SYW-12 Site

Operable Unit of the Wastebed B/Harbor Brook Subsite of the Onondaga Lake Superfund Site

Syracuse, Onondaga County, New York

NEW YORK STATE | Department of Environmental Conservation

January 2023

EPA Region 2

PURPOSE OF THIS DOCUMENT

This Proposed Plan describes the remedial alternatives considered for contaminated soil/fill material and groundwater at a portion of Wetland SYW-12, referred to herein as the SYW-12 Site or the Site, which is an Operable Unit (OU) of the Wastebed B/Harbor Brook (WBB/HB) subsite of the larger Onondaga Lake Superfund site, and identifies the preferred remedial alternative with the rationale for this preference. For a map of the Site and a map of WBB/HB and the surrounding area, please see the attached figures.

This Proposed Plan was developed by the New York State Department of Environmental Conservation (NYSDEC) and the U.S. 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 of the New York Code of Rules and Regulations (NYCRR) Part 375. The nature and extent of the contamination at the Site is described in the *Wastebed B/Harbor Brook (WBB/HB) Revised Remedial Investigation Report* (RI), *the SYW-12 Sources of Contamination Investigation Report,* and *Revised SYW-12 Groundwater Investigation Report.* The remedial alternatives summarized in this Proposed Plan are described in the *SYW-12 Site Feasibility Study Report* (FS Report). These documents are contained in the Administrative Record file for this Site. NYSDEC and EPA encourage the public to review these documents to gain a more comprehensive understanding of the Site and the investigation activities that have been conducted at the Site.

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

NYSDEC and EPA's preferred alternative includes the installation of a two-foot-thick soil cover in select areas of the Site, as well as biota monitoring to evaluate the protectiveness of ecological resources and remedy effectiveness. Monitored natural attenuation (MNA)[1] for Site contaminants in groundwater, development of a Site Management Plan (SMP), implementation of institutional controls (ICs), and long-term maintenance and monitoring are also components of the proposed remedy.

The remedy described in this Proposed Plan is the preferred remedy for the Site as proposed by NYSDEC and EPA. 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 on the Proposed Plan.

MARK YOUR CALENDAR

January 19, 2023 - February 18, 2023*: Public comment period on the Proposed Plan.*

Public Meeting
Tuesday January 31, 2023 at 6:00 PM (snow date of Wednesday February 1, 2023)

Open House *from 5:00 - 6:00 PM*

Salina Town Hall - 201 School Road, Liverpool, NY 13088

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 January 19, 2023 and concludes on February 18, 2023.

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 for the Site.

[1] MNA is the process by which a natural system's ability to attenuate contaminant(s) at a specific site is confirmed, monitored, and quantified.

The open house will be less formal and will provide the public an opportunity to 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 and addressed in the Responsiveness Summary Section of the Record of Decision (ROD), the document that will formalize 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 online through the DECinfo Locator at https://www.dec.ny.gov/data/DecDocs/734075A/ and at the following locations:

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

SITE 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 that 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 CERCLA as amended, for sites where there has been a release of hazardous substances, pollutants, or contaminants.

As documented in the July 2005 ROD issued by EPA and NYSDEC for the Onondaga Lake Bottom subsite, the SYW-12 Site, also known as Murphy's Island, was administratively included in the investigation of the WBB/HB subsite. The SYW-12 Site was investigated by Honeywell as reported in the 2015 *WBB/HB Revised RI Report*, 2009 *Revised Human Health Risk Assessment (HHRA) Report* and hazard calculation updates (Appendix 1 of the *SYW-12 Site FS Report*), the 2011 *Revised Baseline Ecological Risk Assessment (BERA) Report*, the 2014 *SYW-12 Sources of Contamination Investigation Report* and the 2020 *Revised SYW-12 Groundwater Investigation Report*.

Following NYSDEC's approval of the RI and risk assessments for the WBB/HB subsite, it was separated into two OUs. Because many Superfund sites are complex and have multiple contamination impacts and/or geographic areas, they are often divided into 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." OU-1 of the WBB/HB site includes the Lakeshore Area, the Penn-Can Property, the Railroad Area and two "Areas of Study", AOS#1 and AOS#2 (see Figure 1) Following the issuance of an OU-1 *FS Report* in July 2018, an OU-1 ROD was signed in October 2018. The SYW-12 Site (which is OU-2 of WBB/HB) was subsequently designated as New York State Inactive Hazardous Waste Site No. 734075A.

Site Description and History

Location: The Site is 23.5-acres in size and is owned by Onondaga County. The Site includes undeveloped land and a portion of Wetland SYW-12. Wetland SYW-12 is a 45.5-acre Class I wetland, portions of which are located around the mouth of Ley Creek along the southeastern shoreline of Onondaga Lake in Syracuse, New York. See Figure 2, Site Location.

Site Features: The Site is bounded by the CSX railroad tracks to the north and east, Onondaga Creek to the south, and Onondaga Lake to the west. The Lower Ley Creek subsite of the Onondaga Lake NPL site is also situated to the north but is being addressed as part of a separate remedy. A figure showing the Site layout is included as Figure 3. The Site encompasses a total of approximately 23.5 acres with 10.4 acres of upland (*i.e.,* non-wetland areas) and 13.1 acres of delineated wetland between Onondaga Lake and the CSX railroad tracks (based on a 2018 wetland delineation). Mature trees typical of floodplain forests occupy the central portion of the Site, which also serve as a roost site for wintering bald eagles (*Haliaeetus leucocephalus*).

Site Geology and Hydrogeology: The local geology for the Site consists of:

- unconsolidated deposits which consist of 2 to 15 feet (ft) of reworked fill consisting of sand, silt, gravel, shell material, and concretions below a thin layer of recently deposited wetland sediments;
- 15 to 25 ft of marl, which is a carbonate-rich sediment containing a significant amount of shells with variable amounts of clays and silt. The 15 to 25 ft marl unit becomes gradually finer grained with depth from a sandy, shell rich marl at the top of the unit to clayey silt marl with a trace of shell material at the bottom of the unit; and
- the geological units underlying the marl unit include silt and clay, silt and fine-grained sand/basal sand and gravel, till, and bedrock, based on regional geologic information and data collected from nearby locations.

The depth to groundwater beneath the Site ranges from approximately 3.3 to 9.2 ft below ground surface (bgs). The groundwater occurs in the unconsolidated unit and flows westward toward Onondaga Lake from the central and southern portions of the Site. Groundwater on the northern portion of the Site flows north toward Ley Creek.

History of the Site: Prior to the early 1800s, the SYW-12 Site was partially under water, with the remaining portion being wetlands containing cedar and ash trees. Both Mud Creek (later renamed Ley Creek) and Onondaga Creek meandered across the northern portion of the Site before flowing into Onondaga Lake. In 1822, New York State lowered the level of Onondaga Lake by approximately 2 ft, resulting in the draining of wetlands along the lakeshore, including a portion of the Site. The newly created land was filled in and partitioned as building lots.

In 1873, the lower 0.75 mile of Onondaga Creek was rerouted and channelized slightly south of the present-day Barge Canal. A channel and harbor basin were also dredged at the mouth of Onondaga Creek as part of the construction of a large amusement complex known as the Iron Pier Resort (see Figure 4). The complex included a 600-foot pavilion that was built adjacent to the harbor. The pavilion contained venues for dining, bowling, billiards, concerts, and a carousel. Steamboats from the harbor provided service to other resorts on the lake. The Iron Pier Resort was closed in 1906 and the pavilion was demolished by 1908.

Following closure and demolition of the pavilion, historical maps indicate that portions of the Site, the Iron Pier channel, and harbor basin may have been filled with refuse materials (*e.g.*, soda ash, waste fill) from various sources. Dredged materials were also potentially placed on the Site because of additional changes to the Onondaga Creek location and configuration, including dredging of the Barge Canal and harbor terminal in 1915, which relocated the channel between the pre-1873 Onondaga Creek channel and the 1873 relocated Onondaga Creek channel. The Barge Canal was reportedly dredged on several occasions between 1941 and 1954. The potential sources of contamination at the Site include dredge spoils from Onondaga Creek, historic dredge material from the southern portion of Onondaga Lake, and possibly the former Marley property, Oil City properties, former Hiawatha Boulevard Manufactured Gas Plant [MGP] subsite, former Erie Boulevard MGP site, and Ley Creek.

Based on a review of historic aerial maps, the Site has changed in shape and size over time as a result of dredge deposition and natural erosion but has remained undeveloped and vegetated with low-lying vegetation, brush, and trees since the early 1900s.

Current Zoning and Land Use: The Site is owned by Onondaga County and is zoned as parkland within the City of Syracuse. The surrounding area is commercial. As was noted above, CSX Railroad tracks are located immediately to the north and east of the Site. The land is currently undeveloped and, given the prevalent wetlands throughout the Site and proximity to the CSX Railroad tracks, future development for residential or industrial use is unlikely. Based on the land use evaluation, the reasonably anticipated current and future use of the Site is passive recreation as part of the Onondaga County's Loop the Lake Trail – Southeast Extension. Ecological receptors currently use the Site, and it is anticipated that they will continue to use the undeveloped area. An extension of the Onondaga County Loop the Lake Trail, a multi-use recreational trail, has been constructed on the Site. In February 2019, NYSDEC issued a Freshwater Wetlands Permit and Section 401 Water Quality Certification for the project following an extended public comment period and a public hearing. In January 2021, Onondaga County requested a modification to a 2019 permit to replace a proposed steel pile boardwalk over Onondaga Lake with a 330 linear-foot berm trail from the City of Syracuse Lake Lounge to the wetland boundary. The multi-use recreational trail construction includes a wooden boardwalk within wetland areas and a minimum one foot of cover for passive recreational use within the trail footprint in non-boardwalk areas in addition to ICs and signage to keep trail users on the established trail.

RESULTS OF REMEDIAL INVESTIGATION, 2012 SOURCES OF CONTAMINATION INVESTIGATION, AND 2019 GROUNDWATER INVESTIGATION

To evaluate the nature and extent of contamination at the Site, the analytical results from the RI sampling were compared to the respective soil cleanup objectives (SCOs) provided in 6 NYCRR Part 375 *Environmental Remediation Programs* for each

land use type, including Unrestricted-Use SCOs. Unrestricted-Use SCOs represent the concentration of a constituent in soil that, when achieved at a site, is sufficiently low such that there are no land use restrictions on the site for the protection of public health, groundwater, and ecological resources. Additional information can be found in the *Revised RI Report*. Analytical results presented in the *Revised RI Report* were compared during the feasibility study (FS) to the SCOs for Commercial Use, Protection of Ecological Resources, and Protection of Groundwater in consideration of anticipated future land use. Current Site groundwater conditions were also evaluated during an April 2019 groundwater elevation monitoring and sampling event. Tables 1 and 2 (attached) summarize the Unrestricted-Use SCOs, Commercial-Use SCOs, and Protection of Ecological Resources SCOs exceedances in shallow (0-2 ft bgs) and subsurface (deeper than 2 ft bgs) soil/fill material, respectively, for the Site. Table 3 summarizes the New York State Class GA groundwater standards and guidance values (SGVs) exceedances in groundwater for the Site. The primary contaminants at the Site include benzo(a)pyrene, a semi-volatile organic compound (SVOC), and assorted polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals.

It should be noted that the Site boundary described above does not include the portions of the 45.5-acre Wetland SYW-12 that are east of the rail lines or north of Ley Creek. These areas were investigated during the RI, and based on the results of the investigation, are not addressed in this Proposed Plan.

Shallow Soil/Fill Material (0 to 2 ft bgs)

Volatile organic compounds (VOCs), SVOCs, pesticides, PCBs, polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDD/Fs), and metals were detected in shallow soil/fill material on the Site as described below. The data were compared to the SCOs for Commercial Use, Protection of Ecological Resources, and Unrestricted Use (see Table 1).

VOCs, including chlorinated benzenes and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, were detected in the shallow soil/fill material, but they did not exceed the SCOs. The constituents that exceeded the SCOs for Unrestricted Use predominantly included seven SVOCs (assorted PAHs), five pesticides (4,4'-DDT, 4,4'-DDD, dieldrin, 4,4'-DDE, and endrin), PCBs (Aroclor 1254 and Aroclor 1260), and inorganic compounds/metals (mercury, zinc, lead, chromium, cadmium, copper, silver, and nickel).

Several of the above-mentioned constituents exceeded the following SCOs: Commercial Use SCOs, for four SVOCs (assorted PAHs), including benzo(a)anthracene (maximum concentration of 7,300 µg/kg [Commercial Use SCO of 1,000 µg/kg]), benzo(a)pyrene (maximum concentration of 9,100 µg/kg [Commercial Use SCO of 1,000 µg/kg]), benzo(b)fluoranthene (maximum concentration of 12,000 µg/kg [Commercial Use SCO of 5,600 µg/kg]), and dibenzo(a,h)anthracene (maximum concentration of 1,100 µg/kg [Commercial Use SCO of 560 µg/kg]); PCBs (Aroclor 1254 and Aroclor 1260) with the highest concentration at 3,470 µg/kg (Commercial Use SCO of 1,000 µg/kg); and three inorganics including mercury (maximum concentration of 8.6 mg/kg [Commercial Use SCO of 2.8 mg/kg]), copper (maximum concentration of 330 mg/kg [Commercial Use SCO of 270 mg/kg]), and cadmium (maximum concentration of 52 mg/kg [Commercial Use SCO of 9.3 mg/kg]). The Protection of Ecological Resources SCOs were exceeded for one SVOC (benzo(a)pyrene at a maximum concentration of 9,100 µg/kg [Ecological Resource SCO of 2,600 µg/kg]); five pesticides including 4,4'-DDT (maximum concentration of 100 µg/kg [Ecological Resource SCO of 3.3 µg/kg]), 4,4'-DDD (maximum concentration of 73 µg/kg [Ecological Resource SCO of 3.3 µg/kg]), 4,4'-DDE (maximum concentration of 3.6 µg/kg [Ecological Resource SCO of 3.3 µg/kg]), dieldrin (maximum concentration of 30 µg/kg [Ecological Resource SCO of 6 µg/kg]), and endrin (maximum concentration of 26 µg/kg [Ecological Resource SCO of 14 µg/kg]); PCBs (Aroclor 1254 and Aroclor 1260) with the highest concentration at 3,470 µg/kg (Ecological Resource SCO of 1,000 µg/kg); and eight inorganic compounds including mercury (maximum concentration of 8.6 mg/kg [Ecological Resource SCO of 0.18 mg/kg]), zinc (maximum concentration of 780 mg/kg [Ecological Resource SCO of 109 mg/kg]), lead (maximum concentration of 390 mg/kg [Ecological Resource SCO of 63 mg/kg]), chromium (maximum concentration of 410 mg/kg [Ecological Resource SCO of 41 mg/kg]), cadmium (maximum concentration of 52 mg/kg [Ecological Resource SCO of 4 mg/kg]), copper (maximum concentration of 330 mg/kg [Ecological Resource SCO of 50 mg/kg]), silver (maximum concentration of 13 mg/kg [Ecological Resource SCO of 2 mg/kg]), and nickel (maximum concentration of 87 mg/kg [Ecological Resource SCO of 30 mg/kg]).

