving the RAOs. The selected remedy is more protective than Alternatives 2 and 3, and more practicable and implementable than Alternative 5 at significantly less cost. Because the selected remedy includes *in-situ* treatment in addition to the enhanced engineered covers, it would significantly reduce the potential mobility of contaminants and therefore will provide greater long-term effectiveness than would Alternatives 2 and 3.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Subsite.

The selected remedy will reduce the mobility of Semet residue-related contaminants through *in-situ* treatment. The selected remedy will also reduce mobility associated with erosion and infiltration of contaminants through cover systems, but it will involve no treatment. The selected remedy will permanently address the contamination.

Preference for Treatment as a Principal Element

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). Under the selected remedy, *in-situ* treatment will be utilized to reduce the mobility of any remaining Semet residue-related contaminants.

Five-Year Review Requirements

The selected remedy, once fully implemented, will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that would otherwise allow for unlimited use and unrestricted exposure. Consequently, a statutory review will be conducted within five years after initiation of remedial action, and at five-year intervals thereafter, to ensure that the remedy is, or will be, protective of human health and the

environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on December 17, 2018, identified Alternative 4, *in-situ* treatment of targeted material and enhanced engineered cover system, as the preferred alternative for the Subsite. Based upon its review of the written and verbal comments submitted during the public comment period, NYSDEC and EPA have determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX I

FIGURES

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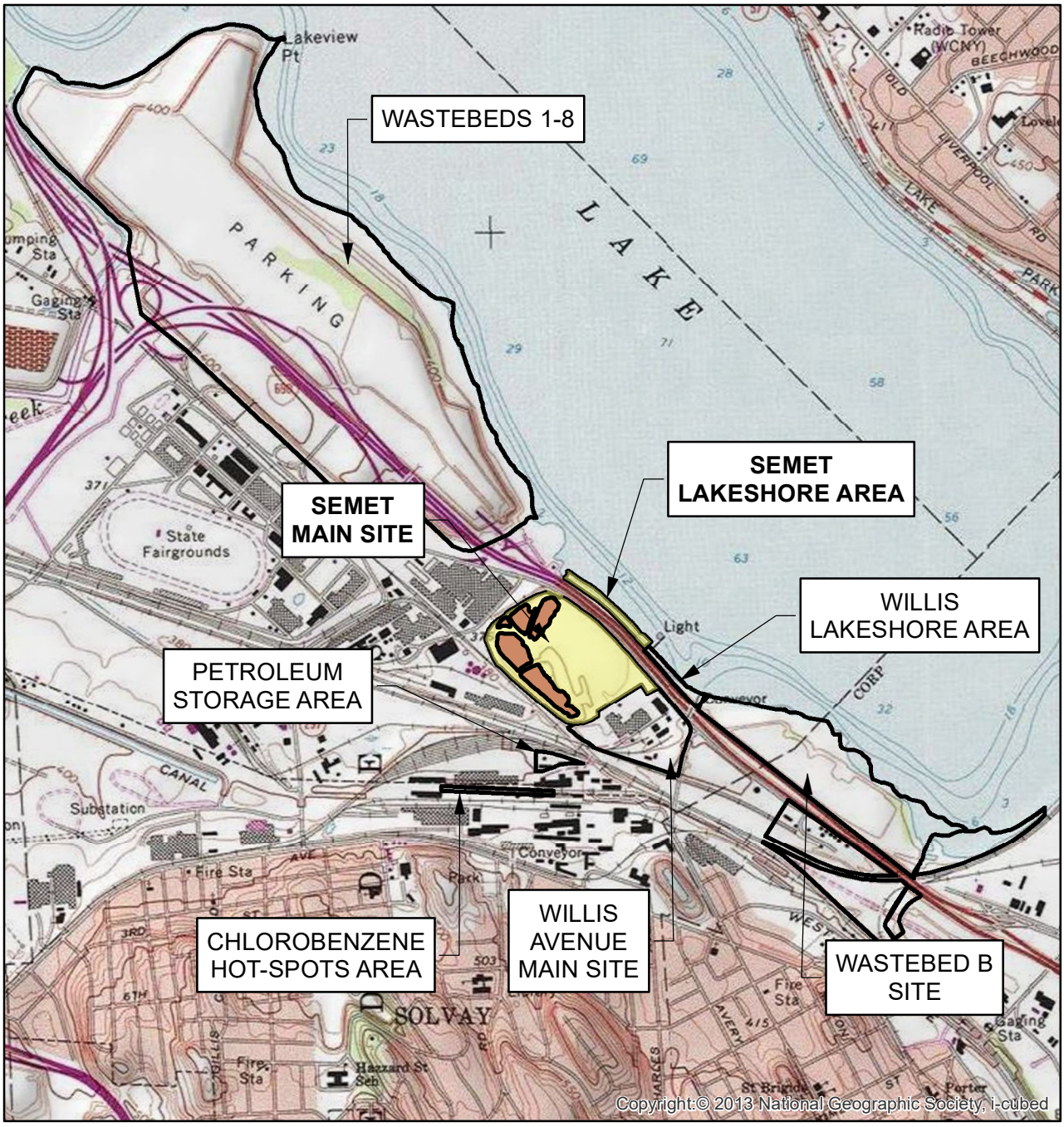

ADAPTED FROM: SYRACUSE WEST, NY USGS QUADRANGLE

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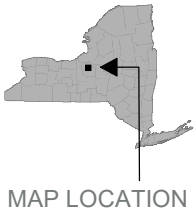
SEMET RESIDUE PONDS SITE
OU-2 RECORD OF DECISION
GEDDES, NEW YORK



MAP LOCATION

N

LEGEND

SEMET RESIDUE PONDS

SEMET RESIDUE PONDS SITE

SITE LOCATION

0 1,000 2,000 4,000

Feet

1:24,000

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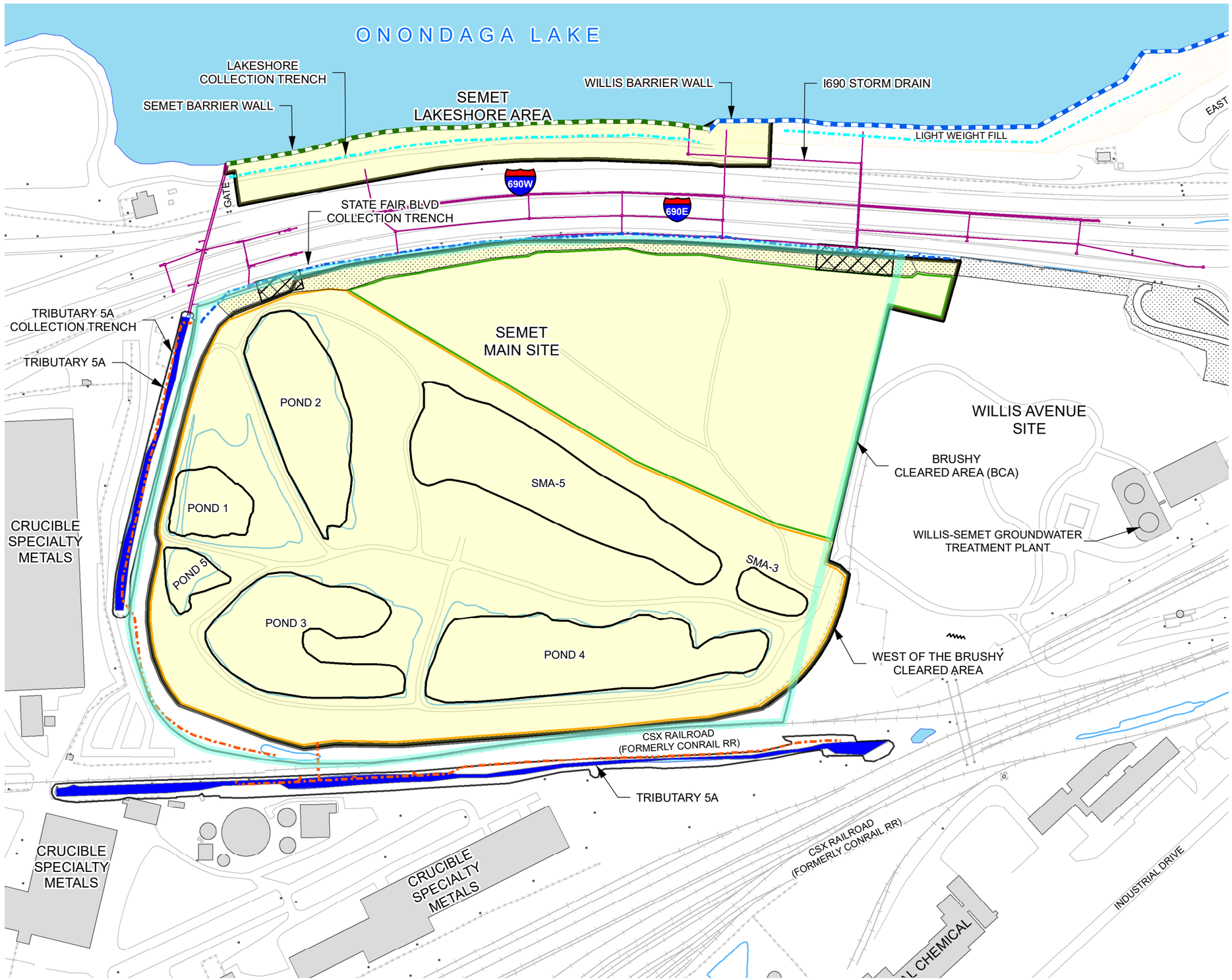

N

LEGEND

IRMS & REMEDIAL ACTIONS

- STATE FAIR COLLECTION TRENCH
- LAKESHORE COLLECTION TRENCH
- TRIBUTARY 5A COLLECTION TRENCH
- I-690 STORM DRAIN
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIBUTARY 5A
- TRIBUTARY 5A SEDIMENT REMOVAL
- SOIL REMOVAL AREA
- BALLFIELD / WILLIS / SEMET BERM AREA

STUDY AREA

- SEMET RESIDUE PONDS SITE
- WASTEBED A AREA
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- SEMET BERM AREA

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 RECORD OF DECISION
GEDDES, NEW YORK

SITE PLAN

0 125 250 500
Feet

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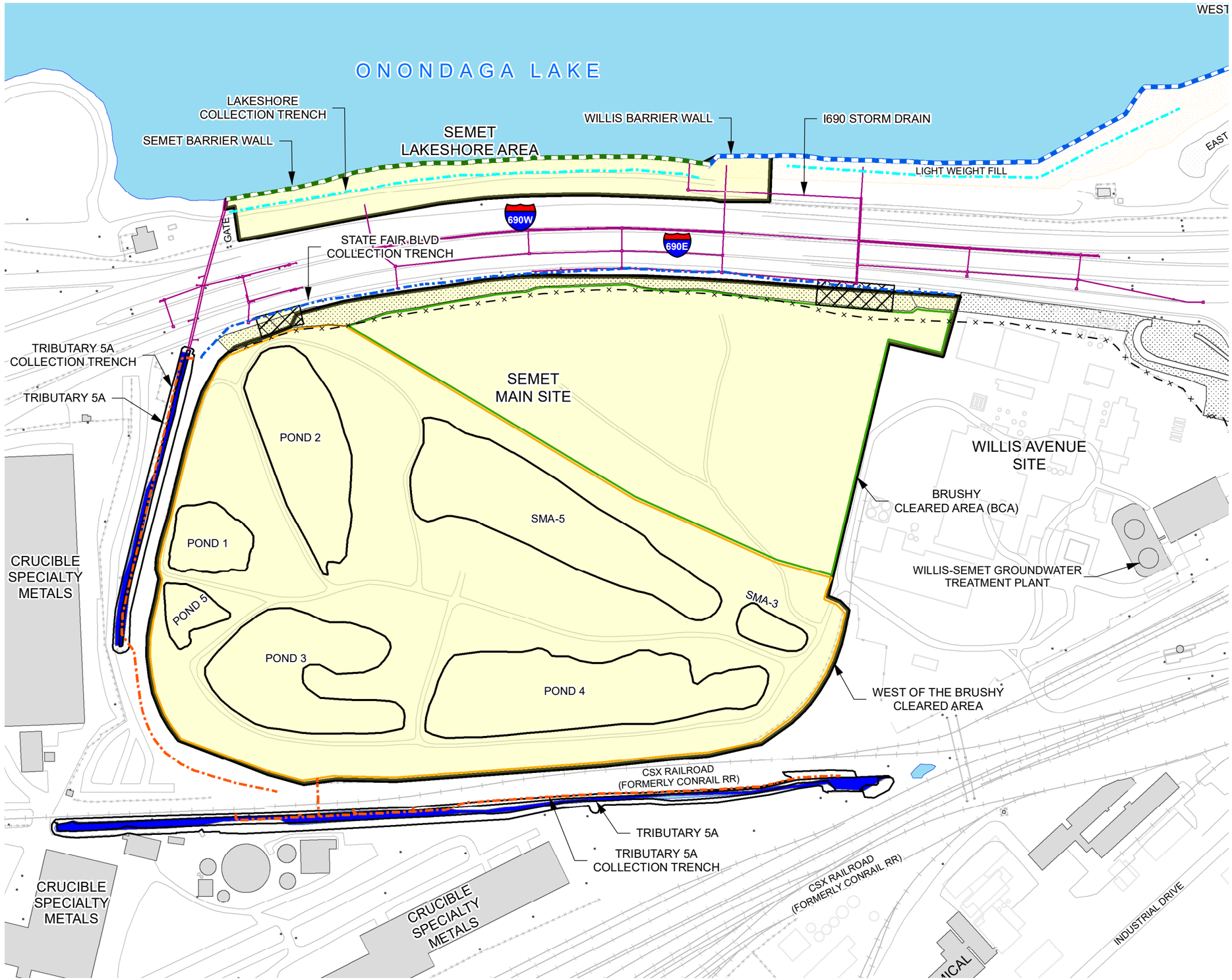

LEGEND

- SEMET RESIDUE PONDS SITE

INTERIM REMEDIAL MEASURES

WILLIS - SEMET HYDRAULIC CONTAINMENT SYSTEM

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL

I-690 STORM DRAINAGE SYSTEM INVESTIGATION AND REHABILITATION IRM

- I-690 STORM DRAIN
- STATE FAIR COLLECTION TRENCH

WILLIS - SEMET BERM SITE IMPROVEMENTS PROJECT

- BALLFIELD / WILLIS / SEMET BERM AREA
- SOIL REMOVAL AREA

OU1 REMEDY

SEMET RESIDUE REMOVAL

- FORMER POND AREAS - OU1

SEMET PONDS SHALLOW GROUNDWATER REMEDIAL ACTION (TRIBUTARY 5A)

- TRIBUTARY 5A SEDIMENT REMOVAL
- TRIBUTARY 5A COLLECTION TRENCH

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 RECORD OF DECISION
GEDDES, NEW YORK

INTERIM REMEDIAL MEASURES AND REMEDIAL ACTIONS

0 125 250 500
Feet

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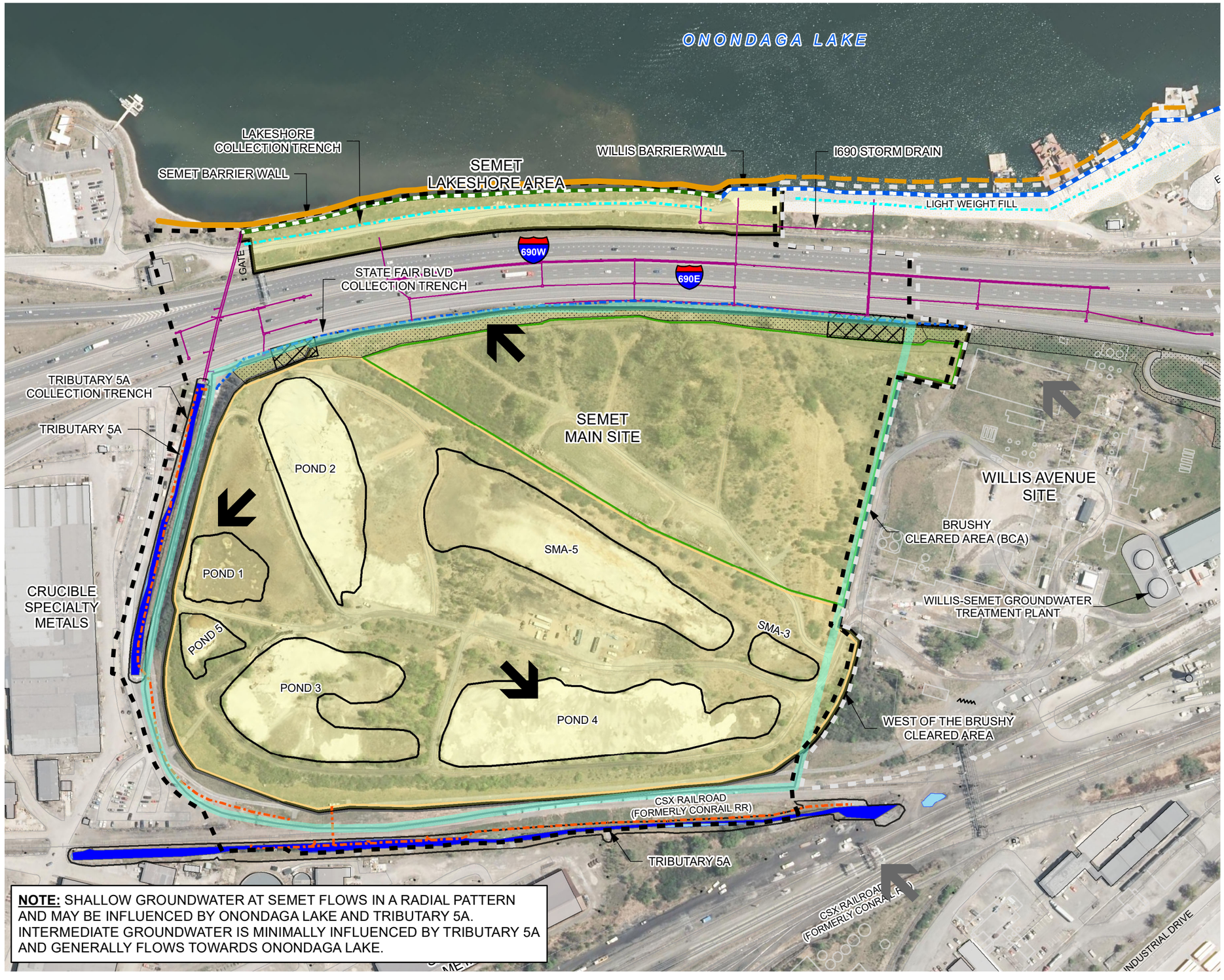

LEGEND

- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT AREA
- WILLIS WASTE MANAGEMENT AREA

IRMS & REMEDIAL ACTIONS

- STATE FAIR COLLECTION TRENCH
- LAKESHORE COLLECTION TRENCH
- TRIBUTARY 5A COLLECTION TRENCH
- I-690 STORM DRAIN
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIBUTARY 5A
- TRIBUTARY 5A SEDIMENT REMOVAL
- SOIL REMOVAL AREA
- BALLFIELD / WILLIS / SEMET BERM AREA

STUDY AREA

- SEMET RESIDUE PONDS SITE
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- SEMET BERM AREA

- SEMET GENERAL SHALLOW AND INTERMEDIATE GROUNDWATER FLOW DIRECTION
- WILLIS GENERAL SHALLOW AND INTERMEDIATE GROUNDWATER FLOW DIRECTION

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 RECORD OF DECISION
GEDDES, NEW YORK

WASTE MANAGEMENT AREA AND GROUNDWATER POINT OF COMPLIANCE

0 125 250 500
Feet

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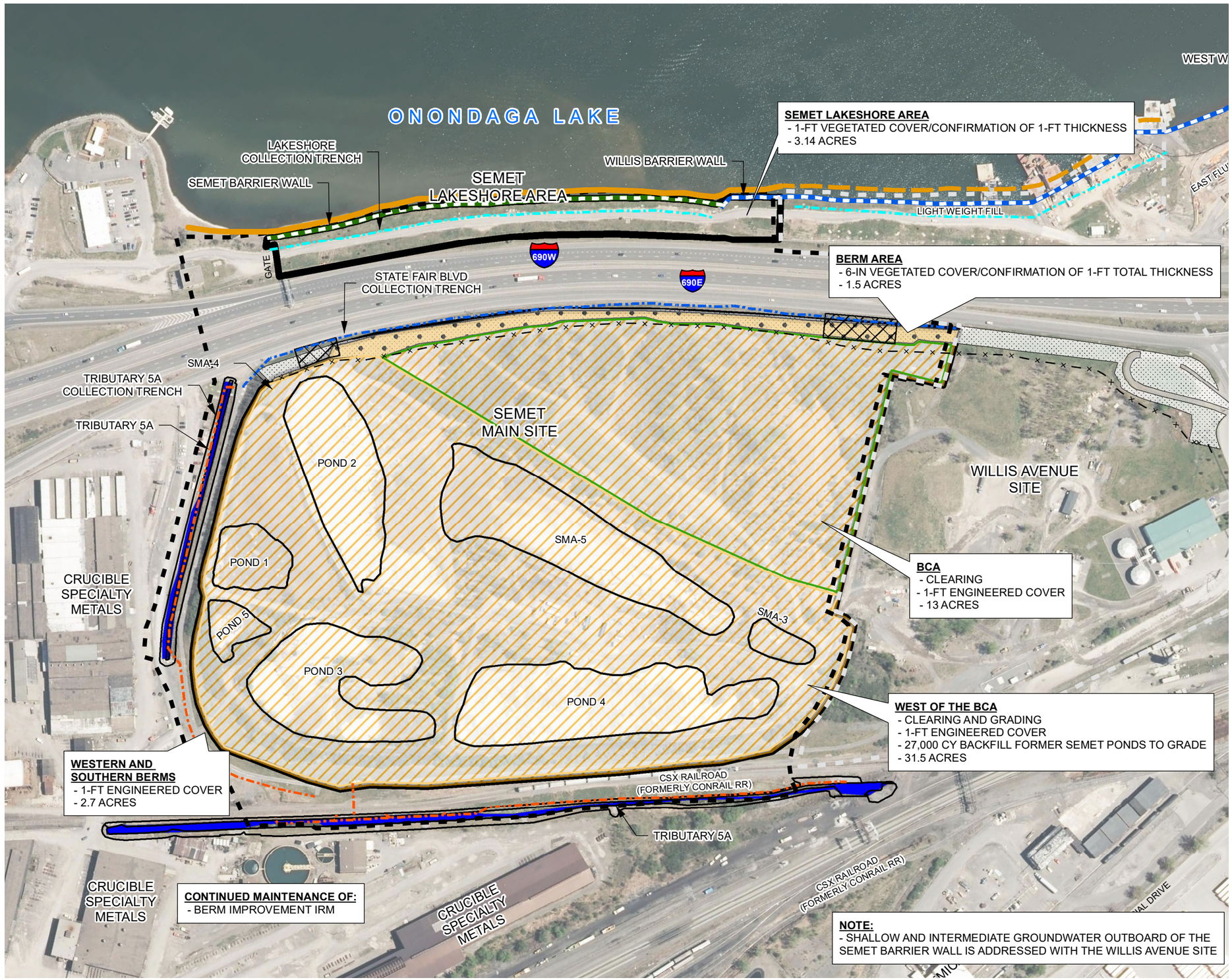

LEGEND

- SEMET PONDS SITE BOUNDARY
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED COVER
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT AREA
- WILLIS WASTE MANAGEMENT AREA
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC. SEMET RESIDUE PONDS SITE OU-2 RECORD OF DECISION GEDDES, NEW YORK

ALTERNATIVE 2

0 125 250 500
Feet

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O'BRIEN & GERE ENGINEERS, INC.

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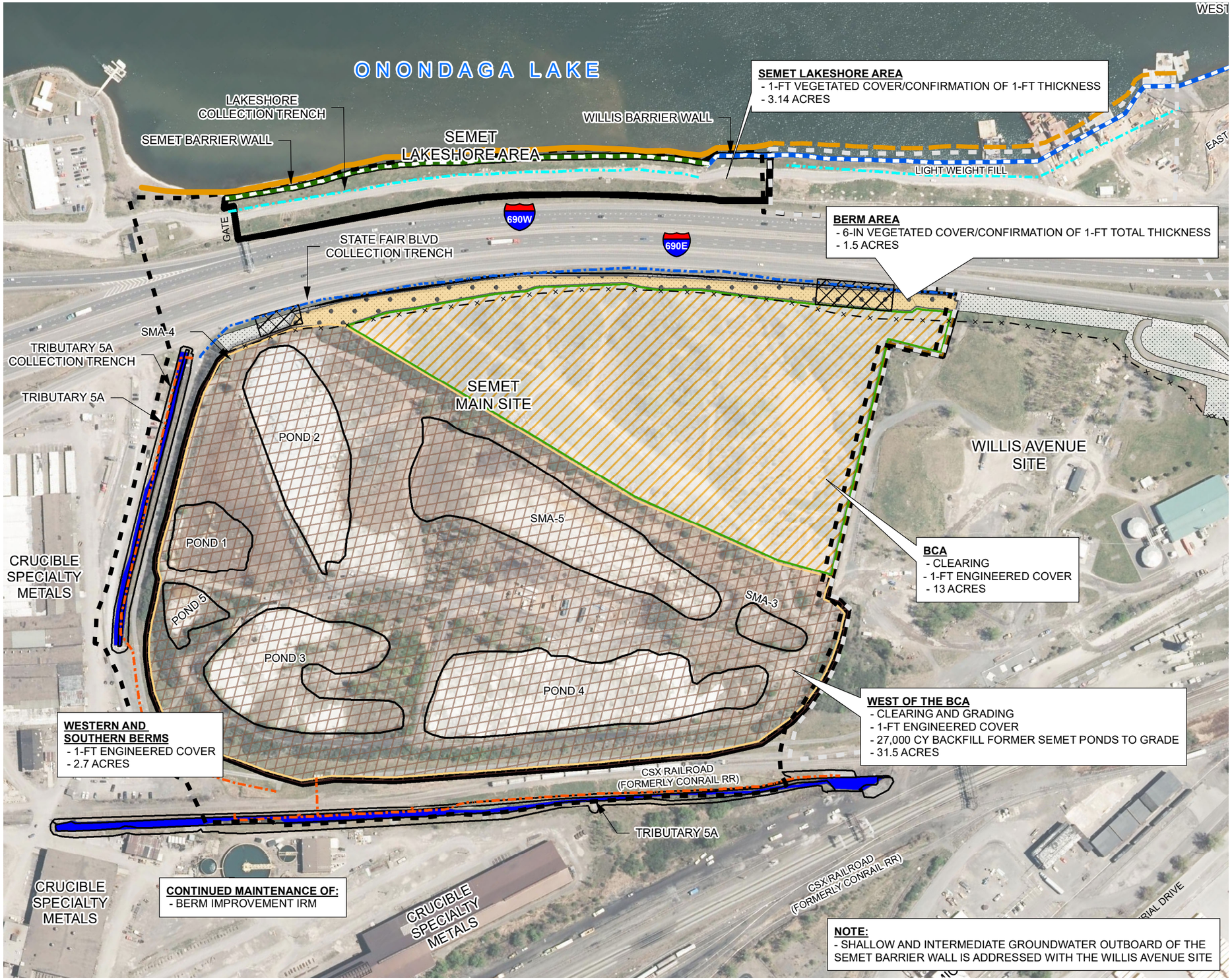

LEGEND

- SEMET PONDS SITE BOUNDARY
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED COVER
- 1.5-FOOT LOW-PERMEABILITY COVER
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT AREA
- WILLIS WASTE MANAGEMENT AREA
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC. SEMET RESIDUE PONDS SITE OU-2 RECORD OF DECISION GEDDES, NEW YORK

ALTERNATIVE 3

0 125 250 500
Feet

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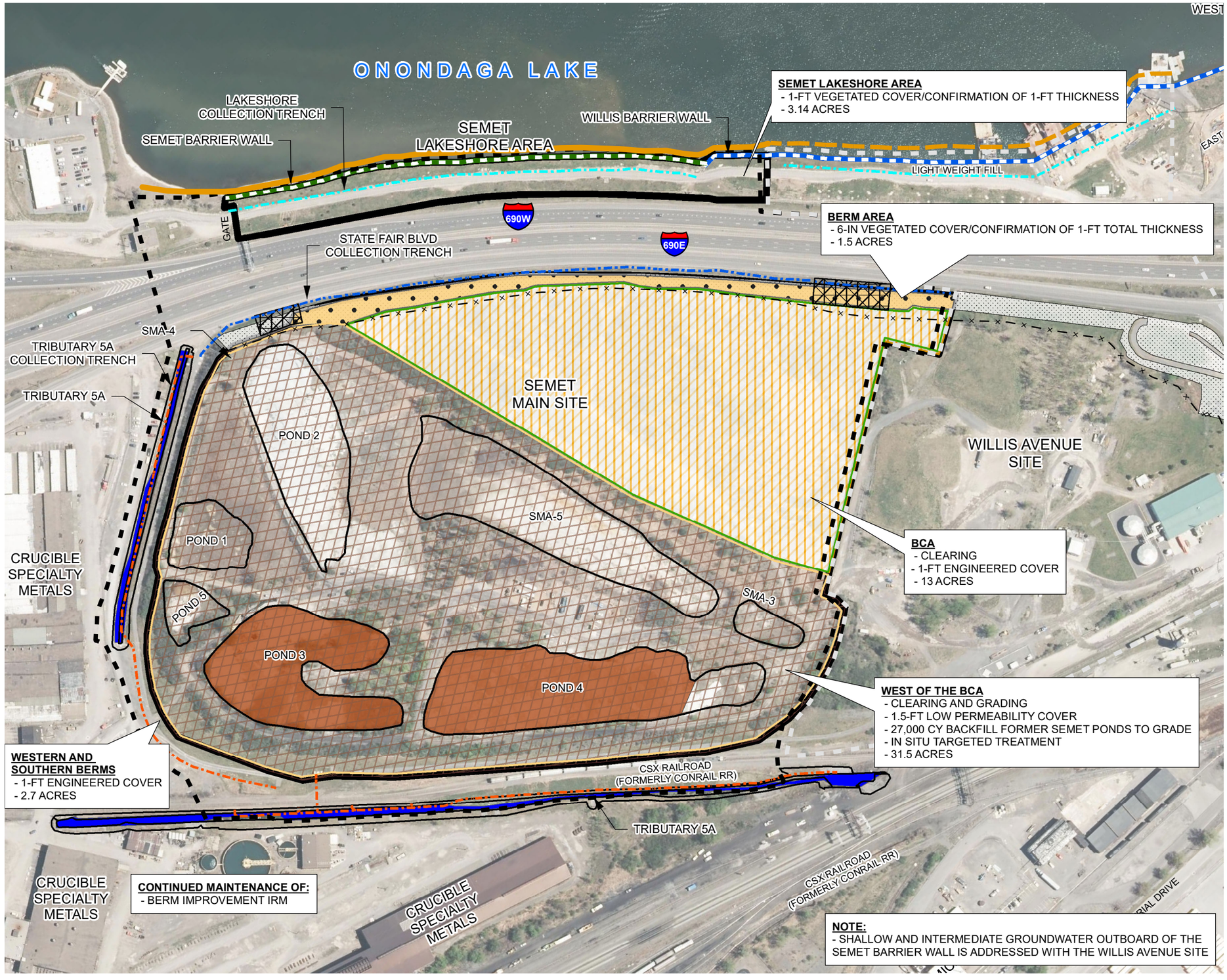

