PROPOSED REMEDIAL ACTION PLAN

Former Air Force Plant No. 51
Operable Unit Number 02: On-Site/Off-Site Soils, Groundwater, and Soil Vapor
Operable Unit Number 03: Off-Site Upgradient Wooded Area/Wetland Area
State Superfund Project
Greece, Monroe County
Site No. 828156
August 2023

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site.

For Operable Unit Number 02 (OU2): On Site Remedial Program the disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives (RAOs) identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

For Operable Unit Number 03 (OU3): Off-Site Upgradient Wooded Area/Wetland Area based on the findings of the investigation of OU3 any past disposal of hazardous wastes and hazardous materials in the OU3 area does not pose a threat to public health and the environment. Therefore, the remedy proposed by this Proposed Remedial Action Plan (PRAP) for OU3 is No Action with Site Management.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and the environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repository identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the

reports and documents, which are available at the following repository:

GREECE PUBLIC LIBRARY
2 VINCE TOFANY BLVD
GREECE, NY 14612
Phone: 585.225.8951

Key project documents and project summary also are available on the NYSDEC website at:
https://www.dec.ny.gov/data/DecDocs/828156/

A public comment period has been set from:

August 9, 2023 to September 7, 2023

A public meeting is scheduled for the following date:

Tuesday – August 22, 2023, from 6 PM to 8 PM
The Lodge at Adeline Park
124 Armstrong Road
Greece, NY 14616

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through **09/07/2023** to:

Gail Dieter
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway – 12th Floor
Albany, NY 12233-7017
gail.dieter@dec.ny.gov

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs.

Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Former Air Force Plant No. 51 site is located just north of the Lake Ontario State Parkway at 4777 Dewey Avenue in suburban area of the Town of Greece, Monroe County, New York. **See Figure 1**.

Site Features: The main site features once included a central complex of large and mid-size buildings surrounded by parking areas, roadways, and open fields. In 2015, the main building and several of the smaller buildings were demolished by the owner with only their concrete slabs now remaining. Four smaller buildings remain on the site (Bldg. No. 2, 7, 9, and 11). None of which are occupied at this time. Bldg. No. 3, 4, 5 (one structure) also remains, but is considered to be off-site.

Access to the site is not controlled.

Current Zoning and Land Use: The site is zoned Flexible Office/Industrial. The site is privately owned and is presently unoccupied.

Surrounding land use consists of commercial and residential use to the east, undeveloped wooded upland areas to the south and wooded upland areas leading to wetlands and Round Pond Creek to the west. The Monroe County Water Authority Shoremont Treatment Plant is located north of the site. An outparcel at 4771 Dewey Avenue is considered an off-site property, but it adjoins the site and was reportedly a part of the historic WWII Odenbach shipbuilding facility. This off-site parcel is currently under separate ownership and operation. The parcel shares driveway access to the site. The building (Building 3, 4, and 5) that currently exists on this parcel historically housed administrative offices, a cafeteria, and a medical facility.

Past Use of the Site: The plant was originally built during WWII by the Odenbach Shipbuilding Corp. for the production of ocean-going ships. To launch the ships, a water-filled channel was dredged from the north end of the shipyard to Round Pond Creek. Today, the remaining portion of the channel is used by the Shoremont Treatment Plant as a settling pond for sediments from filter backwashing.

After the war, the plant was used by the Department of Defense for the production of B-52 bulkheads and the name of the facility was changed to Air Force Plant 51. Records indicate that the A.O. Smith Corporation and the American Machine and Foundry Company occupied the site in the 1950s. In 1959, the facility was declared excess by the United States (U.S.) government. From 1961 to 1963 the property was owned by the Monroe County Water Authority. Since 1963, the facility has been owned by corporate relatives of the current owner with space leased to a variety of businesses including scrap metal recycling and metal plating.

U.S. Air Force contracts indicate that a plating operation was performed at the site prior to 1956 and that plating area rinse water drained to an on-site pond before flowing into Round Pond Creek. Other operations at the site that may have potentially contributed to site contamination include: discharges from acetylene gas production; a variety of maintenance activities including vehicle maintenance; underground gasoline storage tanks; above ground storage tanks; electrical transformers; heat treating; degreasing; laboratory activities; metal plating activities from tenants in the 1970s; discharges to septic systems; and discharges to the storm sewer system which discharges to Round Pond Creek. Other activities not specifically identified above may have also contributed to the contamination of the site.

Over the past 15 years, numerous investigations have been conducted by the U.S. Army Corps of Engineers (USACE), by the current owner of the property under the Voluntary Cleanup Program (VCP), and by the Department under the State Superfund Program (SSF) to define the nature and extent of contamination and develop a plan to clean up the site. The Department is implementing a remedial program at the site while continuing to identify and pursue parties who are potentially responsible for the contamination in order to recover remediation costs. See the enforcement status (Section 5) below for the list of potentially responsible parties.

Operable Units: An operable unit (OU) represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the on-site contamination.

Under the VCP, the site was divided into seven OUs. (Reference Site #V00421 for information on the previous OU designations.) In January 2009, the owner determined that they could no longer afford the costs associated with the investigation and remediation activities and ended their participation in the VCP. The site is now being addressed under State Superfund, and the previous OUs have been consolidated and renamed as follows:

Operable Unit 1 (OU1) refers to the former on-site lagoon/pond where wastewater associated with past site operations was discharged, and the northern portion of the former Building #1 slab. A Proposed Remedial Action Plan (PRAP) is being developed separately, but concurrently with this OU2/OU3 PRAP to address the contamination associated with OU1. One public meeting will be held to present the proposed remedies for all three OUs.

Operable Unit 2 (OU2) encompasses soil, soil vapor, and groundwater (including soil vapor and bedrock groundwater beneath OU1 through OU3 on- and off-site) including the complex of buildings, former storage tanks, former vehicle maintenance facilities and transformer areas occupying the central portion of the site, the industrial sewers that discharged storm water and septic wastes to the wetlands via several outfalls, and other suspected disposal areas.

Operable Unit 3 (OU3) encompasses off-site areas including the adjacent forests, wetlands, Round Pond and Round Pond Creek.

The location of each OU is depicted on **Figure 2**.

Site Geology and Hydrogeology: The upper 1- to 6-feet of the site is composed of a layer of fill

material consisting of soils with small amounts of concrete, asphalt, metal, brick and wood. Soil beneath this fill layer generally consists of mixtures of silts, clays, some sands, and a lesser amount of gravel. Bedrock, consisting of a brick-red interbedded shale, siltstone, sandstone, and limestone of the Queenston Foundation was encountered at an average depth of about 30-feet below ground surface (bgs). Groundwater is generally encountered within 2-feet of the ground surface. The groundwater flow direction on the west side of the former main Air Force Plant No. 51 building is away from the building slab toward the west and northwest. A groundwater divide trending approximately along the axis of the building slab northward toward the Monroe County Water Authority property appears to be present. Groundwater east of the building slab flows toward the east and northeast.

Operable Units (OU) Number 02 and OU 03 are the subject of this document.

A Proposed Remedial Action Plan will be issued separately for OU 01.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site. For the Former Septic System/Leachfield area, impacted soil is evaluated for the Protection of Ecological Resources and/or commercial use.

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

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

A.O. Smith Corporation
Qubica AMP
Genesee Scrap & Tin Bailing, Co.
4800 Dewey Avenue, Inc.
U.S. Department of Defense
U.S. Air Force
U.S. Army Corps of Engineers
U.S. General Services Administration
U.S. Department of Commerce
The PRPs for the site declined to implement the full remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume

responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Reports.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site for OU2 and OU3 includes data for:

- groundwater	- soil	- soil vapor
- surface water	- sediment	

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

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

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Reports contain full discussions of the data.

The contaminant(s) of concern identified for these Operable Units at this site is/are:

For OU2 – On-Site:

Volatile Organic Compounds – 1,1-dichloroethene (1,1-DCE), trans-1,2-dichloroethene, vinyl chloride (VC), cis-1,2-dichloroethene (DCE), trichloroethene (TCE)

Semi-Volatile Organic Compounds – benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene

Total Polychlorinated biphenyls (PCBs)

Metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc

For OU3 – Off-Site:

Volatile Organic Compounds – TCE, DCE, trans-1,2-DCE, VC, 1,1,2-trichloroethane (1,1,2-TCA), 1,1-DCE

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

The following IRM(s) have been completed at the site based on conditions observed during the RI.

PCB Remediation - Building Removal IRM - Building 8 – Building 8 was located along the western edge of the slab of former Building No. 1, within the OU2 portion of the site. Building 8 was likely constructed at the same time as Building No. 1, as it served as a powerhouse for the facility. This building was previously identified as containing a 12KV switchgear for the Rochester Gas & Electric Co. electric feeder, a 600 KVA oil filled transformer bank housed in a vault, and a 1500 KVA load center and batteries that supplied control voltage for the switch gear. Transformers remained on a concrete pad located on the west side of the building at the time of mitigation and demolition.

The general dimensions of Building No. 8 were approximately 48 feet by 25 feet and covered an approximate area of 1,200 square feet. It was a single-story building with a single large room and a semi-partitioned portion located along the northeastern wall. Construction materials included cinderblock walls supported by horizontal steel I-beams, a concrete slab floor, and corrugated

metal roofing overlain with plywood and tar roofing materials. The semi-partitioned area was the transformer vault, measuring 19 feet by 10 feet, and was composed of cinderblocks, metallic grates, and metallic grate door. Three 200 KVA transformers with "No PCB" stickers, indicating prior PCB removal, were present within this vault. Miscellaneous other materials, such as window glaze and caulking, and possible lead-painted surfaces, were noted within Building No. 8 during prior assessments.

Building No. 8 demolition and disposal was conducted between October 2020 and February 2021. The demolition and disposal activities are documented in the *Construction Completion Report for Building No. 8 Mitigation and Demolition – August 2021*.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU2.

A FWRIA for OU3, which is included in the OU3 RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination:

Soil, soil vapor, and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and emerging contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS). Below is a summary of areas with documented contamination, based on investigations conducted to date.

For OU 2: On-Site/Off-Site Soil, Groundwater, and Soil Vapor -

The primary contaminants of concern for OU2 include VOCs, particularly trichloroethene (TCE) and associated degradation products in groundwater, SVOCs, particularly polycyclic aromatic hydrocarbons (PAHs), PCBs, and metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc in the soil.

Soil - Total PCBs were detected in surface soil (0- to 2-feet) at a maximum concentration of 3.09 parts per million (ppm) exceeding both the unrestricted and commercial restricted use soil cleanup objectives (UUSCOs, CUSCOs) of 0.1 ppm and 1 ppm, respectively. Three pesticides – delta-BHC, dieldrin, and p,p'-DDE were detected at a maximum concentration of 0.060 ppm, 0.067 ppm, and 0.0055 ppm, respectively, exceeding the UUSCOs of 0.040 ppm, 0.050 ppm, and 0.0033 ppm, respectively. Six PAHs were detected in surface soil samples at maximum concentrations of 6.2 ppm for benzo(a)anthracene exceeding both UUSCO (1 ppm) and CUSCO (5.6 ppm); 4.9 ppm for benzo(a)pyrene exceeding both UUSCO (1 ppm) and CUSCO (1 ppm); 6.5 ppm for

benzo(b)fluoranthene exceeding UUSCO (1 ppm) only; 2.7 ppm for benzo(k)fluoranthene exceeding UUSCO (0.8 ppm) only; 5.6 ppm for chrysene exceeding UUSCO (1 ppm) only; and 3.1 ppm for indeno(1,2,3-c,d)pyrene exceeding UUSCO (0.5 ppm) only. Eight metals were detected in surface soil samples at maximum concentrations of 26.3 ppm for arsenic exceeding both UUSCO (13 ppm) and CUSCO (16 ppm); 4.1 ppm for cadmium exceeding UUSCO (2.5 ppm) only; 652 ppm for copper exceeding both UUSCO (50 ppm) and CUSCO (270 ppm); 544 ppm for lead exceeding UUSCO (63 ppm) only; 1.9 ppm for mercury exceeding UUSCO (0.18 ppm) only; 315 ppm for nickel exceeding both UUSCO (30 ppm) and CUSCO (310 ppm); 10 ppm for selenium exceeding UUSCO (3.9 ppm) only; and 1320 ppm for zinc exceeding UUSCO (109 ppm) only.

Surficial soil of both the Site-Wide/OU2 area and the Dewey Avenue Frontage represent the horizon from 0-feet to 2-feet below ground surface and share similar contaminants, although the concentration and extent of those contaminants differ, reflecting the different historical uses of both portions of the Air Force Plant 51 site. Contaminants such as lead and arsenic in portions of the Dewey Avenue Frontage may be related to historic pesticide use and/or its use as a former parking area, while the larger set of contaminants in the Site-Wide/OU2 area likely reflect its variety of historical industrial uses and/or imported fill material placed at the site over the years.

Three areas of subsurface soil (2- to 30-feet bgs) contamination were identified, all to the west of Building No. 1. One area contained chlorinated solvent soil contamination that corresponds to the area of groundwater contamination, generally between Building No. 1 and the fire road in the southwestern portion of OU2. TCE was detected at a maximum concentration of 54 ppm exceeding both the UUSCO and protection of groundwater soil cleanup objective (PGWSCO) of 0.47 ppm. Soil contamination exceeding the UUSCO for TCE occupied an area between wells MW3-9 and MW4-6 (see **Figure #5** for locations of these wells) and in the area of MW5-6, an overburden well and MW5-11, a shallow bedrock well. See **Figures #7 and #8** for locations of these monitoring wells.

PAH exceedances were identified in another area located outside the fire road, between the fire road and the OU2 boundary. Five PAHs were detected in subsurface soil samples at maximum concentrations of 25 ppm for benzo(a)anthracene exceeding both UUSCO (1 ppm) and CUSCO (5.6 ppm); 19 ppm for benzo(a)pyrene exceeding both UUSCO and CUSCO (1 ppm); 20 ppm for benzo(b)fluoranthene exceeding both UUSCO (1 ppm) and CUSCO (5.6 ppm); 3.3 ppm for dibenzo(a,h)anthracene exceeding both UUSCO (0.33 ppm) and CUSCO (0.56 ppm); and 12 ppm for indeno(1,2,3-c,d)pyrene exceeding both UUSCO (0.5 ppm) and CUSCO (5.6 ppm).

Data does not indicate any off-site migration of contaminated soil related to this site.

See Figures 9 thru 13.

Groundwater - TCE and its associated degradation product cis-1,2 DCE are the primary contaminants of concern in groundwater at the site. These contaminants were identified in the bedrock and overburden aquifer. The overburden aquifer contained maximum concentrations of TCE at 120,000 parts per billion (ppb) and cis-1,2 DCE was detected at a maximum concentration of 15,000 ppb as sampled in 2016, located near the southwest area of former Building #1,

exceeding 6 NYCRR Part 703 Class GA (Fresh Groundwater) Water Quality Standard (AWQS) of 5 ppb for each. In an area to the south of the Septic System/Leachfield, and to the west of Former Building #1, TCE was detected at a maximum concentration of 46,000 ppb and cis-1,2 DCE was detected at a maximum concentration of 7400 ppb. These concentrations indicate the possible presence of dense non-aqueous phase liquid (DNAPL). Maximum concentrations of TCE and cis-1,2-DCE within the bedrock aquifer were detected at 380 ppb and 130 ppb, respectively, located on the western portion of the site, exceeding AWQS of 5 ppb. Other site contaminants vinyl chloride and 1,1-dichloroethene were detected in samples also exceeding AWQS of 2 ppb and 5 ppb respectively, but at lesser concentrations.

For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctansulfonic acid (PFOS) were reported at concentrations of up to 300 and 97 parts per trillion (ppt), respectively, exceeding NYSDEC's Ambient Water Quality Guidance Values (AWQGV) of 6.7ppt and 2.7ppt, respectively. These concentrations were found in the Septic/Leachfield area of the site. The most ubiquitous PFAS was perfluorobutanoic acid (PFBA) detected in 6 of 7 sample locations with a maximum concentration of 240 ppt detected in MW3-4. Other individual PFAS compounds specifically perfluorobutanesulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), and perfluoropentanoic acid (PFPeA) were also detected in either MW5-14 or the Leachfield sample AFP-PP2.

1,4-Dioxane was reported at a concentration of up to 0.5 parts per billion (ppb) exceeding the AWQGV of 0.35 ppb.

Direct discharges or migration of impacted groundwater and stormwater drainage into off-site areas has been documented.

See Figures 3 thru 8.

Soil Vapor - Soil vapor sampling was limited due to the high groundwater table, but the results of samples collected beneath the former Building #1 slab do not currently show a vapor issue. Building #1 was previously demolished, therefore soil vapor intrusion is not a current concern and cannot be evaluated at this time. VOCs detected were carbon tetrachloride (maximum concentration 0.51 micrograms per cubic meter [ug/m^3]), dichloromethane (maximum concentration 5.1 ug/m^3), tetrachloroethene (maximum concentration 1.9 ug/m^3), and trichloroethene (maximum concentration 1.5 ug/m^3).

VOCs may move into the soil vapor (air spaces within the soil), which in turn may move into any buildings or future on-site or off-site development.

<u>Former Leachfield/Septic System</u>:

The primary contaminants of concern for this area include PCBs and various metals, particularly chromium.

Soil - Given that this area is an undeveloped woodland that leads to a wetland, soil sample results were compared to the soil cleanup objectives for the protection of ecological resources

(PESCOs). Soil impacts extended from the septic tank to the visible edge of the wetland and to a depth of approximately 6-feet. Maximum soil concentrations included PCBs (3.7 ppm, PESCO = 1 ppm), silver (697 ppm, PESCO = 2 ppm), trivalent chromium (471 ppm, PESCO = 41 ppm), and cadmium (20 ppm, PESCO = 4 ppm).

Groundwater - Vinyl chloride slightly exceeds the groundwater standard of 2 ppb at 4.7 ppb. SVOCs (except for hexachlorobutadiene detected at 1.5 ppb, AWQS = 0.5 ppb), metals, PCBs, and pesticides were not detected at concentrations greater than their respective groundwater standards. Off-site migration of this low-level groundwater contamination is not a concern.

Storm Sewer, Infrastructure, Catch Basin/Outfall Area:

The primary contaminants found in the storm sewer infrastructure/catch basins were petroleum compounds, PCBs, and TCE and associated degradation compounds.

Soil - An area of visibly contaminated soil was found near the northwest corner of the main building and adjacent to the storm-sewer system at a depth of about 6-feet. These soils contained total SVOCs, particularly PAHs at 334 ppm, and VOCs cis-1,2-DCE at 64 ppm and vinyl chloride at 46 ppm, greater than their respective soil cleanup objectives for commercial use or protection of groundwater.

Sampling of soils accumulated within the storm sewer and catch basin/outfall area indicated concentrations of VOCs and PCBs greater than the cleanup objectives. TCE was detected at concentrations up to 1,000 ppm (PGWSCO = 5 ppm), cis-1,2-DCE was detected at a maximum concentration of 49 ppm and PCBs were detected at a maximum concentration of 57 ppm.

Groundwater - The primary groundwater contaminants in this area which is at the northwest corner of the former Building #1 slab near Catch Basin 1, were TCE (up to 93,000 ppb, AWQS= 5 ppb) and cyanide (up to 6,140 ppb, AWQS = 200 ppb). Only minor concentrations of VOCs, SVOCs, metals, and PCBs have been detected near the western end of the drainage swale leading toward the Outfall and just outside of the property fence.

On-Site Building No. 8:

The primary contaminants of concern for the area of the previously performed IRM are PCBs.

Soil/Unconsolidated Material - Building #8's sub-slab, floor trench, and exterior soils located immediately adjacent to Building #8 at the same approximate depth of 0.5-feet bgs as the sub-slab point were sampled and analyzed for VOCs, SVOCs, PCBs, pesticides, and metals. PCBs were found only in the floor trench at 150 ppm and 190 ppm, exceeding the CUSCO of 1 ppm for PCBs. The sub-slab and exterior soils were non-detect for PCBs.

In the absence of sufficient soil data and the unknown nature of the subsurface beneath the plywood/poly sheeting area in the central portion of the building beneath the transformer pad area and the trenches, impacted soil may be present beneath the building slab. PCBs will be further evaluated during a Pre-Design Investigation, prior to any remedial action.

For OU3-Off-Site Wetland Area/Upland Area:

Soils, sediment, surface water, and fish tissue were analyzed at OU3 for VOCs, SVOCs, metals, PCBs, pesticides, and PFAS. The primary contaminants of concern for OU3 include TCE and associated degradation products.

The Fish and Wildlife Resources Impact Analysis (FWIRA) for OU3, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

The available data indicate a comingled plume with an on-site source near the west side of the former Building No.1 and an off-site source further west beyond the facility perimeter fence in the wooded area.

Soils – Surface soil (0-0.5 feet bgs) samples collected throughout OU3 did not detect concentrations exceeding CUSCOs and do not indicate widespread exceedances of PGWSCO or UUSCOs. No surface soil samples were reported to have detections of SVOCs or PCBs at concentrations exceeding the UUSCOs. Nickel was detected at a concentration of 33.1 ppm, slightly above the UUSCO of 30 ppm in one sample and pesticides were detected at 28 ppm, greater than the UUSCO of 0.0033 ppm in two samples. These compounds are not considered to be related to the site. PFOA and PFOS concentrations detected were below the current unrestricted use guidance values of 0.66 ppb for PFOA and 0.88 ppb for PFOS. Acetone was detected in one sample at 0.093 ppm, above UUSCO of 0.05 ppm but below CUSCO of 500 ppm and is not considered a constituent of concern.

Subsurface samples were collected between 0.5 feet bgs and 30 feet bgs (approximate depth of bedrock). Laboratory data indicates SVOCs, and metals did not exceed the UUSCOs.

Three pesticides (4,4'-DDD, 4,4'-DDE, and 4,4'-DDT) were detected in the subsurface soil at concentrations exceeding UUSCOs in one sample on the southwestern end of the site, close to the multi-use trail. The concentrations in the sample were 0.0058 ppm, 0.065 ppm, and 0.019 ppm, respectively, which are above the UUSCO concentration of 0.0033 ppm, but below the CUSCOs of 92 ppm, 62 ppm, and 47 ppm, respectively. PFOA and PFOS were not detected in any of the subsurface soil samples.

Surface Water – Surface water samples were collected from three offsite water bodies located within proximity to the site. These three water bodies are Round Pond, located to the north of OU3, Round Pond Creek, located to the west and northwest of the site, and Buck Pond, which is located northwest of the site and west of Round Pond. Samples collected from Buck Pond are used as reference to compare Round Pond and Round Pond Creek samples. Samples were also collected from the wetland area near the discharge locations for the storm-sewer system located in OU2. Samples collected from Round Pond and Round Pond Creek did not exceed Class C Ambient Water Quality Standards. **See Figure 14**.

Sediments – Sediment samples were not reported to have detections of VOCs, SVOCs, or PCBs at concentrations exceeding the Class A Sediment Guidance Values (SGVs). Sediment samples

contained detections of arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc concentrations greater than the Class A SGVs, but below the Class C SGVs, (except for nickel in one sediment sample). Based on the sampling data from the 2021 OU3 Remedial Investigation Report, the sediments were not heavily contaminated by on-site activities. PFOS was detected in Round Pond at a maximum concentration of 4.4 ppt and PFOA was not detected. In Round Pond Creek, PFOA was detected in one sample at 0.069 ppt and PFOS was detected in all samples, with a maximum concentration of 2.8 ppt. In Buck Pond, PFOA was detected at a maximum concentration of 0.47 ppt and PFOS was detected in one sample at 3.3 ppt. The NYSDEC has not established a wildlife or ecological protection criteria for PFAS in sediments. The NYSDEC soil clean up objectives for PFAS are 6.6 ppt for PFOA and 8.8 ppt for PFOS. **See Figure 15**.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching, or swallowing). This is referred to as *exposure.*

People who enter the site could contact contaminants in the soil or groundwater by walking on the site, digging, or otherwise disturbing the ground surface. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. People may come in contact with contaminants present in wetland sediments. Volatile organic compounds may move into the soil vapor (air spaces within the soil), which in turn may move into buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because the site is vacant, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site development. Environmental sampling indicates that soil vapor intrusion may be a concern for a series of off-site buildings located in close proximity to the former main building.

6.5: Summary of the Remediation Objectives

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

There are no remedial action objectives chosen for OU3.

The remedial action objectives for OU2 are:

Groundwater:

RAOs for Human Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with or inhalation of volatile compounds released from contaminated groundwater
- Prevent human exposure to source material/DNAPL (if present)

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable
- Prevent the discharge of contaminants to wetlands or surface water
- Remove the source of groundwater contamination

Soil:

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil and source material/DNAPL (if present)
- Prevent inhalation exposure from contaminants volatilizing from contaminants in soil

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination
- Remove source material/DNAPL (if present) and prevent migration of contaminants that would result in groundwater, wetlands, surface water, or sediment contamination
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain

Soil Vapor:

RAOs for Public Health Protection

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

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

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

6.5. Potential remedial alternatives for the Site's Operable Unit 02 were identified, screened, and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site's Operable Unit 02 is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

For OU2 - On-Site/Off-Site Soils, Groundwater and Soil Vapor, the proposed remedy is referred to Excavation, In-situ Groundwater Treatment and Permeable Reactive Barrier (PRB), Site Cover, Environmental Easement and Site Management Plan Remedy.

For OU3 – Off-Site Upgradient Wooded Area/Wetland Area, the proposed remedy is No Action, based on the investigation results, and since the on- and off-site groundwater for OUs 1 through 3 is addressed under OU2. As a result, OU3 was determined to not pose a significant threat to human health or the environment.

The basis for the Department's proposed remedy is set forth in Exhibit D and depicted on **Figure 16**.

The estimated present worth cost to implement the remedy is $24,835,000. The cost to construct the remedy is estimated to be $18,085,000, and the estimated average annual cost is $6,050,000.

The elements of the proposed remedy are as follows:

1). Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program, including a pre-design investigation of the soil beneath the former Building #8 slab, as well as activities designed to refine and delineate the potential source(s) in OU2. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;

- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise$^{(TM)}$ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightening, heat stress and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2). Excavation

Excavation and off-site disposal of contaminant source areas, as outlined further below, including:

- Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- Concentrated solid or semi-solid hazardous substances per NYCRR Part 375-1.2(au)(l);
- Non-aqueous phase liquids;
- Soil with visual waste material or non-aqueous phase liquid;
- Soils which exceed the Protection of Groundwater soil cleanup objectives (PGWSCOs), as defined by NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- Soils that create a nuisance condition, as defined in Commission Policy CP-51 Section G.

For the Former Septic System/Leach Field Area – removal of infrastructure, soil excavation and offsite disposal. The excavation remedy would include:

- Flush and remove the 12-inch diameter sanitary piping between Building No.1 and the wood line;
- Flush and remove the clay tile pipe associated with the disposal field;
- Remove other septic infrastructure, including the tank and piping;
- Excavate impacted soils as previously delineated. An approximately 20,000 square foot area was identified resulting in a preliminary estimate of 1,800 cubic yards of material to be excavated; and
- Backfill area and restore.

Although excavation of PCB-contaminated soil is included, the waste does not meet the definition of TSCA PCB Remediation Waste. This material can be disposed of at a non-TSCA facility approved for PCB disposal.

For the Stormwater System – removal of infrastructure and contaminated soil. The excavation remedy's work elements include:

- Excavating and removing approximately 1,000-feet of stormwater conveyance piping between CB-1 and CB-2 and from CB-1 and the outfall;
- Contaminated soil under the piping will be removed and stockpiled;
- The material will be characterized and either disposed off-site or reused on the site;
- Based on the PCB concentration in the accumulated material in one of the catch basins, CB-3, a TSCA Self-Implementing Plan (SIP) will be considered for remedial action at CB-3;
- CB-1 and its immediate vicinity are to be remediated separately as part of the OU1 remedy; and
- Replacement of stormwater infrastructure, if deemed necessary.

Approximately 15,800 cubic yards of soil exceeding the CUSCOs and/or PGWSCOs will be removed from the site.

Soils in the top two feet in OU2 exceeding CUSCOs are present in eleven locations. **See Figure 16**. The depth of impacted soils at these locations ranges from 0- to 2-feet below ground surface. At each location it is assumed the soil will be excavated from a 100-foot by 100-foot area to a depth of 2-feet. A pre-design investigation will confirm the delineation. Post excavation confirmation sampling will be completed to demonstrate the CUSCOs have been achieved for the site cover.

