SECOND FIVE-YEAR REVIEW REPORT
WASTEBEDS 1-8 SUBSITE
ONONDAGA LAKE SITE
ONONDAGA COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BOH	Back of House
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMRA	Climate Mapping for Resilience and Adaptation Assessment
COC	chemical of concern
DCE	dichloroethylene
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
ICs	Institutional Controls
IRM	Interim Remedial Measure
LOAEL	Lowest-observed-adverse-effect-level
NOAEL	No-observed-adverse-effect-level
MSL	Mean Sea Level
mg/L	Milligram per Liter
mg/kg	Milligrams per Kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NMCSG	Ninemile Creek Sand and Gravel
NPL	National Priorities List
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SEMS	Superfund Enterprise Management System
SCO	Soil Cleanup Objective
SGV	Standard or Guidance Value
SMP	Site Management Plan
SVI	Soil Vapor Intrusion
TCE	trichloroethylene
UU/UE	Unlimited Use/Unrestricted Exposure
VOCs	Volatile Organic Compounds
VP	Vegetation Plot

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in FYR reports, such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

The Onondaga Lake Superfund site includes eleven subsites (subsites are defined as any site that is situated on Onondaga Lake's shores or tributaries that has contributed contamination to or threatens to contribute contamination to Onondaga Lake). Each subsite consists of one or more operable units (OUs). This FYR report evaluates the Wastebeds 1-8 subsite (Subsite).

This is the second FYR for the Subsite. The triggering action for this statutory review is the completion date of the first FYR, which was March 10, 2020. This FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the Subsite above levels that allow for unlimited use/unrestricted exposure (UU/UE).

The Subsite consists of two OUs--OU22, which addresses contaminated soil/fill/waste materials, as well as impacted media in a surface water drainage ditch (Ditch A), and OU29,[1] which will address the impacted shallow and intermediate groundwater at the Wastebeds 1-8. The deep groundwater is included in this OU as well as part of a regional study that includes the deep groundwater at the Semet Residue Ponds, Willis Avenue, and Wastebed B / Harbor Brook subsites. A remedial investigation/feasibility study (RI/FS)[2] is currently underway for OU2. Therefore, OU2 (i.e., EPA OU29) will not be evaluated in this FYR.

This FYR was led by the EPA remedial project manager (RPM) and lead author, Claudia Shuman. Participants included New York State Department of Environmental Conservation (NYSDEC) project manager Tracy Smith, EPA hydrogeologist Sabrina Gonzalez, EPA human health risk assessors Marian Olsen and Jinnie Hanlee, EPA ecological risk assessor Detbra Rosales, and EPA community involvement coordinator Larisa Romanowski. The potentially responsible party, Honeywell International Inc. (Honeywell), was notified of the initiation of the FYR. The FYR began on August 1, 2024.

Site Background

The 404-acre Subsite includes eight irregularly shaped wastebeds that extend roughly 1.5 miles along the shore, with a maximum width of 0.5 miles. The wastebeds consist, primarily, of inorganic waste materials (Solvay waste) from the production of soda ash (sodium carbonate) using the Solvay process. Other contaminants (*e.g.,* benzene, toluene, ethylbenzene, and xylenes [BTEX], naphthalene and assorted polycyclic aromatic hydrocarbons [PAHs], phenolic compounds, polychlorinated biphenyls [PCBs],

[1] For purposes of consistency with Subsite documents, activities will be discussed in this document in the context of the New York State Department of Environmental Conservation's (NYSDEC's) OU1 and OU2 designations (equivalent to EPA's OU22 and OU29, respectively). To support tracking in EPA's Superfund Enterprise Management System, however, the protectiveness determination will be based on EPA's OU22 designation.

[2] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks. An FS identifies and evaluates remedial alternatives to address the contamination at a site.

pesticides, and inorganics) which are not related to soda ash production, are also present at the Subsite. A surface water drainage ditch, Ditch A, runs along the southern and eastern Subsite boundaries and discharges stormwater from roads, parking areas, and overland surface flow from the Subsite to Ninemile Creek and Onondaga Lake. Subsite elevations range from approximately 363 feet above mean sea level (MSL) at the shores of Onondaga Lake to 430 feet above MSL. The Subsite location is shown on Appendix A, Figure 1, and a Subsite plan view is provided on Appendix A, Figure 2.

The lowering of the lake level in 1822 to the same level as the Seneca River resulted in the formation of Geddes Marsh. The wastebeds were constructed and operated on the Geddes Marsh by a series of companies, of which Honeywell International Inc. is the successor. Wastebeds 1-6 were in use before 1926 and may have become operational as early as 1916, although no definitive construction information is available. Ninemile Creek was rerouted to the north to permit the construction of Wastebeds 5 and 6, and the former creek channel was buried. Wastebeds 7 and 8 were not utilized until after 1939 and remained in use with Wastebeds 1-6 until 1943. An approximate 17-acre Biosolids Area used by the City of Syracuse and Onondaga County for sewage sludge disposal is located near the southeastern end of the Subsite over portions of Wastebeds 1 and 2. A 20-acre permitted, closed landfill, formerly operated by Crucible Specialty Metals (Crucible), is located on Wastebed 5. Lakeview Point, which generally comprises Wastebed 6, forms one of the Subsite's more prominent features--a peninsula that extends into Onondaga Lake near the northern end of the Subsite.

A portion of the property that is developed as parking lots and roadways is owned by New York State (NYS), and there are property easements for highway and stormwater drainage features. Interstate 690 (I-690) and interchanges associated with NYS Route 695, NYS Fairgrounds parking lots, access roads for the parking lots, and foot bridges are present and in use at the Subsite. The NYS Fairgrounds parking lots (approximately 77 acres) include between two and seven feet of gravel and fill material placed over the Subsite's soil/fill/Solvay waste material.

The remaining portion of the Subsite is owned by Onondaga County. The Empower Federal Credit Union Amphitheater at Lakeview (Lakeview Amphitheater), an outdoor music venue with covered seating and an open lawn accommodating 17,500 people, was constructed on the County-owned property in 2015 as part of planned redevelopment for the Subsite. The Onondaga County West Shore Trail Extension, an approximately 2.5-mile (9-acre) public recreation trail, has also been constructed at the Subsite by Onondaga County. The remaining County-owned portion includes undeveloped areas characterized by varying degrees of vegetation ranging from sparsely vegetated areas to stands of mature trees. The County-owned property is deed-restricted for "park purposes" use. Appendix A, Figure 2, depicts the approximate property boundaries.

Appendix B, attached, summarizes the documents utilized to prepare this FYR. For more details related to the Onondaga Lake site, please refer to EPA's webpage for the site at https://www.epa.gov/superfund/onondaga-lake.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Wastebeds 1-8/Onondaga Lake		
EPA ID: NYD986913580		
Region: 2	**State:** NY	**City/County:** Town of Geddes, Onondaga County
SITE STATUS		

NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No
REVIEW STATUS	
Lead agency: State	
Author name (Federal or State Project Manager): Claudia Shuman	
Author affiliation: EPA	
Review period: 3/11/2020 – 3/1/2025	
Date of site inspection: 10/2/2024	
Type of review: Statutory	
Review number: 2	
Triggering action date: 3/10/2020	
Due date *(five years after triggering action date)*: 3/10/2025	

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

As part of the RI, a baseline risk assessment was conducted for the Subsite to estimate the risks to human health and the environment. The baseline risk assessment, consisting of a human health risk assessment (HHRA), which evaluated cancer risks and noncancer health hazards to people, and a baseline ecological risk assessment (BERA), which evaluated risks to the environment, analyzed the potential for adverse effects, both under current conditions, and future conditions if no actions are taken to control or reduce exposure to hazardous substances at the Subsite.

The HHRA concluded that contamination at the Subsite presented noncancer health hazards that were above EPA guidelines for recreational receptors engaging in specific activities (*e.g.*, All-Terrain-Vehicle recreators), or receptors such as a construction worker that would be involved in intrusive work. The hazards are primarily driven by inhalation exposure to nickel and manganese in particulate matter in outdoor air (OBG, 2011b; NYSDEC and EPA, 2014). Subsite-wide groundwater was also evaluated under the hypothetical scenario that future residents and commercial/industrial workers could use the groundwater as a potable water source. Future use of Subsite groundwater as a potable water source is extremely unlikely due to its saline nature. Benzene, and to a lesser extent, PAHs and arsenic, in groundwater drove cancer risks and noncancer hazards when Subsite groundwater was considered a source of potable water (OBG, 2016a). Qualitative evaluations of shallow groundwater and soil vapor indicated some constituents at levels above screening values. Based on these evaluations, a vapor intrusion evaluation and subsequent post-construction sampling were performed for the Lakeview Amphitheater. A summary of the post-construction sampling is discussed in the "Data Review" section, below.

The majority of the ecological risk at the Subsite is associated with terrestrial exposure. Potential unacceptable risks to terrestrial ecological receptors (American robin, shrew, red-tailed hawk and fox) were associated with potential exposures to metals (*e.g.*, chromium, cadmium, vanadium, thallium, and

mercury), pesticides, semi-volatile organic compounds, and PCBs in soil/fill/Solvay waste material. The calculated risk estimates (*i.e.*, ecological hazard quotients [HQs]) for ecological receptors were based on both the no-observed-adverse-effect level (NOAEL), representing the highest chemical of concern (COC) concentration at which no adverse effects are seen, and the lowest-observed-adverse-effect level (LOAEL), representing the lowest COC concentration shown to produce adverse effects. Food chain calculations yielded 56 NOAEL-based ecological HQs and 32 LOAEL-based ecological HQs that were greater than one, which is the threshold value above which adverse ecological effects may occur. The majority of the metals contamination is associated with the Biosolids Area. To a lesser extent than metals, organic constituents including BTEX compounds, naphthalene, phenols, and several other compounds detected at low frequencies but retained for their bioaccumulative properties, presented potential risk to terrestrial ecological receptors exposed to soil/fill/Solvay waste (OBG, 2016a).

Based upon the results of the RI, HHRA, and BERA, NYSDEC and EPA determined that a response action was necessary to protect human health or welfare and the environment from actual and threatened releases of hazardous substances into the environment.

Response Actions

Honeywell entered into a consent order with NYSDEC in 2004 to perform an interim remedial measure (IRM)[3] to develop and evaluate IRM alternatives to mitigate groundwater flow, seep discharge, and shoreline soil/fill material erosion from the Subsite to Onondaga Lake, and groundwater and seep discharge from the Subsite to Ninemile Creek. The IRM, which was documented in an August 2011 Response Action Document issued by NYSDEC and EPA, included the collection of groundwater and seeps along Ninemile Creek and the eastern lakeshore of Onondaga Lake, with treatment of the collected groundwater and seeps at Honeywell's Willis Avenue Groundwater Treatment Plant. The response action also included the placement of a vegetative cover over a 14.4-acre area along the eastern lakeshore, sediment removal from the lower reach of Ditch A, rehabilitation of stormwater conveyance pipes at the upper reach of Ditch A, and stabilization of the lakeshore soils (NYSDEC and EPA, 2011). Construction of these actions was performed between 2011 and 2016 in conjunction with the removal of additional sediment/substrate and the installation of substrate check dams to mitigate transport of Solvay Waste substrate and sediment from the middle reach of Ditch A to its lower reach; construction of a hydraulic control system on the Subsite northern shore to address Subsite groundwater discharging to Onondaga Lake Remediation Area A to mitigate potentially unacceptable upwelling velocities and to minimize to the extent practicable the migration of impacted groundwater (*e.g.,* benzene, toluene, xylenes, phenol) to Onondaga Lake, and construction of 9.5 acres of mitigation wetlands that includes a 2.3-acre connected wetland and 7.2 acres of inland wetlands within the low-lying Eastern Shoreline, in what was collectively referred to as the "Integrated IRM."[4] The areas addressed under the Integrated IRM are depicted on Appendix A, Figure 3.

Additional remedial work was performed in Ditch A in 2017 through 2019 including:

- Installation of a pH adjustment building to treat groundwater collected along Upper Ditch A before discharge to the Onondaga County Department of Water Environment Protection sewer, which ultimately discharges to the Onondaga County Metropolitan Wastewater Treatment Plant.

[3] An IRM is an action taken at a contaminated site in order to reduce the chances of human or environmental exposure to site contaminants.

[4] The mitigation wetlands will mitigate open water aquatic habitat lost from implementation of the Willis/Semet IRM (2.3 acres) and wetland habitat disturbed as a result of implementation of the Wastebed B/Harbor Brook IRM (6.5 acres), and Wastebeds 1 through 8 Integrated IRM (0.7 acres).

- A Ditch A liner system was installed, as well as a collection pipe and seep aprons to mitigate discharge of seeps and shallow groundwater from Wastebeds 1-8 to Ninemile Creek and Onondaga Lake, while maintaining surface water conveyance.
- Placement of a stone layer above the liner system to protect the liner and placement of check dams.

In December 2014, a Record of Decision (ROD) was issued for OU1 of the Subsite. OU1 includes the Solvay waste and contaminated soil/fill materials present at the Subsite. OU1 also includes the shoreline stabilization system, mitigation wetlands, vegetative cover and access roads constructed to support part of the IRM described above.

The following Remedial Action Objectives (RAOs) were established for OU1:

- Prevent ingestion/direct contact with soil/fill material/Solvay waste in surface and subsurface soil above levels that would result in unacceptable human exposure.
- Prevent or minimize inhalation of or exposure to contaminants volatilizing from contaminated soil/fill material/Solvay waste that would result in unacceptable human exposure. In the event that buildings are constructed, mitigate impacts to public health resulting from soil vapor intrusion (SVI) into those buildings, as may be warranted.
- Prevent or minimize adverse ecological impacts to biota from ingestion/direct contact with soil/fill material/Solvay waste causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
- Prevent or minimize, the further migration of contaminants that would result in groundwater, sediment, or surface water contamination.

The ROD called for placement of a cover system in Subsite areas that will be protective for current and/or reasonably anticipated future land uses (*e.g.,* active and passive recreational uses). The remedy includes the placement of a two-foot-thick soil cover over areas where active recreation is planned or where appropriate to protect ecological resources and a one-foot-thick soil cover where passive recreation is planned. Other areas of the Subsite are to be covered with a vegetation enhancement layer to promote growth of vegetation. A Site Management Plan (SMP) and institutional controls (ICs) to ensure that intrusive activities in areas with remaining contamination are performed in accordance with the plan are also included in the ROD remedy.

Status of Implementation

Approximately 309.5 acres of the 404-acre Subsite have cover materials or infrastructure, placed outside of the OU-1 remedy implementation:

- Approximately 90 acres of vegetated covers and roadbeds associated with the I-690/NY695 corridor and other Subsite roads and infrastructure (2014 ROD).
- Approximately 96 acres of NYS Fairgrounds parking lots, generally consisting of 68 acres of paved lots and 28 acres of over two feet of gravel and fill material over Site soil/fill material (e.g., retention basins, cover over spoil materials) (2022 Construction Completion Report (CCR)).
- Approximately 44 acres of cover associated with the Lakeview Point amphitheatre (2022 CCR).
- Approximately 20 acres occupied by the Crucible Landfill, which is a permitted landfill that was closed in 1988 with a cap constructed in accordance with landfill closure requirements specified

in 6 NYCRR Part 360. Long-term monitoring is performed annually consistent with the landfill closure requirements (2014 ROD).

- Approximately 13 acres of the Onondaga County West Shore Trail Extension (public recreation trail), which is a paved walking and biking trail (2024 ISMP).
- Approximately 46.5 acres associated with the IRM - 9.5 acres of wetlands (2.3 connected wetlands and 7.2 inland wetlands) and 37 acres of vegetated cover (including shoreline enhancement, wet swales, vegetative cover, revetment, seep aprons; does not include access roads). Construction in the area of the New York State Fair Orange Parking Lot entrance area (see Appendix A, Figure 4a) was completed in 2019. The steep bank slopes where exposed Solvay waste was present were cut back and regraded. A vegetated soil cover was subsequently placed in this area.

As part of the IRM, a vegetated onshore revetment was constructed along approximately 1,700 feet of steep cliff area at Lakeview Point. The revetment consists of stone to provide protection from erosion caused by wind-wave action. Soil and live plant stakes provide added habitat enhancement. A seeded erosion control blanket was used for the upper portion of the steep cliff area at elevations above the expected wave action to provide protection from wind erosion and to provide habitat enhancement (OBG, 2014).

Design and construction of the Lakeview Amphitheater and related buildings, sidewalks, cover systems, retention basins, and other surface and subsurface features were implemented consistent with the OU1 remedy.

SVI mitigation via a vapor barrier was incorporated into the amphitheater construction. The amphitheater construction included a cover with open sides, stage area (front of house), back of house (BOH) building, and a small number of outbuildings (restrooms and box office). The site usage is seasonal (warmer weather between late spring and early fall) for concert performances.

As part of the IRM, the inland wetlands were constructed between 2013 and 2015. The connected wetland was constructed in 2016.

As noted above, the Integrated IRM for the Subsite includes shallow and intermediate groundwater (and seep) hydraulic control. A summary of the status of the implementation of the groundwater hydraulic control systems of the Eastern Shoreline, Northern Shoreline, and Ninemile Creek systems is provided below.

The Eastern Shoreline system consists of two sections--the Lakefront section and the Lower Ditch A section. The Lakefront section was constructed from 2013 to 2014. The Lakefront system includes an approximately 6,700-foot-long shallow groundwater collection trench that contains a 12-inch slotted high-density polyethylene (HDPE) pipe installed at approximately ten feet below ground surface (bgs) surrounded by sand backfill and 216 passive recovery wells screened below the trench to collect shallow and intermediate groundwater. Seep discharge occurring inland is intercepted via a seep apron that diverts flow to a collection trench to mitigate discharge to Onondaga Lake and the mitigation wetlands. This trench contains a six-inch perforated HDPE pipe installed at a varying depth (a minimum of 4.5 feet bgs) surrounded by stone backfill. The interim startup phase for the Lakefront section was completed in 2014. The Lower Ditch A section collection system, which was constructed in 2015, consists of an approximately 300-foot-long collection trench with seven passive recovery wells screened below the trench. Evaluation and maintenance of the system are ongoing. A lake water influx investigation was

completed in 2019 to evaluate system performance. Based on the results of this investigation, it was recommended that additional sections of sheet pile be installed between the lake and collection system. The installation was performed in 2020.

During the construction of the IRM, additional sediment/substrate was removed from the middle section of Ditch A and substrate check dams were installed to manage stormwater flow. Sampling activities conducted in 2014 and 2015 in the vicinity of and within middle Ditch A identified contaminants in shallow/intermediate groundwater and surface water at levels above standards or guidance values (OBG, 2016b). Based on this information and consistent with an Integrated IRM Construction Work Plan addendum approved in 2017 by NYSDEC, additional measures were implemented in and under Ditch A. These additional measures, which included the installation of a seep collection trench approximately 5,400 feet long, geosynthetic lining systems, and seep aprons, was performed from 2017 to 2018. A groundwater investigation was conducted in 2019 to evaluate effectiveness of the Ditch A collection system. Data collected during this investigation generally indicated that the system was operating effectively to collect seeps and shallow groundwater. However, several measures were undertaken to further optimize the system–replacement of stormwater conveyance pipes to mitigate entry of stormwater into the conveyance system, including installation of a new booster pump and force main to improve efficiency during high flow periods (i.e., precipitation events) and continued evaluation of surface cover systems within the Ditch A drainage area to reduce infiltration.