LEGEND

- SEMET PONDS SITE BOUNDARY
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED COVER
- 1.5-FOOT LOW-PERMEABILITY COVER
- IN-SITU TARGETED TREATMENT
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT AREA
- WILLIS WASTE MANAGEMENT AREA
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 RECORD OF DECISION
GEDDES, NEW YORK

ALTERNATIVE 4

0 125 250 500
Feet

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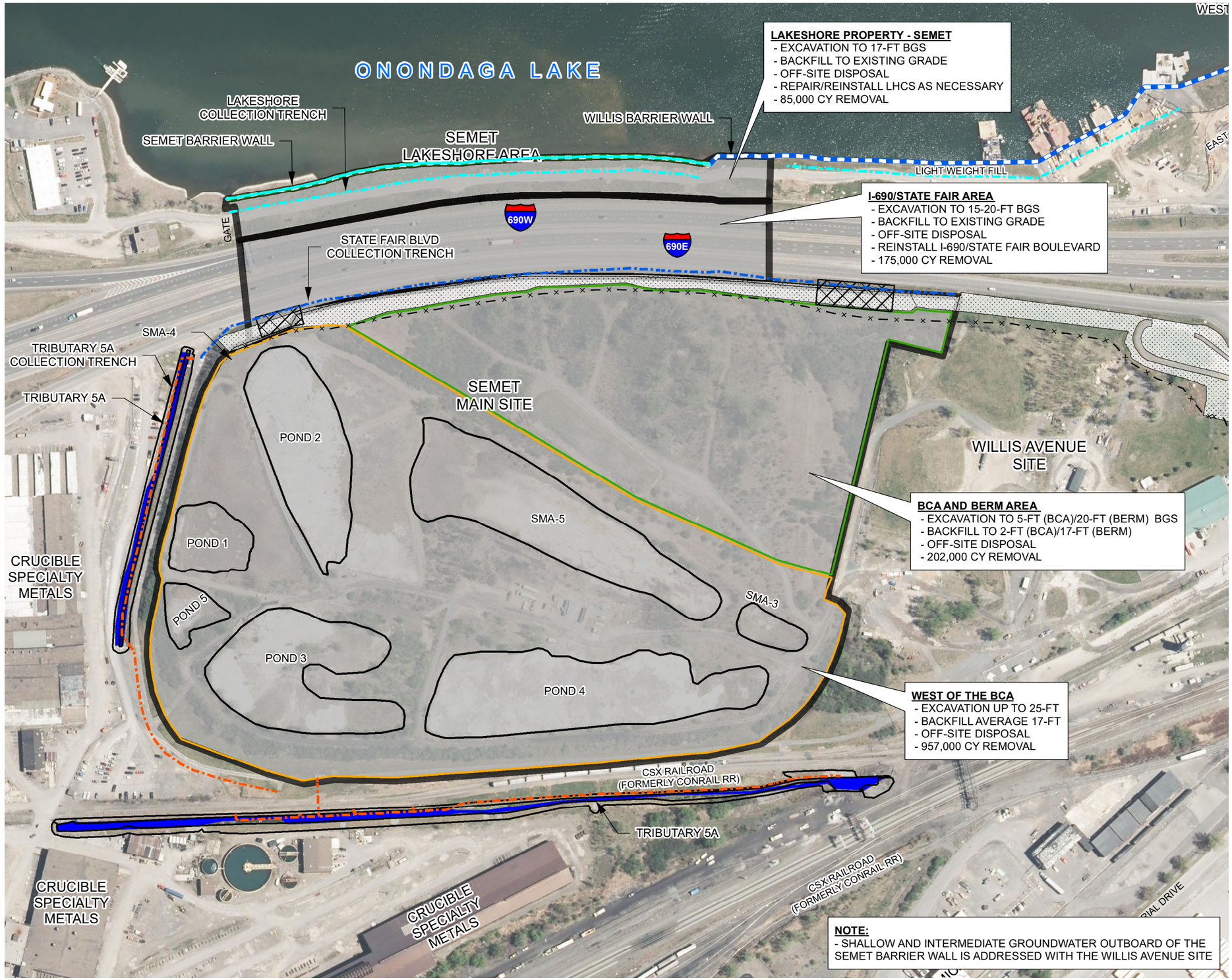

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LEGEND

- SEMET PONDS SITE BOUNDARY / EXCAVATION AREA
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC. SEMET RESIDUE PONDS SITE OU-2 RECORD OF DECISION GEDDES, NEW YORK

ALTERNATIVE 5

0 125 250 500
Feet

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OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

APPENDIX II

TABLES

Table 1

Semet Residue Ponds
Site-wide Surface Soils (0-2 ft bgs)
Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

Parameter	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Industrial SCOs	Number of Industrial SCO Exceedances
Volatile Organic Compounds (µg/kg)						
Benzene	0.49	7,810,000	44,000	11	89,000	10
Toluene	0.89	4,040,000	500,000	9	1,000,000	8
Xylenes (Total)	0.90	5,600,000	500,000	8	1,000,000	8
Semivolatile Organic Compounds (µg/kg)						
Benzo(a)pyrene	48.0	1,100	1,000	1	1,100	0
Dibenz(a,h)anthracene	73.0	564	560	1	1,100	0
Naphthalene	45.0	4,410,000	500,000	7	1,000,000	4
Pesticides (mg/kg)						
beta-BHC	360	360	3	1	14	1
Metals (mg/kg)						
Mercury	0.04	197	2.8	20	5.7	6

NOTES

This table presents (1) the detected concentration data only and (2) only parameters that exceeded the Part 375 Commercial or Industrial SCOs.

The Site-wide data includes the Berm Area, Brushy Cleared Area (BCA), Area west of the BCA, and Lakeshore Area. The Lakeshore Area data were taken from the stockpile samples (soils excavated during barrier wall and collection trench installation; Section 5.5 of *Semet Residue Ponds Site OU-2 FInal Data Summary Document* [OBG, June 2018]).

bgs = below ground surface

Table 2

Semet Residue Ponds
Site-wide Subsurface Soils (>2 ft bgs)
Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

Parameter	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Industrial SCOs	Number of Industrial SCO Exceedances
Volatile Organic Compounds (µg/kg)						
1,2,4-Trimethylbenzene	750,000	750,000	190000	1	380000	1
1,3,5-Trimethylbenzene	510,000	510,000	190000	1	380000	1
1,4-Dichlorobenzene	0.64	260,000	130,000	1	250,000	1
Benzene	0.49	44,000,000	44,000	96	89,000	91
Chlorobenzene	0.51	820,000	500,000	1	1,000,000	0
Ethylbenzene	0.36	480,000	390,000	1	780,000	0
Naphthalene	2.00	2,600,000	500,000	1	1,000,000	1
Toluene	0.89	16,000,000	500,000	68	1,000,000	61
Xylene (Total)	2.00	10,000,000	500,000	68	1,000,000	61
Semivolatile Organic Compounds (µg/kg)						
Benzo(a)pyrene	33.0	1,300	1,000	2	1,100	1
Dibenzofuran	27.0	470,000	350,000	1	1,000,000	0
Napthalene	45.0	63,000,000	500,000	59	1,000,000	43
Metals (mg/kg)						
Arsenic	0.8	18	16	1	16	1
Barium	5.7	795	400	1	10000	0
Copper	1.7	1,180	270	1	10000	0
Mercury	0.005	197	2.8	10	5.7	9

NOTES

This table presents (1) the detected concentration data only and (2) only parameters that exceeded the Part 375 Commercial or Industrial SCOs.

The Site-wide data includes the Berm Area, Brushy Cleared Area (BCA), Area west of the BCA, and Lakeshore Area. The Lakeshore Area data were taken from the stockpile samples (soils excavated during barrier wall and collection trench installation; Section 5.5 of *Semet Residue Ponds Site OU-2 FInal Data Summary Document* [OBG, June 2018]).

bgs = below ground surface

TABLE 3a
SUMMARY OF RISKS AND HAZARDS FOR CONSTRUCTION WORKER
SITEWIDE SOIL / FILL MATERIAL - SURFACE/SUBSURFACE SOIL
SEMET PONDS SITE - GEDDES, NEW YORK

CAS Number	Constituent	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient			
		Ingestion	Dermal	Inhalation	Exposure Routes Total	Ingestion	Dermal	Inhalation	Exposure Routes Total
METALS									
7440-38-2	Arsenic	4E-07	3E-08	2E-07	7E-07	6E-02	4E-03	2E-01	3E-01
7440-47-3	Chromium, Hexavalent (derived)	6E-08		1E-06	1E-06	3E-03		9E-03	1E-02
7440-48-4	Cobalt			6E-07	6E-07	1E-01		7E-01	9E-01
7439-97-6	Mercury					1E+00		4E-02	1E+00
7440-28-0	Thallium					7E-01			7E-01
PESTICIDES									
319-85-7	beta-BHC	2E-05	3E-06	8E-07	3E-05				
SVOCs									
92-52-4	1,1'-Biphenyl	6E-09			6E-09	1E-04		1E-01	1E-01
106-46-7	1,4-Dichlorobenzene	2E-09		3E-08	4E-08	4E-04		3E-04	7E-04
6165-52-2	1-Phenyl-1-[2,4-dimethylphenyl]-ethane								
3717-68-8	1-Phenyl-1-[4-methylphenyl]-ethane								
91-57-6	2-Methylnaphthalene					2E-01	3E-02		2E-01
208-96-8	Acenaphthylene					4E-06			
56-55-3	Benzo(a)anthracene	1E-08	2E-09	2E-10	1E-08				
50-32-8	Benzo(a)pyrene	6E-08	1E-08	1E-09	7E-08				
86-74-8	Carbazole								
53-70-3	Dibenzo(a,h)anthracene	3E-08	6E-09	6E-10	4E-08				
132-64-9	Dibenzofuran					8E-02	3E-03		8E-02
91-20-3	Naphthalene			9E-06	9E-06	5E-01	9E-02	7E+00	7E+00
621-64-7	N-Nitrosodipropylamine	1E-07	2E-08	4E-09	2E-07				
110-86-1	Pyridine					4E-01			4E-01
VOCs									
95-63-6	1,2,4-Trimethylbenzene							3E+00	3E+00
71-43-2	Benzene	1E-05		4E-05	5E-05	4E+00		1E+01	2E+01
74-83-9	Bromomethane					1E-02		2E-01	2E-01
108-90-7	Chlorobenzene					8E-03		4E-02	5E-02
67-66-3	Chloroform	2E-09		4E-08	4E-08	3E-04		1E-03	1E-03
100-41-4	Ethylbenzene	4E-08		1E-07	2E-07	2E-03		3E-03	6E-03
108-87-2	Methylcyclohexane								
99-87-6	p-Isopropyltoluene								
108-88-3	Toluene					1E-01		4E-02	2E-01
1330-20-7	Xylenes (total)					4E-02		1E+00	1E+00
				Total Risk	**9E-05**			Total Hazard	**3E+01**

TABLE 3b
SUMMARY OF RISKS AND HAZARDS FOR INDOOR / OUTDOOR INDUSTRIAL WORKER
SITEWIDE SOIL / FILL MATERIAL - SURFACE SOIL
SEMET PONDS SITE - GEDDES, NEW YORK

CAS Number	Constituent	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient			
		Ingestion	Dermal	Inhalation	Exposure Routes Total	Ingestion	Dermal	Inhalation	Exposure Routes Total
METALS									
7440-38-2	Arsenic	4E-06	4E-07	3E-09	4E-06	2E-02	2E-03	1E-04	3E-02
7440-47-3	Chromium, Hexavalent (derived)	4E-07		2E-08	4E-07	7E-04		6E-06	7E-04
7440-48-4	Cobalt			7E-09	7E-09	3E-02		4E-04	3E-02
7439-97-6	Mercury					3E-01		9E-01	1E+00
7440-28-0	Thallium					2E-01			2E-01
PESTICIDES									
319-85-7	beta-BHC	1E-04	4E-05	1E-08	2E-04				
SVOCs									
92-52-4	1,1'-Biphenyl	6E-08			6E-08	4E-05		2E-01	2E-01
106-46-7	1,4-Dichlorobenzene	2E-08		1E-06	1E-06	1E-04		4E-04	6E-04
6165-52-2	1-Phenyl-1-[2,4-dimethylphenyl]-ethane								
3717-68-8	1-Phenyl-1-[4-methylphenyl]-ethane								
91-57-6	2-Methylnaphthalene					6E-02	2E-02		8E-02
208-96-8	Acenaphthylene					1E-06			
56-55-3	Benzo(a)anthracene	9E-08	3E-08	1E-09	1E-07				
50-32-8	Benzo(a)pyrene	3E-07	1E-07	1E-11	5E-07				
86-74-8	Carbazole								
53-70-3	Dibenzo(a,h)anthracene	3E-07	1E-07	1E-11	5E-07				
132-64-9	Dibenzofuran					3E-02	2E-03		3E-02
91-20-3	Naphthalene			4E-04	4E-04	2E-01	8E-02	1E+01	1E+01
621-64-7	N-Nitrosodipropylamine	8E-07	2E-07	6E-11	1E-06				
110-86-1	Pyridine					1E-01			1E-01
VOCs									
95-63-6	1,2,4-Trimethylbenzene							6E-02	6E-02
71-43-2	Benzene	6E-05		8E-04	9E-04	5E-01		1E+01	1E+01
74-83-9	Bromomethane					2E-03		2E-01	2E-01
108-90-7	Chlorobenzene					1E-03		4E-02	4E-02
100-41-4	Ethylbenzene	2E-07		3E-06	3E-06	4E-04		4E-03	4E-03
108-87-2	Methylcyclohexane								
99-87-6	p-Isopropyltoluene								
108-88-3	Toluene					2E-02		4E-02	6E-02
1330-20-7	Xylenes (total)					6E-03		1E+00	1E+00
				Total Risk	**2E-03**			Total Hazard	**3.E+01**

COST ESTIMATE SUMMARY

TABLE 4. ALTERNATIVE 4 COST ESTIMATE

Site:	Honeywell Semet Residue Ponds Site	Conceptual Basis:	Backfill of emptied Ponds and Grading
Location:	Geddes, NY		Continued Operation of State Fair Boulevard Collection System IRM
Phase:	Feasibility Phase (+50% / -25%)		1-ft Soil Cover BCA and outer berms; 18-inch Low Permeability Engineered Cover West of the BCA
Base Year:	2017		*In situ* targeted treatment

ITEM	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT COST	ESTIMATED COST	NOTES
Direct Capital Costs - OU2					
General Conditions	WK	47	$18,000	$846,000	Trailer, fuel, small tools, consumables and safety
Air Monitoring	WK	47	$15,000	$705,000	
Surveys	WK	47	$3,000	$141,000	During capping
Irrigation	WK	8	$5,000	$40,000	Following seeding; 4 wks per season
Environmental Easement	LS	1	$30,000	$30,000	
Site Management Plan	LS	1	$50,000	$50,000	
Site Preparation					
Clearing and Grubbing	AC	20.5	$2,600	$53,300	Clearing BCA only and portions of West of the BCA area
Rough Grading	AC	44.5	$3,000	$133,500	BCA and West of the BCA area exclusive of pond footprint
Construction Road Maintenance	LF	5,000	$33	$165,000	Resurface and grade existing roadways
Install New Access Roads	LF	5,000	$48	$240,000	Stone roadway over geofabric
Pre-design Investigation	LS	1	$200,000	$200,000	evaluate need for and effectiveness/implementability for passive recovery of remaining Semet Residue.
QA/QC					
Materials QA/QC Testing - Topsoil	EA	79	$500	$39,285	1/500 cy of imported materials
Materials QA/QC Testing - Fill and Stone	EA	141	$400	$56,388	1/500 cy of imported materials
Performance QA/QC - Compaction	WK	47	$1,200	$56,400	
Grading and Grading Fill					
Place and Grade Soil Pile	CY	20,000	$3.85	$77,000	Move and grade stockpiled soils to no less than 2% slope; pond fill
Grade Site Soils -cut/fill	AC	31.5	$4,300	$135,450	Cut and grade existing site soils above pond berm elevation for use as pond fill; inc. soil pile
Place Imported Fill	cy	7,000	$30	$210,000	Net Fill balance to achieve 2% site slopes
Engineered Cover, 1-ft - Brushy Cleared Area (BCA)					
Erosion and Sediment Control	LF	1,700	$4	$6,834	Reinforced silt fence; one replacement
Place Topsoil to 6-inch depth	CY	10,487	$58	$611,792	Placement by conventional equipment in 6-inch lifts
Place Imported Fill to 6-inch depth	CY	10,487	$43	$448,724	Placement by conventional equipment in 6-inch lifts
Seeding	AC	13.0	$18,000	$234,000	Modified old field successional with fertilizer and hydromulch
Engineered Cover, 1-ft - Western and Southern Outboard Berms					
Erosion and Sediment Control	LF	5,500	$4	$22,110	Reinforced silt fence; one replacement
Place Topsoil to 6-inch depth	CY	2,178	$58	$127,065	Placement by conventional equipment in 6-inch lifts
Place Imported Fill to 6-inch depth	CY	2,178	$43	$93,197	Placement by conventional equipment in 6-inch lifts
Stormwater Controls	LS	1	$40,000	$40,000	Perimeter swale (3,000 lf) and rip-rap discharge outlets (4) to Trib 5a
Seeding	AC	2.7	$18,000	$48,600	Modified old field successional with fertilizer and hydromulch
Engineered Cover, 6-in - State Fair Blvd Berm Area					*to total 1-ft cover over the Berm Area IRM footprint*
Erosion and Sediment Control	LF	4,000	$4	$16,080	Reinforced silt fence; one replacement
Place Topsoil to 6-inch depth	CY	1,210	$58	$70,591	Placement by conventional equipment in 6-inch lifts
Seeding	AC	1.5	$18,000	$27,000	Modified old field successional with fertilizer and hydromulch
Engineered Cover, 18-inch - West of the BCA					
Erosion and Sediment Control	LF	12,000	$4	$48,000	Reinforced silt fence; one replacement
Place Topsoil to 6-inch depth	CY	25,410	$58	$1,482,419	Placement by conventional equipment in 6-inch lifts
Place Imported Fill to 12-inch depth	CY	50,820	$43	$2,174,588	Barrier layer; placement by conventional equipment in 6-inch lifts
Geonet drainage layer	SF	1,372,140	$2	$2,552,180	
LLDPE Liner and Geofabric	SF	1,372,140	$2	$2,195,424	40 mil LLDPE and single layer geofabric
Geocushion	SF	1,372,140	$0.50	$686,070	
Perimeter underdrain	LF	6,000	$90.00	$540,000	Stone drain with perforated collection pipe; collect and discharge stormflows from liner system to Trib 5a
Seeding	AC	31.5	$18,000	$567,000	Modified old field successional with fertilizer and hydromulch
In Situ Targeted Treatment					
Stabilization in place	cy	7,000	$100	$700,000	bucket mixing of pond residuals; assumed 18-inch average treatment thickness.
Reagent Cost	ton	1,330	$200	$266,000	assumes reagent 20% by weight of stabilized materials; delivered.
			SUBTOTAL (rounded):	**$16,140,000**	

COST ESTIMATE SUMMARY

TABLE 4. ALTERNATIVE 4 COST ESTIMATE

Site:	Honeywell Semet Residue Ponds Site	Conceptual Basis:	Backfill of emptied Ponds and Grading
Location:	Geddes, NY		Continued Operation of State Fair Boulevard Collection System IRM
Phase:	Feasibility Phase (+50% / -25%)		1-ft Soil Cover BCA and outer berms; 18-inch Low Permeability Engineered Cover West of the BCA
Base Year:	2017		*In situ* targeted treatment

ITEM	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT COST	ESTIMATED COST	NOTES
TOTAL ESTIMATED DIRECT CAPITAL COST (rounded):				**$16,140,000**	
ENGINEERING/MANAGMENT, CONSTRUCTION OVERSIGHT, OBG OH&P				**$3,066,600**	6%, 8%, and 5% respectively
CONTINGENCY (30%)				**$4,842,000**	Scope Contingency
TOTAL ESTIMATED CAPITAL COST (rounded):				**$24,000,000**	
Operation and Maintenance Costs					
Annual					** State Fair Collection System discharges to Trib5A remedy therefore cost is not included here.*
Reporting and Recordkeeping	EA	1	$20,000	$20,000	
Cover inspection	LS	1	$6,240	$6,240	Assumes 2 scientists/engineers, 4 days, 8 hours/day, semi-annual inspections
Cap Maintenance					
Vegetation Maintenance	AC	5	$3,000	$15,000	Spot seeding; 10% of all areas annually
Soil Cover maintenance and incidental repairs	AC	5	$225	$1,125	Topsoil repair, 5 cy per acre annually
Years 5, 10, 15, 20, 25, 30					
Five Year Review	EA	1	$15,000	$15,000	

Present Worth Analysis Years (1-30)		Discount Factor	**Present Worth ($)**	
Cost Type	Cost	Df=7	**(rounded)**	
Capital Cost - Year 0	$24,000,000	1.00	**$24,000,000**	
Annual O&M - Years 1-30	$42,365	0.41	**$526,000**	Average discount factor for years 1-30
Periodic O&M - Years 5, 10, 15, 20, 25, 30	$15,000	0.36	**$32,000**	Average discount factor for years 5, 10, 15, 20, 25 and 30
TOTAL PRESENT WORTH ESTIMATED ALTERNATIVE COST (rounded):			**$24,558,000**	

TABLE 5. POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) MATERIALS

Medium Location/Action	Citation	Requirements	Comments	Potential ARAR	Potential TBC
Potential Chemical-Specific ARARs and TBCs					
Soil/Fill Material	6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives (SCOs)	Promulgated state regulation that provides guidance for SCOs for various restricted property uses (industrial, commercial, restricted residential, and residential), for the protection of groundwater and ecological resources, and for unrestricted property use. Commercial use includes passive recreational use that refers to recreational uses with limited potential for soil contact, such as: (1) artificial surface fields; (2) outdoor tennis or basketball courts; (3) other paved recreational facilities used for roller hockey, roller skating, shuffle board, etc.; (4) outdoor pools; (5) indoor sports or recreational facilities; (6) golf courses; and (7) paved (raised) bike or walking paths [DER-10 (NYSDEC 2010)]. Industrial use includes land use for the primary purpose of manufacturing, production, fabrication or assembly processes and ancillary services. The industrial use category allows the use of the site only for industrial purposes with access to the site limited to workers and occasional visitors [DER-10 (NYSDEC 2010)].	SCOs for restricted use (industrial, commercial) are potentially relevant and appropriate to site soil/fill material given the current and reasonably anticipated future land use as a commercial or industrial property. SCOs for the protection of groundwater may not be applicable, or relevant and appropriate because migration of Site groundwater is currently being controlled.	Yes	No
	USEPA Regional Screening Levels	Guidance that provides human health risk-based screening values for soil at industrial sites. Screening levels are calculated based on human health exposure assumptions and toxicity data.	Industrial soil screening levels are potentially applicable TBC for the screening of soil/fill material.	No	Yes
Potential Location-Specific ARARs and TBCs					
Construction of Buildings	NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York	Guidance document that provides thresholds for indoor air and subslab soil vapor above which vapor mitigation is required.	Not currently applicable or relevant and appropriate because no buildings are present on the Site. Potentially applicable if future buildings are constructed at the Site.	No	Yes
	OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, OSWER Publication 9200.2-154, June 2015	Technical guidance that provides recommendations on assessment of vapor intrusion pathways that pose an unacceptable risk to human health.	Not currently applicable or relevant and appropriate because no buildings are present on the Site. Potentially applicable if future buildings are constructed at the Site.	No	Yes
Water Bodies	33 CFR 320 - 330 - Navigation and Navigable Waters	Regulatory policies and permit requirements for work affecting waters of the United States and navigable waterways.	Substantive, non-administrative requirements potentially relevant or appropriate to work near Tributary 5a that may affect Onondaga Lake.	Yes	No
	16 USC 661 - Fish and Wildlife Coordination Act	Requires protection of fish and wildlife in a stream or other water body when performing activities that modify a stream or river.	Not applicable or relevant and appropriate since no streams present on the Site.	No	No
Potential Location-Specific ARARs and TBCs (Cont'd)					
Wetlands	6 NYCRR 663 - Freshwater wetland permit requirements	Actions occurring in a designated freshwater wetland (within 100 feet) must be approved by NYSDEC or its designee. Activities occurring adjacent to freshwater wetlands must: be compatible with preservation, protection, and conservation of wetlands and benefits; result in no more than insubstantial degradation to or loss of any part of the wetland; and be compatible with public health and welfare.	Not applicable or relevant and appropriate since the Site is not within 100 feet of a designated freshwater wetland regulated by NYSDEC.	No	No
	Clean Water Act Section 404 33 CFR Parts 320 - 330	Regulatory policies and permit requirements for work affecting waters of the United States, including wetlands.	Not applicable or relevant and appropriate. There are no delineated wetlands on Site.	No	No
	Clean Water Act Section 404 40 CFR Parts 230-231	Provides for restoration and maintenance of integrity of waters of the United States, including wetlands, through the control of dredged or fill material discharge.		No	No
	Executive Order 11990 - Protection of Wetlands	Executive order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or loss of wetlands if a practical alternative exists.		No	No

TABLE 5. POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) MATERIALS

Medium Location/Action	Citation	Requirements	Comments	Potential ARAR	Potential TBC
Wetlands & Floodplains	Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-2; 1985)	Policy and guidance requiring Superfund actions to meet substantive requirements of Executive Orders 11988 and 11990. Describes requirements for floodplain assessment during remedial action planning.	Not applicable or relevant and appropriate since there are no delineated wetlands on Site. Not applicable or relevant and appropriate for floodplains as there are no floodplains on Site.	No	No
	Statement of Procedures on Floodplains Management and Wetlands Protection (January 5, 1979)	Policy and guidance for implementing Executive Orders 11988 and 11990. Requires federal agencies to evaluate the potential effects of action proposed in wetlands and floodplains to avoid, to the extent possible, adverse effects. Federal agencies are required to evaluate alternatives to actions in wetlands or floodplains and to avoid or minimize adverse impacts if not practical alternatives exist.		No	No
Floodplains	6 NYCRR 373-2.2 - Location standards for hazardous waste treatment, storage, and disposal facilities -100-yr floodplain	Hazardous waste treatment, storage, or disposal facilities located in a 100-yr floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste during a 100-year flood.	Not applicable or relevant and appropriate. A portion of the Site is within the 100-year floodplain.; however, no hazardous waste treatment, storage, or disposal facilities are planned to be located on Site.	No	No
	40 CFR Part 264.18(b) - Location Standards - Floodplains	Hazardous waste treatment, storage, or disposal facilities located in a 100-yr floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste during a 100-year flood.	Not applicable or relevant and appropriate. A portion of the Site is within the 100-year floodplain; however, no hazardous waste treatment, storage, or disposal facilities are planned to be located on Site.	No	No
	Executive Order 11988 - Floodplain Management	USEPA is required to conduct activities to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupation or modification of floodplains. The procedures also require USEPA to avoid direct or indirect support of floodplain development wherever there are practicable alternatives and minimize potential harm to floodplains when there are no practicable alternatives.	Not applicable or relevant and appropriate as there are no floodplains on Site.	No	No
Potential Location-Specific ARARs and TBCs (Cont'd)					
Floodplains (Cont.)	Executive Order 13690 - Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input	Executive order establishes a Federal Flood Risk Management Standard (FFRMS), a Process for Further Soliciting and Considering Stakeholder Input, and amends Executive Order 11988. The FFRMS establishes a construction standard and framework for Federally funded projects constructed in, and affecting, floodplains, to reduce the risks and cost of floods. Under the FFRMS, federal agency management is expanded from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk to increase resiliency of projects funded with federal funds. The Executive Order also sets forth a process for solicitation and consideration of public input, prior to implementation of the FFRMS.	Not applicable or relevant and appropriate as there are no floodplains on Site.	Yes	No
	6 NYCRR 500 - Floodplain Management Regulations Development Permits	Promulgated state regulations providing permit requirements for development in areas of special flood hazard (floodplain within a community subject to a one percent or greater chance of flooding in any given year).	Not applicable or relevant and appropriate as there are no floodplains on Site.	No	No
	Town of Geddes Flood Protection Ordinance	Permit requirements for work in areas of special flood hazard.	Not applicable or relevant and appropriate as there are no floodplains on Site.	No	No
Within 61 meters (200 feet) of a Fault Displaced in Holocene Time	40 CFR Part 264.18(a) - Location Standards - Seismic considerations	New treatment, storage, or disposal of hazardous waste is not allowed.	Not applicable or relevant and appropriate. Site is not located within 200 feet of a fault displaced in Holocene time, as listed in 40 CFR 264 Appendix VI. None listed in New York State.	No	No