Subsurface Soil/Fill Material (at depths greater than 2 ft bgs)

VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and inorganic compounds were detected in subsurface soil/fill material on the Site as described below. The data were compared to the SCOs for Commercial Use, Protection of Ecological Resources, and Unrestricted Use (see Table 2).

SVOCs were detected throughout shallower subsurface soils (2 to 16 ft bgs) but were not detected in the deeper subsurface samples. PAHs were the most commonly detected SVOCs in the subsurface soil/fill material and accounted for most of the exceedances observed above the Commercial Use SCOs. Limited exceedances of pesticides and PCBs were observed with

detections only between 2 and 10 ft bgs with two Commercial Use SCO exceedances. Inorganic compounds were detected throughout the subsurface with Commercial Use SCO exceedances for arsenic, mercury, copper, and cadmium.

Coal tar/petroleum-like impacted soils, including blebs of nonaqueous phase liquids (NAPLs), were also identified in the location of the former Onondaga Creek channel. Stained soil and black stained sludge were found in subsurface soil in the central part of the Site. An evaluation of data and field observations determined that the presence of stained soils and NAPL does not necessarily correlate with elevated organics concentrations in soil and groundwater at proximate locations. This evaluation included a comparison of subsurface soil data exceeding SCOs for the Protection of Groundwater, exceedances of Class GA SGVs, and field observations of stained soils and NAPL.

Polytetrafluoroethylene Sheen Net Samples

Polytetrafluoroethylene (PTFE) sheen net samples were collected as part of the sources of contamination investigation. Visual observations during the test trenching within or in the vicinity of the former Onondaga Creek channel footprint indicated that when soils were disturbed, a sheen formed on the groundwater within the excavated trench. The results of the sheen net sampling verified that PAHs and petroleum biomarkers were detected in this sheen that had been mobilized from the Site soils when disturbed. The results of the sheen net sampling and the corresponding groundwater sampling indicate that the organic compounds remain bound to the soils when undisturbed.

Groundwater

The groundwater analytical data were compared to the New York State Class GA groundwater SGVs (see Table 3). As detailed in Table 3, there were a few VOC (ethylbenzene, isopropylbenzene and xylenes) and SVOC exceedances (4-methylphenol, 4-nitrophenol, acenaphthene, and naphthalene) of Class GA SGVs identified during the RI from data collected before 2015. A supplemental groundwater investigation conducted in 2019 indicated that naphthalene, at a concentration of 23 µg/L in one well, was the only organic compound that marginally exceeded the Class GA SGV (guidance value of 10 µg/L), with slightly lower detected concentrations than in historical detections (36 µg/L in 2012). Inorganic compounds/metals detected in Site groundwater include barium, iron, magnesium, manganese, sodium, and chloride, with Class GA SGV exceedances primarily observed for iron, manganese, sodium, and chloride, which may be ubiquitous in the area and/or naturally occurring as described in the *Revised SYW-12 2019 Groundwater Investigation Report*.

Natural attenuation of organic constituents in groundwater at the Site is discussed in the *Revised SYW-12 2019 Groundwater Investigation Report.* As summarized in that report, geochemical conditions at the Site are favorable for natural attenuation of PAHs, including naphthalene, to occur. The determination that natural attenuation is occurring is, in part, based upon detected concentrations of ferrous iron, sulfide, and methane in groundwater and oxidation-reduction potential data that suggest the presence of iron- and sulfate-reducing conditions in groundwater. Biodegradation of naphthalene can occur under anaerobic conditions, particularly under iron- or sulfate-reducing conditions. Further, the presence of methane and observed decreases in groundwater concentrations of PAHs over time such as acenaphthene and naphthalene indicate that natural attenuation is likely occurring.

Conclusions

Based on the results of the RI and supplemental groundwater investigation, the following conclusions have been drawn:

- The primary Site contaminants include assorted PAHs (*e.g.,* benzo(a)pyrene), PCBs, and metals;
- As shown on Figures 5 to 10, Site contaminants in soil/fill material are randomly distributed and are likely related to several sources, including historical placement of fill material in the former Onondaga Creek channel/Iron Pier area, dredge spoils from Onondaga Creek, historic dredge material from the southern portion of Onondaga Lake, and potential historical off-Site sources (*i.e.,* former Marley property, Oil City properties, former Hiawatha Boulevard MGP subsite, former Erie Boulevard MGP site, and Ley Creek). The Marley and Oil City properties are believed to have impacted the Barge Canal sediment that was then dredged and placed on the Site during historical dredging operations. Contamination at these properties is currently being addressed by the potentially responsible parties for these sites under NYSDEC and EPA oversight; and
- There are few exceedances of the Class GA groundwater SGVs for organic constituents in RI groundwater samples, suggesting that organic constituents in shallow and subsurface soils are generally not mobilizing to groundwater; however, naphthalene concentrations in subsurface soil may be contributing to localized naphthalene detected in one monitoring well (HB-MW-29). The 2019 groundwater samples indicated that naphthalene was the only organic compound that marginally exceeded the Class GA SGV (exceedance of the guidance value in only one well), with an overall decrease in organic constituent concentrations over time. Geochemical conditions at the Site are favorable for natural attenuation of napthalene to occur.

The Site contaminants in surface soil identified during the RI were further evaluated during the FS to identify a targeted list of compounds (*i.e.,* benzo(a)pyrene, 4,4'-DDT, total PCBs, mercury, chromium and cadmium) that can serve as surrogates for other contaminants that are most likely to drive risk and remediation, and, therefore, will be representative chemicals for optimizing remedy protectiveness.

SCOPE AND ROLE OF ACTION

As mentioned above, there are many subsites, that are part of the cleanup of the overall Onondaga Lake NPL site. The following are the eleven subsites that are being addressed:

1. Onondaga Lake Bottom (which includes Geddes Brook/Ninemile Creek as an OU);
2. LCP Bridge Street;
3. Semet Residue Ponds;
4. Willis Avenue;
5. WBB/HB;
6. Solvay Wastebeds 1-8;
7. General Motors - Inland Fisher Guide;
8. Town of Salina Landfill;
9. Ley Creek PCB Dredgings;
10. Lower Ley Creek; and
11. Niagara-Mohawk Hiawatha Boulevard.

For the Onondaga Lake Bottom subsite, dredging and capping activities were performed from 2012 to 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 constructed on former Solvay Wastebed 13. Construction activities at the consolidation area, which included the placement of an engineered cap, were completed in 2017. Remedial construction has also been fully implemented at the Semet Residue Ponds, Wastebeds 1-8 OU-1, WBB/HB, LCP Bridge Street, Geddes Brook/Ninemile Creek, Niagara-Mohawk Hiawatha Boulevard, Salina Landfill, and the Ley Creek PCB Dredgings subsites. All the noted subsites/OUs are undergoing long-term maintenance and monitoring. Remedial actions at portions of, or environmental media (*e.g.,* soil, groundwater) at Wastebeds 1-8 OU-2, Willis Avenue, and General Motors - Inland Fisher Guide (OU-1 and OU-2) 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.

The scope of the action outlined in this Proposed Plan is to address the contaminated soil/fill material and groundwater at the SYW-12 Site. NYSDEC and EPA expect this remedy to be a final, comprehensive remedy. Due to the presence of forested areas on the Site that are winter roosting habitat for bald eagles, some of the alternatives evaluated in this Proposed Plan include remediation in 8.2 to 10 acres of the 23.5-acre Site that are accessible and/or non-forested so the mature trees used for roosting are not impacted. Additional discussion is provided in the alternatives below.

Principal threat wastes are wastes that are considered source materials, *i.e.,* materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or as a source for direct exposure. While stained soils and blebs of NAPL are present at the Site, they do not necessarily correlate with elevated organic contaminant concentrations in soil and groundwater at proximate locations. NYSDEC and EPA have not identified material at the Site as principal threat wastes. In addition, sediment and surface water data from Onondaga Lake and Ley Creek indicate that contamination from the Site is not migrating off-Site.

Summary of Quantitative Site Risk Assessments

As part of the RI process, baseline quantitative risk assessments were conducted for the Site to estimate the potential risks to human health and the environment (see the "What is Human Health Risk and How is it Calculated?" and "What is Ecological Risk and How is it Calculated?" text boxes below). Baseline risk assessments, consisting of a HHRA, which evaluates potential risks to people, and a BERA, which evaluates potential risks to ecological receptors, have been performed 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.

Human Health Risk Assessment

Because the Site is zoned as parkland, exposure scenarios were developed based on this current and likely future land use. Exposure to many different media were considered in the Baseline HHRA process through a number of current and future exposure scenarios for different potential receptors, including child and adult recreational visitors, railroad worker, utility worker, construction worker, commercial/industrial worker, and child and adult residents.

Exposure scenarios were developed for these populations. These scenarios were evaluated based on potential exposure through incidental ingestion and inhalation of and dermal contact with surface soil, subsurface soil, fugitive dust, or volatile emissions. In addition, exposure to groundwater was also evaluated.

Since the completion of the *Revised HHRA Report* in 2009*,* EPA has re-evaluated and updated toxicity information for PAHs and issued new guidance on the methodology for assessing risks associated with the inhalation pathway of exposure. To incorporate these updates, risk calculations for soil exposures for the most sensitive nonresidential receptor group and based on the anticipated site use (*i.e.*, recreators) were revised in 2018, and the risk calculations for soil exposures for the remaining receptor groups evaluated in the HHRA which were not addressed in the 2018 evaluation were revised in 2022. Updated risks and hazard tables resulting from all of the recalculations conducted since the 2009 HHRA are presented in Appendix 1 of the FS Report. A summary of the revised cancer risks and noncancer hazards above threshold levels for each population in each of the areas of the Site, along with the chemicals that contribute the most to the risk or hazard, or chemicals of concern (COCs), can be found in Table 4.

It should be noted that the lifetime excess cancer risks for utility workers, construction workers, and child residents are below the regulatory risk threshold based on the revised hazard and risk evaluation as a result of the incorporation of updated published cancer toxicity values for select PAHs in the evaluation. Noncarcinogenic hazards calculated for these receptors are essentially unchanged by the EPA updates to risk assessment methods and cancer-based toxicity values. As such, the unacceptable hazards posed to child residents by highly chlorinated PCBs in surface soil and to construction workers by chromium and benzo(a)pyrene in groundwater, as calculated in the 2009 *Revised HHRA Report*, remain potential threats to these receptor groups. However, it should be noted that the anticipated future land use of the Site does not include residential

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-tenthousand 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.

use and that the unacceptable hazard posed by chromium and benzo(a)pyrene to construction workers was based on the results obtained during the RI; sampling subsequent to the RI indicate the absence of chromium and benzo(a)pyrene in groundwater underlying the Site[2], indicating there may not be an unacceptable risk attributable to chromium and benzo(a)pyrene in groundwater.

The vapor intrusion screening in the HHRA identified chemicals with a potential to migrate to indoor air, based on factors such as the chemical-specific vapor pressure. Because these factors apply to chemicals present in media, such as soil, fill material, and groundwater, all media with these chemicals have the potential for future vapor intrusion concerns. Naphthalene was identified and retained as a vapor intrusion COPC because its maximum detected concentration in Site groundwater exceeded its groundwater vapor intrusion screening level.

Consumption of groundwater was not quantitatively evaluated in the HHRA. As mentioned above, naphthalene is the only contaminant that is present in groundwater that exceeds the state guidance value. Naphthalene does not have a federal drinking water standard. It should be noted though that the maximum concentration of naphthalene in groundwater of 170 µg/L detected during the RI exceeds both the concentration associated with a noncancer hazard quotient of 1 (6 µg/L) and the concentration associated with the high end (10^{-4}) of the acceptable cancer risk range (11.7 µg/L). A memorandum was added to the Site file to document this finding.

The HHRA and post-HHRA evaluations concluded that potential risks associated with exposure to surface soil/fill material (0 to 2 ft bgs) assuming passive recreational use of the Site are acceptable under current and future conditions. Potential risks associated with exposure to surface soil/fill material (0 to 2 ft bgs) for a future child resident would not be acceptable, if such exposures were allowed to occur.

A full discussion of the HHRA evaluation and conclusions is presented in the HHRA report with post-HHRA evaluations presented in the FS Report.

Ecological Risk Assessment

The BERA for the Site identified current and future habitat use and potential ecological receptors. Based on the ecological receptors identified, potentially unacceptable risk was driven by the following constituents by receptor for the Site Exposure Area:

- Potential risk to terrestrial plants is driven by 11 metals via exposure to surface soil based on average concentrations throughout the exposure area exceeding screening criteria for the protection of plants.
- Potential risk to soil invertebrates is driven by five metals via exposure to surface soil based on exceedances of screening criteria for the protection of soil invertebrates and microfauna.
- Potential food chain bioaccumulation risks for insectivorous birds, as represented by the American robin (*Turdus migratorius*), exceeded the risk threshold (*i.e.,* hazard quotient [HQ] > 1.0) for lowest effect dose levels for six metals and four organic compounds in surface soil.
- Risks to insectivorous mammals from food chain exposure, as represented by the short-tailed shrew (*Blarina brevicauda*), exceeded 1.0 based on lowest effect level doses for five metals and five organic compounds in surface soil.
- Potential food chain risks to carnivorous mammals, as represented by the red fox (*Vulpes vulpes*), are considered nominal for each constituent with the exception of chromium.
- Risks to carnivorous mammals from food chain exposure, as represented by the red-tailed hawk (*Buteo jamaicensis*), did not exceed 1.0 for any constituent based on lowest effect level doses.
- Potential risks to predatory mammals that may forage on terrestrial mammals and fish in the lake area abutting the Site, as represented by the mink (*Neovison vison*), are considered nominal given that no HQs based on lowest effect level doses exceeded 1.0.

In summary, the Site BERA concluded that select metals and organic compounds, namely chromium, cadmium and PCBs, pose a potential risk to communities or organisms and to bird and mammal populations with relatively restrictive home ranges (*e.g.,* American robin and short-tailed shrew). A full discussion of the BERA's evaluation and conclusions is presented in the BERA Report.