On-site soil which does not exceed the above excavation criteria may be used to backfill the excavation above the groundwater table outside of the wetland or adjacent area. On-site soil which does not exceed the protection of groundwater SCOs for any constituent may be used/re
used on-site, including beneath the water table, to backfill the excavation or re-grade the site. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) (fill below the groundwater table will need to meet Protection of Groundwater criteria/fill above the groundwater table will need to meet commercial use criteria) will be brought in to complete the backfilling of the excavation and

establish the designed grades at the site. Backfill meeting the Ecological SCOs will be used in any excavation within the wetland or adjacent area. Alternative fill may be used as backfill beneath the cover if it meets criteria of a Beneficial Use Determination and is approved by the Department.

Excavation is expected to have some disturbance of the state-regulated wetland GR-22 and adjacent area. Implementation will be conducted consistent with the substantive requirements of NYCRR Part 663 and will minimize, to the extent practicable, disturbance of the wetland habitats. The remedy will include a site restoration plan for any disturbance of the wetland, adjacent area, or forested habitats disturbed during the remedy with the goal of in-kind replacement.

Dewatering will be performed to facilitate the excavation. Contaminated groundwater from dewatering operations will be treated as necessary prior to discharge.

3). Site Cover

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site development will maintain the existing site cover. This includes the concrete slabs remaining after the demolition of Building #1 and Building #8. The site cover may include paved surface parking areas, sidewalks, or soil where the upper one foot of exposed surface soil is meeting the applicable soil cleanup objectives (SCOs) for commercial use and consistent with wetland regulations. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

4). In-Situ Chemical Reduction

In-situ treatment by chemical reduction (ISCR) and biologically enhanced reductive dechlorination (ERD) will be implemented to treat contaminants in groundwater. A chemical reducing agent will be injected into the subsurface to destroy the contaminants in an approximately 25,000 square foot area located in the southwestern portion of the site, and a second area of approximately 19,000 square feet located in the western portion of the upland near the border of OU3 and adjacent to the closed septic/leachfield. Both areas are located where chlorinated VOC compounds were present at the highest concentrations in the groundwater. Treatment would be applied via injection wells. The method and depth of injection will be determined during the remedial design, covering the plume in the overburden with the highest level of contamination.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to more clearly define design parameters. Between the pilot and full-scale implementations, it is estimated that 630 injection points will be installed to target the 15-foot interval on top of bedrock. It is estimated that the chemical reducing agent will be injected during two separate events, pilot test and full-scale implementation, conducted over twenty-four months. A third, contingent event may be conducted based on the results of the full-scale implementation. This event would include 38 injection points and be conducted around Year 5 of the remedy. Once injections are completed restoration of disturbed wetland or adjacent areas will take place as described in the site restoration plan.

5). Installation of Permeable Reactive Barriers (PRB)

A Permeable Reactive Barrier (PRB) will be installed along the multi-use trail along the southern end of the site which will intersect the observed spread of contamination in that direction toward the possibly hydraulically connected wetland on the south side of the parkway. Linear injections will form the PRB. The injections will be designed, arranged, and monitored to create a PRB of approximately 25-feet in depth and 500-feet in length. The reactive amendment will be determined during the Pre-Design Investigation (PDI)/Design Phase. The PDI will also confirm the hydrogeologic conditions (e.g., groundwater velocity, hydraulic conductivity, and hydraulic gradient) are favorable for a PRB. The injections, with little to no excavation required, would minimize the impact to the surrounding wetland area and multi-use trail.

The properties of the overburden aquifer determined during the RI suggests that the PRB's main function would be to treat contaminated groundwater before it migrates out of the OU3 area. This remedial element relies on the PRB to limit further migration of the contaminants outside of OU3, but also relies on a combination of the source removal and natural attenuation within the plume to fully remediate the groundwater.

6). Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan (SMP) for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allow the use and development of the controlled property for commercial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or county DOH; and
- require compliance with a Site Management Plan (SMP).

The SMP will include monitoring and inspection requirements to assess the performance and effectiveness of the remedy. The plan will include groundwater monitoring requirements and frequency, inspection frequency, managing remaining soil contamination above the UUSCO and/or CUSCO, and periodic reporting requirements.

7). Site Management Plan

A Site Management Plan is required for OU2, which includes the following:

a). An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and any off-site impacts, and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in remedy element 6 above.

Engineer Controls: Site Cover discussed in paragraph 3, the PRB discussed in paragraph 5, future vapor mitigation systems as may be required based on the soil vapor intrusion evaluations discussed below.

The plan includes, but may not be limited to:

- descriptions of the provisions of the environmental easement including any land use and groundwater restrictions;
- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objective (SCO);
- a provision for evaluation of the potential for soil vapor intrusion for any building(s) developed on either OU1, OU2 or OU3, and any occupied buildings adjacent to the original facility boundary, including provisions for implementing actions recommended to address exposures related to vapor intrusion;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b). A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring groundwater and soil vapor (as appropriate) to assess the performance and effectiveness of the remedy, and inform the need for additional groundwater treatment/injections;
- a schedule of monitoring and frequency of submittals to the Department;
- monitoring for vapor intrusion for any building(s) developed on the site, and any occupied buildings adjacent to the site, as may be required by the Institutional and Engineering Control Plan discussed above; and
- monitoring and repair of habitat restoration elements including vegetation planting for a period of 5 years after planting.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into four categories: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). For comparison purposes, the standards, criteria and guidance (SCGs) are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and adjacent to the site and are impacting groundwater and soil.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Source areas within soil and groundwater (including bedrock groundwater beneath OU1 and OU3) across the entire site include, the complex of buildings, the former storage tanks, the former vehicle maintenance facilities, the transformer areas occupying the central portion of the site, the industrial sewers that discharged storm water and septic wastes to the wetlands via several outfalls, and other suspected on-site disposal areas. OU2 also includes all bedrock groundwater underlying the site and all soil vapor at the site.

Waste/source materials identified include an area centered around MW5-6 where concentrations of TCE were detected at concentrations up to 46,000 ppb, suggesting DNAPL may be present.

An area of soil and groundwater contamination was identified during the Remedial Investigation (RI) off the west side of Building No. 1 and near the southwest corner of the property. Concentrations of chlorinated VOCs detected in groundwater greatly exceeded NYS Class GA standards. The results of surface soil samples collected throughout OU2, including the Dewey Avenue frontage, show exceedances of Unrestricted Use Soil Cleanup Objectives (UUSCOs) for SVOCs, metals, pesticides, and PCBs. Exceedances of Commercial Use Soil Cleanup Objectives (CUSCOs) were limited to eleven sample locations and included SVOCs, metals, and PCBs. **See Figures 9 thru 11**.

Groundwater flow in the overburden is generally to the northwest, with localized deviations which may be due to underground utilities with higher permeability backfill, possible leaking water mains, areas with higher rates of precipitation infiltration, or effects associated with the former channel extension within former Building No. 1. Flow in the bedrock is consistently northerly to northwesterly.

Groundwater sampling results showed that groundwater impacted by chlorinated VOCs is in the area west and south of former Building No. 1, which is consistent with the dumping location identified by United States Army Corp of Engineers (USACE) in 2000. Two overburden wells contained TCE concentrations

five orders of magnitude greater than the Groundwater Quality Standards (GWQS) (14,000 and 67,000 ppb), which suggests proximity to a source with a possibility of dense non aqueous phase liquid (DNAPL) presence. The groundwater sampling results of deeper bedrock wells indicate that TCE is vertically delineated in these areas. **See Figures 3 thru 8**.

Although the soil vapor sampling effort was limited due to the high groundwater table, the results of samples collected beneath the Building No.1 slab do not indicate a current vapor issue. It is noted that vapor intrusion could not be evaluated at the time, due to the site conditions, specifically the high-water table, and because Building No. 1 had been demolished.

The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected in 2017, 2019 and 2021 from overburden and bedrock monitoring wells for VOCs, SVOCs, Metals, Pesticides, and PFAS. The samples were collected to assess groundwater conditions on- and off-site. The results indicate that contamination in the overburden and shallow bedrock both on- and offsite exceeds the SCGs for volatile organic compounds. There are no private drinking water wells in the immediate vicinity of the site.

Table 1 – Groundwater – OU2

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG (based on RI/FS)
VOCs			
1,1-Dichloroethene	ND to 43	5	7/70
trans-1,2-Dichloroethene	ND to 29	5	2/70
Vinyl Chloride	ND to 770	2	20/70
cis-1,2-Dichloroethene	ND to 7400	5	45/70
Trichloroethene	ND to 46,000	5	47/70
Per- and Polyfluoroalkyl Substances (PFAS)	Concentration Range Detected (ppt)[c]	SCG (ppt)	Frequency Exceeding SCG (based on RI/FS)
Perfluorobutyric Acid (PFBA)	ND to 240	100	3/7

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG (based on RI/FS)
Perfluorohexanesulfonic Acid (PFHxS)	ND to 120	100	1 of 7
Perfluorooctane Sulfaonic Acid (PFOS)	ND to 97	2.7	2 of 7
Perfluorooctanoic Acid (PFOA)	ND to 300	6.7	2 of 7

Data based on June 2017, June 2019 and May 2021 groundwater sampling results
a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance – New York State Regulation 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations
c – ppt: parts per trillion, which is equivalent to nanograms per liter, ng/L, in water
ND – Non-detected

The primary groundwater contaminants are 1,1-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene associated with the former plant. As noted in Figures 3 thru 8, the impacted areas are in the area west and south of former Building No.1. Overburden wells within the area have TCE concentrations five orders of magnitude above the GWQS, which suggests proximity to a source with a possibility of DNAPL presence.

Limited sampling for PFAS in 2017 did not identify a groundwater issue associated with this contaminant when compared with the NYS criteria. Apart from the groundwater sample collected from AFP-PP-2, near the site's septic system/leach field, and estimated PFBA concentrations in MW3-4 and MW4-3, the 2017 groundwater samples results are below the NYSDEC January 2021 criteria, 10 ng/L. However, a water sample collected from catch basin CB-1 exceeds those criteria for PFOS and PFOA.

Exceedances of the GWQS were detected in both overburden and bedrock aquifers, but overburden concentrations were more than two orders of magnitude higher than bedrock aquifer concentrations.

No wells along the eastern side of former Building No. 1 were sampled as part of the recent events due to the lower (non-detect) levels of TCE and other VOCs reported at those locations during earlier sampling efforts (2016 and 2017). These levels were orders of magnitude lower than those reported on the west side of Building No. 1, although some of the concentrations still exceeded GWQS for TCE in groundwater.

Overburden concentrations indicate impacted groundwater in the MW3-9 vicinity with a plume stretching a total of approximately 525-feet north/south and 250-feet east/west and contained within the OU2 boundary. The plume extends further from MW3-9 to the south and west directions with steep concentration gradients to the east and north. The southerly extent of the plume has decreased between 2019 and 2021 while the other extents have remained relatively consistent. The contamination within the plume, however, has seen a decrease in concentrations over the last 5 years.

Based on all the groundwater quality and hydrogeologic data collected a second overburden TCE plume is centered around MW5-6, where very high concentrations of TCE (46,000 ppb) were noted in the

overburden groundwater in 2019. (**See Figure #8**) During the 2021 round of groundwater sampling, overburden well MW5-13 exhibited the highest concentration of CVOCs at 13,790 ppb. This monitoring well is co-located with MW5-15 (shallow bedrock) and MW5-25 (deep bedrock) where the CVOC concentration was found to be decreasing with depth. These results suggest that DNAPL may also be present within the overburden in this area and be contaminating the groundwater.

The lower concentration areas of the overburden TCE plume extend along the Lake Ontario State Parkway north into the area of the former leachfield/septic system. The furthest western extent of the plume is defined by monitoring wells MW5-17, MW5-18, MW5-19, and MW5-24 within the wooded upland area. (**See Figure #8**)

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of the overburden groundwater and bedrock groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: 1,1-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene.

Soil

Surface and subsurface soils were collected from the Site-Wide OU2 Area, the Dewey Avenue Frontage, and the OU3 Area during the remedial investigation. Surface soil samples were collected from a depth of 0- to 2-feet below ground surface (bgs) to assess direct human exposure. Subsurface samples were collected from a depth of 2- to 30-feet bgs to assess soil contamination impacts to groundwater. The RI sampling results were compared to the applicable Soil Cleanup Objectives (SCOs) for Unrestricted Use which is also the Protection of Groundwater (POGWSCO) and Restricted Use Commercial. The results indicate that surface soils at the site have exceedances for PAHs, metals, pesticides, and PCBs. Subsurface soils at the site have exceedances for VOCs and PAHs. Results are depicted on **Figures #9, 12, and 13**.

Table 2 – Soil – OU2

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted
VOCs					
Trichloroethene (TCE)	ND – 4.8	0.47	2/37	0.5	0/37
Acetone	ND - 0.093	0.05	1/37	0.5	0/37
cis-1,2 DCE	ND – 0.73	0.25	2/37	0.5	0/37
vinyl chloride	ND – 0.044	0.02	2/37	0.013	0/37
SVOCs					
Benzo(a)anthracene	ND to 6.2	1	5/89	5.6	1/89

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted
Benzo(a)pyrene	ND to 4.9	1	3/89	1	3/89
Benzo(b)fluoranthene	ND to 6.5	1	6/89	5.6	1/89
Benzo(k)fluoranthene	ND to 2.7	0.80	2/89	56	0/89
Chrysene	ND to 5.6	1	5/89	56	0/89
Indeno(1,2,3-c,d)pyrene	ND to 3.1	0.50	6/89	5.6	0/89
Inorganics					
Arsenic	ND to 26.3	13	3/89	16	3/89
Cadmium	ND to 13.1	2.5	4/89	9.3	0/89
Copper	ND to 652	50	8/89	270	4/89
Lead	ND to 3100	63	15/89	1000	0/89
Mercury	ND to 1.9	0.18	9/89	2.8	0/89
Nickel	ND to 361	30	15/89	310	1/89
Selenium	ND to 10	3.9	1/89	1500	0/89
Zinc	ND to 1320	109	11/89	10,000	0/89
Pesticides					
delta-BHC	ND to 0.047	0.040	3/89	0.5	0/89
Dieldrin	ND to 0.067	0.050	3/89	1.4	0/89

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted
DDE	ND to 0.0055	0.0033	2/89	62	0/89
PCBs					
Total PCBs	ND to 3.09	0.1	6/89	1	1/89

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg in soil
b – SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives
Note: The Restricted Use Soil Cleanup Objectives for Protection of Groundwater values for these selected constituents are the same as the Unrestricted Use Soil cleanup Objectives
c – SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for Commercial Use

Table 3 – Soil – OU3

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG[b]	Restricted Use (Commercial) SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Inorganics (Metals)					
Nickel	1.0 (Non-detect) – 33.1	30	2/37	310	0/37
Pesticides/PCBs					
DDD	1.0 (Non-detect) – 0.0058	0.0033	1/21	62	0/21
DDE	1.0 (non-detect) – 0.065	0.0033	3/21	62	0/21
DDT	1.0 (Non-detect) – 0.019	0.0033	2/21	47	0/21

a - ppb: parts per billion, which is equivalent to micrograms per kilogram, ug/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.

For Surface Soils – OU2 -

Surficial soil of both the Site-Wide OU2 Area and the Dewey Avenue Frontage represent the horizon from 0- to 2-feet below ground surface and share similar contaminants, although the concentration and

extent of those contaminants differ, reflecting the different historical uses of both portions of the Air Force Plant 51 site. Contaminants such as lead and arsenic in portions of the Dewey Avenue Frontage may be

related to historic pesticide use and/or its use as a former parking area, while the larger set of contaminants in the Site-Wide OU2 area likely reflect its variety of historical industrial uses and/or imported fill material placed at the site over the years.

PAHs appear to be concentrated in the historic dumping areas. In these areas, the shallow fill included construction and demolition (C&D) materials, possibly from the historic building demolition. SVOC detections in locations behind and bordering buildings, likely reflect buried debris/fill. These locations contained SVOC concentrations above the CUSCO. Samples collected within the Dewey Avenue Frontage did not contain SVOCs at concentrations above any SCO.

Concentrations of specific metals such as cadmium, chromium, lead, mercury, nickel, zinc, and copper may represent the past industrial nature of the site and detections of these metals exist within the Site-Wide OU2 area. These metals were also sporadically detected in samples collected from the Dewey Avenue Frontage area, with some concentrations above the UUSCO, but no exceedances of the less stringent CUSCO. These occurrences may be residual contamination related to the former parking lot/driveway. In addition, the occurrence of lead can also be associated with historic pesticide application. Concentrations of calcium, magnesium, aluminum, and iron likely represent naturally occurring metals within the soil.

Pesticides are present in numerous samples across both the Site-Wide OU2 area and Dewey Avenue Frontage sections. However, only those pesticides on the Site-Wide OU2 portion of the site exceed UUSCOs, with no exceedances of the less stringent CUSCO. The Dewey Avenue Frontage does not appear to contain any pesticides at concentrations exceeding the SCOs.

PCBs are present in both portions of the site, with both areas containing samples that exceed the UUSCO. Aroclor 1260 was detected most frequently. The highest Aroclor concentration was 2.7 ppm of Aroclor 1268. Aroclor 1268 was noted in the Site-Wide OU2 portion. A possible source might be PCB-containing galbestos construction material from former Building No. 1 and several smaller buildings on-site. Each detected PCB exceeded its UUSCO, including two soil locations within the Dewey Avenue Frontage. Only one sample within the Site-Wide OU2 area exceeds the less stringent CUSCO.

For Surface Soils – OU3 -

Surficial soil of OU3-Upland is defined as the top two feet of material. No VOCs are present in the surface soil of OU3.

The surface exceedance of nickel in OU3 is not thought to be associated with the site and it is not a contaminant of concern for the site due to its discontinuous presence and low concentration.

The pesticides DDE and DDT detected in OU3 surface soil are thought to be from an orchard that was present on parts of the site in the past, not from the manufacturing facility. Concentrations were detected at levels only slightly above the UUSCO and below the CUSCOs. These concentrations are limited regarding the number of exceedances and magnitude and are not considered a COC for the site.

The single exceedance of acetone is not considered to be a COC because it is not present on a large portion of the site at concentrations which exceed the SCOs for the site.

Concentrations of PFAS in surface soils were below current guidance values.

For Subsurface Soils – OU2 –

The subsurface soils for OU2 represent the horizon from 2- to 30-feet below ground surface and were investigated during monitoring well installations, test pits, and probe sampling events. Three areas of subsurface soil contamination were identified, both to the west of Building No. 1.

One area had chlorinated solvent soil contamination that corresponds to the area of groundwater contamination, generally between Building No. 1 and the fire road in the southwestern portion of OU2. Contamination exceeding CUSCO for TCE was limited to the area immediately surrounding well MW3-9. Contamination exceeding the UUSCO for TCE occupied a larger area between wells MW3-9 and MW4-6.

Another area, also located on the west side of OU2 near OU3 has the same site derived VOC compounds, TCE, cis-1,2-DCE, and vinyl chloride. The area of highest concentration is an area immediately surrounding wells MW5-6, MW5-11, and MW5-26 as shown in Figure 13.

The other area had PAH exceedances and was located outside the fire road, between the fire road and the OU2 boundary. These exceedances were from test pit samples and may not necessarily be indicative of subsurface conditions in that area.

PFAS was not sampled for during the OU2 surface and subsurface soil sampling.

For Subsurface Soils – OU3 -

The pesticide contamination in subsurface soils is present in the southern section of the site. It is most likely residue from the former orchard similar to the surface pesticide contamination. Detected concentrations were below the Commercial Use SCOs. VOCs, SVOCs, PCBs, and metals were not detected in subsurface soil samples at concentrations above the Unrestricted Use SCOs.

Concentrations of PFAS in subsurface soils were detected at levels below guidance values; no further assessment is required.

For Former Septic System/Leach Field Area –

This area located west of Building #1 (within a wooded area of the site) with the former septic system located outside of Building #9 (northeast portion of the site) received waste discharges from the buildings that have impacted the shallow soil and was primarily contaminated with metals and PCBs. **See Figures #2 and #16**. PCB concentrations are less than 50 ppm with a maximum soil concentration detection of 5.5 ppm. Based on the PCB concentrations, the PCB contamination in this area is not considered TSCA PCB Remediation Waste and will not require Toxic Substances Control Act (TSCA)-related requirements.

SVOCs and pesticides had limited exceedances within the extent of the metals' contamination. Contamination was vertically delineated to be less than 4-feet deep throughout this area.

For Stormwater System –

The stormwater system consists of a series of interconnected catch basins that eventually discharge into a wetland that is part of the Round Creek/Pond system beyond the northwestern corner of the site. The catch basins drain into CB-1, which will be remediated under the OU1 remedy. Contamination associated with the stormwater system includes CVOCs, petroleum constituents, PCBs, and some heavy metals were detected in soil. Based on the PCB concentration of 57 ppm in the accumulated material in one of the catch basins, CB-3, applicable TSCA-related criteria, and regulations will be adhered to, including the preparation of a TSCA Self Implementing Plan (SIP).

For Building No. 8 –

Soils surrounding former Building No. 8 have been sampled for PCBs based on the historic use and did not indicate PCB contamination. A sample of accumulated soil in the floor drain detected total PCBs at 190 ppm. Soil samples collected adjacent to the building did not indicate PCB contamination.

Based on the findings of the Remedial Investigation, surficial soil of both the site-wide/OU2 area and the Dewey Avenue Frontage represent the horizon from 0- feet to 2-feet below ground surface and share similar contaminants, although the concentration and extent of those contaminants differ, reflecting the different historical uses of both portions of the Air Force Plant 51 site. Contaminants such as lead and arsenic in portions of the Dewey Avenue Frontage may be related to historic pesticide use and/or its uses as a former parking area, while the larger set of contaminants in the site-wide/OU2 area likely reflect its variety of historical industrial uses and/or imported fill material placed at the site over the years.

The OU2 contaminants identified in soil which are the primary contaminants of concern to be addressed by the remedy selection process are: PAHs – benzo(a)anthracene, benzo(a) pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene; metals – arsenic, cadmium, copper, lead, mercury, nickel, and zinc; Total PCBs; and Pesticides – delta-BHC, dieldrin, and p,p'-DDE.

Based on the findings of the Remedial Investigation, the presence of VOCs including TCE, cis-1,2 DCE, and vinyl chloride, has resulted in the contamination of soil in the OU3 Area. The site contaminants identified in soil which are considered to be the primary contaminants of concern in the OU3 Area, to be addressed by the remedy selection process are TCE, cis-1,2 DCE, and vinyl chloride. These areas of contamination have now been incorporated into the OU2 boundary.

Surface Water – OU3

Surface water samples were collected during the RI from Round Pond Creek, Round Pond, and Buck Pond and analyzed for metals, including mercury, PCBs, and PFAS. Round Pond Creek samples were collected upstream and downstream from the site. Round Pond samples were collected downstream from the site compared to nearby Buck Pond. Sample locations are shown in **Figure 14**. These waterbodies are designated as Class C, which is for waters supporting fisheries and suitable for non-contact activities. The samples were collected to assess the surface water conditions of bodies of water in the vicinity of the western boundary of OU3. Results indicate that aluminum, iron, copper, and lead were present in Round Pond Creek surface water, and aluminum and iron were present in Round Pond surface water, above the Class C standard.

Table 4 – Round Pond

Detected Constituents	Concentration Range Detected (ppm)[a]	NYS Surface Water Class C Standards[b] (ppm)	Frequency Exceeding NYS Class C
Metals			
Aluminum	0.66 – 1.2 ppm	0.100	5/5
Iron	0.79 – 1.6 ppm	0.300	5/5

Table 5 – Round Pond Creek

Detected Constituents	Concentration Range Detected (ppm)[a]	NYS Surface Water Class C Standards[b] (ppm)	Frequency Exceeding NYS Class C
Metals			
Aluminum	0.13 – 2.1 ppm	0.100	6/6
Copper	0.086 – 0.64 ppm	0.0126	2/6
Iron	1.2 – 2.4 ppm	0.300	6/6
Lead	0.001 (non-detect) – 0.0059 ppm	0.00410	2/6

a – ppm: parts per million
b – NYS Surface Water Standards: *Water Quality Standards and Classifications. Part 703.5. Water quality standards for taste- color- and odor-producing, toxic and other deleterious substances* (NYSDEC, 2020)

The highest concentration of PFOS detected in the surface water samples collected from Round Pond and Round Pond Creek was 9.8 parts per trillion (ppt). The concentrations were compared to 10 parts per billion (ppb), the Maximum Contaminant Level for Drinking Water, as a screening value and are below the MCL.

No site-related surface water contamination of concern was identified during the RI. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediment – OU3

Sediment samples were collected during the RI from Round Pond Creek, Round Pond, and Buck Pond and sampled for metals, PCBs, and PFAS to assess the potential for impacts to sediment from the site. Samples from Round Pond Creek were collected from upstream and downstream of the effluent inflow from the Site to assess the impact of contamination in the creek. Samples from Buck Pond were used to assess background levels of contamination in the ponds and used as a baseline for the samples from Round Pond and Round Pond Creek. Many of the metals detected in Round Pond Creek and Round Pond were detected at similar concentrations in Buck Pond. PCBs were not detected in the sediment samples from any of the three water bodies. Sample locations are shown in **Figure 15**. Results indicate that sediment collected downstream of the inflow of the site drainage exceeded the Class A Sediment Guidance Values (SGV) for the metals

cadmium, copper, lead, nickel, zinc, and arsenic. Samples collected farther downstream from the inflow area only exceeded Class A SGV for zinc. No samples from Round Pond Creek exceeded the Class C SVGs. The sediment from Round Pond also exceeded Class A SVGs for arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc. The contaminants which exceeded the Class C SGV were nickel and silver in two locations.

Table 6 – Surface Sediment/ Round Pond

Detected Constituents	Concentration Range Detected (ppm)[a]	Class A Sediment Guidance Value (SGV)[b]	Frequency Exceeding Class A SGV	Class B (SGV)[c] (ppm)	Frequency Exceeding Class B SGV	Class C SGV[d] (ppm)	Frequency Exceeding Class C SGV
Inorganics (Metals)							
Arsenic	1.0 (Non-detect) – 15.2 ppm	<10 ppm	2/5	10 – 33 ppm	2/5	>33 ppm	0/5
Cadmium	0.24 ppm -- 1.9 ppm	<1 ppm	3/5	1 – 5 ppm	3/5	>5 ppm	0/5
Chromium	6.3 ppm -- 96.2ppm	<43 ppm	2/5	43 – 110 ppm	2/5	>110 ppm	0/5
Copper	6.4 ppm --79.2 ppm	<32 ppm	3/5	32 – 150 ppm	3/5	>150 ppm	0/5
Lead	7.5ppm – 91.1ppm	<36 ppm	3/5	36 – 130 ppm	3/5	>130 ppm	0/5
Nickel	4.9 ppm – 83.7 ppm	<23 ppm	3/5	23 – 49 ppm	2/5	>49 ppm	1/5
Silver	0.97 – 2.9 ppm	<1 ppm	3/5	1 – 2.2 ppm	2/5	>2.2 ppm	1/5
Mercury	0.046ppm – 0.23ppm	<0.2 ppm	1/5	0.2 – 1 ppm	1/5	>1 ppm	0/5
Zinc	71.8 ppm - 317 ppm	<120 ppm	4/5	120 – 460 ppm	4/5	>460 ppm	0/5

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;

Table 7 – Surface Sediment/ Round Pond Creek

Detected Constituents	Concentration Range Detected (ppm)[a]	Class A Sediment Guidance Value (SGV)[b]	Frequency Exceeding Class A SGV	Class B (SGV)[c] (ppm)	Frequency Exceeding Class B[c] SGV	Class C SGV[d] (ppm)	Frequency Exceeding Class C SGV
Inorganics (Metals)							
Arsenic	1.0 (Non-detect) – 14.7 ppm	10 ppm	1/5	10 – 33 ppm	1/5	33 ppm	0/5
Cadmium	0.16 ppm -- 2.9 ppm	1 ppm	1/5	1 – 5 ppm	1/5	5 ppm	0/5
Chromium	6.4 ppm – 41.7 ppm	43 ppm	0/5	43 – 110 ppm	0/5	110 ppm	0/5
Copper	6.8 ppm –36.3 ppm	32 ppm	1/5	32 – 150 ppm	1/5	150 ppm	0/5
Lead	7.6 ppm – 51.8 ppm	36 ppm	1/5	36 – 130 ppm	1/5	130 ppm	0/5
Nickel	4.7 ppm – 33.5 ppm	23 ppm	2/5	23 – 49 ppm	1/5	49 ppm	1/5
Silver	0.71 ppm – 3.5 ppm	1 ppm	1/5	1 – 2.2 ppm	0/5	2.2 ppm	1/5
Mercury	0.021ppm – 0.2ppm	0.2 ppm	0/5	0.2 – 1 ppm	0/5	1 ppm	0/5
Zinc	125 ppm - 195 ppm	120 ppm	4/5	120 – 460 ppm	4/5	460 ppm	0/5

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.
b - SGV: Class A-The Department's Screening and Assessment of Contaminated Sediment (June 2014).
c - SGV: Class B-The Department's Screening and Assessment of Contaminated Sediment (June 2014).
d - SGV: Class C-The Department's Screening and Assessment of Contaminated Sediment (June 2014).