Installation of the Northern Shoreline hydraulic control system was completed in 2013. This system includes an approximately 1,050-foot-long shallow collection trench located approximately eight feet bgs with 44 passive recovery wells screened below the trench to collect intermediate groundwater. Following completion of the interim startup of the system, it was observed that the geochemical variability within the formation screened by the recovery wells and trench created fouling of the trench sand and well sand pack that limited recovery well discharge rates outside design expectations. To achieve hydraulic control and maintain the capping schedule for the lake remedy, a temporary vacuum extraction system was installed; operational verification was achieved between 2014 and 2015 (Parsons and OBG, 2017b). Additional field modifications were also performed between 2014 and 2018 to help address scale buildup and sediment accumulation with the pump station and force main, limit inflow of lake water into the system, and achieve long-term hydraulic control. These modifications included the installation of a dedicated collection pipe adjacent to the existing North Shoreline groundwater collection trench to connect the passive recovery wells and convey the intermediate groundwater from those wells to the Northern Shoreline pump station, installation of a smaller scale version of the vacuum extraction mobilized in 2014, online placement of an acid delivery system at the pump station wet well, and the construction of a physical barrier of steel sheet piling with hydrophilic sealed joints in the area and past the depth where the majority of the influence from lake water occurs. The Northern Shoreline hydraulic control system continues to undergo evaluation and maintenance.

The Ninemile Creek hydraulic control system includes a collection trench that is approximately 1,800 feet long and ranges in depth from 12 to 15 feet. There are also 53 passive recovery wells screened in and below the trench to collect intermediate groundwater. Seventeen of these wells are specifically designed and installed to address the Ninemile Creek Sand and Gravel (NMCSG) unit that occurs near the southern end of the system at a depth below the Solvay waste and marl geologic units. The NMCSG unit includes fine to coarse grained sand and gravel deposits that are likely deltaic deposits related to glacial and post-glacial fluvial discharges from historic Ninemile Creek prior to its 1926 rerouting to its current location to accommodate the construction of Wastebed 5 (OBG, 2013a). The NMCSG unit is approximately 370 feet wide and may be a preferential pathway for intermediate groundwater flow. The 17 passive recovery wells installed within it are more closely spaced and generally deeper than the 36 recovery wells installed in and below the rest of the collection trench. The interim startup phase (*i.e.,* operational verification) of

the Ninemile Creek hydraulic control system was performed from July to November 2013. The system hydraulic has been undergoing performance verification since the interim startup phase. Seep discharge from shallow soil to Ninemile Creek has not been observed when the system is in operation; however, the IRM objective to mitigate the discharge of NMCSG unit groundwater (intermediate) to Ninemile Creek is still under evaluation. Since interim startup, additional evaluations and maintenance, including sampling for geochemical parameters, redevelopment of recovery wells and piezometers, and well pump testing have been performed to better understand and optimize its effectiveness. These efforts are ongoing.

The soil cover portion of the remedy was implemented in five phases because of cover material availability, material placement productivity rates, planting seasons for the optimal establishment of vegetation enhancements, and site usage. Between 2015 and 2019 (phases 1, 2, and 3), approximately 52 acres of vegetative enhancement cover, nine acres of one-foot vegetative structural fill cover (subsequently paved over as part of the Orange Lot), and five acres of one-foot vegetative cover were placed on the Subsite. Since the last five-year review, (field modification 4 to phase 3, phase 4, and phase 5), approximately 49 acres of cover material was placed. Upon completion, approximately two acres were comprised of one-foot-thick vegetated soil cover (passive recreational areas), 12 acres of two-foot-thick vegetated soil cover (ecological resource areas), 30 acres of vegetation enhancement cover, and five acres of one-foot-thick stone cover (2022 CCR). Appendix A, Figure 4b, shows the various cover systems in place across the entirety of the subsite.

It should be noted that the approximate total acreage of cover placed both outside and within the OU-1 remedy exceeds 404 acres (total area of the Subsite) due to overlap of various phases of work.

Institutional Controls (ICs) Summary Table

Table 1, below, summarizes the status of the ICs.

Table 1: **Summary of Planned and/or Implemented ICs for Wastebeds 1-8 Subsite**

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soils/fill material	Yes	Yes	Sitewide	Requires that intrusive activities be conducted in accordance with the SMP.	Declaration of Covenants and Restrictions and Environmental Easement (Planned June 2026)
Vapor Intrusion	Yes	Yes	Sitewide	Requires vapor intrusion investigation and/or mitigation measures be conducted for future on-site structures, as appropriate, in accordance with the SMP.	Declaration of Covenants and Restrictions and Environmental Easement (Planned June 2026)

Systems Operations/Operation & Maintenance

From 2015 to 2019, vegetation monitoring for the wetlands included quantitative vegetation sampling at six vegetative plot (VP) locations, including two each in Inland Wetlands A and B, and one each in Inland

Wetland C and the connected wetland. At each station, 100-square foot sample plots were established to evaluate herbaceous and woody vegetation. Overall plant cover at the Subsite was calculated using data from the sample plots. Annual goals for percent cover of seeded areas and survival of trees/shrubs and invasive species are provided in the Performance Verification and Monitoring Plan and Wastebeds 1-8 OU1 Interim Site Management Plan. In addition to vegetative cover, indicators of wetland hydrology, hydric soil, and wildlife utilization were evaluated within each VP.

Data collected from VP locations in all inland wetlands from 2015 to 2019 showed that vegetation had been established in excess of the 85% vegetative cover target. It was, therefore, determined that quantitative vegetation inspections and associated photograph monitoring were no longer required, starting in 2020.

Additionally, invasive species were shown to be maintained at less than 5% cover in Wetlands A and B for multiple consecutive years. Therefore, quantitative monitoring is no longer required. Invasive species were quantitatively assessed in Wetland C until 2023. In 2022, the common reed (*phragmites australis*) was the only invasive plant species observed within Wetland C, accounting for approximately 1% of the total vegetative cover (below the 5% cover target). The common reed and purple loosestrife were treated with herbicide in August and September of 2021 and August and October of 2022.

Aerial photography monitoring is performed in the spring and qualitative field inspections (including wildlife observations) are performed during the growing season, to evaluate vegetative cover and assess the integrity of installed soil cover, including the presence of exposed soil or Solvay waste and evidence of erosion.

To assess water quality within the Inland Wetlands and vegetated wet swales, surface water quality sampling has been performed annually since 2015 in three areas--one location in each wetland and 13 locations in the vegetated wet swales. Wetland surface water samples were initially analyzed for chloride and vegetated wet swale samples were analyzed for BTEX, naphthalene, phenol, inorganics, and cyanide. Beginning in 2016, chloride was added to the vegetated wet swale parameters list, and beginning in 2017, the analytical parameters for wetland surface water samples were expanded to include BTEX, naphthalene, phenol, inorganics and cyanide. All surface water samples are analyzed for field parameters (*i.e.,* temperature, pH, turbidity, conductivity, oxidation-reduction potential, and dissolved oxygen). The analytical results are compared to NYSDEC Class C standards or guidance values (SGVs) where available. For chloride, which does not have an NYSDEC Class C SGV, the results are compared to the EPA ambient water quality criteria (AWQC) aquatic life freshwater chronic criterion of 230 milligram per liter (mg/L). Sampling locations are presented on Appendix A, Figure 5.

As part of the Lakeview Amphitheater building construction, a mitigation system was installed to protect the occupants from potential SVI. Initial sampling was conducted in 2015 to assess the BOH building of the Lakeview Amphitheater. The BOH building represents the area most susceptible to SVI concerns due to the enclosed nature of the structure and the potential for increased human occupancy during seasonal venues. Three samples were collected using Summa canisters over an approximate 24-hour period from the building maintenance room. The samples included one sub-slab air sample collected from a sub-slab sampling port, one interior sample collected proximate to the sub-slab location, and one outdoor ambient air sample collected from the loading dock area. Samples were analyzed for volatile organic compounds (VOCs) in accordance with EPA TO-15 methodology (Gilbane, 2018). These samples did not indicate the presence of indoor air contaminants at levels of concern or a specific indoor source. Consistent with state and EPA guidance, however, additional samples were collected to evaluate SVI during subsequent heating seasons (2016, 2017, 2018, and 2023). During each of these years, one sub-slab sample was collected from the BOH maintenance closet, five indoor air samples were collected from the BOH maintenance

closet, BOH office, BOH kitchen [artist lounge], BOH stage, ticket box office, and concession stand and two outdoor air samples (near the ticket box office and stage). The sample locations are shown in Figures 6 and 7. In 2018, one additional indoor air sample was collected from the concession stand and one additional outdoor air sample was collected near the concession stand (see Figure 8).

Remedy Resilience

Potential impacts to OU1 of the Subsite from severe weather have been assessed, and the performance of the remedy is currently not at significant risk due to the expected effects of weather-related events in the region and near the Site. The integrity of the cover placed at the site will continue to be monitored and maintained to remain functional and protective. Appendix D, attached, provides the full evaluation.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in Table 2, below.

Table 2: Protectiveness Determination and Statement from the 2020 Five-Year Review

OU #	Protectiveness Determination	Protectiveness Statement
1	Will be Protective	The remedy at OU1 is expected to be protective of human health and the environment upon its completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks.

The previous FYR did not have any recommendations.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On August 7, 2024, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 43 Superfund sites in New York, New Jersey and Puerto Rico, including this Subsite of the Onondaga Lake Superfund Site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, a notice of the commencement of the FYR was sent to local public officials. The notice was provided to the town of Geddes by email on January 30, 2025, with a request that the notice be posted in the town hall and on the town webpage. In addition, on February 3, 2025, the notice was distributed via the NYSDEC's Onondaga Lake News email listserv, which includes approximately 11,000 subscribers. The purpose of the public notice was to inform the community that the EPA would be conducting a FYR to ensure that the remedy implemented at the Subsite remains protective of human health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process for the Subsite.

Once this FYR is completed, the results will be made available at the Site information repositories maintained at the NYSDEC Region 7 Office, 615 Erie Boulevard West, Syracuse, New York; NYSDEC Central Office, 625 Broadway, Albany, New York; Onondaga County Public Library, Syracuse Branch at the Galleries, 447 South Salina Street, Syracuse, New York; and the Atlantic States Legal Foundation,

658 West Onondaga Street, Syracuse, New York. In addition, efforts will be made to reach out to local public officials to inform them of the results of the FYR.

No interviews were conducted for this FYR.

Data Review

Post-construction data relating to remedy effectiveness for OU1 of the Subsite include results pertaining to SVI and surface water monitoring in the inland wetlands and vegetated wet swales. These results are discussed below.

Soil Vapor Intrusion

SVI samples were collected during the heating season in 2023. These were the only samples collected during the review period.

One sub-slab sample was collected from the BOH maintenance closet; six indoor air samples were collected from the BOH maintenance closet, BOH office, BOH kitchen [artist lounge], BOH stage, ticket box office, and concession stand; and three outdoor air samples were collected near the ticket box office, stage and concession stand. The sample locations are shown in Appendix A, Figures 6, 7 and 8.

The analytical results for the 2023 sampling were generally similar to those obtained in 2016, 2017, and 2018 (see Appendix C, Table 1. The majority of analytes detected in sub-slab and indoor samples were also detected in outdoor samples, indicating ubiquitous conditions. Exceptions include tetrahydrofuran and methyl butyl ketone, which were detected in sub-slab vapors. These substances are common components of PVC plumbing cement/cleaner and may be attributed to residual vapors from curing and construction of the facility.

In addition, EPA evaluated indoor air concentration data and sub-slab data based on comparison to EPA's Vapor Intrusion Screening Levels (VISLs) for occupational exposures, as seen in Appendix C, Table 2. The sub-slab data and indoor air concentrations were below their respective VISLs or were not detected. To evaluate the outdoor air concentrations, EPA's Regional Screening Level (RSL) Calculator was used to generate RSLs for an outdoor worker exposed to air. This scenario was chosen because it best fit the outdoor air sampling locations: outside near the stage, the ticket office, and the concession stand. All of the outdoor air concentrations were either non-detect or detected below the RSLs, as can be seen in Appendix C, Table 2.

The contaminant concentrations were also compared to the New York State Department of Health Soil Vapor Intrusion Decision Matrices and conclusions of "no further action" were reached (see Appendix C, Table 3), which is in agreement with the conclusion reached by the EPA RSL/VISL comparison. Carbon tetrachloride and methylene chloride were detected at low levels in all air samples collected; concentrations were compared to the New York State Department of Health Soil Vapor Intrusion Decision Matrix A thresholds, resulting in a "no further action" determination for both contaminants. Trichloroethene (TCE) was detected in all indoor samples, but not in the maintenance closet sub-slab sample. Concentrations were compared to Decision Matrix A thresholds, resulting in a "no further action" determination. Tetrachloroethylene, 1,1-dichloroethylene (DCE), cis-1,2-DCE, 1,1,1-TCE and vinyl chloride were not detected in any of the samples.

Surface Water Monitoring

Surface water samples were collected from locations near the gauge and outlet structure of each of the Inland Wetlands A, B, and C (where surface water levels are deepest) for each year during this FYR period. Eleven surface water samples were collected from the vegetated wet swales in 2019[5] (two locations – OSES-A-2 and CB-02 – were not sampled due to a lack of flow during storm events). Samples were not collected from the vegetated wet swales in 2020 due to an abnormally dry season, resulting in insufficient amounts of flowing water. In 2021, nine surface water samples were collected from the vegetated wet swales; four locations (OSES-A-2, OS-ES-B-1, CB-03, and CB-04) were not sampled due to insufficient flow. Ten surface water samples were collected from the vegetated wet swales in 2022; three locations (CB-02, CB-03, and CB-04) were not sampled due to insufficient flow. In 2023, twelve surface water samples were collected from the vegetated wet swales; one location, CB-04, was not sampled due to insufficient flow.

Toluene was detected in Inland Wetland A in 2019 and in Inland Wetland B in 2021 and 2022 at levels below the surface water criterion. No other VOCs were detected in the wetland surface water samples during the review period. SVOCs were not detected in any of the Inland Wetlands during the review period. No VOCs or SVOCs detected in vegetated wet swale samples exceeded their surface water criteria during the review period.

Chloride and inorganic surface water exceedances for the inland wetlands and vegetated wet swales are presented on Figures 9 through 12. Chloride concentrations in samples collected from all three Inland Wetlands were either below the EPA Aquatic Life Criterion of 230 mg/L or non-detect during this review period. Chloride exceeded the EPA Aquatic Life Criterion of 230 mg/L in one vegetated wet swale location (OS-ES-OL) in 2019, 2022, and 2023. Chloride concentrations at this location have varied annually with no discernible trends. While impacts to the liner system were not observed in 2023, this area will continue to be evaluated in 2024 to confirm that the liner integrity at this location has not been compromised. No other chloride exceedances were observed in the vegetated wetland swales.

In 2019, multiple metals including aluminum, iron, and thallium were detected at concentrations exceeding their SGVs in all three Inland Wetlands. No metals exceeded their respective SGVs in 2020. In 2021, iron was detected at concentrations exceeding its SGV at Inland Wetlands A and B. Aluminum was detected at concentrations exceeding its SGV, in Inland Wetland C, and iron was detected at concentrations exceeding its SGV in all Inland Wetland samples in 2022. In 2023, iron was the only metal detected at concentrations exceeding its SGV, in Inland Wetlands A and B. Multiple metals, including aluminum, cobalt, cyanide, iron, thallium, and vanadium were detected above their SGVs in a number of vegetated wet swale samples in 2019. Aluminum and iron exceeded their SGVs in multiple wet swale samples in 2021; thallium exceeded its SGV at just one sampling location. In 2022, aluminum and iron were detected at concentrations exceeding their SGVs at multiple locations; cobalt, selenium, silver, and vanadium exceeded their SGVs at one sampling location (OS-ES-OL). Aluminum and iron were detected at concentrations exceeding their SGVs at multiple locations in 2023; zinc exceeded its SGV at one sampling location (OS-ES-B-1); and lead and selenium exceeded their SGVs at one sampling location (OS-ES-C).

The observed aluminum and iron concentrations exceeding SGVs may be related to Subsite particulates deposited within the inland wetlands via wind. Another potential source of inorganic constituents to Subsite surface waters is the fill material used in the construction of the inland wetlands (and vegetated

[5] Although the FYR period commenced on March 11, 2020, the review covers data from 2019, as it was not available during the previous FYR.

wet swales). For example, imported fill used during the construction of the inland wetlands was sampled for the presence of aluminum and iron and in four samples. Aluminum averaged 22,425 milligrams per kilogram (mg/kg) and iron averaged 27,550 mg/kg. These concentrations are within or near the reported ranges of background concentrations for aluminum and iron for uncontaminated soils in New York. Nevertheless, an evaluation of data collected across the current and previous FYR periods indicates that the presence of these metals within the wetlands is stable. Furthermore, detected concentrations of iron have largely shown a decreasing trend at nearly all wetland sampling locations since 2017.

It should be noted that SGVs are based on reported effects to aquatic fauna, including fish, but the inland wetlands were designed to be disconnected from the lake to avoid migration to and inhabitation by fish. Fish are predators of amphibians and, therefore, undesirable in the inland wetlands because amphibians are target organisms for utilization/inhabitation of the wetlands. Although amphibians are known to be sensitive throughout their life cycle to heavy metals due to their permeable skin and reliance on water for respiration, there is a lack of criteria or guidance values on the effects of aluminum or iron in surface water specific to amphibians in available literature. However, other lines of evidence such as qualitative surveys have been and continue to be employed at the site to ensure amphibian populations remain supported. Qualitative wildlife observations include visual (e.g., scat, tracks, individuals) and auditory observations. Qualitative visual and audio surveys for amphibians were conducted throughout the Site at multiple times through the growing season for the presence of eggs, larvae, metamorphs and adults, and included a field visit by a herpetologist. Prior to 2020, standardized methods of reporting were performed. During this time, amphibian presence was evaluated with visual observations, spring call surveys, dip netting, and minnow traps. Since all life stages of multiple amphibian species were consistently observed during these events, it was determined that these surveys were no longer required as part of O&M starting in 2020. However, the presence of amphibians continues to be recorded during site inspections (e.g., restoration monitoring, wetland sampling events) when observed. The results of these observations are included in the Wastebeds 1-8 Cover System Inspection Annual Reports produced by Parsons on behalf of Honeywell. Site inspections performed during this FYR period have continued to find that amphibian species are prevalent in and around the wetlands at all life stages, thus providing evidence suggesting that these species are successfully breeding and recruiting new individuals to their population. Furthermore, based on a literature review conducted to evaluate the potential effects of aluminum and iron in surface water on aquatic plants, levels of aluminum and iron found, to date, in the inland wetlands do not appear to be at levels of concern to the floral community. The floral communities of the wetlands and swales continue to appear diverse and thriving. The restored plant communities in the lakeshore area continually met or exceeded established quantitative performance targets for vegetative cover and diversity when they were implemented. As described under Section II (Systems Operations/Operation & Maintenance), quantitative vegetation inspections were discontinued in 2020 after vegetative cover targets were consistently met. Based on the stable to declining concentrations observed and the qualitative lines of evidence above, the presence of aluminum and iron at levels above SGVs in some samples is not believed to resulting in adverse effects on the floral and faunal communities of the wetlands and swales.

Site Inspection

An inspection of the Subsite was conducted on October 1, 2024, by Ms. Shuman. The Pink, Brown, and Orange Parking lots were inspected, as well as Ditch A, Crucible Landfill, the Lakeview Amphitheater footprint, and parts of the Onondaga County West Shore Trail and access pathways. The focus of the inspection was to assess the integrity of the various cover systems that are in place. No issues or concerns were noted.

V. TECHNICAL ASSESSMENT

QUESTION A: *Is the remedy functioning as intended by the decision documents?*

All construction-related components of the OU1 remedy are consistent with the ROD and are functioning as intended. Post-remediation monitoring of the Subsite is being conducted in accordance with the interim SMPs. The vegetative community along the Onondaga Lake shoreline is providing stability and coverage for wildlife. Monitoring of wetlands and aquatic habitats confirms that the ecological function at the Subsite is being restored.