TABLE 5. POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) MATERIALS

Medium Location/Action	Citation	Requirements	Comments	Potential ARAR	Potential TBC
Within Salt Dome or Bed Formation, Underground Mine, or Cave	40 CFR Part 264.18 (c) - Location standards; salt dome formations, salt bed formations, underground mines and caves.	Placement of non-containerized or bulk liquid hazardous waste is not allowed.	Not applicable or relevant and appropriate. No salt dome formations, salt bed formations, underground mines or caves present at Site.	No	No
Habitat of an Endangered or Threatened Species	6 NYCRR 182	Promulgated state regulation that provides requirements to minimize damage to habitat of an endangered species.	Not applicable or relevant and appropriate. No endangered or threatened wildlife species, rare plants or significant habitats were identified at the site. One threatened plant within 2 miles of Site on north shore of Onondaga Lake not anticipated to be impacted by Site activities.	No	No
	Endangered Species Act	Provides a means for conserving various species of fish, wildlife, and plants that are threatened with extinction.		No	No
	50 CFR Part 17 - Endangered and Threatened Wildlife and Plants and 50 CFR Part 402 - Interagency Cooperation	Promulgated federal regulation that requires that federal agencies ensure authorized, funded, or executed actions will not destroy or have adverse modification of critical habitat.		No	No
Historical Property or District	National Historic Preservation Act 36 CFR 800- Preservation of Historic Properties Owned by a Federal Agency	Remedial actions are required to account for the effects of remedial activities on any historic properties included on or eligible for inclusion on the National Register of Historic Places.	Potentially applicable. A draft Phase 1 assessment identified the potential for prehistoric and historic resources in and in the vicinity of the Site.	Yes	No
	National Historic Preservation Act 36 CFR Part 65 - National Historic Landmarks Program	Promulgated federal regulation requiring that actions must be taken to preserve and recover historical/archeological artifacts found.		Yes	No
	New York State Historic Preservation Act of 1980 9 NYCRR Parts 426 - 428	State law and regulations requiring the protection of historic, architectural, archeological and cultural property.		Yes	No
Wilderness Area	Wilderness Act 50 CFR Part 35 - Wilderness Preservation and Management	Provides for protection of federally-owned designated wilderness areas.	Not applicable or relevant and appropriate. Site not located in wilderness area.	No	No
Potential Location-Specific ARARs and TBCs (Cont'd)					
Wild, Scenic, or Recreational River	Wild and Scenic Rivers Act	Provides for protection of areas specified as wild, scenic, or recreational.	Not applicable or relevant and appropriate. Site not located near wild, scenic or recreational river.	No	No
Coastal Zone	Coastal Zone Management Act	Requires activities be conducted consistent with approved State management programs.	Not applicable or relevant and appropriate. Site not located in coastal zone.	No	No
Coastal Barrier	Coastal Barrier Resources Act	Prohibits any new Federal expenditure within the Coastal Barrier Resource System.	Not applicable or relevant and appropriate. Site not located in coastal barrier.	No	No
Protection of Waters	33 U.S.C. 1341 - Clean Water Act Section 401, State Water Quality Certification Program	States have the authority to veto or place conditions on federally permitted activities that may result in water pollution.	Potentially relevant and appropriate to Site.	Yes	No
Potential Action-Specific ARARs and TBCs					
Institutional Controls	NYSDEC DER-33 Institutional Controls: A Guide to Drafting and Recording Institutional Controls, December 2010	Technical guidance document that provides guidelines for proper development and recording of institutional controls as part of a site remedial program.	Potentially applicable TBC when institutional controls are implemented as a component of the selected remedy.	No	Yes

TABLE 5. POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) MATERIALS

Medium Location/Action	Citation	Requirements	Comments	Potential ARAR	Potential TBC
Cover Systems	NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010	Technical guidance document that provides guidelines for cover thicknesses as they relate to property use in areas where exposed surface soil exceeds NYCRR Part 375 SCOs. Specifically, where the exposed surface soil at the site exceeds the applicable soil cleanup objective for protection of human health and/or ecological resources, the soil cover for restricted residential use, is to be two feet; for commercial or industrial use, is to be one foot; or when an ecological resource has been identified is to be a minimum of two feet; and when such a concern is identified by NYSDEC, consideration should be given to supplementing the demarcation layer to serve as an impediment to burrowing.	Potentially applicable TBC for cover alternatives.	No	Yes
	RCRA Subtitle D, 40 CFR Part 258.60 - Closure Criteria	Regulations established under Subtitle D set federal closure requirements including installation of a final cover system that is designed to minimize infiltration and erosion, for owners and operators of municipal solid waste landfill units.	Potentially relevant and appropriate. Due to the presence of soil/fill material deposited at the Site it is being considered a Waste Management Area (WMA) for which closure criteria for final cover systems may be relevant.	Yes	No
Landfill	40 CFR Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices	Promulgated federal regulation that provides criteria for solid waste disposal facilities to protect health and the environment.	Potentially applicable for treatment residuals or soil/fill material consolidated on-Site in a containment unit.	Yes	No
	40 CFR Parts 264 and 265, Subpart N - Landfills	Promulgated federal regulation that provides requirements for hazardous waste landfill units.		Yes	No
Generation and Management of Solid waste	6 NYCRR 360 - Solid Waste Management Facilities	Promulgated state regulation that provides requirements for management of solid wastes, including disposal and closure of disposal facilities.	Potentially applicable to alternatives including disposal of residuals generated by treatment processes.	Yes	No
Land Disposal	6 NYCRR 376 - Land Disposal Restrictions	Promulgated federal and state regulations that provide treatment standards to be met prior to land disposal of hazardous wastes.	Potentially applicable to residuals generated by treatment processes if found to be hazardous wastes and disposed at a landfill. Potentially applicable for off-site treatment and disposal of soil/fill material.	Yes	No
	40 CFR Part 268 - Land Disposal Restrictions				
	62 CFR 25997 - Phase IV Supplemental Proposal on Land Disposal of Mineral Processing Wastes				
Green Remediation	NYSDEC DER-31 Green Remediation Program Policy, January 2011	State and federal technical guidance documents that provide guidelines for the development of site remediation strategies in a manner that minimizes environmental impacts and applies green remediation concepts (e.*g.*, reduction in greenhouse gas emissions, energy consumption and resource use, promotion of recycling of materials and conservations of water, land and habitat).	Potentially applicable TBC.	No	Yes
	Superfund Green Remediation Strategy, September 2010				
Potential Action-Specific ARARs and TBCs (Cont'd)					
General Excavation	6 NYCRR 200-203, 211-212 - Prevention and Control of Air Contamination and Air Pollution	Provides requirements for air emission sources.	Portions potentially applicable to volatile emissions during excavation	Yes	No

TABLE 5. POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) MATERIALS

Medium Location/Action	Citation	Requirements	Comments	Potential ARAR	Potential TBC
	6 NYCRR 257 - Air Quality Standards	Promulgated state regulation that provides specific limits on generation of SO_2, particulates, CO_2, photochemical oxidants, hydrocarbons (non-methane), NO_2, fluorides, beryllium and H2S from point sources.	Not applicable or relevant and appropriate. Dust emissions would not be generated from a point source. Potentially applicable TBC during dust generating activities such as earth moving, grading and excavation.	No	Yes
	40 CFR Part 50.1 - 50.12 - National Ambient Air Quality Standards	Promulgated federal regulation that provides air quality standards for pollutants considered harmful to public health and the environment. The six principle pollutants are carbon monoxide, lead, nitrogen dioxide, particulates, ozone, and sulfur oxides.	Potentially applicable to alternatives during which dust generation may result, such as during earth moving, grading, and excavation.	Yes	No
	NYS TAGM 4031 - Dust Suppressing and Particle Monitoring at Inactive Hazardous Waste Disposal Sites	State guidance document that provides limitations on dust emissions.	Potentially applicable TBC where more stringent than air-related ARARs.	No	Yes
Transportation	6 NYCRR 364 - Waste Transporter Permits	Promulgated state regulation requiring that hazardous waste transport must be conducted by a hauler permitted under 6 NYCRR 364.	Potentially applicable for off-site transport of hazardous waste.	Yes	No
	49 CFR 107, 171-174 and 177-179 - Department of Transportation Regulations	Promulgated federal regulation requiring that hazardous waste transport to off-site disposal facilities must be conducted in accordance with applicable Department of Transportation requirements	Potentially applicable for off-site transport of hazardous waste to off-site treatment/disposal facilities.	Yes	No

Notes:

ARARs - Applicable or Relevant and Appropriate Requirements
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
DER - Division of Environmental Remediation
FFRMS - Federal Flood Risk Management Standard
NYCRR - New York Code of Rules and Regulations
NYS - New York State
NYSDEC - New York State Department of Environmental Conservation
NYSDOH - New York State Department of Health
OSWER - Office of Solid Waste and Emergency Response
SCOs - Soil Cleanup Objectives
TAGM - Technical and Administrative Guidance Memorandum (NYSDEC)
TBC - To be Considered
USC - United States Code
USEPA or EPA - United States Environmental Protection Agency
WMA – Waste Management Area
Shaded cells - not identified as Potential ARARs or TBCs

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Administrative Record Index
Operable Unit 2 of the Semet Residue Ponds Site

(New York State Inactive Hazardous Waste Disposal Site #7-34-008)

RI/FS Activities	Documents
Pre-Remedial Investigation Information	History of the Semet Residue Ponds, Geddes, New York (September 1989) Citizen Participation Plan for the Onondaga Lake National Priority List Site (January 1996) Semet Residue Ponds Site Operable Unit 1 Record of Decision Administrative Record (March 2002)
Remedial Investigation/Feasibility Study Work Plans	Scope of Work (Work Plan) for the Remedial Investigation/ Feasibility Study, Semet Residue Ponds, Geddes, New York (January 1996)
Remedial Investigation Reports	Remedial Investigation for the Semet Residue Ponds Site, Geddes, New York (October 1991, revised May 1992) Volume I: Text, Tables, and Figures Volume II: Appendices A-L Review of Semet Residue Ponds Risk Assessments, Geddes, New York, TAMS Consultants Inc., (March 19, 1999) Semet Residue Ponds Volume Verification Investigation (July 2009) Revised Semet Ponds Site Soil/Fill Material Ecological Risk Assessment (February 2017) Revised Semet Ponds Site Soil/Fill Material Human Health Risk Assessment (March 2017) Semet Residue Ponds Site OU-2 Final Data Summary Document (June 2018)
Feasibility Study Report	Semet Residue Ponds Site OU-2 Feasibility Study (December 2018)

Documents Related to IRM Activities	Ballfield/Willis Avenue/Semet Ponds Site Improvements Design Project (May 2011) Ballfield/Willis Avenue/Semet Ponds Landscape Restoration Berm Surface Soil Sampling Work Plan (May 2011) Ballfield/Willis/Semet Berm and I-690 Underdrain Construction Completion Report (April 2014)
Proposed Plan Released Start of Public Comment Period	Proposed Plan and Listserv Notice (December 17, 2018) Notice of Public Meeting and Opportunity to Comment (December 19, 2018)
Public Meetings Held	Documentation and Transcript of January 9, 2019 Public Meeting (Attached to the Record of Decision as Appendix V-d) Written Comments on Proposed Plan (Attached to the Record of Decision as Appendix V-e)
Record of Decision Issued	Record of Decision and Responses to Comments (Responsiveness Summary) (March 2019)
Enforcement Documents	RI/FS Consent Order for the Semet Residue Ponds Site (1989)

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX IV

NEW YORK STATE DEPARTMENT OF HEALTH LETTER OF CONCURRENCE

NEW YORK STATE OF OPPORTUNITY. Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

December 12, 2018

Michael Ryan, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233

Re: **Proposed Plan**
Semet Residue Ponds – Operable Unit 2
Site #734008
Geddes, Onondaga County

Dear Mr. Ryan:

At your Department's request, we have reviewed the US EPA's December 2018 *Proposed Plan* for Operable Unit 2 (Solvay Waste / Soil / Fill Material) of the referenced site to determine whether the selected remedy is protective of public health. The Semet Residue Ponds site is a subsite of the Onondaga Lake Superfund Site. I understand that human exposures to contamination associated with this site will be addressed by the remedy as follows:

- Soil: An engineered cover system consisting of an 18-inch thick soil/granular cover (or maintained paved surfaces) that incorporates a geomembrane cap will be required in the former Semet residue pond areas west of the Brushy Cleared Area (BCA). A soil cover over the BCA (where the geomembrane cap will not be present) would be a minimum of 1-foot thick soil/granular cover (or maintained paved surface). Use and development of the site will be restricted to commercial or industrial uses. Future excavations at the site will be conducted in accordance with an approved excavation plan to properly manage human exposures to remaining contaminated soil.

- Groundwater: Use of groundwater at the site without approved treatment will be restricted by environmental easements and/or restrictive covenants placed on the site.

- Soil Vapor: A soil vapor intrusion evaluation will be completed, and appropriate actions implemented, for any buildings developed at the site.

Periodic reviews will be completed to certify that these elements of the remedy are in place and remain effective. Based on this information, and with the understanding that protections will be in place during the remediation to prevent the community from being exposed to site-related contaminants and particulates, I believe the proposal is protective of public health and concur with the remedial plan. If you have any questions, please contact Ms. Maureen Schuck at (518) 402-7860.

Sincerely,

FOR

Christine Vooris, P.E. Director
Bureau of Environmental Investigation

ec: E. Lewis-Michl / K. Malone / M. Schuck / M. Sergott / e-File
J. Strepelis – NYSDOH CRO
L. Letteney – OCHD
S. Edwards / D. Hesler / T. Smith – NYSDEC Central Office
H. Warner – NYSDEC Region 7

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOR THE
RECORD OF DECISION
OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS
SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE
TOWN OF GEDDES, ONONDAGA COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns received during the public comment period related to Operable Unit 2 (OU-2) of the Semet Residue Ponds Subsite (Subsite) of the Onondaga Lake Superfund site Proposed Plan and provides the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. All comments summarized in this document have been considered in NYSDEC and EPA's final decision in the selection of a remedy to address the contamination at the Subsite.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Honeywell International, Inc., (Honeywell), under NYSDEC's oversight, conducted field investigations at the Subsite from 1990 through 2018, which culminated in the completion of a Data Summary Document (DSD)[1] in June 2018, and a feasibility study (FS)[2] report in December 2018. NYSDEC and EPA's preferred remedy for the Subsite and the basis for that preference were identified in a Proposed Plan.[3] The DSD/FS reports and Proposed Plan were released to the public for comment on December 17, 2018. These documents were made available to the public on NYSDEC's website, http://www.dec.ny.gov/chemical/37558.html, and at information repositories maintained at the Solvay Library, 615 Woods Road, Solvay, New York; Onondaga County Public Library, 447 South Salina Street, Syracuse, New York; Atlantic States Legal Foundation, 658 West Onondaga Street, Syracuse, New York; NYSDEC, Division of Environmental Remediation, 625 Broadway, Albany, New York and NYSDEC Region 7, 615 Erie Boulevard West, Syracuse, New York. An NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period commencement and completion dates, and the date of the planned public meeting was issued on December 17, 2018. A notice providing the same information was published in *The Syracuse Post-Standard* on December 19, 2018. The public comment period ended on January 16, 2019.

[1] The DSD is similar to a Remedial Investigation (RI) report, which determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks.
[2] An FS identifies and evaluates remedial alternatives to address the contamination.
[3] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for this preference.

On January 9, 2019, NYSDEC conducted a public meeting at the Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds to inform local officials and interested citizens about the Superfund process, present the Proposed Plan for the Subsite, including the preferred remedy, and respond to questions and comments from the public. Approximately 15 people, including residents and local government officials, attended the public meeting.

SUMMARY OF COMMENTS AND RESPONSES

Comments were received at the public meeting and in writing. Written comments were received from:

- Alma Lowry, Of Counsel, Law Office of Joseph J. Heath (submitted on behalf of the Onondaga Nation), via a January 17, 2019 letter

The transcript from the public meeting can be found in Appendix V-d.

The written comments submitted during the public comment period can be found in Appendix V-e. In addition, the Onondaga Nation had the opportunity to review the draft Proposed Plan and provided comments on this draft on October 18, 2018. The Onondaga Nation's comments and responses to those comments can be found in Appendix V-f.

A summary of the comments provided at the public meeting and comments that were received from the Onondaga Nation during the public comment period, as well as NYSDEC and EPA's responses to them, are provided below.

Anticipated Future Use

Comment #1: A commenter asked about the anticipated use of the Subsite after the construction of the remedy is complete.

Response #1: The current and reasonably anticipated future land uses for the Subsite are industrial and commercial (including passive recreation).[4] The anticipated future use of the Semet Lakeshore Property (north of I-690) includes the construction of paved roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future access/use of the Southwest Lakeshore Area. It is anticipated that the portions of the property south of I-690 will continue to be used for either industrial or commercial purposes (*e.g.*, parking for the State Fair).

[4] Based on 6NYCRR Part 375 and NYSDEC's *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10) passive recreation includes recreational uses with limited potential for soil contact (*e.g.,* artificial surface fields; outdoor tennis or basketball courts; other paved recreational facilities used for roller hockey, roller skating, shuffleboard, etc.; outdoor pools; indoor sports or recreational facilities; golf courses; and paved bike or walking paths).

Comment #2: A commenter asked if the remedy would affect the construction of the Onondaga County West Shore Trail Extension.

Response #2: It is not anticipated that the remedy will interfere with the trail construction. The trail construction in this Lakeshore Area (extending from the Semet Residue Ponds Subsite to Harbor Brook) is part of Honeywell's Natural Resource Damages settlement and it is anticipated that remedy construction will be coordinated with the trail construction.

Basis for Semet Residue Volume Change

Comment #3: A commenter asked why estimates of the amount of Semet residue present at the Subsite had changed.

Response #3: Based on a review of historical photographs and other information, volumes of Semet residue in the 2002 OU1 ROD[5] were determined to be overestimated. Supplemental subsurface investigations, which included geoprobe borings to better delineate the depth of tar present, estimated the volume of Semet residue to be 10 to 17 million gallons, significantly less than the originally estimated volume of 50 to 80 million gallons. The investigations are summarized in the July 2009 *Semet Residue Ponds Volume Verification Investigation* submitted by O'Brien & Gere.

Trends in Concentration of Contaminants

Comment #4: A commenter asked if there are any trends in the concentration of contaminants collected by the groundwater collection system that was installed as part of the OU1 remedy.

Response #4: Volatile organic compound and semivolatile organic compound analytical results for shallow/intermediate groundwater samples collected from monitoring wells located at the Semet Residue Ponds Subsite as well as other lakeshore area subsites (*i.e.,* Wastebed B/Harbor Brook, Willis Ave, Wastebeds 1-8) were evaluated using time series trend plots and statistical analysis to evaluate if trends were statistically significant. A review of the time series trend plots yielded observations of decreasing concentration trends in the shallow and intermediate groundwater. Additional information on this evaluation is available in Appendix C of the December 2018 *Semet Residue Ponds OU-2 Feasibility Study* submitted by O'Brien & Gere. An evaluation of trends specific to groundwater captured by the groundwater collection system has not been performed.

[5] The OU-1 ROD addressed the Semet residue in five man-made ponds and the containment of shallow and intermediate groundwater, with modifications made in a 2017 Explanation of Significant Differences.

Ecological and Habitat Value of Subsite

Comment #5: A commenter opined that the ecological and habitat value of the Subsite was discounted.

Response #5: Ecological risks were considered during the development of the remedial alternatives. Due to the current zoning and proposed future uses of the site (*e.g.,* parking, trails), remediating to ecological-use Soil Cleanup Objectives[6] is not appropriate as the land use remedy selection criterion in State regulation[7] considers the current, intended, and reasonably anticipated future uses of a site. However, the selected alternative does include a minimum one-foot thick soil/granular cover over the brushy cleared area (BCA) and the lakeshore area, as well as a minimum 18-inch thick soil/granular cover and geomembrane cap over the area west of the BCA. These covers will significantly reduce potential exposures and risks to any wildlife that may be present on or frequent the Subsite.

Waste Management Area

Comment #6: A commenter indicated that the designation of the Subsite as part of a waste management area (WMA) would be an admission that the shorelines have been made into industrial waste landfills. The commenter supports complete removal of contaminated materials at the Subsite and indicated that removal of contaminated soil under Alternative 5 would be preferable to placing a cover over it.

Response #6: Due to the presence of historical fill materials (*e.g.,* Solvay waste) deposited at the Subsite, it is not anticipated that groundwater standards would be achievable at the Subsite within a reasonable timeframe. Therefore, the area will be treated as part of a WMA with the groundwater point of compliance for attainment of groundwater standards being the WMA boundary (*i.e.,* outside of the barrier wall). The material within the WMA includes Solvay waste commingled with hazardous substances that are contaminants of concern for the site. The management of the waste within the WMA includes meeting Resource Conservation and Recovery Act (RCRA) municipal landfill capping requirements. In many areas, existing covers and/or Solvay waste/soil/fill material is expected to meet the $1x10^{-5}$ centimeter per second permeability rate required under the RCRA Subtitle D standards. Buildings/asphalt parking lots are expected to achieve and exceed the permeability rates. In areas where existing covers or Solvay waste/soil/fill material do not meet the standard, cover material will include materials needed to achieve the required permeability rates.

Placing a soil cover over contaminated materials is a recognized method of preventing human and ecological exposure to contaminated materials. Alternative 5, which includes removal and off-site disposal of contaminated materials, would be much more difficult to

[6] 6 NYCRR Part 375-6.8.
[7] 6 NYCRR Part 375-1.8(f)(9)

implement, present significant short-term impacts to the community, and would be considerably costlier than constructing a soil cover.

The Subsite will be remediated in a manner that is protective of human health and the environment. The studies that were conducted and evaluations and decisions that were made relative to selecting the remedy were in accordance with state and federal laws, policies, and guidance.

Consequences of Selected Alternative

Comment #7: A commenter opined that a complete description of the consequences of the selected alternative, including the time frame in which soils and groundwater within the site will remain contaminated and barriers and institutional controls will have to be maintained, should be provided.

Response #7: As was noted in Response #6, due to the presence of historical fill materials (*e.g.,* Solvay waste) deposited at the Subsite, it is not anticipated that groundwater standards would be achievable at the Subsite within a reasonable timeframe. The cover system under the selected remedy would require maintenance and monitoring in perpetuity. In addition, the groundwater controls (*e.g.,* barrier wall and groundwater collection systems) that have been implemented at the Subsite under OU1 would require O&M in perpetuity.

Honeywell's Capacity to Maintain Remedy

Comment #8: Two commenters opined that Honeywell's capacity to maintain the barrier and treatment system until the contaminants left in place no longer pose a threat should be assessed.

Response #8: After a remedy is selected in a ROD, NYSDEC intends to negotiate an order on consent with Honeywell that would require the development of the design and implementation of the remedy, and long-term O&M and Site Management. Under the order, Honeywell would be required to provide financial assurance, such as through a surety performance bond (or other mechanism), to demonstrate that it can complete the work described in the ROD.

Success of Groundwater Remediation Unknown

Comment #9: A commenter opined that there is no information about the adequacy or likely success of the selected remedy because groundwater remediation outside the barrier wall is being addressed under the adjacent Willis Avenue Site. The commenter recommended that the Proposed Plan be reissued with a full discussion of the expected natural attenuation of groundwater outside the Semet-Willis Barrier Wall, so that the full

consequences of the preferred alternative can be included, and the public can provide appropriate comments.

Response #9: Sufficient information is available to determine the success of the selected remedy. The subsurface sheet pile barrier wall and groundwater collection system along the lakeshore has been in operation for several years. This system, in addition to the liner and collection systems installed adjacent to and underneath Tributary 5A, eliminate, to the extent practicable, the discharge of contaminated groundwater into Onondaga Lake. Moreover, the groundwater plume at the Semet Residue Pond site has been affected by and commingled with groundwater contamination emanating from the adjacent Willis Avenue site. Therefore, it is appropriate to select an alternative for the site since, as stated in Response #6, the Subsite will be considered as part of a WMA and shallow and intermediate groundwater at the point of compliance (*e.g.,* outboard of the Semet barrier wall) will be addressed as part of a future remedy selection at the adjacent Willis Avenue Site.

Natural Attenuation Timeframe

Comment #10: A commenter opined that there is no information regarding the timeframe for natural attenuation of contaminants in the soil or groundwater at the Subsite

Response #10: It is not anticipated that natural attenuation of the contaminants in the soil will occur. As noted previously, groundwater at the point of compliance (*e.g.,* outboard of the Semet barrier wall) will be addressed as part of a future remedy selection at the adjacent Willis Avenue Site.

Clarification of Cover Elements

Comment #11: A commenter requested that the Proposed Plan and related figures be revised to clarify the cover elements of the preferred alternative and properly characterize both the contaminants and the remedy.

Response #11: The Proposed Plan briefly characterizes the site and describes the preferred alternative. The DSD includes additional information regarding the investigations and contaminant concentrations related to OU2. Additional clarification of the selected remedy has been included in the ROD.

Modifications to Cover as Result of Change in Use

Comment #12: A commenter requested that the commitment to a minimum 12-inch soil cover on the Lakeshore Area of the site be clarified and if any active recreational uses emerge on that site, such as off-trail picnicking or other active uses that bring people into direct contact with soil, a thicker cover will be required.

Response #12: At the Lakeshore Area a minimum 12-inch soil cover is necessary. Based on previous work performed during the installation of the Semet barrier wall and groundwater collection system, a minimum of 12-inches of material is assumed to be present, but will be confirmed and additional material placed, as necessary. As stated in the Proposed Plan and the ROD, the extent, thickness, and permeability of the covers would be revisited during the design phase and/or during site management, if site uses change, as necessary. The Environmental Easement to be granted for the property will restrict the site use to commercial/passive recreational, with a requirement that additional remediation must be performed prior to the implementation of a higher use (i.e., active recreational).

Description of Soil/Fill

Comment #13: A commenter opined that a more precise description of soils on-site should be provided. The commenter stated that the reference to "Solvay Waste/soil/fill" in the Proposed Plan fails to recognize the range of wastes that were disposed of on the Semet Site or may have leached from the Semet Residue Ponds.

Response #13: Site geology consists of seven distinct layers including soil/fill material, marl/peat, clay and silt, fine grained sand and silt, sand with gravel, till and bedrock layers. Additional site geologic data is described in the 2018 *Semet Residue Ponds Site OU-2 Data Summary Document*. The Proposed Plan states that OU-2 consists of material including the Semet residue and Solvay waste/soil/fill that was not addressed by other actions. In addition, Tables 1 and 2 of the Proposed Plan provide ranges of contaminant concentrations present in surface and subsurface soil. Other details, such as principal threat wastes, are also included in the Proposed Plan.

In-Situ Treatment

Comment #14: A commenter opined that Alternative 4 should not be characterized as reducing the toxicity of the wastes on-site, since the *in-situ* treatment merely immobilizes the Semet residue and does nothing to change their toxicity.

Response #14: While the *in-situ* treatment included under Alternative 4 will not alter the toxicity of the Semet residue, it will result in a reduction of the leachability of contaminants and/or reduces their solubility, which will result in a reduction in mobility and, hence, the potential for exposure.

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

APPENDIX V-a

DECEMBER 2018 PROPOSED PLAN

Proposed Plan

Semet Residue Ponds Operable Unit 2

Subsite of the Onondaga Lake Superfund Site

Geddes, Onondaga County, New York

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

December 2018

EPA *Region 2*

PURPOSE OF THIS DOCUMENT

This Proposed Plan describes the remedial alternatives to address Semet Residue Ponds Subsite (Subsite) Operable Unit 2 (OU-2), identifies the preferred remedy for the Solvay waste/soil/fill material, and provides the rationale for this preference. The remedy for OU-1 that addressed Semet residue in five man-made ponds and containment of shallow and intermediate groundwater was selected in a 2002 Record of Decision (ROD), with modifications made in a 2017 Explanation of Significant Differences (ESD).

This Proposed Plan was developed by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (EPA) in consultation with the New York State Department of Health (NYSDOH). NYSDEC and EPA are issuing this Proposed Plan as part of their public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as well as the New York State Environmental Conservation Law (ECL) and Title 6 New York Code of Rules and Regulations (NYCRR) Part 375. The nature and extent of the contamination is described in the *Semet Residue Ponds Site OU-2 Data Summary Document (DSD)* and the remedial alternatives summarized in this Proposed Plan are described in *Semet Residue Ponds Site OU-2 Feasibility Study Report (FS)*, which is contained in the Administrative Record file for this Subsite. NYSDEC and EPA encourage the public to review these documents to gain a more comprehensive understanding of the Subsite and the Superfund activities that have been conducted at the Subsite.

This Proposed Plan is being provided as a supplement to the documents listed above to inform the public of NYSDEC's and EPA's preferred remedy and to solicit public comments pertaining to the remedial alternatives evaluated, including the preferred remedy.

NYSDEC and EPA's preferred alternative includes *in situ* treatment of targeted material (*e.g.,* remaining Semet material that cannot be reused under the OU-1 remedy) and the installation of an enhanced engineered cover system where shallow soil exhibits concentrations above 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) for commercial use. In addition, this remedy includes the continuation of operation and maintenance (O&M) for Interim Remedial Measures (IRMs) that have been implemented at the Subsite, site grading, institutional controls, development of a Site Management Plan (SMP), periodic reviews, and long-term maintenance. The proposed enhanced engineered cover system would require routine maintenance and inspections to maintain cover system integrity.

Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, the shallow and intermediate groundwater in this area will be addressed as part of the Willis Avenue subsite.

The remedy described in this Proposed Plan is the preferred remedy for the OU-2 portion of the Subsite. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the remedy will be made after NYSDEC and EPA have taken into consideration all public comments. NYSDEC and EPA are soliciting public comment on the alternatives considered in the Proposed Plan and in the detailed analysis section of the *Semet Residue Ponds Site OU-2 Feasibility Study Report* because NYSDEC and EPA may select a remedy other than the preferred remedy.

MARK YOUR CALENDAR

December 17, 2018 – January 16, 2019*: Public comment period on the Proposed Plan.*

Public Meeting
Wednesday January 9, 2019 (inclement weather date of January 10) at 6:00 PM
Open House from 5:00 – 6:00 PM

Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds

Community Role in the Selection Process

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, this Proposed Plan has been made available to the public for a public comment period which begins on December 17, 2018 and concludes on January 16, 2019.

As noted above, a public meeting and an open house will be held during the comment period to elaborate on the reasons for recommending the preferred remedy and to receive public comments. The public meeting will include a formal presentation by NYSDEC of the preferred remedy and other cleanup options which have been considered for the Subsite.

The open house session will be less formal, and provide the public a chance to receive printed information and discuss the cleanup options with NYSDEC and EPA representatives on a one-on-one basis.

Comments received at the public meeting and in writing during the comment period, will be documented in the Responsiveness Summary Section of the ROD, the document that formalizes the selection of the remedy.

Written comments on this Proposed Plan should be addressed to:

Tracy A. Smith
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7013
E-mail: tracy.smith@dec.ny.gov.

INFORMATION REPOSITORIES

The administrative record file, which contains copies of the Proposed Plan and supporting documentation are available at the following locations:

Onondaga County Public Library
Syracuse Branch at the Galleries
447 South Salina Street
Syracuse, NY 13204
315-435-1800

Solvay Public Library
615 Woods Road
Solvay, NY 13209
315-468-2441

Atlantic States Legal Foundation
658 West Onondaga Street
Syracuse, NY 13204
315-475-1170

New York State Department of Environmental Conservation
615 Erie Boulevard, West
Syracuse, NY 13204
315-426-7400

New York State Department of Environmental Conservation
Attn.: Tracy A. Smith
625 Broadway
Albany, NY 12233-7013
518-402-9676

SUBSITE BACKGROUND

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, Onondaga Lake, its tributaries and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) were added to EPA's National Priorities List (NPL). This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there has been a release of hazardous substances, pollutants, or contaminants.