[2] The RI data used in the 2009 HHRA included data from groundwater screening samples, which are more likely to have aquifer solids (*e.g.,* turbidity) present, and which could result in higher concentrations than the monitoring well samples collected in 2012 and 2019.

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 (COPECs) 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 and post-HHRA evaluations indicate that exposure to contaminated soil, indoor air, and groundwater present current and/or potential future unacceptable risks, and the ecological risk assessment indicates that the contaminated soils pose an unacceptable risk.

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 Site, 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.

Subsequent to publication of the *Revised BERA,* the occupation of the Site by bald eagles has increased significantly, particularly exhibited by winter roosting behavior of a large number of individuals and is recognized by the United States Fish and Wildlife Service (USFWS) and NYSDEC. Bald eagles likely gather at the Site because of the warm water outflow from the nearby Metropolitan Syracuse Wastewater Treatment Plant (Metro) which provides ice-free open water and the opportunity for eagles to forage during winter months. The large trees at the Site serve as roosts for wintering bald eagles. Location-specific applicable or relevant and appropriate requirements (ARARs) related to habitat protection, including the *Federal Bald and Golden Eagle Protection Act* (16 U.S.C. 668 *et seq*), USFWS *National Bald Eagle Management Guidelines*, *Conservation Plan for Bald Eagles in New York State*, and 6 NYCRR 182, provide requirements and guidance regarding the protection of bald eagle habitat, including the “take and disturbance” of bald eagles, and limiting activities that may alter communal roost sites and foraging areas.

As part of the FS development, USFWS provided recommendations related to soil/fill material locations to be addressed that would also preserve trees that serve as roosts for bald eagles. The following measures were also recommended by USFWS to provide for the continued integrity of this roost site and enable bald eagles to feed and shelter during winter:

- Minimize tree clearing as part of remediation.

- Perform remedial activities outside the December 15 to March 15 winter roosting season to avoid disturbance to roosting bald eagles.

The NYSDEC's March 2016 *Conservation Plan for Bald Eagles in New York State* cited above provides further guidelines and actions recommended for the conservation of New York's bald eagle population and recommends that work and activities disturbing trees be performed outside the December 1 to March 31 winter roosting season. These measures were considered as part of the development and evaluation of remedial alternatives, in particular when balancing potential risks with remedy elements potentially detrimental to valuable habitat.

New York State Soil Cleanup Objectives

For the SYW-12 Site, Commercial Use and Protection of Ecological Resources SCOs are applicable. SCOs are contaminant-specific remedial action objectives for soil based on a site's current, intended, or reasonably anticipated future use. Separate sets of SCOs were developed in consideration of public health, groundwater, and ecological resources. A brief summary of how the SCOs were developed is presented below. For more information on the development of the SCOs, see https://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf.

HOW WERE SCOs DEVELOPED?

Developing the health-based SCOs (*e.g.,* Commercial Use) required a number of exposure considerations including who might be exposed to soil contaminants, in what ways they might be exposed, and for how long the exposure might occur. Since these considerations can vary with the use of a site, health-based SCOs differ depending upon site use. Protection of Groundwater SCOs are estimated based on NYSDEC's experience with impacts on groundwater from soils at inactive hazardous waste sites. An approach was selected which estimates the amount of contamination that may be present in water when it is in direct contact with soil for a long time, and the amount of contaminant that may leach out of contaminated soil as water travels down through the soil column. The approach also accounts for the reduction in water contaminant concentrations as the water in the soil travels to groundwater. To develop the Ecological Resources SCOs the NYSDEC reviewed existing soil criteria available in the literature along with the corresponding derivation methodologies. After an extensive review, the NYSDEC chose to adopt many of the procedures and methods developed by the EPA Ecological Soil Screening Levels (Eco-SSL) program. In addition to protection of health, groundwater, and ecological resources, two other considerations, the levels of Priority List contaminants in rural soils of New York State and maximum acceptable soil contaminant concentrations, contributed to the basis of the final SCOs.

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 guidance, and site-specific risk-based levels established using the risk assessments. Based on consideration of potential chemical-specific ARARs, nature and extent of contamination, potentially unacceptable risks, the current, intended and reasonably anticipated future use of the Site and its surroundings, and the recognized value of and use of the forested areas of the Site by the bald eagle, the following RAOs have been established for the Site:

Groundwater

RAO for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards and/or guidance values.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil above remedial goals and/or that result in unacceptable risk.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

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

Vapor Intrusion

RAO for Public Health Protection

- Mitigate impacts to public health resulting from existing, or potential for vapor intrusion.

NYSDEC's SCOs for Commercial Use and the Protection of Ecological Resources 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 and ecological exposure depending upon the existing and anticipated future use of the Site. While the land use of the Site has historically been vacant, current and anticipated future uses of some areas could include commercial use (including passive recreational use such as a trail). Groundwater remedial goals are the New York State Ambient Water Quality Standards.

COCs identified for the Site include cadmium, chromium, mercury and other metals, benzo(a)pyrene and other PAHs, 4,4'-DDT and other pesticides, and PCBs. As presented in the FS Report, an evaluation of surface soil Area-Weighted Average Concentrations (AWACs) was conducted to further understand and evaluate surface soil concentrations pre- and post-remedy implementation relative to NYSDEC's SCOs (for more information, see the textbox "What is an "AWAC" and How is it Calculated?"). Discussion of this evaluation is presented below under the Comparative Analysis of Alternatives heading.

WHAT IS AN "AWAC" AND HOW IS IT CALCULATED?

Area-Weighted Average Concentrations (AWACs) are calculated concentrations of select constituents representative of site-wide conditions that facilitate comparisons between existing conditions and future conditions following implementation of potential remedial alternatives. To develop AWACs, computer software is used to interpolate concentrations between sample locations from known sample data based on the premise that closer values are more similar than values farther away and therefore the closer values should have greater influence, or weight, in the averaging process. The result is a grid or an array of cells (2 ft x 2 ft) encompassing the entire site with each cell assigned a sample concentration. The calculated AWAC for a given constituent is equal to the average concentration of the interpolated grid and represents the pre-remediation AWAC for that constituent. Where remedial activities are proposed, the exercise is repeated using representative topsoil concentrations within the remedial footprint and the remaining surface soil concentration in undisturbed areas. The existing AWAC concentrations are then compared to the post-remediation AWAC results to assess improvement and protectiveness of remedial alternatives relative to existing conditions. Appendix 8 of the Site FS Report presents additional details on the site-specific approach to calculating AWACs.

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 the anticipated future development of the Site, 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 (which is encompassed by a commercial use) and ecological use. In addition, special consideration of the value provided by the Site's habitat and seasonal use of the Site by bald eagles was included during the development of the alternatives. This special consideration resulted in alternatives that would not address contamination in all areas of the Site and would leave areas with contaminant concentrations that may exceed SCOs within approximately 13.5 to 15.3 acres of the 23.5-acre Site.

The remedial alternatives are as follows:

Alternative 1 - No Action

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison with the other alternatives. The no action remedial alternative would not include any remedial measures to address the soil/fill material and groundwater contamination at the Site.

Since the No Action alternative does not include any remedial measures there are no capital, annual, and present-worth costs for this alternative:

Capital Cost:	$0
Annual operation and maintenance (O&M) Cost:	$0
Present-Worth Cost:	$0

Alternative 2 – Soil Cover in Select Areas, Wetland Restoration, Biota Monitoring, and Monitored Natural Attenuation

This alternative includes the placement of a soil cover where accessible and not detrimental to the environment (*i.e.,* avoiding mature tree removal, disturbance of bald eagles, etc.) and restoring wetlands in select non-forested wetland and upland areas of the Site. The 2-foot-thick soil cover would be placed on an approximately 8.2-acre area, which would include 7.5 acres of non-forested wetland (perched wetland cover areas on Figure 11) and 0.7 acre of non-forested upland. The soil cover would control potential erosion of, and direct contact with, contaminated soil/fill material, as well as control the potential inhalation of dust in these areas. To restore wetland areas, contaminated soil may be removed, and either reused on-Site or disposed off-Site, prior to cover placement to a depth necessary to preserve wetland conditions and functions. It is estimated that clean backfill would be transported to the Site, resulting in approximately 2,450 dump truck trips (*i.e.,* round-trip with a 10-yard dump truck). The remedial footprint is targeted to reduce ecological exposure while still retaining forested SYW-12 habitat to preserve areas currently used by bald eagles for roosting. Specifically, damage to root zones through the placement of soil cover material which would limit oxygen supply to the tree roots or removal of mature trees used for eagle roosting would be avoided under this alternative. The remediated areas would be restored and biota monitoring performed. As described in the "Results of Remedial Investigation" section above, because of special considerations being given to the mature trees and bald eagle population, surface soil in non-remediated areas may exceed Commercial Use and the Protection of Ecological Resources SCOs where cover would not be placed.

A surface soil pre-design investigation and tree survey would be performed to evaluate the addition of up to seven areas, totaling 2.2 acres, to the remediation footprint. The areas for consideration include two areas within the forested wetland characterized by scrub vegetation on the northern portion of the Site, four areas within the non-forested wetland on the western portion of the Site, and one upland forested area on the southern portion of the Site (purple outlined areas on Figure 11). Should surface soil sampling and the tree survey indicate that elevated surface soil/fill material contaminant concentrations are present and large trees would not need to be removed or disturbed (*e.g.,* within the drip-zone of the large trees), soil excavation and backfilling of these areas with clean material would be considered during the design.

To minimize loss of wetland acreage or function, wetland conditions and functions would be integrated into the areas where the cover would be placed within the current wetland footprint. To improve the success of the restored wetlands, the remedial design would consider excavation and/or grading to allow wetland functions and values. An evaluation would be conducted as part of the cover design to promote sufficient flooding and saturation to facilitate the development of wetland soils and hydrology appropriate for native plants and other habitat in conjunction with grading/soil profile design such that wetland conditions and functions are addressed. Where the water budget and/or grading cannot replace wetland conditions or functions, additional mitigation measures would be included during the design.

The soil covers would also be installed to support and preserve existing mature trees present proximate to the proposed cover to allow for future tree succession. Additional tree-planting may be performed as part of restoration. Where cover material is placed, a demarcation layer would be evaluated during the remedial design to delineate the boundary between the contaminated soil/fill material and the soil cover and would be compatible with the wetland or tree growth, as necessary. The demarcation layer would provide evidence of cap erosion and provide a warning that contaminated material may exist below the demarcation layer.

Excavated soil reuse options and limitations (*e.g.,* within wetland areas), impacts to the bald eagle habitat, and the final wetland restoration approach, including opportunities to improve wetland functions and values, planting of trees and sustainable remediation principles would be further evaluated during the pre-design and design phases. Should reuse of excavated/graded/handled materials not be possible at the Site following remedial design evaluations, the material would need to be managed off-Site.

Because of the Onondaga County trail construction, geotechnical concerns, and discussion and coordination with railroad operations, the boundaries of the remedy illustrated in Figure 11 are conceptual. It is anticipated that there would be no excavation in wetland areas adjacent to the railroad based on stability concerns. Mitigation would be necessary where construction results in a loss of wetland acreage or function and wetland conditions cannot be returned. The extent of the

cover would be revisited during the design phase based on pre-design sampling and other activities and in consideration of the trail alignment. Onondaga County has included signage requiring recreational users to remain on the trail in the design for the multi-use recreational trail. The potential need for additional measures (*e.g.,* fencing/railing, maintaining dense vegetation along the trail, improved signage, and/or sampling) would be reviewed during the design phase and based on management of the trail.

Biota monitoring would be performed to evaluate remedy effectiveness and assess protectiveness of ecological receptors. A baseline sampling program, consisting of two sampling events, would be implemented, with subsequent sampling events following remedy implementation using an adaptive, data-driven approach (*e.g.,* years 3 and 5). A field assessment of Site vegetative community composition (*e.g.,* diversity, richness, invasive species evaluation) and qualitative wildlife community observations would be performed to support the biota monitoring program. The field assessment would also include an evaluation of Site trees, specifically trees that serve as roosts for bald eagles, for overall health and preservation. Specific sample locations, species, sample and analytical methods, and frequencies would be assessed and established during the remedial design. It is assumed that the monitoring program would consist of analysis of soil invertebrate and small mammal tissue, with collection of co-located surface soil/fill material samples for laboratory analysis of chemical constituents. The details related to the scope of biota sampling would be developed during the remedial design phase.

Periodic sampling and analysis of groundwater would be included as a means of detecting changes in groundwater concentrations and monitoring the natural attenuation of naphthalene in groundwater. Natural attenuation of other contaminants may be evaluated, if necessary. Specific monitoring locations, parameters, and frequencies would be established during remedial design. For cost estimation purposes, it was assumed that the monitoring program would consist of semi-annual sampling of ten monitoring wells with analyses for VOCs, SVOCs (including PAHs), metals, mercury, cyanide, and cations/anions. However, the specific number of wells and analyses will be determined during remedial design or site management.

The cover would require routine maintenance and inspection to maintain integrity and proper function.

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

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls (ECs) for the Site and documents the steps and media-specific requirements necessary to ensure the following ECs and ICs remain in place and effective:
    - environmental easements and/or restrictive covenants described above
    - Site cover described above
    - Future remediation/management in areas where no cover is present at the Site (*e.g.,* due to erosion or changes in vegetation)
    - excavation plan that details the provisions for management of future excavations on the Site
    - descriptions of the provisions of the ICs, including any land use or groundwater use restrictions
    - a soil vapor intrusion evaluation will be completed and appropriate actions implemented for any on-Site buildings, if they were to be constructed
    - provisions for the management and inspection of the identified ECs
    - protection measures to be implemented while conducting any needed subsurface soil disturbance activities, to prevent exposure to sheens or blebs of NAPL
    - maintaining Site access controls and NYSDEC notification
    - steps necessary for periodic reviews and certification of the ECs and/or ICs.
- Monitoring Plan to assess the performance and effectiveness of the remedy. Elements of the monitoring plan will include groundwater and biota monitoring, and success or repair of habitat and wetland restoration. The monitoring plan will include assessing restoration success and repair, wetland delineation, and invasive species management during restoration. 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 remedy for the Site be reviewed at least once every five years.

The estimated construction time of this alternative is one construction season.