ICs, such as environmental easements, will be used to ensure that any intrusive activities in areas where contamination remains are implemented in accordance with the final SMP.

QUESTION B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

Human Health

There have been no changes in the physical conditions of the Subsite since the remedy was selected that would change the protectiveness of the remedy. The HHRA conducted for OU1 concluded that there was potential unacceptable risk for recreational receptors engaging in certain activities such as riding all-terrain vehicles and to construction workers. The risks were driven by exposure to particulates in air and to dust generated during these activities and to direct contact with shallow groundwater through construction activities (OBG, 2011b). The exposure assumptions and pathways assessed in the ROD followed the Risk Assessment Guidance for Superfund used by EPA and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid. In addition, some of the toxicity values that were used in the HHRA have changed; however, the changes would not impact the remedial decision that was made for the Subsite.

The RAOs remain valid, and the selected remedy is protective of human health. The implementation of the OU1 remedy effectively interrupts potential exposures to the recreational receptors and construction workers. Once established, the ICs will restrict site use and prevent exposure to contamination remaining on-site.

The cleanup goals identified in the ROD, which are identified as the NYSDEC Soil Cleanup Objectives contained in 6 NYCRR Part 375, remain valid.

Vapor Intrusion

Vapor intrusion testing has been performed at several locations at the amphitheater over the past several years and the data indicate that there are no indoor air impacts that would be associated with unacceptable levels of risk. Additionally, the ROD included a provision that future on-site buildings should be evaluated for the potential for SVI and that any impacts to human health resulting from SVI into those buildings should be mitigated, as warranted. Therefore, this pathway is also sufficiently addressed by the remedy.

Ecological

The BERA concluded that ecological risk was primarily associated with exposure to metals, pesticides, semivolatile organic compounds, and PCBs in soil, fill and Solvay waste by terrestrial receptors (i.e., American robin, shrew, red-tailed hawk and fox). The majority of the risks were related to soil in the

Biosolids Area. There were some potential risks to aquatic ecological receptors exposed to soil/fill material located in the lower ditch A.

The RAOs and goals established at the time of the ROD are still valid. The ROD called for placement of a two-foot-thick soil cover over areas where active recreation is planned or where it is appropriate to protect ecological resources and a one-foot-thick soil cover where passive recreation is planned. Additionally, the IRMs included the placement of vegetative cover material over the eastern shoreline, removal of sediment/substrate and placement of a liner and new substrate in Ditch A and construction of wetlands (Wetlands A, B, C and the connected wetland). These remedies interrupt any exposure to ecological receptors.

Vegetation monitoring data collected in 2023 revealed successful vegetation growth throughout the site including: Wetland A-C, connected wetland, wet swales, seep aprons, Ditch A, shoreline enhancement areas, northern revetment and areas adjacent to access pathways). There was no exposed soil or evidence of erosion. The wet meadow, shallow emergent marsh, deep emergent marsh, successional old-field and successional forest community continue to provide valuable habitat for many species of wildlife. Abundant wildlife continued to be observed within the restored areas. Recreational areas such as amphitheater and parking lots are not expected to be suitable habitat for wildlife and interrupt exposure to ecological receptors.

Surface water monitoring data showed low VOCs and no SVOCs in inland wetland and wet swale samples at levels exceeding criteria. Multiple metals were detected in the inland wetland and wet swale at variable concentrations, at times exceeding their SGVs, throughout this review period. These metals, however, are likely related to particulate deposition and fill material used to construct the wetlands. In addition, the SGVs are also designed to be protective of aquatic fauna, such as fish, and the wetlands were designed to be disconnected from the lake to avoid migration and inhabitation of fish. The levels of the metals identified is not believed to be a concern for the wetland flora community as stated under Data Review. Monitoring of vegetation cover, contaminant concentrations and liner integrity will continue.

QUESTION C: *Has any other information come to light that could call into question the protectiveness of the remedy?*

There is no new information that calls into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Table 4, below, presents the recommendations and follow-up actions for this FYR.

Table 4: Issues and Recommendations

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the Five-Year Review:	
None	
Issues and Recommendations Identified in the Five-Year Review:	
	Issue Category: Institutional Controls
	Issue: The ROD calls for the development of ICs to ensure that intrusive activities in soils/fill material areas with remaining contamination are performed in

OU(s): 22[6]	accordance with an SMP and the performance of a vapor intrusion investigation and/or mitigation measures for future on-site structures, as appropriate, in accordance with the SMP. The ICs are not yet in place.			
	Recommendation: The ICs should be implemented at the Subsite in accordance with the SMP.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	State	6/30/2026

VII. PROTECTIVENESS STATEMENT

Table 5, below, presents the operable unit protectiveness statement.

Table 5: Protectiveness Statement

Protectiveness Statement	
Operable Unit: 22	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The implemented remedy at OU22 is protective of human health and the environment in the short-term. To be protective in the long-term, ICs need to be implemented.	

VIII. NEXT REVIEW

The next FYR report for the Subsite is required five years from the completion date of this review.

[6] As stated under Section I, for purposes of consistency with Subsite documents, EPA's designation of OU22 corresponds to NYSDEC OU1. To support tracking in EPA's Superfund Enterprise Management System, the protectiveness determination will be based on EPA's OU22 designation.

APPENDIX A – FIGURES

Figure 1

ADAPTED FROM: SYRACUSE WEST, NY USGS QUADRANGLE.

QUADRANGLE LOCATION

HONEYWELL
WASTEBEDS 1 - 8
REMEDIAL INVESTIGATION
GEDDES, NEW YORK

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000
Feet

1:24,000

APRIL 2014
1163.39642

O'BRIEN & GERE

Figure 2

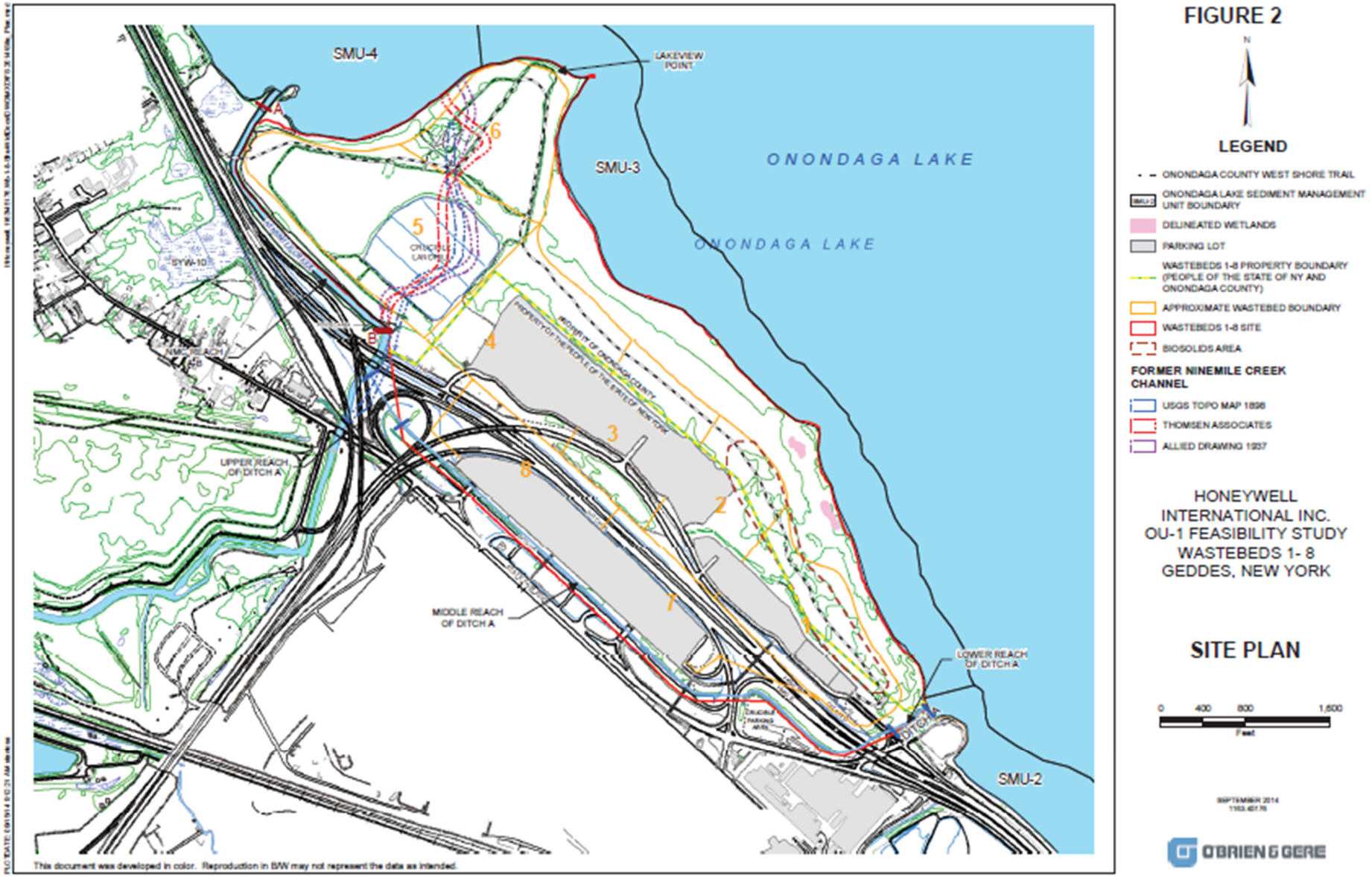


FIGURE 2

N

LEGEND

- ONONDAGA COUNTY WEST SHORE TRAIL
- ONONDAGA LAKE SEDIMENT MANAGEMENT UNIT BOUNDARY
- DELINEATED WETLANDS
- PARKING LOT
- WASTEBEDS 1-8 PROPERTY BOUNDARY (PEOPLE OF THE STATE OF NY AND ONONDAGA COUNTY)
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE
- BIOSOLIDS AREA

FORMER NINEMILE CREEK CHANNEL

- USGS TOPO MAP 1898
- THOMSEN ASSOCIATES
- ALLIED DRAWING 1937

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

SITE PLAN

0 400 800 1,600
Feet

SEPTEMBER 2014
1163.4E178

O'BRIEN & GERE

Figure 3

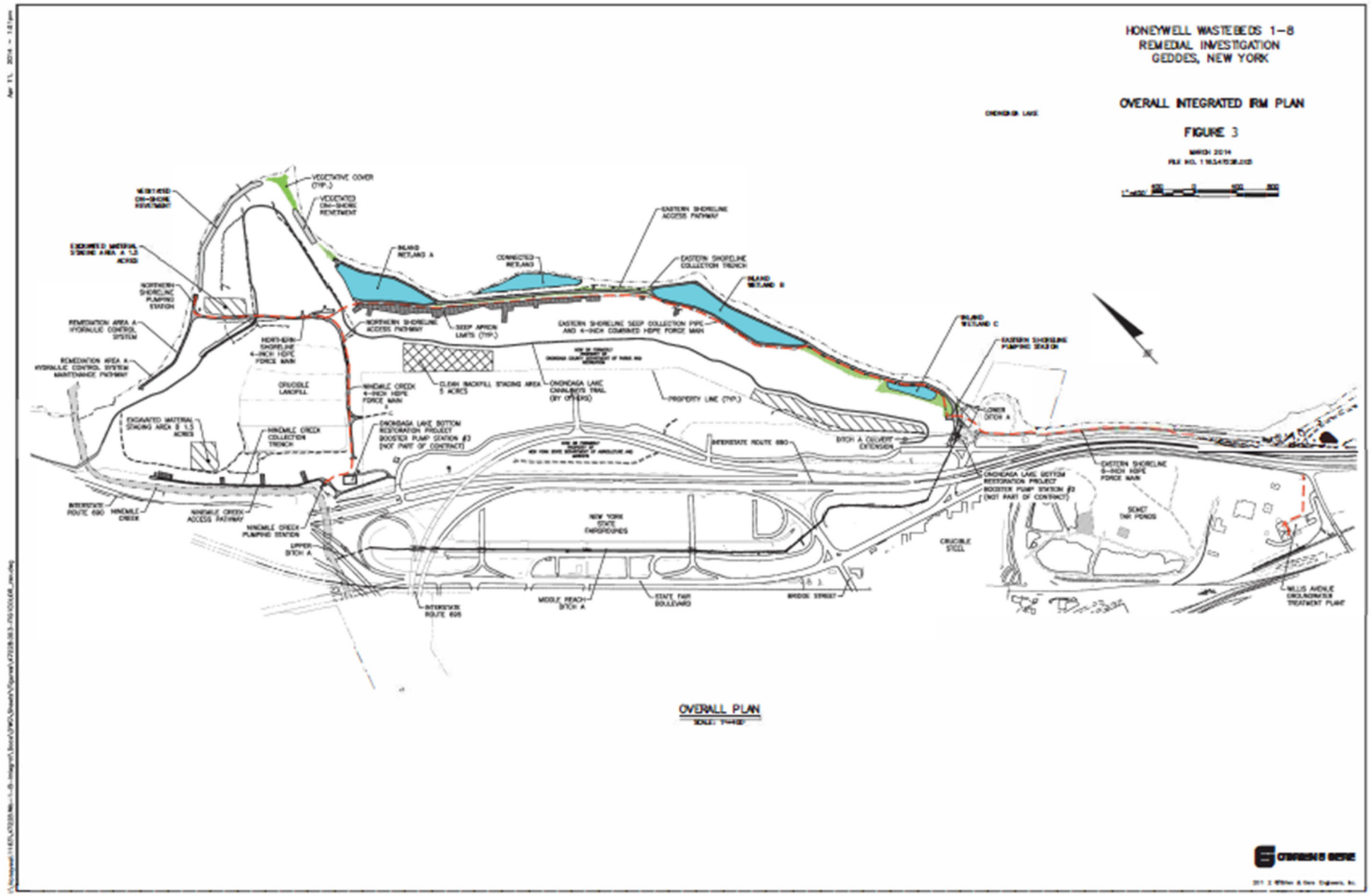

HONEYWELL WASTEBEDS 1–8
REMEDIAL INVESTIGATION
GEDDES, NEW YORK
OVERALL INTEGRATED IRM PLAN
FIGURE 3
MARCH 2014
OVERALL PLAN
VEGETATIVE COVER (TYP.)
VEGETATED ON-SHORE REVETMENT
NORTHERN SHORELINE PUMPING STATION
REMEDIATION AREA A HYDRAULIC CONTROL SYSTEM
REMEDIATION AREA A HYDRAULIC CONTROL SYSTEM MAINTENANCE PATHWAY
EXCAVATED MATERIAL STAGING AREA A 1.5 ACRES
NORTHERN SHORELINE 4-INCH HDPE FORCE MAIN
CRUCIBLE LANDFILL
EXCAVATED MATERIAL STAGING AREA B 1.5 ACRES
MINOA CREEK COLLECTION TRENCH
INTERSTATE ROUTE 690
MINOA CREEK
MINOA CREEK ACCESS PATHWAY
MINOA CREEK PUMPING STATION
UPPER DITCH A
INTERSTATE ROUTE 695
ISLAND WETLAND A
CONNECTED WETLAND
NORTHERN SHORELINE ACCESS PATHWAY
SEEP AREAS LIMITS (TYP.)
MINOA CREEK 4-INCH HDPE FORCE MAIN
CLEAN BACKFILL STAGING AREA 5 ACRES
ONONDAGA LAKE BOTTOM RESTORATION PROJECT BOOSTER PUMP STATION #3 (NOT PART OF CONTRACT)
ONONDAGA LAKE CANAL/BOTE TRAIL (BY OTHERS)
MIDDLE REACH DITCH A
NEW YORK STATE EMERGENCIES
STATE FAIR BOULEVARD
BRIDGE STREET
EASTERN SHORELINE ACCESS PATHWAY
EASTERN SHORELINE COLLECTION TRENCH
ISLAND WETLAND B
EASTERN SHORELINE SEEP COLLECTION PIPE AND 4-INCH COMBINED HDPE FORCE MAIN
PROPERTY LINE (TYP.)
ISLAND WETLAND C
EASTERN SHORELINE PUMPING STATION
LOWER DITCH A
DITCH A CULVERT EXTENSION
INTERSTATE ROUTE 690
ONONDAGA LAKE BOTTOM RESTORATION PROJECT BOOSTER PUMP STATION #2 (NOT PART OF CONTRACT)
EASTERN SHORELINE 6-INCH HDPE FORCE MAIN
SEMET TAR PONDS
CRUCIBLE STEEL
WILLIS AVENUE GROUNDWATER TREATMENT PLANT

Figure 4a

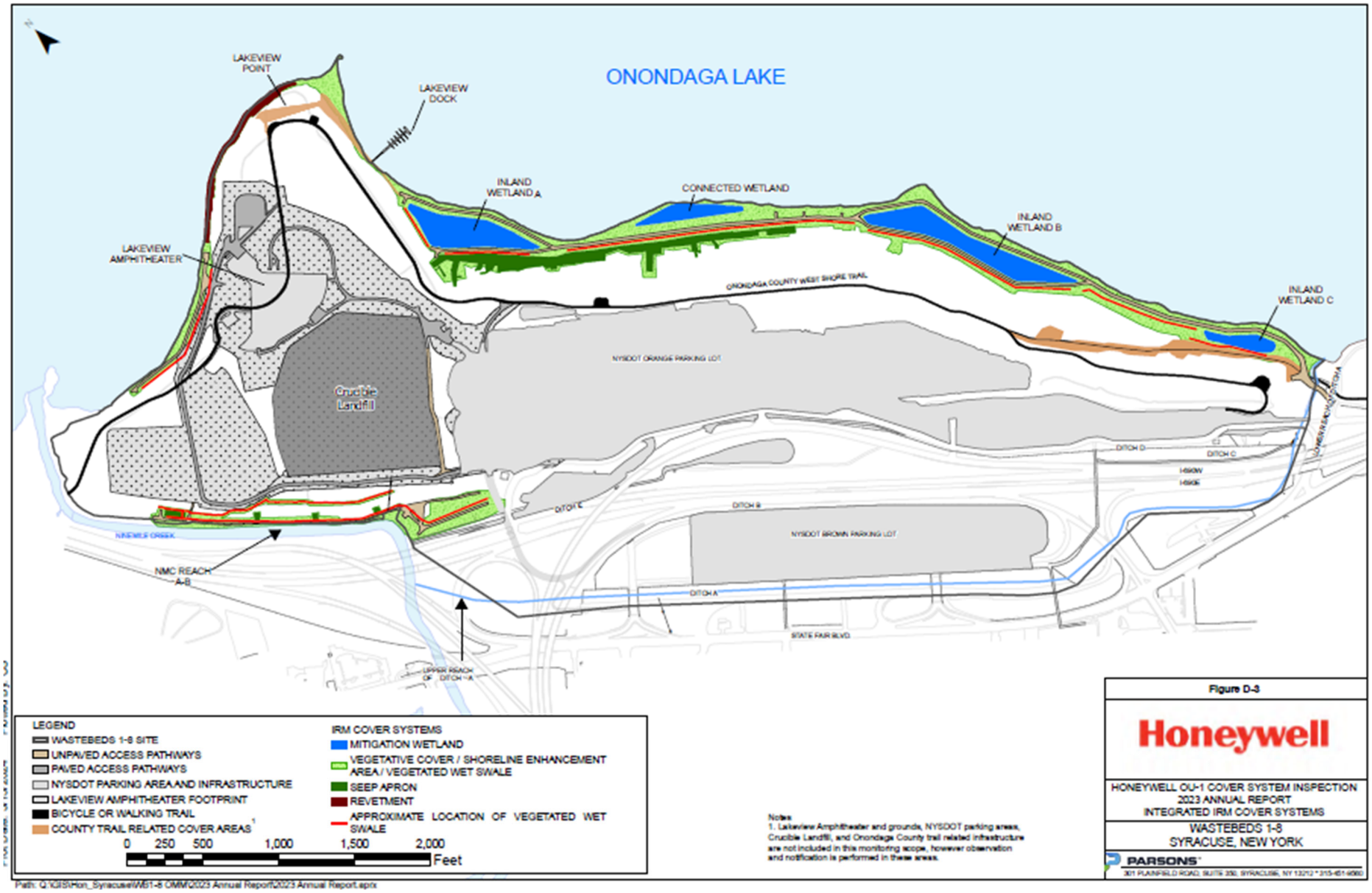

ONONDAGA LAKE
LAKEVIEW POINT
LAKEVIEW DOCK
INLAND WETLAND A
CONNECTED WETLAND
INLAND WETLAND B
INLAND WETLAND C
LAKEVIEW AMPHITHEATER
ONONDAGA COUNTY WEST SHORE TRAIL
NYSDOT ORANGE PARKING LOT
Crucible Landfill
DITCH D
DITCH C
DITCH E
DITCH B
NYSDOT BROWN PARKING LOT
NMC REACH A-B
DITCH A
STATE FAIR BLVD
UPPER REACH OF DITCH A
LEGEND
WASTEBEDS 1-8 SITE
UNPAVED ACCESS PATHWAYS
PAVED ACCESS PATHWAYS
NYSDOT PARKING AREA AND INFRASTRUCTURE
LAKEVIEW AMPHITHEATER FOOTPRINT
BICYCLE OR WALKING TRAIL
COUNTY TRAIL RELATED COVER AREAS 1
IRM COVER SYSTEMS
MITIGATION WETLAND
VEGETATIVE COVER / SHORELINE ENHANCEMENT AREA / VEGETATED WET SWALE
SEEP APRON
REVETMENT
APPROXIMATE LOCATION OF VEGETATED WET SWALE
0 250 500 1,000 1,500 2,000
Feet
Notes
1. Lakeview Amphitheater and grounds, NYSDOT parking areas, Crucible Landfill, and Onondaga County trail related infrastructure are not included in this monitoring scope, however observation and notification is performed in these areas.
Figure D-3
Honeywell
HONEYWELL OU-1 COVER SYSTEM INSPECTION
2023 ANNUAL REPORT
INTEGRATED IRM COVER SYSTEMS
WASTEBEDS 1-8
SYRACUSE, NEW YORK
PARSONS
Path: Q:\GIS\Hon_Syracuse\WB1-8 OMM\2023 Annual Report\2023 Annual Report.aprx