Because many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into Operable Units (OUs) for managing the site-wide response actions. The NCP (Section 300.5) defines an OU as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site may be divided into OUs, depending on the complexity of the problems associated with the site. OUs address geographical portions of a site, specific site problems, or initial phases of an action, or consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

This Subsite, which is part of the Onondaga Lake NPL site and is listed as a Class "2" site in the New York State Registry of Inactive Hazardous Waste Disposal Sites (a Class 2 site represents a significant threat to public health or the environment; action is required), consists of two OUs. OU-1 includes the Semet residue[1] and containment of shallow and intermediate groundwater at the Subsite, and OU-2 consists of material including the Semet residue and Solvay waste/soil/fill[2] that was not addressed by other actions. The other actions include the implementation of the OU-1 remedy that consists of Semet residue removal and beneficial reuse and the installation of groundwater collection and treatment systems, as documented in the ROD issued by NYSDEC and EPA for OU-1 in 2002 and an ESD in 2017, which documented changes to the remedy selected in the 2002 ROD. Groundwater collection and treatment systems mitigate contaminated groundwater discharge to Onondaga Lake and Tributary 5A, with the collected groundwater being treated at the Willis-Semet Groundwater Treatment Plant, as documented in the ROD issued by NYSDEC and EPA for OU-1 in 2002. The shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake is comingled with the shallow

[1] Semet residue is a tarry, organic-based residue generated by the acid washing of coke light oil during the production of benzene, toluene, naphthalene, xylene, and "motor benzol" at the benzol, toluol, xylol (BTX) Plant formerly operated by Honeywell predecessor Allied Chemical Corporation (later AlliedSignal).

[2] The Subsite was used historically as a settling basin (Solvay Wastebed A) for Solvay waste, a waste product from the Solvay Process. Solvay waste consists largely of calcium carbonate, calcium silicate, and magnesium hydroxide and which in an unweathered state has an elevated pH. In addition to the Solvay waste, the area received coarse ash and cinder from stoker-fired boilers, and soil/miscellaneous fill material appears to have been used to cover portions of the wastebed. The term "Solvay waste/soil/fill material" throughout this document refers to Solvay waste, fill materials (*e.g.*, coarse ash and cinder from stoker-fired boilers, and soil/miscellaneous fill material) that have been placed at the Subsite, and soil that is located above the Solvay waste.

and intermediate groundwater of the adjacent Willis Avenue subsite. Therefore, shallow and intermediate groundwater outboard of the hydraulic containment system will be addressed as part of the Willis Avenue subsite. The remedial options for deep groundwater at this and adjacent subsites (*i.e*., Wastebeds 1-8, Wastebed B, and Willis Avenue) are being evaluated by the potentially responsible party, Honeywell International Inc., and will be addressed separately as part of a regional OU.

SUBSITE DESCRIPTION AND HISTORY

Location: The Subsite is located south of Onondaga Lake in Geddes, New York within an industrial setting (see Figure 1).

Subsite Features: The approximately 52-acre Subsite includes berms and fenced-in areas. The Subsite is bordered on the north and west by the Crucible Specialty Metals Corporation (Crucible) and by the Crucible Lake Pump site and the Syracuse Metropolitan West Side Pump Station to the north. It is bordered on the northeast by Onondaga Lake, on the west by Conrail Railroad tracks and an industrial complex and on the southeast by the Willis Avenue Subsite (New York State Inactive Hazardous Waste Site #734026). There are no buildings present on the Subsite.

The main site area includes the portion of the Subsite to the west of I-690 and State Fair Boulevard, while the Semet Lakeshore Area includes the portion of the Subsite to the east of I-690 and State Fair Boulevard. The Semet Lakeshore Area is situated to the northeast between the southern shore of Onondaga Lake and the west bound lane of I-690. The extent of the Semet Lakeshore Area on the northwest is defined by a gated entrance, and the southeastern extent is defined by the Willis Lakeshore Area. The Semet Lakeshore Area is bounded by an 8 foot (ft.) high chain link fence with a locked gate and Onondaga Lake. A portion of the Willis-Semet Hydraulic Containment System IRM[3] was implemented in the Semet Lakeshore Area. The IRM consisted of the installation of the Semet barrier wall and associated groundwater collection system, construction of a low permeability cap over the groundwater collection system and restoration of the Semet Lakeshore Area. Plantings included trees, shrubs and native grasses. In addition, an access road was constructed through the area.

An approximately 13-acre area designated as the Brushy Cleared Area (BCA) is located on the northeast portion of the main site area. There are five man-made excavations located west of the BCA within Solvay waste, referred to as ponds, containing Semet residue that is being removed for beneficial reuse to the maximum extent practicable in accordance with the OU-1 ROD and ESD. A site plan can be found on Figure 2.

Subsite Geology and Hydrogeology: The local geology consists of seven distinct layers including soil and fill material (including Solvay Waste) overlying the marl/peat, clay and silt, fine-grained sand and silt, sand with gravel, till, and bedrock.

The Subsite has three distinct groundwater zones including:

- The shallow hydrogeologic unit consists of anthropogenic fill/waste material.
- The intermediate hydrogeologic unit consists of the marl and peat material, underlain by a confining layer which includes the clay and silt unit.
- The deep hydrogeologic unit is composed of the fine-grained sand and silt and the medium- to coarse-grained sand.

The depth to groundwater ranges from 5 to 15 ft. below ground surface (bgs). The elevation of the shallow zone ranges from a minimum elevation of approximately 350 ft. above mean sea level (amsl) along the lake shore to 405 ft. amsl at the center of the main site area. The maximum thickness of this unit is approximately 45 ft. with an average thickness around 25 ft. The marl unit ranges from 345 ft. amsl to 365 ft. amsl. The maximum thickness of the marl is approximately 15 ft. near State Fair Boulevard and the average thickness is around 10 ft. The marl pinches out on the southern side of the main site area and is not present below Tributary 5A. The deep zone ranges from 280 ft. amsl to 370 ft. amsl with the deep elevations being closer to Onondaga lake. This zone has a maximum thickness of approximately 50 ft. and an average thickness of approximately 25 ft. This layer pinches out moving away from the lake and appears to pinch out moving to the south towards Tributary 5A.

Shallow groundwater at the Subsite, which is influenced by Onondaga Lake and Tributary 5A, generally flows in a radial pattern. Intermediate groundwater is not influenced by Tributary 5A and generally flows toward Onondaga Lake. This groundwater flow is captured by the groundwater collection systems that have been installed.

[3] The term "IRM" describes an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term, need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the CERCLA removal program pursuant to 40 CFR Part 300.415(b)(2).

History of the Subsite: Before 1917, the area was a settling basin (wastebed) for Solvay waste and known as Solvay Wastebed A. From 1917 to 1970, Semet residue, generated by Honeywell's predecessor Allied Chemical Corporation (later AlliedSignal) and its former BTX plant, was deposited in five bermed excavations in Wastebed A. The Semet residue ponds are in the western half of Wastebed A (Figure 2). The ponds were constructed by dragline and bulldozer excavation of the Solvay waste. Non-engineered dikes encompassing the ponds were constructed from fill materials, including concrete rubble, old electrolytic cell parts, ashes, and bricks. A clay and gravel mixture was also observed in the berms during investigative work performed in 2002. There are also Semet material areas (SMAs) within the western half of Wastebed A that were material handling areas during former operations.

Remedial Actions and Interim Remedial Measures: Various IRMs and remedial actions have been implemented at the Subsite (see Figure 3). Contaminated sediment and soils from the Tributary 5A remedial action and Willis-Semet Berm Improvements IRM were excavated and staged on the main site area. Following consolidation, this soil pile was graded and seeded (see Staged Soil Piles section, below). These and other remedial actions and IRMs are discussed below:

- Semet Residue Removal and Reuse: As part of the OU-1 remedy, over 32,300 tons of Semet material was dewatered, as needed, and sent off-site to a Resource Conservation and Recovery Act (RCRA) permitted thermal processing facility for beneficial reuse. A temporary fiber-based or cement-based spray cover was used for odor and emission control.
- Tributary 5A: As part of the OU-1 remedy, to prevent migration of groundwater to Onondaga Lake and a drainage ditch that discharges to Onondaga Lake called Tributary 5A, as well as associated Subsite impacts to sediment and surface water, a shallow groundwater collection system was installed beneath Tributary 5A from 2010 to 2012. As part of this remedial action, sediment in Tributary 5A was removed and an isolation layer was installed. Groundwater collected by this system is treated at the Willis Groundwater Treatment Plant (GWTP). Operation, maintenance, and monitoring of the groundwater remedy is ongoing.
- Willis-Semet Lakeshore Hydraulic Containment System IRM: To prevent the migration of contaminated shallow and intermediate groundwater to Onondaga Lake, the Willis-Semet Hydraulic Containment System IRM was installed in 2006 and 2007. The Semet portion of this IRM consists of approximately 1,440 linear ft. of barrier wall and groundwater collection system along the Onondaga Lake shoreline and was part of the OU-1 remedy. Groundwater collected from this system is treated at the Willis GWTP. The Willis GWTP, installed in 2006 and upgraded three times since then, treats groundwater collected across Honeywell's subsites around Onondaga Lake. A low permeability cap was constructed over the groundwater collection trench to minimize infiltration of rainwater and surface water runoff into the trench. The cap material was placed in a 1 ft. lift followed by compaction. Restoration included the placement of topsoil over the low permeability cap and seeding. This work was completed in 2007. Additionally, restoration along the Semet Lakeshore Area consisted of the placement of topsoil over the existing riprap embankment and the establishment of a native plant community using upland and shoreline plantings and seeding. Plantings included trees, shrubs, and native grasses. Restoration along the Semet Lakeshore Area was performed in 2010. The Willis-Semet Hydraulic Containment System was identified as a component of the OU-1 remedy in the 2002 ROD.
- I-690 Storm Drainage System IRM: In addition to the above-mentioned OU-1 groundwater remedies, an additional groundwater IRM was implemented at the Subsite. Groundwater discharging from the Subsite observed to be infiltrating into storm water sewers along State Fair Boulevard was mitigated in 2012 by the I-690 Storm Drainage System IRM (and the groundwater collection trench along State Fair Boulevard). Groundwater collected by this system is treated at the Willis GWTP.
- Willis-Semet Berm Improvements IRM: In 2012, berm material from select impacted areas was excavated and replaced with clean fill/topsoil prior to application of 6-inches of topsoil. In total, between 12- and 24-inches of clean fill and topsoil that met Unrestricted SCOs was placed. Native species (*e.g.,* grass, trees and shrubs) were introduced after the topsoil was applied.

Current Zoning and Land Use: The Subsite is currently zoned for industrial use and is bounded by commercial and industrial properties. The current and reasonably anticipated future land uses for the Subsite are industrial and commercial (including passive recreational[4]). The anticipated future use of the Semet Lakeshore Property (north of I-690) will include construction of paved roads and trails for passive recreational use as part of the Onondaga County West Shore Trail

[4] Based on 6NYCRR Part 375 and NYSDEC's *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10) passive recreation includes recreational uses with limited potential for soil contact (*e.g.,* artificial surface fields; outdoor tennis or basketball courts; other paved recreational facilities used for roller hockey, roller skating, shuffleboard, etc.; outdoor pools; indoor sports or recreational facilities; golf courses; and paved bike or walking paths).

Extension and future access/use of the Southwest Lakeshore Area. It is reasonably anticipated that the portions of the property south of I-690 will continue to be used for either industrial or commercial purposes (*e.g.*, parking for the State Fair).

RESULTS OF THE REMEDIAL INVESTIGATION

As presented in the *Semet Residue Ponds Site OU-2 Data Summary Document (DSD),* the analytical results for Solvay waste/soil/fill material at the Subsite were compared to the respective industrial and commercial land use SCOs in consideration of anticipated future land use (see attached Tables 1 and 2). In addition, for purposes of developing an alternative to evaluate pre-disposal conditions, the analytical results were compared to unrestricted land use SCOs. Based on these considerations, the nature and extent of the contamination, discussed below, is presented in the context of these land uses.

In addition to environmental sample collection and analysis at the Subsite, the extent of contamination in the area west of the BCA was evaluated using a technology known as Tar-Specific Green Optical Screening Tool (TarGOST®). The TarGOST® responses and associated analytical soils data are summarized in the 2010 *Operable Unit 1 Pre-Design Investigation,* and are included in the *DSD*.

Solvay Waste/Soil/Fill Material West of the BCA

The Semet residue ponds are located on the portion of the Subsite west of the BCA, and, as discussed above, the Semet residue is being removed for beneficial reuse to the maximum extent practicable. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and inorganics were detected in subsurface Solvay waste/soil/fill material in this area of the Subsite, and the analytical results were compared to the SCOs for Commercial, Industrial, and Unrestricted Uses. TarGOST® responses correlating to detected VOC concentrations were also observed in this area.

The analytical results comparison and TarGOST® responses are summarized as follows:

- ***VOCs:*** Benzene, toluene, ethylbenzene and xylene (BTEX) are the principal VOCs in the Solvay waste/soil/fill material with benzene generally having the highest VOC concentrations. VOC exceedances of Unrestricted Use SCOs were observed as deep as 40 ft. bgs, and VOC exceedances of Industrial Use SCOs and Commercial Use SCOs were noted as deep as 20 ft. bgs. Typically, benzene concentrations across the area west of the BCA exceeded Industrial Use and Commercial Use SCOs**.** Toluene and xylene frequently exceeded Commercial and Unrestricted Use SCOs with isolated Industrial Use SCO exceedances. Ethylbenzene concentrations were infrequently observed above Unrestricted Use SCOs.
- ***SVOCs:*** SVOCs are present at concentrations that are generally comparable to the VOC concentrations. SVOC exceedances of Unrestricted Use SCOs were observed as deep as 40 ft. bgs. SVOC exceedances of Industrial Use SCOs and Commercial Use SCOs were noted as deep as 20 ft. bgs. Detected SVOCs include: 1,1'-biphenyl, dibenzofuran, 2-methylnaphthalene, naphthalene, phenol, and various other polycyclic aromatic hydrocarbons (PAHs). Naphthalene is the predominant SVOC. Of the SVOCs observed, naphthalene, benzo(a)pyrene, and dibenzofuran (at one sample location) had concentrations exceeding the Commercial Use SCOs. Naphthalene and benzo(a)pyrene concentrations also exceeded Industrial Use SCOs.
- ***Inorganic constituents:*** Mercury was detected above Unrestricted Use SCOs across the Subsite. Concentrations of mercury exceeding Commercial Use and Industrial Use SCOs were also observed at a lower frequency across the site. Barium was observed at concentrations above Commercial Use SCOs at a single location.
- ***Pesticides and PCBs:*** The pesticide beta-BHC was detected at a concentration above its Industrial Use SCO in one sample. No PCBs were detected in Subsite Solvay waste/soil/fill material samples.
- ***TarGOST® responses:*** TarGOST® responses varied across the area west of the BCA. High responses, generally correlating with detected VOC concentrations, were observed as deep as 25 ft. over much of this area. Observations deeper than 35 ft. were limited to fewer locations.

Solvay Waste/Soil/Fill Material in the BCA

VOCs, SVOCs, pesticides and inorganics were detected in subsurface Solvay waste/soil/fill material in the BCA as described below. The analytical results were compared to the SCOs for Commercial, Industrial, and Unrestricted Uses.

The BCA generally has several inches to 2 ft. of soil/fill material overlying Solvay waste, located on the portion of the Subsite where the Semet residue ponds are not present. The BCA has a vegetative cover of buckthorn, cottonwood, and aspens.

Semet residue has not been observed in the BCA.

- ***VOCs and SVOCs:*** VOC and SVOC concentrations were below the SCOs.
- ***Inorganic constituents:*** Mercury concentrations exceeded Industrial Use and Unrestricted Use SCOs in soil at the BCA. The mercury exceedances were noted as deep as 3.5 ft.
- ***Pesticides and PCBs:*** Pesticides and PCBs were analyzed at one location. The concentration of beta-BHC was observed above the Industrial Use and Unrestricted Use SCOs at this location and PCBs were not detected.

Staged Soil Piles

Approximately 20,000 cubic yards of contaminated soil excavated during the Tributary 5A remedial action and Willis-Semet Berm Improvements IRM were consolidated into a pile located on the Subsite. Characterization sampling and analysis were performed to document that the materials did not exceed hazardous waste characteristics (*e.g.,* Toxicity Characteristic Leaching Procedure testing). Data for these samples are included in the *Semet Residue Ponds Site OU-2 Data Summary Document (DSD)*.

- ***VOCs:*** VOC concentrations were below the SCOs.
- ***SVOCs:*** The PAHs benzo(a)anthracene and benzo(a)pyrene exceeded Industrial Use SCOs. The PAHs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeded Commercial Use SCOs. 1,2-dichlorobenzene and various other PAHs exceeded the Unrestricted Use SCOs.
- ***Inorganic constituents:*** Mercury concentrations exceeded Industrial Use, Commercial Use and Unrestricted Use SCOs.
- ***Pesticides and PCBs:*** Pesticides and PCBs were not analyzed.

Semet Related Materials

Stained Solvay wastes and Semet residue that cannot be reused (*e.g.,* due to unacceptable sulfur or moisture content, insufficient heat content and/or unacceptable soil/debris content) as part of the OU-1 remedy have been observed in soil borings and test pits advanced during the investigations and other remedial work performed at the Subsite. These materials are present in the western portion of the main Subsite area where the Semet residue was present. Some of these materials may exhibit characteristics of principal threat waste. These areas are discussed in depth in the DSD and FS Reports. A detailed explanation of principal threat waste can be found in the textbox, "What is a Principal Threat?"

"What is a Principal Threat?"

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to ground water, surface water, or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater may be viewed as source material.

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Conclusions

Based on the DSD and other investigations, the following conclusions have been drawn:

- Contaminants of Concern (COCs) include BTEX, PAHs, phenolic compounds, and mercury.
- Stained Solvay waste and Semet residue-related materials are present in the western portion of main site area.

Waste Management Area

The NCP preamble language sets forth the EPA's policy that, for groundwater, "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area (WMA) when waste

is left in place." The NCP preamble also indicates that, in certain situations, it may be appropriate to address the contamination as one WMA for purposes of the groundwater point of compliance (POC). Therefore, groundwater POCs for meeting applicable or relevant and appropriate requirements (ARARs) are established at the WMA edge.

Due to the presence of historical fill materials (*e.g.,* Solvay waste) deposited at the Subsite, it is not anticipated that groundwater standards would be achievable at the Subsite within a reasonable timeframe. Therefore, the area will be treated as part of a WMA (see Figure 4) with the groundwater POC being the WMA boundary (*i.e.,* outside of the barrier wall). The material within the WMA includes Solvay waste comingled with hazardous substances that are contaminants of concern for the site. The management of the waste within the WMA includes meeting RCRA municipal landfill capping requirements. In many areas, existing covers and/or Solvay waste/soil/fill material is expected to meet the $1x10^{-5}$ centimeter per second (cm/sec) permeability rate required under the Subtitle D standards. Buildings/asphalt parking lots are expected to achieve and exceed the infiltration requirements. In areas where existing covers or Solvay waste/soil/fill material do not meet the standard, cover material will include materials needed to achieve the required infiltration rate requirements. The WMA boundary is conceptual and may be refined during remedial design.

Based on the results of a 2017 field investigation to assess degradation in groundwater, monitored natural attenuation (MNA) may be a viable option to address contaminated shallow/intermediate groundwater at and beyond the POC. The basis for MNA is supported by an evaluation of the shallow and intermediate groundwater using data collected in 2017, as part of an investigation of deep groundwater. Based on multiple lines of evidence, degradation of organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would be conducted as part of the preliminary remedial design and/or O&M. Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater at and beyond the POC (*i.e.,* outside of the barrier wall) will be addressed as part of the Willis Avenue subsite.

SCOPE AND ROLE OF ACTION

In addition to this Subsite, eleven other subsites, Onondaga Lake Bottom; LCP Bridge Street; Geddes Brook/Ninemile Creek; Wastebed B/Harbor Brook; Willis Avenue; Wastebeds 1-8; General Motors (GM)-Inland Fisher Guide (IFG); Salina Landfill; Ley Creek PCB Dredgings; Lower Ley Creek; and Niagara-Mohawk Hiawatha Boulevard, are being addressed as part of the Onondaga Lake NPL site.

Dredging and capping activities for the Onondaga Lake Bottom subsite commenced in 2012. Dredging and capping activities in the lake were completed in 2014 and 2016, respectively. Habitat restoration activities associated with the remedy were completed in 2017. The dredged material is being managed at a sediment consolidation area (SCA) constructed on a former Solvay wastebed, Wastebed 13. Construction activities at the SCA, which included the placement of an engineered cap, were completed in 2017. The subsite is undergoing long-term maintenance and monitoring.

Remedies have been fully implemented at the LCP Bridge Street, Geddes Brook/Ninemile Creek, Salina Landfill and Ley Creek PCB Dredgings subsites. These subsites are undergoing long-term maintenance and monitoring. Remedial activities for portions of, or environmental media at, the Wastebed B/Harbor Brook, Wastebeds 1-8, GM-IFG and Niagara-Mohawk Subsites have been completed or are in progress. Other portions of, or media at, these subsites are in the remedial design or RI/FS phase. The Lower Ley Creek Subsite is in the remedial design phase. An RI/FS for the Willis Avenue subsite is near completion. A remedy for the Wastebed B/Harbor Brook Subsite was selected on September 28, 2018.

The scope of the action for this Subsite is to address the Solvay waste/soil/fill material and remaining Semet residue not addressed in OU1. NYSDEC and EPA expect this remedy to be a final, comprehensive remedy for these materials. Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, the shallow/intermediate groundwater outboard of the hydraulic containment system will be addressed as part of the Willis Avenue subsite. Deep groundwater will be evaluated and addressed separately as part of a regional OU.

<u>Summary of Quantitative Site Risk Assessments</u>

As part of the RI process, quantitative risk assessments were conducted for the Subsite to estimate the potential risks to human health and the environment (see the "What is Risk and How is it Calculated?" and "What is Ecological Risk and How is it Calculated?" textboxes below). Baseline risk assessments, consisting of a human health risk assessment (HHRA), which evaluates potential risks to people, and an ecological risk assessment, which evaluates potential risks to ecological receptors, analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken.

Human Health Risk Assessment

The Subsite is zoned commercial/industrial, and exposure scenarios were developed based on this current and likely future land use. The baseline HHRA considered exposure to many different media through a number of current and future exposure scenarios for different potential receptors including adolescent and adult trespassers, utility worker, State Fair Boulevard transients, surveillance worker, industrial worker, construction worker, sewer worker, and child and adult residents.

Exposure scenarios were developed for these populations, and considered exposure through incidental ingestion and inhalation of and dermal contact with surface/subsurface Solvay waste/soil/fill material, and sediment, and ingestion of groundwater as a hypothetical drinking water source in the future. Human health risks associated with ingestion of groundwater are based on groundwater data from the Willis Avenue subsite. Human health risks associated with exposure to Semet Residue Ponds Subsite groundwater can be considered similar to that for the Willis Avenue subsite since the groundwater plumes comingle at the two subsites. A summary of the cancer risks and noncancer hazards above threshold levels for each population in each of the areas of the Subsite, along with the chemicals that contribute the most to the risk or hazard, or COCs, can be found in Tables 3a and 3b.

The HHRA considered various current and future exposure scenarios for different potential receptors including future industrial workers that work both indoors and outdoors during their work day, and future construction workers. Exposure for future indoor/outdoor industrial workers was evaluated through incidental ingestion of, and dermal contact with, surface

WHAT IS HUMAN HEALTH RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the Contaminants of Potential Concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals can cause both cancer risks and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people because of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as COCs in the ROD.

Solvay waste/soil/fill material (0-2 ft. bgs) and inhalation of ambient vapors and fugitive dust. Potential exposures were assumed to occur for the construction workers through incidental ingestion of surface/subsurface Solvay waste/soil/fill material (0-10 ft. bgs) through incidental ingestion, dermal contact, and inhalation of ambient vapors and fugitive dust.

The hazards and risks posed to indoor/outdoor industrial workers and construction workers from exposure to COPCs via incidental ingestion, dermal contact, and ambient air inhalation are as follows:

Indoor/Outdoor Industrial Worker – The calculated total excess lifetime cancer risk for all COPCs and exposure routes for the indoor/outdoor industrial worker is $2x10^{-3}$, which is above the acceptable regulatory range of 1×10^{-4} to 1×10^{-6}. Unacceptable carcinogenic risks are primarily driven by inhalation of benzene and naphthalene in surface Solvay waste/soil/fill materials. The calculated hazard index (HI) for all COPCs and exposure routes is 30, which exceeds the regulatory threshold of 1. The unacceptable hazard is driven by exposure via inhalation of naphthalene and benzene originating from surface Solvay waste/soil/fill materials.

Construction Worker – The calculated total excess lifetime cancer risk for all COPCs and exposure routes for the construction worker is within the acceptable regulatory range of 1×10^{-4} to 1×10^{-6}. The calculated HI for all COPCs and exposure routes is above the regulatory threshold of 1. Unacceptable hazard is driven by incidental ingestion of benzene in surface/subsurface Solvay waste/soil/fill materials and by inhalation of benzene, naphthalene, and 1,2,4-trimethylbenzene in surface/subsurface Solvay waste/soil/fill material.

Based on the HIs computed for the indoor/outdoor industrial worker and construction worker and the lifetime excess cancer risk computed for the indoor/outdoor worker, control of exposures to surface/subsurface Solvay waste/soil/fill material is warranted to provide adequate protection for future human users of the Subsite.

Groundwater at the Subsite is not used as a drinking or industrial water supply and is highly unlikely to be used as a drinking or industrial supply in the future, since the area is supplied by municipal water from the Onondaga County Water Authority. Furthermore, the groundwater at the Subsite is not suitable as a drinking water supply irrespective of any contributions related to waste at the Subsite because the yield of the overburden groundwater unit is inadequate for water supply wells, and the high natural salinity of the bedrock aquifer (approximately 3,000 mg/L chlorides) precludes its use as drinking water. In addition, since there are no buildings on the property, the indoor air pathway was not evaluated in risk assessments for the Subsite.

The HHRA included a recommendation that, based on the vapor intrusion screening presented in the HHRA and the vapor pressure of many of the compounds detected, a vapor intrusion evaluation should be conducted if buildings that will be occupied are constructed at the Subsite. Based on the vapor intrusion evaluation, measures may be included in the design and construction of buildings at the Subsite to mitigate the potential for exposure to constituents that may be present in soil vapor. Such measures may include an active sub-slab depressurization system, use of a vapor barrier or the installation of a venting system.

A full discussion of the HHRA evaluation and conclusions is presented in the HHRA Report.

Ecological Risk Assessment

Surface Solvay waste/soil/fill material data were screened against values protective of terrestrial plants, invertebrates, birds, and mammals. Inorganics, one pesticide, SVOCs, and VOCs were retained due to exceedances of screening values, their potential to bioaccumulate, or the absence of screening values.

Ecological hazard quotients (HQs) were calculated for six wildlife species (American robin, northern short-tailed shrew, mourning dove, eastern cottontail rabbit, red-tailed hawk, red fox) representing distinct trophic level receptors that may be exposed to Contaminants of Ecological Concern (COECs) in Subsite surface Solvay waste/soil/fill material. Based on food chain modeling using average and upper-bound surface soil concentrations of COECs coupled with exposure assumptions under both conservative and refined scenarios, potentially unacceptable risks to ecological receptors were identified at the Subsite. Under both the refined and the conservative modeling scenarios, risks were lower for the red-tailed hawk and red fox (wide-ranging wildlife receptors) relative to the American robin and short-tailed shrew. Because of its small size, high ingestion rate, and small home range, the highest HQs were calculated for the short-tailed shrew. Elevated risks under both conservative and refined exposure scenarios were attributable mainly to metals and SVOCs, which were detected more frequently and had a greater frequency of HQs exceeding the threshold of 1, relative to pesticides and VOCs. There is some uncertainty associated with the risks attributable to select COECs (*i.e.,* some VOCs) in Subsite surface Solvay waste/soil/fill material given the absence of comparative toxicity values for these chemicals.

Based on the exceedances of surface Solvay waste/soil/fill material COEC concentrations to ecologically-based screening

benchmarks and calculated food chain HQs exceeding 1 for the terrestrial avian and mammal wildlife receptors, control of exposures to surface Solvay waste/soil/fill material is warranted to provide adequate protection for current and future wildlife use of the Subsite. It should be noted that while an ecological risk assessment was performed for the Subsite, the reasonably anticipated future use for the Subsite will be industrial or commercial use, which is not suitable habitat for ecological receptors.

A full discussion of the ecological risk evaluation and conclusions is presented in the Ecological Risk Assessment Report.

WHAT IS ECOLOGICAL RISK AND HOW IS IT CALCULATED?

A Superfund baseline ecological risk assessment is an analysis of the potential adverse health effects to biota caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future land and resource uses. The process used for assessing site-related ecological risks includes:

Problem Formulation: In this step, the contaminants of potential ecological concern at the site are identified. Assessment endpoints are defined to determine what ecological entities are important to protect. Then, the specific attributes of the entities that are potentially at risk and important to protect are determined. This provides a basis for measurement in the risk assessment. Once assessment endpoints are chosen, a conceptual model is developed to provide a visual representation of hypothesized relationships between ecological entities (receptors) and the stressors to which they may be exposed.

Exposure Assessment: In this step, a quantitative evaluation is made of what plants and animals are exposed to and to what degree they are exposed. This estimation of exposure point concentrations includes various parameters to determine the levels of exposure to a chemical contaminant by a selected plant or animal (receptor), such as area use (how much of the site an animal typically uses during normal activities); food ingestion rate (how much food is consumed by an animal over a period of time); bioaccumulation rates (the process by which chemicals are taken up by a plant or animal either directly from exposure to contaminated soil, sediment or water, or by eating contaminated food); bioavailability (how easily a plant or animal can take up a contaminant from the environment); and life stage (*e.g.*, juvenile, adult).

Ecological Effects Assessment: In this step, literature reviews, field studies or toxicity tests are conducted to describe the relationship between chemical contaminant concentrations and their effects on ecological receptors, on a media-, receptor- and chemical-specific basis. To provide upper and lower bound estimates of risk, toxicological benchmarks are identified to describe the level of contamination below which adverse effects are unlikely to occur and the level of contamination at which adverse effects are more likely to occur.

Risk Characterization: In this step, the results of the previous steps are used to estimate the risk posed to ecological receptors. Individual risk estimates for a given receptor for each chemical are calculated as a hazard quotient (HQ), which is the ratio of contaminant concentration to a given toxicological benchmark. In general, an HQ above 1 indicates the potential for unacceptable risk. The risk is described, including the overall degree of confidence in the risk estimates, summarizing uncertainties, citing evidence supporting the risk estimates and interpreting the adversity of ecological effects.

Summary of Human Health and Ecological Risks

The results of the HHRA indicate that the contaminated Solvay waste/soil/fill material presents current and/or potential future unacceptable exposure risk and the ecological risk assessment indicates that the contaminated soils pose an unacceptable exposure risk. While some of the risks associated with contaminated Solvay waste/soil/fill material have been mitigated in part by the OU-1 remedial actions and IRMs that have been implemented, the calculated risks are unacceptable. Although the indoor air pathway was not evaluated, measures may be included in the design and construction of buildings at the Subsite to mitigate the potential for exposure to constituents that may be present in soil vapor. Such measures may include an active sub-slab depressurization system, use of a vapor barrier or the installation of a venting system.