The FWIA indicates that the contaminants are not related to the site. Based on the findings of the Remedial Investigation, the compounds detected in sediment samples collected are not considered statistically different between Round Pond, Round Pond Creek, and Buck Pond. Therefore, no action is required to address the sediment in relation to the subject site.

Soil Vapor

A soil vapor survey was conducted in 2019 for OU2 and consisted of installing 8 sub-slab soil vapor points in the Building No. 1 slab and 3 soil vapor points. The survey produced few results as the site conditions were unfavorable to soil vapor sampling due to a high-water table caused by high water levels in Lake Ontario and/or groundwater pooled below the slab. Sampling was attempted in May 2019, but only two

sub-slab vapor points produced viable samples. Sampling was re-attempted in August 2019 when regional water levels had dropped, but the water table under the slab had not receded enough to collect a full round of samples. Only 3 sub-slab soil vapor samples were viable for this second attempt.

Soil vapor samples were analyzed for VOCs via EPA Method TO-15 and results compared to the NYSDOH sub-slab vapor guidance decision ranges presented in NYSDOH final Soil Vapor Intrusion Guidance, updated through May 2017. A total of 6 samples were analyzed (including QA/QC field duplicate sample). TCE was detected in 4 of the 6 samples, but all below the most stringent criterion of 6 micrograms per cubic meter (ug/m^3). The maximum TCE concentration was 1.5 ug/m^3. There were no exceedances for any of the criterion in this dataset.

Membrane interface probe (MIP) investigations conducted in 2014 and 2017 noted CVOC vapor impacts corresponding with areas of groundwater contamination, mainly in the vicinity of the former plating pond and the OU2 groundwater plume.

The NYS Department of Health has developed guidance for evaluating and mitigating exposures from soil vapor intrusion within residences and the workplace based on the presence of volatile organics within subsurface soil, soil vapor, and groundwater. The presence of VOCs within soil and groundwater within OU2, represent potential sources for exposures related to soil vapor intrusion to any structures developed on the site or for occupied structures adjacent to the site.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A. All of the alternatives, except for the No Action alternatives, will include a Pre-Design Investigation (PDI) or Pilot Testing, as well as remediation of the Former Septic System/Leach Field Area, Stormwater System Infrastructure, and Former Building No. 8 Area. These "Common Remedial Elements" are described at the end of this Exhibit.

Remedial Alternatives for OU2

OU2 - Alternative S1: No Action – Soil

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison with active soil remediation technologies in accordance with Section 4.2 of NYSDEC DER-10. If no remedial action is taken, contaminants already present in the soil will remain in place and RAOs will not be met. There will be no reduction in volume of contaminated soil onsite, and contaminants may continue to dissolve into groundwater, and migrate via the overburden and bedrock groundwater. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment. There are no costs associated with this alternative.

OU2 - Alternative S2: Soil Excavation to Unrestricted Use (or Protection of Groundwater) Soil Cleanup Objectives and Offsite Disposal

Alternative S2 consists of excavation and off-Site disposal of impacted soils exceeding the Unrestricted Use Soil Cleanup Objectives (UUSCOs) or Protection of Groundwater Soil Cleanup Objectives (PGWSCOs), where applicable, and placement of clean, imported soil backfill for site restoration. Contamination in surficial soils is largely limited to the onsite areas, while subsurface soil contamination is limited to the area in the vicinity of MW5-6.

For surface soils, the proposed overall excavation area encompasses approximately 854,000 square feet. The depth of impacted soil primarily extends to 1 foot below the ground surface (bgs), although in approximately 30 percent of the total area, contamination extends to 2 feet bgs. Isolated areas of contamination would be excavated to 3 feet bgs. Approximately 41,000 cubic yards of soil would be excavated from the surface soil contamination areas and shipped off-Site for disposal. Post-excavation confirmation sampling would be completed to demonstrate that the UUSCOs have been achieved.

This alternative also includes the excavation and off-Site disposal of subsurface soil exceeding the PGWSCOs in the MW5-6 source area. The soils will be remediated by removing the impacted material in both the saturated and unsaturated zones. The proposed excavation encompasses an area of approximately 82,000 square feet, and extends to bedrock, or a depth of approximately 25 feet. The overall subsurface excavation volume is estimated at approximately 76,000 cubic yards. The estimated cost for this alternative is based on the expectation that a portion (approximately 75%) of the unsaturated soils (up to 10 feet bgs) would meet the PGWSCOs and would be suitable for reuse as backfill. Approximately 53,000 cubic yards of soil would be shipped off-Site for disposal, and approximately 23,000 cubic yards of soil would be reused for backfill.

A pre-design investigation (PDI) would be implemented to refine the limits of excavations, limits of soil that may be suitable for reuse, excavation dewatering needs, waste classifications, and various geotechnical details. Clean fill material would be imported to supplement the surface and subsurface excavation backfill.

This alternative will remove the greatest amount of contaminated material from the site, would require a large volume of material for backfill, and would disrupt a large area of the wetland (as well as lands adjacent to wetland) both directly by excavation and related traffic.

An active remediation period of 2 years is projected. Long-term operations and maintenance (O&M) would not be required under Alternative S2.

Present Worth: $36,800,000
Capital Cost: $36,800,000
Annual Costs: $0.0

OU2 - Alternative S3 –Soil Excavation to Commercial Use Soil Cleanup Objectives, Offsite Disposal, Soil Cover, and Institutional Controls

Alternative S3 consists of excavation and off-Site disposal of impacted soils exceeding the Commercial Use Soil Cleanup Objectives (CUSCOs) and placement of clean, imported soil backfill for site restoration. This alternative also includes placement of a soil cover over any residual soil exceeding the UUSCOs in the portion of the site between the foundation of the former Building No. 1 and Dewey Avenue (Dewey Avenue Frontage Area). The soil cover would consist of 1-foot minimum of clean fill plus 6-inches of vegetative topsoil, and may also include paved surfaces, parking area, or sidewalks.

For surface soils, the proposed overall excavation area encompasses approximately 80,000 square feet, and the depths of the excavations are expected to range between 1 and 2 feet bgs. Isolated areas are expected to be excavated down to 3 feet bgs. Using an average excavation depth of 2 feet, approximately 6,000 cubic yards of soil would be shipped off-Site for disposal. Cap construction over the Dewey Avenue Frontage Area would require approximately 20,500 cubic yards of clean, imported soil.

This alternative also includes excavation and off-Site disposal of subsurface soil exceeding the CUSCOs in the MW5-6 source are. The soil would be remediated by removing the impacted material in both the saturated and unsaturated zones. The proposed excavation encompasses an area of approximately 8,100 square feet, and extends to bedrock, or a depth of approximately 25 feet. The overall excavation volume is estimated at approximately 7,500 cubic yards. The estimated cost for this alternative is based on the expectation that a portion (25%) of the unsaturated soils (up to 10 feet bgs) would meet the CUSCOs and would be suitable for reuse as backfill. Approximately 6,800 cubic yards of soil would be shipped for off-Site disposal from this excavation, and approximately 700 cubic yards of soil would be reused for backfill.

A pre-design investigation (PDI) would be implemented to determine limits of excavations, limits of soil that may be suitable for reuse, excavation dewatering needs, waste classifications, and various geotechnical details. Clean fill material would be imported to supplement the backfill.

An active remediation period of 1 year is projected for this alternative. This alternative would also require institutional controls (ICs) such as environmental easement(s) along with a Site Management Plan to ensure proper function of the soil cover. In addition, a total of 30 years has been used for O&M cost estimation purposes, although O&M would be required in perpetuity.

Present Worth: $10,600,000

Capital Cost: …… $9,600,000
Annual Costs: …… $1,000,000

OU2 - Alternative G1 – No Action - Groundwater

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison to the other action alternatives in accordance with Section 4.2 of NYSDEC DER-10. This alternative includes no active remediation or monitoring and allows the groundwater contaminants to remain in place and/or continue to move downgradient in the direction of groundwater flow. Contaminants may possibly undergo natural degradation and attenuation processes, resulting in transformation to other compounds (degradation products) over time. Under this alternative, analysis is based on land and groundwater resource use not changing over time and that any existing Institutional Controls (ICs) will remain in place and will continue to be enforced by other regulatory programs. There are no costs associated with this alternative.

OU2 - Alternative G2 –In-Situ Treatment and Permeable Reactive Barrier

Alternative G2 consists of injections to promote biologically enhanced reductive dechlorination (ERD) and abiotic in-situ chemical reduction (ISCR) treatment in the vicinity of MW3-9 and MW5-13, as well as in a linear arrangement to create a Permeable Reactive Barrier (PRB) in the vicinity of the multi-use trail. An emulsified amendment with a zero valent iron (ZVI) reducing agent and microbial cultures will be injected into each of these areas. Injections (little to no excavation required) for creation of the PRB would minimize the impact to the surrounding wetland area and multi-use trail.

The estimated areal extent of the treatment area for MW3-9 is approximately 25,000 square feet.

The MW5-13 target areas is approximately 19,000 square feet in size and extends through the saturated zone to the top of bedrock (15-foot interval, roughly 10 to 25 feet bgs) or as determined by the pre-design investigation (PDI) and pilot test.

The linear arrangement of injections forming the PRB will be installed along the multi-use trail in the southern portion of the site. Injections would be designed, arranged, and monitored to create a PRB of approximately 25 feet in depth and approximately 500 feet in length. It is anticipated that the installation of the PRB will be completed within one year with an additional two years for the injections in the MW5-13 area.

A PDI/pilot test would be implemented to determine the extent of the groundwater plume(s) and facilitate selection of injection method and treatment amendments for the full-scale remediation systems.

Long-term monitoring (LTM) would be implemented to confirm that groundwater concentrations are decreasing after the in-situ treatment and PRB applications. LTM will involve installation of additional overburden and bedrock wells located within and downgradient of the active treatment area and PRB. ICs such as environmental easements, vapor intrusion requirements, and well drilling restrictions will be implemented to eliminate the exposure pathways of contaminated groundwater to receptors. It is anticipated that the site would meet groundwater SCGs within 20 to 30 years. Alternative G2 also includes re-evaluation of the injection progress after 5 years, with limited re-injections, if needed.

Present Worth: …… $10,400,000
Capital Cost: …… $5,600,000
Annual Costs: …… $4,800,000

OU2 - Alternative G3 – Groundwater Extraction and Treatment, In-Situ Treatment, and Permeable Reactive Barrier

Alternative G3 combines groundwater extraction and ex-situ treatment for the MW3-9 area, with in-situ treatment (ERD and ISCR) for the MW5-13 area and a PRB for the multi-use trail area, followed by LTM/MNA, as applicable.

This alternative will actively remove contaminant mass from the area of the MW3-9 plume with highest contaminant mass and establish hydraulic control of the aquifer in this area to minimize further migration. The estimated areal extent of the focus area for MW3-9 is approximately 25,000 square feet. Considering the geologic conditions, groundwater will be extracted from a series of collection trenches installed within and downgradient of the central plume. Extracted groundwater will be conveyed to a central location and treated with a combination of air stripping and granular activated carbon (GAC) processes.

An active remediation period of 27-years is projected for the MW3-9 area, with an additional 3-year period for LTM sampling (30-year total). This active remediation period is based on removing four volumes of groundwater within the plume area with highest contaminant mass.

Alternative G3 also includes injections within the MW5-13 plume to promote ERD and ISCR treatment of groundwater, as well as similar injections in a linear arrangement to create a PRB in the vicinity of the multi-use trail. An emulsified amendment with a ZVI reducing agent and microbial cultures will be injected into each of these areas. Injections versus excavation for in-situ treatment would minimize the impact to the surrounding wetland area and multi-use trail.

The MW5-13 target area is approximately 19,000 square feet in size and extends through the saturated zone to the top of bedrock (15-foot interval, roughly 10 to 25 feet bgs) or as determined by the pre-design investigation (PDI) and pilot test.

The linear arrangement of injections forming the PRB will be installed along the multi-use trail in the southern portion of the site. Injections would be designed, arranged, and monitored to create a PRB of approximately 25 feet in depth and approximately 500 feet in length. It is anticipated that the installation of the PRB will be completed within one year with an additional two years for the injections in the MW5-13 area.

A PDI/pilot test would be implemented to determine the extent of the groundwater plume(s) and facilitate selection of injection methods and treatment amendments for the full-scale remediation systems.

Long-term monitoring (LTM) would be implemented to confirm that groundwater concentrations are decreasing after the in-situ treatment and PRB applications, as well as during the extraction system operation. LTM will involve installation of additional overburden and bedrock wells located within and downgradient of each area, as necessary.

ICs such as environmental easements, vapor intrusion requirements, and well drilling restrictions will be implemented to eliminate the exposure pathways of contaminated groundwater to receptors. It is anticipated that the site would meet groundwater SCGs within 30 years. Alternative G3 also includes re-evaluation of the injection progress after 5 years, with limited re-injections, if needed.

Present Worth: $17,500,000
Capital Cost: $6,200,000
Annual Costs: $11,300,000

Common Remedial Elements – All Alternatives

Common Remedial Element - Soil Vapor

Institutional Controls (ICs) will be implemented to achieve the RAO for soil vapor minimizing risk to public health resulting from soil vapor intrusion into buildings. These institutional controls will limit the types of future site development and will include a provision for evaluation of the potential for soil vapor intrusion for any structure(s) developed on the site, and occupied buildings adjacent to the site, including provision for implementing actions recommended to address exposures related to vapor intrusion.

Present Worth: $35,000
Capital Cost: $35,000
Annual Costs: $0.0

Common Remedial Element - Former Septic System/Leach Field Area

Excavation and off-Site disposal of impacted soil and piping is the remedial action for the Former Septic System/Leach Field Area. The work elements include:

- PDIs including collection and analysis of soil samples to delineate the area of impacted soil;
- Flush and remove the 12-inch diameter sanitary piping between Building No.1 and the wood line;
- Flush and remove the clay tile pipe associated with the disposal field;
- Remove other septic system infrastructure, including the tank and piping;
- Excavate impacted soils as delineated. An approximately 20,000 square foot area has been identified resulting in an estimated 2,300 cubic yards of material to be excavated;
- Backfill area and restore; and
- Replace any damaged monitoring wells as needed

Excavation of metals- and PCB-contaminated soil is included. The PCB-contaminated soil will be segregated to the extent practicable and can be disposed of at any facility approved for PCB disposal (does not require disposal at a TSCA facility).

Present Worth: $1,500,000
Capital Cost: $1,500,000
Annual Costs: $0.00

Common Remedial Element - Stormwater System Remediation

Excavation and off-Site disposal is the remedial action for the Stormwater System. The work elements include:

- PDIs including collection and analysis of soil samples along the storm sewer alignment between Former Building No. 8 and OU1;
- Excavating and removing approximately 1,000-feet of stormwater conveyance piping between catch basins and outfall;

- Potentially contaminated soil under the piping will be removed and stockpiled. This material will be characterized and either disposed off-Site or, if determined to be acceptable after testing, reused on the site; and
- Based on PCB concentrations in the stormwater system, a TSCA Self-Implementing Plan (SIP) may be required for future remedial actions.

Present Worth: …… $1,900,000
Capital Costs: …… $1,900,000
Annual Costs: …… $0.00

Common Remedial Element – Former Building No. 8

Building No. 8 was demolished in 2020, and the following additional remedial work is planned:

- PDIs including sampling soil beneath the remaining building floor slab, groundwater grab samples, and preparation of a TSCA Self-Implementing Plan (SIP);
- Installation of a TSCA-compliant cap over concrete slab;
- Installation of chain link fence around slab with proper signage;
- ICs and Site Management Plan; and
- Long-term monitoring

Present Worth: …… $400,000
Capital Cost: …… $150,000
Annual Costs: …… $250,000

Exhibit C

Remedial Alternative Costs - OU2

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action – S1 and G1	0	0	0
S2 – Soil Excavation to UUSCO and Off-Site Disposal	$36,800,000	$0.00	$36,800,000
S3 –Soil Excavation to CUSCO, Off-Site Disposal, and Soil Cover, and ICs	$9,600,000	$1,000,000	$10,600,000
G2- In-Situ Treatment and Permeable Reactive Barrier	$5,600,000	$4,800,000	$10,400,000
G3 – Groundwater Extraction & Treatment, In-Situ Treatment, and Permeable Reactive Barrier	$6,200,000	$11,300,000	$17,500,000

Common Elements Remedial Action Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Soil Vapor ICs	$35,000	$0.00	$35,000
Former Septic System/Leachfield Area	$1,500,000	$0.00	$1,500,000
Stormwater System	$1,900,000	$0.00	$1,900,000
Building #8	$150,000	$250,000	$400,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing a combination of alternatives as the remedy for OU2's soil and site-wide groundwater. Alternative S3 – Soil Excavation to Commercial Use Soil Cleanup Objectives (CUSCO), Off-Site Disposal, Soil Cover, and Institutional Controls and Alternative G2 – In-Situ Treatment and Permeable Reactive Barrier (PRB). Included with these remedies will be the common remedial components of the Former Septic System/Leachfield, Stormwater System, Building No. 8, and Soil Vapor ICs. The combination of Alternative S3 and Alternative G2 would achieve the remediation goals for the site by the excavation and off-site disposal of soils exceeding the CUSCO and maintaining the soil cover on soil exceeding UUSCO between Building No.1 and Dewey Avenue; and for groundwater, by injections to promote biologically enhanced reductive dechlorination (ERD) and abiotic in-situ chemical reduction (ISCR) treatment and permeable reactive barrier (PRB) installed downgradient of the plume to allow for treatment of contaminated groundwater moving through it and serve as a barrier to limit contaminants in groundwater from migrating further off-site, with long-term monitoring and natural attenuation. Institutional Controls (ICs) will remain in place to prohibit groundwater use in the area. Pre-Design Investigations will be conducted to refine the design parameters. This combination of alternatives will achieve the RAOs for OU2 over time. The elements of the remedy are described in Section 7. The proposed remedy is depicted in **Figure 16**.

For OU3 – Off-Site Upgradient Wooded Area/Wetland Area the Department is proposing No Action with Site Management.

Total Present Worth = $24,835,000
Capital Costs = $18,085,000
Annual Costs = $6,050,000

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS reports.

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

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

The proposed remedy (Alternatives S3 and G2*)* would satisfy this criterion by removing soil contamination exceeding the soil RAO for the future intended use of the site, CUSCO. The implementation of a soil cover would also prevent exposure to impacted soil and eliminate migration of contaminated soil due to wind-blown dust or storm water erosion. ICs would be put in place to restrict future land use at the site. Risks to workers and the public would be controlled during implementation of remediation activities through monitoring and site-specific health and safety plans. The active remediation period for the soil alternative is up to 1-year with a total O&M period of 30-years for the soil cover. The soil alternative is anticipated to meet soil RAOs over the estimated 30-year duration of the remedy. Alternative G2 for groundwater will satisfy this criterion through a combination of injections in the source area, installation of PRB, and down gradient long-term monitoring (LTM). ICs will restrict local groundwater use and will protect human health

and the environment in the short term. There are no public water supply sources down gradient of the site. LTM will be implemented outside the source remediation areas and as a contingency to monitor the contaminant concentrations in groundwater after active treatment.

Alternatives S1 and G1 provide no protection of human health and the environment since no remedial action will be taken. Alternatives S2, S3, G2, and G3 are protective of human health and the environment and are expected to achieve soil and groundwater RAOs. Alternative S2 provides the highest degree of protectiveness, since contaminants will be removed to lower UUSCOs compared to S3 that removes soils exceeding the CUSCOs. Alternatives G2 and G3 provide a similar degree of protectiveness since contaminants mass will be removed from similar areas of the site and the alternatives rely on natural attenuation with LTM and ICs to address remaining contamination.

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

Alternative S1 and G1 will not achieve compliance with applicable SCGs. For soils, Alternatives S2 and S3 will reduce contaminant concentrations in the treatment area by excavation and offsite disposal to meet SCGs – UUSCOs and CUSCOs respectively. For groundwater, Alternatives G2 and G3 will reduce contaminant concentrations in the treatment area by application of treatment processes. The remaining low concentration contamination within and outside the treatment areas would be further reduced by natural attenuation to achieve RAOs over the long-term. Alternative G2 is expected to meet GWQS within the shortest period.

Soil vapor SCGs will be met through ICs included in each alternative that will be used to limit risks to public health resulting from potential vapor intrusion into buildings at the site or offsite.

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

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

Alternative S1 and G1 will not provide active reduction in contaminant levels or risk and do not provide any long-term effectiveness or permanence. For soil, alternatives S2 and S3 provide long-term effectiveness and permanence by using excavation and offsite disposal to reduce the contaminant mass in the treatment area. Remaining concentration contaminants in Alternative S3 would be addressed by a soil cover limiting direct contact. For groundwater, alternatives G2 and G3 provide similar degrees of long-term effectiveness and permanence by using in-situ treatment or hydraulic control to reduce the contaminant mass in the treatment area. Remaining low concentration contaminants would be further degraded through natural attenuation processes in the long term.

Each alternative relies on NA, ICs and LTM for areas of groundwater contamination outside the active remediation zone.

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

Alternative S1 and G1 will not reduce toxicity, mobility, or volume of contamination. For soil, alternatives S2 and S3 provide reduction of toxicity, mobility, through removal of contaminants and disposal in a permitted, lined landfill limiting the mobility of the contaminants. However, alternatives S2 and S3 will not result in an overall reduction of contaminated volume as the alternatives include only excavation and disposal at another location without any contaminant treatment. Alternative S2 would be the most effective in reducing the volume of contamination in soil at the site, followed by alternative S3. For Groundwater, Alternatives G2 and G3 provide reduction of toxicity, mobility, and volume through treatment and removal of contaminants. Alternative G2 would be the most effective in reducing toxicity and volume of contamination in groundwater through treatment as the reduction is estimated to occur more quickly compared to Alternative G3.

Alternative G2 and G3 include an NA component as part of the remedy. Historical groundwater data suggest that reductive dechlorination processes are naturally occurring within OU2, and as the COCs naturally attenuate, a temporary increase in toxicity within the groundwater will occur.

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

Alternative S1 and G1 will not create short-term impacts to human health or the environment because no remedial action is conducted. For soil and groundwater, alternatives S2, S3, G2 and G3 have similar short-term impacts to remediation workers, the public, and the environment during implementation. Construction during each alternative will create noise and increased vehicle traffic on local roads. Each alternative implements monitoring to provide the data needed for proper management of the remedial processes and a mechanism to address any potential impact to the community, remediation workers, and the environment.

Both alternatives G2 and G3 will have short-term impacts on regulated areas, wetlands and their buffer zones.

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

All three soil alternatives are implementable. Alternative S1 would be easiest both technically and administratively to implement as no additional work would be performed at OU2. Alternatives S2 and S3 would be technically implementable since services, materials, and experienced vendors are readily available. Various permit equivalences will be required for Alternatives S2 and S3.

All of the groundwater alternatives are implementable. Alternative G1 would be easiest both technically and administratively to implement as no additional work would be performed at OU2. Alternatives G2 and G3 would be technically implementable since services, materials, and experienced vendors are readily available. Alternative G2 would be the most difficult to implement due to the limited number of qualified technology vendors required for in-situ injections. Alternative S2 would have the greatest

impact on the wetlands as the excavation area to meet the POGWSCOs is considerably larger than the excavation proposed in the other alternatives. Alternatives G2 and G3 would have limited physical impact

on the ground surface with injections conducted via small, track-mounted rigs. Various permit equivalences will be required for all alternatives except S1 and G1.

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

The costs of the alternatives range from $10.6 million to $36.8 million for the soil remedy; and $10.4 million to 17.5 million for the OU2 groundwater remedy. With the four common remedial actions totaling $3.8 million.

The costs of the alternatives vary significantly, as does the time expected to achieve NYSDEC cleanup objectives. Soil Alternative S2 is the shortest time with 0.5-years of active remedial work and zero time for O&M, however, it is the most expensive of the alternatives, and would be the most disruptive to the site. Groundwater Alternative G2 is the shortest time with 2-years of active remedial work and 30-years of long-term monitoring, with Alternative G3 having both the longest time of 27-years of active remedial work/30-years of long-term monitoring, and the second most expensive costs.

Soil Alternative S3 and Groundwater Alternative G2 have been determined to be the most implementable of the alternatives.

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

Since the OU2 area is zoned by the Town of Greece for Flexible Office/Industrial use, the anticipated use of OU2 is commercial.

For soil, Alternatives S2 and S3 achieve either UUSCO or CUSCO within the active treatment area. For groundwater, Alternatives G2 and G3 achieve Class GA GWQS within the active treatment area. Current zoning would limit land use to commercial or industrial uses, so there would be no change in the current land use because of implementation of any of the alternatives.

9. Green and Sustainable Remediation: Potential Indirect Environmental Impact of the Remedy. For this criterion, preference is given to alternatives that have the potential to remediate the site with the lowest potential negative environmental impact, such as CO_2 emissions. This criterion also considers the resilience of alternatives to potential climate change effects such as sustained changes in average temperatures, increased heavy precipitation events, and increased coastal flooding. A detailed analysis can be found as Attachment A to this Proposed Remedial Action Plan.

For soil, Alternative S2 would have a higher impact on the environment than Alternative S3. Approximately 77,200 million British Thermal Units (MMBtus) of total energy would be used (on-site and off-site consumption). The estimated greenhouse gas (GHG) emissions associated with alternative S2 are approximately 6,800 tons of "carbon dioxide equivalents of global warming potential" (CO_2e); approximately 142,400 pounds of total nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM) emissions; and approximately 580 pounds of total (hazardous air pollutant) HAP emissions.

For alternative S3, approximately 15,000 MMBtus of total energy would be used (on-site and off-site consumption). The estimated GHG emissions associated with alternative S3 are approximately 1,200 tons

of CO_2e; approximately 23,000 pounds of total NOx, SOx, and PM emissions; and approximately 130 pounds of total HAP emissions.

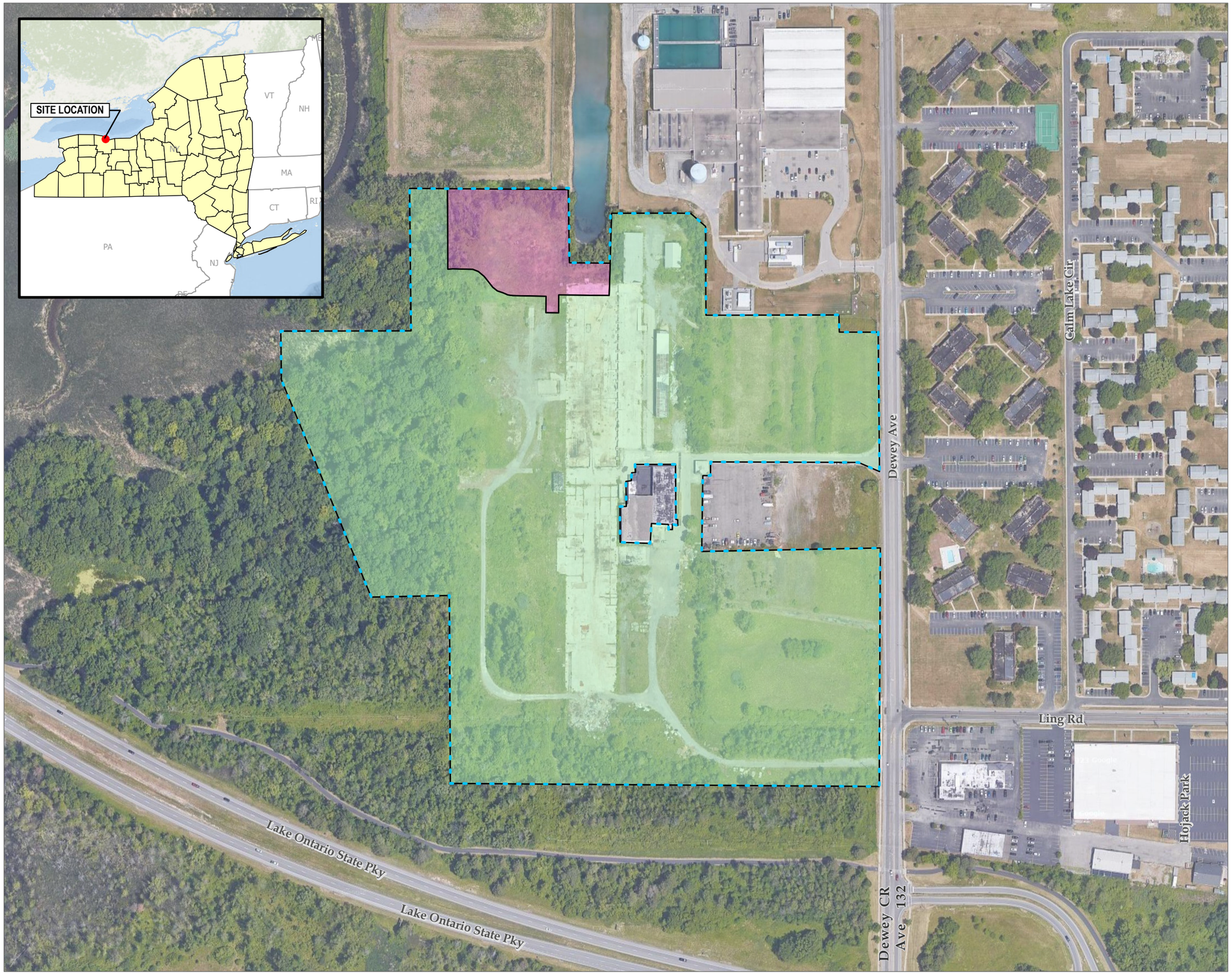
For groundwater, Alternative G3 would have a higher impact on the environment than Alternative G2. Alternative G3 would use approximately 40% recycled materials (i.e., reactivated GAC), consume approximately 142 million gallons of water (groundwater), and consume approximately 12,800 MMBtus of total energy (on-site and off-site consumption). Most of the air emissions associated with this alternative are related to the system installations, while most of the energy use is related to the long-term operation of the pump and treat system. The estimated GHG emissions associated with this alternative are approximately 600 tons of CO_2e; approximately 11,200 pounds of total NOx, SOx, and PM emissions; and approximately 200 pounds of total HAP emissions.