Figure 4b

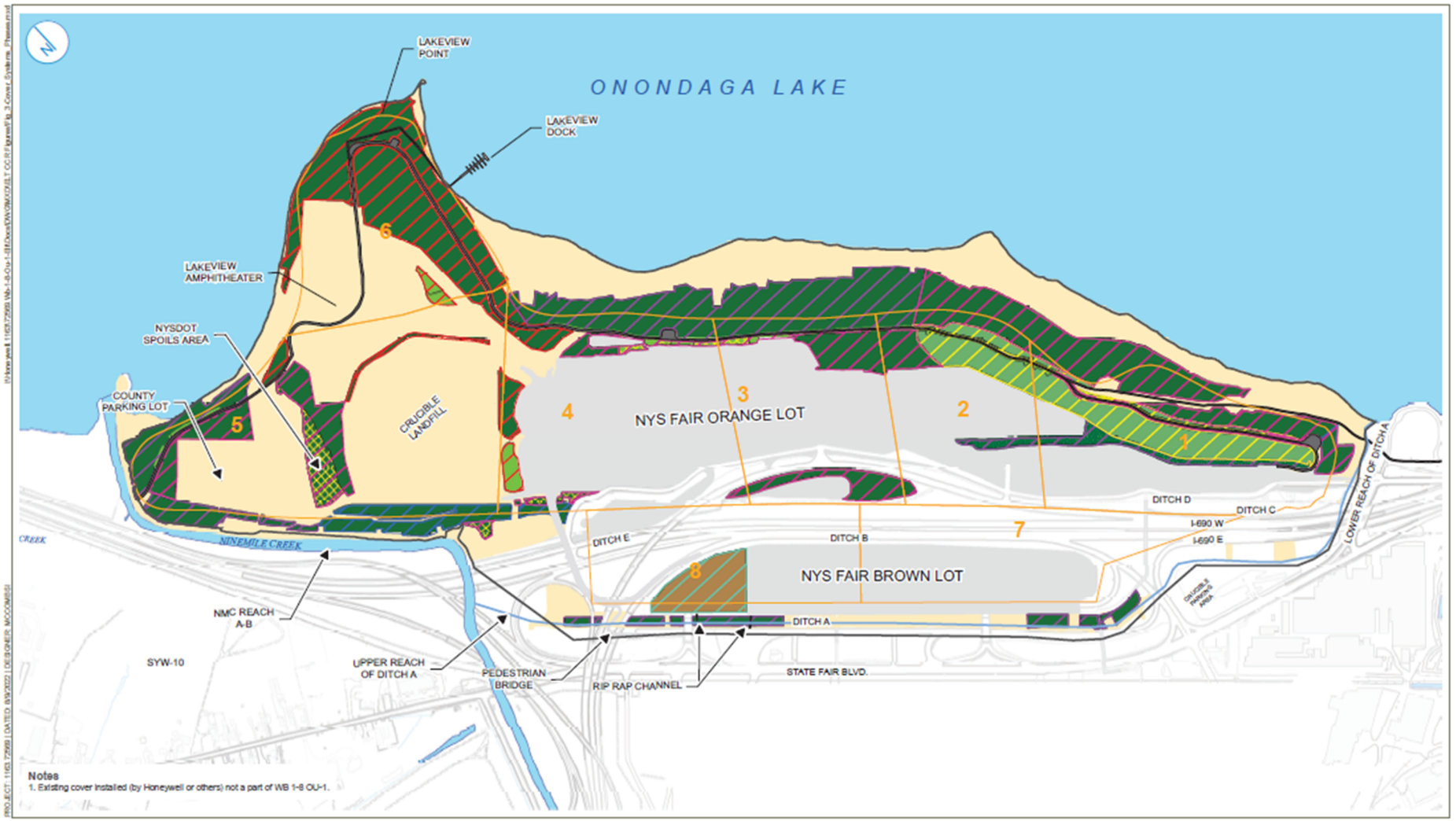

ONONDAGA LAKE
LAKEVIEW POINT
LAKEVIEW DOCK
LAKEVIEW AMPHITHEATER
NYSDOT SPOILS AREA
COUNTY PARKING LOT
CRUCIBLE LANDFILL
NYS FAIR ORANGE LOT
NYS FAIR BROWN LOT
NINEMILE CREEK
NMC REACH A-B
SYW-10
UPPER REACH OF DITCH A
PEDESTRIAN BRIDGE
RIP RAP CHANNEL
STATE FAIR BLVD.
DITCH A
DITCH B
DITCH C
DITCH D
DITCH E
I-690 W
I-690 E
LOWER REACH OF DITCH A
1
2
3
4
5
6
7
8
Notes
1. Existing cover installed (by Honeywell or others) not a part of WB 1-8 OU-1.
LEGEND
WASTEBEDS 1-8 SITE
APPROXIMATE WASTEBED BOUNDARY
ONONDAGA COUNTY WEST SHORE TRAIL AND EXTENSION[1]
NYSDOT PARKING LOT AND INFRASTRUCTURE[1]
EXISTING COVER[1]
0
600
1,200
Feet
OU-1 COVER SYSTEMS
1-FT VEGETATED SOIL COVER INSTALLED (1.7 AC)
1-FT SOIL COVER VERIFIED (0.33 AC; AREA REMOVED FROM PROJECT SCOPE DUE TO SUFFICIENT COVER)
2-FT VEGETATED SOIL COVER INSTALLED (12.44 AC)
VEGETATION ENHANCEMENT COVER INSTALLED (30.4 AC)
VEGETATED COVER VERIFIED (0.69 AC; AREA REMOVED FROM SCOPE DUE TO SUFFICIENT COVER)
STABILIZED 1-FT VEGETATED SOIL COVER INSTALLED (3.43 AC)
1-FT STONE COVER INSTALLED (4.47
OU1 PHASE OF WORK
PHASE 1 (2015)
PHASE 2 (2016)
PHASE 3 (2018)
PHASE 3 (2020)
PHASE 4 (2020)
PHASE 5 (2020)
COVER SYSTEMS
WASTEBEDS 1-8 OU1 2020 CCR
WASTEBEDS 1-8
SYRACUSE, NEW YORK
FIGURE 3
AUGUST 2022
RAMBOLL AMERICAS
INTEGRATED SOLUTIONS, INC.
FKA OGNA
RAMBOLL

Figure 5

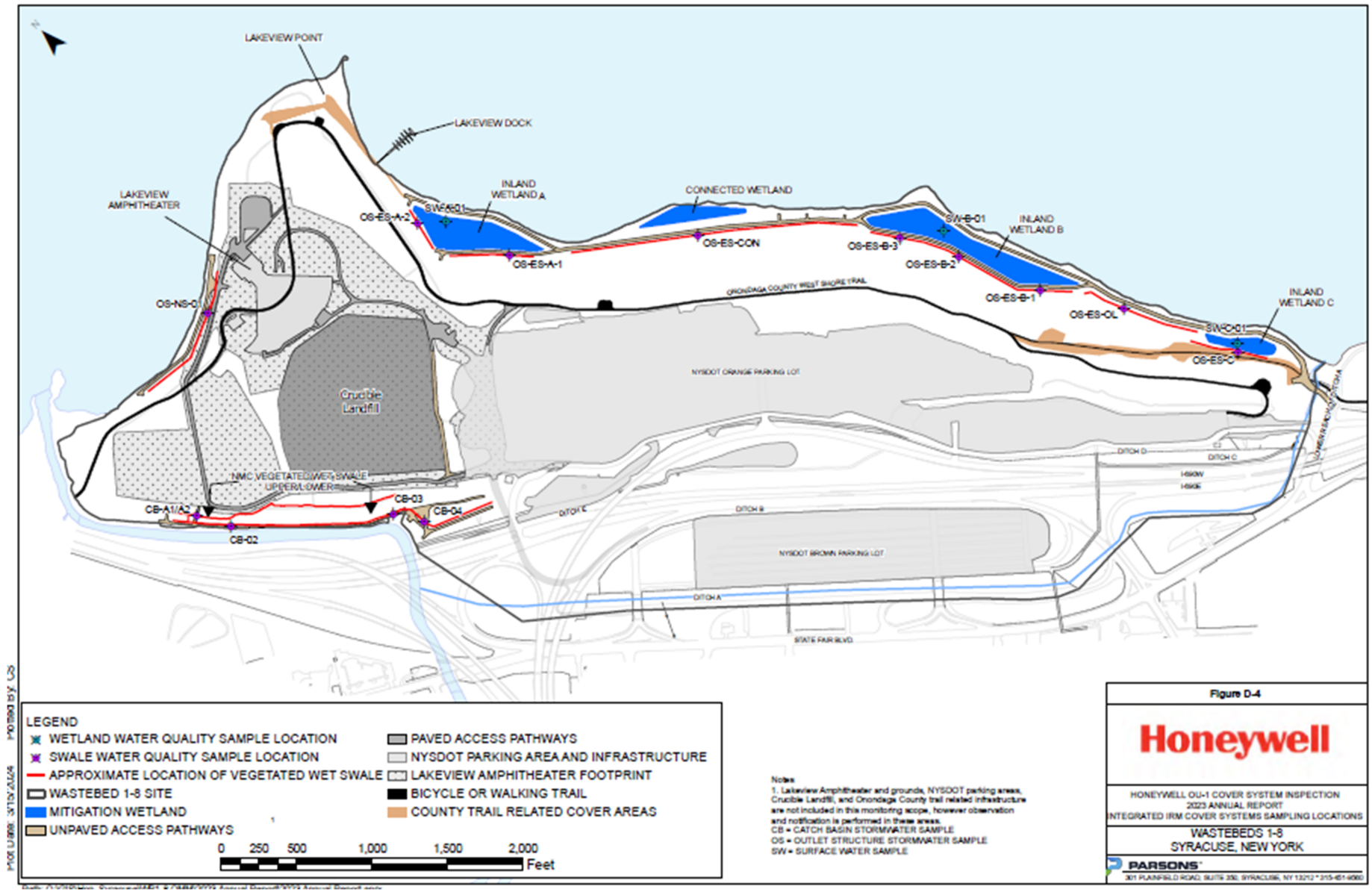

LAKEVIEW POINT
LAKEVIEW DOCK
LAKEVIEW AMPHITHEATER
INLAND WETLAND A
CONNECTED WETLAND
INLAND WETLAND B
INLAND WETLAND C
SW-A-01
SW-B-01
SW-C-01
OS-ES-A-2
OS-ES-A-1
OS-ES-CON
OS-ES-B-3
OS-ES-B-2
OS-ES-B-1
OS-ES-OL
OS-ES-C
OS-NS-01
ONONDAGA COUNTY WEST SHORE TRAIL
NYSDOT ORANGE PARKING LOT
Crucible Landfill
NMC VEGETATED WET SWALE UPPER/LOWER
CB-A1/A2
CB-02
CB-03
CB-04
DITCH E
DITCH B
DITCH D
DITCH C
DITCH A
NYSDOT BROWN PARKING LOT
STATE FAIR BLVD
LEGEND
WETLAND WATER QUALITY SAMPLE LOCATION
SWALE WATER QUALITY SAMPLE LOCATION
APPROXIMATE LOCATION OF VEGETATED WET SWALE
WASTEBED 1-8 SITE
MITIGATION WETLAND
UNPAVED ACCESS PATHWAYS
PAVED ACCESS PATHWAYS
NYSDOT PARKING AREA AND INFRASTRUCTURE
LAKEVIEW AMPHITHEATER FOOTPRINT
BICYCLE OR WALKING TRAIL
COUNTY TRAIL RELATED COVER AREAS
0 250 500 1,000 1,500 2,000
Feet
Notes
1. Lakeview Amphitheater and grounds, NYSDOT parking areas, Crucible Landfill, and Onondaga County trail related infrastructure are not included in this monitoring scope, however observation and notification is performed in these areas.
CB = CATCH BASIN STORMWATER SAMPLE
OS = OUTLET STRUCTURE STORMWATER SAMPLE
SW = SURFACE WATER SAMPLE
Figure D-4
Honeywell
HONEYWELL OU-1 COVER SYSTEM INSPECTION
2023 ANNUAL REPORT
INTEGRATED IRM COVER SYSTEMS SAMPLING LOCATIONS
WASTEBEDS 1-8
SYRACUSE, NEW YORK
PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Figure 6

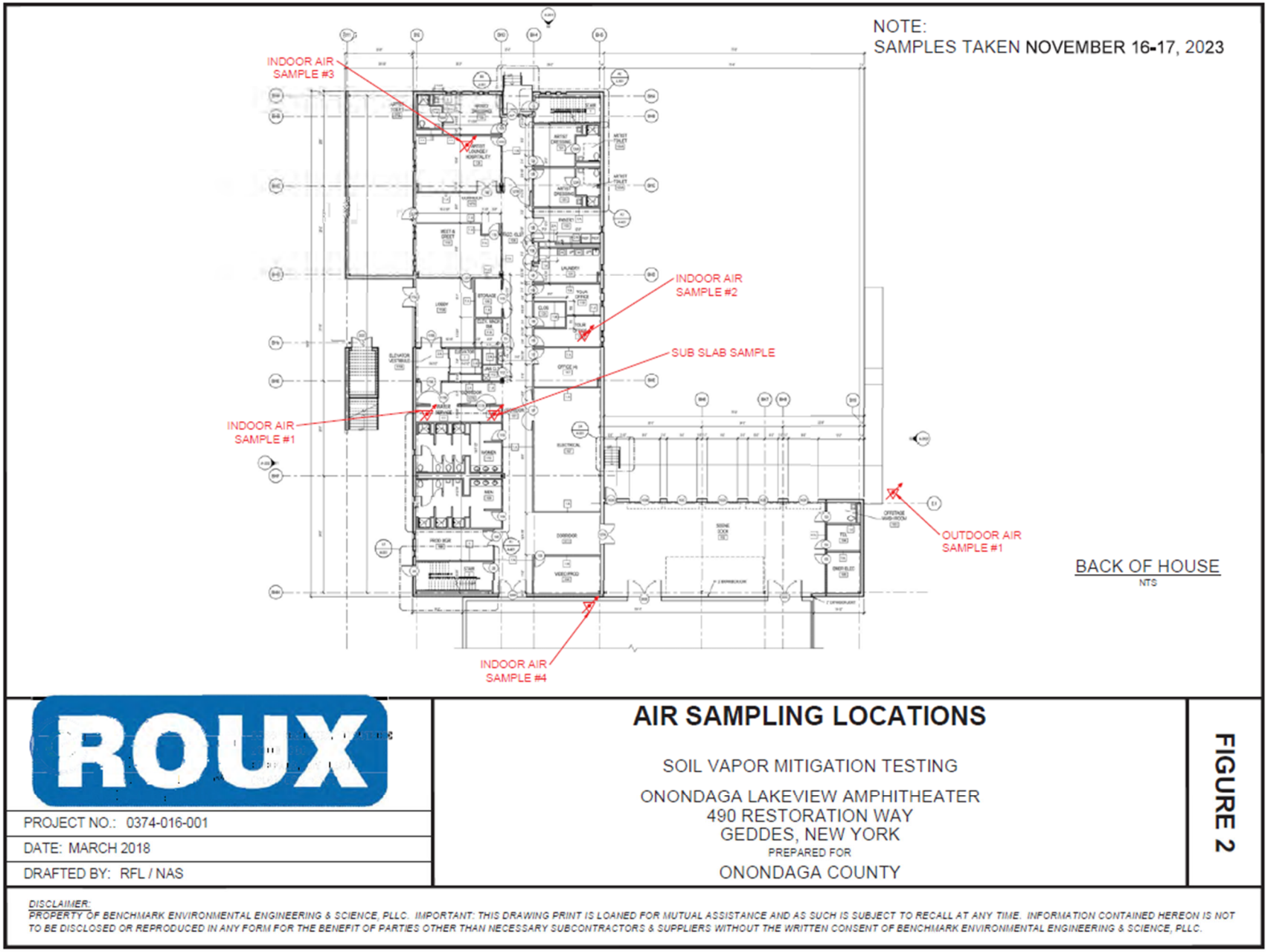
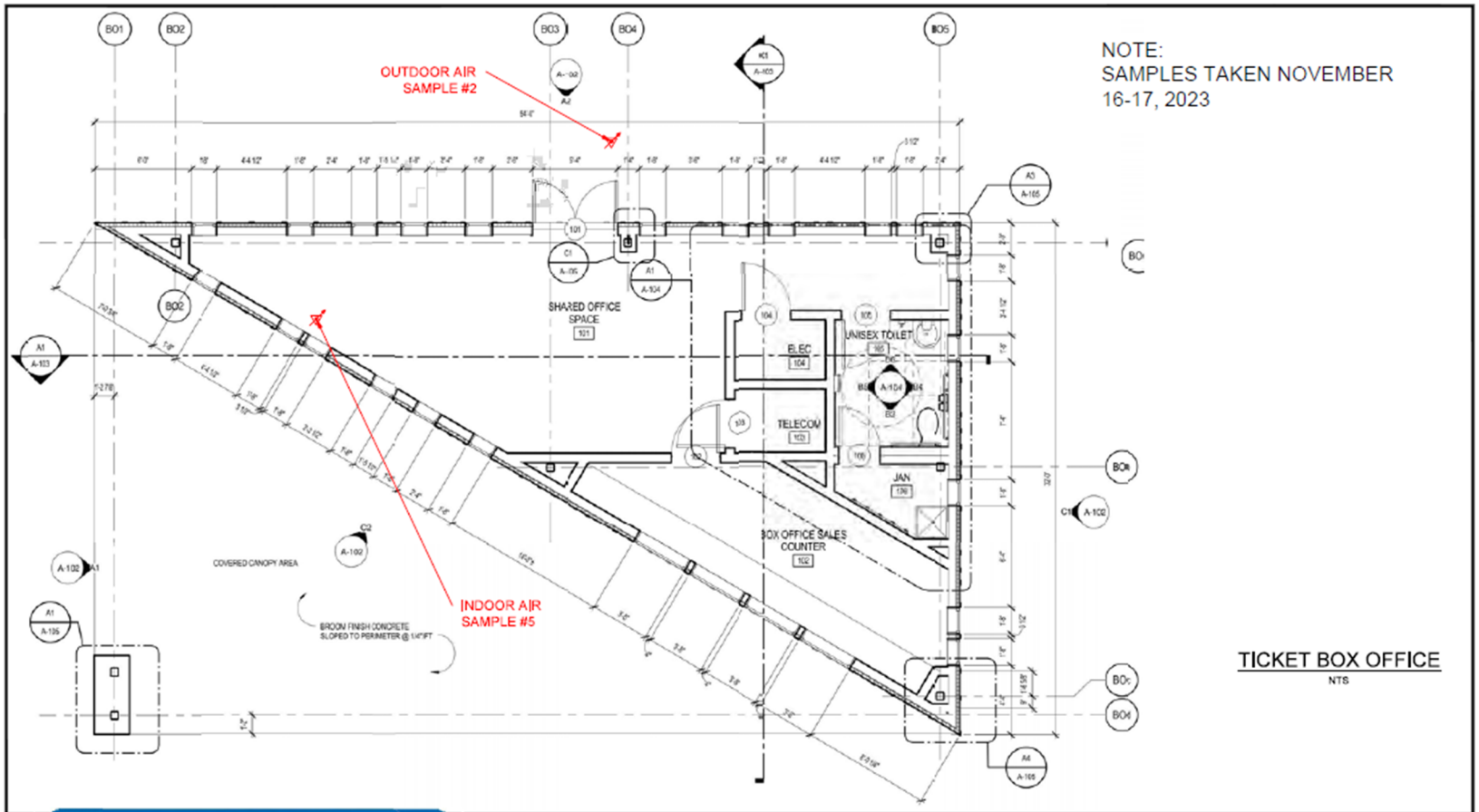