Based upon the results of the RI and the risk assessments, EPA and NYSDEC have determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed by the preferred remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as potential ARARs, to-be-considered guidance, and site-specific risk-based levels established using the risk assessments. The following RAOs have been established for the Subsite:

- Prevent, or reduce to the extent practicable, ingestion/direct contact with contaminated Solvay waste/soil/fill material to be protective under the current and reasonably anticipated future land uses.
- Prevent, or reduce to the extent practicable, inhalation of or exposure to contaminants volatilizing from contaminated Solvay waste/soil/fill material and groundwater, and unacceptable inhalation threat associated with soil vapor.
- Restore groundwater outside of the WMA to levels that meet state and federal standards within a reasonable time frame.
- Prevent, or reduce to the extent practicable, the release of Subsite-related contaminants to groundwater, surface water and sediment that may cause unacceptable adverse effects on shallow and intermediate groundwater, surface water or sediment quality in Tributary 5A and Onondaga Lake.

NYSDEC's SCOs have been identified as remediation goals for soil to attain these RAOs. SCOs are risk-based criteria that have been developed by the State following methods consistent with EPA's methods/protocols/guidance and they are set at levels consistent with EPA's acceptable levels of risk that are protective of human health, ecological exposure, or the groundwater depending upon the existing and anticipated future use of the Subsite. While the land use of the Subsite has historically been industrial, current and anticipated future uses of some areas could include commercial use or recreational use.

Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater at and beyond the POC will be addressed as part of the Willis Avenue subsite. As described for the Willis Avenue subsite, groundwater remedial goals are the New York State Ambient Water Quality Standards. Remedial actions and IRMs to address surface water and sediment have eliminated exposure to these media and maintenance of the remedial actions and IRMs are expected to achieve the RAO.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA § 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA § 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA § 121(d)(4), 42 U.S.C. § 9621(d)(4).

Based on anticipated future development of the Subsite, expectations of the reasonably anticipated land use, as described above, were considered in the FS to facilitate the development and evaluation of remedial alternatives. The reasonably anticipated land use includes passive recreational use for the Semet Lakeshore Area, and industrial/commercial use for the main site area south of I-690.

All the alternatives other than Alternative 1 - No Further Action include the continuation of the O&M for the IRMs that have been implemented at the Subsite. Maintenance for the IRMs would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or re-application of vegetation in areas of non-survivorship.[5]

The remedial alternatives are as follows:

Alternative 1 - No Further Action

A "no action" alternative is required to be considered by the NCP and NYSDEC's *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10) Section 4.4(b)3 and serves as a benchmark for the evaluation of action alternatives. This alternative provides for an assessment of the environmental conditions if no further remedial actions are implemented.

[5] The annual O&M cost estimates associated with monitoring and maintenance of the other IRM elements cited here are included in the cost estimates for each of the action alternatives.

Because this alternative would result in contaminants remaining above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the Subsite be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated media.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0

Alternative 2 – Cover System

Alternative 2 includes the placement of a cover system based on potential chemical-specific ARARs and reasonably-anticipated future land uses at the Subsite for commercial use. This alternative also includes the continuation of O&M for the IRMs that have been implemented at the Subsite, site grading, institutional controls, development of an SMP, and periodic reviews.

As necessary, grading would be conducted to support commercial and/or industrial development and would consist of backfilling of the emptied Semet residue ponds. The staged soil pile located on the BCA would be reused as backfill during grading. Following grading, a minimum 1-ft. thick soil/granular cover (or maintained paved surfaces and buildings) would be placed to minimize erosion and mitigate potentially unacceptable exposure of human receptors to constituents exceeding Commercial Use SCOs in surface Solvay waste/soil/fill material. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design. Sampling would be performed to identify the appropriate cover thickness and limits. Design of the cover would take into consideration development plans that are available for the Subsite at that time. Further evaluation of Semet residue seep areas and Semet Lakeshore Area existing cover thickness would be performed during the design. Any fill material brought to the Subsite would need to meet the requirements for the identified Subsite use as set forth in 6 NYCRR Part 375-6.7(d). Native species would be used for the vegetative component of the covers, as appropriate. Structures, such as buildings, pavement, or sidewalks, as part of future development, could also serve as acceptable substitutes for the vegetated cover either at implementation of the remedy or at a future time.

A portion of the main site area is anticipated to be used for overflow parking for the New York State Fairgrounds, and an extension of the "Onondaga Loop the Lake" trail will cross a portion of the Semet Lakeshore Area. Because Subsite development plans for the remaining portions of the Subsite have not been determined, the boundaries of the covers are conceptual and presented for cost-estimation purposes. The extent, thickness, and permeability of the covers would be revisited during the design and/or during site management if site uses change, as necessary. The conceptual extent of the cover system is depicted on Figure 5.

As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1×10^{-5} cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1×10^{-5} cm/sec). The proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for site groundwater would meet the requirements for containment under RCRA Subtitle D, which would be an ARAR for this action.

Prior to pond backfilling activities, an assessment for the need to address the remaining Semet residue[6] that could contribute to potential seepage during or following construction activities would be performed. The effectiveness and implementability of passive recovery wells to minimize or monitor the potential for future Semet residue seeps from ponds, would be evaluated as part of a pre-design investigation. Should passive recovery of Semet residue be deemed necessary, effective and implementable, it would be included in the remedial design. Recovered Semet residue would be transported for disposal off-site.

Institutional controls in the form of environmental easements and/or restrictive covenants would be used to limit land use to commercial (including passive recreational) or industrial, as appropriate, prevent the use of groundwater without approved treatment and require that any intrusive activities in areas where contamination remains would be conducted in accordance with a NYSDEC-approved SMP, which would include the following:

[6] There is Semet residue remaining that is unsuitable for off-site thermal processing for beneficial reuse.

- Institutional and Engineering Control Plan that identifies use restrictions and engineering controls (if applicable) for the Subsite and documents the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or restrictive covenants described above
    - Subsite cover systems described above
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions
    - provision that future on-site buildings should be evaluated for the potential for vapor intrusion and may include vapor intrusion sampling and/or installation of mitigation measures, if necessary
    - provisions for the management and inspection of the identified engineering controls
    - maintaining Subsite access controls and NYSDEC notification
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during the design.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time for this alternative is one year. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$10,900,000
Annual O&M Cost:	$42,500
Present-Worth Cost:	$11,500,000

Alternative 3 – Enhanced Engineered Cover System

Alternative 3 includes each of the elements of Alternative 2. In addition, the alternative includes the placement of an enhanced engineered cover system in the former Semet residue pond areas west of the BCA in lieu of the cover system described under Alternative 2.

The enhanced cover system over the area west of the BCA would be a minimum of 18-inch thick soil/granular cover (or maintained paved surfaces) incorporating a geomembrane cap for the purposes of mitigating potentially unacceptable exposure risks and surface erosion in support of the reasonably-anticipated future use of the Subsite and its surroundings. This geomembrane cap would also address the potential mobility of the remaining Semet residue. The minimum 18-inches of soil/granular cover would be needed for protection of the geomembrane cap (*e.g.,* from puncture, etc.). The cover system would also include an engineered component to enhance structural stability, ranging from geofabric to geogrid depending on the needs of the final cover system uses.

In areas where a geomembrane cap would not be installed a minimum one-foot cover would be placed. In these areas the need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design and sampling would be performed to identify the appropriate cover thickness and limits. The extent, thickness, and permeability of the covers would be revisited during the design phase and/or during site management if Subsite uses change, as necessary. The conceptual extent of the cover system is depicted on Figure 6.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is two years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$22,600,000

Annual O&M Costs:	$42,500
Present-Worth Cost:	$23,200,000

Alternative 4 – *In-Situ* Treatment of Targeted Material and Enhanced Engineered Cover System

Alternative 4 includes each element of Alternative 3 (with the exception of potential passive recovery of Semet residue) and the addition of *in-situ* treatment of targeted materials. Following the completion of the implementation of the OU-1 Semet residue remedy, (*i.e.,* removal of Semet residue to the maximum extent practicable for beneficial reuse in accordance with the 2002 *ROD* and 2017 *ESD*), there will be Semet residue remaining that is unsuitable for off-site thermal processing for beneficial reuse. Semet residue unsuitable for off-site thermal processing under the OU-1 remedy either exhibits unacceptable sulfur or moisture content, insufficient heat content and/or exhibits unacceptable soil/debris content, as documented in demonstration reports. The remaining Semet residue that cannot be beneficially reused and may contain a free aqueous phase would be considered targeted material and would be treated *in-situ* by solidification/stabilization. Specifically, the treatment would consist of the addition of amendments (*e.g.*, Portland cement, cement kiln dust, lime kiln dust, blast furnace slag) to alter the physical characteristics to a granular material. The estimated volume of targeted material is approximately 7,000 cubic yards. The approximate area of *in-situ* targeted treatment is illustrated on Figure 7.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is two years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$24,000,000
Annual O&M Costs:	$42,500
Present-Worth Cost:	$24,600,000

Alternative 5 – Removal

Alternative 5 includes mechanical excavation of Solvay waste/soil/fill material exhibiting concentrations above Unrestricted Use SCOs[7]. Excavated Solvay waste/soil/fill material would be transported off-site for management and/or disposal.

This alternative is intended to evaluate restoration to pre-disposal conditions through full removal and replacement of Solvay waste/soil/fill material at the Subsite exhibiting concentrations above Unrestricted Use SCOs. Based on existing data, removal to depths of 5 ft. in the BCA and up to 25 ft. west of the BCA are assumed. Removal depths of up to 20 ft. in the Semet Lakeshore Area and I-690/State Fair Boulevard were assumed. Removal depths would be confirmed based upon either pre-construction or post excavation sampling. For cost estimation purposes, it was assumed that Solvay waste/soil/fill material would be removed from the existing grade to the top of marl (a native material); approximately a 5 ft. thickness would be removed from the BCA area, and generally between 10 and 25 ft. thickness would be removed from the area west of the BCA, and between 10 and 20 ft. for the Semet Lakeshore and beneath I-690/State Fair Boulevard. Based on these approximate depths, the total volume of Solvay waste/soil/fill material to be excavated in Alternative 5 is estimated at approximately 1.42 million cubic yards *in situ* (*i.e.*, volume in place), with an additional 20,000 cubic yards to be removed from the material piled on the BCA. Sloping techniques, benching, and/or engineering structures (*e.g.,* sheet piling) would be necessary during excavation to maintain stability of excavation walls. Excavation activities are also anticipated to impact adjacent Tributary 5A remedial action. Excavated material would be managed off-site in accordance with applicable waste management regulations.

Clean backfill would be transported via trucks from off-site borrow sources to the Subsite for restoration. Given the elevated grade of the BCA and area west of the BCA, backfill would be placed to match surrounding grade features, such as State Fair Boulevard, the railway elevation, and to restore the Tributary 5A bank. For cost estimation purposes, it is assumed that backfill thicknesses would range between 2 and 20 ft., resulting in approximately 1.29 million cubic yards to restore excavated areas to elevations approximately ranging from 368 to 376 ft. amsl. Excavated areas would be restored and vegetated consistent with plans developed based on future site use.

[7] A partial removal alternative was not evaluated since, in addition to similar short-term impacts as Alternative 5, groundwater collection and treatment and, potentially, cover systems would still be necessary, negating much of the benefit from the partial removal of contamination.

The conceptual extent of excavation for this alternative is depicted on Figure 8.

The estimated construction time of this alternative is six to nine years. The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost:	$977,000,000
Annual O&M Costs:	$28,000
Present-Worth Cost:	$977,000,000

COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see textbox below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

A comparative analysis of these alternatives based upon the evaluation criteria noted below follows.

NINE EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES
Overall protection of human health and the environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with ARARs evaluates whether the alternative would meet all the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the site, or provide grounds for invoking a waiver.
Long-term effectiveness and permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies an alternative may employ.
Short-term effectiveness considers the period needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation.
Implementability is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services.
Cost includes estimated capital and annual O&M costs, as well as present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the selected response measure.
Community acceptance will be assessed in the *ROD* and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Comments received on the Proposed Plan are an important indicator of community acceptance.

Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment. Alternatives 2 through 5 would be protective of human health and the environment through cover systems, removal, *in-situ* treatment, and/or site management.

Alternative 1 would not meet the RAOs. Alternatives 2 through 5 would address RAOs and would be consistent with current, intended, and reasonably anticipated future use of the Subsite upon implementation of the remedies. Alternatives 3 and 4, through the enhanced cover, provide greater protectiveness than Alternative 2. Alternatives 2, 3, and 4 provide adequate and reliable protection of human health and the environment without the risks to workers/community/environment and environmental footprint associated with Alternative 5. These added impacts are further described below under the effectiveness and implementability criteria.

Compliance with ARARS

Chemical-, location-, and action-specific ARARs were identified in the FS. Consistent with the NCP preamble that indicates that for groundwater "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place," attainment of chemical-specific groundwater ARARs is at the edge of a WMA. Thus, the POC (*e.g.,* outside the barrier wall) for this Subsite is at the WMA edge and would be

addressed in conjunction with the Willis Avenue subsite remedy. The Subsite is part of a WMA because the waste is a solid waste containing site-related contaminants and would meet the requirements for containment under RCRA Subtitle D, which would be an action-specific ARAR under Alternatives 2 through 4. As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1 x 10^{-5} cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1 x 10^{-5} cm/sec). The proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for the Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Alternative 1 does not actively address chemical-specific ARARs relative to potential erosion of, or exposure to, Solvay waste/soil/fill material. For Alternatives 2 through 4, chemical-specific ARARs are addressed by limiting potential for exposures to Solvay waste/soil/fill material exceeding chemical-specific ARARs using cover systems, an SMP, and institutional controls. Alternative 5 addresses chemical-specific ARARs through removal of Solvay waste/soil/fill material.

No action- or location-specific ARARs were identified for Alternative 1. Construction methods and safety procedures would be implemented to adhere to the location- and action-specific ARARs identified for Alternatives 2 through 5. Specifically, institutional controls would be implemented in Alternatives 2 through 5 in conformance with NYSDEC's guidance DER-33[8] and EPA guidance.[9] The cover systems would be implemented in conformance with NYSDEC's guidance DER-10.[10]Procedures would be implemented to adhere to the location-specific ARARs related to federal and state requirements for cultural, archeological, and historical resources. With respect to action-specific ARARs, the proposed cover systems and excavation activities would be conducted consistent with applicable standards; earth moving/excavation activities would be conducted consistent with air quality standards; transportation and disposal activities would be conducted in accordance with applicable state and federal requirements (including land disposal restrictions), by licensed and permitted haulers.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating potential exposure to contaminants. Thus, with respect to the magnitude of residual risk, potentially unacceptable human health risks associated with Solvay waste/soil/fill material exceeding SCOs would remain under Alternative 1. For Alternatives 2 and 3, the passive recovery of Semet residue, if any, would provide added control of potential risks associated with potential for Semet residue seeps. The low permeability cover systems under Alternatives 3 and 4 would more effectively address the potential migration of contaminants than the soil cover under Alternative 2. Potentially unacceptable human health risk attributed to Solvay waste/soil/fill material exceeding ARARs would be addressed in Alternatives 2 through 4 through cover systems, institutional controls, an SMP, and periodic reviews. The removal of Solvay waste/soil/fill material in Alternative 5 does not result in added long-term effectiveness relative to addressing potential human health risks.

Reduction in Toxicity, Mobility, or Volume Through Treatment

There would be no reduction in toxicity, mobility, or volume in Solvay waste/soil/fill material through treatment provided in Alternative 1. Alternatives 2 and 3 would result in a reduction in mobility (*i.e.*, erosion) of Subsite-related contaminants in Solvay waste/soil/fill material through the placement of cover systems. Alternative 4 would provide for reduction in toxicity and mobility through an enhanced engineered cover system and *in situ* treatment of targeted materials. Alternative 5 would provide for reduction in mobility through removal. While Alternatives 2 through 3 and 5 would provide reduction in mobility of contaminants through containment or removal, the reduction would not be through treatment.

Short-Term Effectiveness

Alternative 1 does not include physical measures in areas of contamination and, therefore, would not present potential adverse impacts to remediation workers or the community due to implementation. Because of the increased quantity of materials that would be managed associated with Alternatives 2 through 5, there would be increased potential impacts to workers and the community. The risks to remediation workers and nearby residents under these alternatives would be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Impacts to the community resulting from the construction under Alternatives 2, 3 and 4 would primarily be due to increased truck traffic and increased noise for the duration of the construction. Alternative 5 would result in significant truck traffic and related noise. Alternative 5 would require the off-site transport of approximately 70 truckloads per day (for six to nine years), of contaminated material which would potentially adversely affect local traffic and may pose the potential for traffic

[8] See https://www.dec.ny.gov/docs/remediation_hudson_pdf/der33.pdf
[9] See https://www.epa.gov/superfund/superfund-institutional-controls-guidance-and-policy
[10] See https://www.dec.ny.gov/regulations/67386.html

accidents, which in turn could result in releases of hazardous substances. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude would be anticipated to result in significant adverse effects on the conditions of roadways.

Because no actions would be performed under Alternative 1, there would be no implementation time. It is anticipated that Alternative 2 would require one construction season to implement. It is estimated that Alternatives 3 and 4 would require two construction seasons. Alternative 5 is anticipated to take six to nine construction seasons to implement.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. Alternatives 2 through 4 can be readily constructed and operated; the materials necessary for the construction of these alternatives are reasonably available. The necessary equipment and specialists would be available for these alternatives. Monitoring the effectiveness of Alternatives 2 through 4 would be accomplished through cover system inspections and maintenance to verify continued cover integrity, visual signs of erosion, and condition of the cover. Alternatives 2 through 5 would require coordination with other agencies, including NYSDEC, the New York State Department of Transportation, NYSDOH, and EPA.

The excavation and off-site management of an estimated 1,420,000 cubic yards of Solvay waste/soil/fill material associated with Alternative 5 would be substantially more difficult to implement than the cover placement contemplated in Alternatives 2 and 3, or cover and *in-situ* targeted treatment in Alternative 4. Specifically, there would be significant implementability limitations associated with excavation, transportation, and obtaining appropriate disposal capacity for this large volume of material.

In addition, Alternative 5 would include challenging construction water management and slope stability concerns. Construction water management would be significant during excavation because large volumes would require management due to the presence of excavations proximate to Tributary 5A. Construction water treatment capacity would not be available at the Willis GWTP; therefore, another treatment system would need to be constructed. Due to the presence of active railroads, excavation proximate to them would be limited. Excavations along the Lakeshore proximate to the groundwater collection system would further limit implementability of Alternative 5, relative to potential for damage or need to replace the barrier wall and collection system. Based on a daily production rate of 1,000 cubic yards per day for 10 months of the year, it is estimated that up to approximately 240,000 cubic yards of material would be shipped off-site each year in 16,800 truckloads (70 truckloads per day) with an approximately equivalent number of trips being required for restoration. During a 10-hour work day, this would equate to approximately 1 truck entering or leaving the Subsite every 4 minutes for a period of six to nine years. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude would result in significant adverse effects on the conditions of roadways.

Cost

The estimated present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period. (Although O&M would continue as needed beyond the thirty-year period, thirty years is the typical period used when estimating costs for a comparative analysis.)

The estimated capital, annual O&M, and present-worth costs using a 7% discount factor for each of the alternatives are presented in the table below.

Alternatives	Capital	Annual O&M	Total Present Worth
1 – No Further Action	$0	$0	$0
2 – Cover System	$10.9 million	$42,500	$11.5 million
3 – Enhanced Engineered Cover System	$22.6 million	$42,500	$23.2 million
4 – In Situ Treatment of Targeted Material and Enhanced Engineered Cover System	$24 million	$42,500	$24.6 million
5 – Removal	$977 million	$28,000	$977 million

Support Agency Acceptance

NYSDOH has reviewed this Proposed Plan and concurs with the preferred remedy.

Community Acceptance

Community acceptance of the preferred remedy will be addressed in the ROD following review of the public comments received on the Proposed Plan.

PREFERRED REMEDY

Based upon an evaluation of the various alternatives, NYSDEC and EPA recommend Alternative 4 – *In-Situ* Treatment of Targeted Material and Enhanced Engineered Cover System as the preferred remedy. The preferred remedy would include implementation of *in-situ* treatment of targeted material and an enhanced engineered cover system based on potential chemical-specific ARARs and reasonably anticipated future land uses at the Subsite for industrial or commercial use. In addition, this remedy includes the continuation of O&M for the IRMs that have been implemented at the Subsite, site grading, institutional controls, development of an SMP, and periodic reviews.

The engineered cover in the former Semet residue pond areas west of the BCA would be a minimum of 18-inch thick soil/granular cover (or maintained paved surfaces), incorporating a geomembrane cap for the purposes of mitigating potentially unacceptable exposure risks and surface erosion in support of the reasonably anticipated future use of the Subsite. This geomembrane cap would also address the potential for mobility of the remaining Semet residue. The minimum 18 inches of soil/granular cover would be needed for protection of the geomembrane cap (*e.g.,* from puncture, etc.). The cover systems would also include an engineered component to enhance structural stability, ranging from geofabric to geogrid depending on the needs of the final cover system uses. The soil cover over the BCA, where the geomembrane cap would not be present, would be a minimum of 1-foot thick soil/granular cover (or maintained paved surfaces) for the purposes of mitigating potentially unacceptable exposure of human receptors to constituents exceeding Commercial Use SCOs in surface Solvay waste/soil/fill material and surface erosion in support of the reasonably anticipated future use of the Subsite and its surroundings. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design. The engineered cover system would require routine maintenance and inspections to maintain cover integrity.

Subsite grading would be conducted to support commercial and/or industrial development and would consist of backfilling of the emptied Semet residue ponds. The staged soil pile located on the BCA would be reused as backfill during grading (*e.g.,* to fill in the former Semet residue pond areas) prior to cover placement. Fill material brought to the Subsite would need to meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d)

Design of the cover would take into consideration development plans that are available for the Subsite at that time. Further evaluation of Semet residue seep areas, Semet Lakeshore Area existing cover thickness, and other areas (*e.g*., berms) would be performed during the design and, as necessary, sampling would be performed to determine the appropriate cover extents. Native species would be used for the vegetative component of covers. Structures, such as buildings, pavement, or sidewalks, as part of future development, could also serve as acceptable substitutes for the vegetated cover either at implementation of the remedy or at a future time. The cost estimates assume that the seed application would consist of a grassland seed mix native to New York State that has been selected for its ability to attain relatively high growth rates and ecological function.

The Subsite is part of a WMA because the waste is a solid waste containing site-related contaminants and would meet the requirements for containment under RCRA Subtitle D. The vertical hydraulic conductivity of the Solvay waste/soil/fill material present at the Subsite is generally less than 1×10^{-5} cm/sec. The existing or proposed cover materials in combination with the underlying Solvay waste/soil/fill material and continued O&M of the groundwater collection and treatment systems for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Given the comingling of the shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, shallow and intermediate groundwater at and beyond the POC will be addressed as part of the Willis Avenue subsite.

Following the removal of the Semet residue under the OU-1 remedy, there is Semet residue remaining at the Subsite that is unsuitable for off-site thermal processing for beneficial reuse. Semet residue under the OU-1 remedy that is unsuitable for off-site thermal processing either exhibits unacceptable sulfur or moisture content, insufficient heat content and/or

exhibits unacceptable soil/debris content, as documented in demonstration reports. The remaining Semet residue that cannot be beneficially reused and may contain a free aqueous phase would be treated *in-situ* by solidification/stabilization. Specifically, the treatment would consist of the addition of amendments (*e.g.*, Portland cement, cement kiln dust, lime kiln dust, blast furnace slag) to alter the physical characteristics to a granular material.

A portion of the main site area is anticipated to be used for overflow parking for the New York State Fairgrounds, while an extension of the "Onondaga Loop the Lake" trail will cross a portion of the Semet Lakeshore Area. The extent, thickness, and permeability of the covers would be revisited during the design phase and/or during site management, if site uses change, as necessary. The cover systems would require routine maintenance and inspections to maintain their integrity. The conceptual extent of the cover system is depicted on Figure 7.

Institutional controls in the form of environmental easements and/or restrictive covenants would limit land use to commercial (including passive recreational) or industrial, as appropriate, restrict groundwater use without approved treatment and, require that any intrusive activities in areas where contamination remains would be conducted in accordance with a NYSDEC-approved SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies use restrictions and engineering controls for the Subsite and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:
    - environmental easements and/or restrictive covenants described above
    - Subsite cover systems described above
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions
    - provision that future on-site buildings should be evaluated for the potential for vapor intrusion and may include vapor intrusion sampling and/or installation of mitigation measures, if necessary
    - provisions for the management and inspection of the identified engineering controls
    - maintaining Subsite access controls and NYSDEC notification
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during design.

O&M would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or reapplication of vegetation in areas of non-survivorship.[11] Continued maintenance of the Willis-Semet Berm Improvement IRM is anticipated at the Subsite.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31,[12] and EPA Region 2's Clean and Green Policy[13] would be considered for the preferred remedy to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or O&M of the remedy
- Reduction in vehicle idling, including both on and off-road vehicles and construction equipment during construction and/or O&M of the remedy
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.*, less mowing) and/or be integrated with the planned use of the property
- Beneficial reuse of material that would otherwise be considered a waste
- Ultra-low sulfur diesel.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

[11] The annual O&M cost estimates associated with monitoring of the vegetative cover and for maintenance of the vegetative cover are included in the cost estimates.
[12] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.
[13] See http://epa.gov/region2/superfund/green_remediation.

BASIS FOR THE REMEDY PREFERENCE

Alternative 1 would not satisfy the threshold criteria upon implementation. Alternatives 2 through 5 would be protective of human health and the environment and would address the RAOs; however, Alternative 5 would be extremely difficult and much more costly to implement than Alternatives 2, 3, and 4. In addition, Alternative 5 would present greater short-term impacts to the community and take longer to implement than Alternatives 2, 3, and 4. Relative to Alternative 2, Alternatives 3 and 4 would provide added effectiveness and permanence by incorporating enhanced covers that would provide added isolation from Solvay waste/soil/fill material at the Subsite. Alternative 4 would also include *in-situ* treatment of targeted material and, therefore, better address potential principal threat waste at the Subsite than Alternative 3. While Alternative 4 costs more than Alternative 3, it is only marginally more expensive. Given the added degree of protectiveness that Alternative 4 provides, it would be more cost-effective than Alternative 3.

Based on information currently available, NYSDEC and EPA believe that Alternative 4, the preferred alternative, meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. NYSDEC and EPA expect the preferred alternative to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element (or justify not meeting the preference).