Alternative G2 would use approximately 0.36 million gallons of water and approximately 2,700 MMBtus of total energy (on-site and off-site consumption). The estimated GHG emissions associated with this alternative are approximately 270 tons of CO_2e; approximately 4,000 pounds of total NOx, SOx, and PM emissions; and approximately 60 pounds of total HAP emissions.

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

10. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsive summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative S3 for soils and Alternative G2 for groundwater are being proposed because, as described above, they satisfy the threshold criteria and provide the best balance of the balancing criterion. Included with these remedies will be the common remedial components of the Former Septic System/Leachfield, Stormwater System, Building No. 8, and Soil Vapor ICs.



LEGEND

- SITE BOUNDARY
- OU1 BOUNDARY
- OU2 BOUNDARY

BASE MAP: GOOGLE EARTH IMAGERY
SHEET SIZE: 11X17L

1" = 250'

0 125 250 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER AIR FORCE PLANT NO. 51 - SITE NO. 828156
4777 DEWEY AVENUE
GREECE, NEW YORK 14612

TITLE:

SITE LOCATION MAP

DRAWN BY:	L. LILL	PROJ. NO.:	481220.0000.0000
CHECKED BY:	J. ZIAYA		**FIGURE 1**
APPROVED BY:	K. SULLIVAN		
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: PRAP.aprx

Coordinate System: NAD 1983 2011 StatePlane New York West FIPS 3103 Ft US; Map Rotation: 0
Saved By: LLILL on 8/7/2023 12:34:4 PM - File Path: T:\1\PROJECTS\NYSEC\481220_FormerAirForce_PlantNo.51\2-APRX\PRAP\PRAP.aprx: Layout Name: Fig01_SiteLoc

LEGEND

- SITE BOUNDARY
- TAX PARCEL BOUNDARIES
- OU1 BOUNDARY
- OU2 BOUNDARY
- OU3 BOUNDARY

NOTES:

1. OU3 BOUNDARY INCLUDES PORTIONS OF THE STATE PARKWAY PROPERTY, LOT 046.01-1-3, AND LOT 035.03-1-7.

BASE MAP: GOOGLE EARTH IMAGERY
SHEET SIZE: 11X17L

1" = 300'

0 150 300 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER AIR FORCE PLANT NO. 51 - SITE NO. 828156
4777 DEWEY AVENUE
GREECE, NEW YORK 14612

TITLE:
SITE PLAN AND OPERABLE UNITS

DRAWN BY:	L. LILL	PROJ. NO.:	481220.0000.0000
CHECKED BY:	J. ZIAYA		**FIGURE 2**
APPROVED BY:	K. SULLIVAN		
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: PRAP.aprx

Coordinate System: NAD 1983 2011 StatePlane New York West FIPS 3103 Ft US; Map Rotation: -90
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MW4-4		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	14	
Trichloroethylene	5	5.5	

MW3-8		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	16	
Trichloroethylene	5	73	

MW4-6		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	520	
Trichloroethylene	5	9100	

MW-D		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	6.9	
Trichloroethylene	5	73	

MW4-3		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	130	
Trichloroethylene	5	860	

MW4-10		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	28	
Trans-1,2-Dichloroethene	5	0.32	J
Trichloroethylene	5	51	

MW4-11		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Trichloroethylene	5	2.2	

MW4-8		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	0.72	J
Trichloroethylene	5	1.3	

MW3-9		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
1,1,2-Trichloroethane	1	2	
1,1-Dichloroethene	5	6.5	
Carbon Tetrachloride	5	0.58	J
Chloroform	7	2	
Cis-1,2-Dichloroethene	5	2400	
Tetrachloroethene	5	2.9	
Trans-1,2-Dichloroethene	5	29	
Trichloroethylene	5	33000	
Vinyl Chloride	2	770	

MW-D
MW4-4
MW3-8
Fire Road
MW4-11
MW4-6
MW4-3
MW3-9
MW3-10
MW4-10
MW4-8
MW4-13
MW4-14
MW4-7
MW4-23
MW2-10
MW3-1
MW4-25

Legend

Overburden Monitoring Wells

Overburden TCE Isoconcentrations

10 ug/l

100 ug/l

1,000 ug/l

10,000 ug/l

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

Notes:

1. Only exceedances of NYSDEC 703.5 TOGS Class GA criteria are shown.
2. Wells without boxes had no exceedances.
3. J qualifier indicates result is estimated.
4. All results are in ug/l.

0 Feet 200

OVERBURDEN GROUNDWATER EXCEEDANCES - MAY 2019

FORMER AIR FORCE PLANT NO. 51 (NYSDEC SITE # 828156)

FIGURE 3

MW4-1		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Cis-1,2-Dichloroethene	5	0.31	J
Trichloroethylene	5	0.44	J

MW4-2		04 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
1,1-Dichloroethene	5	0.47	J
Cis-1,2-Dichloroethene	5	**180**	
Trans-1,2-Dichloroethene	5	1.7	
Trichloroethylene	5	**12**	
Vinyl Chloride	2	**22**	

MW5-2		04 Jun 2019		Field Duplicate	
Analyte	703.5/TOGS	Result	Qual	Result	Qual
Chloroform	7	1.9		1.7	
Trichloroethylene	5			0.9	J

MW5-1		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Acetone	50	22	J
Chloroform	7	2.4	
Cis-1,2-Dichloroethene	5	0.33	J
Trichloroethylene	5	0.88	J

MW4-9		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
Trichloroethylene	5	**6.4**	

MW4-5		05 Jun 2019	
Analyte	703.5/TOGS	Result	Qual
1,1-Dichloroethene	5	0.6	J
Cis-1,2-Dichloroethene	5	**130**	
Trans-1,2-Dichloroethene	5	3.3	
Trichloroethylene	5	**330**	
Vinyl Chloride	2	0.52	J

MW4-1
MW4-2
MW5-2
MW5-1
MW4-5
MW4-22
MW4-9
MW4-21
MW4-24
MW4-20
Fire Road

Bedrock Monitoring Wells

Bedrock Groundwater TCE Isoconcentrations

1 ug/l

10 ug/l

100 ug/l

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

Notes:

1. Only exceedances of NYSDEC 703.5 TOGS Class GA criteria are shown.
2. Wells without boxes had no exceedances.
3. J qualifier indicates result is estimated.
4. All results are in ug/l.

0 Feet 200

New York State, Maxar, Microsoft

BEDROCK GROUNDWATER EXCEEDANCES - MAY 2019

FORMER AIR FORCE PLANT NO. 51 (NYSDEC SITE # 828156)

FIGURE 4

Overburden

Overburden Groundwater TCE Isoconcentrations

- 10 ug/l (dashed where inferred)
- 100 ug/l (dashed where inferred)
- 1,000 ug/l (dashed where inferred)
- 10,000 ug/l
- OU1 BOUNDARY
- OU2 BOUNDARY
- OU3 BOUNDARY

Analyte	NYSDEC 703.5/TOGS Standards
Cis-1,2-Dichloroethylene	5
Methylene Chloride	5
Trichloroethylene (TCE)	5
Vinyl Chloride	2

Notes:
1. Only exceedances of NYSDEC 703.5 TOGS Class GA criteria are shown.
2. Wells without boxes had no exceedances.
3. J qualifier indicates result is estimated.
4. All results are in ug/l.

0 Feet 100

MW4-6	AFP51-OU2-MW4-6-20210519 5/19/2021
Analyte	
Cis-1,2-Dichloroethylene	310
Trichloroethylene (TCE)	8500

MW3-8	AFP51-OU2-MW3-8-20210520 5/20/2021
Analyte	
Cis-1,2-Dichloroethylene	20
Trichloroethylene (TCE)	110

MW4-3	AFP51-OU2-MW4-3-20210520 5/20/2021
Analyte	
Cis-1,2-Dichloroethylene	140
Methylene Chloride	17 J
Trichloroethylene (TCE)	960

MW3-9	AFP51-OU2-MW3-9-20210519 5/19/2021
Analyte	
Cis-1,2-Dichloroethylene	760
Trichloroethylene (TCE)	12000

MW4-10	AFP51-OU2-MW4-10-20210521 5/21/2021
Analyte	
Cis-1,2-Dichloroethylene	5.1

MW-D
MW4-4
Fire Road
MW3-8
MW4-11
MW4-6
MW4-3
MW3-9
MW4-10
MW4-8
MW4-7

New York State, Maxar, Microsoft

OVERBURDEN GROUNDWATER EXCEEDANCES - MAY 2021

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 5

Legend

Bedrock Wells

Bedrock Groundwater TCE Isoconcentrations

10 ug/l (dashed where inferred)

100 ug/l (dashed where inferred)

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

Analyte	NYSDEC 703.5/TOGS Standards
Cis-1,2-Dichloroethylene	5
Methylene Chloride	5
Trichloroethylene (TCE)	5
Vinyl Chloride	2

Notes:

1. Only exceedances of NYSDEC 703.5 TOGS Class GA criteria are shown.
2. Wells without boxes had no exceedances.
3. J qualifier indicates result is estimated.
4. All results are in ug/l.

0 Feet 100

MW4-5	AFP51-OU2-MW4-5-20210519 5/19/2021
Analyte	
Cis-1,2-Dichloroethylene	120
Trichloroethylene (TCE)	140

MW4-2	AFP51-OU2-MW4-2-20210520 5/20/2021
Analyte	
Cis-1,2-Dichloroethylene	120
Trichloroethylene (TCE)	5.5
Vinyl Chloride	11

MW4-9	AFP51-OU2-MW4-9-20210519 5/19/2021
Analyte	
Trichloroethylene (TCE)	21

MW4-24	AFP51-OU2-MW4-24-20210519 5/19/2021
Analyte	
Cis-1,2-Dichloroethylene	8.5
Trichloroethylene (TCE)	12

MW4-22

Fire Road

MW4-5

MW4-2

MW4-9

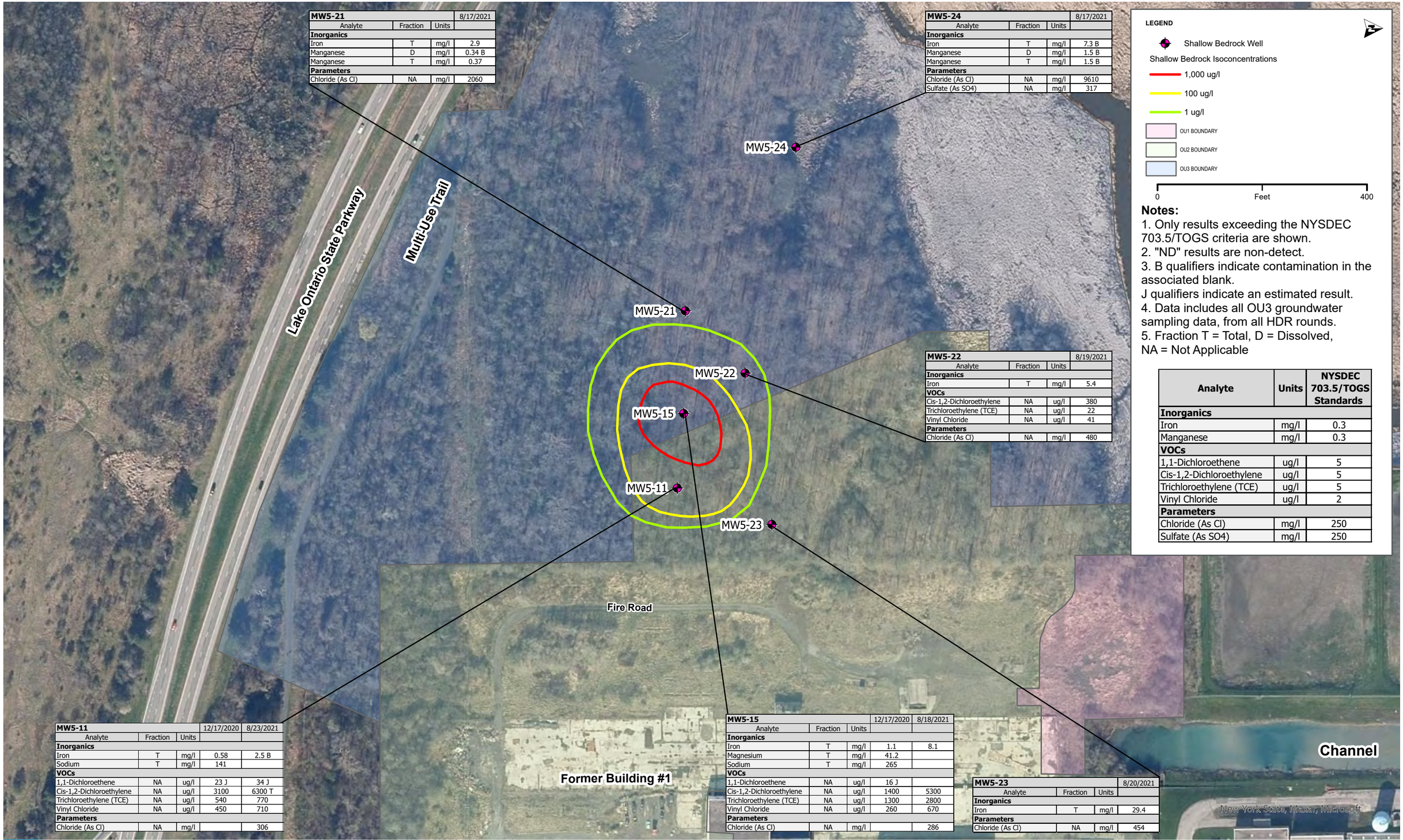
MW4-24

New York State, Maxar, Microsoft

BEDROCK GROUNDWATER EXCEEDANCES - MAY 2021

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 6



MW5-21			8/17/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	2.9
Manganese	D	mg/l	0.34 B
Manganese	T	mg/l	0.37
Parameters			
Chloride (As Cl)	NA	mg/l	2060

MW5-24			8/17/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	7.3 B
Manganese	D	mg/l	1.5 B
Manganese	T	mg/l	1.5 B
Parameters			
Chloride (As Cl)	NA	mg/l	9610
Sulfate (As SO4)	NA	mg/l	317

MW5-22			8/19/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	5.4
VOCs			
Cis-1,2-Dichloroethylene	NA	ug/l	380
Trichloroethylene (TCE)	NA	ug/l	22
Vinyl Chloride	NA	ug/l	41
Parameters			
Chloride (As Cl)	NA	mg/l	480

MW5-11			12/17/2020	8/23/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	0.58	2.5 B
Sodium	T	mg/l	141	
VOCs				
1,1-Dichloroethene	NA	ug/l	23 J	34 J
Cis-1,2-Dichloroethylene	NA	ug/l	3100	6300 T
Trichloroethylene (TCE)	NA	ug/l	540	770
Vinyl Chloride	NA	ug/l	450	710
Parameters				
Chloride (As Cl)	NA	mg/l		306

MW5-15			12/17/2020	8/18/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	1.1	8.1
Magnesium	T	mg/l	41.2	
Sodium	T	mg/l	265	
VOCs				
1,1-Dichloroethene	NA	ug/l	16 J	
Cis-1,2-Dichloroethylene	NA	ug/l	1400	5300
Trichloroethylene (TCE)	NA	ug/l	1300	2800
Vinyl Chloride	NA	ug/l	260	670
Parameters				
Chloride (As Cl)	NA	mg/l		286

MW5-23			8/20/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	29.4
Parameters			
Chloride (As Cl)	NA	mg/l	454

LEGEND

- Shallow Bedrock Well
- Shallow Bedrock Isoconcentrations
  - 1,000 ug/l
  - 100 ug/l
  - 1 ug/l
- OU1 BOUNDARY
- OU2 BOUNDARY
- OU3 BOUNDARY

0 Feet 400

Notes:

1. Only results exceeding the NYSDEC 703.5/TOGS criteria are shown.
2. "ND" results are non-detect.
3. B qualifiers indicate contamination in the associated blank.
   J qualifiers indicate an estimated result.
4. Data includes all OU3 groundwater sampling data, from all HDR rounds.
5. Fraction T = Total, D = Dissolved, NA = Not Applicable

Analyte	Units	NYSDEC 703.5/TOGS Standards
Inorganics		
Iron	mg/l	0.3
Manganese	mg/l	0.3
VOCs		
1,1-Dichloroethene	ug/l	5
Cis-1,2-Dichloroethylene	ug/l	5
Trichloroethylene (TCE)	ug/l	5
Vinyl Chloride	ug/l	2
Parameters		
Chloride (As Cl)	mg/l	250
Sulfate (As SO4)	mg/l	250

SHALLOW BEDROCK TCE ISOCONCENTRATIONS

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 7

MW5-8			12/16/2020	8/23/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	30.6	
Magnesium	T	mg/l	72.6	
Manganese	T	mg/l	2.1	
Sodium	T	mg/l	106	
VOCs				
Cis-1,2-Dichloroethylene	NA	ug/l	80	53
Trichloroethylene (TCE)	NA	ug/l	160	230
Parameters				
Chloride (As Cl)	NA	mg/l		286

MW5-16			12/16/2020	8/17/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	1.6	1.2 B
Magnesium	T	mg/l	69.6	
Manganese	D	mg/l		0.45 B
Manganese	T	mg/l	0.99	0.46 B
Sodium	T	mg/l	48.5	
VOCs				
1,1-Dichloroethene	NA	ug/l	11 J	
Cis-1,2-Dichloroethylene	NA	ug/l	850	1100
Trichloroethylene (TCE)	NA	ug/l	95	190
Vinyl Chloride	NA	ug/l	320	350

MW5-17			8/17/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	0.73 B
Manganese	D	mg/l	0.31 B
Manganese	T	mg/l	0.33 B

MW5-14			12/16/2020	8/17/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	3.2	5.5
Magnesium	T	mg/l	80.1	
Sodium	T	mg/l	69.2	
VOCs				
Cis-1,2-Dichloroethylene	NA	ug/l	79	110
Trichloroethylene (TCE)	NA	ug/l	700	720
Parameters				
Chloride (As Cl)	NA	mg/l		270

MW5-18			8/19/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	0.4

MW5-5			6/4/2019	12/15/2020	8/20/2021
Analyte	Fraction	Units			
VOCs					
Cis-1,2-Dichloroethylene	NA	ug/l		5.6	10
Trichloroethylene (TCE)	NA	ug/l	9.4	79	79

MW5-9			12/17/2020	8/19/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l		0.78
Magnesium	T	mg/l	70.5	
Sodium	T	mg/l	49.1	
VOCs				
1,1-Dichloroethene	NA	ug/l	43 J	
Cis-1,2-Dichloroethylene	NA	ug/l	3300	3700
Trichloroethylene (TCE)	NA	ug/l	2500	1400
Vinyl Chloride	NA	ug/l	580	470

MW5-7			12/16/2020	8/23/2021	Duplicate
Analyte	Fraction	Units			
Inorganics					
Iron	T	mg/l	0.99	1.8 B	
Magnesium	T	mg/l	41.5		
Manganese	T	mg/l		0.33 B	
Sodium	T	mg/l	39		
VOCs					
Cis-1,2-Dichloroethylene	NA	ug/l	58	51	55
Trichloroethylene (TCE)	NA	ug/l	290	170	240
Parameters					
Chloride (As Cl)	NA	mg/l		446	

MW5-13			12/17/2020	Duplicate	8/18/2021
Analyte	Fraction	Units			
Inorganics					
Iron	T	mg/l	1.4	1.5	2.7
Magnesium	T	mg/l	88	88.2	
Manganese	T	mg/l	0.33	0.34	
Sodium	T	mg/l	61.6	61.3	
VOCs					
Cis-1,2-Dichloroethylene	NA	ug/l	7400	7000	6000
Trichloroethylene (TCE)	NA	ug/l	9300	8700	7200
Vinyl Chloride	NA	ug/l	700	620	590
Parameters					
Chloride (As Cl)	NA	mg/l			333

MW5-20			8/18/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	6.9
VOCs			
Cis-1,2-Dichloroethylene	NA	ug/l	330
Trichloroethylene (TCE)	NA	ug/l	380
Vinyl Chloride	NA	ug/l	47
Parameters			
Chloride (As Cl)	NA	mg/l	326

MW5-4			8/23/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	1.2 B

MW5-3			8/23/2021
Analyte	Fraction	Units	
Inorganics			
Iron	T	mg/l	0.58 B

MW5-6			6/6/2019
Analyte	Fraction	Units	
VOCs			
1,1-Dichloroethene	NA	ug/l	6.8
Carbon Tetrachloride	NA	ug/l	24
Chloroform	NA	ug/l	65
Cis-1,2-Dichloroethylene	NA	ug/l	500
Trans-1,2-Dichloroethene	NA	ug/l	5.5
Trichloroethylene (TCE)	NA	ug/l	46000

MW5-10			12/17/2020	8/19/2021
Analyte	Fraction	Units		
Inorganics				
Iron	T	mg/l	2.7	3.7
Magnesium	T	mg/l	69.3	
VOCs				
Cis-1,2-Dichloroethylene	NA	ug/l	2800	3500
Trichloroethylene (TCE)	NA	ug/l	700	1300
Vinyl Chloride	NA	ug/l	220	220

MW5-12			12/17/2020	8/19/2021	Duplicate
Analyte	Fraction	Units			
Inorganics					
Iron	T	mg/l	1.1		
Magnesium	T	mg/l	67.8		
Sodium	T	mg/l	41.6		
VOCs					
Cis-1,2-Dichloroethylene	NA	ug/l	2700	4100	4200
Trichloroethylene (TCE)	NA	ug/l	110	1600	1600
Vinyl Chloride	NA	ug/l	440	96 J	

Probe Borings

Overburden Well

Overburden Isoconcentration Lines

- 10,000 ug/l
- 1,000 ug/l
- Dashed where inferred
- 100 ug/l
- Dashed where inferred
- 10 ug/l
- Dashed where inferred

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

Notes:

1. Only results exceeding the NYSDEC 703.5/TOGS criteria are shown.
2. "ND" results are non-detect.
3. B qualifiers indicate contamination in the associated blank. J qualifiers indicate an estimated result.
4. Data includes all OU3 groundwater sampling data, from all HDR rounds.
5. Fraction T = Total, D = Dissolved, NA = Not Applicable
6. Groundwater probe locations from April, 2019 and OU2 isoconcentration lines from 2021 are included.

Analyte	Units	NYSDEC 703.5/TOGS Standards
Inorganics		
Iron	mg/l	0.3
Magnesium	mg/l	35
Manganese	mg/l	0.3
Sodium	mg/l	20
VOCs		
1,1-Dichloroethene	ug/l	5
Carbon Tetrachloride	ug/l	5
Cis-1,2-Dichloroethylene	ug/l	5
Chloroform	ug/l	7
Trans-1,2-Dichloroethene	ug/l	5
Trichloroethylene (TCE)	ug/l	5
Vinyl Chloride	ug/l	2
Parameters		
Chloride (As Cl)	mg/l	250
Sulfate (As SO4)	mg/l	250

GP-2 GP-23 GP-22 GP-21 GP-20 MW5-8 GP-1 GP-19 GP-30 GP-18 GP-29 GP-28 GP-17 GP-2 GP-27 GP-3 GP-25 GP-16 MW5-7 GP-26 MW5-5 GP-4 GP-5 GP-6 MW5-4 MW5-3 MW5-17 MW5-18 MW5-16 MW5-14 MW5-19 MW5-9 MW5-13 MW5-12 MW5-20 MW5-6 MW5-10 MW-D MW4-4 MW4-3 MW4-10 MW4-7 MW3-8 MW4-11 MW4-6 MW3-9 MW4-8

Lake Ontario State Parkway

Multi-Use Trail

Fire Road

Former Building #1

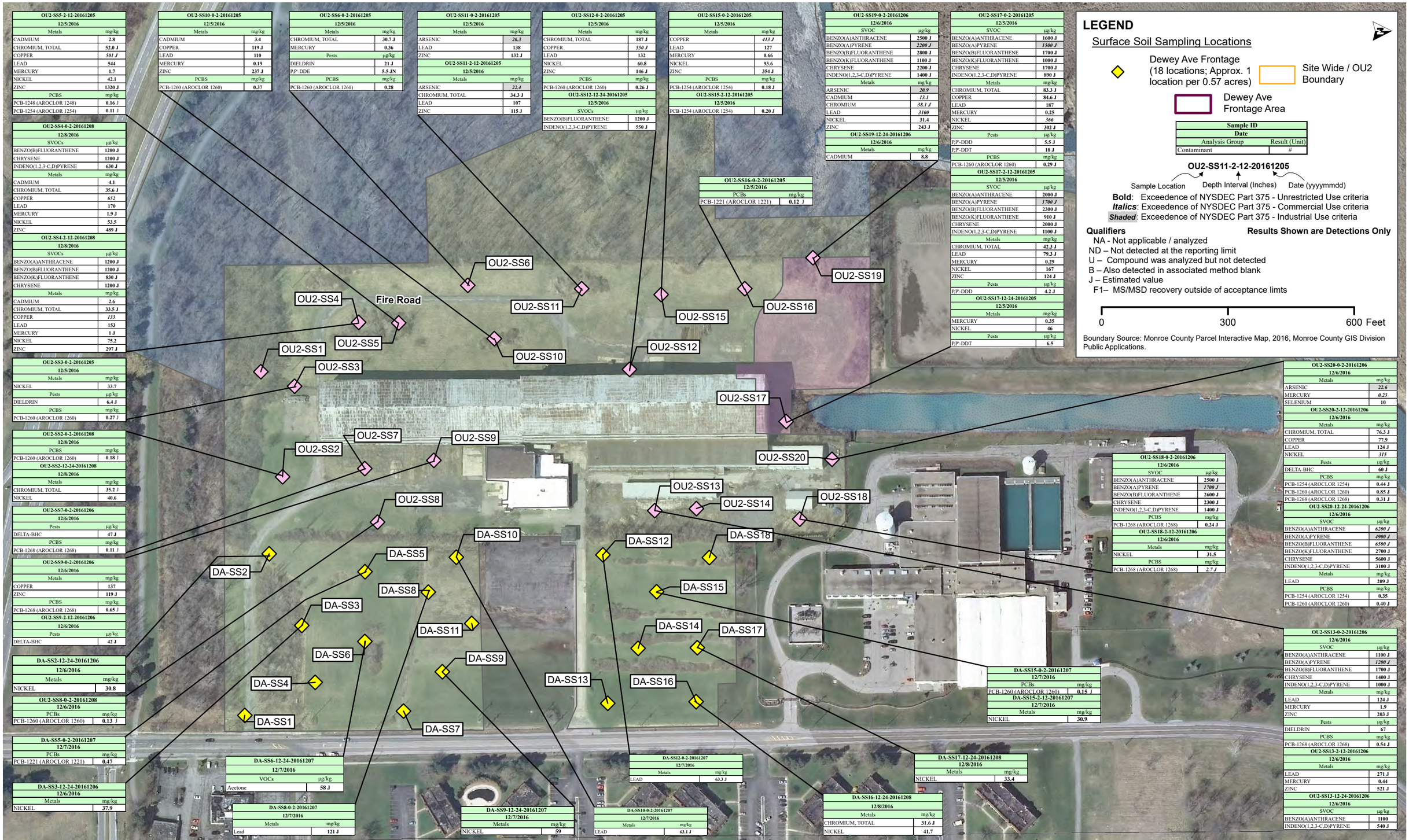
Channel

0 Feet 400

OVERBURDEN TCE ISOCONCENTRATIONS

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 8



OU2-SS5-2-12-20161205
12/5/2016

Metals	mg/kg
CADMIUM	2.8
CHROMIUM, TOTAL	52.0 J
COPPER	*501 J*
LEAD	544
MERCURY	1.7
NICKEL	42.1
ZINC	1320 J
PCBS	mg/kg
PCB-1248 (AROCLOR 1248)	0.16 J
PCB-1254 (AROCLOR 1254)	0.11 J