NOTE:
SAMPLES TAKEN NOVEMBER 16-17, 2023
INDOOR AIR SAMPLE #3
INDOOR AIR SAMPLE #2
SUB SLAB SAMPLE
INDOOR AIR SAMPLE #1
OUTDOOR AIR SAMPLE #1
INDOOR AIR SAMPLE #4
BACK OF HOUSE
NTS
ROUX
PROJECT NO.: 0374-016-001
DATE: MARCH 2018
DRAFTED BY: RFL / NAS
AIR SAMPLING LOCATIONS
SOIL VAPOR MITIGATION TESTING
ONONDAGA LAKEVIEW AMPHITHEATER
490 RESTORATION WAY
GEDDES, NEW YORK
PREPARED FOR
ONONDAGA COUNTY
FIGURE 2
DISCLAIMER:
PROPERTY OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC.

Figure 7



ROUX

PROJECT NO.: 0374-016-001
DATE: MARCH 2018
DRAFTED BY: RFL/ NAS

AIR SAMPLING LOCATIONS

SOIL VAPOR MITIGATION TESTING

ONONDAGA LAKEVIEW AMPHITHEATER
490 RESTORATION WAY
GEDDES, NEW YORK
PREPARED FOR
ONONDAGA COUNTY

FIGURE 3

Figure 8

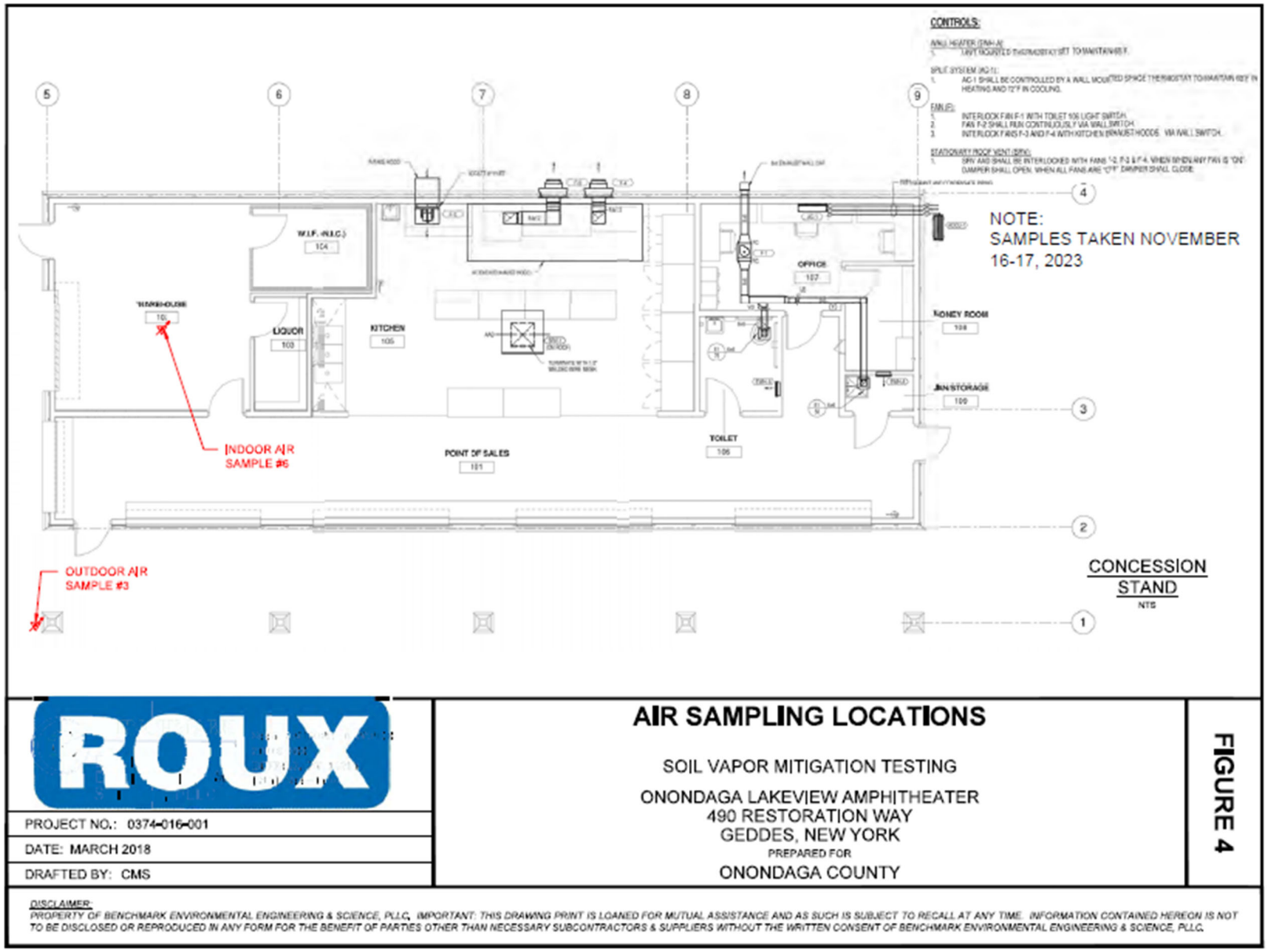

CONTROLS:
NOTE:
SAMPLES TAKEN NOVEMBER 16-17, 2023
INDOOR AIR SAMPLE #6
OUTDOOR AIR SAMPLE #3
CONCESSION STAND
NTS
W.I.F. (N.I.C.)
LIQUOR
KITCHEN
OFFICE
MONEY ROOM
JAN/STORAGE
POINT OF SALES
TOILET
AIR SAMPLING LOCATIONS
SOIL VAPOR MITIGATION TESTING
ONONDAGA LAKEVIEW AMPHITHEATER
490 RESTORATION WAY
GEDDES, NEW YORK
PREPARED FOR
ONONDAGA COUNTY
FIGURE 4
PROJECT NO.: 0374-016-001
DATE: MARCH 2018
DRAFTED BY: CMS
DISCLAIMER:
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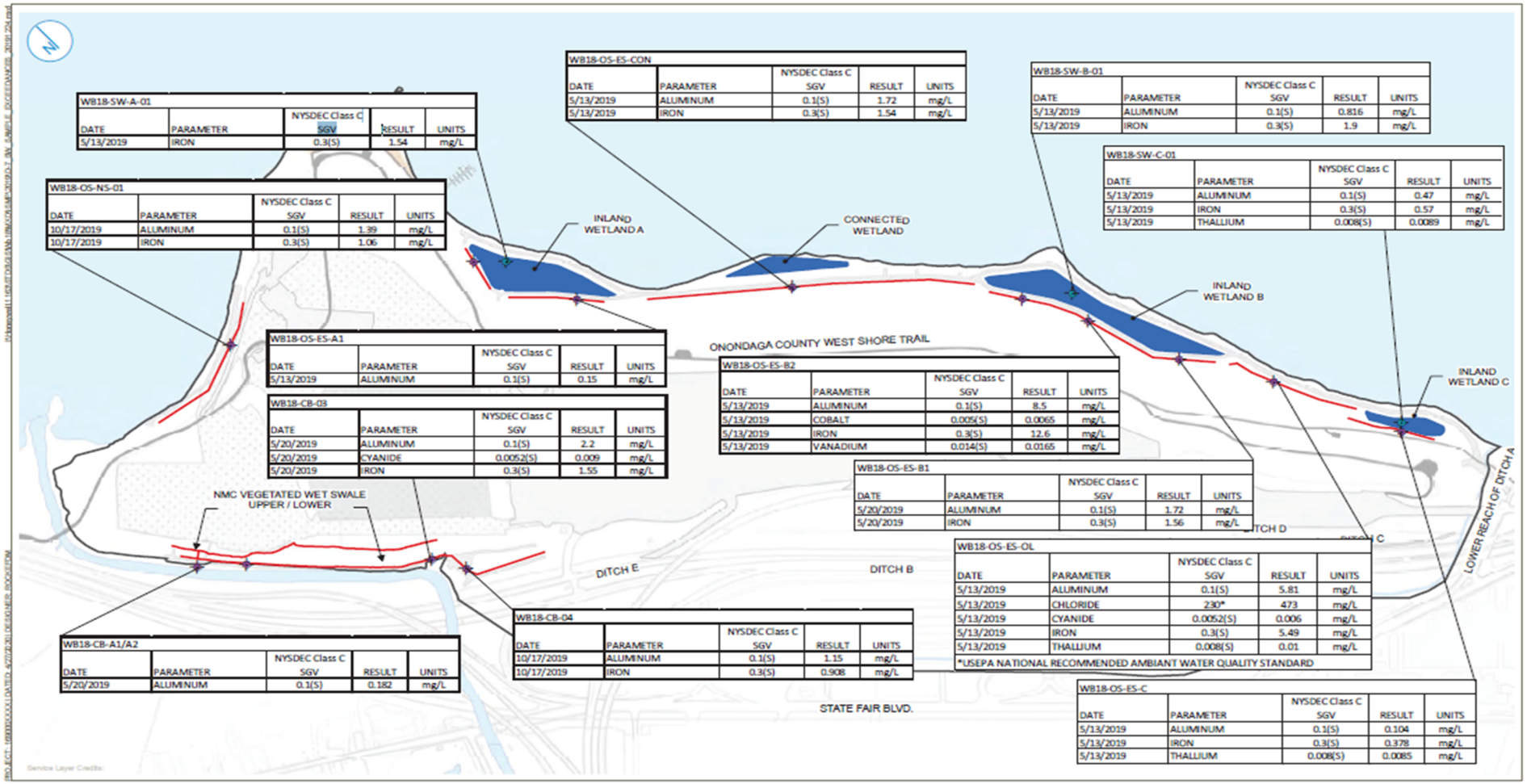
Figure 9



LEGEND
- SWALE WATER QUALITY SAMPLE LOCATION
- WETLAND WATER QUALITY SAMPLE LOCATION
- APPROXIMATE LOCATION OF VEGETATED WET SWALE
- MITIGATION WETLAND
- WASTEBEDS 1-8 SITE

Notes
SAMPLING LOCATIONS OS-ES-A-2 AND CB-02 WERE NOT SAMPLED IN 2019 DUE TO A LACK OF FLOW DURING STORM EVENTS

0 500 1,000 2,000 Feet

HONEYWELL OU-1 COVER SYSTEM INSPECTION
2019 ANNUAL REPORT
2019 SURFACE WATER SAMPLE EXCEEDANCES

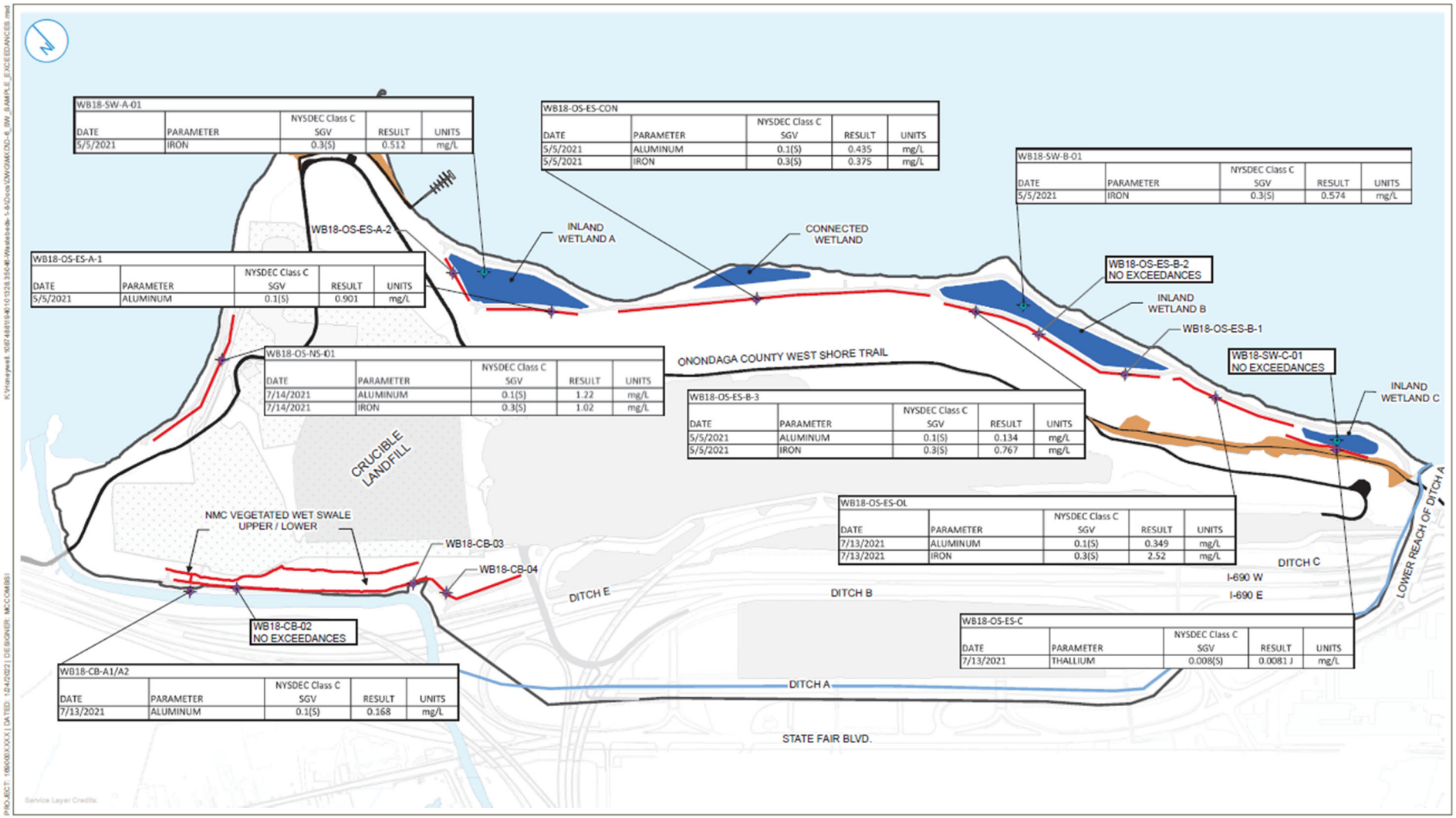
WASTEBEDS 1-8
SYRACUSE, NEW YORK

FIGURE D-7

O'BRIEN & GERE ENGINEERS, INC.
A RAMBOLL COMPANY

RAMBOLL

Figure 10



LEGEND
- SWALE WATER QUALITY SAMPLE LOCATION
- WETLAND WATER QUALITY SAMPLE LOCATION
- APPROXIMATE LOCATION OF VEGETATED WET SWALE
- MITIGATION WETLAND
- WASTEBEDS 1-8 SITE
- NYSDOT PARKING AREA AND ACCESS FOOTPRINT

NOTES
SAMPLING LOCATIONS OS-ES-A-2, OS-ES-B-1, CB-03, AND CB-04 WERE NOT SAMPLED IN 2021 DUE TO INSUFFICIENT FLOW EVEN DURING STORM EVENTS.