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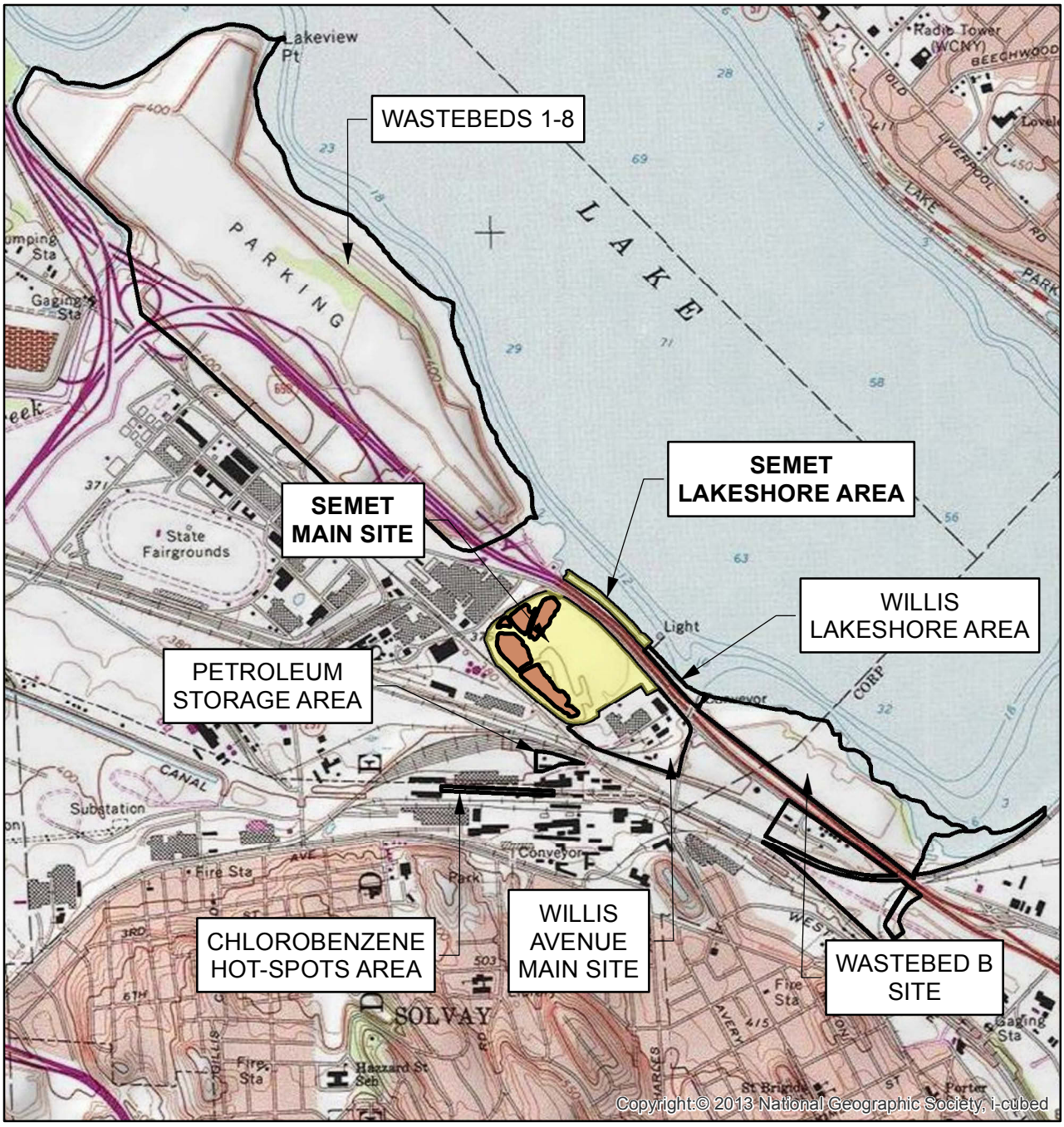

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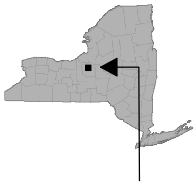
HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK



MAP LOCATION

N

LEGEND

SEMET RESIDUE PONDS

SEMET RESIDUE PONDS SITE

SITE LOCATION

0 1,000 2,000 4,000

Feet

1:24,000

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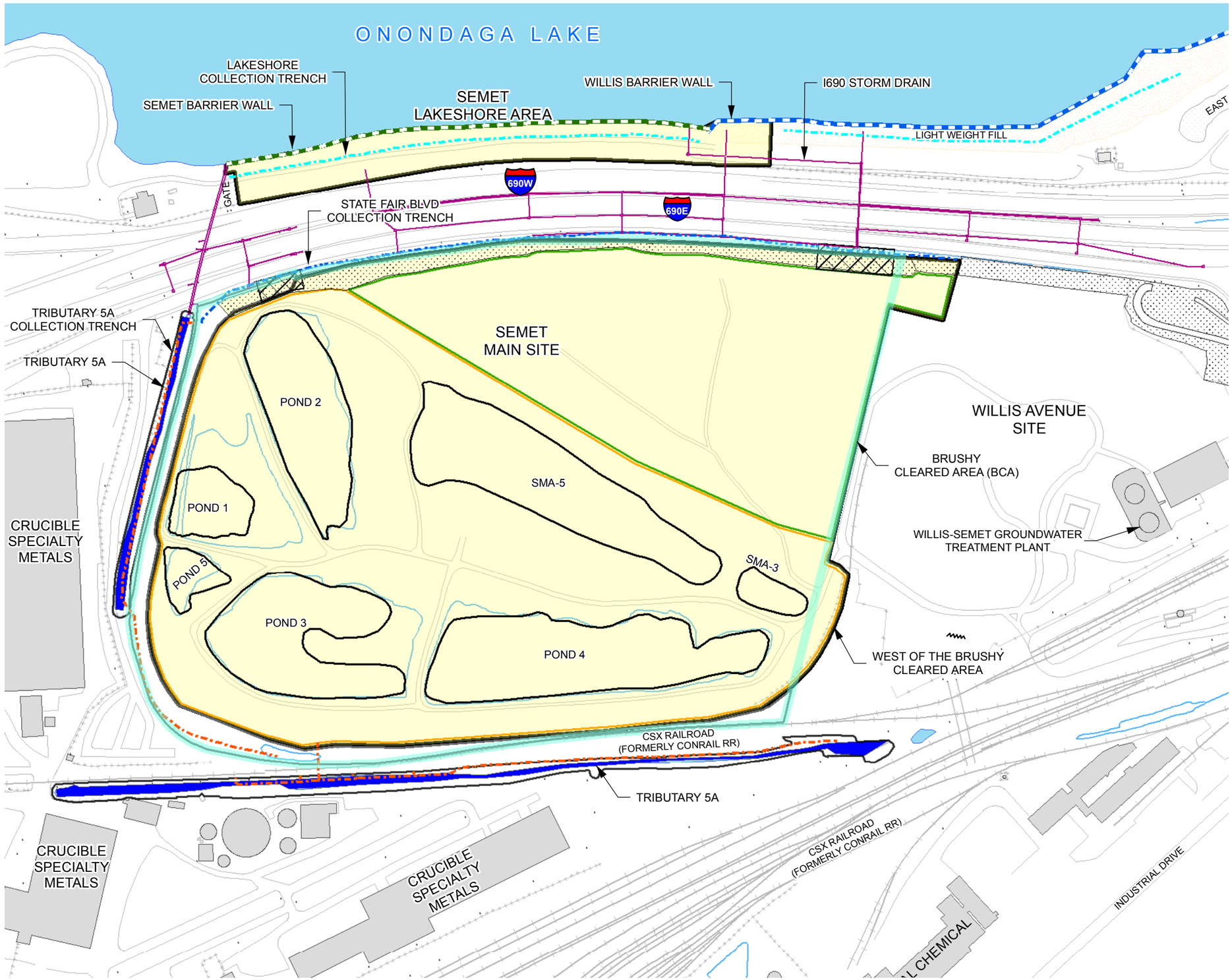

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LEGEND

IRMS & REMEDIAL ACTIONS

- STATE FAIR COLLECTION TRENCH
- LAKESHORE COLLECTION TRENCH
- TRIBUTARY 5A COLLECTION TRENCH
- I-690 STORM DRAIN
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIBUTARY 5A
- TRIBUTARY 5A SEDIMENT REMOVAL
- SOIL REMOVAL AREA
- BALLFIELD / WILLIS / SEMET BERM AREA

STUDY AREA

- SEMET RESIDUE PONDS SITE
- WASTEBED A AREA
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- SEMET BERM AREA

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK

SITE PLAN

0 125 250 500
Feet

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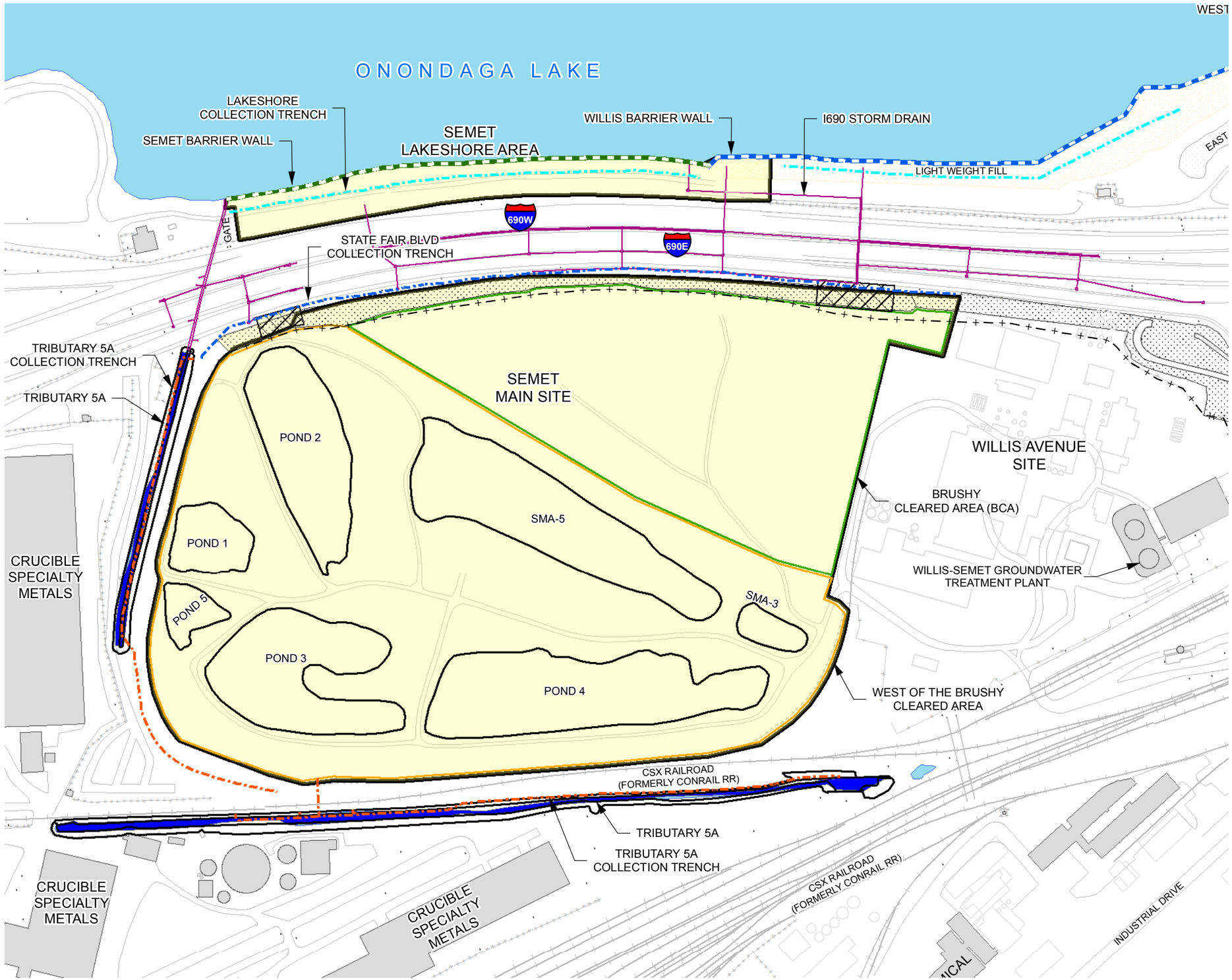

N

LEGEND

SEMET RESIDUE PONDS SITE

INTERIM REMEDIAL MEASURES

WILLIS - SEMET HYDRAULIC CONTAINMENT SYSTEM

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL

I-690 STORM DRAINAGE SYSTEM INVESTIGATION AND REHABILITATION IRM

- I-690 STORM DRAIN
- STATE FAIR COLLECTION TRENCH

WILLIS - SEMET BERM SITE IMPROVEMENTS PROJECT

- BALLFIELD / WILLIS / SEMET BERM AREA
- SOIL REMOVAL AREA

OU1 REMEDY

SEMET RESIDUE REMOVAL

- FORMER POND AREAS - OU1

SEMET PONDS SHALLOW GROUNDWATER REMEDIAL ACTION (TRIBUTARY 5A)

- TRIBUTARY 5A SEDIMENT REMOVAL
- TRIBUTARY 5A COLLECTION TRENCH

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK

INTERIM REMEDIAL MEASURES AND REMEDIAL ACTIONS

0 125 250 500
Feet

OCTOBER 2018
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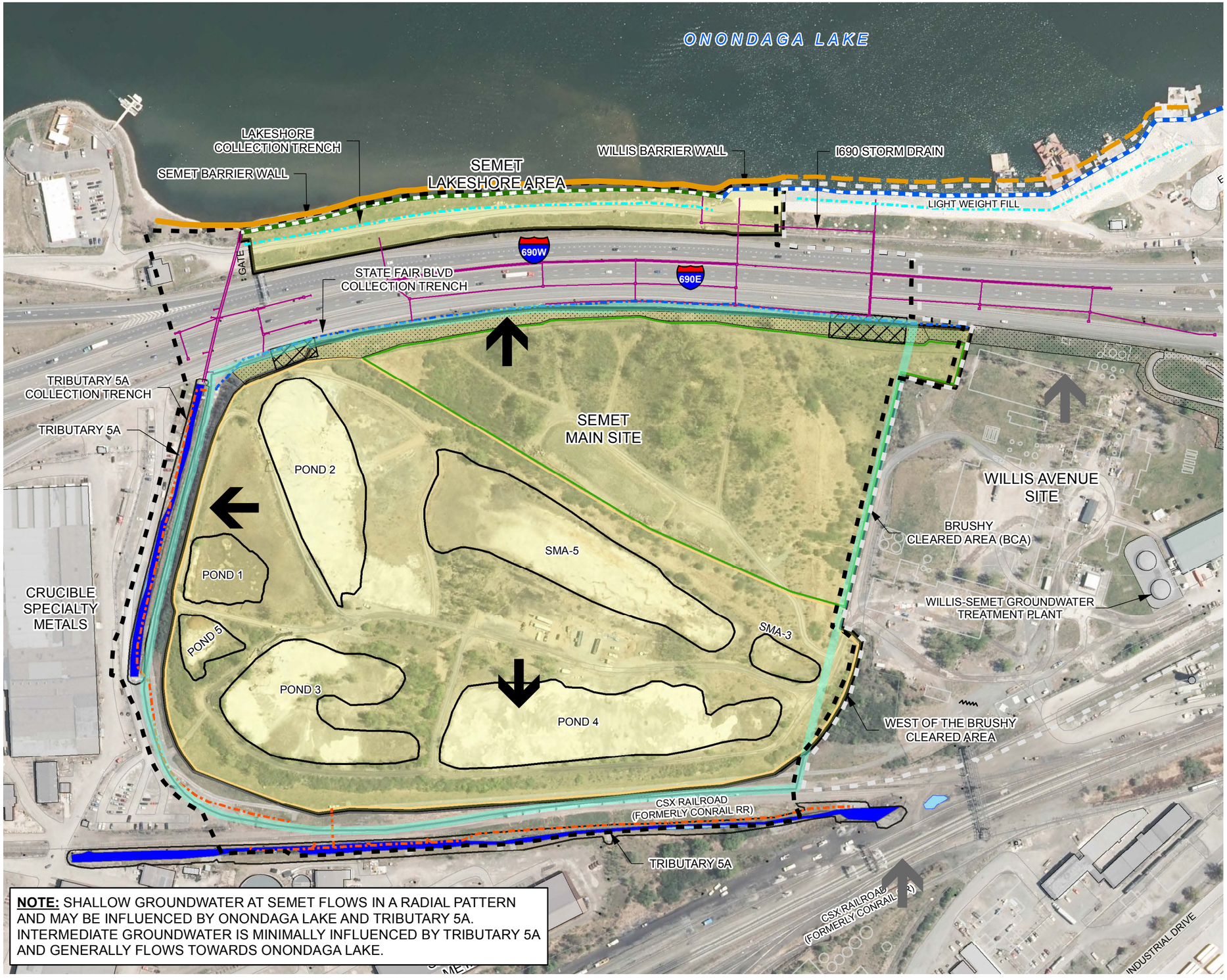

NOTE: SHALLOW GROUNDWATER AT SEMET FLOWS IN A RADIAL PATTERN AND MAY BE influenced BY ONONDAGA LAKE AND TRIBUTARY 5A. INTERMEDIATE GROUNDWATER IS MINIMALLY INFLUENCED BY TRIBUTARY 5A AND GENERALLY FLOWS TOWARDS ONONDAGA LAKE.

N

LEGEND

- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT AREA
- WILLIS WASTE MANAGEMENT AREA

IRMS & REMEDIAL ACTIONS

- STATE FAIR COLLECTION TRENCH
- LAKESHORE COLLECTION TRENCH
- TRIBUTARY 5A COLLECTION TRENCH
- I-690 STORM DRAIN
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIBUTARY 5A
- TRIBUTARY 5A SEDIMENT REMOVAL
- SOIL REMOVAL AREA
- BALLFIELD / WILLIS / SEMET BERM AREA

STUDY AREA

- SEMET RESIDUE PONDS SITE
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- SEMET BERM AREA
- SEMET GENERAL SHALLOW AND INTERMEDIATE GROUNDWATER FLOW DIRECTION
- WILLIS GENERAL SHALLOW AND INTERMEDIATE GROUNDWATER FLOW DIRECTION

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK

WASTE MANAGEMENT AREA AND GROUNDWATER POINT OF COMPLIANCE

0 125 250 500
Feet

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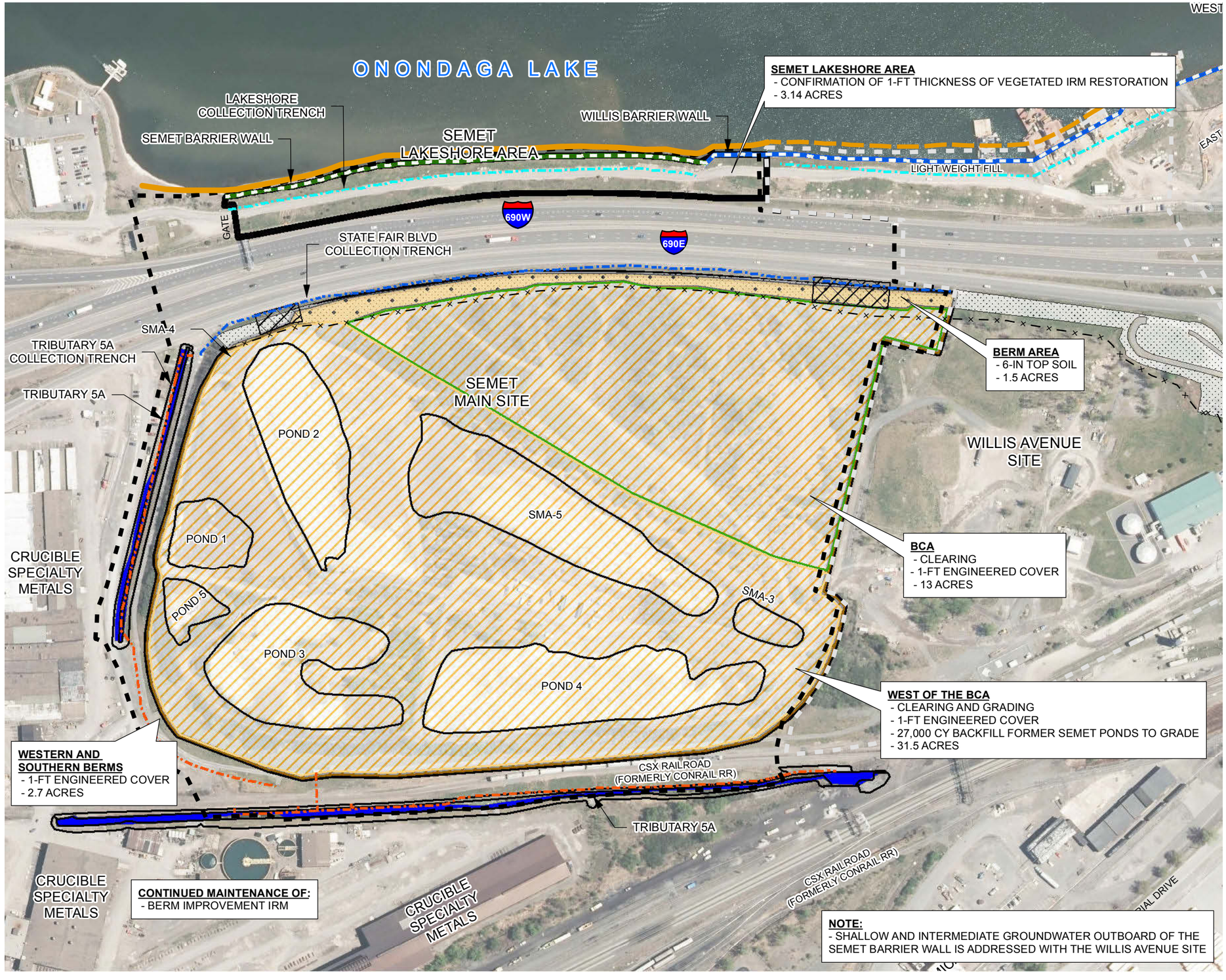

LEGEND

- SEMET PONDS SITE BOUNDARY
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED COVER
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT
- WILLIS WASTE MANAGEMENT
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC. SEMET RESIDUE PONDS SITE OU-2 PROPOSED REMEDIAL ACTION PLAN GEDDES, NEW YORK

ALTERNATIVE 2

0 125 250 500
Feet

DECEMBER 2018
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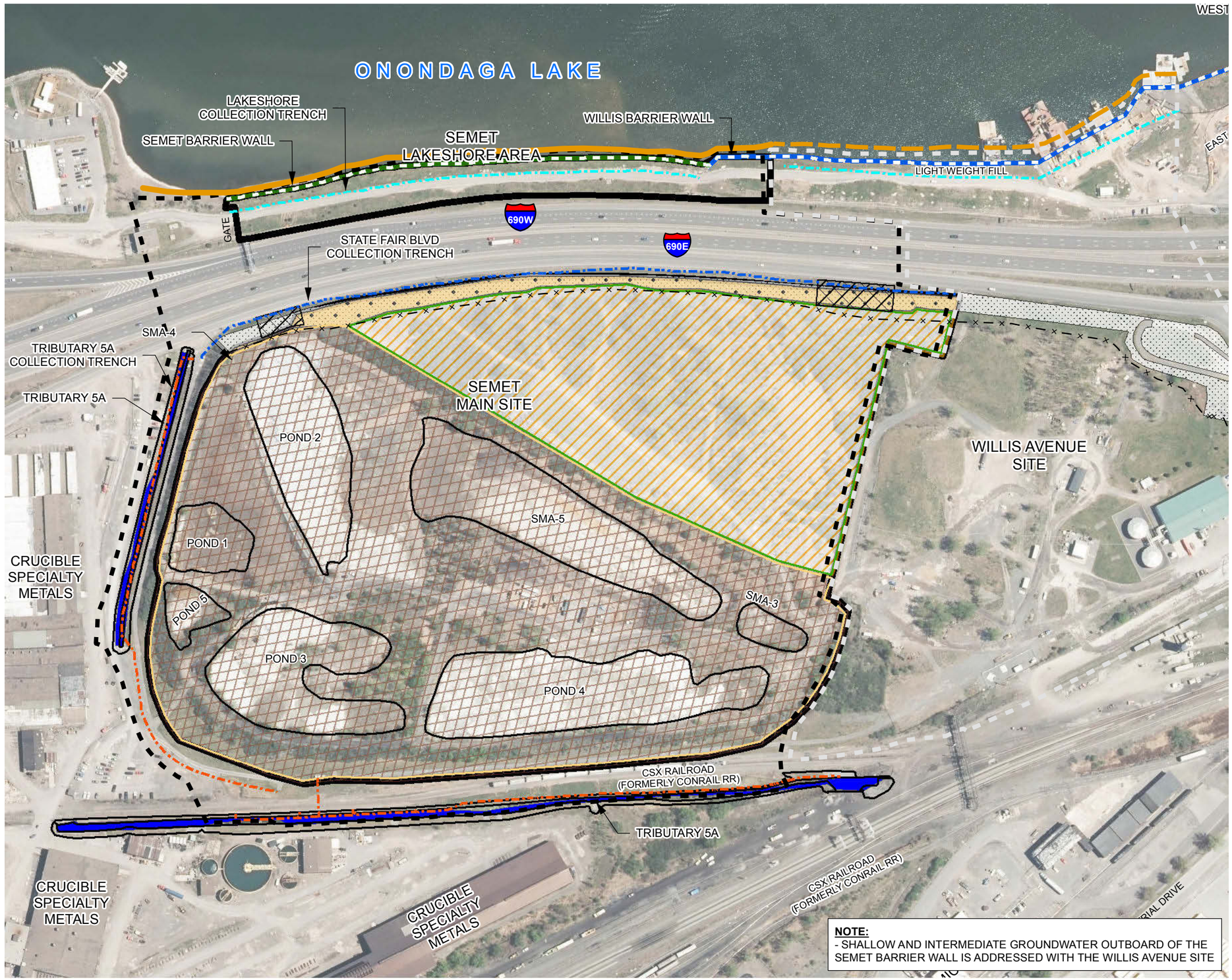

NOTE:
- SHALLOW AND INTERMEDIATE GROUNDWATER OUTBOARD OF THE SEMET BARRIER WALL IS ADDRESSED WITH THE WILLIS AVENUE SITE

LEGEND

- SEMET PONDS SITE
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED
- 1.5-FOOT LOW-PERMEABILITY COVER
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF
- WILLIS POINT OF
- SEMET WASTE MANAGEMENT
- WILLIS WASTE MANAGEMENT
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION
- TRIB 5A SEDIMENT

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK

ALTERNATIVE 3

0 125 250 500
Feet

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FIGURE 7

ONONDAGA LAKE

LAKESHORE COLLECTION TRENCH

SEMET BARRIER WALL

SEMET LAKESHORE AREA

WILLIS BARRIER WALL

SEMET LAKESHORE AREA
- CONFIRMATION OF 1-FT THICKNESS OF VEGETATED IRM RESTORATION
- 3.14 ACRES

LIGHT WEIGHT FILL

WEST

EAST

GATE

690W

690E

STATE FAIR BLVD COLLECTION TRENCH

SMA-4

TRIBUTARY 5A COLLECTION TRENCH

TRIBUTARY 5A

SEMET MAIN SITE

POND 2

POND 1

POND 5

POND 3

POND 4

SMA-5

SMA-3

BERM AREA
- 6-IN TOP SOIL
- 1.5 ACRES

WILLIS AVENUE SITE

BCA
- CLEARING
- 1-FT ENGINEERED COVER
- 13 ACRES

WEST OF THE BCA
- CLEARING AND GRADING
- 1.5-FT LOW PERMEABILITY COVER
- 27,000 CY BACKFILL FORMER SEMET PONDS TO GRADE
- IN SITU TARGETED TREATMENT
- 31.5 ACRES

CRUCIBLE SPECIALTY METALS

WESTERN AND SOUTHERN BERMS
- 1-FT ENGINEERED COVER
- 2.7 ACRES

CSX RAILROAD (FORMERLY CONRAIL RR)

TRIBUTARY 5A

CRUCIBLE SPECIALTY METALS

CONTINUED MAINTENANCE OF:
- BERM IMPROVEMENT IRM

CRUCIBLE SPECIALTY METALS

CSX RAILROAD (FORMERLY CONRAIL RR)

NOTE:
- SHALLOW AND INTERMEDIATE GROUNDWATER OUTBOARD OF THE SEMET BARRIER WALL IS ADDRESSED WITH THE WILLIS AVENUE SITE

N

LEGEND

- SEMET PONDS SITE BOUNDARY
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- 6-INCH TOP SOIL
- 1-FOOT ENGINEERED COVER
- 1.5-FOOT LOW-PERMEABILITY COVER
- IN-SITU TARGETED TREATMENT
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SEMET POINT OF COMPLIANCE
- WILLIS POINT OF COMPLIANCE
- SEMET WASTE MANAGEMENT
- WILLIS WASTE MANAGEMENT
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY
- LAKESHORE COLLECTION TRENCH
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC.
SEMET RESIDUE PONDS SITE
OU-2 PROPOSED REMEDIAL ACTION PLAN
GEDDES, NEW YORK

ALTERNATIVE 4

0 125 250 500
Feet

DECEMBER 2018
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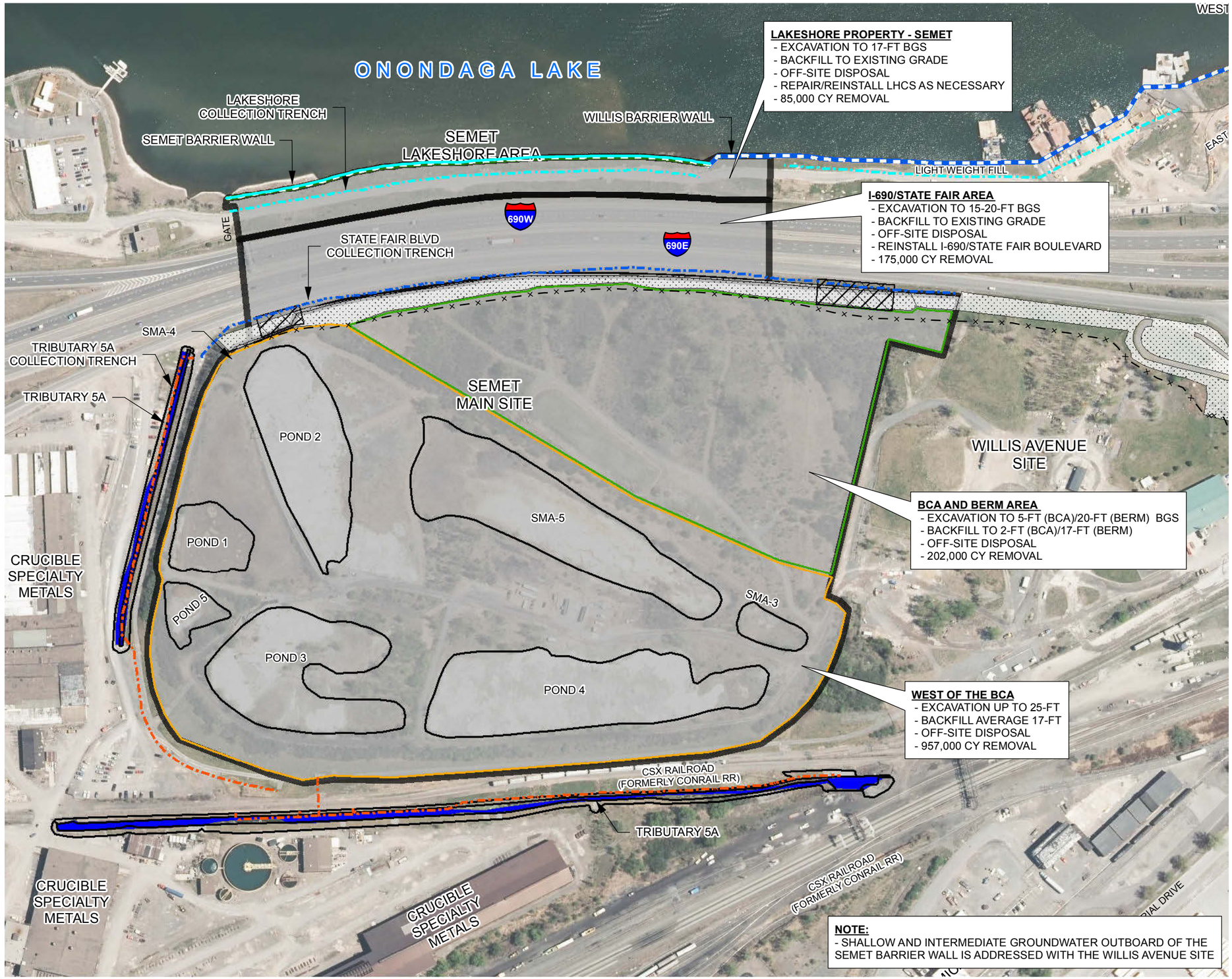

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LEGEND

- SEMET PONDS SITE BOUNDARY / EXCAVATION AREA
- BRUSHY CLEARED AREA (BCA)
- WEST OF THE BCA
- TRIBUTARY 5A
- STATE FAIR BOULEVARD COLLECTION TRENCH (IRM)
- SOIL REMOVAL AREA (IRM)
- BALLFIELD / WILLIS / SEMET BERM SITE IMPROVEMENTS AREA (IRM)

OU1 REMEDY

- LAKESHORE COLLECTION
- SEMET BARRIER WALL
- WILLIS BARRIER WALL
- TRIB 5A COLLECTION TRENCH
- TRIB 5A SEDIMENT REMOVAL

HONEYWELL INTERNATIONAL INC. SEMET RESIDUE PONDS SITE OU-2 PROPOSED REMEDIAL ACTION PLAN GEDDES, NEW YORK

ALTERNATIVE 5

0 125 250 500
Feet

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Table 1

Semet Residue Ponds
Site-wide Surface Soils (0-2 ft bgs)
Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

Parameter	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Industrial SCOs	Number of Industrial SCO Exceedances
Volatile Organic Compounds (µg/kg)						
Benzene	0.49	7,810,000	44,000	11	89,000	10
Toluene	0.89	4,040,000	500,000	9	1,000,000	8
Xylenes (Total)	0.90	5,600,000	500,000	8	1,000,000	8
Semivolatile Organic Compounds (µg/kg)						
Benzo(a)pyrene	48.0	1,100	1,000	1	1,100	0
Dibenz(a,h)anthracene	73.0	564	560	1	1,100	0
Naphthalene	45.0	4,410,000	500,000	7	1,000,000	4
Pesticides (mg/kg)						
beta-BHC	360	360	3	1	14	1
Metals (mg/kg)						
Mercury	0.04	197	2.8	20	5.7	6

NOTES

This table presents (1) the detected concentration data only and (2) only parameters that exceeded the Part 375 Commercial or Industrial SCOs.