OU2-SS10-0-2-20161205
12/5/2016

Metals	mg/kg
CADMIUM	3.4
COPPER	119 J
LEAD	110
MERCURY	0.19
ZINC	237 J
PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.37

OU2-SS6-0-2-20161205
12/5/2016

Metals	mg/kg
CHROMIUM, TOTAL	30.7 J
MERCURY	0.36
Pests	µg/kg
DIELDRIN	21 J
P,P'-DDE	5.5 JN
PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.28

OU2-SS11-0-2-20161205
12/5/2016

Metals	mg/kg
ARSENIC	*26.3*
LEAD	138
ZINC	132 J

OU2-SS11-2-12-20161205
12/5/2016

Metals	mg/kg
ARSENIC	*22.4*
CHROMIUM, TOTAL	34.3 J
LEAD	107
ZINC	115 J

OU2-SS12-0-2-20161205
12/5/2016

Metals	mg/kg
CHROMIUM, TOTAL	187 J
COPPER	*550 J*
LEAD	132
NICKEL	60.8
ZINC	146 J
PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.26 J

OU2-SS12-12-24-20161205
12/5/2016

SVOCs	µg/kg
BENZO(B)FLUORANTHENE	1200 J
INDENO(1,2,3-C,D)PYRENE	550 J

OU2-SS15-0-2-20161205
12/5/2016

Metals	mg/kg
COPPER	*413 J*
LEAD	127
MERCURY	0.66
NICKEL	93.6
ZINC	354 J
PCBS	mg/kg
PCB-1254 (AROCLOR 1254)	0.18 J

OU2-SS15-2-12-20161205
12/5/2016

PCBS	mg/kg
PCB-1254 (AROCLOR 1254)	0.20 J

OU2-SS19-0-2-20161206
12/6/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	2500 J
BENZO(A)PYRENE	*2200 J*
BENZO(B)FLUORANTHENE	2800 J
BENZO(K)FLUORANTHENE	1100 J
CHRYSENE	2200 J
INDENO(1,2,3-C,D)PYRENE	1400 J
Metals	mg/kg
ARSENIC	*20.9*
CADMIUM	*13.1*
CHROMIUM	*58.1 J*
LEAD	*3100*
NICKEL	31.4
ZINC	243 J

OU2-SS19-12-24-20161206
12/6/2016

Metals	mg/kg
CADMIUM	8.8

OU2-SS17-0-2-20161205
12/5/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	1600 J
BENZO(A)PYRENE	*1500 J*
BENZO(B)FLUORANTHENE	1700 J
BENZO(K)FLUORANTHENE	1000 J
CHRYSENE	1700 J
INDENO(1,2,3-C,D)PYRENE	890 J
Metals	mg/kg
CHROMIUM, TOTAL	83.3 J
COPPER	84.6 J
LEAD	187
MERCURY	0.25
NICKEL	*366*
ZINC	302 J
Pests	µg/kg
P,P'-DDD	5.5 J
P,P'-DDT	18 J
PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.29 J

OU2-SS17-2-12-20161205
12/5/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	2000 J
BENZO(A)PYRENE	*1700 J*
BENZO(B)FLUORANTHENE	2300 J
BENZO(K)FLUORANTHENE	910 J
CHRYSENE	2000 J
INDENO(1,2,3-C,D)PYRENE	1100 J
Metals	mg/kg
CHROMIUM, TOTAL	42.3 J
LEAD	79.3 J
MERCURY	0.29
NICKEL	167
ZINC	124 J
Pests	µg/kg
P,P'-DDD	4.2 J

OU2-SS17-12-24-20161205
12/5/2016

Metals	mg/kg
MERCURY	0.35
NICKEL	46
Pests	µg/kg
P,P'-DDT	6.5

OU2-SS16-0-2-20161205
12/5/2016

PCBs	mg/kg
PCB-1221 (AROCLOR 1221)	0.12 J

OU2-SS4-0-2-20161208
12/8/2016

SVOCs	µg/kg
BENZO(B)FLUORANTHENE	1200 J
CHRYSENE	1200 J
INDENO(1,2,3-C,D)PYRENE	630 J
Metals	mg/kg
CADMIUM	4.1
CHROMIUM, TOTAL	35.6 J
COPPER	*652*
LEAD	170
MERCURY	1.9 J
NICKEL	53.5
ZINC	489 J

OU2-SS4-2-12-20161208
12/8/2016

SVOCs	µg/kg
BENZO(A)ANTHRACENE	1200 J
BENZO(B)FLUORANTHENE	1200 J
BENZO(K)FLUORANTHENE	830 J
CHRYSENE	1200 J
Metals	mg/kg
CADMIUM	2.6
CHROMIUM, TOTAL	33.5 J
COPPER	*133*
LEAD	153
MERCURY	1 J
NICKEL	75.2
ZINC	297 J

OU2-SS3-0-2-20161205
12/5/2016

Metals	mg/kg
NICKEL	33.7
Pests	µg/kg
DIELDRIN	6.4 J
PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.27 J

OU2-SS2-0-2-20161208
12/8/2016

PCBS	mg/kg
PCB-1260 (AROCLOR 1260)	0.18 J

OU2-SS2-12-24-20161208
12/8/2016

Metals	mg/kg
CHROMIUM, TOTAL	35.2 J
NICKEL	40.6

OU2-SS7-0-2-20161206
12/6/2016

Pests	µg/kg
DELTA-BHC	47 J
PCBS	mg/kg
PCB-1268 (AROCLOR 1268)	0.11 J

OU2-SS9-0-2-20161206
12/6/2016

Metals	mg/kg
COPPER	137
ZINC	119 J
PCBS	mg/kg
PCB-1268 (AROCLOR 1268)	0.65 J

OU2-SS9-2-12-20161206
12/6/2016

Pests	µg/kg
DELTA-BHC	42 J

DA-SS2-12-24-20161206
12/6/2016

Metals	mg/kg
NICKEL	30.8

OU2-SS8-0-2-20161208
12/6/2016

PCBs	mg/kg
PCB-1260 (AROCLOR 1260)	0.13 J

DA-SS5-0-2-20161207
12/7/2016

PCBs	mg/kg
PCB-1221 (AROCLOR 1221)	0.47

DA-SS3-12-24-20161206
12/6/2016

Metals	mg/kg
NICKEL	37.9

DA-SS6-12-24-20161207
12/7/2016

VOCs	µg/kg
Acetone	58 J

DA-SS8-0-2-20161207
12/7/2016

Metals	mg/kg
Lead	121 J

DA-SS9-12-24-20161207
12/7/2016

Metals	mg/kg
NICKEL	59

DA-SS10-0-2-20161207
12/7/2016

Metals	mg/kg
LEAD	63.1 J

DA-SS12-0-2-20161207
12/7/2016

Metals	mg/kg
LEAD	63.3 J

DA-SS16-12-24-20161208
12/8/2016

Metals	mg/kg
CHROMIUM, TOTAL	31.6 J
NICKEL	41.7

DA-SS17-12-24-20161208
12/8/2016

Metals	mg/kg
NICKEL	33.4

DA-SS15-0-2-20161207
12/7/2016

PCBs	mg/kg
PCB-1260 (AROCLOR 1260)	0.15 J

DA-SS15-2-12-20161207
12/7/2016

Metals	mg/kg
NICKEL	30.9

OU2-SS18-0-2-20161206
12/6/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	2500 J
BENZO(A)PYRENE	*1700 J*
BENZO(B)FLUORANTHENE	2600 J
CHRYSENE	2300 J
INDENO(1,2,3-C,D)PYRENE	1400 J
PCBS	mg/kg
PCB-1268 (AROCLOR 1268)	0.24 J

OU2-SS18-2-12-20161206
12/6/2016

Metals	mg/kg
NICKEL	31.5
PCBS	mg/kg
PCB-1268 (AROCLOR 1268)	*2.7 J*

OU2-SS20-0-2-20161206
12/6/2016

Metals	mg/kg
ARSENIC	*22.6*
MERCURY	*0.23*
SELENIUM	10

OU2-SS20-2-12-20161206
12/6/2016

Metals	mg/kg
CHROMIUM, TOTAL	76.3 J
COPPER	77.9
LEAD	124 J
NICKEL	*315*
Pests	µg/kg
DELTA-BHC	60 J
PCBS	mg/kg
PCB-1254 (AROCLOR 1254)	0.44 J
PCB-1260 (AROCLOR 1260)	0.85 J
PCB-1268 (AROCLOR 1268)	0.31 J

OU2-SS20-12-24-20161206
12/6/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	*6200 J*
BENZO(A)PYRENE	*4900 J*
BENZO(B)FLUORANTHENE	*6500 J*
BENZO(K)FLUORANTHENE	2700 J
CHRYSENE	5600 J
INDENO(1,2,3-C,D)PYRENE	3100 J
Metals	mg/kg
LEAD	209 J
PCBS	mg/kg
PCB-1254 (AROCLOR 1254)	0.35
PCB-1260 (AROCLOR 1260)	0.40 J

OU2-SS13-0-2-20161206
12/6/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	1100 J
BENZO(A)PYRENE	*1200 J*
BENZO(B)FLUORANTHENE	1700 J
CHRYSENE	1400 J
INDENO(1,2,3-C,D)PYRENE	1000 J
Metals	mg/kg
LEAD	124 J
MERCURY	1.9
ZINC	203 J
Pests	µg/kg
DIELDRIN	67
PCBS	mg/kg
PCB-1268 (AROCLOR 1268)	0.54 J

OU2-SS13-2-12-20161206
12/6/2016

Metals	mg/kg
LEAD	271 J
MERCURY	0.44
ZINC	521 J

OU2-SS13-12-24-20161206
12/6/2016

SVOC	µg/kg
BENZO(A)ANTHRACENE	1100
INDENO(1,2,3-C,D)PYRENE	540 J

LEGEND

Surface Soil Sampling Locations

Dewey Ave Frontage (18 locations; Approx. 1 location per 0.57 acres)

Site Wide / OU2 Boundary

Dewey Ave Frontage Area

Sample ID	
Date	
Analysis Group	Result (Unit)
Contaminant	#

OU2-SS11-2-12-20161205

Sample Location | Depth Interval (Inches) | Date (yyyymmdd)

Bold: Exceedence of NYSDEC Part 375 - Unrestricted Use criteria
Italics: Exceedence of NYSDEC Part 375 - Commercial Use criteria
Shaded: Exceedence of NYSDEC Part 375 - Industrial Use criteria

Qualifiers

NA - Not applicable / analyzed
ND – Not detected at the reporting limit
U – Compound was analyzed but not detected
B – Also detected in associated method blank
J – Estimated value
F1– MS/MSD recovery outside of acceptance limts

Results Shown are Detections Only

0 300 600 Feet

Boundary Source: Monroe County Parcel Interactive Map, 2016, Monroe County GIS Division Public Applications.

SITE-WIDE SOIL SAMPLING RESULTS – EXCEEDANCES ONLY

FORMER AIR FORCE PLANT NO. 51 (NYSDEC SITE# 828156)

FIGURE 9

LEGEND

- FORMER BUILDINGS
- APPROXIMATE LIMITS OF OU2
- EXISTING STORM SEWER
- EXISTING CATCH BASIN
- EXISTING OVERBURDEN MONITORING WELL
- EXISTING BEDROCK WELL
- EXISTING MONITORING WELL WITHIN UNKNOWN AQUIFER
- EXISTING SURFACE SOIL SAMPLE - SITE-WIDE/OU2
- EXISTING SURFACE SOIL SAMPLE - DEWEY AVE FRONTAGE
- EXISTING SOIL VAPOR SAMPLE
- EXISTING SUB-SLAB SOIL VAPOR SAMPLE
- EXISTING SURFACE SOIL SAMPLE
- EXISTING TEST BORING/WELL
- EXISTING TEST PIT
- EXISTING HTRW SAMPLE
- UNRESTRICTED USE SCO EXCEEDED AT THIS LOCATION

NOTES:

1. PHYSICAL FEATURES AND BOUNDARIES ARE FROM PHASE II REMEDIAL INVESTIGATION REPORT, OPERABLE UNIT 2, DECEMBER 2020, PREPARED BY HDR.
2. EXISTING TEST PIT LOCATIONS TP2-17 AND TP2-18 WERE MOVED FROM THEIR COORDINATE LOCATIONS BASED UPON PREVIOUS REPORTS.
3. LOCATIONS AND DIMENSIONS OF EXISTING FEATURES ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY CONTRACTOR.
4. TWO DIFFERENT SETS OF SURVEY COORDINATES WERE PROVIDED FOR THE MW2-10 LOCATION, APPROXIMATELY 25 FEET APART. BOTH LOCATIONS HAVE BEEN PLOTTED.

Constituent	UUSCO
Arsenic	13 ppm
Chromium, Total	30 ppm
Copper	50 ppm
Lead	63 ppm
Mercury	0.18 ppm
Nickel	30 ppm
Selenium	3.9 ppm
Zinc	109 ppm
Methylene Chloride	0.05 ppm
Benzo(a)Anthracene	1 ppm
Benzo(a)Pyrene	1 ppm
Benzo(b)Fluoranthene	1 ppm
Benzo(k)Fluoranthene	0.8 ppm
Chrysene	1 ppm
Indeno(1,2,3-cd)Pyrene	0.5 ppm
Delta-BHC	0.04 ppm
Dieldrin	0.005 ppm
PCBs, Total	0.1 ppm

ppm = parts per million
UUSCO = Unrestricted Use Soil Cleanup Objective

OU2-SS13-2-12-20161206
Sample Location
Sample Interval (Inches Below Grade)
Sample Date (YYYY/MM/DD)
" in Sample Identifier represents Inches below Grade
' in Sample Identifier represents Feet below Grade

OU2-SS2-0-2-20161208	PCBs, Total	0.18	J	ppm
OU2-SS2-12-24-20161208	Chromium, Total	35.2	J	ppm
	Nickel	40.6		ppm
OU2-SS7-0-2-20161206	Delta-BHC	0.047	J	ppm
	PCBs, Total	0.11	J	ppm
OU2-SS8-0-2-20161208	PCBs, Total	0.13	J	ppm
OU2-SS9-0-2-20161206	Copper	137		ppm
	Zinc	119	J	ppm
	PCBs, Total	0.65	J	ppm
OU2-SS9-2-12-20161206	Delta-BHC	0.042	J	ppm

OU2-SS13-0-2-20161206	Benzo(a)Anthracene	1.10	J	ppm
	Benzo(a)Pyrene	1.20	J	ppm
	Benzo(b)Fluoranthene	1.70	J	ppm
	Chrysene	1.40	J	ppm
	Indeno(1,2,3-cd)Pyrene	1.00	J	ppm
	Lead	124	J	ppm
	Mercury	1.9		ppm
	Zinc	203	J	ppm
	Dieldrin	0.067		ppm
	PCBs, Total	0.54	J	ppm
OU2-SS13-2-12-20161206	Benzo(a)Anthracene	1.10		ppm
	Indeno(1,2,3-cd)Pyrene	0.54	J	ppm
	Lead	271	J	ppm
	Mercury	0.44		ppm
	Zinc	521	J	ppm
OU2-SS18-0-2-20161206	Benzo(a)Anthracene	2.50	J	ppm
	Benzo(a)Pyrene	1.70	J	ppm
	Benzo(b)Fluoranthene	2.60	J	ppm
	Chrysene	2.30	J	ppm
	Indeno(1,2,3-cd)Pyrene	1.40	J	ppm
	PCBs, Total	0.24	J	ppm
OU2-SS18-2-12-20161206	Nickel	31.5		ppm
	PCBs, Total	2.7	J	ppm

OU2-SS20-0-2-20161206	Arsenic	22.6		ppm
	Mercury	0.23		ppm
	Selenium	10		ppm
OU2-SS20-2-12-20161206	Chromium, Total	76.3	J	ppm
	Copper	77.9		ppm
	Lead	124	J	ppm
	Nickel	315		ppm
	Delta-BHC	0.060	J	ppm
	PCBs, Total	1.6	J	ppm
OU2-SS20-12-24-20161206	Benzo(a)Anthracene	6.20	J	ppm
	Benzo(a)Pyrene	4.90	J	ppm
	Benzo(b)Fluoranthene	6.50	J	ppm
	Benzo(k)Fluoranthene	2.70	J	ppm
	Chrysene	5.60	J	ppm
	Indeno(1,2,3-cd)Pyrene	3.10	J	ppm
	Lead	209	J	ppm
	PCBs, Total	0.75	J	ppm
DA-SS2-12-24-20161206	Nickel	30.8		ppm
DA-SS3-12-24-20161206	Nickel	37.9		ppm

DA-SS5-0-2-20161207	PCBs, Total	0.47		ppm
DA-SS8-0-2-20161207	Lead	121	J	ppm
DA-SS9-12-24-20161207	Nickel	59		ppm
DA-SS10-0-2-20161207	Lead	63.1	J	ppm
DA-SS12-0-2-20161207	Lead	63.3	J	ppm
DA-SS15-0-2-20161207	PCBs, Total	0.15	J	ppm
DA-SS15-2-12-20161207	Nickel	30.9		ppm
DA-SS16-12-24-20161208	Chromium, Total	31.6	J	ppm
	Nickel	41.7		ppm
DA-SS17-12-24-20161208	Nickel	33.4		ppm
SS2-2 (0" - 2")	Methylene Chloride	0.18		ppm
TP2-20 (3')	Nickel	369		ppm
	PCBs, Total	2.3		ppm

1:600 BASE MAP: GOOGLE EARTH IMAGERY
SHEET SIZE: 24X36L
1" = 50'
0 25 50 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER AIR FORCE PLANT NO. 51 - SITE NO. 828156
4777 DEWEY AVENUE
GREECE, NEW YORK 14612

TITLE:
OU2: DEWEY AVE FRONTAGE AREA UNRESTRICTED USE EXCEEDANCES

DRAWN BY:	L. LILL	PROJ. NO.:	481220.0000.0000
CHECKED BY:	J. ZIAYA	FIGURE 10	
APPROVED BY:	K. SULLIVAN		
DATE:	DECEMBER 2022		

TRC
10 Maxwell Drive
Clifton Park, NY 12065
Phone: 518-348-1190

FILE: OU2

LEGEND

- FORMER BUILDINGS
- APPROXIMATE LIMITS OF OU2
- EXISTING STORM SEWER
- EXISTING CATCH BASIN
- EXISTING OVERBURDEN MONITORING WELL
- EXISTING BEDROCK WELL
- EXISTING MONITORING WELL WITHIN UNKNOWN AQUIFER
- EXISTING SURFACE SOIL SAMPLE - SITE-WIDE/OU2
- EXISTING SURFACE SOIL SAMPLE - DEWEY AVE FRONTAGE
- EXISTING SOIL VAPOR SAMPLE
- EXISTING SUB-SLAB SOIL VAPOR SAMPLE
- EXISTING SURFACE SOIL SAMPLE
- EXISTING TEST BORING/WELL
- EXISTING TEST PIT
- EXISTING HTRW SAMPLE
- COMMERCIAL USE SCO EXCEEDED AT THIS LOCATION

NOTES:

1. PHYSICAL FEATURES AND BOUNDARIES ARE FROM PHASE II REMEDIAL INVESTIGATION REPORT, OPERABLE UNIT 2, DECEMBER 2020, PREPARED BY HDR.
2. EXISTING TEST PIT LOCATIONS TP2-17 AND TP2-18 WERE MOVED FROM THEIR COORDINATE LOCATIONS BASED UPON PREVIOUS REPORTS.
3. LOCATIONS AND DIMENSIONS OF EXISTING FEATURES ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY CONTRACTOR.
4. TWO DIFFERENT SETS OF SURVEY COORDINATES WERE PROVIDED FOR THE MW2-10 LOCATION, APPROXIMATELY 25 FEET APART. BOTH LOCATIONS HAVE BEEN PLOTTED.

Constituent	CUSCO
Arsenic	16 ppm
Nickel	310 ppm
Benzo(a)Anthracene	5.6 ppm
Benzo(a)Pyrene	1.0 ppm
Benzo(b)Fluoranthene	5.6 ppm
PCBs, Total	1 ppm

ppm = parts per million
CUSCO = Restricted (Commercial) Use Soil Cleanup Objective

OU2-SS13-0-2-20161206
Sample Location
Sample Interval (Inches Below Grade)
Sample Date (YYYY/MM/DD)
' in Sample Identifier represents Feet below Grade

OU2-SS13-0-2-20161206	Benzo(a)Pyrene	1.20	J	ppm
OU2-SS18-0-2-20161206	Benzo(a)Pyrene	1.70	J	ppm
OU2-SS18-2-12-20161206	PCBs, Total	2.7	J	ppm
OU2-SS20-0-2-20161206	Arsenic	22.6		ppm
OU2-SS20-2-12-20161206	Nickel	315		ppm
	PCBs, Total	1.6	J	ppm
OU2-SS20-12-24-20161206	Benzo(a)Anthracene	6.20	J	ppm
	Benzo(a)Pyrene	4.90	J	ppm
	Benzo(b)Fluoranthene	6.50	J	ppm
TP2-20 (3')	Nickel	369		ppm
	PCBs, Total	2.3		ppm

1:600
1" = 50'
0 25 50 FEET
BASE MAP: GOOGLE EARTH IMAGERY
SHEET SIZE: 24X36L

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER AIR FORCE PLANT NO. 51 - SITE NO. 828156
4777 DEWEY AVENUE
GREECE, NEW YORK 14612

TITLE:
OU2: DEWEY AVE FRONTAGE AREA COMMERCIAL USE EXCEEDANCES

DRAWN BY:	L. LILL	PROJ. NO.:	481220.0000.0000
CHECKED BY:	J. ZIAYA	FIGURE 11	
APPROVED BY:	K. SULLIVAN		
DATE:	DECEMBER 2022		

TRC
10 Maxwell Drive
Clifton Park, NY 12065
Phone: 518-348-1190

FILE: OU2

MW5-8	11/19/2020
Pesticides (ug/kg)	
P,P'-DDE	28
P,P'-DDT	9.7

MW5-14	11/25/2020
Inorganics (mg/kg)	
Nickel	33.1

LEGEND

Soil Sample Locations

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

0 Feet 200

Notes:

1. Only exceedances of NYSDEC Soil SCO Unrestricted criteria are shown.
2. Surface soil sample locations without boxes had no exceedances.

Criteria	NYSDEC Soil SCO Unrestricted Use
Inorganics (mg/kg)	
Nickel	30
VOCs (ug/kg)	
Acetone	50
Pesticides (ug/kg)	
P,P'-DDE	3.3
P,P'-DDT	3.3

MW5-7	11/19/2020
VOCs (ug/kg)	
Acetone	93
Pesticides (ug/kg)	
P,P'-DDE	3.4

Lake Ontario State Parkway

Multi-Use Trail

MW5-16

MW5-9

MW5-15

MW5-13

MW5-12

MW5-11

MW5-10	11/20/2020
Inorganics (mg/kg)	
Nickel	32.7

OU3 SURFACE SOIL SAMPLE EXCEEDANCES

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 12

MW5-8	MW5-8-S9-0
	9'
	11/19/2020
Pesticides (ug/kg)	
P,P'-DDD	5.8
P,P'-DDE	65
P,P'-DDT	19

MW5-16	MW5-16-S14-16-0
	14-16'
	11/30/2020
VOCs (ug/kg)	
Cis-1,2-Dichloroethylene	270
Vinyl Chloride	44

MW5-15	MW5-15-S16-18-0
	16-18'
	11/30/2020
VOCs (ug/kg)	
Cis-1,2-Dichloroethylene	730
Trichloroethylene (TCE)	4800
Vinyl Chloride	35

LEGEND

Soil Sample Locations

OU1 BOUNDARY

OU2 BOUNDARY

OU3 BOUNDARY

0 Feet 200

Notes:

1. Only exceedances of NYSDEC Soil SCO Unrestricted criteria are shown.
2. Subsurface soil sample locations without boxes had no exceedances.

Criteria	NYSDEC Soil SCO Unrestricted Use
VOCs (ug/kg)	
Cis-1,2-Dichloroethylene	250
Trichloroethylene (TCE)	470
Vinyl Chloride	20
Pesticides (ug/kg)	
P,P'-DDD	5.8
P,P'-DDE	65
P,P'-DDT	19

Lake Ontario State Parkway

Multi-Use Trail

MW5-7

MW5-14

MW5-9

MW5-13

MW5-12

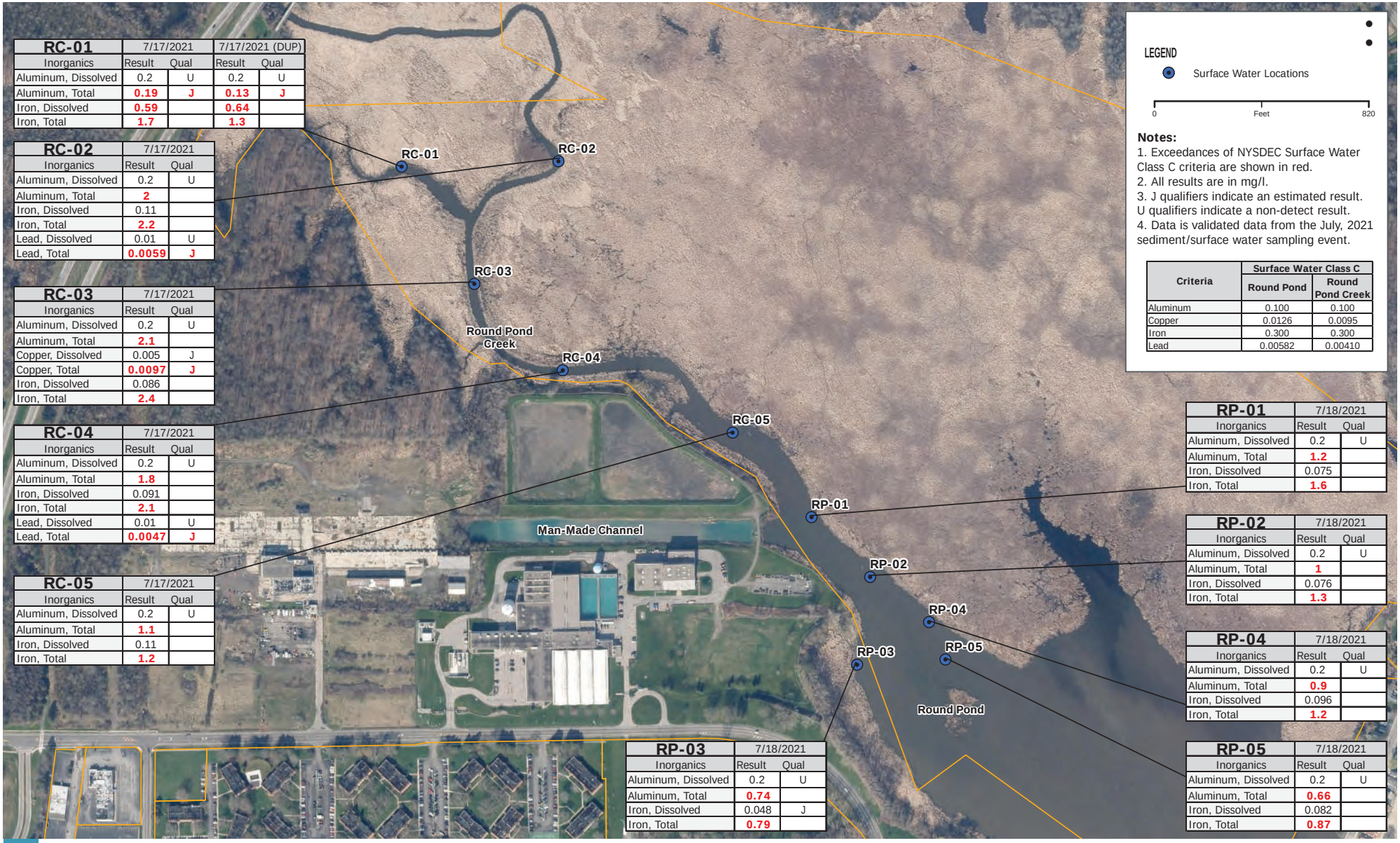
MW5-11

MW5-10

OU3 SUBSURFACE SOIL SAMPLE EXCEEDANCES

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 13



RC-01	7/17/2021		7/17/2021 (DUP)	
Inorganics	Result	Qual	Result	Qual
Aluminum, Dissolved	0.2	U	0.2	U
Aluminum, Total	**0.19**	**J**	**0.13**	**J**
Iron, Dissolved	**0.59**		**0.64**	
Iron, Total	**1.7**		**1.3**	

RC-02	7/17/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**2**	
Iron, Dissolved	0.11	
Iron, Total	**2.2**	
Lead, Dissolved	0.01	U
Lead, Total	**0.0059**	**J**

RC-03	7/17/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**2.1**	
Copper, Dissolved	0.005	J
Copper, Total	**0.0097**	**J**
Iron, Dissolved	0.086	
Iron, Total	**2.4**	

RC-04	7/17/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**1.8**	
Iron, Dissolved	0.091	
Iron, Total	**2.1**	
Lead, Dissolved	0.01	U
Lead, Total	**0.0047**	**J**

RC-05	7/17/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**1.1**	
Iron, Dissolved	0.11	
Iron, Total	**1.2**	

Notes:
1. Exceedances of NYSDEC Surface Water Class C criteria are shown in red.
2. All results are in mg/l.
3. J qualifiers indicate an estimated result. U qualifiers indicate a non-detect result.
4. Data is validated data from the July, 2021 sediment/surface water sampling event.