0 250 500 1,000 1,500 Feet

HONEYWELL OU-1 COVER SYSTEM INSPECTION
2021 ANNUAL REPORT
2021 SURFACE WATER SAMPLE EXCEEDANCES

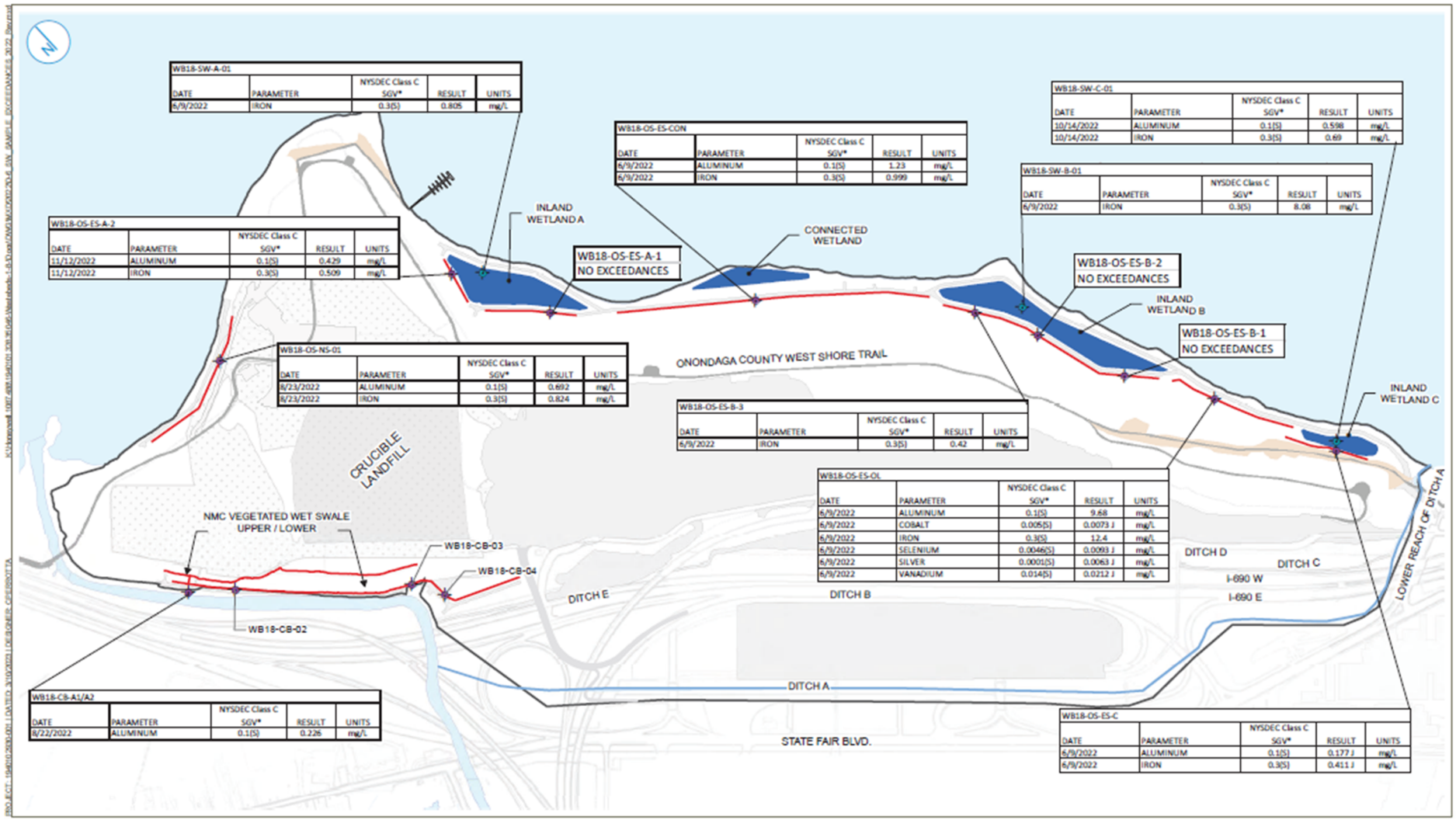
WASTEBEDS 1-8
SYRACUSE, NEW YORK

FIGURE D-6

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

Figure 11



LEGEND
- SWALE WATER QUALITY SAMPLE LOCATION
- WETLAND WATER QUALITY SAMPLE LOCATION
- APPROXIMATE LOCATION OF VEGETATED WET SWALE
- MITIGATION WETLAND
- WASTEBEDS 1-8 SITE
- NYSDOT PARKING AREA AND INFRASTRUCTURE

NOTES
*NYSDEC CLASS C STANDARD (S) OR GUIDANCE (G) VALUE (SGV; NYSDEC 1998).

SAMPLING LOCATIONS CB-02, CB-03, AND CB-04 WERE NOT SAMPLED IN 2022 DUE TO INSUFFICIENT FLOW EVEN DURING STORM EVENTS.

0 250 500 1,000 1,500 Feet

HONEYWELL OU-1 COVER SYSTEM INSPECTION
2022 ANNUAL REPORT
2022 SURFACE WATER SAMPLE EXCEEDANCES

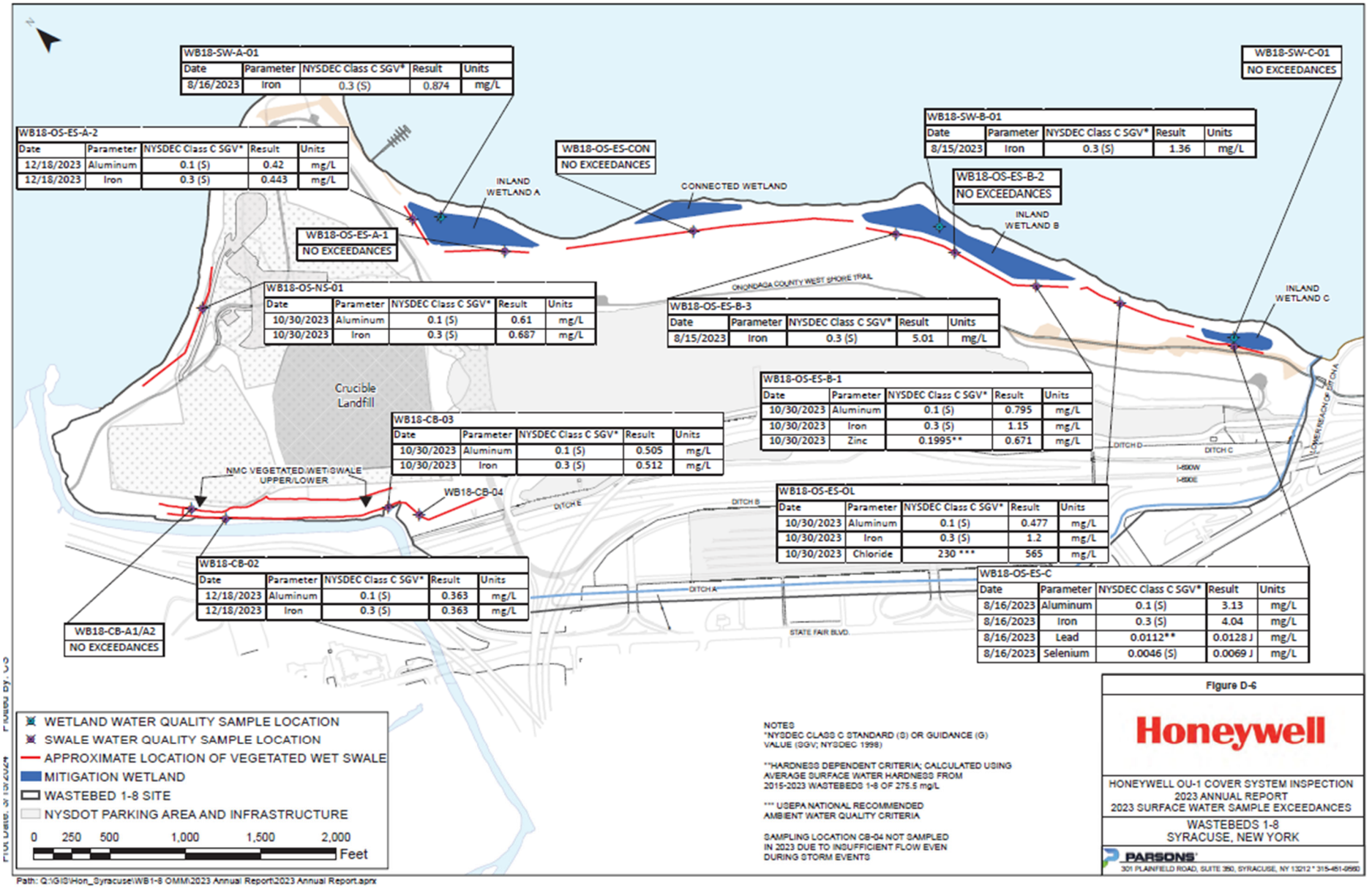
WASTEBEDS 1-8
SYRACUSE, NEW YORK

FIGURE D-6

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

Figure 12


WB18-SW-A-01
Date | Parameter | NYSDEC Class C SGV* | Result | Units
8/16/2023 | Iron | 0.3 (S) | 0.874 | mg/L
WB18-SW-C-01
NO EXCEEDANCES
WB18-OS-ES-A-2
Date | Parameter | NYSDEC Class C SGV* | Result | Units
12/18/2023 | Aluminum | 0.1 (S) | 0.42 | mg/L
12/18/2023 | Iron | 0.3 (S) | 0.443 | mg/L
WB18-OS-ES-CON
NO EXCEEDANCES
WB18-SW-B-01
Date | Parameter | NYSDEC Class C SGV* | Result | Units
8/15/2023 | Iron | 0.3 (S) | 1.36 | mg/L
WB18-OS-ES-B-2
NO EXCEEDANCES
INLAND WETLAND A
CONNECTED WETLAND
INLAND WETLAND B
WB18-OS-ES-A-1
NO EXCEEDANCES
ONONDAGA COUNTY WEST SHORE TRAIL
INLAND WETLAND C
WB18-OS-NS-01
Date | Parameter | NYSDEC Class C SGV* | Result | Units
10/30/2023 | Aluminum | 0.1 (S) | 0.61 | mg/L
10/30/2023 | Iron | 0.3 (S) | 0.687 | mg/L
WB18-OS-ES-B-3
Date | Parameter | NYSDEC Class C SGV* | Result | Units
8/15/2023 | Iron | 0.3 (S) | 5.01 | mg/L
Crucible Landfill
WB18-OS-ES-B-1
Date | Parameter | NYSDEC Class C SGV* | Result | Units
10/30/2023 | Aluminum | 0.1 (S) | 0.795 | mg/L
10/30/2023 | Iron | 0.3 (S) | 1.15 | mg/L
10/30/2023 | Zinc | 0.1995** | 0.671 | mg/L
WB18-CB-03
Date | Parameter | NYSDEC Class C SGV* | Result | Units
10/30/2023 | Aluminum | 0.1 (S) | 0.505 | mg/L
10/30/2023 | Iron | 0.3 (S) | 0.512 | mg/L
DITCH D
DITCH C
LOWER REACH OF DITCH A
I-690W
I-690E
NMC VEGETATED WET SWALE UPPER/LOWER
WB18-CB-04
DITCH E
DITCH B
WB18-OS-ES-OL
Date | Parameter | NYSDEC Class C SGV* | Result | Units
10/30/2023 | Aluminum | 0.1 (S) | 0.477 | mg/L
10/30/2023 | Iron | 0.3 (S) | 1.2 | mg/L
10/30/2023 | Chloride | 230 *** | 565 | mg/L
WB18-CB-02
Date | Parameter | NYSDEC Class C SGV* | Result | Units
12/18/2023 | Aluminum | 0.1 (S) | 0.363 | mg/L
12/18/2023 | Iron | 0.3 (S) | 0.363 | mg/L
DITCH A
WB18-OS-ES-C
Date | Parameter | NYSDEC Class C SGV* | Result | Units
8/16/2023 | Aluminum | 0.1 (S) | 3.13 | mg/L
8/16/2023 | Iron | 0.3 (S) | 4.04 | mg/L
8/16/2023 | Lead | 0.0112** | 0.0128 J | mg/L
8/16/2023 | Selenium | 0.0046 (S) | 0.0069 J | mg/L
STATE FAIR BLVD.
WB18-CB-A1/A2
NO EXCEEDANCES
WETLAND WATER QUALITY SAMPLE LOCATION
SWALE WATER QUALITY SAMPLE LOCATION
APPROXIMATE LOCATION OF VEGETATED WET SWALE
MITIGATION WETLAND
WASTEBED 1-8 SITE
NYSDOT PARKING AREA AND INFRASTRUCTURE
0 250 500 1,000 1,500 2,000
Feet
NOTES
*NYSDEC CLASS C STANDARD (S) OR GUIDANCE (G) VALUE (SGV; NYSDEC 1998)
**HARDNESS DEPENDENT CRITERIA; CALCULATED USING AVERAGE SURFACE WATER HARDNESS FROM 2015-2023 WASTEBED 1-8 OF 275.5 mg/L
*** USEPA NATIONAL RECOMMENDED AMBIENT WATER QUALITY CRITERIA
SAMPLING LOCATION CB-04 NOT SAMPLED IN 2023 DUE TO INSUFFICIENT FLOW EVEN DURING STORM EVENTS
Figure D-6
Honeywell
HONEYWELL OU-1 COVER SYSTEM INSPECTION
2023 ANNUAL REPORT
2023 SURFACE WATER SAMPLE EXCEEDANCES
WASTEBEDS 1-8
SYRACUSE, NEW YORK
PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560
Path: Q:\GIS\Hon_Syracuse\WB1-8 OMM\2023 Annual Report\2023 Annual Report.aprx

APPENDIX B – REFERENCES

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APPENDIX C – TABLES

Table 1: Summary of Air Sampling Analytical Results (2016-2023)

ROUX

TABLE 1

SUMMARY OF AIR SAMPLING ANALYTICAL RESULTS

Onondaga Lakeview Amphitheater

Parameter [1]	Sample Location																																	
	March 2016 Sub-slab Back of House	April 2017 Sub-slab Back of House	March 2018 Sub-slab Back of House	November 2023 Sub-slab Back of House	March 2016 Indoor Air #1 Back of House	April 2017 Indoor Air #1 Back of House	March 2018 Indoor Air #1 Back of House	November 2023 Indoor Air #1 Back of House	March 2016 Indoor Air #2	April 2017 Indoor Air #2	March 2018 Indoor Air #2	November 2023 Indoor Air #2	March 2016 Indoor Air #3 Kitchen	April 2017 Indoor Air #3 Kitchen	March 2018 Indoor Air #3 Kitchen	November 2023 Indoor Air #3 Kitchen	March 2016 Indoor Air #4 Back of House	April 2017 Indoor Air #4 Back of House	March 2018 Indoor Air #4 Back of House	November 2023 Indoor Air #4 Back of House	March 2016 Indoor Air #5 Box Office	April 2017 Indoor Air #5 Box Office	March 2018 Indoor Air #5 Box Office	November 2023 Indoor Air #5 Box Office	March 2016 Outdoor Air 2	April 2017 Outdoor Air 2	March 2018 Outdoor Air 2	November 2023 Outdoor Air 2	March 2016 Outdoor Air 1 Near Stage	April 2017 Outdoor Air 1 Near Stage	March 2018 Outdoor Air 1 Near Stage	November 2023 Outdoor Air 1 Near Stage	March 2018 Indoor Air #6	November 2023 Indoor Air #6	March 2018 Outdoor air # 3	November 2023 Outdoor Air #3
Location	**Maintenance closet**				**Maintenance closet**				**Back of House Office**				**Artist Lounge**				**Stage**				**Ticket Office**				**Ticket Office**				**Front of House**				**Concession stand**		**Concession stand**	
Volatile Organics Compounds (VOCs) - ug/m3 (micrograms per cubic meter)																																		
1,2,4-Trimethylbenzene	0.49 J	0.59 J	9.8	ND	0.74	ND	ND	ND	0.64 J	ND	ND	ND	0.79	ND	ND	ND	0.79	ND	ND	ND	ND	ND	ND	ND	0.64 J	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	3	ND	ND	ND	ND	ND	0.49 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
2,2,4- Trimethylpentane	1	ND	0.79	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.61 J	ND	ND	ND	0.65 J	ND	ND	ND	0.47 J	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
4-ethyltoluene	ND	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Acetone	35	51	590	66	28	18	15	14	19	23	20	27	19	20	14	31	16	15	13	26	28	17	14	31	26	14	20	16	25	NS	22	14	21	28	24	17
Benzene	2	ND	2	0.8	1.1	0.48	0.54	0.83	0.89	0.48	ND	0.86	0.86	0.51	0.54	0.8	1.3	ND	0.45	0.77	0.8	0.38 J	0.54 J	0.86	1.1	0.32 J	0.54 J	0.77	0.93 J	NS	ND	0.83	0.51	0.8	0.54	0.8
Carbon disulfide	ND	1.8	98	23	ND	0.37 J	ND	ND	0.34 J	0.44 J	ND	ND	0.4 J	0.47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Carbon tetrachloride [2,3]	ND	ND	ND	3.3	0.5	0.50	0.63	0.76	0.57	0.57	ND	0.76	0.57	0.57	0.63	0.69	0.63	ND	0.57	0.76	0.31	0.57	0.63	0.69	0.63	ND	0.63	0.89	0.63	NS	ND	0.69	0.63	0.69	0.63	0.69
Chloroform	ND	4.2	1.1	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	1.3	0.92	ND	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Chloromethane	3.1	3.2	91	35	1.7	1.3	1.1	0.97	ND	1.3	1.1 J	1	1.6 J	1.6	1.1	0.46	2	1.6	1.1	0.89	1.1	1.5	1.1	0.93	1.8	1.5	1.2	0.47	2	NS	0.6	0.93	1.5	0.93	1.3	0.91
Cyclohexane	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Ethyl acetate	ND	1.1	3.7	0.68	ND	2.2	0.68	0.12 J	ND	2.7	0.68	0.11 J	ND	19	1.4	1.5	ND	ND	1	ND	ND	ND	0.61	1.3	ND	ND	1.6	ND	ND	NS	ND	ND	2.1	0.9	0.47 J	ND
Ethylbenzene	0.78	ND	7.8	ND	0.52 J	ND	ND	ND	0.48 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Freon 11	2.9	1.7	1.6	1.6	2.4	1.5	1.7	1.6	2.2	1.5	1.7	1.6	2.5	1.6	1.7	1.6	3.1	1.6	1.7	1.6	1.6	1.7	1.8	1.7	2.8	1.6	1.7	1.7	3	NS	ND	1.6	1.5	1.6	1.7	1.6
Freon 113	0.84 J	ND	ND	ND	ND	ND	ND	ND	0.84 J	ND	ND	ND	0.84 J	ND	ND	ND	0.92 J	ND	ND	ND	1 J	ND	ND	ND	0.84 J	ND	ND	ND	1 J	NS	ND	ND	ND	ND	ND	ND
Freon 12	4	2.5	2.8	3	3.2	2.7	3	3	3.1	2.6	3.1	3	3.5	2.8	3	2.9	4.2	2.8	3	2.9	2.1	2.7	3.1	2.9	3.9	2.8	3	2.9	4.2	NS	0.89	2.9	2.8	2.9	3.1	2.9
Heptane	ND	ND	30	ND	ND	ND	ND	ND	0.98	ND	0.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.82	ND	ND	ND	ND	ND	0.41 J	ND	0.82	NS	ND	ND	ND	ND	ND	ND
Hexane	1.7	ND	ND	0.14 J	0.95	ND	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	0.6	ND	ND	0.46 J	0.14 J	ND	NS	ND	0.56	ND	ND	ND	ND
Isopropyl alcohol	6.1	14	13	2.3	3.9	1.5	ND	ND	1.7	1.9	ND	ND	2.8 J	1.7	ND	ND	ND	1.2	ND	ND	3.1	2	4.5	ND	10	2.6	7.9	0.33	2.5	NS	ND	1.1	ND	1.4	7.1	1.5
Methyl butyl ketone	ND	ND	ND	0.1 J	ND	0.57 J	ND	ND	0.45 J	0.57 J	ND	ND	0.41 J	0.45 J	ND	ND	ND	ND	ND	ND	0.57 J	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	4.8	82	170	41	2.3	3.4	1.7	1.4	2.2	3.3	1.9	1.7	1.9	2.6	3.3	1.2	3.3	1	0.91	1.2	3.2	1.6	ND	1.4	1.9	0.68 J	1.3 J	1.1	1.8	NS	ND	1.2	2	1.1	1.2	1.2
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Methylene Chloride [2,3]	2.4	4.1	30	2.2	5.5	2.7	2	2.3	1.7	1.9	2	2.7	1.70 J	3.2	1	2.2	1.9	3.1	1.5	2.7	2.5	3.0	2.5	1.6	1.7	2.3	2.7	1.9	2.2	NS	1.5	2.3	1.9	1.6	1.6	1.6
Styrene	0.55 J	ND	1.4	ND	0.77	1.1	ND	ND	0.6	1.2	ND	ND	ND	0.89	ND	ND	0.98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	4.1	0.21	ND	ND
Tetrachloroethylene [2,3]	ND	ND	0.81 J	ND	ND	0.81 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	6.8	330	800	300	1.1	2.3	0.44	ND	0.65	1.7	1.1	ND	ND	1.3	ND	ND	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Toluene	3.1	1.8	2000	0.21	2.3	1.2	0.75	1.3	2.1	1.5	1.1	1.3	1.4	1.6	1.4	1.2	2.1	0.49 J	0.72 J	1.1	2.2 J	0.75	0.72	1.2	1.4	0.41 J	0.53 J	1.1	1.3	NS	ND	1.1	0.53 J	1.2	0.64	1.2
Trichloroethene [2,3]	ND	ND	2.1	ND	ND	ND	ND	0.32	ND	ND	ND	0.38	ND	ND	ND	0.32	ND	ND	ND	0.38	ND	ND	ND	0.04	ND	ND	ND	0.27	ND	NS	ND	0.27	ND	0.27	ND	0.21
o-Xylene	0.82	0.43 J	9.6	ND	0.69	ND	ND	ND	0.69	0.52	ND	ND	ND	ND	ND	ND	0.96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
p/m-Xylene	2.4	0.82 J	26	ND	1.6	1.1 J	ND	ND	1.6	1.3	0.91 J	ND	1.1 J	0.91 J	ND	ND	2.9	0.65 J	ND	ND	1.1 J	ND	ND	ND	0.87 J	ND	ND	ND	0.65 J	NS	ND	ND	ND	ND	ND	ND
Vinyl acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	0.95	ND	ND	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND

Notes:

1. Only those parameters detected above the method detection limit, at a minimum of one location, are presented in this table.
2. Constituent monitored under NYSDOH Vapor/ Indoor Air Quality Standards - (Matricies A,B,C- Updated May 2017)
3. NYSDOH Decision Matrix A: used to determine appropriate corrective action.
4. NYSDOH Decision Matrix B used to determine appropriate corrective action.