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

Capital Cost:	$7,530,000
Annual O&M Costs:	$181,000
Present-Worth Cost:	$8,300,000

Alternatives 3A/3B – Surface Excavation with On-Site Reuse or Off-Site Disposal and Soil Cover/Wetland Restoration on Perimeter and Interior Areas, Biota Monitoring, and Monitored Natural Attenuation, with Limited Tree Removal

This alternative is similar to Alternative 2, except that it includes remediation in an additional 1.8 acres in not readily accessible non-forested wetland areas (perimeter and interior wetlands). Excavation of approximately 21,000 cubic yards (cy) of surface soil/fill material (up to 2 ft bgs) over 7 acres would be performed prior to placement of the soil cover. In addition to the 8.2 acres of perimeter wetlands addressed under Alternative 2 with a cover, this alternative also includes an additional 1.3 acres of cover to address interior wetland areas as indicated on Figure 12. Disturbance of approximately 0.5 acres of forested upland/wetlands, which would result in the removal of trees, would be needed to construct a road to access the 1.3 acres of non-forested wetlands, and the soil cover would be extended over these 0.5 acres. The total anticipated acreage of the soil cover is approximately 10 acres. Pre-design surface soil sampling and a tree survey would be performed to evaluate the potential need to address contaminated surface soil/fill material in approximately 1 acre of additional wetland and upland areas based on surface soil SCOs, including one upland forested area on the southern portion of the Site and two areas of forested wetland on the northern portion of the Site. However, because of the special considerations being given to the mature trees and bald eagle population, surface soil in non-remediated areas may exceed Commercial Use and the Protection of Ecological Resources SCOs in areas where a soil cover is not being placed.

Excavated contaminated soil/fill material management options are included as variations of Alternative 3. Specifically, on-Site reuse and off-Site disposal options to a permitted facility are presented as Alternatives 3A and 3B, respectively. Alternative 3A is anticipated to result in approximately 2,650 dump truck trips, while Alternative 3B is anticipated to result in 4,200 dump truck trips due to the off-Site disposal of excavated soil/fill material. Because of the Onondaga County trail construction, geotechnical concerns, and discussion and coordination with railroad operations, the boundaries of the remedy illustrated in Figure 12 are conceptual.

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

The estimated construction time of this alternative is one to two construction seasons.

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

	Alternative 3A (On-Site Reuse)	Alternative 3B (Off-Site Disposal)
Capital Cost:	$21,110,000	$26,150,000
Annual O&M Costs:	$185,000	$185,000
Present-Worth Cost:	$21,900,000	$27,000,000

Alternative 4 – Full Removal and Off-Site Disposal with Wetland Restoration and Monitored Natural Attenuation

Alternative 4 includes the mechanical excavation of soil/fill material within the forested and non-forested areas of the Site exhibiting concentrations above 6 NYCRR Part 375 Unrestricted Use SCOs (Figure 13). This is anticipated to require the removal of material as deep as 16 ft bgs. Approximately 400,000 cy of contaminated soil/fill material would be excavated and disposed off-Site under this alternative. The excavated areas would be backfilled with clean fill. Excavated wetland areas would be backfilled to existing grade using materials appropriate for wetland establishment. Appropriate wetland species would be planted to reestablish both forested and non-forested wetlands to include wetland vegetation, shrubs and trees.

Given the number of trees and larger organic debris (*e.g.,* chipped mature trees and brush) that would be generated from clearing, it is estimated that 900 tons of organic debris would also require off-Site transport and management. In addition, this alternative would include monitoring the natural attenuation of naphthalene in the groundwater. The timeframe for the naphthalene to achieve groundwater standards would be the same as for Alternative 2. Groundwater monitoring would be performed as part of site management.

It is estimated that 600,000 tons of excavated soil/fill material would be transported and disposed off-Site to a permitted facility. It is estimated that the soil/fill and organic debris would be transported off-Site over the course of four construction seasons, resulting in approximately 56,000 truck trips. Because of the required 30-foot setback from the adjacent CSX Railroad tracks, impacted material may need to remain on-Site. Therefore, ICs, a SMP, and periodic reviews, as described under Alternative 2, may be necessary.

ECs (*i.e.*, sheet piling and bulkhead) would be necessary along the perimeter of the Site to maintain stability of the excavation walls, prevent potential impacts to the railroad tracks, and to prevent inundation from Onondaga Lake, Onondaga Creek and Ley Creek. Further geotechnical evaluations would be necessary to evaluate sheet pile installation in the vicinity of the railroad.

It is assumed that the soil/fill material excavated below the groundwater table would need to be dewatered prior to off-Site transportation and disposal. Treatment of this construction water is anticipated to be necessary; a temporary water treatment facility would be utilized to treat this construction water. Treated construction water would be managed in a manner and in accordance with discharge requirements to be determined by NYSDEC during the remedial design phase.

Because additional geotechnical evaluations and discussion and coordination with Onondaga County and railroad operations would need to be conducted, the remedy depiction illustrated in Figure 13 is conceptual.

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

The estimated construction time of this alternative is five to seven construction seasons.

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

Capital Cost:	$281,150,000
Annual O&M Costs:	$57,000
Present-Worth Cost:	$281,300,000

COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see box below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria. The first two evaluation criteria are termed "threshold" criteria and must be satisfied for an alternative to be considered for selection. The next five criteria are "primary balancing" criteria. These are used to make comparisons and to identify the major tradeoffs between alternatives. The remaining two criteria are "modifying" criteria. These criteria are used in the final evaluation of the remedial alternatives after the formal comment period and may prompt modification of the preferred remedy that was presented in the Proposed Plan.

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

NINE EVALUATION CRITERIA FOR FEDERAL SUPERFUND REMEDIAL ALTERNATIVES
Overall protection of human health and the environment addresses whether an alternative eliminates, reduces, or controls threats to public health and the environment through ICs, ECs, 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 of time 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 considers 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

Based on the reasonably anticipated future Site use, including a recreational trail, current human health hazards and risks associated with recreational use for all receptors are acceptable based on post-HHRA re-evaluations of hazard and risk (see Table 4). Alternative 1, no action, would not be protective of human health and the environment because it would not actively address the contaminated soil/fill or groundwater, which pose unacceptable human health and ecological risks. Alternatives 2 through 4 would provide for human health protection relative to potential exposure to soil/fill material through ECs and ICs. ICs, a SMP, and monitoring the natural attenuation of naphthalene in groundwater included in Alternatives 2 through 4 would provide protection of human health relative to potential exposure to surface and subsurface soil/fill material, sheens that may develop during soil excavations, and groundwater for receptors such as construction or utility workers. The SMP would require special measures to address water during excavation activities. Alternative 2 would provide protectiveness through placement of clean cover material in 8.2 acres of non-forested wetland and non-forested upland areas, in addition to ICs and MNA for the groundwater. Alternative 3 would provide protectiveness over 10 acres through removal of surface soil/fill material within non-forested wetlands, restoration of non-forested wetlands, placement of a soil cover within non-forested upland areas, ICs, and MNA for the groundwater. Alternative 3 is anticipated to result in some disturbance to the eagle habitat, since it requires removal of an approximate half-acre area that includes mature trees. Alternatives 2 and 3 would also include the flexibility to provide added protection (as determined by pre-design soil sampling) through grading/handling of surface soil/fill material to address additional wetland and/or upland areas, provided that eagle habitat (*e.g.,* mature trees) is not significantly impacted. Alternative 4 would be the most protective but would also result in the greatest impact to forested habitat, including the eagle roosting areas, through Site-wide removal of trees.

The soil cover and/or targeted excavation of surface soil as presented in Alternatives 2 and 3 would address SCOs for Commercial Use and Protection of Ecological Resources where the cover is placed within the non-forested wetland and upland areas, while preserving as much of the forested bald eagle roosting habitat as possible. In order to consider contaminant concentrations on a Site-wide basis (including contamination that would remain in the undisturbed forested areas), an evaluation of Site-wide surface soil AWACs was performed to demonstrate the level of protectiveness that would be achieved for remedial alternatives relative to one another and to current conditions. Exceedances of Commercial Use SCOs in surface soil may be present in the forested areas where a soil cover is not being placed, although the AWACs calculated for the existing conditions and conditions following implementation of Alternatives 2 and 3 illustrate improvement in average surface soil concentrations as a result of these remedies. With respect to human health, based on this analysis the surface soil AWACS are below SCOs for Commercial Use for chromium, mercury, 4,4-DDT and total PCBs with no further remedy implementation (*i.e.*, under Alternative 1). Implementation of Alternatives 2 or 3 would further reduce AWACs for these representative risk and remedy drivers and reduces AWAC values for cadmium to below the corresponding Commercial Use SCO. Implementation of Alternatives 2 and 3 would also reduce AWAC values for benzo(a)pyrene to concentrations marginally exceeding the corresponding Commercial Use SCO. Potential exposure risks for human receptors to residual contamination would be addressed through ECs (*e.g.,* soil cover, fencing/railing) and ICs (*e.g.,* signage, environmental easements).

In developing ecological remediation goals in sensitive habitats, consideration must be given to the intrusive nature of some remedial activities and the potential negative impacts resulting from implementation of such remedial activities, particularly in consideration of the extensive utilization of the Site by bald eagles and the forested habitat present. Exceedances for Protection of Ecological Resources SCOs may be present in the forested areas where a soil cover is not being placed, although Alternatives 2 and 3 are expected to reduce average surface soil concentrations below the SCOs for benzo(a)pyrene. Average levels of total PCBs pre-remediation are below the Protection of Ecological Resources SCO for PCBs and would be further reduced after implementation of Alternatives 2 or 3. Post-remediation AWACs for cadmium, chromium, mercury, and 4,4-DDT would potentially exceed SCOs for the Protection of Ecological Resources within the top two feet of soil, though significant reductions are anticipated under Alternatives 2 and 3.

Under Alternatives 2 and 3, a significant portion of the elevated concentrations of contaminants at the Site would be addressed, remaining concentrations would be expected to be protective of community impacts to ecological receptors when the Site is considered in its entirety, and significant habitat alteration and bald eagle disturbance would be avoided. As a result, Alternatives 2 and 3 are considered to improve protection of ecological exposures. Specifically, further examination of post-remedy exposure to constituents that would potentially exceed the SCOs for the Protection of Ecological Resources, indicates that Alternatives 2 and 3 would reduce lowest observed adverse effect level (LOAEL)-based HQs to below 1, or marginally above 1, for the most sensitive receptor (short-tailed shrew) evaluated in the BERA. Thus, Alternatives 2 and 3

address protectiveness of anticipated future use and ecological receptors while observing primary tenets of *Ecological Risk Assessment Guidance for Superfund* (ERAGS). Biota monitoring would also be performed under Alternatives 2 and 3 to monitor protectiveness of ecological resources and remedy effectiveness and to determine if additional remedial actions are necessary.

Consistent with 6 NYCRR-1.8(f) and DER-10.4.2(i), the current, intended, and reasonably anticipated future use of the Site was considered when selecting SCOs. Alternative 1 would not be consistent with current, intended, and reasonably anticipated future use of the Site. The soil cover in Alternative 2 would address at least 8.2 acres of non-forested wetland and upland area surface soil/fill material exceeding SCOs consistent with current, intended, and reasonable anticipated future use of the Site, while 15.3 acres would not be addressed. The soil cover with added removal of surface soil/fill material in Alternative 3 would support the current, intended, and reasonably anticipated future land use, and address at least 9.5 acres of non-forested wetland and upland areas along with 0.5 acres of forested upland, while 13.5 acres would not be addressed. However, Alternative 3 would impact 0.5 acres of mature trees that are important habitat for the bald eagle population. Removal of soil/fill material in Alternative 4 would support the current, intended, and reasonably anticipated future land use and address 23.5 acres of Site area exceeding SCOs; however, it would remove and/or prevent use of the recreational trail at the Site during the 5-to-7-year construction period and would result in Site-wide clearing of valuable forested habitat and likely adversely affect the local bald eagle population.

Alternative 1 would not address RAOs related to potential erosion and direct contact with soil/fill material. RAOs for protection of ecological receptors would be improved via AWACs for Alternatives 2 and 3, although SCOs at certain locations may still be exceeded. Alternatives 2 and 3 would improve protectiveness of the environment and would provide for additional protection of human health within non-forested wetland and upland areas and would meet RAOs through the use of soil covers, which would control potential erosion of, and direct contact with, soil/fill material as well as control the potential inhalation of dust in these areas. Alternative 3 would provide added protection of human health and the environment within non-forested wetland areas as compared to Alternative 2 and would meet RAOs through soil covers and the removal of surface soil/fill material for portions of the Site. ICs, a SMP, and monitoring would provide for continued protection of the environment and provide a means to evaluate continued protectiveness in Alternatives 2 through 4. Alternatives 2 and 3 also include biota monitoring for the purpose of assessing ecological protectiveness. Alternative 4 would be protective of human health and the environment within forested and non-forested wetland and upland areas through removal of accessible surface and subsurface soil/fill material and would allow for unrestricted use of the majority of the Site by addressing soil/fill material exceeding SCOs for Unrestricted Use. With the exception of Alternative 4, each of the alternatives would provide preservation of trees utilized seasonally by bald eagles for roosting.

In summary, since Alternative 1 does not provide protection of human health and the environment, this alternative does not satisfy this threshold criterion. Alternatives 2 through 4 would satisfy this threshold criterion by providing protection of human health and the environment. Alternatives 2 through 4 would provide varying degrees for protection of human health and the environment through ECs and ICs. Alternative 3 is anticipated to directly address more of the Site as compared to Alternative 2, however, this is at the expense of eliminating 0.5 acres of valuable forested habitat. Alternative 4 would provide the greatest protectiveness. but would result in the most significant impact to forested habitat, including eagle roosting, through Site-wide removal of trees. Alternatives 2 and 3 are considered reasonably protective of human and ecological receptors by addressing elevated soil concentrations while preserving the forested habitat, critical to overall Site ecology and utilized by bald eagles.

Compliance with ARARS

SCOs are identified in 6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6, effective December 14, 2006. New York State's Commercial Use and Protection of Ecological Resources SCOs at 6 NYCRR Section 375-6.3(b) have been identified as an ARAR, TBC, or other guideline to address contaminated surface and subsurface soil[3]. While surface soil at the Site contains contaminants at concentrations exceeding Commercial Use SCOs, potential exposure risks for human receptors to residual contamination would be addressed through ECs (*e.g.,* soil removal/cover, fencing/railing, etc.) and ICs (*e.g.,* signage, environmental easements). As discussed above under HHRA and Overall Protection of Human Health and the Environment section, the *Revised HHRA* and subsequent re-evaluation identified acceptable risks for the anticipated public use of the Site (*e.g.*, recreational trail).