Criteria	Surface Water Class C	
	Round Pond	Round Pond Creek
Aluminum	0.100	0.100
Copper	0.0126	0.0095
Iron	0.300	0.300
Lead	0.00582	0.00410

RP-01	7/18/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**1.2**	
Iron, Dissolved	0.075	
Iron, Total	**1.6**	

RP-02	7/18/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**1**	
Iron, Dissolved	0.076	
Iron, Total	**1.3**	

RP-03	7/18/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**0.74**	
Iron, Dissolved	0.048	J
Iron, Total	**0.79**	

RP-04	7/18/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**0.9**	
Iron, Dissolved	0.096	
Iron, Total	**1.2**	

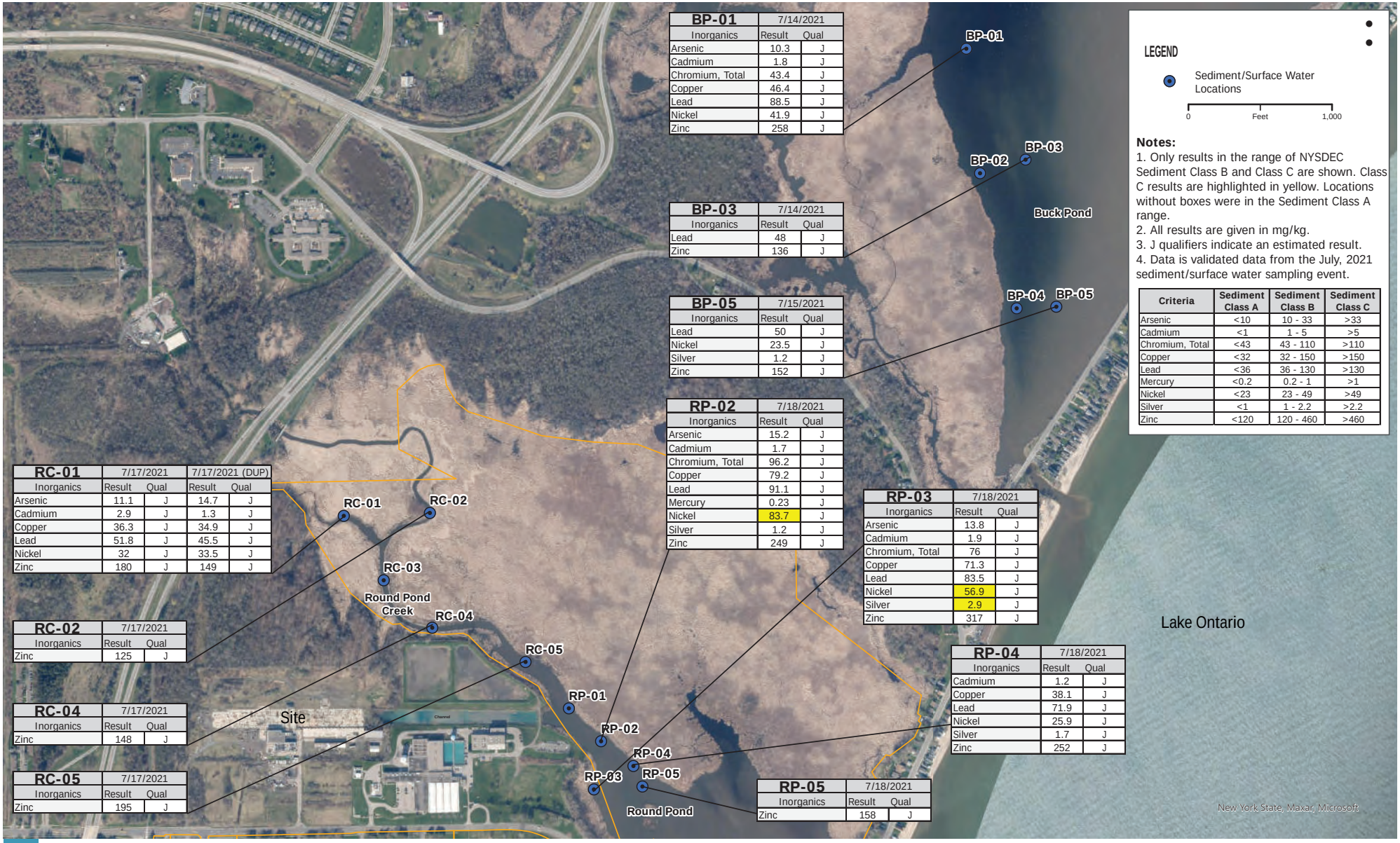
RP-05	7/18/2021	
Inorganics	Result	Qual
Aluminum, Dissolved	0.2	U
Aluminum, Total	**0.66**	
Iron, Dissolved	0.082	
Iron, Total	**0.87**	

HDR

SURFACE WATER EXCEEDANCES

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 14



BP-01	7/14/2021	
Inorganics	Result	Qual
Arsenic	10.3	J
Cadmium	1.8	J
Chromium, Total	43.4	J
Copper	46.4	J
Lead	88.5	J
Nickel	41.9	J
Zinc	258	J

BP-03	7/14/2021	
Inorganics	Result	Qual
Lead	48	J
Zinc	136	J

BP-05	7/15/2021	
Inorganics	Result	Qual
Lead	50	J
Nickel	23.5	J
Silver	1.2	J
Zinc	152	J

RP-02	7/18/2021	
Inorganics	Result	Qual
Arsenic	15.2	J
Cadmium	1.7	J
Chromium, Total	96.2	J
Copper	79.2	J
Lead	91.1	J
Mercury	0.23	J
Nickel	83.7	J
Silver	1.2	J
Zinc	249	J

RC-01	7/17/2021		7/17/2021 (DUP)	
Inorganics	Result	Qual	Result	Qual
Arsenic	11.1	J	14.7	J
Cadmium	2.9	J	1.3	J
Copper	36.3	J	34.9	J
Lead	51.8	J	45.5	J
Nickel	32	J	33.5	J
Zinc	180	J	149	J

RC-02	7/17/2021	
Inorganics	Result	Qual
Zinc	125	J

RC-04	7/17/2021	
Inorganics	Result	Qual
Zinc	148	J

RC-05	7/17/2021	
Inorganics	Result	Qual
Zinc	195	J

RP-03	7/18/2021	
Inorganics	Result	Qual
Arsenic	13.8	J
Cadmium	1.9	J
Chromium, Total	76	J
Copper	71.3	J
Lead	83.5	J
Nickel	56.9	J
Silver	2.9	J
Zinc	317	J

RP-04	7/18/2021	
Inorganics	Result	Qual
Cadmium	1.2	J
Copper	38.1	J
Lead	71.9	J
Nickel	25.9	J
Silver	1.7	J
Zinc	252	J

RP-05	7/18/2021	
Inorganics	Result	Qual
Zinc	158	J

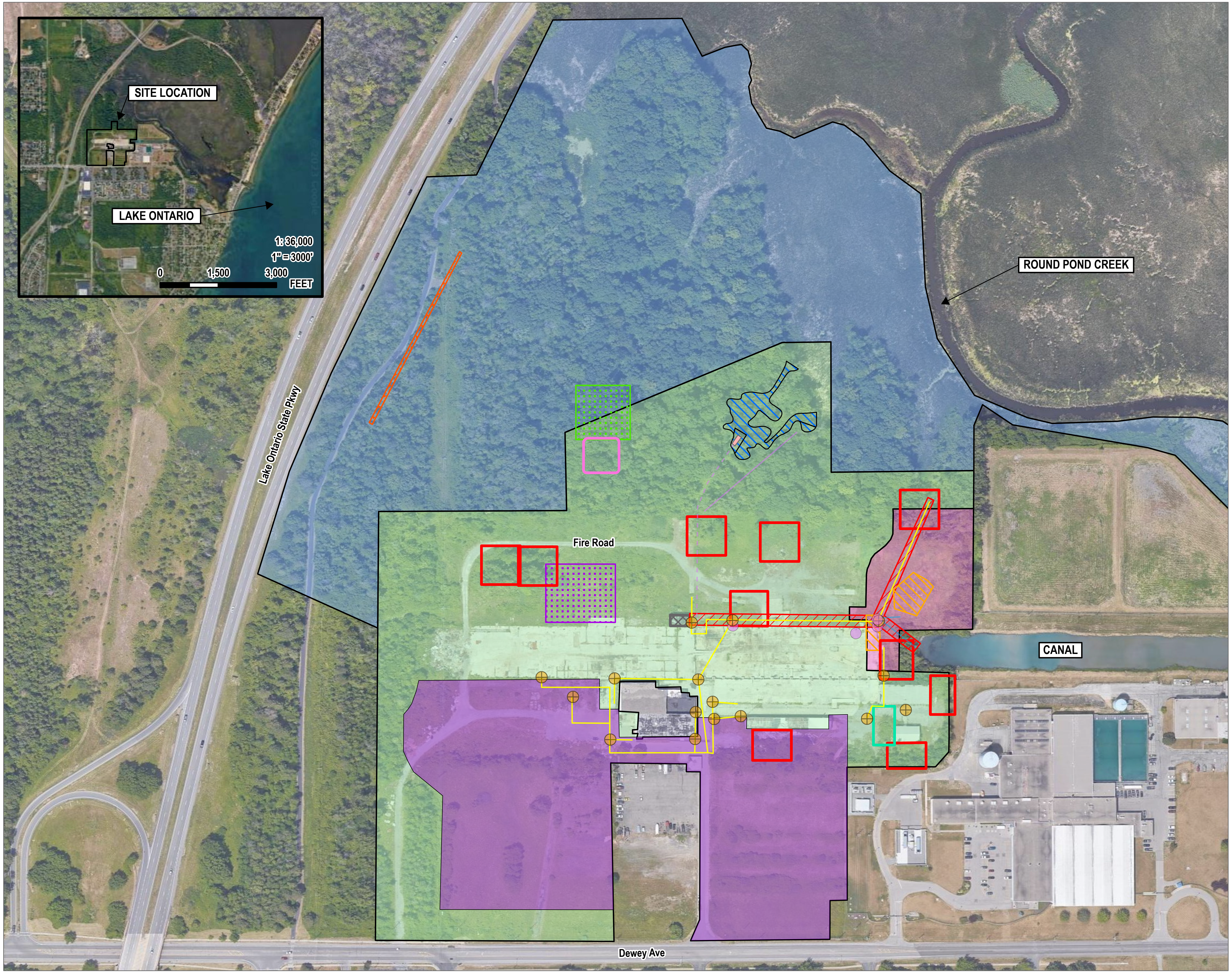
Notes:
1. Only results in the range of NYSDEC Sediment Class B and Class C are shown. Class C results are highlighted in yellow. Locations without boxes were in the Sediment Class A range.
2. All results are given in mg/kg.
3. J qualifiers indicate an estimated result.
4. Data is validated data from the July, 2021 sediment/surface water sampling event.

Criteria	Sediment Class A	Sediment Class B	Sediment Class C
Arsenic	<10	10 - 33	>33
Cadmium	<1	1 - 5	>5
Chromium, Total	<43	43 - 110	>110
Copper	<32	32 - 150	>150
Lead	<36	36 - 130	>130
Mercury	<0.2	0.2 - 1	>1
Nickel	<23	23 - 49	>49
Silver	<1	1 - 2.2	>2.2
Zinc	<120	120 - 460	>460

SEDIMENT SAMPLE RESULTS

FORMER AIR FORCE PLANT NO. 51 OFF-SITE (NYSDEC SITE # 828156)

FIGURE 15



LEGEND

- OU1 BOUNDARY
- OU2 BOUNDARY
- OU3 BOUNDARY
- PROPOSED "COMMON ELEMENTS" FORMER BUILDING NO. 8 REMEDIATION AREA
- PROPOSED "COMMON ELEMENTS" STORMWATER SYSTEM INFRASTRUCTURE EXCAVATION AREA - APPROXIMATELY 8 FEET BELOW GRADE
- PROPOSED "COMMON ELEMENTS" SEPTIC SYSTEM/LEACH FIELD EXCAVATION AREA - UP TO APPROXIMATELY 6 FEET BELOW GRADE
- PROPOSED OU1 EXCAVATION AREA - TO TOP OF BEDROCK APPROXIMATELY 25 - 30 FEET BELOW GRADE
- PROPOSED OU2 SURFICIAL SOIL EXCAVATION AREA - APPROXIMATELY 2 FEET BELOW GRADE
- PROPOSED OU2 SURFICIAL SOIL EXCAVATION AREA - APPROXIMATELY 3 FEET BELOW GRADE
- PROPOSED OU2 SOIL EXCAVATION AREA - TO TOP OF BEDROCK APPROXIMATELY 25 - 30 FEET BELOW GRADE
- PROPOSED OU2 IN SITU TREATMENT AREA
- PROPOSED OU2/OU3 IN SITU TREATMENT AREA
- PROPOSED OU3 PERMEABLE REACTIVE BARRIER
- FORMER SEPTIC TANK/SAND FIILTER
- DEWEY AVENUE FRONTAGE AREA - LIMIT OF SOIL CAP
- HISTORIC SEWER
- EXISTING STORM SEWER
- EXISTING 12" SANITARY PIPE
- EXISTING OUTFALL PIPE (CLAY TILE PIPE)
- EXISTING CATCH BASIN
- EXISTING FLOOR DRAIN

BASE MAP: GOOGLE EARTH IMAGERY
SHEET SIZE: 11X17L

1" = 250'
0 125 250 FEET

N

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER AIR FORCE PLANT NO. 51 - SITE NO. 828156
4777 DEWEY AVENUE
GREECE, NEW YORK 14612

TITLE:
PROPOSED REMEDIAL ACTIONS

DRAWN BY:	L. LILL	PROJ. NO.:	481220.0000.0000
CHECKED BY:	J. ZIAYA	FIGURE 16	
APPROVED BY:	K. SULLIVAN		
DATE:	JULY 2023		

TRC
10 Maxwell Drive
Clifton Park, NY 12065
Phone: 518-348-1190

FILE: PRAP.aprx

Coordinate System: NAD 1983 StatePlane New York West FIPS 3103 Feet; Map Rotation: -90
-- Saved By: LLILL on 7/20/2023, 10:58:01 AM; File Path: T:\1-PROJECTS\NYSDEC\481220_FormerAirForce_PlantNo.51\2-APRX\PRAP\PRAP.aprx; Layout Name: Fig16_RemediationActivities

ATTACHMENT 1

SEFA ANALYSIS OUTPUT – ALTERNATIVE S2 (SOIL)

SOIL EXCAVATION TO UNRESTRICTED USE (OR PROTECTION OF GROUNDWATER) SOIL CLEANUP OBJECTIVES AND OFFSITE DISPOSAL

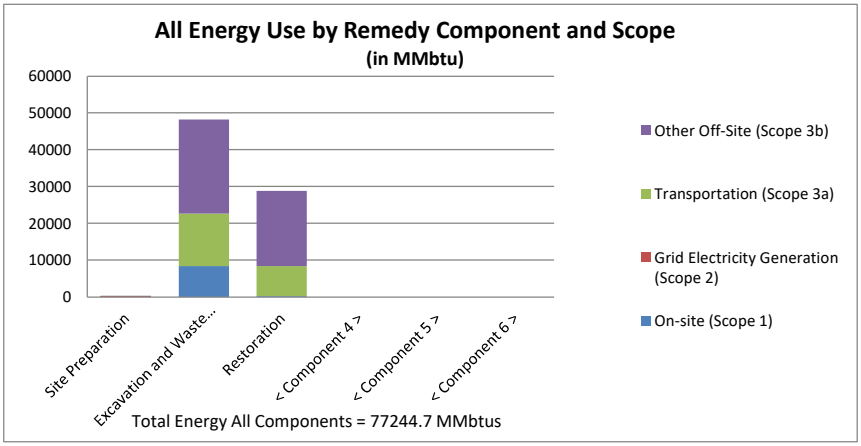
Environmental Footprint Summary

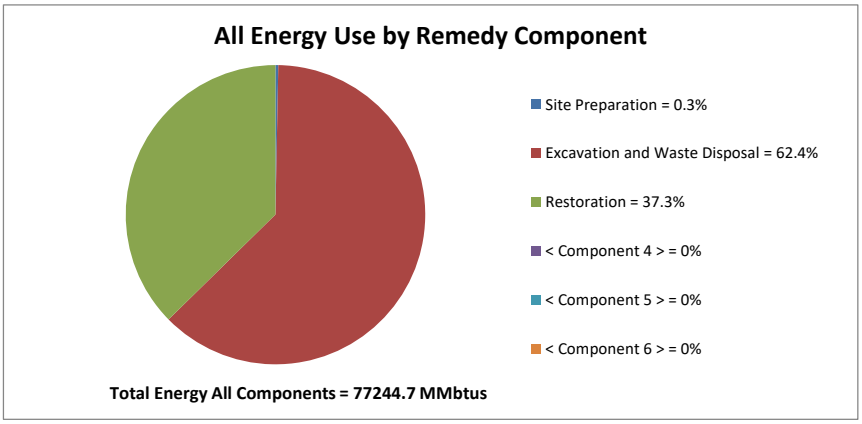
Core Element	Metric		Unit of Measure	Footprint						
				Site Preparation	Excavation and Waste Disposal	Restoration	< Component 4 >	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-2	% of refined materials from recycled or reused material	%							
	M&W-3	Unrefined materials used on-site	Tons	0.0	0.0	141,000.0	0.0	0.0	0.0	141,000.0
	M&W-4	% of unrefined materials from recycled or reused material	%			0.0%				0.0%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	7,050.0	0.0	0.0	0.0	0.0	7,050.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	133,950.0	0.0	0.0	0.0	0.0	133,950.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%		0.0%					0.0%
Water (used on-site)	W-1	Public water use	MG	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	W-2	Groundwater use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-3	Surface water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-4	Reclaimed water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-5	Storm water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-6	Wastewater generated	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	230.6	48,168.4	28,845.8	0.0	0.0	0.0	77,244.7
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	17.1	0.0	0.0	0.0	0.0	0.0	17.1
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	4.4	6,656.2	218.9	0.0	0.0	0.0	6,879.5
	A-2	On-site HAP emissions	Pounds	0.0	2.4	0.0	0.0	0.0	0.0	2.4
	A-3	Total NOx, SOx, and PM emissions	Pounds	225.0	114,832.0	27,429.8	0.0	0.0	0.0	142,486.7
	A-3A	Total NOx emissions	Pounds	58.1	44,338.4	19,907.9	0.0	0.0	0.0	64,304.4
	A-3B	Total SOx emissions	Pounds	165.1	12,583.8	6,265.6	0.0	0.0	0.0	19,014.5
	A-3C	Total PM emissions	Pounds	1.7	57,909.8	1,256.3	0.0	0.0	0.0	59,167.8
	A-4	Total HAP emissions	Pounds	4.0	423.0	153.3	0.0	0.0	0.0	580.4
	A-5	Total greenhouse gas emissions	Tons CO2e*	12.7	3,845.6	2,180.4	0.0	0.0	0.0	6,038.8
Land & Ecosystems	Qualitative Description									

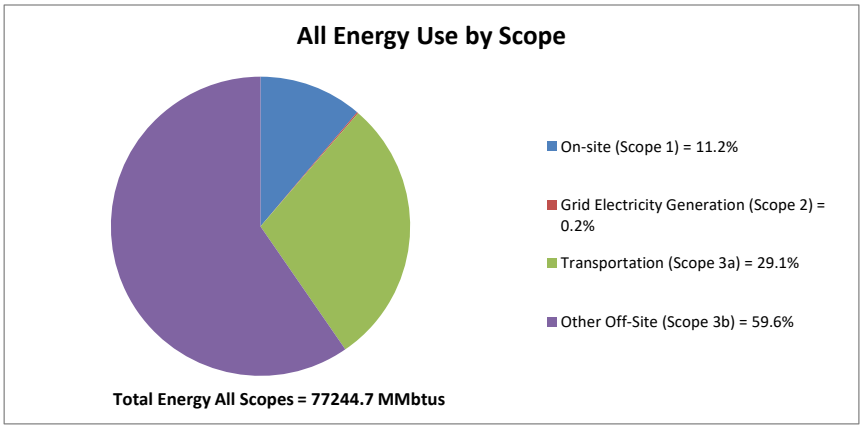
** Total greenhouse gases emissions (in CO2e) include CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)
"HAP" = hazardous air pollutants
"PM" = particulate matter
"NOx" = nitrogen oxides
"SOx" = sulfur oxides
"CO2" = carbon dioxide
"CH4" = methane
"N2O" = nitrous oxide

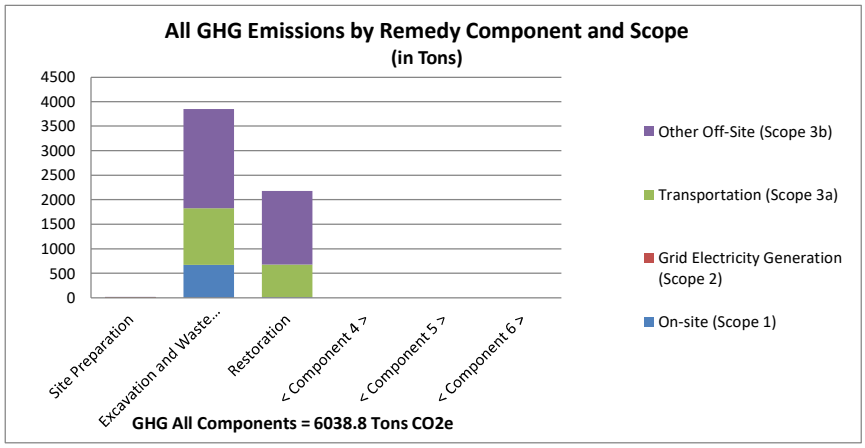
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

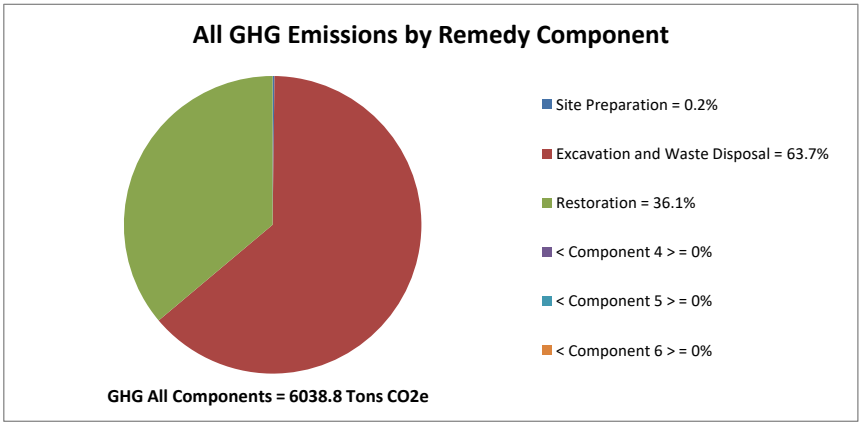
Notes: Components 4, 5, and 6 not used in estimate.

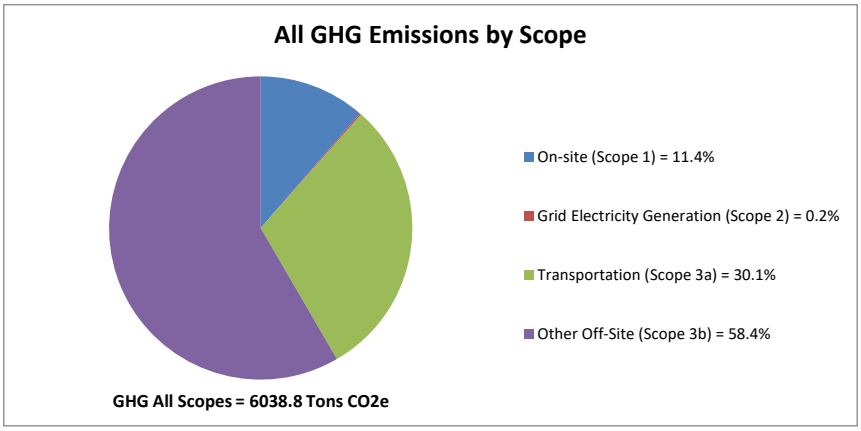

All Energy Use by Remedy Component and Scope
(in MMbtu)
60000
50000
40000
30000
20000
10000
0
Site Preparation
Excavation and Waste...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 77244.7 MMbtus

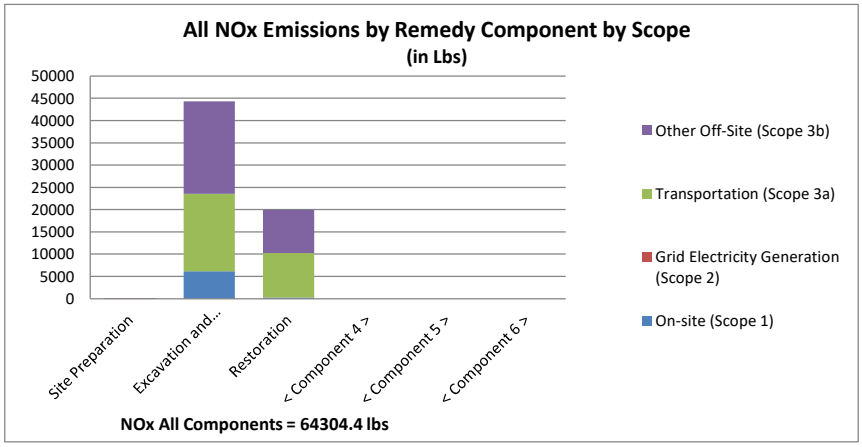

All Energy Use by Remedy Component
Site Preparation = 0.3%
Excavation and Waste Disposal = 62.4%
Restoration = 37.3%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
Total Energy All Components = 77244.7 MMbtus

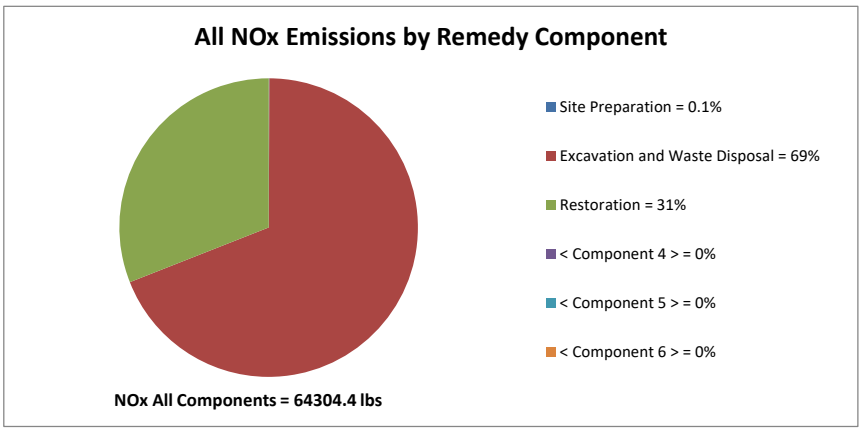

All Energy Use by Scope
On-site (Scope 1) = 11.2%
Grid Electricity Generation (Scope 2) = 0.2%
Transportation (Scope 3a) = 29.1%
Other Off-Site (Scope 3b) = 59.6%
Total Energy All Scopes = 77244.7 MMbtus