The Site-wide data includes the Berm Area, Brushy Cleared Area (BCA), Area west of the BCA, and Lakeshore Area. The Lakeshore Area data were taken from the stockpile samples (soils excavated during barrier wall and collection trench installation; Section 5.5 of *Semet Residue Ponds Site OU-2 FInal Data Summary Document* [OBG, June 2018]).

bgs = below ground surface

Table 2

Semet Residue Ponds
Site-wide Subsurface Soils (>2 ft bgs)
Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

Parameter	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Industrial SCOs	Number of Industrial SCO Exceedances
Volatile Organic Compounds (µg/kg)						
1,2,4-Trimethylbenzene	750,000	750,000	190000	1	380000	1
1,3,5-Trimethylbenzene	510,000	510,000	190000	1	380000	1
1,4-Dichlorobenzene	0.64	260,000	130,000	1	250,000	1
Benzene	0.49	44,000,000	44,000	96	89,000	91
Chlorobenzene	0.51	820,000	500,000	1	1,000,000	0
Ethylbenzene	0.36	480,000	390,000	1	780,000	0
Naphthalene	2.00	2,600,000	500,000	1	1,000,000	1
Toluene	0.89	16,000,000	500,000	68	1,000,000	61
Xylene (Total)	2.00	10,000,000	500,000	68	1,000,000	61
Semivolatile Organic Compounds (µg/kg)						
Benzo(a)pyrene	33.0	1,300	1,000	2	1,100	1
Dibenzofuran	27.0	470,000	350,000	1	1,000,000	0
Napthalene	45.0	63,000,000	500,000	59	1,000,000	43
Metals (mg/kg)						
Arsenic	0.8	18	16	1	16	1
Barium	5.7	795	400	1	10000	0
Copper	1.7	1,180	270	1	10000	0
Mercury	0.005	197	2.8	10	5.7	9

NOTES

This table presents (1) the detected concentration data only and (2) only parameters that exceeded the Part 375 Commercial or Industrial SCOs.

The Site-wide data includes the Berm Area, Brushy Cleared Area (BCA), Area west of the BCA, and Lakeshore Area. The Lakeshore Area data were taken from the stockpile samples (soils excavated during barrier wall and collection trench installation; Section 5.5 of *Semet Residue Ponds Site OU-2 FInal Data Summary Document* [OBG, June 2018]).

bgs = below ground surface

TABLE 3a
SUMMARY OF RISKS AND HAZARDS FOR CONSTRUCTION WORKER
SITEWIDE SOIL / FILL MATERIAL - SURFACE/SUBSURFACE SOIL
SEMET PONDS SITE - GEDDES, NEW YORK

CAS Number	Constituent	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient			
		Ingestion	Dermal	Inhalation	Exposure Routes Total	Ingestion	Dermal	Inhalation	Exposure Routes Total
METALS									
7440-38-2	Arsenic	4E-07	3E-08	2E-07	7E-07	6E-02	4E-03	2E-01	3E-01
7440-47-3	Chromium, Hexavalent (derived)	6E-08		1E-06	1E-06	3E-03		9E-03	1E-02
7440-48-4	Cobalt			6E-07	6E-07	1E-01		7E-01	9E-01
7439-97-6	Mercury					1E+00		4E-02	1E+00
7440-28-0	Thallium					7E-01			7E-01
PESTICIDES									
319-85-7	beta-BHC	2E-05	3E-06	8E-07	3E-05				
SVOCs									
92-52-4	1,1'-Biphenyl	6E-09			6E-09	1E-04		1E-01	1E-01
106-46-7	1,4-Dichlorobenzene	2E-09		3E-08	4E-08	4E-04		3E-04	7E-04
6165-52-2	1-Phenyl-1-[2,4-dimethylphenyl]-ethane								
3717-68-8	1-Phenyl-1-[4-methylphenyl]-ethane								
91-57-6	2-Methylnaphthalene					2E-01	3E-02		2E-01
208-96-8	Acenaphthylene					4E-06			
56-55-3	Benzo(a)anthracene	1E-08	2E-09	2E-10	1E-08				
50-32-8	Benzo(a)pyrene	6E-08	1E-08	1E-09	7E-08				
86-74-8	Carbazole								
53-70-3	Dibenzo(a,h)anthracene	3E-08	6E-09	6E-10	4E-08				
132-64-9	Dibenzofuran					8E-02	3E-03		8E-02
91-20-3	Naphthalene			9E-06	9E-06	5E-01	9E-02	7E+00	7E+00
621-64-7	N-Nitrosodipropylamine	1E-07	2E-08	4E-09	2E-07				
110-86-1	Pyridine					4E-01			4E-01
VOCs									
95-63-6	1,2,4-Trimethylbenzene							3E+00	3E+00
71-43-2	Benzene	1E-05		4E-05	5E-05	4E+00		1E+01	2E+01
74-83-9	Bromomethane					1E-02		2E-01	2E-01
108-90-7	Chlorobenzene					8E-03		4E-02	5E-02
67-66-3	Chloroform	2E-09		4E-08	4E-08	3E-04		1E-03	1E-03
100-41-4	Ethylbenzene	4E-08		1E-07	2E-07	2E-03		3E-03	6E-03
108-87-2	Methylcyclohexane								
99-87-6	p-Isopropyltoluene								
108-88-3	Toluene					1E-01		4E-02	2E-01
1330-20-7	Xylenes (total)					4E-02		1E+00	1E+00
				Total Risk	**9E-05**			Total Hazard	**3E+01**

TABLE 3b
SUMMARY OF RISKS AND HAZARDS FOR INDOOR / OUTDOOR INDUSTRIAL WORKER
SITEWIDE SOIL / FILL MATERIAL - SURFACE SOIL
SEMET PONDS SITE - GEDDES, NEW YORK

CAS Number	Constituent	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient			
		Ingestion	Dermal	Inhalation	Exposure Routes Total	Ingestion	Dermal	Inhalation	Exposure Routes Total
METALS									
7440-38-2	Arsenic	4E-06	4E-07	3E-09	4E-06	2E-02	2E-03	1E-04	3E-02
7440-47-3	Chromium, Hexavalent (derived)	4E-07		2E-08	4E-07	7E-04		6E-06	7E-04
7440-48-4	Cobalt			7E-09	7E-09	3E-02		4E-04	3E-02
7439-97-6	Mercury					3E-01		9E-01	1E+00
7440-28-0	Thallium					2E-01			2E-01
PESTICIDES									
319-85-7	beta-BHC	1E-04	4E-05	1E-08	2E-04				
SVOCs									
92-52-4	1,1'-Biphenyl	6E-08			6E-08	4E-05		2E-01	2E-01
106-46-7	1,4-Dichlorobenzene	2E-08		1E-06	1E-06	1E-04		4E-04	6E-04
6165-52-2	1-Phenyl-1-[2,4-dimethylphenyl]-ethane								
3717-68-8	1-Phenyl-1-[4-methylphenyl]-ethane								
91-57-6	2-Methylnaphthalene					6E-02	2E-02		8E-02
208-96-8	Acenaphthylene					1E-06			
56-55-3	Benzo(a)anthracene	9E-08	3E-08	1E-09	1E-07				
50-32-8	Benzo(a)pyrene	3E-07	1E-07	1E-11	5E-07				
86-74-8	Carbazole								
53-70-3	Dibenzo(a,h)anthracene	3E-07	1E-07	1E-11	5E-07				
132-64-9	Dibenzofuran					3E-02	2E-03		3E-02
91-20-3	Naphthalene			4E-04	4E-04	2E-01	8E-02	1E+01	1E+01
621-64-7	N-Nitrosodipropylamine	8E-07	2E-07	6E-11	1E-06				
110-86-1	Pyridine					1E-01			1E-01
VOCs									
95-63-6	1,2,4-Trimethylbenzene							6E-02	6E-02
71-43-2	Benzene	6E-05		8E-04	9E-04	5E-01		1E+01	1E+01
74-83-9	Bromomethane					2E-03		2E-01	2E-01
108-90-7	Chlorobenzene					1E-03		4E-02	4E-02
100-41-4	Ethylbenzene	2E-07		3E-06	3E-06	4E-04		4E-03	4E-03
108-87-2	Methylcyclohexane								
99-87-6	p-Isopropyltoluene								
108-88-3	Toluene					2E-02		4E-02	6E-02
1330-20-7	Xylenes (total)					6E-03		1E+00	1E+00
				Total Risk	**2E-03**			Total Hazard	**3.E+01**

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX V-b

PUBLIC NOTICE PUBLISHED IN THE
ONONDAGA COUNTY EAGLE OBSERVER
ON DECEMBER 19, 2019

THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION INVITES PUBLIC COMMENT ON THE PROPOSED PLAN FOR OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SITE

The New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA) will hold an open house from 5:00 6:00 PM and a public meeting at 6:00 PM on January 9, 2019 (inclement weather date of January 10) at the Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds, Geddes, NY to discuss the Proposed Plan for Operable Unit (OU) 2 of the Semet Residue Ponds Subsite (Subsite) of the Onondaga Lake Superfund Site.

The Proposed Plan provides a summary of the findings of the site investigation (which are summarized in a Data Summary Document), and Feasibility Study (FS) conducted to determine the nature and extent of the contamination at the Subsite, whether this contamination poses a threat to public health and the environment, and identify and evaluate remedial alternatives. The Proposed Plan also identifies the preferred remedy and the basis for this preference.

NYSDEC and EPA are issuing the Proposed Plan to encourage and receive input and comments from the public. The primary objectives of the proposed action are to minimize the migration of contaminants and any current or potential future human health and environmental impacts.

Under the OU-1 remedy, over 32,000 tons of Semet material were excavated and sent off-site for beneficial reuse. The main features of the preferred remedy for OU-2 include in-situ treatment of targeted material (e.g., remaining Semet material that cannot be reused under the OU-1 remedy); installation of an enhanced engineered cover system where shallow soil exhibits contaminant concentrations above 6 NYCRR Part 375 Soil Cleanup Objectives for commercial use; continuation of the operation and maintenance related to Interim Remedial Measures that have been implemented at the Subsite; site grading; institutional controls; development of a Site Management Plan; periodic reviews; and long-term maintenance. Given the comingling of the Subsite's shallow and intermediate groundwater outboard of the hydraulic containment system at the shore of Onondaga Lake with that of the adjacent Willis Avenue subsite, the shallow and intermediate groundwater in this area will be addressed as part of the Willis Avenue subsite. The deep groundwater will be addressed as part of a regional unit in a future study.

The remedy described in the Proposed Plan is NYSDEC and EPA s preferred remedy for the Subsite. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after NYSDEC and EPA have taken into consideration all public comments. NYSDEC is soliciting public comment on the alternatives considered in the detailed analysis of the FS because NYSDEC and EPA may select a remedy other than the preferred remedy.

The OU-2 Proposed Plan, Data Summary Document, and FS report are available on NYSDEC's website at www.dec.ny.gov/chemical/37558.html and at the following locations:

Onondaga County Public Library
447 South Salina Street
Syracuse, New York 13202
315-435-1800

Solvay Public Library
615 Woods Road
Solvay, NY 13209
Phone: (315) 468-2441

Atlantic States Legal Foundation
658 West Onondaga Street
Syracuse, New York 13204
315-475-1170

NYSDEC
615 Erie Boulevard, West
Syracuse, New York 13204-2400
315-426-7400
Please call for an appointment

NYSDEC, DER
625 Broadway, 12th Floor
Albany, New York 12233-7013
518-402-9676
Please call for an appointment

Written comments associated with the remedy for the Subsite, received during the public comment period which ends on January 16, 2019, as well as oral comments received at the public meeting, will be documented and addressed in the Responsiveness Summary section of the Record of Decision, the document which formalizes the selection of the remedy. All written comments should be addressed to:
Mr. Tracy A. Smith, Project Manager
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7013
tracy.smith@dec.ny.gov
(Indicate “Semet OU-2 Proposed Plan Comments” in the subject line of the e-mail)
EO-205203

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX V-c

PUBLIC MEETING SIGN-IN SHEET

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

Public Meeting

Topic Semet Residue Site 042 Public Meeting
Date January 9, 2019

Name	Affiliation, if any
21. MATT EDWIE	CASCADE
22. Mike Lewis	Hanson Aggregates
23. Wayne Curtis	" "
24. Jack Ramsden	CPNG
25. Travis Glazier	Onondaga County
26. Tom Korary	Barrett Paving Materials Inc.
27. Holly Granat	Office of the Environment (Onondaga Co)
28. Bill Morse	Town of Geddes
29. Maude Morse	NYSDEC + local resident
30. Gregg Tripoli	OHA
31.	
32.	
33.	
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36.	
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39.	
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OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX V-d

JANUARY 9, 2019 PUBLIC MEETING TRANSCRIPT

STATE OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

In the Matter of the

REMEDY PROPOSED for STATE SUPERFUND SITE,

PUBLIC MEETING conducted at the Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds, 581 State Fair Boulevard, Syracuse, New York before JOHN F. DRURY, CSR, Certified Shorthand Reporter in and for the State of New York, on January 9, 2019 at 6:00 p.m.

A p p e a r a n c e s:

TRACY ALAN SMITH,	Presenter, Project Manager, NYSDEC
DON HESLER,	NYSDEC
STEPHANIE WEBB,	NYSDEC
MARK SERGOTT, PG,	NYSDOH
ERIN RANKIN,	O'Brien & Gere, Sr. Project Mngr.
CLARE LEARY,	O'Brien & Gere

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Smith Presentation

MR. TRACY SMITH: All right, we'll get started, it's 6. I don't plan on using the microphone, if anybody can't hear me let me know and I'll speak up or I can use the microphone, but I'll try to avoid using it if I can.

So my name is Tracy Smith, I'm the Project Manager, Department of Environmental Conservation Project Manager for the Semet Residue Pond Site. I've been working on this project for about twenty years, since the late '90s, been involved in various investigations, pilot tests and other work that's been performed since then. Also here with me is my Supervisor, Don Hesler, and Mark Sergott, from the Department of Health.

So today I'm going to be talking about the 2nd Operable Unit or OU of the Semet Residue Pond Site. Going to discuss some background, alternatives that were evaluated to clean up the site and the preferred remedy and next step.

If there is any questions, just

please hold them until the end of the presentation and then we can go through questions and answers that anybody might have.

So the site, the sub site of Onondaga Lake, the Onondaga Lake NPL site, it's located north and south of I-690 and southwest of Onondaga Lake. It covers approximately 50 acres. The site includes lakeshore area, which is along here, the strip of land along here between I-690 and Onondaga Lake. And it includes the main site area, which includes the former residue ponds which are these areas here, and an area called brushy cleared area, which you'll see in figures shortly.

In addition there is a deep groundwater that needs to be addressed at this sub site and other nearby sub sites like Waste Beds 1 through 8, nearby Willis Avenue site, and the Waste Bed B site. These will be addressed separately as part of a regional ground

water unit. So they're not going to be addressed at this time. I'm also Project Manager for all those other sites that I mentioned also.

So this is the aerial photo of the Semet residue pond site, with the adjacent Willis Avenue site next to it. Just to let you know, there is going to be a similar selection, remedy selection process and proposed plan, with a public meeting and comment period and all that in the near future for the Willis Avenue site, the nearby site there, so just want to make you aware of that.

So some site background. Solvay waste was disposed there in the early 1900s. Solvay waste, the material I'm sure some people are aware of what it is. Made of calcium carbonate, calcium silicate, other salts and minerals disposed in large quantities around the area.

This was Waste Bed A, one of the early wastebeds, deposited in the early

1900s. Following that, from about 1917 to 1970, there's Semet residue it's called disposed here. There is about 15 to 20 million gallons of Semet residue disposed at the site, what estimates we have. That contains really high levels of benzene, toluene, ethyl benzene and xylene, and has a really low pH, so it's quite acidic.

In addition there is layers of tar present in the ponds besides that near the surface, that's been observed down to depth of 20 feet. So it's not just the surficial tar, there are other layers present at the site. There's also mercury and other contaminants present at elevated levels at the site.

OU-1 itself includes the Semet residue that could be beneficially reused off-site, and the containment of the shallow and intermediate groundwater. I'll get into that a little bit more later. But there are barrier walls and other groundwater controls to prevent

the off-site migration of groundwater.

OU-2, which we're talking about today, includes the remaining contaminated soil and fill materials at the site that includes residue, the tar material that can't be beneficially reused. That's due to unacceptable soil, sulfur or moisture content, insufficient heat content because of the way it was reused as a fuel basically. And there is presence of soil debris in the tar present also, so it couldn't be reused. I'll get into that a little bit more later also.

Shallow and intermediate groundwater outboard of the hydraulic containment system on the shore of Onondaga Lake will be addressed in the proposed plan for the adjacent Willis Avenue site also, let you know that.

Here's some pictures of the Semet residue ponds. This is prior to implementation of OU-1. The OU-1 remedies are removal of the tar. So as

you can see there was a lot of tar present in the ponds, just stuff wouldn't grow on it. They did periodically cover those ponds with spray on cement and fiber cover, which was done to reduce odors in the area.

Several investigations were performed at the site. Some applicable for the Operable Unit 1, such as pilot studies to determine how to remove and address the residue. That's pretty difficult material to deal with. Many of the investigations that were performed were applicable to both the sites though. They focused on the remaining materials that we're discussing today. And a lot of that data is available in the document depositories. There was a document, Date of Summary report document where the material was summarized. And the alternatives I'm going to be discussing today were evaluated in a feasibility study document. Both those documents

are available in the repository.

The remedy for OU-1, just to give us some background of that, that was selected in 2002. So quite a while ago. And that included reuse of the residue back then, to make a component of driveway sealer. And of course to prevent the migration of the contaminated groundwater into Onondaga Lake.

The remedies to address the groundwater were implemented. The barrier wall I mentioned and the other groundwater mitigation systems, which I'll discuss later. But there were issues with the driveway sealer component remedies, due to market conditions and other factors. So it was determined that that remedy could not be implemented.

So additional investigation and pilot studies were performed to determine the best way to address the tar, Semet residue. And an ESD or

Explanation of Significant Differences document was issued in 2017 now, and since 2017, and that changed the 2002 remedy from the reduction of the driveway sealer component to the off-site thermal process for beneficial reuse components. That's basically a reuse of the fuel. I'll show you some more details on that shortly.

We also performed risk assessments for OU-2. These included a human health risk assessment or HHRA, and ecological risk assessment. And those were based on No Remedial activities being performed. HHRA indicated unacceptable risk to future workers at the site, and the ecological risk assessment identified potential unacceptable risk to several animals, such as rabbits, some shrews and robins, stuff like that.

This is a summary of some of the remedial action and interim remedial measures that were performed. They're listed here and I'll discuss those in

more detail in the next slide. But these were performed to prevent exposure, to shut off the contaminants to Onondaga Lake.

So the OU-1 remedial action, the Semet residue removal and the off-site reuse. So the Semet residue was removed from essentially five ponds located on the site here. The residue was excavated, and if necessary water was removed prior to the off-site transport via lined tanks or tank cars or trucks. Seen in some of these pictures here.

The material was then sent to several permitted facilities out of state for use as a fuel in cement kilns. Pilot studies were performed from 2014 to 2016 to evaluate the feasibility of this remedy. And then we had the ESD in 2017, and following that additional shipment of the material was performed in 2017 and 2018. Based on the current data we have it appears that all the material that is acceptable for off-site

reuse has been removed from the site. So basically the material that's remaining will be dealt with under this operable unit we're discussing today.

During the work performed here under OU-1, the Semet residue removal, there was a lot of air monitoring, odor and emission controls. They applied temporary covers, stuff like that. During that work, total of approximately 32,000 tons, about 1,600 tractor trailer loads, some of these are tractor trailers seen here, the tank cars, think of it that way, of material was shipped off-site for reuse. So they did get reuse out of this material and get it off-site which was good.

Another, the other work done, as I mentioned the barrier wall on the lakeshore here. This is actually a component done in conjunction with the wall with Semet and nearby Willis Avenue site. And there is additional barrier walls, as seen in some of the figures in

the back there, that go down along the rest of the lake, but that's a separate site.

So those were performed to prevent migration of the contaminated shallow and intermediate groundwater to the lake. So approximately 1,400 foot barrier wall and groundwater collection system were installed along the shoreline. And that was back in 2006 and 2007.

So that remedy, all that groundwater that's collected from the barrier wall here gets sent up to the Willis groundwater treatment plant which was constructed back in that time frame, 2006, that's been upgraded several times. That groundwater treatment system collects or treats the water from several sites along the lake, the Honeywell site, including Waste Bed 1 through 8, Waste Bed B and the Semet and Willis site.

There's also low permeability

material placed over the trench that was installed over this collection system. And there was restoration performed along that shoreline area. They placed trees, shrubs and other seedings back in 2010; sort of a supplemental restoration program.

Next there was tributary 5A remedial action, that was also part of OU-1. That's located on the south and west sides of the site I guess, as you see here. The tributary 5A is a drainage ditch discharged to Onondaga Lake. So to address the discharge and shallow groundwater to that ditch and to address impacts of sediment and the surface water in that ditch, the remedial actions were performed.

They include the removal of the sediment from the tributary, installation of an isolation layer, basically a liner below the tributary, and installation of a shallow groundwater collection system. As you

can see in some of these pictures here, with the liner and installation being installed, installed a collection system, groundwater collection system along or adjacent to or underneath the tributary in some areas just due to limitation with room, because of the adjacent railroad tracks and stuff like that.

So groundwater collected by that system goes to the Willis Avenue plant also. There is also a shallow groundwater collection system along State Fair Boulevard that was installed back in 2012. That system essentially is a French drain type shallow stone collection trench. And that prevents groundwater from infiltrating into storm sewer pipes along State Fair Boulevard in that area. That groundwater goes into the tributary 5A system.

And lastly we had a berm improvement IRM we called it. They did sampling along this berm along State Fair

Boulevard to determine if there was contamination present. They found some areas a little bit higher levels of mercury and other contaminants.

So they did some removals in these two areas here and some shallow removal along the other parts of the site, and the other parts of the berm, and backfilled with clean material. Up to one to two feet of clean material was placed here, along this stretch of State Fair Boulevard. And then they performed planting of grasses, trees and shrubs in that area to make it look a lot better and to address some of the exposure concerns along that berm.

This slide shows the objectives for the remediation that has been established for this unit. I'm not going to read them all, but the main purpose of these is to prevent the migration of contaminants to tributary 5A in Onondaga Lake. At a minimum the remedy needs to eliminate or mitigate

all the significant threats to the public health and the environment.

So getting into the alternatives we evaluated. These alternatives were considered based on the remedial action objectives in the previous slides and a review of the applicable technologies to address the contamination. And as I mentioned before, as shown here, the downgrading groundwater is going to be addressed as far as the adjacent Willis Avenue site.

So Alternative 1 we always evaluate, the No Action alternative. We're required to evaluate that as part of a comparison, compared to the other alternatives. That alternative leaves the site in its present condition. It doesn't provide any protection to the public health or the environment.

Alternatives 2 and 3 are cover alternatives, and they include different components. Those alternatives include grading and placement of cover systems

to prevent exposure to the contaminated materials. They also include operating and maintaining the IRM as I mentioned.

So the cover systems in these alternatives are based on a commercial soil clean up objective or SDO, since we assume future uses of the site will be commercial, or I guess passive recreational we call it, which could be used for the trails or other non-active use.

So planned use of the area, the main site area is probably possible parking or other commercial facility. And the lakeshore right now is planned for the trail system for the county to go through that area.

So both the cover alternatives include a minimum of 1 foot of soil cover. Alternative 3 includes a low permeability cap in the former Semet residue pond areas, so about a little over half the site in those areas. So that would be a geo membrane liner in

the western portion of the main site area. Then there is also some passive recovery wells could be installed to minimize or monitor the potential for any Semet residue seeps or migration. And that would be evaluated and included if this is feasible, if that would collect tars. So there would be some investigation to determine if that's feasible.

Alternative 4 is similar to Alternative 3, with the cover system and the low permeable cover system present. But in the former residue pond areas there would be in situ or in place remediation of the tar like Semet residue that's remaining. So any of the tar like material that can't be beneficially used would be considered a targeted material and be treated by a solidification or stabilization. That essentially is adding amendments to like cement or Portland concrete to alter the tar, make it a more granular material

and so it isn't so tar like and mobile.

Then Alternative 5 is removal alternative. That includes the full removal of the contaminated materials, including removing and replacing infrastructure, such as highways and utilities. That removes everything to basically pre-existing conditions before contamination was placed there.

So we evaluated the remedial alternatives using these criteria listed here. So all the remedial alternatives, other than No Action alternative undergoing this detailed evaluation. And it's got to meet the first two criteria, which are protection of human health and the environment. And in compliance with state and federal regulations.

Because this is an NPL site we need to meet the EDPA and federal regulations at the site here.

So other criteria, as shown here, long term effective and the short term

effectiveness, how easy or how difficult the remedy is to implement, and how the remedy is accepted by the community, which is part of our public process.

Alternative 5, the remediate removal alternative of course has several implementability issues. The alternative assumes up to 25 feet depth of removal in some areas, and approximately 1.4 million cubic yards of material transported off-site for disposal. If you think about that, it's about 70 truck loads of material per day over 10 months of the year for six to nine years being removed off-site.

In addition to the increased truck traffic there is worker and public safety issues, stability issues, management of that large volume of material, and construction water, and just to find a place to place that material.

We didn't really evaluate a partial removal alternative because there is not

really an appreciable benefit to a partial removal alternative since there is still remaining contamination. We would still have to place a cover, and there is still appreciable short term issues with removing a lot more material off-site.

The summary is basically a table of those alternatives, the evaluation of the alternatives, so you could see the orange X's there, so that designates basically the short term effectiveness and implementability issues for Alternative 5.

There are some additional short term effectiveness and implementability issues for Alternative 4 as compared to just the cover alternatives for Alternatives 2 and 3. But they're a lot less than Alternative 5, and they can be addressed with health and safety protocols and sound engineered practices and utilizing proper protective equipment during the work.

Smith Presentation

You can see the cost for the remedies in the table also. So Alternative 1 of course is zero. And Alternative 2, a cost of $11 million or approximately $11 million. That would take about one year to implement for Alternative 2.

Alternative 3, approximately $23 million, that would take about two years to implement.

Alternative 4 has a cost of almost $25 million as you can see, and would take approximately two years to implement also.

Alternative 5, the highest cost of the removal, would be almost $1 billion and would take six to nine years.

These costs include the long term operation maintenance of the alternative. Doesn't include the cost of the work that's already occurred. All the work under Operable Unit 1 and the IRM.

So based on the evaluations that were performed, and we selected the

preferred alternative is Alternative 4. That includes the treatment of the targeted material, the tar and the placement of the cover system.

In addition, due to presence of those historical fill materials, the Solvay waste, it's not anticipated that groundwater standards are going to be achievable within the site boundaries within a reasonable time frame due to all the Solvay waste that's present there. So the remaining site or the site would be treated as a waste management area essentially. Shallow and intermediate groundwater outside of the site will be addressed.

We're still looking to do that under the Willis Avenue sub site, as I mentioned, due to just the location of the sites next to each other and commingling of that shallow and intermediate groundwater. It's probably a little confusing, but I can explain that more if you have a question.

Smith Presentation

This figure shows the preferred remedy a little bit clearer. So we have the removal of the targeted materials in the pond areas here -- or not the removal, it includes the treatment of those targeted materials by solidification and stabilization. So amendments like I said, cement, make the tar more of a granular material so it's not mobile.

The targeted materials estimated to include approximately 7,000 cubic yards. And then following that targeted treatment in these areas, the ponds, some of them are up to 10 feet deep, other ones are shallower, but there would need to be grading of some fill performed. And then a geo membrane cover system would be placed over that area with 18 inches of clean backfill on top. That minimum 18 inches of material is more to protect the geo membrane liner that's going to be placed.

Then in the brushy cleared area and

the lakeshore areas and other applicable areas, grading would be performed if necessary, and a minimum of one foot of material be placed to meet the commercial use cleanup objectives. And we perform any confirmation of existing covers, since there was previous work performed in the lakeshore area, if necessary.

So as part of the work to determine if this remedy is feasible we did pilot studies on the Semet residue to determine if it could be -- the material that couldn't be beneficially reused. These were performed in the last year to determine if the solidification and stabilization would be effective.

This video shows some of the work that was ongoing, it's basically the pilot study work. It was performed to determine what amendments would be best to use, best methods for mixing. They tried different methods. Shown here the rotating head on an excavator mixing in

the cement. They also tried using an excavator bucket, which wasn't as effective. They tried different, added water to help the amendments set up better. And other methods to measure when sufficient solidification and stabilization was achieved.

More pictures of rotating head on the excavator, some of the other site areas where the pilot studies were performed. Here, added water to the material to help set up better during some of the dry periods of time. And this picture you can see the guy is actually spraying a temporary cover on the site to help with the odors during the work.

So consistent with the work that was performed under OU-1, was the tar removal, air monitoring was performed at the site to make sure there is no off-site air impact during the work and protect the workers. They also added the temporary cover that's shown in the

picture to reduce the emission and odors. And if necessary they used other mitigation measures they had, like orchard fans to mix the air, and would move to different work areas, depending on the wind speed and the direction.

So Alternative 4 is being proposed as the preferred remedy, because it best protects the public health and environment and provides the best balance of the alternatives based on the previous evaluation criteria. And it achieves the remediation goals for the site. The preferred remedy also includes institutional controls and site management. Institutional controls would further reduce potential for exposures by restricting the future use of the site. And the site management would include maintenance monitoring of section of covers and address any future change in use of the site.

As I mentioned before, the time to implement this alternative is

approximately two years. And as shown there, design, construction and maintenance of the remedy would be performed by Honeywell.

That's basically it. We've got a public comment area period right now that plans to close on January 16th. We'll be taking comments up to that date. You can mail, e-mail, write comments on a card at this meeting if you like, Stephanie can probably help you out with that. Or any questions that are taken would be incorporated into the public process for the site also.

Following the public comment period we'd be drafting a Record Of Decision, which selects the final remedy for the site. And remedial design would proceed, with construction following after that.

There is some contact information if you need it. Or take questions now, if anybody has any, and give name and

information. Anybody have any questions?

BILL MORSE: Bill Morse, Town of Geddes engineer. What sort of use is anticipated after closure would be?

MR. TRACY SMITH: That would depend on what Honeywell would want to use the site for. It would be restricted, like I said, to a commercial use. Right now there is plans, possibly to use it as parking, but that could change if Honeywell wanted to use it for building a warehouse or wanted to lease it to somebody that would be an appropriate use.

BILL MORSE: But it is anticipated that it would be back into active use rather than just staying as a passive area?

MR. TRACY SMITH: Some use, yeah, I think, I mean with a cover on it, it's up to what Honeywell would want to do with the area really, yes. Any other questions?

FEMALE: Hi, I'm a resident of

Mosley

Solvay, and I use the Onondaga Lake trail quite a bit.