Because the contaminated soil/fill material would not be actively addressed under Alternative 1, it would not achieve the SCOs. Under Alternative 2, soil/fill material exceeding SCOs would be addressed within a portion of the non-forested wetland and upland areas (8.2 of the 23.5-acres) through the installation of a soil cover where accessible and not detrimental to the

[3] Protection of Groundwater SCOs are not applicable based on provisions within NYCRR Part 375 (*e.g.,* an environmental easement will be put in place which provides for a groundwater use restriction; contaminated groundwater at the site is not migrating, or likely to migrate, off-site).

environment (*e.g.*, tree removal, disturbance of bald eagles, etc.). In Alternative 3, as compared to Alternative 2, the installation of a soil cover with the additional removal of surface soil/fill material within the western portion of the non-forested wetland areas and restoration with clean material would address soil exceeding SCOs within the additional non-forested wetland (10 of the 23.5-acres) although this would require the removal of some forested habitat. While some areas exhibiting soil concentrations greater than the Protection of Ecological Use SCOs may remain under Alternatives 2 and 3 they are expected to be protective of community impacts to ecological receptors throughout the Site, based on AWAC calculations, coupled with the avoidance of significant habitat alteration and bald eagle disturbance. For Alternative 3, should reuse of material be incorporated into the remedy, consideration for re-exposure and long-term management would be addressed in the remedial design and O&M requirements. Alternative 4 would address surface and subsurface soil exceeding Unrestricted Use SCOs within the footprint of the Site, including the forested and non-forested areas. Alternatives 2, 3 and 4 would address exceedances of New York State Class GA guidance value for naphthalene through natural attenuation.

No location- or action-specific ARARs were identified for Alternative 1 (No-Action alternative). Construction methods and safety procedures would be implemented to adhere to the location- and action-specific ARARs that are pertinent to Alternatives 2 through 4. Specifically, ICs would be implemented in Alternatives 2 through 4 in general conformance with NYSDEC's guidance DER-33 (see https://www.dec.ny.gov/docs/remediation_hudson_pdf/der33.pdf) and EPA guidance (see https://www.epa.gov/superfund/superfund-institutional-controls-guidance-and-policy). Additionally, Alternatives 2 and 3 would mitigate potential erosion and exposure to soil/fill material where soil covers are installed and would be implemented in general conformance with NYSDEC's DER-10 (see https://www.dec.ny.gov/regulations/67386.html). Procedures would be implemented to adhere to the location-specific ARARs related to federal and state requirements, such as for the portion of the Site that is a designated wetland for cultural, archeological, and historical resources. Additionally, proposed actions would be conducted in a manner consistent with Fish and Wildlife Coordination Act requirements for the protection of Onondaga Lake and for areas proximate to Onondaga Lake. As necessary, actions under Alternatives 2 through 4 would be implemented in general conformance with state and federal wetland and floodplain assessment requirements in addition to navigable waterway and New York State Railroad Law. Specifically, wetland permitting and mitigation requirements, such as those in 6 NYCRR Part 663, Article 15 and 6 NYCRR Part 608 would be considered during the remedial design phase. With respect to action-specific ARARs, the soil cover, wetland restoration, and excavation related activities would be conducted consistent with applicable standards including RCRA Subtitle D, 40 CFR Part 358.60 – Closure Criteria, 40 CFR Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices, and 40 CFR Parts 264 and 265, Subpart N – Landfills and 6 NYCRR 360 - Solid Waste Management Facilities, earth moving/excavation activities would be conducted consistent with air quality standards including 6 NYCRR 200-203, 211-212 – Prevention and Control of Air Contamination and Air Pollution, and 40 CFR Part 50.1 - 50.12 – National Ambient Air Quality Standards, and transportation and disposal activities would be conducted in accordance with applicable state and federal requirements including 6 NYCRR 364 - Waste Transporter Permits and 49 CFR 107, 171-174 and 177-179 - Department of Transportation Regulations, by licensed and permitted haulers, with disposal at permitted facilities. Under Alternative 4, construction water would be managed in a manner and in accordance with discharge requirements to be determined by NYSDEC during the remedial design phase.

Location-specific ARARs related to habitat protection, including the Federal Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq*), USFWS National Bald Eagle Management Guidelines, Conservation Plan for Bald Eagles in New York State, and 6 NYCRR 182, provide requirements and guidance regarding the protection of bald eagle habitat, including the "take and disturbance" of bald eagles, and limiting activities that may alter communal roost sites and foraging areas. Alternatives 2 and 3 can be implemented while preserving the valuable tree habitat, with minimal removal of low- to mid-story vegetation and retaining larger-scale vegetation at the Site, whereas Alternative 4 would require the Site-wide removal of trees currently providing high-value forested habitat used as winter eagle roosting habitat.

Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants in the soil/fill material and groundwater. Unlike Alternative 1, Alternatives 2 through 4 would provide varying levels of long-term effectiveness and permanence. Alternative 4 provides the most reduction in residual risk, however, it requires removal of trees that enhance the overall value of Site habitat and provide eagle roosting habitat. Alternatives 2 and 3 would support the anticipated future use of the Site for a multi-use recreational trail while preserving trees utilized seasonally by bald eagles for foraging and roosting. Alternative 3 would provide some additional level of long-term effectiveness and permanence relative to Alternative 2 as it would result in a greater acreage of remediation although limited tree removal would be required. Potential human health risks associated with Alternatives 2 through 4 would be reliably addressed through ECs (*e.g.,* soil removal/cover, fencing/railing) and/or ICs (*e.g.,* signage, environmental easements). Each alternative would result in minimal long-term fuel/energy consumption, greenhouse gas emissions, and impacts to water, ecology, workers, or the community associated with long-term maintenance of the remedies.

The long-term performance of Alternatives 2, 3 and 4 could potentially be impacted as a result of erosion of the soil covers during severe storms/weather events and associated flooding that may be more frequent or severe as a result of climate

change. These effects would be noted and documented as a result of inspections which would be conducted in accordance with the SMP, particularly after flood events, and mitigated as may be necessary and appropriate.

Reduction in Toxicity, Mobility, or Volume Through Treatment

Since none of the alternatives involve active treatment, there would be no reduction in toxicity, mobility, or volume in soil/fill material through treatment provided under Alternatives 1 through 4. Reduction of mobility (*i.e.*, potential erosion) of contaminants in surface soil/fill material would be achieved through the installation of soil covers in select areas under Alternatives 2 and 3. Alternative 4 would provide the greatest reduction in toxicity, mobility, and volume through the excavation and off-Site management of contaminated surface and subsurface soil/fill material. Reduction of toxicity, mobility and volume of representative constituents in surface soil/fill material would not be due to treatment. Under each alternative, natural attenuation is expected to reduce groundwater naphthalene concentrations within a reasonable time frame.

Short-Term Effectiveness

Alternative 1, the no-action alternative, does not include active remedial components, and, therefore, would not present any potential adverse impacts to workers and the community. Alternatives 2 through 4 would be implemented and constructed using proper protective equipment to manage potential risks to on-Site workers, and proper precautions and monitoring to be protective of the general public and the environment.

Because no action would be performed under Alternative 1, there would be no implementation time. Alternative 2 is anticipated to be completed within one construction season, while Alternative 3 is anticipated to be completed within one to two construction seasons. Due to the volume of surface and subsurface soil/fill material exceeding Unrestricted Use SCOs, Alternative 4 would require a longer timeframe to attain RAOs in the forested and non-forested wetland, as excavation is estimated to take place over five to seven construction seasons.

Impacts to the community resulting from the implementation of Alternatives 2 and 3 would primarily be due to increased truck traffic and increased noise for the duration of construction for the soil cover under Alternative 2 and contaminated surface soil/fill material excavation and soil cover construction under Alternative 3. Additional truck traffic and noise is anticipated for the duration of Alternative 3B due to off-Site transport of excavated surface soil/fill material. Alternative 4 would have significantly increased truck traffic, noise, dust and emissions compared to Alternatives 2 and 3 due to the need to clear the Site of trees prior to surface and subsurface soil/fill material excavation for the five- to seven-year duration of construction. The implementation of the clearing, surface and subsurface soil/fill material excavation and off-Site disposal included in Alternative 4 would result in far greater impacts to the community, including substantially increased traffic, dust and emissions as well as increased noise, although mitigative measures would be implemented to the extent practicable to limit the impacts of noise, dust and traffic. Additionally, Alternative 4 would involve the addition of sheeting or other stabilization measures along the railroad tracks and bulkhead installation along the shoreline during construction.

As it relates to traffic, transportation of cover material to the Site is anticipated to result in approximately 2,450 truck trips under Alternative 2, while transport of cover material, excavation of surface soil/fill material, on-Site consolidation and wetland restoration under Alternative 3A (on-Site reuse of excavated material) is anticipated to result in approximately 2,650 truck trips. Alternative 3B (off-Site disposal of excavated material) is anticipated to result in an additional 1,550 truck trips for off-Site disposal of excavated soil/fill material when compared to Alternative 3A. Excavation of contaminated surface and subsurface soil/fill material, off-Site transportation and disposal and wetland restoration included in Alternative 4 would require approximately 56,000 truck trips over four years, resulting in the greatest impact on traffic and potentially adverse effects on local air quality. The increased traffic associated with construction of Alternatives 3 and 4 would result in a potential increase in safety-related risks and impacts to CSX Railroad operations due to off-Site transport of excavated soil/fill material requiring additional crossing and coordination with railroad traffic proximate to the Site.

With respect to sustainability, there is an environmental footprint inherent in implementation of each alternative as it relates to construction and operation, as well as impacts to the community (as described above). The implementation of the excavation and off-Site disposal included under Alternative 4 would result in far greater direct emissions and fuel consumption, as compared to importing construction materials and construction of the soil cover included in Alternative 2 and soil cover, surface soil/fill material excavation and management of excavated material included in Alternative 3. Construction of Alternatives 2 and 3 would result in greater greenhouse gas impacts than Alternative 1 and construction of Alternative 4 would result in substantially greater greenhouse gas impacts than the other alternatives. Consistent with NYSDEC and EPA policies on green remediation, sustainability considerations will not be used to justify implementation of the no-action alternative or a less comprehensive alternative when a more comprehensive remedy is called for, appropriate, and feasible.

Worker and community risks during remedy implementation are significantly greater for Alternative 4 compared to Alternatives 2 and 3. Specifically, the added risks to workers and the community, the added duration to achieve RAOs, the significant

traffic impacts to the community, and the significantly greater environmental footprint associated with Alternative 4 would be less effective in the short-term relative to Alternatives 2 and 3.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake.

Alternatives 2 through 4 would employ technologies (soil covers and excavation) known to be reliable and that can be readily implemented. Equipment, services and materials needed for these alternatives are readily available. Monitoring the effectiveness of the soil covers under Alternatives 2 and 3 would be accomplished through inspections and maintenance to verify continued cover integrity, visual signs of erosion, and condition of the soil cover. Areas of wetland restoration/mitigation under Alternatives 2 and 3 would be monitored for signs of erosion, condition of vegetation, and presence of invasive species. A SMP and periodic reviews would also be implemented under Alternatives 2 and 3 for the purpose of monitoring and documenting remedy effectiveness, managing remaining contamination, and implementing measures as needed to prevent human exposures, in addition to groundwater monitoring as a means to assess potential changes in groundwater concentrations.

The actions under Alternatives 2 through 4 would be administratively feasible. They would require access across the CSX Railroad tracks and work in proximity to the railroad, Onondaga Lake, Onondaga Creek, and Ley Creek. Alternatives 2 through 4 would also require coordination with other agencies, including NYSDEC, New York State Department of Transportation, NYSDOH, USEPA, USFWS, City of Syracuse, and CSX Railroad. Coordination with Onondaga County would also be necessary since it is the property owner and for maintenance of the multi-use recreational trail.

Alternative 3, which includes Alternatives 3A (on-Site reuse of excavated material) and 3B (off-Site disposal of excavated material), would be more difficult to implement than Alternative 2. Specifically, a geotechnical evaluation concluded that global stability associated with excavation in the vicinity of the railroad tracks under Alternative 3 is anticipated to limit implementability of this alternative. CSX Railroad concurrence with remedial design of the cover and excavation elements included in this alternative would be required. Thus, stability concerns may affect the implementability of this alternative. Additionally, Alternative 3A is less implementable than Alternative 2, because it is necessary to evaluate and identify on-Site reuses to manage the additional spoils anticipated during implementation of Alternative 3A. Alternative 3B is less implementable than Alternative 2 because off-Site transport and disposal included under Alternative 3B would result in impacts to CSX Railroad operations requiring additional crossing and coordination with railroad traffic proximate to the Site. In addition, landfill disposal capacity would require confirmation prior to implementation of Alternative 3B.

Alternative 4 would be the most difficult to implement in comparison to Alternatives 2 and 3 for the following reasons:

- There are significant implementability limitations associated with the excavation, transportation, and disposal (capacity) for approximately 400,000 cy of soil/fill material.
- There are challenging construction water management and greater slope stability concerns relative to the active CSX Railroad lines when compared to the shallow excavations included under Alternative 3, which would require CSX concurrence. Construction water management using a temporary treatment system is anticipated to be significant during the excavation, as large water volumes are anticipated due to the presence of heterogenous and permeable fill and excavations in proximity of the on-Site wetlands, Onondaga Lake, Onondaga Creek, and Ley Creek. Excavations in the vicinity of active railroads, subsurface utilities, and surface water bodies are anticipated to limit the implementability of excavations in certain areas and require the costly design, procurement, and installation of shoring. As part of the supporting geotechnical evaluations, installation of sheet piling would be evaluated and installed, if required, to support excavations in these areas.
- There are also significant transportation concerns related to Alternative 4. The estimated volume requiring disposal is 400,000 cy (estimated to be approximately 615,000 tons). Based on a daily production rate of 500 cy per day for 10 months of the year, it is estimated that up to approximately 100,000 cy of material could be shipped off-Site each year in 7,000 truckloads (up to 35 truckloads per day) with an approximately equivalent number of trips being required for restoration, over a duration of 5 to 7 years. During a 10-hour workday, this would equate to approximately one truck entering or leaving the Site every 10 minutes. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude is anticipated to result in significant adverse effects on conditions of roadways.
- Ecological considerations limit the implementability of Alternative 4, including the removal of trees providing valuable forested habitat and that are utilized by bald eagles. The Site serves as a winter roost site and concentration area for a large number of bald eagles; a State-listed Threatened species. Alternative 4 would require the disturbance of 23.5 acres and the Site-wide removal of trees that serve as an important habitat, and it is anticipated it would take several decades to restore.