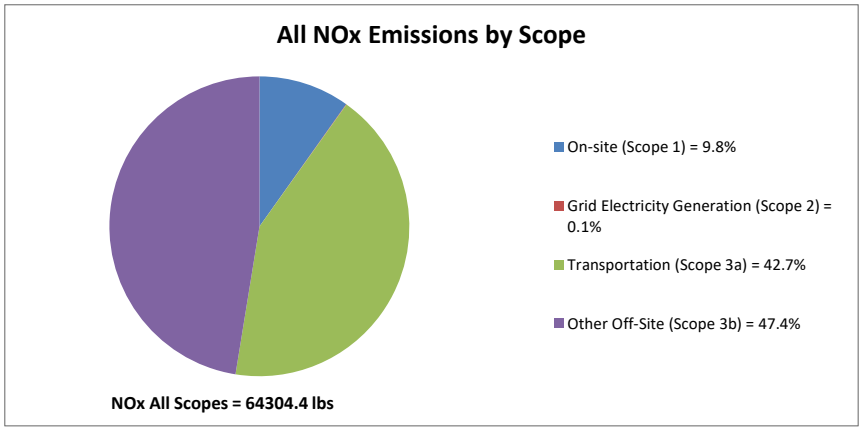

All GHG Emissions by Remedy Component and Scope
(in Tons)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Site Preparation
Excavation and Waste...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 6038.8 Tons CO2e

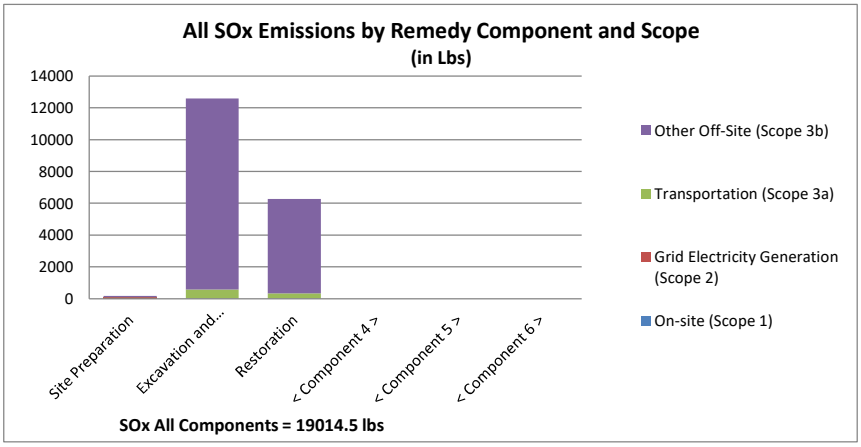

All GHG Emissions by Remedy Component
Site Preparation = 0.2%
Excavation and Waste Disposal = 63.7%
Restoration = 36.1%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
GHG All Components = 6038.8 Tons CO2e

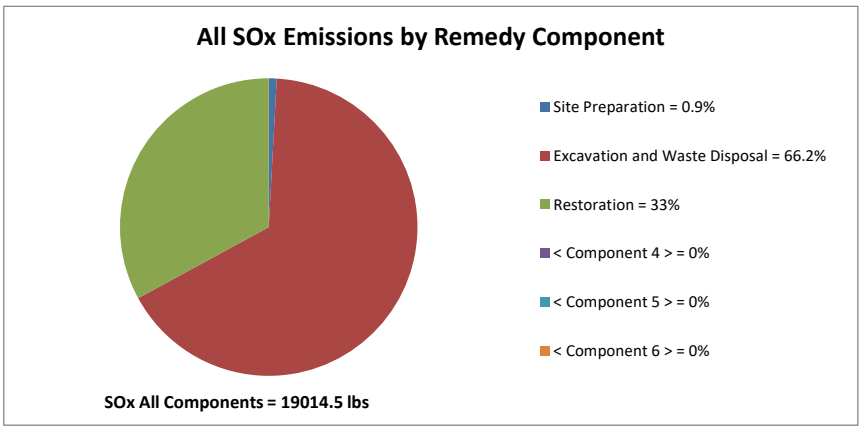

All GHG Emissions by Scope
On-site (Scope 1) = 11.4%
Grid Electricity Generation (Scope 2) = 0.2%
Transportation (Scope 3a) = 30.1%
Other Off-Site (Scope 3b) = 58.4%
GHG All Scopes = 6038.8 Tons CO2e

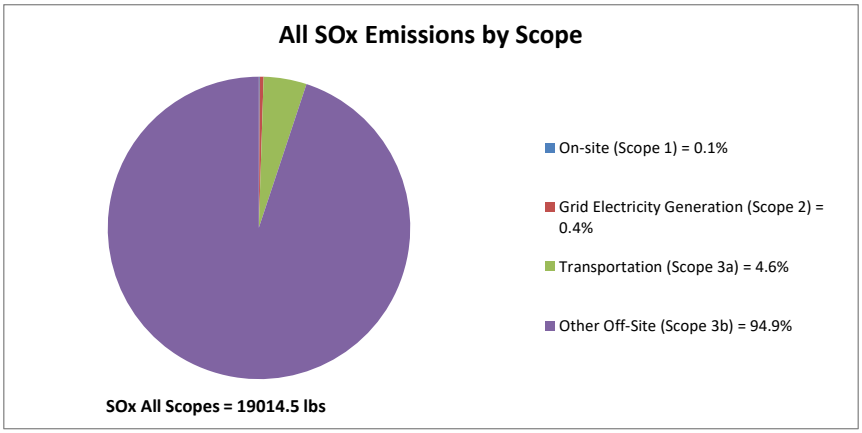

All NOx Emissions by Remedy Component by Scope
(in Lbs)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Site Preparation
Excavation and...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 64304.4 lbs

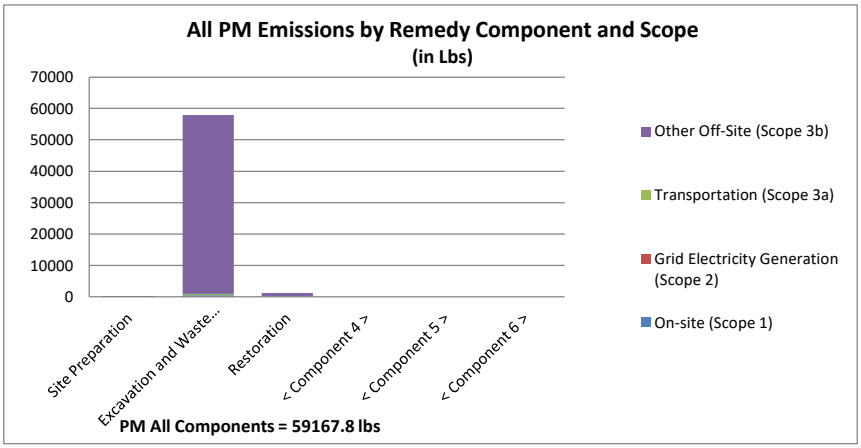

All NOx Emissions by Remedy Component
Site Preparation = 0.1%
Excavation and Waste Disposal = 69%
Restoration = 31%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
NOx All Components = 64304.4 lbs

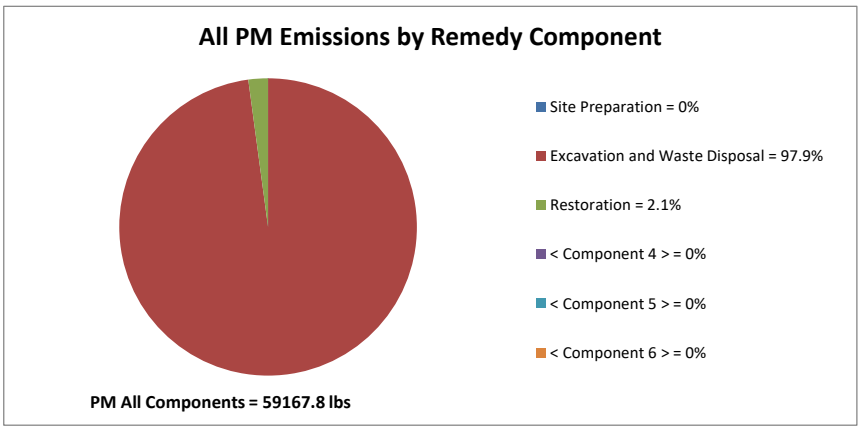

All NOx Emissions by Scope
On-site (Scope 1) = 9.8%
Grid Electricity Generation (Scope 2) = 0.1%
Transportation (Scope 3a) = 42.7%
Other Off-Site (Scope 3b) = 47.4%
NOx All Scopes = 64304.4 lbs

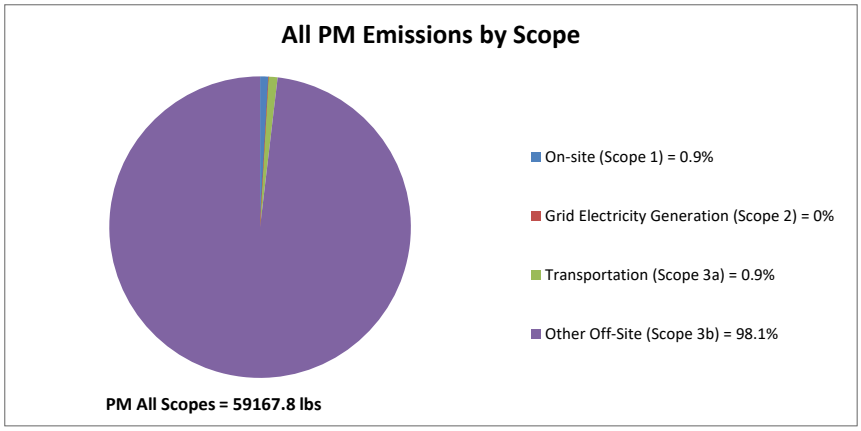

All SOx Emissions by Remedy Component and Scope
(in Lbs)
14000
12000
10000
8000
6000
4000
2000
0
Site Preparation
Excavation and...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 19014.5 lbs

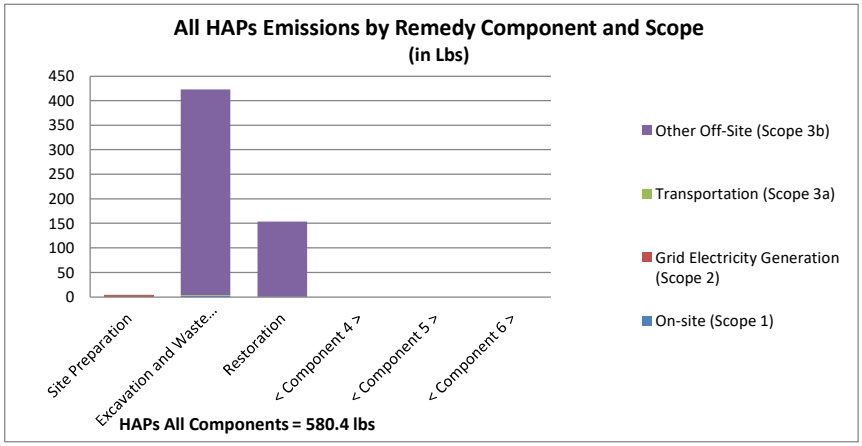

All SOx Emissions by Remedy Component
Site Preparation = 0.9%
Excavation and Waste Disposal = 66.2%
Restoration = 33%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
SOx All Components = 19014.5 lbs

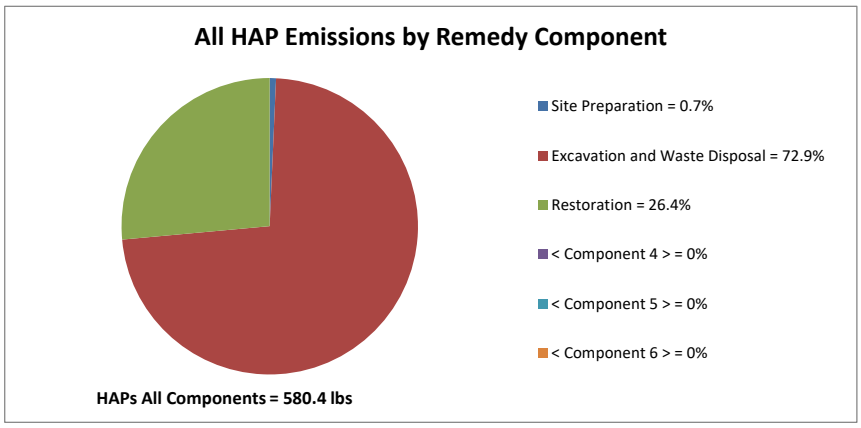

All SOx Emissions by Scope
On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0.4%
Transportation (Scope 3a) = 4.6%
Other Off-Site (Scope 3b) = 94.9%
SOx All Scopes = 19014.5 lbs

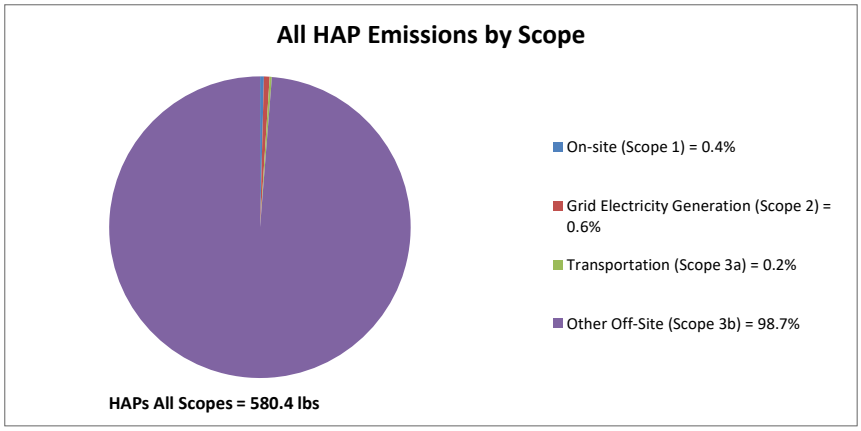

All PM Emissions by Remedy Component and Scope
(in Lbs)
70000
60000
50000
40000
30000
20000
10000
0
Site Preparation
Excavation and Waste...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 59167.8 lbs


All PM Emissions by Remedy Component
Site Preparation = 0%
Excavation and Waste Disposal = 97.9%
Restoration = 2.1%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
PM All Components = 59167.8 lbs


All PM Emissions by Scope
On-site (Scope 1) = 0.9%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.9%
Other Off-Site (Scope 3b) = 98.1%
PM All Scopes = 59167.8 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
450
400
350
300
250
200
150
100
50
0
Site Preparation
Excavation and Waste...
Restoration
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 580.4 lbs


All HAP Emissions by Remedy Component
Site Preparation = 0.7%
Excavation and Waste Disposal = 72.9%
Restoration = 26.4%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
HAPs All Components = 580.4 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0.4%
Grid Electricity Generation (Scope 2) = 0.6%
Transportation (Scope 3a) = 0.2%
Other Off-Site (Scope 3b) = 98.7%
HAPs All Scopes = 580.4 lbs

ATTACHMENT 2

SEFA ANALYSIS OUTPUT – ALTERNATIVE S3 (SOIL)

SOIL EXCAVATION TO COMMERCIAL USE SOIL CLEANUP OBJECTIVES, OFFSITE DISPOSAL, SOIL COVER, AND INSTITUTIONAL CONTROLS

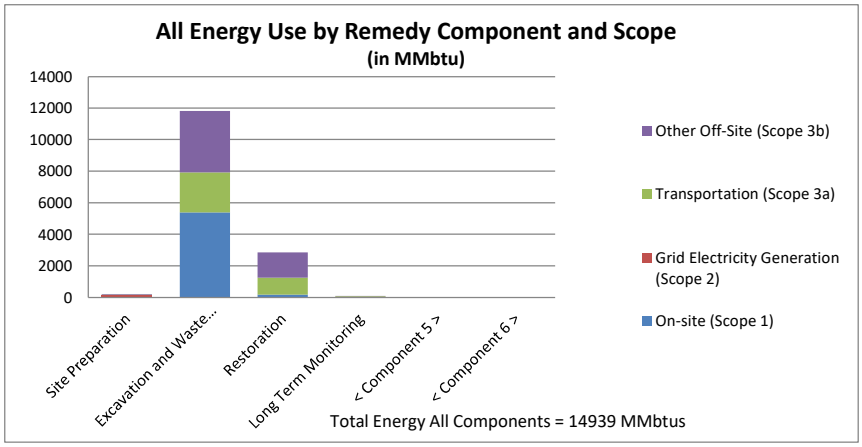
Environmental Footprint Summary

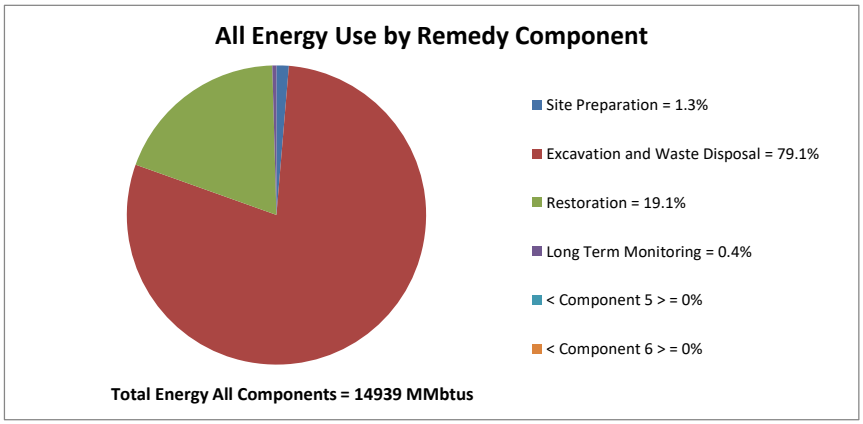
Core Element		Metric	Unit of Measure	Footprint						
				Site Preparation	Excavation and Waste Disposal	Restoration	Long Term Monitoring	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-2	% of refined materials from recycled or reused material	%							
	M&W-3	Unrefined materials used on-site	Tons	0.0	0.0	18,022.0	0.0	0.0	0.0	18,022.0
	M&W-4	% of unrefined materials from recycled or reused material	%			0.0				0.0%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	2,002.5	0.0	0.0	0.0	0.0	2,002.5
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	16,020.0	0.0	0.0	0.0	0.0	16,020.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%		0.0%					0.0%
Water (used on-site)	W-1	Public water use	MG	0.01	0.00	0.00	0.00	0.00	0.00	0.06
	W-2	Groundwater use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-3	Surface water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-4	Reclaimed water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-5	Storm water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-6	Wastewater generated	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	198.0	11,823.7	2,852.2	65.1	0.0	0.0	14,939.0
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	14.6	0.0	0.0	0.0	0.0	0.0	14.6
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	4.4	4,260.0	218.9	0.0	0.0	0.0	4,483.2
	A-2	On-site HAP emissions	Pounds	0.0	1.5	0.0	0.0	0.0	0.0	1.6
	A-3	Total NOx, SOx, and PM emissions	Pounds	193.4	19,694.4	3,009.2	32.8	0.0	0.0	22,929.8
	A-3A	Total NOx emissions	Pounds	51.0	9,900.8	2,396.4	26.5	0.0	0.0	12,374.8
	A-3B	Total SOx emissions	Pounds	140.8	1,974.4	463.5	2.7	0.0	0.0	2,581.5
	A-3C	Total PM emissions	Pounds	1.5	7,819.2	149.3	3.6	0.0	0.0	7,973.6
	A-4	Total HAP emissions	Pounds	3.5	106.6	21.0	1.5	0.0	0.0	132.6
	A-5	Total greenhouse gas emissions	Tons CO2e*	11.0	950.4	206.0	5.3	0.0	0.0	1,172.6
Land & Ecosystems		Qualitative Description								

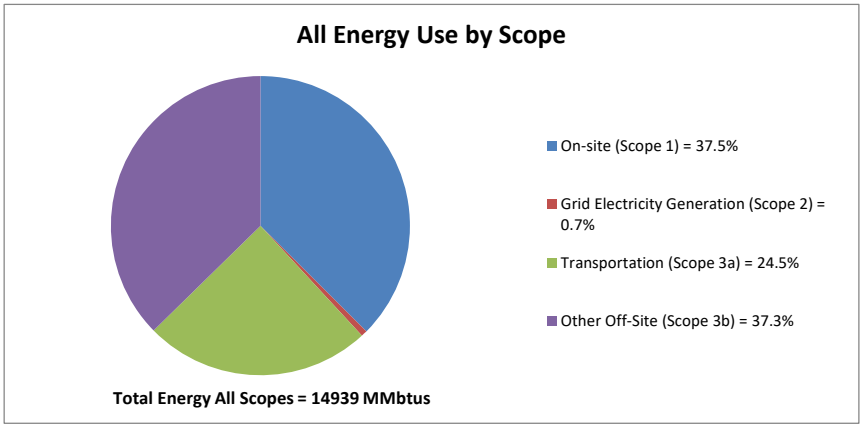
** Total greenhouse gases emissions (in CO2e) include CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)
"HAP" = hazardous air pollutants
"PM" = particulate matter
"NOx" = nitrogen oxides
"SOx" = sulfur oxides
"CO2" = carbon dioxide
"CH4" = methane
"N2O" = nitrous oxide

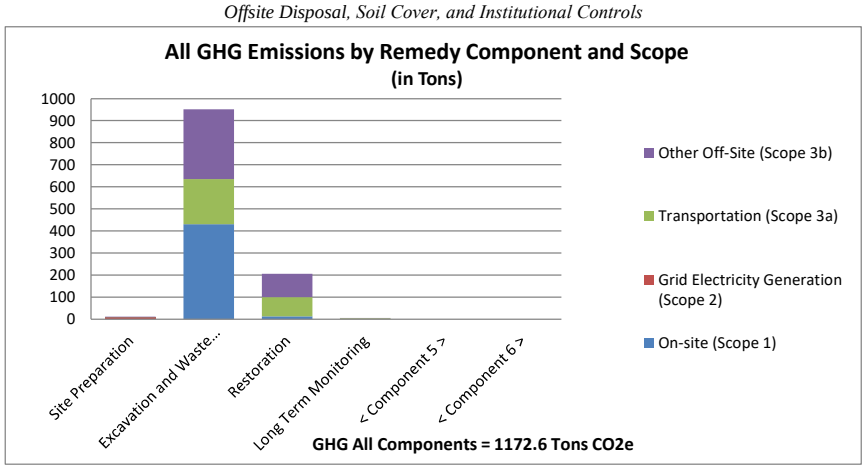
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

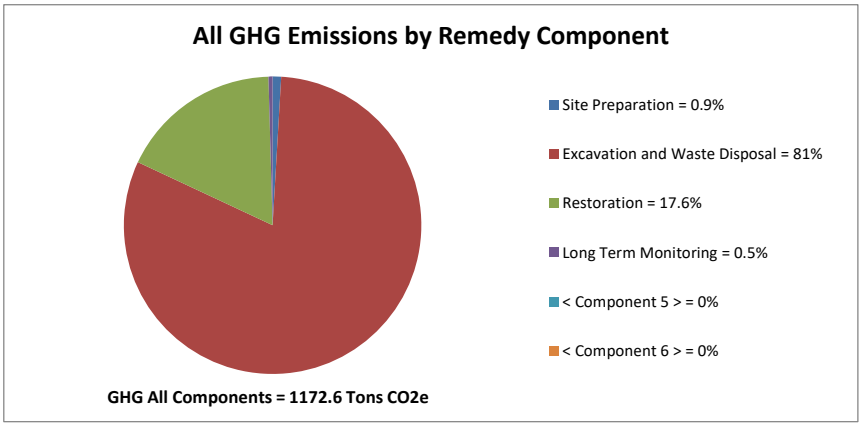
Notes: Components 5 and 6 were not used in this estimate.

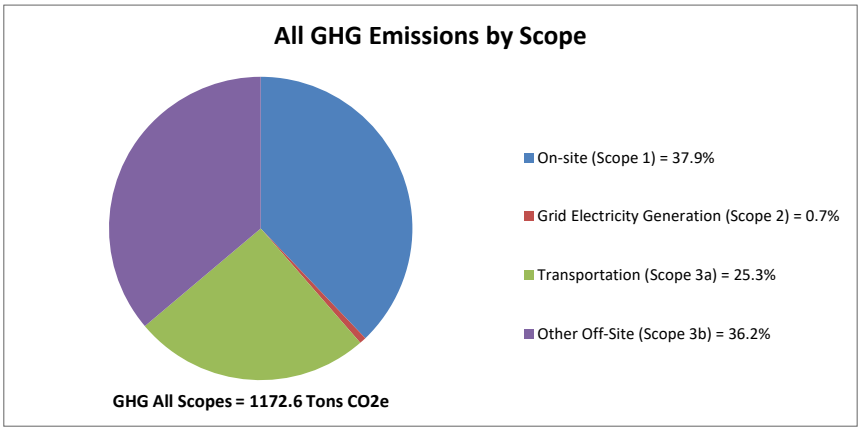

All Energy Use by Remedy Component and Scope
(in MMbtu)
14000
12000
10000
8000
6000
4000
2000
0
Site Preparation
Excavation and Waste...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 14939 MMbtus

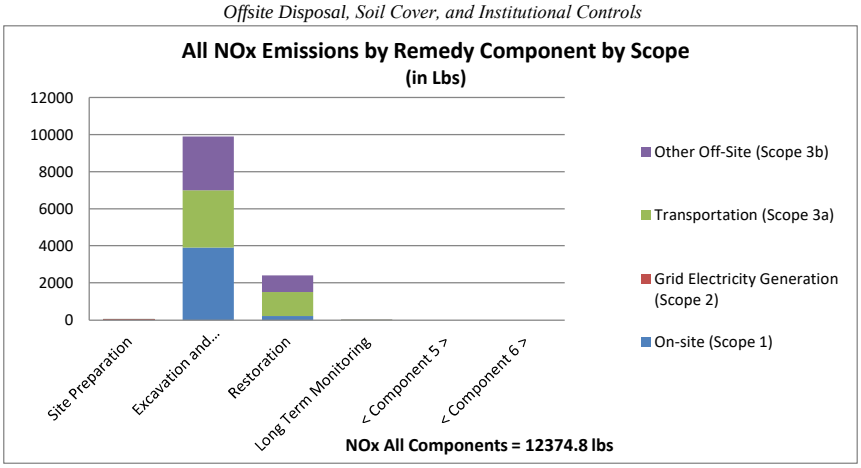

All Energy Use by Remedy Component
Site Preparation = 1.3%
Excavation and Waste Disposal = 79.1%
Restoration = 19.1%
Long Term Monitoring = 0.4%
< Component 5 > = 0%
< Component 6 > = 0%
Total Energy All Components = 14939 MMbtus

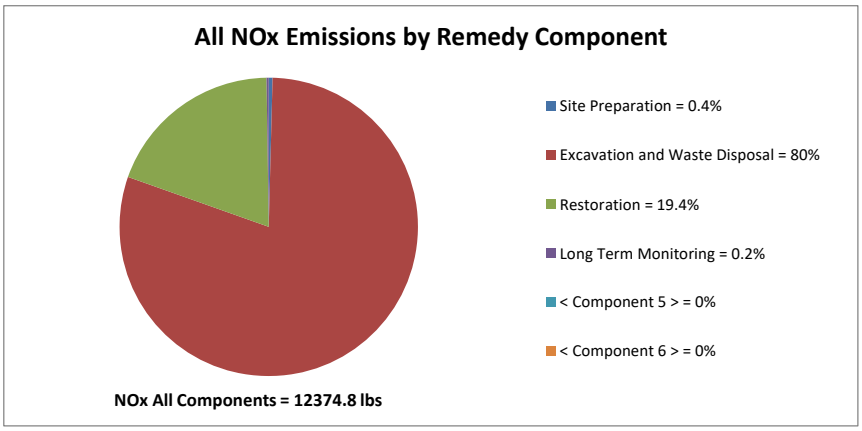

All Energy Use by Scope
On-site (Scope 1) = 37.5%
Grid Electricity Generation (Scope 2) = 0.7%
Transportation (Scope 3a) = 24.5%
Other Off-Site (Scope 3b) = 37.3%
Total Energy All Scopes = 14939 MMbtus

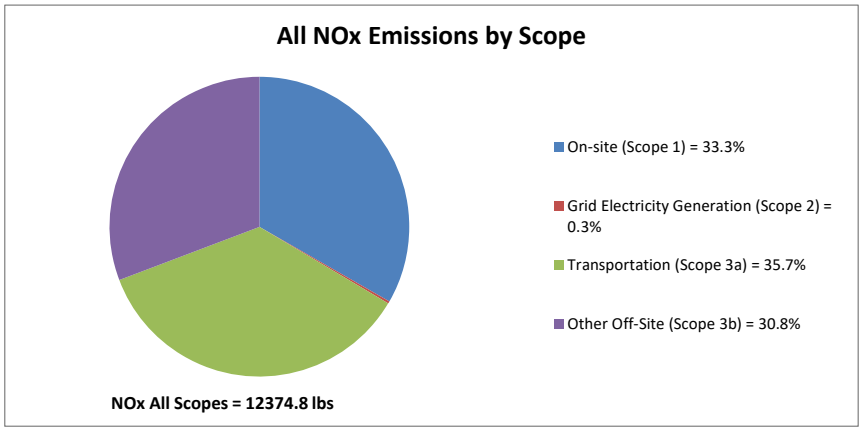

All GHG Emissions by Remedy Component and Scope
(in Tons)
1000
900
800
700
600
500
400
300
200
100
0
Site Preparation
Excavation and Waste...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 1172.6 Tons CO2e