Definitions:

ND = Parameter not detected above laboratory detection limit.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
NS = No Sample collected due to sample canister malfunction.

Table 2: 2023 Soil Vapor Intrusion Sampling Results

Table 2: 2023 Soil Vapor Intrusion Sampling Results

CASRN	56-23-5	79-01-6	156-59-2
Chemical	**Carbon Tetrachloride**	**Trichloroethene (TCE)**	**cis-1,2-Dichloroethene**
Sub-Slab Screening Criteria	68.1	99.7	5840
Sub-slab (Back of House Maintenance Closet)	3.3	ND (0.81)	ND (0.59)
Indoor Air Screening Criteria	2.04	2.99	175
Indoor Air 1 (Back of House Maintenance Closet)	0.76	0.32	ND (0.16)
Indoor Air 2 (Back of House Office)	0.76	0.38	ND (0.16)
Indoor Air 3 Kitchen (Artist Lounge)	0.69	0.32	ND (0.16)
Indoor Air 4 (Back of House Stage)	0.76	0.38	ND (0.16)
Indoor Air 5 Box Office (Ticket Office)	0.69	0.21	ND (0.16)
Indoor Air 6 Concession Stand	0.69	0.27	ND (0.16)
Outdoor Air Screening Criteria	2.27	3.32	195
Outdoor Air 1 (Front of House)	0.69	0.27	ND (0.16)
Outdoor Air 2 (Ticket Office)	0.69	0.27	ND (0.16)
Outdoor Air 3 (Concession Stand)	0.69	0.21	ND (0.16)

CASRN	75-35-4	127-18-4	71-55-6
Chemical	**1,1-Dichloroethene**	**Tetrachloroethene (PCE)**	**1,1,1-Trichloroethane**
Sub-Slab Screening Criteria	578	1570	730000
Sub-slab (Back of House Maintenance Closet)	ND (0.59)	ND (1)	ND (0.82)
Indoor Air Screening Criteria	17.3	47.2	21900
Indoor Air 1 (Back of House Maintenance Closet)	ND (0.16)	ND (1)	ND (0.82)
Indoor Air 2 (Back of House Office)	ND (0.16)	ND (1)	ND (0.82)
Indoor Air 3 Kitchen (Artist Lounge)	ND (0.16)	ND (1)	ND (0.82)
Indoor Air 4 (Back of House Stage)	ND (0.16)	ND (1)	ND (0.82)
Indoor Air 5 Box Office (Ticket Office)	ND (0.16)	ND (1)	ND (0.82)
Indoor Air 6 Concession Stand	ND (0.16)	ND (1)	ND (0.82)
Outdoor Air Screening Criteria	19.3	52.4	24300
Outdoor Air 1 (Front of House)	ND (0.16)	ND (1)	ND (0.82)
Outdoor Air 2 (Ticket Office)	ND (0.16)	ND (1)	ND (0.82)
Outdoor Air 3 (Concession Stand)	ND (0.16)	ND (1)	ND (0.82)

CASRN	75-09-2	75-01-4
Chemical	Methylene Chloride	Vinyl Chloride
Sub-Slab Screening Criteria	40900	92.9
Sub-slab (Back of House Maintenance Closet)	2.2	ND (0.38)
Indoor Air Screening Criteria	1230	2.79
Indoor Air 1 (Back of House Maintenance Closet)	2.3	ND (0.1)
Indoor Air 2 (Back of House Office)	2.7	ND (0.1)
Indoor Air 3 Kitchen (Artist Lounge)	2.2	ND (0.1)
Indoor Air 4 (Back of House Stage)	2.7	ND (0.1)
Indoor Air 5 Box Office (Ticket Office)	1.6	ND (0.1)
Indoor Air 6 Concession Stand	1.6	ND (0.1)
Outdoor Air Screening Criteria	1360	3.1
Outdoor Air 1 (Front of House)	2.3	ND (0.1)
Outdoor Air 2 (Ticket Office)	1.9	ND (0.1)
Outdoor Air 3 (Concession Stand)	1.6	ND (0.2)

Notes:

CASRN = chemical abstract service registry number; ND = non-detect; RSL = regional screening level;
TCR = target cancer risk; THQ = target hazard quotient; VISL = vapor intrusion screening level

Results and screening criteria are in micrograms per meters cubed ($\mu g/m^3$)

If result was not detected above the reporting limit, "ND" is written with the reporting limit is written in parantheses

Screening criteria for each air type is listed in the gray-shaded rows and described below:

Indoor Air: minimum target indoor air VISL, protective of TCR = 1E-06 and THQ = 1

Sub-slab: minimum target sub-slab and near-source soil gas VISL, protective of TCR = 1E-06 and THQ = 1

Indoor Air: minimum outdoor worker air RSL, protective of TCR = 1E-06 and THQ = 1

Table 3: Comparison of Subslab Vapor, Indoor Air, and Outdoor Air Analytical Results to NYSDOH Decision Matrices

TABLE 2

ROUX

COMPARISON OF SUBSLAB VAPOR, INDOOR AIR, AND OUTDOOR AIR ANALYTICAL RESULTS TO NYSDOH DECISION MATRICES

Onondaga Lakeview Amphitheater
November 16-17, 2023

Sample Location	Carbon Tetrachloride		Trichloroethene (TCE)		cis-1,2-Dichloroethene		1,1-Dichloroethene		Tetrachloroethene (PCE)		1,1,1 -Trichloroethane		Methylene Chloride		Vinyl Chloride	
	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix A	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix A	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix A	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix A	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix B	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix B	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix B	Lab Reported Concentration (ug/m³)	Soil Vapor / Indoor Air Matrix C
Subslab Vapor/Indoor Air /Outdoor Air																
Sub-slab (Back of House Maintenance Closet)	3.3	NFA	ND< 0.81	NFA	ND< 0.59	NFA	ND< 0.59	NFA	ND< 1	NFA	ND< 0.82	NFA	2.2	NFA	ND< 0.38	NFA
Indoor Air #1 (Back of House Maintenance Closet)	0.76		0.32		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		2.3		ND< 0.1	
Indoor Air #2 (Back of House Office)	0.76		0.38		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		2.7		ND< 0.1	
Indoor Air #3 Kitchen (Artist Lounge)	0.69		0.32		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		2.2		ND< 0.1	
Indoor Air #4 (Back of House Stage)	0.76		0.38		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		2.7		ND< 0.1	
Indoor Air #5 Box Office (Ticket Office)	0.69		0.21		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		1.6		ND< 0.1	
Indoor Air #6 Concession Stand	0.69		0.27		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		1.6		ND< 0.1	
Outdoor Air #1 (Front of House)	0.69		0.27		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		2.3		ND< 0.1	
Outdoor Air #2 (Ticket Office)	0.69		0.27		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		1.9		ND< 0.1	
Outdoor Air #3 (Concession Stand)	0.69		0.21		ND< 0.16		ND< 0.16		ND< 1		ND< 0.82		1.6		ND< 0.2	

ND = Not Detected
NFA = No further action.

Analytes Assigned:
Trichloroethene (TCE), cis-1,2-Dichloroethene (c12-DCE), 1,1-Dichloroethene (11-DCE), Carbon Tetrachloride

SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m³)	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m³)		
	< 0.2	0.2 to < 1	1 and above
< 6	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	4. No further action	5. MONITOR	6. MITIGATE
60 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

Analytes Assigned:
Tetrachloroethene (PCE), 1,1,1-Trichloroethane (111-TCA), Methylene Chloride

SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m³)	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m³)		
	< 3	3 to < 10	10 and above
< 100	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
100 to < 1,000	4. No further action	5. MONITOR	6. MITIGATE
1,000 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

Analytes Assigned:
Vinyl Chloride

SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m³)	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m³)	
	< 0.2	0.2 and above
< 6	1. No further action	2. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	3. MONITOR	4. MITIGATE
60 and above	5. MITIGATE	6. MITIGATE

APPENDIX D – REMEDY RESILIENCE EVALUATION

In line with regional practice, three tools were utilized to assess the Wastebeds 1-8 Subsite. Screenshots from each of the tools used are included below.

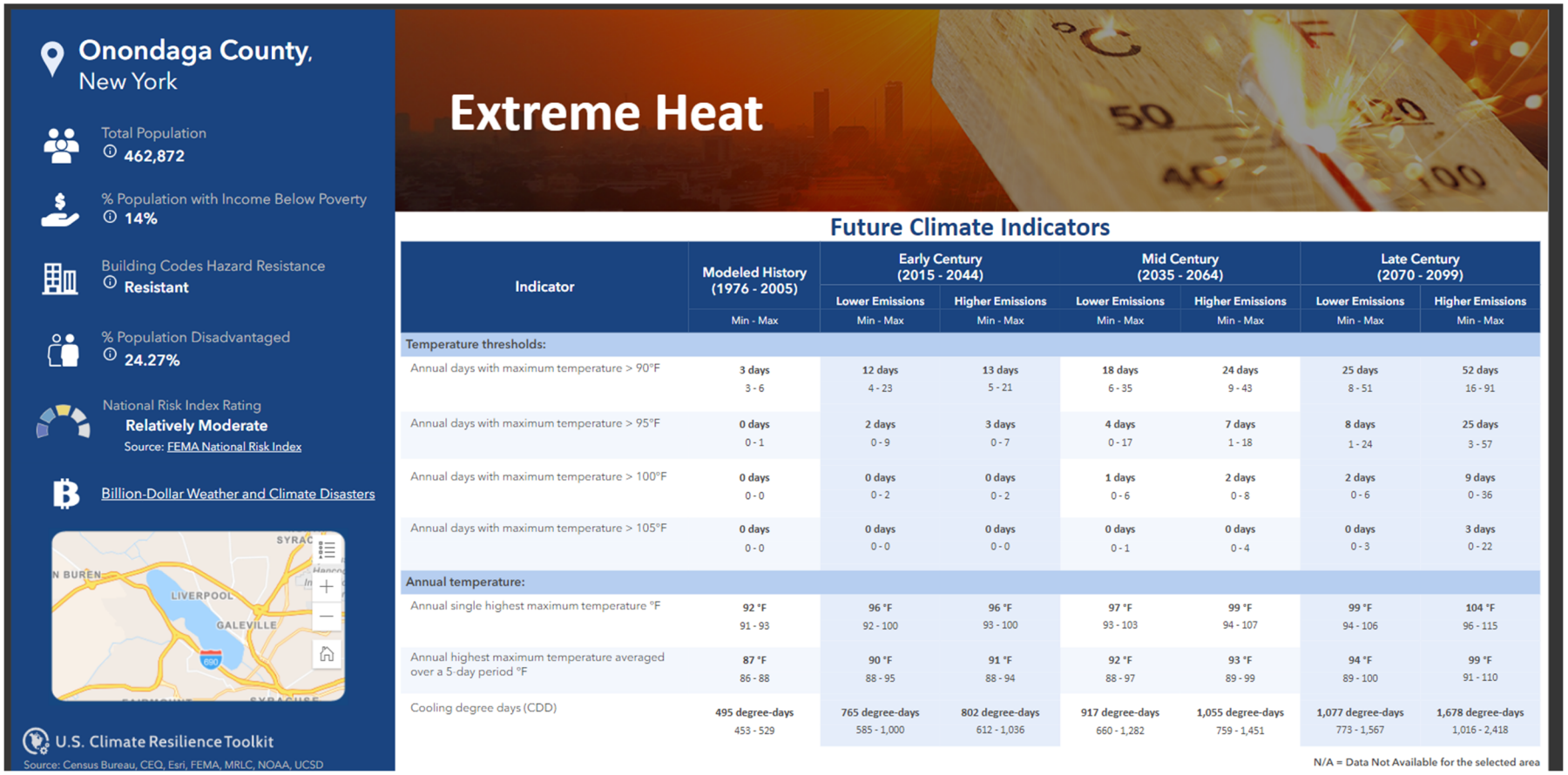
The first tool, the Climate Mapping for Resilience and Adaptation Assessment (CMRA) Tool (see CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)) examined five climate hazards (extreme heat, drought, wildfire, flooding, and costal inundation) for Onondaga County, the county in which the site is located. According to the CMRA tool, the National Risk Index Rating for extreme heat and wildfire are "Relatively Moderate" and "Very Low," respectively. No rating was provided for drought (see Figures D-1 through D-3). The CMRA tool reported the risks for flooding as "Relatively Moderate" as shown in Figures D-4. A moderate rating for heat and flooding is not expected to be significant in terms of impact to OU1 of the subsite. Heat is unlikely to affect the integrity of the cover placed at the site. However, extreme temperatures could potentially impact survival rates of vegetation. Significant flooding has not been observed at OU1 in the past; shoreline areas (more susceptible to erosion) are stabilized and planted to help to maintain lakefront soils. The risks for coastal inundation were "not applicable," likely due to the site's distance from the coast, as explained further below.

The second tool is called the NOAA Sea Level Rise Viewer (see https://coast.noaa.gov/slr/). This tool assessed the potential for impacts to the site vicinity from sea level rise and coastal flooding. Because the site is located over 200 miles from the Atlantic Ocean, coastal flooding impacts at the site are unlikely. Figure D-6 illustrates the Sea Level Rise Viewer for Onondaga County, NY and the surrounding area.

The final tool is called the USGS U.S. Landslide Inventory and Susceptibility Map (see https://www.usgs.gov/tools/us-landslide-inventory-and-susceptibility-map). As shown by Figure D-7, there have been no landslides recorded in the vicinity of the site. Landfill susceptibility in the subsite vicinity is relatively low as well, with the exception of some areas along the shoreline. However, shoreline stabilization and planted vegetation as part of the overall restoration better help maintain integrity of the lakefront soils.

Based on this information, potential site impacts from severe weather have been assessed, and the performance of the remedy is currently not at significant risk due to the expected effects of weather-related events in the region and near the site. The integrity of the cover placed at the site will continue to be monitored and maintained to remain functional and protective.

FIGURE D-1



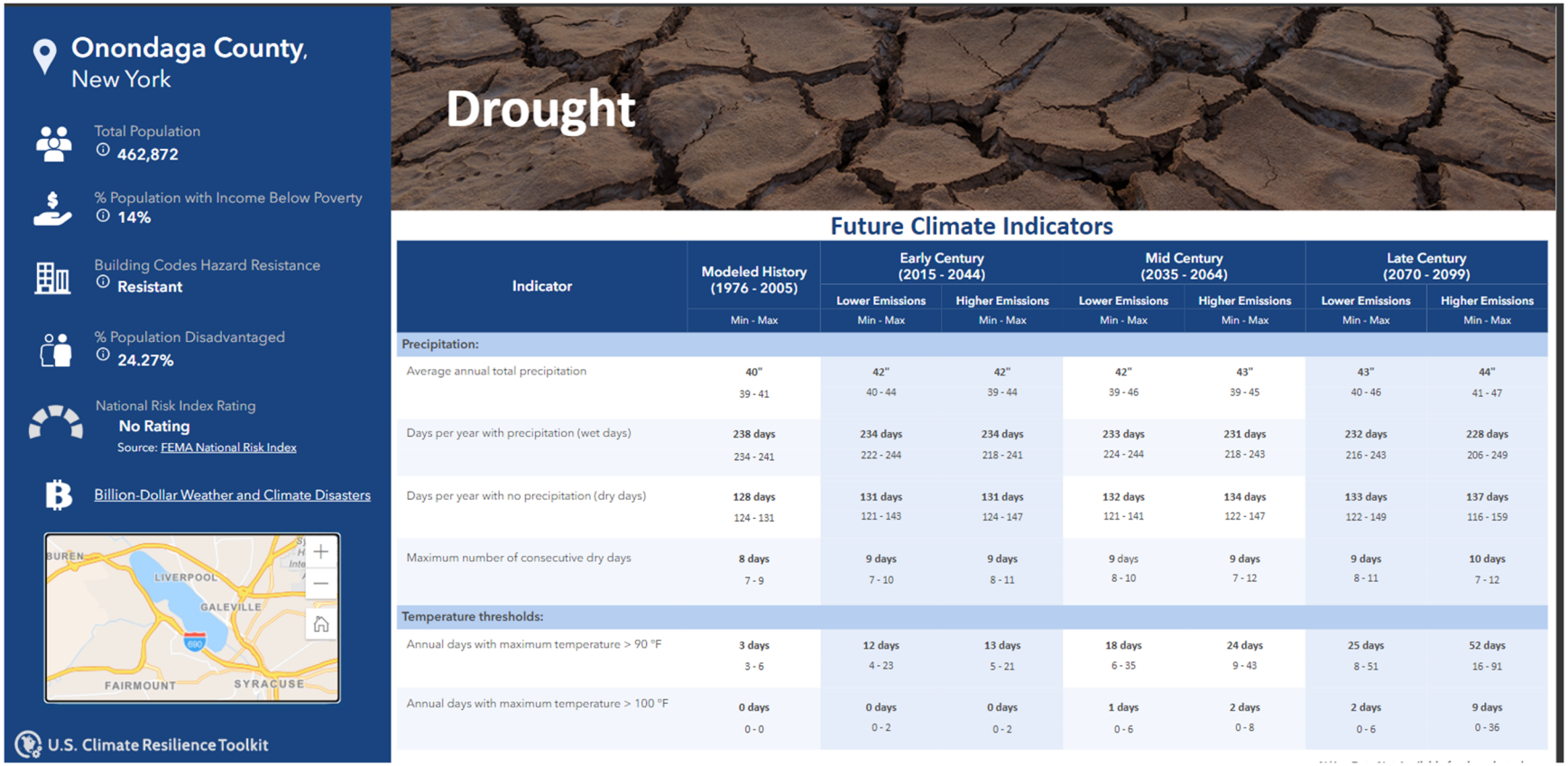
Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	3 days 3 - 6	12 days 4 - 23	13 days 5 - 21	18 days 6 - 35	24 days 9 - 43	25 days 8 - 51	52 days 16 - 91
Annual days with maximum temperature > 95°F	0 days 0 - 1	2 days 0 - 9	3 days 0 - 7	4 days 0 - 17	7 days 1 - 18	8 days 1 - 24	25 days 3 - 57
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 2	0 days 0 - 2	1 days 0 - 6	2 days 0 - 8	2 days 0 - 6	9 days 0 - 36
Annual days with maximum temperature > 105°F	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1	0 days 0 - 4	0 days 0 - 3	3 days 0 - 22
Annual temperature:							
Annual single highest maximum temperature °F	92 °F 91 - 93	96 °F 92 - 100	96 °F 93 - 100	97 °F 93 - 103	99 °F 94 - 107	99 °F 94 - 106	104 °F 96 - 115
Annual highest maximum temperature averaged over a 5-day period °F	87 °F 86 - 88	90 °F 88 - 95	91 °F 88 - 94	92 °F 88 - 97	93 °F 89 - 99	94 °F 89 - 100	99 °F 91 - 110
Cooling degree days (CDD)	495 degree-days 453 - 529	765 degree-days 585 - 1,000	802 degree-days 612 - 1,036	917 degree-days 660 - 1,282	1,055 degree-days 759 - 1,451	1,077 degree-days 773 - 1,567	1,678 degree-days 1,016 - 2,418