Cost

The estimated capital, annual O&M, and present-worth costs for each of the alternatives are presented in the table below. The present-worth costs were calculated using a discount rate of seven percent and a 30-year time interval for post-construction monitoring and maintenance period (although O&M would continue as needed beyond the 30-year period, 30 years is the typical period used when estimating costs for a comparative analysis).

Alternative	Capital Cost	Annual O&M Cost	Total Present Worth Cost
1 – No Action	$0	$0	$0
2 – Soil Cover in Select Areas, Wetland Restoration, Biota Monitoring, and MNA	$7.5 million	$181,000	$8.3 million
3A – Surface Excavation with On-Site Reuse and Soil Cover/Wetland Restoration on Perimeter and Interior Areas, Biota Monitoring, MNA, with Limited Tree Removal	$21.1 million	$185,000	$21.9 million
3B – Surface Excavation with Off-Site Disposal and Soil Cover/Wetland Restoration on Perimeter and Interior Areas, Biota Monitoring, MNA, with Limited Tree Removal	$26.2 million	$185,000	$27.0 million
4 - Full Removal and Off-Site Disposal with Wetland Restoration and MNA	$281.2 million	$57,000	$281.3 million

State Acceptance

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

Community Acceptance

Community acceptance of the preferred alternative 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 2 – Soil Cover in Select Areas, Wetland Restoration, Biota Monitoring, and MNA as the preferred alternative. The preferred alternative includes the installation of an 8.2-acre 2-foot-thick soil cover in select areas of the Site, as well as biota monitoring to evaluate the protectiveness of ecological resources and remedy effectiveness. To restore wetland areas, contaminated soil may be removed prior to cover placement to a depth necessary to preserve wetland conditions and functions. Monitoring the natural attenuation of naphthalene in the groundwater, development of a SMP, implementation of ICs, and long-term maintenance and monitoring are also components of the proposed remedy. A conceptual depiction of the preferred remedy is presented in Figure 11.

The remedial footprint is targeted to reduce ecological exposure within the cover footprint and to defer remediation in the forested SYW-12 habitat to preserve current bald eagle habitat. Specifically, damage to root zones or removal of mature trees used for eagle roosting would be avoided under the preferred Alternative 2.

A surface soil pre-design investigation and tree survey would be performed to evaluate the addition of up to seven areas, totaling 2.2 acres, to the remediation footprint. The areas for consideration include two areas within the forested wetland characterized by scrub vegetation on the northern portion of the Site, four areas within the non-forested wetland on the western portion of the Site, and one upland forested area on the southern portion of the Site (purple outlined areas on Figure 11). Should surface soil sampling and the tree survey indicate that elevated surface soil/fill material contaminant concentrations are present and large trees would not need to be removed or disturbed (*e.g.,* within the drip-zone of the large trees), soil excavation and backfilling of these areas with clean material would be considered during the design.

To minimize loss of wetland acreage or function, wetland conditions and functions would be integrated into the areas where the cover would be placed within the current wetland footprint. To improve the success of the restored wetlands, the remedial design would consider excavation and/or grading to allow for continued wetland functions and values. An evaluation would be conducted as part of the cover design to promote sufficient flooding and saturation to facilitate the development of wetland soils and hydrology appropriate for native plants and other habitat in conjunction with grading/soil profile design such that wetland conditions and functions are addressed. Where the water budget and/or grading cannot replace wetland conditions or functions, additional mitigation measures would be included during the design.

The soil covers would also be installed to support and preserve existing mature trees present proximate to the proposed cover to allow for future tree succession. Additional tree-planting may be performed as part of restoration. Where cover material is placed, a demarcation layer would be evaluated during the remedial design to delineate the boundary between the contaminated soil/fill material and the soil cover and would be compatible with the wetland or tree growth, as necessary. The demarcation layer would provide evidence of cap erosion and provide a warning that contaminated material may exist below the demarcation layer.

Excavated soil reuse options and limitations (*e.g.,* within wetland areas), impacts to the bald eagle habitat, and the final wetland restoration approach, including opportunities to improve wetland functions and values, planting of trees and sustainable remediation principles would be further evaluated during the pre-design and design phases. Should reuse of excavated/graded/handled materials not be possible at the Site following remedial design evaluations, the material would need to be managed off-Site.

Because of the Onondaga County trail construction, geotechnical concerns, and discussion and coordination with railroad operations, the boundaries of the remedy illustrated in Figure 11 are conceptual. It is anticipated that there would be no excavation in wetland areas adjacent to the railroad based on stability concerns. Mitigation would be necessary where construction results in a loss of wetland acreage or function and wetland conditions cannot be returned. The extent of the cover would be revisited during the design phase based on pre-design sampling and other activities and in consideration of the trail alignment. Onondaga County has included signage requiring recreational users to remain on the trail in the design for the multi-use recreational trail. The potential need for additional measures (*e.g.,* fencing/railing, maintaining dense vegetation along the trail, improved signage, and/or sampling) would be reviewed during the design phase and based on management of the trail.

Biota monitoring would be performed to evaluate remedy effectiveness and assess protectiveness of ecological receptors. A baseline sampling program, consisting of two sampling events, would be implemented, with subsequent sampling events following remedy implementation using an adaptive, data-driven approach (*e.g.,* years 3 and 5). A field assessment of Site vegetative community composition (*e.g.,* diversity, richness, invasive species evaluation) and qualitative wildlife community observations would be performed to support the biota monitoring program. The field assessment would also include an evaluation of Site trees, specifically trees that serve as roosts for bald eagles, for overall health and preservation. Specific sample locations, species, sample and analytical methods, and frequencies would be assessed and established during the remedial design. It is assumed that the monitoring program would consist of analysis of soil invertebrate and small mammal tissue, with collection of co-located surface soil/fill material samples for laboratory analysis of chemical constituents. The details related to the scope of biota sampling would be developed during the remedial design phase.

Periodic sampling and analysis of groundwater would be included as a means of detecting changes in groundwater concentrations and monitoring the natural attenuation of naphthalene in groundwater. Natural attenuation of other contaminants may be evaluated, if necessary. Specific monitoring locations, parameters, and frequencies would be established during remedial design. For cost estimation purposes, it was assumed that the monitoring program would consist of semi-annual sampling of ten monitoring wells with analyses for VOCs, SVOCs (including PAHs), metals, mercury, cyanide, and cations/anions. However, the specific number of wells and analyses will be determined during remedial design or site management.

The cover would require routine maintenance and inspection to maintain integrity and proper function.

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

- Institutional and Engineering Control Plan that identifies all use restrictions and ECs for the Site and documents the steps and media-specific requirements necessary to ensure the following ECs and ICs remain in place and effective:
    - environmental easements and/or restrictive covenants described above;

    - soil cover described above;
    - future remediation/management of areas where no cover is present at the Site (*e.g.,* due to erosion or changes in vegetation);
    - excavation plan that details the provisions for management of future excavations on the Site ;
    - descriptions of the provisions of the ICs, including any land use or groundwater use restrictions;
    - a soil vapor intrusion evaluation will be completed and appropriate actions implemented for any on-Site buildings, if they were to be constructed;
    - provisions for the management and inspection of the identified ECs;
    - protection measures to be implemented while conducting any needed subsurface soil disturbance activities to prevent exposure to sheens or blebs of NAPL;
    - maintaining Site access controls and NYSDEC notification; and
    - steps necessary for periodic reviews and certification of the ECs and/or ICs.
- Monitoring Plan to assess the performance and effectiveness of the remedy. Elements of the monitoring plan will include groundwater and biota monitoring, and success or repair of habitat and wetland restoration/mitigation. The monitoring plan will include assessing restoration success and repair, wetland delineation, and invasive species management during restoration. 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 remedy for the Site be reviewed at least once every five years.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy - DER-31 and EPA's Region 2 Clean and Green Policy, would be considered during remedy implementation 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 the soil cover, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.*, less mowing), allow for infiltration of storm water and/or be integrated with the planned use of the property;
- Maximizing habitat value and creating habitat when possible;
- Reuse of material that would otherwise be considered a waste; and
- Use of Ultra Low Sulfur Diesel.

BASIS FOR THE REMEDY PREFERENCE

Alternative 1 does not satisfy the threshold criteria, because it does not provide protection of human health or the environment or provide a means to attain ARARs. Alternatives 2 and 3 provide a balance between addressing the human health and ecological risks and protecting bald eagle habitat at the Site and addressing the ARARs. Alternative 4 satisfies the threshold criteria, however, this alternative would significantly impact the bald eagle habitat at the Site.

As described below, Alternative 2 is more effective at achieving the primary balancing criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost) than would be achieved under Alternatives 3 or 4.

Alternatives 2 and 3 would provide similar degrees of protectiveness relative to potential exposure to contaminated soil/fill material and groundwater, although surface soil SCO exceedances may be present in areas where cover is not being placed. Alternatives 2 and 3 are also comparable in terms of the primary balancing criterion, reduction of toxicity, mobility, or volume through treatment (neither alternative employs treatment) and both would support the anticipated future use of the Site for a multi-use recreational trail, while preserving trees utilized seasonally by bald eagles for foraging and roosting. Alternative 3 would provide some additional long-term effectiveness and permanence relative to Alternative 2, as it would result in the remediation of a greater acreage of wetland area, though this would result in impacts to the valuable forested habitat. However, relative to Alternative 3, Alternative 2 would better meet the primary balancing criteria for implementability, short-term effectiveness, and cost, as Alternative 3 would potentially present geotechnical stability issues for the nearby CSX Railroad that limit its implementability, may require an additional construction season to implement resulting in more potential community impacts, and would require an additional cost expenditure of approximately $13-19 million.

Site-wide excavation of contaminated soil/fill material under Alternative 4 would present greater geotechnical stability concerns along the railroad tracks as compared to Alternative 3. When considering the primary balancing criteria, Alternative

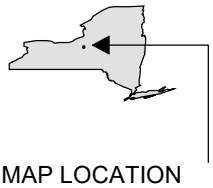
4 does not compare favorably because this alternative is significantly less implementable than Alternatives 2 and 3 and cannot be constructed without significantly impacting the forested habitat, including the bald eagle habitat. Furthermore, Alternative 4 would involve disturbing a substantial quantity of soil requiring significant water management and material transportation and would involve challenges with slope stability and would likely have impacts on nearby railroad operations. As a result of the additional construction challenges under Alternative 4, the alternative would take significantly longer to implement, and the Alternative 4 cost is more than an order of magnitude greater than the costs for Alternatives 2 and 3.

Overall, while satisfying the threshold criteria, Alternative 2 best satisfies the primary balancing criteria, as it is more implementable than Alternatives 3 and 4 and can be constructed with less short-term impacts to the community and to the CSX Railroad. In addition, Alternative 2 is less costly than Alternatives 3 and 4.

Based on information currently available, NYSDEC and EPA believe that 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).

FIGURE 1

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
GEDDES AND SYRACUSE, NY



MAP LOCATION

OU-1 LOCATION

N

0 1,000 2,000 4,000
Feet

SEPTEMBER 2018
1163.61858

1:24,000

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 06/13/18 12:52:23 PM RozwodBJ

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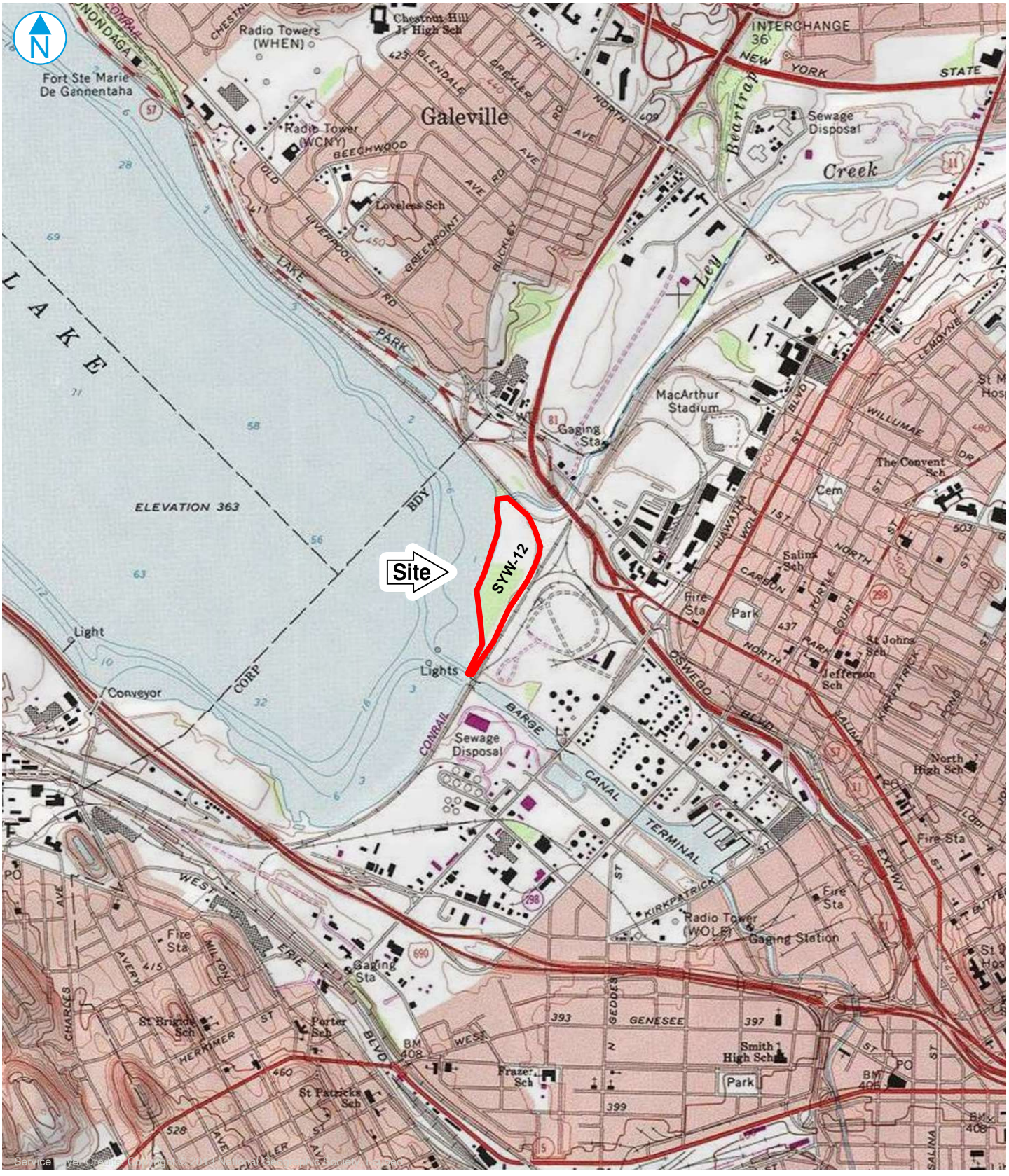

KEY MAP

Map Scale: 1:1:24,000;
Map Center: 76°10'33"W 43°4'17"N

0 1,000 2,000 Feet

SITE LOCATION

HONEYWELL INTERNATIONAL INC.
SYW-12 PROPOSED REMEDIAL ACTION PLAN
SYRACUSE, NEW YORK

FIGURE 2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/1/2022 | DESIGNER: MONETANT

ONONDAGA LAKE

WESTERN NON-FORESTED WETLANDS TOTAL AREA = 1.3

EASTERN NON-FORESTED WETLANDS TOTAL AREA = 5.2

CSX RAILROAD TRACKS

Harborside Dr

ONONDAGA CREEK

LEY CREEK

Onondaga Lake Pkwy

Park St

370

81

P and C Pkwy

Service Layer Credits: NYS GIS Program Office, Westchester County GIS

NOTE:
THE WETLAND DELINEATION IS BASED ON A 2018 DELINEATION TO REEVALUATE WETLAND BOUNDARIES BETWEEN CSX RAILROAD TRACKS AND ONONDAGA CREEK (ANCHOR QEA 2018).