TRACY SMITH: Name please?

FEMALE: Mosley. And so there's been a lot of talk about the extension of the trail towards that end. And one of the reasons I came here, I said I want to hear about this because it's going to affect the trail. But is it?

TRACY SMITH: Some. I mean the trail does go over some of the site. I'll go back. I mean the trail would go along the shoreline portion of the site. Yes, so the trail would go along the shoreline portion of the site here. So this remedy would affect the site, but it's off the main site area really. So a lot of the work in that area has already been performed with the installation of the barrier wall down there.

Honeywell has got an access trail down through there, and with the remedy that's proposed probably work could be

performed this year. But really a lot of the work down in that lakeshore area has been performed, so it shouldn't really hold up any path forward I would think. It's really, the lakeshore area is a minor part of the site at this time compared to the remaining main parts of the site.

But I mean there is still a lot of work to be performed going down with the other sites along the lakeshore here, Waste Bed B, which we did have a remedy for we came out with late last year. But the work and construction is ongoing there. So extension is planned, is the best thing I can say right now.

Any other questions? Kind of a small crowd here tonight. So feel free to jump in if you have anything.

PATRICK GLAZER: Pat Glazer, Liverpool. Early estimates of the tar were like 84,000, or 84 the other day, and then sounded like 24. How did that change?

Glazer

TRACY SMITH: Yes, so back in the remedial investigation there were some estimates of the tar up to 80 million, 50 million gallons, which is more than twice what we actually determined to be there. A lot of that was based on doing additional investigation of the site.

They did borings actually through the pond during the winter, put some matting out so they could perform some geo probes through the pond, do some drilling through there basically. And found that the depths were a lot shallower than were anticipated.

So that's the biggest thing to change, the volume. Just doing a lot more of that work and lot more investigation on the pond itself. So they were able to do that with smaller equipment and stuff to get out there. So that was the biggest difference.

But that was one reason why the off-site remedy was determined to be an effective remedy to remove the material

and send it to an off-site cement kiln. Because before they were estimating a huge volume of material, it would have, if you think, it would have taken a substantial amount of time and a lot more trucks and stuff being sent off-site or going off-site. So that made the off-site removal that was performed a lot more feasible also.

BILL MORSE: Are you seeing any trends in the contamination concentration to the groundwater collection system?

TRACY SMITH: We don't have a lot of I guess good data to show that at this time. We haven't performed really a lot of trend analysis. I mean probably over time of course we should. Within the site itself we probably don't anticipate a lot of change with the contamination at the present, and the Solvay waste and stuff like that outside of the site.

That will be determined probably as we go forward. But as I said, a lot of

that would be evaluator included with the evaluation of the Willis Avenue site, but we anticipate there would be some reduction outside of the site just due to the installation of the barrier walls. And so groundwater isn't migrating outside of the site anymore.

Anything else? I'm open for questions here, through pretty quick. If not, I mean I'm available if you have any questions you want to discuss one-on-one or information we'll be here for a little while and willing to answer any questions you might have.

All right appreciate it, and thank you for coming.

[Conclusion of Public Meeting].

* * * *

C E R T I F I C A T E

This is to certify that I am a Certified Shorthand Reporter and Notary Public in and for the State of New York, that I attended and reported the above entitled proceedings, that I have compared the foregoing with my original minutes taken therein and that it is a true and correct transcript thereof and all of the proceedings had therein.

_____
John F. Drury, CSR

Dated: January 14, 2019

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX V-e

WRITTEN COMMENTS RECEIVED DURING THE COMMENT PERIOD

LAW OFFICE OF JOSEPH J. HEATH
GENERAL COUNSEL FOR THE ONONDAGA NATION
ATTORNEY AT LAW
512 JAMESVILLE AVENUE
SYRACUSE, NEW YORK 13210-1502
315-447-4851
Facsimile
315-475-2465

January 17, 2019

Tracy Smith
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-0001
tracy.smith@dec.ny.gov

Re: Comments on the Proposed Plan for Semet Residue Ponds Site Operable Unit 2

Dear Mr. Smith:

On behalf of the Onondaga Nation, I am submitting the following comments regarding the Proposed Plan ("Proposed Plan") for Operable Unit 2 of the Semet Residue Ponds Subsite ("the Semet site") of the Onondaga Lake Superfund site. The Nation had the opportunity to consult with the Department of Environmental Conservation (DEC) during the development of this Proposed Plan and has already expressed some of these concerns during that process. Many of these concerns remain valid and are repeated here, along with some additional issues triggered by the scope of the draft concerns

The Nation has a unique cultural, spiritual, and historic relationship with Onondaga Lake. Nation leaders are mandated to act as stewards of the Lake and its surrounding ecosystems. It was on the shores of Onondaga Lake that the Peacemaker brought the Five Nations together to form the Haudenosaunee Confederacy, under the Great Law of Peace. For centuries prior to the arrival of the colonists, the Nation's citizens lived on the Lake, fished it extensively and preserved it for future generations. To the Onondagas, the Lake is a living relative. The Nation has repeatedly expressed the need for a better and more complete remediation to restore the Lake and its shoreline to a clean and healthy state. The Preferred Alternative identified in this Proposed Plan falls short of this standard.

The Onondaga Nation reiterates its support for the complete removal of contaminated materials that have been dumped in and around Onondaga Lake, described

in Alternative 5, rather than the Preferred Alternative of simply covering over these wastes and leaving them in place. In this regard, the Proposed Plan for the Semet site is similar to the remedies chosen for Wastebed B and Harbor Brook, for Wastebeds 1-8, and for the Lake bottom itself. By choosing a "cover and contain" remedy, DEC has opted to allow the Semet site, along with the rest of the western shore of Onondaga Lake and the Lake itself, to function as an industrial waste landfill for hundreds of years to come. In fact, DEC has explicitly characterized the Semet site (along with Wastebed B/Harbor Brook) as a "Waste Management Area" (WMA). This designation acknowledges that significant volumes of toxic waste will be left in place and abandons the groundwater within the WMA boundaries to its contaminated state. This decision is incompatible with and an affront to the Lake as a sacred space. For this reason and to ensure long-term environmental protection, the contaminated soils and buried wastes on the site should be removed to the extent possible. The Nation objects to this disrespectful treatment of its sacred Lake and urges the DEC to require a complete removal of contaminants and restoration of this property to its original state.

The Nation also objects to DEC's decision to discount the ecological or habitat value of this site. Much of the western shore of Onondaga Lake is zoned as industrial or commercial, including large portions of Wastebed B/Harbor Brook, Willis Avenue, Semet, and Wastebeds 1-8. Despite this zoning, the on-going remediation-related construction, the presence of large parking lots in some sections, and the degraded state of other areas, the western shore of the Lake is home to a wide range of wildlife. Certainly, the wildlife for which DEC calculated potential exposures (American robin, northern short-tailed shrew, mourning dove, eastern cottontail rabbit, red-tailed hawk, and red fox) are ubiquitous in urban and suburban areas alike and may also be expected to visit the green edges of industrial sites or office complexes. While the Semet site may not provide ideal habitat, there is no reason to think that it will provide no habitat at all for area wildlife or to discount potential exposures.

If DEC insists on moving forward with a simple contaminant cover, it should provide a complete description of the consequences of this alternative, including the time frame in which soils and groundwater within the site will remain contaminated and barriers and institutional controls will have to be maintained. DEC should also assess Honeywell's capacity to maintain the barrier and treatment system until such time as the contaminants left in place no longer pose a threat. Finally, DEC should clarify its commitment to a minimum cover across the entire site and should properly characterize or describe the wastes on site.

By designating the Semet site as a WMA, DEC has determined that groundwater will remain contaminated within the site and is only required to meet applicable standards

at or beyond the site boundary. DEC has designated the Semet-Willis Barrier Wall as the WMA boundary and suggested that groundwater remediation outside the wall will occur via "natural attenuation." Thus, the adequacy of the preferred alternative depends, in part, on whether monitored natural attenuation of groundwater outside the barrier wall will occur within a "reasonable time frame." However, DEC has opted to postpone any discussion of groundwater recovery until the proposed plan for the adjacent Willis Avenue site is issued. As a result, the public does not have complete information about the adequacy or likely success of DEC's preferred remedial alternative. DEC should reissue this Proposed Plan with a full discussion of the expected natural attenuation of groundwater outside the Semet-Willis Barrier Wall, so that the public can understand the full consequences of DEC's preferred alternative and provide appropriate comments.

In addition, DEC's preferred alternative will only be successful if the soil cover, barrier wall and other containment systems remain intact and functional as long as the remaining wastes remain dangerous. However, DEC provides no information on the timeframe for natural attenuation of contaminants in soil or groundwater within the Semet site. As a result, the public has absolutely no idea how long the soil caps, barrier walls and groundwater capture and treatment systems designed to contain the environmental hazards remaining on the Semet site must be maintained. Even more alarmingly, the omission of this information suggests that DEC may not know how long these systems will have to be maintained. Further, DEC has provided no assurances that Honeywell will be able to maintain these systems for the requisite time period. Again, because the public cannot make an informed decision about the adequacy of the preferred remedy without such data, DEC should reissue the Proposed Plan with a full discussion of this issue.

Finally, DEC should revise this Proposed Plan and related figures to clarify the cover elements of the preferred alternative. In addition, DEC should properly characterize both the contaminants and the remedy.

Specifically, DEC should clarify its commitment to a minimum 12-inch soil cover on the Lakeshore Area of the site. While the description of Alternative 2 includes general references to a "minimum 1-ft. thick soil/granular cover," the reference is related to a discussion of backfilling and grading in the Semet Ponds and Brushy Cleared Area (BCA) sections of the site. The Preferred Alternative description (pp. 18-19) references an 18-inch cover over the Semet Ponds and a 12-inch cover in the BCA, but does not explicitly reference the Lakeshore Area. Similarly, the figures provided do not include the Lakeshore Area within the sections to be covered by a "1-foot engineered cover," although some indicate that the thickness of the vegetated restoration already done in that area will be confirmed. DEC should revise the Proposed Plan to include an explicit

commitment to a minimum 1-foot soil cover on the Lakeshore Area and should acknowledge that, if any active recreational uses emerge on that site, such as off-trail picnicking or other active uses that bring people into direct contact with soil, a thicker cover will be required.

DEC should also be more precise in its description of soils on-site. The Proposed Plan repeatedly refers to the surface soils on site as "Solvay Waste/soil/fill," which is defined as "calcium carbonate, calcium silicate, and magnesium hydroxide, . . . coarse ash and cinder from stoker-fired boilers, and soil/miscellaneous fill material" (Proposed Plan, p. 3, fn 2). This definition fails to recognize the range of toxic wastes that were dumped on the Semet Site or may have leached from the Semet Residue Ponds, including mercury, BTEX compounds, naphthalene, polyaromatic hydrocarbons, and pesticides. Given the apparently routine practice of using Solvay waste beds to dispose of other industrial wastes, DEC should refocus its discussion of on-site soils to highlight the components of concern – that is, the "co-disposed" industrial wastes that are present and problematic on most of the subsites ringing Onondaga Lake.

Finally, DEC should not characterize Alternative 4 as reducing the toxicity of the wastes on site. While the proposed *in situ* remedy of encapsulating residual tars in concrete or similar materials is preferable to simply covering those wastes with soil, this remedy merely immobilizes these wastes. It does nothing to change their inherent toxicity. Unless DEC has additional information indicating that the residual Semet tars are, in fact, subect to biodegradation or otherwise made less toxic by the proposed *in situ* remedy, it should acknowledge that its Preferred Alternative reduces the mobility, but not the toxicity of the residual tars.

Sincerely,

Alma L. Lowry

Alma L. Lowry, Of Counsel
Law Office of Joseph J. Heath

cc: Council of Chiefs

OPERABLE UNIT 2 OF THE SEMET RESIDUE PONDS SUBSITE
OF THE ONONDAGA LAKE SUPERFUND SITE
RECORD OF DECISION

APPENDIX V-f

NYSDEC/EPA RESPONSES TO THE OCTOBER 18, 2018 ONONDAGA NATION COMMENTS ON THE DRAFT SEMET RESIDUE PONDS OPERABLE UNIT 2 PROPOSED PLAN

Comment 1a. First, the Onondaga Nation renews its call for full removal of the industrial wastes lining the shores of Onondaga Lake, which is the birthplace and the center of the Haudenosaunee Confederacy and sacred to the Onondaga Nation. The DEC's preferred alternative leaves large volumes of heavily contaminated industrial wastes in place on the shores of this sacred space and institutionalizes its use as an industrial waste landfill. This is deeply disrespectful to the Nation and its traditions.

Response 1a. The New York State Department of Environmental Conservation (DEC) and the US Environmental Protection Agency (EPA) recognize and respect the Onondaga Nation's cultural and historic ties to Onondaga Lake and the sacred nature of the Lake to the Nation's people and its traditions.

The complete removal with off-site disposal alternative was evaluated; it would be much more difficult to implement, and would present significant short-term impacts to the community, while also being considerably costlier. The preferred remedy will be protective of human health and the environment. The studies that were conducted, the evaluations that were performed, and the decisions that were made in order to identify the preferred remedy were in accordance with state and federal laws, policies and guidance.

Comment 1b. DEC's preferred alternative is a "cover and contain" remedy. Such measures interfere with the Nation's stewardship obligations toward the natural world and its commitment to cleaning groundwater and removing the acres of wastes that currently smother the Onondaga Lake shorelines. As described in the Nation's Vision for a Clean Onondaga Lake, each element of the natural world has a role in supporting ecosystem functions. The Onondaga Lake shoreline is intended to nourish life; to provide a healthy and sustainable home to plants, trees and shrubs; and to filter and clean groundwater before it enters the Lake. Rather than moving the Lake towards this vision, DEC's preferred remedy requires separating contaminated groundwater from the Lake for up to 700 years and, due to its reliance on a simple soil cover for most of the site, will certainly limit the trees that may be planted without fear of root intrusion into or disturbance of contaminated soils. For all these reasons and to ensure long-term environmental and public health protection, the Onondaga Nation supports complete removal of the contaminated wastes remaining at the Semet Residue Ponds.

Response 1b. See response 1a. Tree planting, including the planting of native species, as may be appropriate, would only be precluded in areas where a liner is placed as part of the cap (e.g., Semet pond areas) or in areas where it would be contrary to the intended future use of the site (e.g., paved/mowed areas). Vegetative cover consisting of smaller plantings (e.g. grasses, small shrubs, etc.) could still be used in these areas. It is anticipated that native plantings will be used in all areas of the site which will have a vegetative cover. The conservative estimate of 700 years is for contaminated groundwater that would be addressed via monitored natural attenuation outside the waste management area (WMA) (e.g., outside the barrier wall).

Comment 2. Second, the Nation objects to the method DEC employs to compare the removal option (Alternative 5) to other alternatives. DEC evaluates a range of cover and containment options, but only one complete removal option. Other easily identifiable alternatives, such as complete removal with the exception of soils underlying the existing highway, are not evaluated, meaning that the only removal option considered can be characterized as unreasonably expensive and disruptive. DEC includes monitoring and maintenance costs in its Alternative 5 cost estimate without an explanation of why a full removal option requires on-going monitoring or maintenance. DEC also makes no effort to account for the environmental, and potentially economic, benefits of truly cleaning this site – benefits that would not be provided by the

preferred containment alternatives – or to compare these benefits to the up-front costs of removal. Without such a comparison, the relative value of the alternatives presented is not discernible.

Response 2. A partial removal alternative was not evaluated because groundwater collection and treatment and, potentially, cover systems would still be necessary, negating much of the benefit from the partial removal of contamination. Cost estimates provided in the feasibility study (FS) Report and Proposed Plan include estimated capital, annual operation & maintenance (O&M), and total present-worth costs. The anticipated long-term O&M costs for the alternatives include cover maintenance, continued O&M of the groundwater collection and treatment systems, and inspections. Even under the full removal alternative, groundwater contamination would still need to be addressed (also, see the September 14, 2018 responses to Alma Lowry's comments on the Semet FS Report). This will be clarified in the Proposed Plan.

Comment 3. Third, DEC minimizes the potential harm to wildlife from site contamination by characterizing the Semet site as industrial and therefore "unsuitable for ecological receptors" (p. 10). However, as the Nation has pointed out before, there is a significant difference between ideal habitat and usable habitat. Despite the industrial nature of the area, the presence of highways and the proximity of an urban area, a wide variety of wildlife, including deer, foxes, rabbits and other small mammals, birds, and reptiles, have been observed or documented along the southern shores of Onondaga Lake. There is no reason to think that the Semet site has or will have significantly less wildlife traffic and DEC should not discount potential ecological impacts.

Response 3. As discussed in the Proposed Plan, ecological risks were considered during the development of the remedial alternatives. Due to the current zoning and proposed future uses (e.g., parking, trails) of the site, the need to clean up the site for ecological use SCOs is not appropriate since the remedy needs to consider the reasonably anticipated future site uses. However, the preferred alternative does include a minimum one-foot thick soil/granular cover over the brushy cleared area (BCA) and the lakeshore, as well as a minimum 18-inch thick soil/granular cover and geomembrane cap over the area west of the BCA. These covers will significantly reduce potential exposures and risks to any wildlife that may be present on or frequent the Subsite.

Comment 4a. Fourth, as with the recently released Willis Avenue PRAP, the draft Semet site PRAP seems to suggest that Monitored Natural Recovery (MNR) is a viable option for groundwater remediation at the "Point of Compliance" (POC) or the edges of the subsite. Although the purpose of the PRAP section discussing MNR of contaminated groundwater is somewhat unclear (which is a concern in and of itself, given that the PRAP is supposed to be drafted for the general public to read and understand), the Nation objects to any suggestion that MNR is a suitable remedy for groundwater within or at the edge of the site.

Response 4a. The WMA designation identifies the appropriate POC (e.g., the barrier wall) for attainment of groundwater standards. Shallow/intermediate groundwater restoration would be via monitored natural attenuation (MNA) where this groundwater is anticipated to meet standards (i.e., outboard of the POC). The Proposed Plan will be clarified.

With regard to the Proposed Plan being a document drafted for the general public, DEC and EPA will try to include lay person text to the extent possible, while recognizing that complex technical issues are discussed within the document and it must follow state and federal guidelines with legal descriptions. In addition, DEC and EPA are available to discuss and/or explain the alternatives and details included in the Proposed Plan with the public (e.g., public meeting, by phone, etc.).

Comment 4b. According to DEC estimates, it will take between 43 and 700 years for the groundwater on site to meet applicable standards via MNR. The more typical estimate for MNR is closer to 200 years. None of these estimates should be considered a "reasonable timeframe" for remediating groundwater. At one point, DEC compares the most extended MNR timeframe (700 years) to the "1,000-year cap design." Setting aside the confusion likely to be created by this unexplained reference to the original Lake Bottom cap design, the implication is that MNR would be an adequate remedy because the Lake Bottom cap should remain a barrier to contaminated groundwater re-entering the Lake throughout the longest estimated MNR time period. However, this assertion does not explain why DEC presumes that contaminated groundwater would enter the Lake below the cap. It does not account for areas near the Semet site where thinner caps or no cap at all was installed. In addition, Honeywell's initial estimate of the duration of cap effectiveness was based on the volume of contaminated groundwater anticipated to flow into and be captured by the cap. DEC does not address whether contaminated groundwater from the Semet site (or other lakeshore subsites) was included in the initial assessment of cap effectiveness or whether the assessment should be revised to consider unremediated shallow and intermediate groundwater flowing off the lakeshore subsites.

The MNR discussion is also confusing because it does not seem to recognize (or, at least, directly address) the barrier wall and groundwater collection system that were installed along the Semet Lakeshore Area to capture and treat contaminated groundwater before it can enter and re-contaminate Onondaga Lake. If the MNR discussion is focused on groundwater that is currently outside the barrier wall/groundwater capture system, that fact should be clarified. Given all of the uncertainties discussed above, if, as suggested by the PRAP, some contaminated groundwater is likely to bypass the barrier wall and groundwater capture system and enter the Lake – whether above or below the cap – DEC should mandate treatment at or before the POC rather than allowing toxic materials to continue to circulate through the lake environment for centuries to come.

Response 4b. As discussed above, the designation of the WMA was made to identify the appropriate POC for attainment of groundwater standards. Shallow/intermediate groundwater restoration would be via MNA where this groundwater is anticipated to meet standards outside the WMA (i.e., outboard of the POC). The time frames to meet applicable standards via MNA were determined to be not inappropriate because the barrier wall and collection systems prevent the migration of contaminated shallow/intermediate groundwater to Onondaga Lake, groundwater beneath the lake is not being used as a drinking water source and the presence of the lake bottom cap will prevent contaminated groundwater and sediment porewater from impacting the lake. It should also be noted that the basis for the estimated timeframes incorporated conservative assumptions and methodologies. For example, the degradation rates used in the calculations are based on data from upland sites where degradation may occur more slowly relative to the area at and beyond the POC due to conditions (e.g., elevated pH) in the upland areas which may not be as conducive for biotic degradation (i.e., environment which supports microorganisms that consume organic contaminants). Routine monitoring of the cap is being performed pursuant to the Onondaga Lake Monitoring and Maintenance Plan. The text in the Proposed Plan will be clarified.

As discussed in the Proposed Plan's IRM section (under the Willis-Semet Lakeshore Hydraulic Containment System IRM), the barrier wall and collection system prevent the migration of contaminated shallow/intermediate groundwater to Onondaga Lake. The collected groundwater is treated at the Willis groundwater treatment plant. The barrier wall and collection system minimize groundwater upwelling to Onondaga Lake, which was incorporated into the Onondaga Lake cap design. In addition, as noted in the Onondaga Lake ROD Responsiveness Summary (NYSDEC/EPA, July 2005), "the operation of

the groundwater barrier wall and collection system with respect to limiting groundwater flow towards Onondaga Lake will need to be maintained in perpetuity and the treatment of collected groundwater will likely need to be maintained until such time as the concentration of contaminants in the groundwater is no longer of concern."

As documented in the final design for the Onondaga Lake cap (Parsons and Anchor QEA, 2012), the upwelling rates used in the cap modeling for the lake areas adjacent to the upland hydraulic containment systems were developed based on calculations of vertical flow through the underlying silt and clay unit (i.e., from the deep groundwater zone) based on measurements of thickness, vertical hydraulic conductivity, and hydraulic gradient of that deep unit in each of these areas. The mean upwelling velocity in Remediation Area C adjacent to the Semet barrier wall and shallow/intermediate hydraulic containment system used in the deterministic cap model was 1.5 centimeters per year (cm/yr) in Cap Model Area C-3. In addition, the final cap design included probabilistic model simulations to assess granular activated carbon (GAC) performance over the full range of potential input parameter values and conditions specific to each model area. These additional simulations included developing cumulative frequency distributions of upwelling velocities based on a consideration of the uncertainty/variability in the estimates of thickness, vertical hydraulic conductivity, and hydraulic gradient of the silt and clay unit in each area. In this area, the probabilistic (Monte Carlo) distribution included upwelling velocities as high as 28.1 cm/yr in Cap Model Area C-3. The cap design (thickness and GAC dosage) was determined to be protective for 1,000 years based on these additional simulations. Additional information can be found in Appendices B and C of the final lake design.

The comment also refers to lake areas adjacent to the Semet site where no cap was installed. As documented in Appendix A (Remedial Area Delineation) of the Onondaga Lake final design (Parsons and Anchor QEA, 2012), a portion of the SMU-2 area adjacent to the Semet site shoreline (as shown in Figure A-3 for Remediation Area C) was not remediated as sediment concentrations in multiple cores in this area were less than the cleanup criteria for the lake (i.e., mean PECQ less than 1 and mercury less than 2.2 mg/kg).

For the Modified Protective Cap (MPC) design in Remediation Area C-1 in the deeper water portion of SMU 2 in the vicinity of the Semet site barrier wall, the same upwelling velocity as used for Cap Model Area C-3 in the final design was used. Due to the thinner caps placed in this area, the required GAC dosages increased from 0.24 lb/sf as specified in the 2012 design to higher dosages ranging from 0.39 to 0.73 lb/sf to be protective for 1,000 years (Parsons and Anchor QEA, April 2016).

Updates of these cap models are not needed to support the Semet site remedy. Clarification and/or additional information will be added to the Proposed Plan regarding the lake bottom cap and barrier wall.

Comment 5. Fifth, the PRAP should provide more information about the contaminant levels on site generally and in the various named areas within the site. Simply noting that benzene, toluene and xylene exceedances are widespread across the full site or even providing the minimum and maximum concentration and number of exceedances of industrial and commercial standards is not terribly informative without more context. To make sense of this data, DEC should indicate how many samples were tested and the mean and median results for each contaminant and should sort this information by subarea. The Lakeshore Area, which will be developed as a biking/hiking trail, is likely to be of particular interest to the general public. In addition to more specific contaminant information, DEC should indicate the total size of the Lakeshore subarea and the percentage of that subarea that will be covered by trails or paved roads.

Although the final design may be in flux, there are current proposals which could be discussed as part of the PRAP.

Response 5. Tables attached to the Proposed Plan include ranges of contaminant levels, the commercial and industrial SCOs, and how many samples exceed the commercial and industrial SCOs. In addition, a discussion of human health risk and principal threat waste is included in the Proposed Plan. For more information regarding contaminant levels, please see the Semet Residue Ponds OU-2 Data Summary Document.

The acreage of the cover areas is included in the alternative figures included with the Proposed Plan. The areal extent of the Lakeshore Area that will be covered by roads/trails is unknown, but due to the small footprint between I-690 and Onondaga Lake, they should represent the majority of the area. In addition, much of this area was previously covered as part of restoration following the Willis-Semet Lakeshore Hydraulic Containment System IRM.

Comment 6a. Sixth, DEC should provide more information on passive vs. active recreational uses and, given the potential for hikers/bikers to stray from paved trails, should anticipate active recreational uses in the Lakeshore area. According to DEC regulations, passive recreational uses are limited to "public uses with limited potential for soil contact" and are considered to be protected by Commercial Soil Contaminant Objectives (SCOs) **[Note, this should be Soil Cleanup Objectives]**. 6 NYCRR § 375-1.8(g)(2)(iii). Active recreational uses are defined as "public uses with a reasonable potential for soil contact" and are considered to fall under Restricted Residential SCOs. 6 NYCRR § 375-1.8(g)(2)(ii)(b). DEC fails to justify its apparent presumption that people using the hiking/biking trail through the Lakeshore Area will not leave the trail to walk along the shoreline, picnic, birdwatch, fish or simply view the Lake from a closer vantage point. Given that all of these perfectly permissible activities create a reasonable potential for soil contact (i.e., constitute "active recreational use"), DEC should redo its site assessment to incorporate the appropriate Restricted Residential SCOs for the Lakeshore Area. This may require installation of a thicker soil cover, as has been used in other acknowledged active recreational areas.

Response 6a. Additional information regarding passive and active recreational uses will be included. However, a reasonably-anticipated use of the Lakeshore Property includes access roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future public access/use. For the examples of passive recreational use provided in the comment, with the exception of picnicking (e.g., birdwatching, fishing), a one-foot cover would be protective and prevent exposure to the underlying contaminated soils. Any changes at the site would need to be compatible with the Site Management Plan, which would identify the use restrictions and engineering controls for the site and document the steps and media-specific requirements necessary to ensure that the institutional and engineering controls remain in place and effective. Change in site use (e.g., establishing a picnic area) also requires formal notification to NYSDEC, which, in consultation with the New York State Department of Health, would ensure that the remedy remains protective of human health and the environment.

Comment 6b. The Nation is also concerned with DEC's proposal to adopt institutional controls that limit the site to industrial or commercial uses. Given the hiking/biking trail already proposed for the Lakeshore area, off-trail activity that would be considered "active recreational uses" is already likely to occur on this site. The proposed institutional controls prioritize protections that may only exist on paper over actual uses of and likely public exposures on the site. Rather than relying on institutional controls, DEC should

recognize the uses that are actually likely to occur on the Lakeshore Area and ensure that the public can safely engage in active recreational uses in that subarea.

Response 6b. Because the trail has not been constructed, there are currently no recreational uses (active or passive). The institutional controls would include the appropriate uses for the site and would include recreational uses. The Proposed Plan will be revised to reflect this.

Comment 7. Last, DEC should revise its alternatives analysis for clarity, completeness, and comparability. For example, Alternative 2 proposes soil covers to contain the contaminants left in place, but does not set a minimum thickness for or composition of these covers. Alternatives 3 and 4 propose a minimum 18" cover for the portion of the site that currently houses the Semet Residue Ponds and a 12" cover on the Brushy Cleared Area (BCA) at the east of the site. DEC doesn't explain why the cover thicknesses proposed for Alternatives 3 and 4 are sufficient to prevent public exposures, making evaluation of these alternatives difficult. The failure to even set a minimum cover thickness makes it completely impossible to assess the effectiveness of Alternative 2. The lack of detail in Alternative 2, tips the scale in favor of DEC's preferred alternative. DEC further tips the balance toward its preferred alternative by improperly characterizing Alternative 4 as reducing toxicity, mobility and volume of the contaminants on site, although an in situ stabilization treatment will not affect the toxicity or volume of the immobilized contaminants.

For a complete and truly comparable alternatives assessment, DEC should consider a range of treatments for residual Semet tars, such as removal and off-site disposal of these wastes. In addition, DEC should include a minimum cover thickness for all cover/containment alternatives and, to ensure that the public can fully assess the alternatives, should provide some justification of or explanation for the minimum covers established for each alternative. Similarly, DEC should explain the maintenance and monitoring presumed necessary for each alternative. And, as discussed above, DEC should consider the relative environmental benefits of the alternatives analyzed, as well as reasonable modifications to the removal alternative.

Response 7. Alternative 2 includes a "minimum 1-ft. thick soil/granular cover (or maintained paved surfaces and buildings)" and does not include any liners or additional treatment. Alternatives 3 and 4 include a liner in select areas (e.g., over the Semet residue ponds) and the minimum 18" cover is included to protect the liner (e.g., from puncture, etc.). Where a liner is not present, a minimum one-foot cover would be appropriate. The Proposed Plan will be revised to clarify this.

The minimum cover thickness of 12" would be placed to mitigate potentially unacceptable exposure of human receptors to constituents exceeding Commercial Use SCOs in surface Solvay waste/soil/fill material. This would be applicable for Alternatives 3, 4 and 5. Also see Responses 1 and 2.

References

DEC and EPA. 2005. Record of Decision. Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site. July.

Parsons and Anchor QEA. 2012. *Onondaga Lake Capping, Dredging, Habitat, and Profundal Zone (Sediment Management Unit 8) Final Design.* Prepared for Honeywell. March.

Parsons and Anchor QEA, 2016. *Onondaga Lake Capping, Dredging, Habitat and Profundal Zone (SMU 8) Final Design, Modified Protective Cap RA-C-1 Design Revision*. Prepared for Honeywell, Syracuse, NY. April.