N/A = Data Not Available for the selected area

*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-2



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	40" 39 - 41	42" 40 - 44	42" 39 - 44	42" 39 - 46	43" 39 - 45	43" 40 - 46	44" 41 - 47
Days per year with precipitation (wet days)	238 days 234 - 241	234 days 222 - 244	234 days 218 - 241	233 days 224 - 244	231 days 218 - 243	232 days 216 - 243	228 days 206 - 249
Days per year with no precipitation (dry days)	128 days 124 - 131	131 days 121 - 143	131 days 124 - 147	132 days 121 - 141	134 days 122 - 147	133 days 122 - 149	137 days 116 - 159
Maximum number of consecutive dry days	8 days 7 - 9	9 days 7 - 10	9 days 8 - 11	9 days 8 - 10	9 days 7 - 12	9 days 8 - 11	10 days 7 - 12
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	3 days 3 - 6	12 days 4 - 23	13 days 5 - 21	18 days 6 - 35	24 days 9 - 43	25 days 8 - 51	52 days 16 - 91
Annual days with maximum temperature > 100 °F	0 days 0 - 0	0 days 0 - 2	0 days 0 - 2	1 days 0 - 6	2 days 0 - 8	2 days 0 - 6	9 days 0 - 36

*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-3

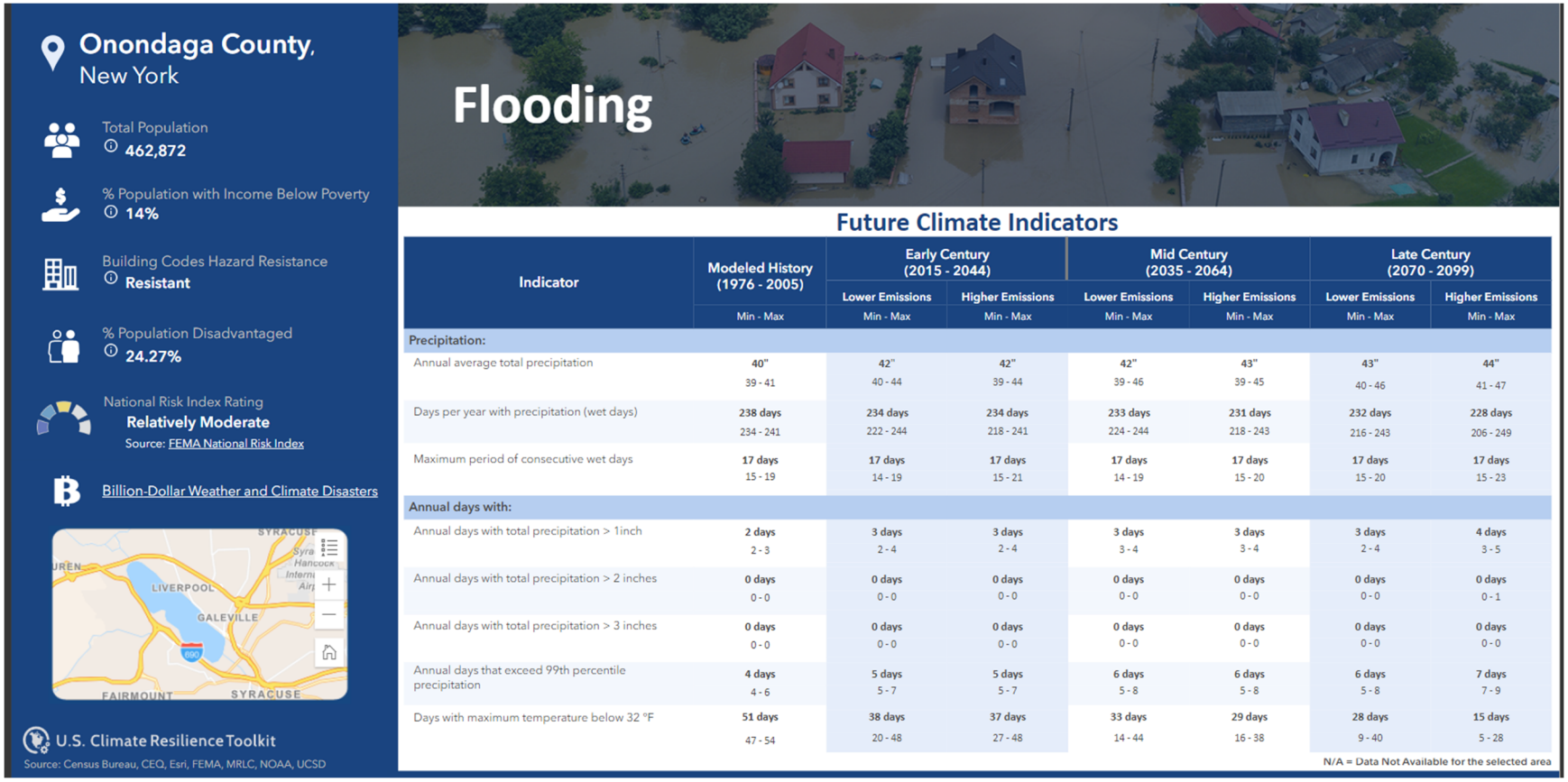
Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	128 days 124 - 131	131 days 121 - 143	131 days 124 - 147	132 days 121 - 141	134 days 122 - 147	133 days 122 - 149	137 days 116 - 159
Maximum number of consecutive dry days	8 days 7 - 9	9 days 7 - 10	9 days 8 - 11	9 days 8 - 10	9 days 7 - 12	9 days 8 - 11	10 days 7 - 12
Days per year with precipitation (wet days)	238 days 234 - 241	234 days 222 - 244	234 days 218 - 241	233 days 224 - 244	231 days 218 - 243	232 days 216 - 243	228 days 206 - 249
Temperature thresholds:							
Annual days with maximum temperature > 90°F	3 days 3 - 6	12 days 4 - 23	13 days 5 - 21	18 days 6 - 35	24 days 9 - 43	25 days 8 - 51	52 days 16 - 91
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 2	0 days 0 - 2	1 days 0 - 6	2 days 0 - 8	2 days 0 - 6	9 days 0 - 36

N/A = Data Not Available for the selected area

*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-4

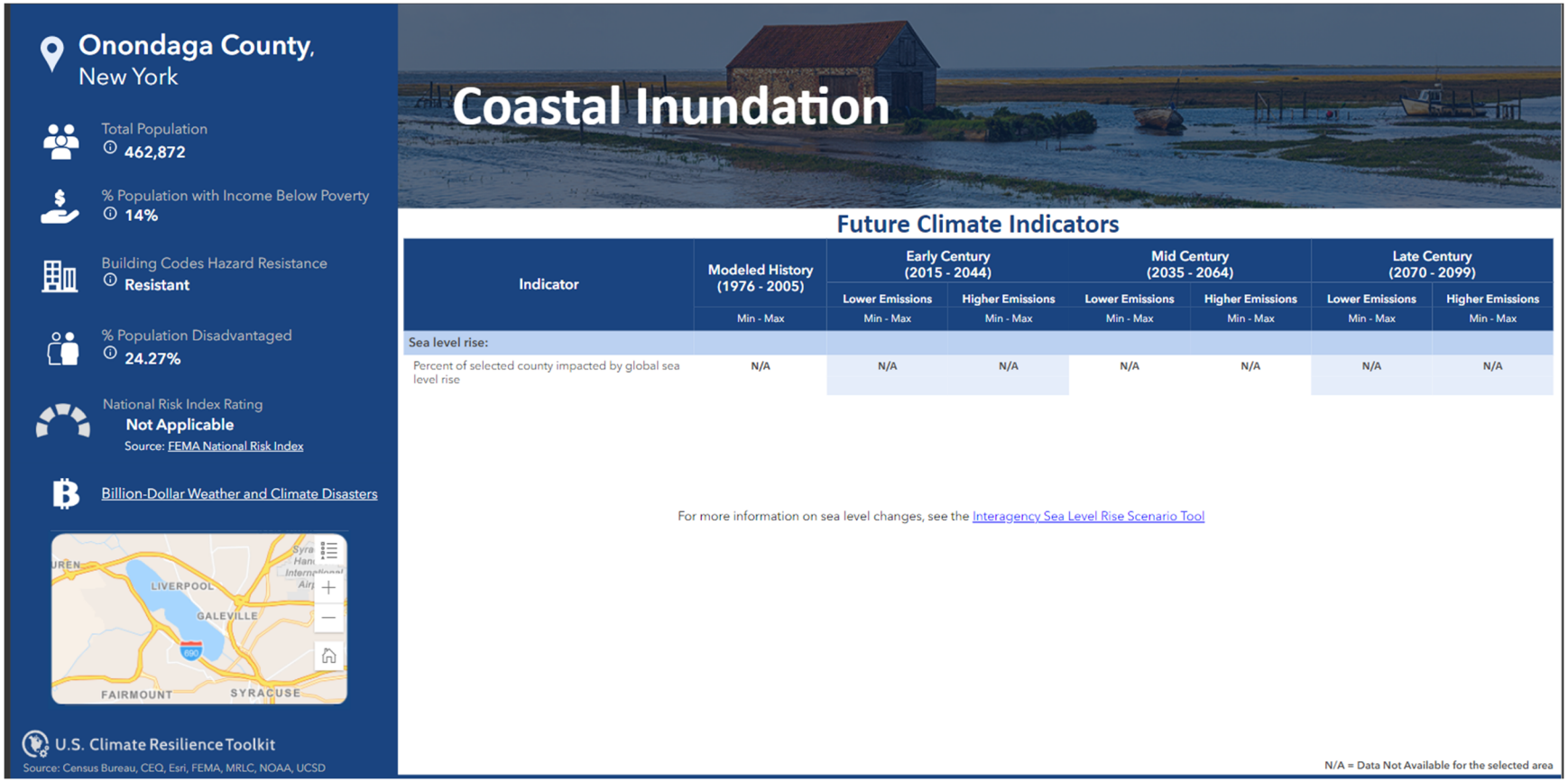


Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	40" 39 - 41	42" 40 - 44	42" 39 - 44	42" 39 - 46	43" 39 - 45	43" 40 - 46	44" 41 - 47
Days per year with precipitation (wet days)	238 days 234 - 241	234 days 222 - 244	234 days 218 - 241	233 days 224 - 244	231 days 218 - 243	232 days 216 - 243	228 days 206 - 249
Maximum period of consecutive wet days	17 days 15 - 19	17 days 14 - 19	17 days 15 - 21	17 days 14 - 19	17 days 15 - 20	17 days 15 - 20	17 days 15 - 23
Annual days with:							
Annual days with total precipitation > 1inch	2 days 2 - 3	3 days 2 - 4	3 days 2 - 4	3 days 3 - 4	3 days 3 - 4	3 days 2 - 4	4 days 3 - 5
Annual days with total precipitation > 2 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1
Annual days with total precipitation > 3 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days that exceed 99th percentile precipitation	4 days 4 - 6	5 days 5 - 7	5 days 5 - 7	6 days 5 - 8	6 days 5 - 8	6 days 5 - 8	7 days 7 - 9
Days with maximum temperature below 32 °F	51 days 47 - 54	38 days 20 - 48	37 days 27 - 48	33 days 14 - 44	29 days 16 - 38	28 days 9 - 40	15 days 5 - 28

N/A = Data Not Available for the selected area

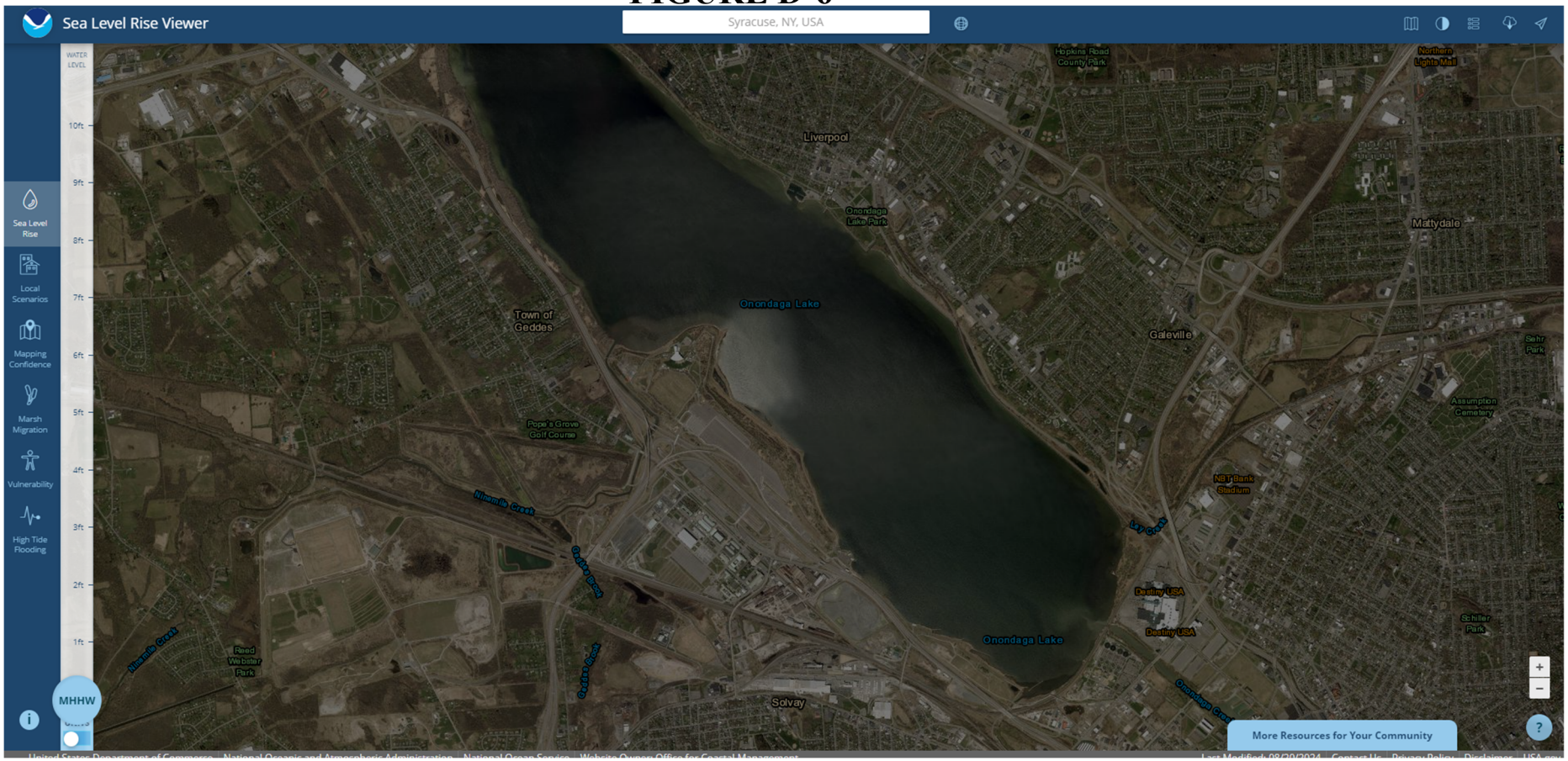
*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-5



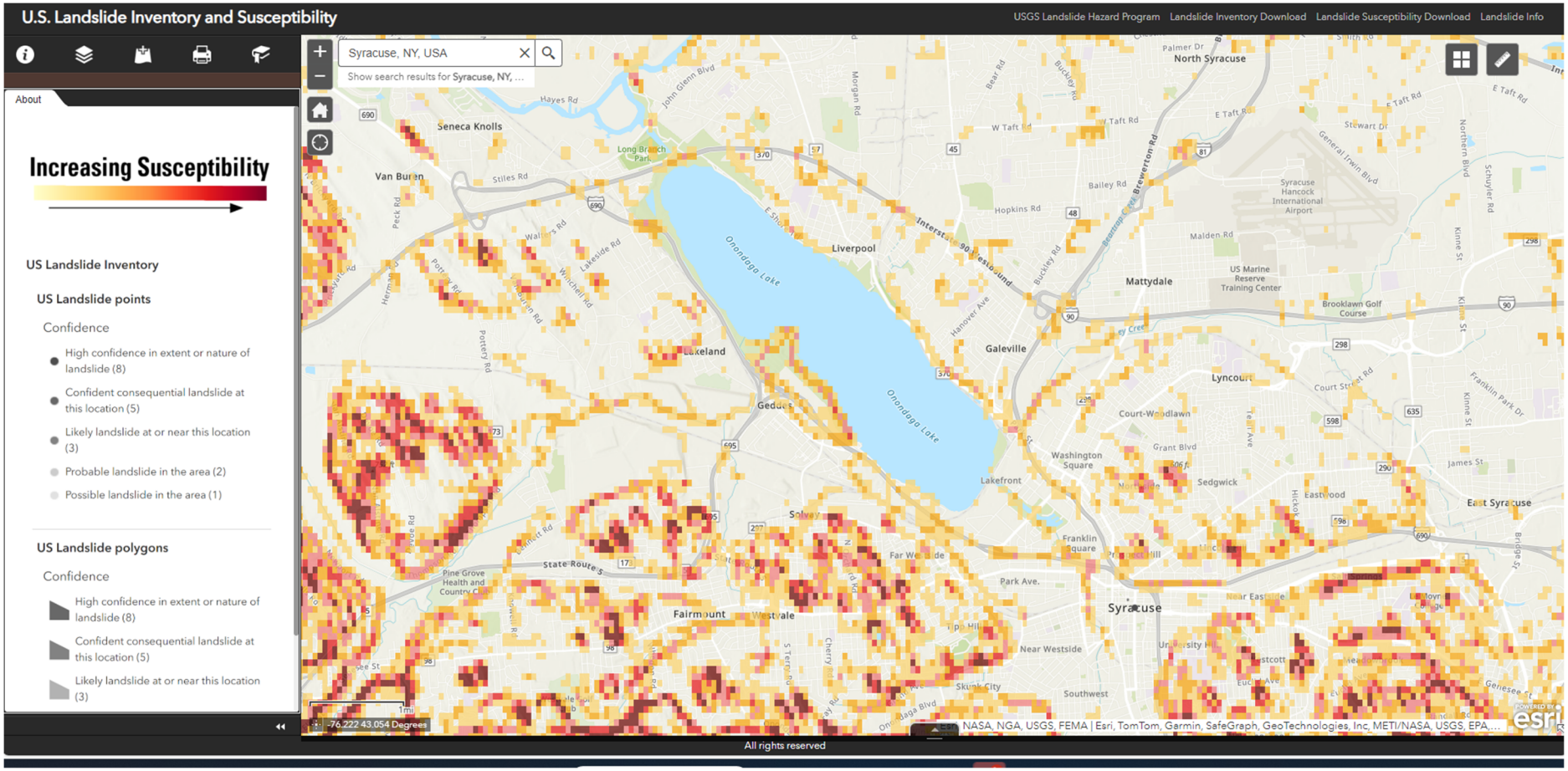
*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-6



*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.

FIGURE D-7



*In the figure above, the Wastebeds 1-8 subsite is the landmass jutting into the lake to the east of Route 690.