FORESTED UPLAND (7.4 AC)
NONFORESTED UPLAND (3.0 AC)
FORESTED WETLAND (6.6 AC)
NONFORESTED WETLAND (6.5 AC)
SITE BOUNDARY

0 125 250 Feet

SITE PLAN

HONEYWELL INTERNATIONAL INC.
SYW-12 PROPOSED REMEDIAL ACTION PLAN
SYRACUSE, NEW YORK

FIGURE 3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

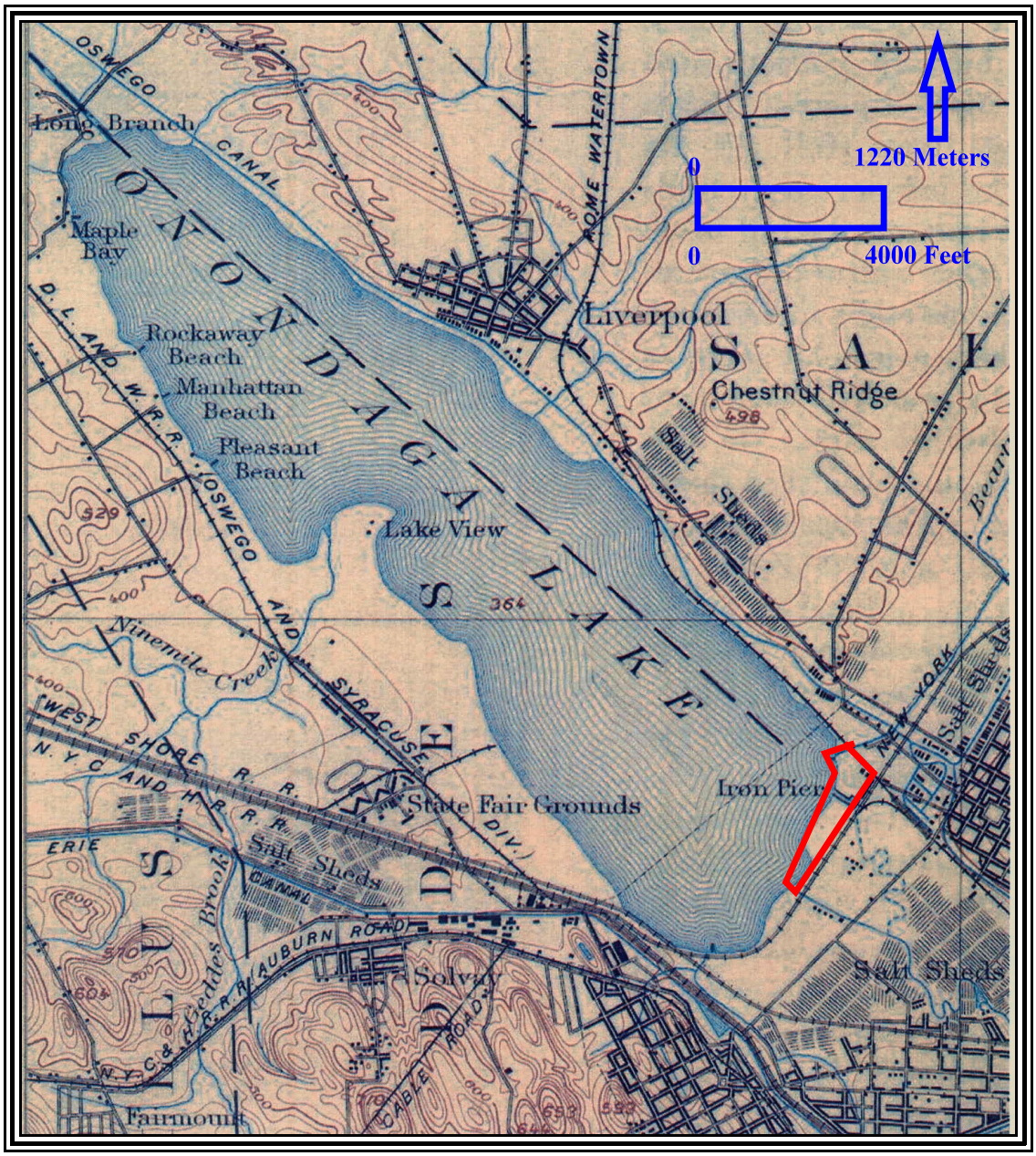

Figure 4. 1898 15-minute Syracuse East USGS quadrangle, with approximate area of the SYW-12 Site highlighted.

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PROJECT: 1940065696 | DATED: 3/2/2022 | DESIGNER: MONETANT

NOTE:
COMMERCIAL SCO= 9.3 mg/kg
POGW SCO= 7.5 mg/kg
ECO SCO= 4.0 mg/kg
J = ESTIMATED VALUE

COMMERCIAL, PROTECTION OF ECOLOGICAL RESOURCES (ECO), AND PROTECTION OF GROUNDWATER (POGW) SOIL CLEANUP OBJECTIVES (SCOS) ARE BASED ON 6 NYCRR PART 375-6.8(B) RESTRICTED USE SCOS

HUMAN HEALTH RISK ASSESSMENT (HHRA) ESTIMATED ACCEPTABLE RISKS TO HUMAN RECEPTORS UNDER ANTICIPATED SITE USE.

LEGEND
- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS
- < ECO SCO
- EXCEEDED ECO SCO
- EXCEEDED ECO AND POGW SCO
- EXCEEDED ECO, POGW AND COMMERCIAL SCO

DEPTH
- 0 - 6"
- 6" - 1'
- 1' - 2'

CADMIUM
RESULT IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 5

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696| DATED: 3/2/2022 | DESIGNER: MONETANT

NOTE:
COMMERCIAL SCO= 1,500 mg/kg
POGW SCO= N/A
ECO SCO= 41 mg/kg
J = ESTIMATED VALUE

COMMERCIAL, PROTECTION OF ECOLOGICAL RESOURCES (ECO), AND PROTECTION OF GROUNDWATER (POGW) SOIL CLEANUP OBJECTIVES (SCOS) ARE BASED ON 6 NYCRR PART 375-6.8(B) RESTRICTED USE SCOS .

HUMAN HEALTH RISK ASSESSMENT (HHRA) ESTIMATED ACCEPTABLE RISKS TO HUMAN RECEPTORS UNDER ANTICIPATED SITE USE.

LEGEND
- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS
- < ECO SCO
- EXCEEDS ECO SCO
- EXCEEDS BOTH ECO AND COMMERCIAL SCO

DEPTH
- 0 - 6"
- 6" - 1'
- 1' - 2'

CHROMIUM
RESULTS IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 6

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/2/2022 | DESIGNER: MONETANT

NOTE:
COMMERCIAL SCO= 2.8 mg/kg
POGW SCO= 0.73 mg/kg
ECO SCO= 0.18 mg/kg
J = ESTIMATED VALUE

COMMERCIAL, PROTECTION OF ECOLOGICAL RESOURCES (ECO), AND PROTECTION OF GROUNDWATER (POGW) SOIL CLEANUP OBJECTIVES (SCOS) ARE BASED ON 6 NYCRR PART 375-6.8(B) RESTRICTED USE SCOS .

HUMAN HEALTH RISK ASSESSMENT (HHRA) ESTIMATED ACCEPTABLE RISKS TO HUMAN RECEPTORS UNDER ANTICIPATED SITE USE.

LEGEND

- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- ▲ SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS

- < ECO SCO
- EXCEEDED ECO SCO
- EXCEEDED ECO AND POGW SCO
- EXCEEDED ECO, POGW AND COMMERCIAL SCO

DEPTH

- 0 - 6"
- 6" - 1'
- 1' - 2'

MERCURY
RESULTS IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 7

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/2/2022 | DESIGNER: MONETANT

NOTE:
COMMERCIAL SCO= 1.0 mg/kg
ECO SCO= 2.6 mg/kg
POGW SCO= 22 mg/kg
J = ESTIMATED VALUE

COMMERCIAL, PROTECTION OF ECOLOGICAL RESOURCES (ECO), AND PROTECTION OF GROUNDWATER (POGW) SOIL CLEANUP OBJECTIVES (SCOS) ARE BASED ON 6 NYCRR PART 375-6.8(B) RESTRICTED USE SCOS

HUMAN HEALTH RISK ASSESSMENT (HHRA) ESTIMATED ACCEPTABLE RISKS TO HUMAN RECEPTORS UNDER ANTICIPATED SITE USE.

LEGEND
- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS
- < COMMERCIAL SCO
- EXCEEDED COMMERCIAL SCO
- EXCEEDED ECO AND COMMERCIAL SCO
- EXCEEDED ECO, POGW AND COMMERCIAL SCO

DEPTH
- 0 - 6"
- 6" - 1'
- 1' - 2'

BENZO(A)PYRENE
RESULTS IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 8

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1163.65696 | DATED: 3/2/2022 | DESIGNER: MONETANT
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LEGEND

- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- ▲ SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS

- < ECO SCO
- EXCEEDED ECO AND COMMERCIAL SCO
- EXCEEDED ECO, COMMERCIAL AND POGW SCO

DEPTH

- 0 - 6"
- 6" - 1'
- 1' - 2'

TOTAL PCB
RESULTS IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 9

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/2/2022 | DESIGNER: MONETANT

NOTE:
ECO SCO= 0.0033 mg/kg
COMMERCIAL SCO= 47.0 mg/kg
POGW SCO= 136 mg/kg
ND = NON-DETECT RESULT BELOW THE DETECTION LIMIT
J = ESTIMATED VALUE
JN = ESTIMATED, UNCONFIRMED VALUE

COMMERCIAL, PROTECTION OF ECOLOGICAL RESOURCES (ECO), AND PROTECTION OF GROUNDWATER (POGW) SOIL CLEANUP OBJECTIVES (SCOS) ARE BASED ON 6 NYCRR PART 375-6.8(B) RESTRICTED USE SCOS

HUMAN HEALTH RISK ASSESSMENT (HHRA) ESTIMATED ACCEPTABLE RISKS TO HUMAN RECEPTORS UNDER ANTICIPATED SITE USE.

LEGEND
- FORESTED UPLAND
- DELINEATED FORESTED WETLAND
- DELINEATED NON-FORESTED WETLAND
- ▲ SOIL SAMPLE

0 75 150 Feet

SOIL ANALYTICAL RESULTS
- < ECO SCO
- EXCEEDED ECO SCO
- EXCEEDED ECO AND COMMERCIAL SCO
- EXCEEDED ECO, POGW AND COMMERCIAL SCO

DEPTH
- 0 - 6"
- 6" - 1'
- 1' - 2'

4-4-DDT
RESULTS IN SURFACE SOIL (MG/KG)

HONEYWELL INTERNATIONAL INC.
SYW-12 FEASIBILITY STUDY
SYRACUSE, NY

FIGURE 10

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/4/2022 | DESIGNER: MONETANT

ONONDAGA LAKE

ENGINEERED COVER IN NON-FORESTED AREA
- PERCHED WETLAND COVER (7.5 ACRES)

UNDISTURBED EAGLE ROOSTING HABITAT
- UNDISTURBED FORESTED HABITAT (15.3 ACRES)

ENGINEERED SOIL COVER IN NON-FORESTED AREA
- UPLAND VEGETATED SOIL COVER (0.7 ACRES)

ALSO INCLUDES:
- WETLAND RESTORATION/MITIGATION
- GROUNDWATER MONITORING
- MONITORED NATURAL ATTENUATION
- ON-SITE REUSE AND/OR OFF-SITE DISPOSAL OF EXCAVATED SOIL/FILL MATERIAL
- INSTITUTIONAL CONTROLS
- BIOTA MONITORING
- PRE-DESIGN SOIL SAMPLING AND TREE SURVEY

CSX RAILROAD TRACKS
Park St
Onondaga Lake Pkwy
370
LEY CREEK
24B 24A
Harborside Dr
ONONDAGA CREEK
Service Layer Credits: NYS ITS GIS Program Office, Westchester County GIS

POTENTIAL FUTURE TRAIL EXTENSION
PLANNED RECREATIONAL TRAIL ALIGNMENT
UPLAND VEGETATED SOIL COVER (0.7 AC)
PERCHED WETLAND COVER (7.5 AC)
SITE BOUNDARY
POTENTIAL ADDITIONAL REMEDIAL AREAS (E.G., BASED ON SOIL SAMPLING, TREE SURVEY)

0 125 250 Feet

SYW-12 ALTERNATIVE 2
ENGINEERED COVER ON PERIMETER AREA (8.2 ACRES), WETLAND RESTORATION / CREATION, BIOTA MONITORING, AND MNA

HONEYWELL INTERNATIONAL INC.
SYW-12 PROPOSED REMEDIAL ACTION PLAN
SYRACUSE, NEW YORK

FIGURE 11

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1940065696 | DATED: 3/4/2022 | DESIGNER: MONETANT

POTENTIAL FUTURE TRAIL EXTENSION

PLANNED RECREATIONAL TRAIL ALIGNMENT

UPLAND VEGETATED SOIL COVER (3 AC)

SURFACE EXCAVATION / WETLAND RESTORATION (6.5 AC)

ON-SITE CONSOLIDATION AREA (ALTERNATIVE 4A)

POTENTIAL ADDITIONAL REMEDIAL AREAS (E.G., BASED ON SOIL SAMPLING, TREE SURVEY)

SITE BOUNDARY

0 110 220 Feet

SYW-12 ALTERNATIVE 3A/B

SURFACE EXCAVATION AND ENGINEERED COVER / RESTORATION ON PERIMETER AND INTERIOR AREAS (10 ACRES), BIOTA MONITORING, AND MNA, WITH LIMITED TREE REMOVAL

HONEYWELL INTERNATIONAL INC.

SYW-12 PROPOSED REMEDIAL ACTION PLAN
SYRACUSE, NEW YORK

FIGURE 12

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

ONONDAGA LAKE

FULL EXCAVATION
- REMOVAL OF ALL TREES AND EXISTING HABITAT TO FACILITATE EXCAVATION (23.5 ACRES)
- EXCAVATION (23.5 ACRES)

6-FT EXCAVATION
4.7 ACRES

8-FT EXCAVATION
3.9 ACRES

12-FT EXCAVATION
12.3 ACRES

16-FT EXCAVATION
2.6 ACRES

CSX RAILROAD TRACKS

Harborside Dr

Park St

Onondaga Lake Pkwy

370

248 24A

NOTE:
THIS ALTERNATIVE WOULD BE EXTREMELY DIFFICULT TO IMPLEMENT DUE TO STABILITY CONCERNS AND PROXIMITY TO ACTIVE RAILROAD TRACKS.

ALSO INCLUDES:
- RESTORATION
  - FORESTED UPLAND (7.4 ACRES)
  - NON-FORESTED UPLAND (3.0 ACRES)
  - FORESTED WETLAND (6.6 ACRES)
  - NON-FORESTED WETLAND (6.5 ACRES)
- MONITORED NATURAL ATTENUATION
- FULL EXCAVATION TO APPROXIMATELY 6 TO 16 FT BGS
- OFF-SITE DISPOSAL OF EXCAVATED SOIL/ FILL MATERIAL
- GROUNDWATER MONITORING
- INSTITUTIONAL CONTROLS

POTENTIAL FUTURE TRAIL EXTENSION

PLANNED RECREATIONAL TRAIL ALIGNMENT

FORESTED AND NON-FORESTED UPLAND (10.4 AC) | FORESTED AND NON-FORESTED WETLAND (13.1 AC)

EXCAVATION AREA (23.5 AC)

0 125 250 Feet

SYW-12 ALTERNATIVE 4
FULL REMOVAL (INCLUDING ALL TREES) AND OFF-SITE DISPOSAL (23.5 ACRES)

HONEYWELL INTERNATIONAL INC.
SYW-12 PROPOSED REMEDIAL ACTION PLAN
SYRACUSE, NEW YORK

FIGURE 13

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

Table 1
SYW-12 Site
Surface Soils (0-2 ft bgs)
Summary of Detected Concentrations and Part 375 SCO Exceedances

Parameter	Number of Samples	Number of Detects	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Unrestricted Use SCOS	Number of Unrestricted Use SCO Exceedances	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Ecological SCOs	Number of Ecological SCO Exceedances
Semivolatile Organic Compounds (µg/kg)										
BENZO(A)ANTHRACENE	63	63	140	7,300	1,000	48	5,600	6	NC	0
BENZO(A)PYRENE	63	63	130	9,100	1,000	49	1,000	49	2,600	20
BENZO(B)FLUORANTHENE	63	63	180	12,000	1,000	51	5,600	10	NC	0
BENZO(K)FLUORANTHENE	63	63	63	4,500	800	40	56,000	0	NC	0
CHRYSENE	63	63	140	9,200	1,000	49	56,000	0	NC	0
DIBENZO(A,H)ANTHRACENE	63	57	63	1,100	330	22	560	9	NC	0
INDENO(1,2,3-CD)PYRENE	63	62	52	2,800	500	35	5,600	0	NC	0
Pesticides (µg/kg)										
4,4'-DDD	63	9	6.5	73	3.3	9	92,000	0	3.3	9
4,4'-DDE	63	3	0.5	3.6	3.3	1	62,000	0	3.3	1
4,4'-DDT	63	21	2.5	100	3.3	20	47,000	0	3.3	20
DIELDRIN	63	10	4.9	30	5	9	1,400	0	6	9
ENDRIN	63	1	26	26	14	1	89,000	0	14	1
PCBs (µg/kg)										
AROCLOR-1254	63	58	31	2,110	NC	0	NC	0	NC	0
AROCLOR-1260	63	58	29.6	1,360	NC	0	NC	0	NC	0
Total PCBs	63	58	65.3	3,470	100	50	1,000	8	1,000	8
Metals (mg/kg)										
CADMIUM	63	63	1	52	2.5	55	9.3	34	4	53
CHROMIUM	63	63	7.3	410	30	55	1,500	0	41	49
COPPER	63	63	7.3	330	50	47	270	4	50	47
LEAD	63	63	9.1	390	63	51	1,000	0	63	51
MERCURY	63	63	0.07	8.6	0.18	60	2.8	13	0.18	60
NICKEL	63	63	3.4	87	30	28	310	0	30	28
SILVER	63	57	0.34	13	2	32	1,500	0	2	32
ZINC	63	63	37	780	109	56	10,000	0	109	56

NOTES
This table presents (1) RI Report and SCI data only, (2) the detected concentration data only and (3) only parameters that exceeded the Part 375 Unrestricted, Restricted-Commercial or Restricted-Protection of Ecological SCOs.
NC = No criteria available.
SCO = Soil Cleanup Objectives; NYSDEC = New York State Department of Environmental Conservation.

Table 2
SYW-12 Site
Subsurface Soils (>2 ft bgs)
Summary of Detected Concentrations and Part 375 SCO Exceedances

Parameter	Number of Samples	Number of Detects	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Part 375 Unrestricted Use SCOS	Number of Unrestricted Use SCO Exceedances	NYSDEC Part 375 Restricted Use - Commercial SCOs	Number of Commercial SCO Exceedances	NYSDEC Part 375 Restricted Use - Ecological SCOs	Number of Ecological SCO Exceedances
Volatile Organic Compounds (µg/kg)										
2-BUTANONE	40	22	3.1	220	120	1	500,000	0	100,000	0
ACETONE	40	15	14.2	730	50	9	500,000	0	2,200	0
ETHYLBENZENE	40	22	1.2	11,200	1,000	9	390,000	0	NC	0
METHYLENE CHLORIDE	40	2	5.3	80	50	1	500,000	0	12,000	0
XYLENES, TOTAL	40	24	0.96	15,300	260	9	500,000	0	260	9
Semivolatile Organic Compounds (µg/kg)										
4-METHYLPHENOL	21	8	84	1,800	330	4	500,000	0	NC	0
ACENAPHTHENE	40	33	53	210,000	20,000	4	500,000	0	20,000	4
BENZO(A)ANTHRACENE	40	34	161	53,000	1,000	31	5,600	15	NC	0
BENZO(A)PYRENE	40	34	307	46,000	1,000	31	1,000	31	2,600	28
BENZO(B)FLUORANTHENE	40	34	236	45,000	1,000	32	5,600	12	NC	0
BENZO(K)FLUORANTHENE	40	34	97	9,500	800	28	56,000	0	NC	0
CHRYSENE	40	34	201	59,000	1,000	31	56,000	1	NC	0
DIBENZO(A,H)ANTHRACENE	40	32	66.9	4,220	330	27	560	20	NC	0
FLUORENE	40	33	48	86,000	30,000	3	500,000	0	30,000	3
INDENO(1,2,3-CD)PYRENE	40	34	160	8,350	500	31	5,600	5	NC	0
NAPHTHALENE	40	33	43.2	380,000	12,000	6	500,000	0	NC	0
PHENANTHRENE	40	34	65.1	280,000	100,000	3	500,000	0	NC	0
PYRENE	40	34	279	140,000	100,000	2	500,000	0	NC	0
Pesticides (µg/kg)										
4,4'-DDD	21	1	4.4	4.4	3.3	1	92,000	0	3.3	1
4,4'-DDT	21	3	4.9	31	3.3	3	47,000	0	3.3	3
PCBs (µg/kg)										
AROCLOR-1248	40	1	1,110	1,110	NC	1	NC	1	NC	1
AROCLOR-1254	40	6	7.88	1,530	NC	3	NC	2	NC	2
AROCLOR-1260	40	6	12.2	853	NC	2	NC	0	NC	0
Total PCBs	40	6	18.3	2640	100	3	1,000	2	1,000	2
Metals (mg/kg)										
ARSENIC	40	37	1.5	19.7	13	3	16	2	13	3
CADMIUM	40	31	0.31	100	2.5	13	9.3	2	4	4
CHROMIUM	40	40	3	470	30	13	1,500	0	41	8
COPPER	40	40	2.8	450	50	27	270	1	50	27
LEAD	40	40	1.5	437	63	29	1,000	0	63	29
MERCURY	40	40	0.0069	6	0.18	29	2.8	4	0.18	29
NICKEL	40	40	3.6	116	30	21	310	0	30	21
SILVER	40	28	0.23	13	2	18	1,500	0	2	18
ZINC	40	40	11	1,200	109	27	10,000	0	109	27

NOTES
This table presents (1) RI Report and SCI data only, (2) the detected concentration data only and (3) only parameters that exceeded the Part 375 Unrestricted, Restricted-Commercial or Restricted-Protection of Ecological SCOs.
NC = No criteria available.
SCO = Soil Cleanup Objectives; NYSDEC = New York State Department of Environmental Conservation.

Table 3
SYW-12 Site
Shallow and Intermediate Groundwater
Summary of Detected Concentrations and Class GA SGV and EPA MCL Exceedances

Parameter	Number of Samples	Number of Detects	Minimum Detected Conc.	Maximum Detected Conc.	NYSDEC Class GA SGVs	Number of Class GA Exceedances	EPA National Primary Drinking Water MCLs	Number of MCL Exceedances
Volatile Organic Compounds (µg/L)								
ETHYLBENZENE	26	3	0.48	14.8	5(S)	2	700	0
ISOPROPYLBENZENE	26	5	0.23	5.25	5(G)	1	NC	0
O-XYLENE	3	2	2.1	7.3	5(S)	1	NC	0
XYLENES, TOTAL	26	5	0.45	15.2	5(S)	2	10,000	0
Semivolatile Organic Compounds (µg/L)								
4-METHYLPHENOL	23	3	0.36	2	1(S)	1	NC	0
4-NITROPHENOL	26	1	1.1	1.1	1(S)	1	NC	0
ACENAPHTHENE	26	13	0.53	41	20(G)	1	NC	0
NAPHTHALENE	26	5	1.6	170	10(G)	4	NC	0
Pesticides (µg/L)								
Alpha-BHC	23	2	0.0087	0.027	0.01(S)	1	NC	0
Metals (mg/L)								
BARIUM	26	18	0.12	2	1(S)	6	2	2
CHROMIUM	26	4	0.0093	0.16	0.05(S)	1	0.1	1
IRON	26	25	0.34	62.3	0.3(S)	25	NC	0
LEAD	26	4	0.005	0.041	0.025(S)	1	0.015	2
MAGNESIUM	26	20	23	176	35(G)	15	NC	0
MANGANESE	26	26	0.086	2.1	0.3(S)	23	NC	0
SODIUM	26	26	250	3,400	20(S)	26	NC	0
Inorganics (mg/L)								
BROMIDE	17	11	1.6	16.6	2(G)	9	NC	0
CHLORIDE	26	26	380	9,940	250(S)	26	NC	0
NITROGEN, AMMONIA (AS N)	3	3	5.5	36	2(S)	3	NC	0
SULFIDE	14	4	2	17.6	0.05(G)	4	NC	0

NOTES
This table presents (1) RI Report and 2019 follow up data only, (2) the detected concentration data only and (3) only parameters that exceeded the NYSDEC Class GA SGVs or USEPA Drinking Water MCLs.
NC = No criteria available.
(S) = Standard; (G) = Guidance Value; MCL = Maximum Contaminant Level; EPA = Environmental Protection Agency; NYSDEC = New York State Department of Environmental Conservation.

Table 4 – Human Health Risk Re-Evaluation Summary

Timeframe	Receptor	Exposure Medium	Cancer Risk	Non-Cancer Hazard	Hazard/Risk Driving COCs
Current/Future	Utility Worker	Surface/Subsurface Soil	3×10^{-6}	0.07	--
		Outdoor Air	4×10^{-7}	0.006	--
		Shallow Groundwater	6×10^{-5}	0.6	--
		All Media	6×10^{-5}	0.6	--
Current/Future	Child Recreator	Surface Soil	6×10^{-5}	0.9	--
		Outdoor Air	2×10^{-7}	0.006	--
		All Media	6×10^{-5}	0.9	--
Current/Future	Adult Recreator	Surface Soil	3×10^{-6}	0.05	--
		Outdoor Air	9×10^{-7}	0.006	--
		All Media	4×10^{-6}	0.06	--
Current/Future	Railroad Worker	Surface Soil	1×10^{-5}	0.2	--
		Outdoor Air	2×10^{-6}	0.01	--
		All Media	1×10^{-5}	0.2	--
Future	Commercial/ Industrial Worker	Surface Soil	2×10^{-5}	0.3	--
		Outdoor Air	9×10^{-6}	0.07	--
		All Media	2×10^{-5}	0.3	--
Future	Construction Worker	Surface/Subsurface Soil	1×10^{-6}	0.8	--
		Outdoor Air	2×10^{-7}	0.07	--
		Shallow Groundwater	3×10^{-5}	7.1	Benzo(a)pyrene, chromium[1]
		All Media	3×10^{-5}	8.0	Benzo(a)pyrene, chromium[1]
Future	Child Resident[2]	Surface Soil	9×10^{-5}	7.6	Highly chlorinated PCBs
		Outdoor Air	5×10^{-6}	0.4	--
		All Media	1×10^{-4}	7.9	Highly chlorinated PCBs
Future	Adult Resident[2]	Surface Soil	1×10^{-5}	0.2	--
		Outdoor Air	3×10^{-5}	0.2	--
		All Media	4×10^{-5}	0.4	--

- Shaded cells indicate exceedance of the USEPA acceptable cancer risk or non-cancer hazard threshold.

1 Based on HHRA results using groundwater data collected during RI; chromium and benzo(a)pyrene were not detected in groundwater monitoring well samples collected subsequent to the RI.

2 While child and adult resident receptors were evaluated in the HHRA, residential use would not be consistent with the anticipated future land use of the SYW-12 Site.