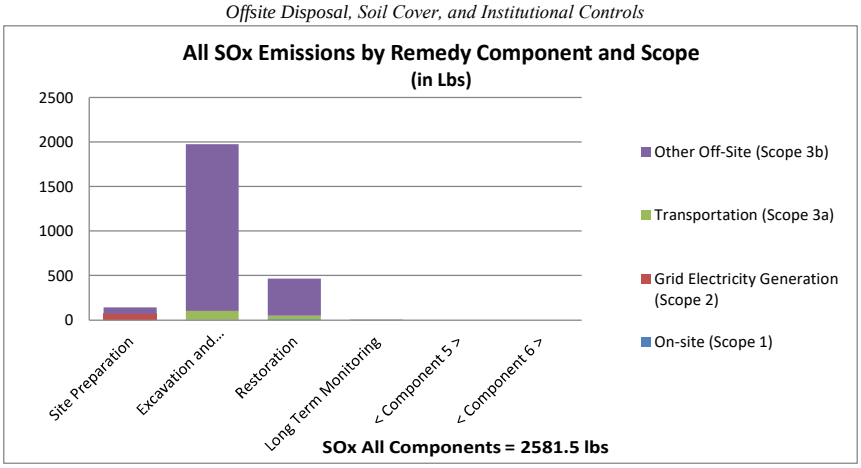

All GHG Emissions by Remedy Component
Site Preparation = 0.9%
Excavation and Waste Disposal = 81%
Restoration = 17.6%
Long Term Monitoring = 0.5%
< Component 5 > = 0%
< Component 6 > = 0%
GHG All Components = 1172.6 Tons CO2e

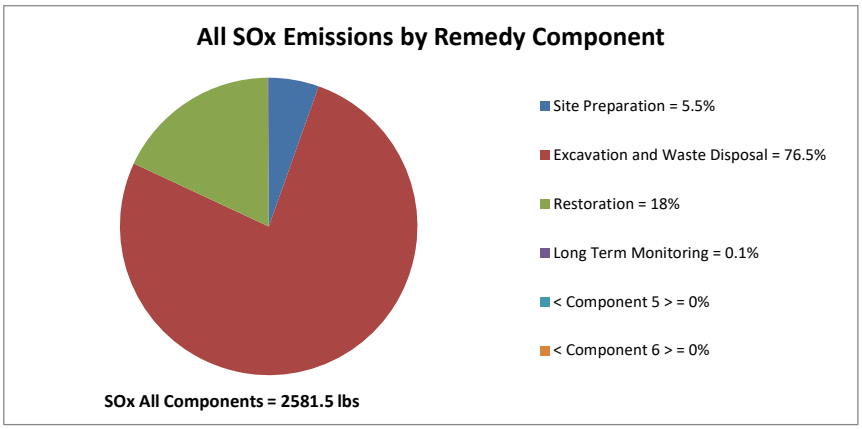

All GHG Emissions by Scope
On-site (Scope 1) = 37.9%
Grid Electricity Generation (Scope 2) = 0.7%
Transportation (Scope 3a) = 25.3%
Other Off-Site (Scope 3b) = 36.2%
GHG All Scopes = 1172.6 Tons CO2e

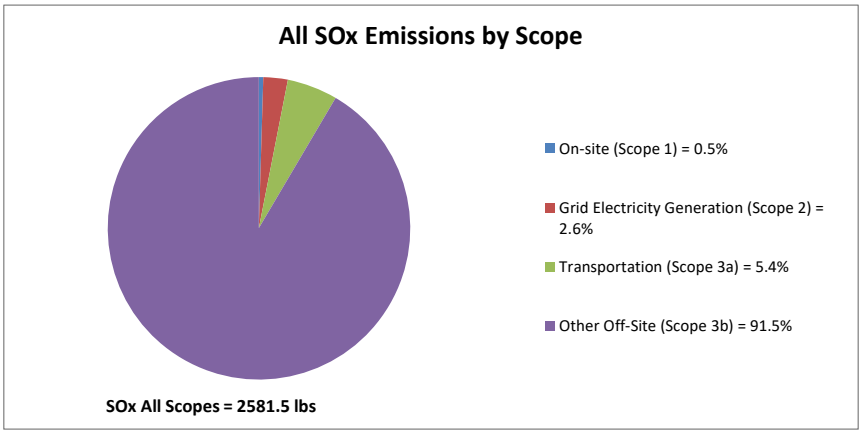

All NOx Emissions by Remedy Component by Scope
(in Lbs)
12000
10000
8000
6000
4000
2000
0
Site Preparation
Excavation and...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 12374.8 lbs

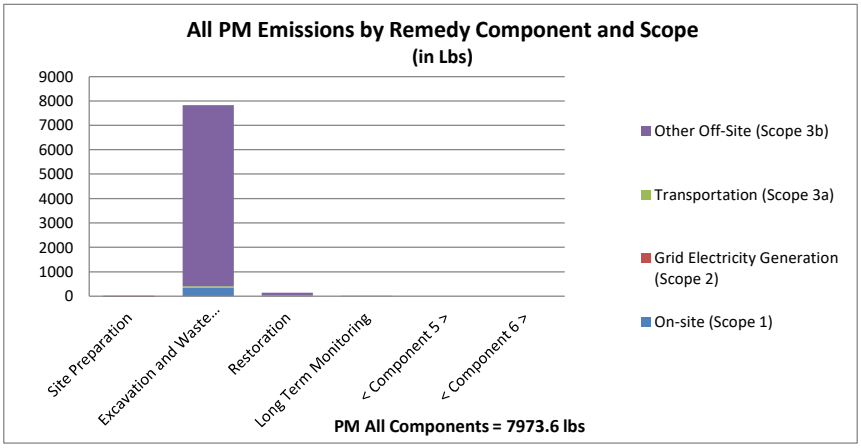

All NOx Emissions by Remedy Component
Site Preparation = 0.4%
Excavation and Waste Disposal = 80%
Restoration = 19.4%
Long Term Monitoring = 0.2%
< Component 5 > = 0%
< Component 6 > = 0%
NOx All Components = 12374.8 lbs

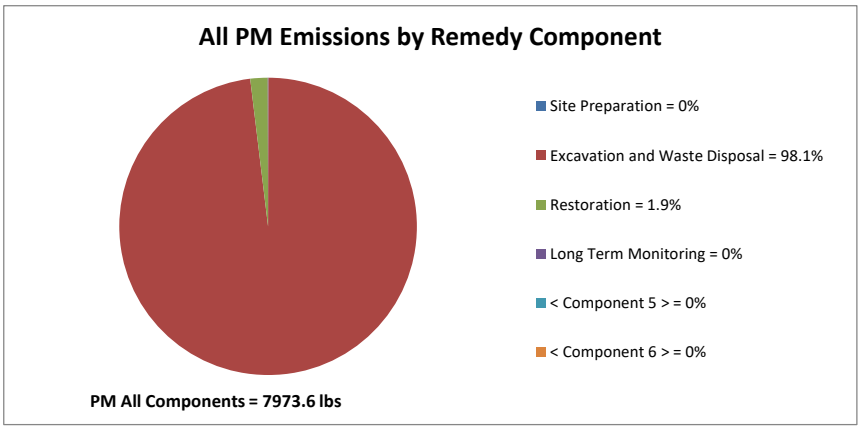

All NOx Emissions by Scope
On-site (Scope 1) = 33.3%
Grid Electricity Generation (Scope 2) = 0.3%
Transportation (Scope 3a) = 35.7%
Other Off-Site (Scope 3b) = 30.8%
NOx All Scopes = 12374.8 lbs

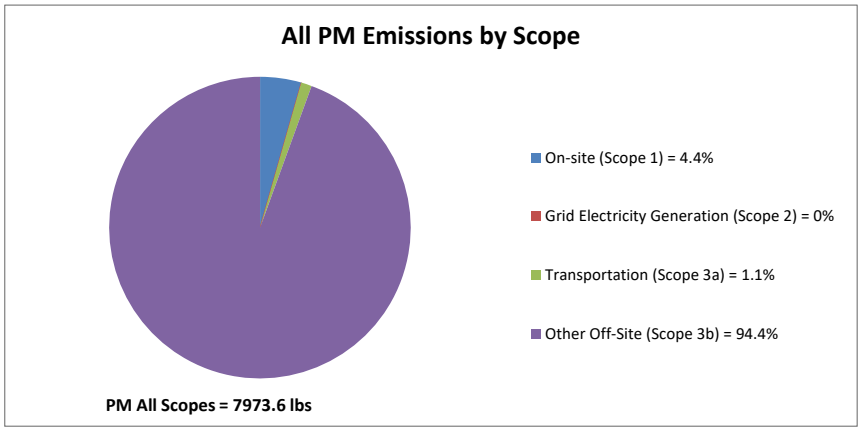

All SOx Emissions by Remedy Component and Scope
(in Lbs)
2500
2000
1500
1000
500
0
Site Preparation
Excavation and...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 2581.5 lbs

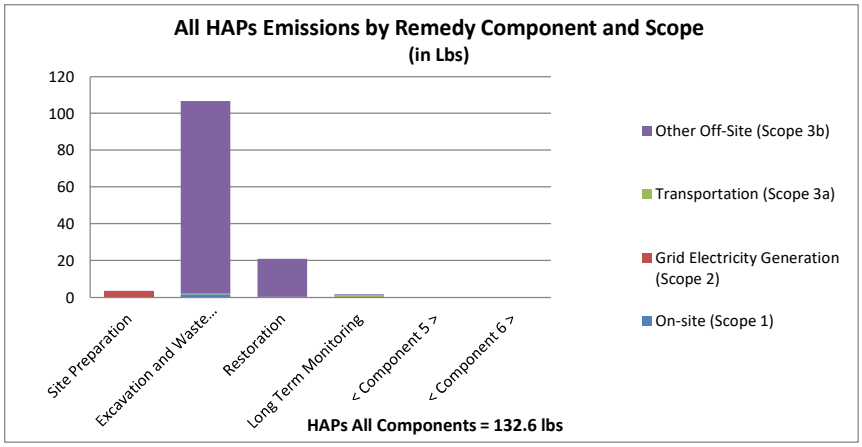

All SOx Emissions by Remedy Component
Site Preparation = 5.5%
Excavation and Waste Disposal = 76.5%
Restoration = 18%
Long Term Monitoring = 0.1%
< Component 5 > = 0%
< Component 6 > = 0%
SOx All Components = 2581.5 lbs

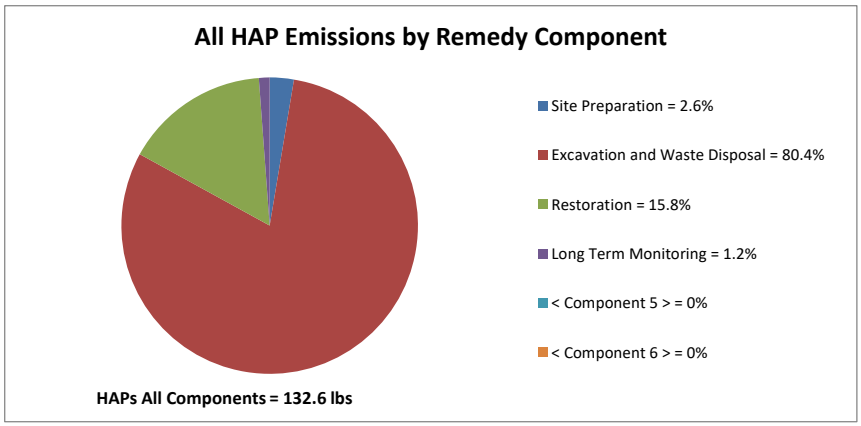

All SOx Emissions by Scope
On-site (Scope 1) = 0.5%
Grid Electricity Generation (Scope 2) = 2.6%
Transportation (Scope 3a) = 5.4%
Other Off-Site (Scope 3b) = 91.5%
SOx All Scopes = 2581.5 lbs

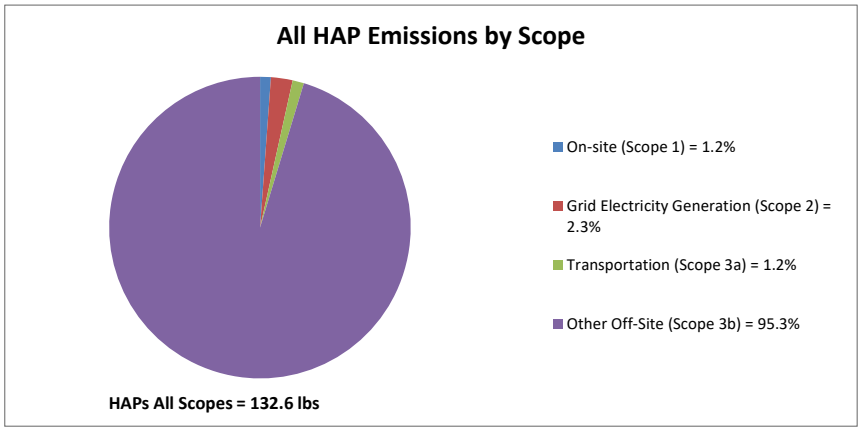

All PM Emissions by Remedy Component and Scope
(in Lbs)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Site Preparation
Excavation and Waste...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 7973.6 lbs


All PM Emissions by Remedy Component
Site Preparation = 0%
Excavation and Waste Disposal = 98.1%
Restoration = 1.9%
Long Term Monitoring = 0%
< Component 5 > = 0%
< Component 6 > = 0%
PM All Components = 7973.6 lbs


All PM Emissions by Scope
On-site (Scope 1) = 4.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.1%
Other Off-Site (Scope 3b) = 94.4%
PM All Scopes = 7973.6 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
120
100
80
60
40
20
0
Site Preparation
Excavation and Waste...
Restoration
Long Term Monitoring
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 132.6 lbs


All HAP Emissions by Remedy Component
Site Preparation = 2.6%
Excavation and Waste Disposal = 80.4%
Restoration = 15.8%
Long Term Monitoring = 1.2%
< Component 5 > = 0%
< Component 6 > = 0%
HAPs All Components = 132.6 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 1.2%
Grid Electricity Generation (Scope 2) = 2.3%
Transportation (Scope 3a) = 1.2%
Other Off-Site (Scope 3b) = 95.3%
HAPs All Scopes = 132.6 lbs

ATTACHMENT 3

SEFA ANALYSIS OUTPUT – ALTERNATIVE G2 (GROUNDWATER)

IN-SITU TREATMENT AND PERMEABLE REACTIVE BARRIER

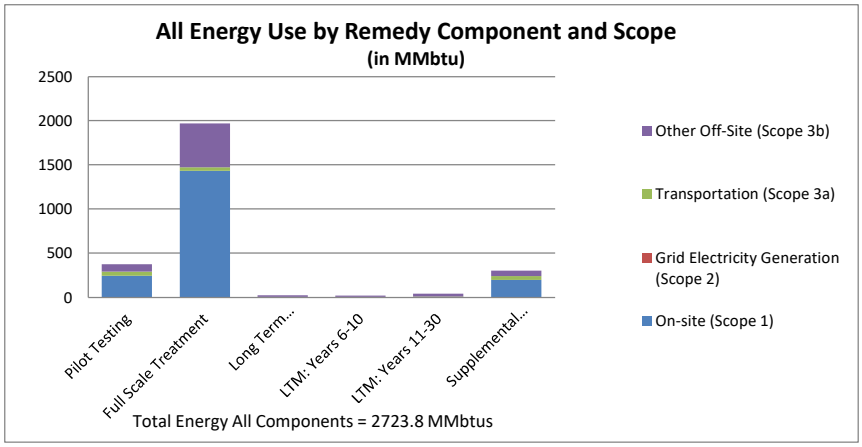
Environmental Footprint Summary

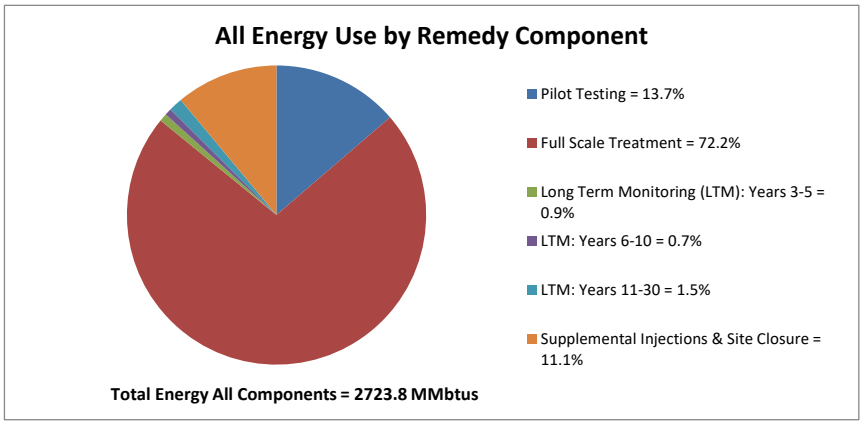
Core Element	Metric		Unit of Measure	Footprint						
				Pilot Testing	Full Scale Treatment	Long Term Monitoring (LTM): Years 3-5	LTM: Years 6-10	LTM: Years 11-30	Supplemental Injections & Site Closure	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	6.2	63.7	0.0	0.0	0.0	6.3	76.2
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	M&W-3	Unrefined materials used on-site	Tons	1.0	0.0	0.0	0.0	0.0	0.0	1.0
	M&W-4	% of unrefined materials from recycled or reused material	%	0.0%						0.0%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	3.3	3.3	0.0	0.0	0.0	0.0	6.6
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%	0.0%					0.0%
Water (used on-site)	W-1	Public water use	MG	0.02	0.17	0.00	0.00	0.00	0.17	0.36
	W-2	Groundwater use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-3	Surface water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-4	Reclaimed water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-5	Storm water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-6	Wastewater generated	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	372.9	1,966.8	23.2	19.5	40.2	301.2	2,723.8
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	312.2	1,843.9	0.0	0.0	0.0	251.0	2,407.1
	A-2	On-site HAP emissions	Pounds	0.0	0.1	0.0	0.0	0.0	0.0	0.1
	A-3	Total NOx, SOx, and PM emissions	Pounds	609.1	2,772.6	81.2	67.7	135.5	457.6	4,123.7
	A-3A	Total NOx emissions	Pounds	421.6	2,068.7	24.3	20.3	40.5	335.0	2,910.5
	A-3B	Total SOx emissions	Pounds	154.5	561.2	49.3	41.1	82.4	98.2	986.9
	A-3C	Total PM emissions	Pounds	33.0	142.7	7.5	6.3	12.5	24.3	226.3
	A-4	Total HAP emissions	Pounds	13.8	17.4	5.4	4.5	9.0	7.7	57.8
	A-5	Total greenhouse gas emissions	Tons CO2e*	33.6	202.8	1.4	1.2	2.4	28.4	269.9
Land & Ecosystems	Qualitative Description									

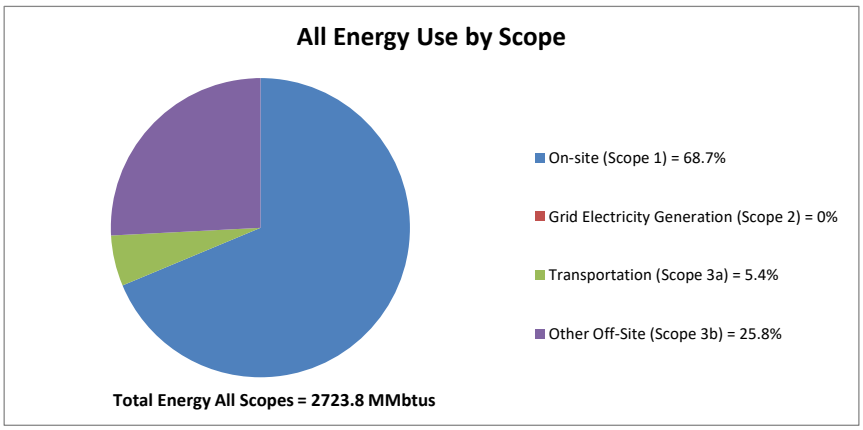
** Total greenhouse gases emissions (in CO2e) include CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)
"HAP" = hazardous air pollutants
"PM" = particulate matter
"NOx" = nitrogen oxides
"SOx" = sulfur oxides
"CO2" = carbon dioxide
"CH4" = methane
"N2O" = nitrous oxide

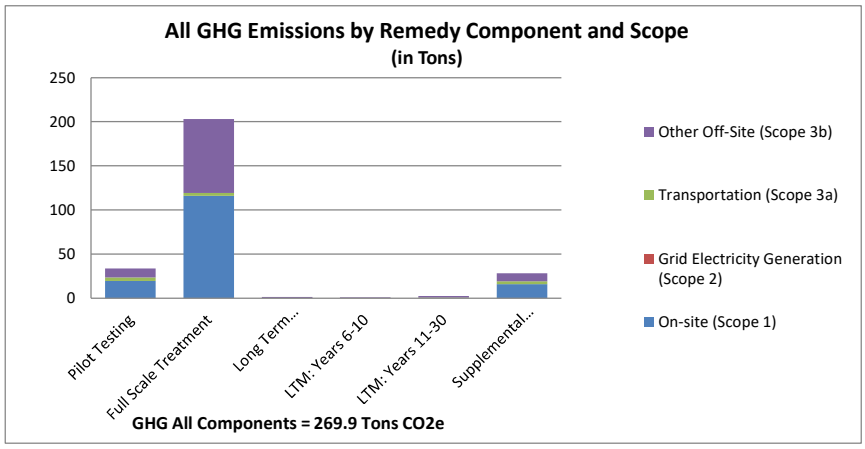
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

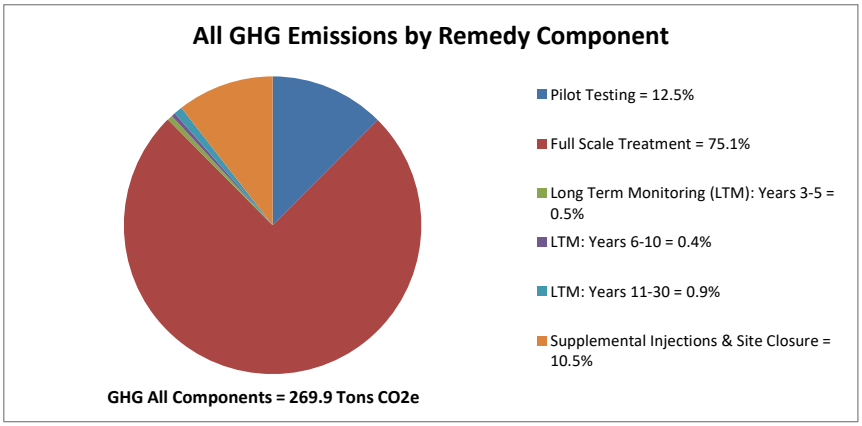
Notes:

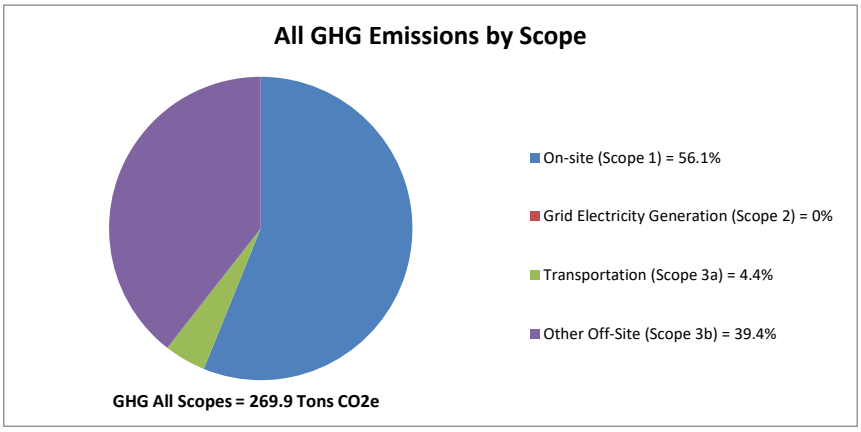

All Energy Use by Remedy Component and Scope
(in MMbtu)
2500
2000
1500
1000
500
0
Pilot Testing
Full Scale Treatment
Long Term...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 2723.8 MMbtus

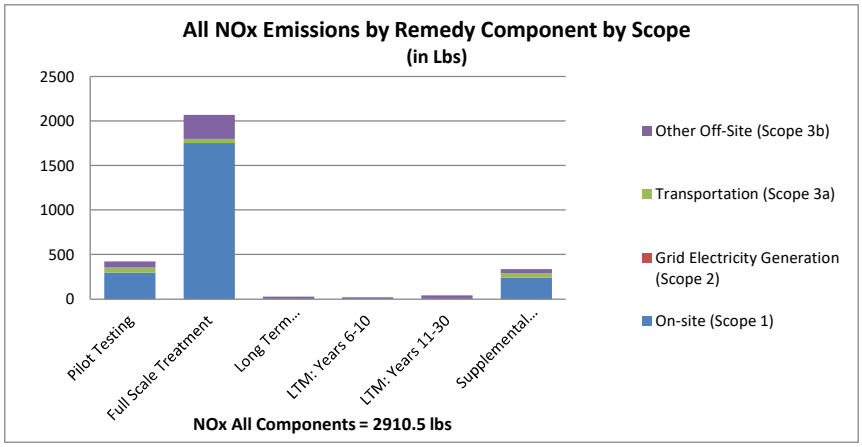

All Energy Use by Remedy Component
Pilot Testing = 13.7%
Full Scale Treatment = 72.2%
Long Term Monitoring (LTM): Years 3-5 = 0.9%
LTM: Years 6-10 = 0.7%
LTM: Years 11-30 = 1.5%
Supplemental Injections & Site Closure = 11.1%
Total Energy All Components = 2723.8 MMbtus

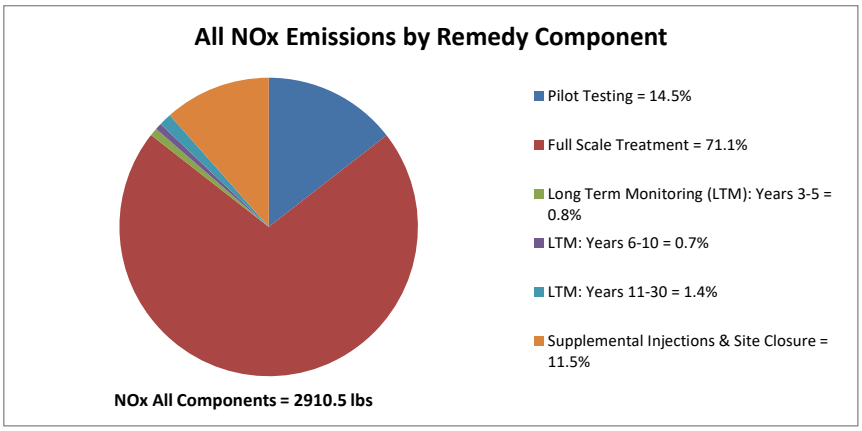

All Energy Use by Scope
On-site (Scope 1) = 68.7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.4%
Other Off-Site (Scope 3b) = 25.8%
Total Energy All Scopes = 2723.8 MMbtus

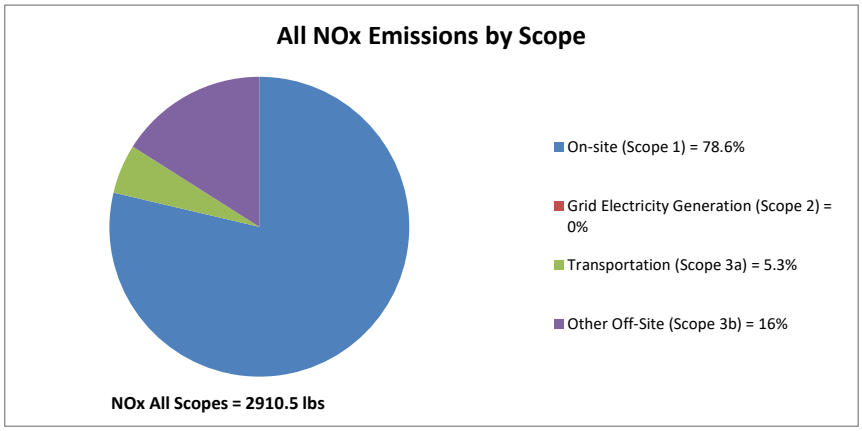

All GHG Emissions by Remedy Component and Scope
(in Tons)
250
200
150
100
50
0
Pilot Testing
Full Scale Treatment
Long Term...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 269.9 Tons CO2e

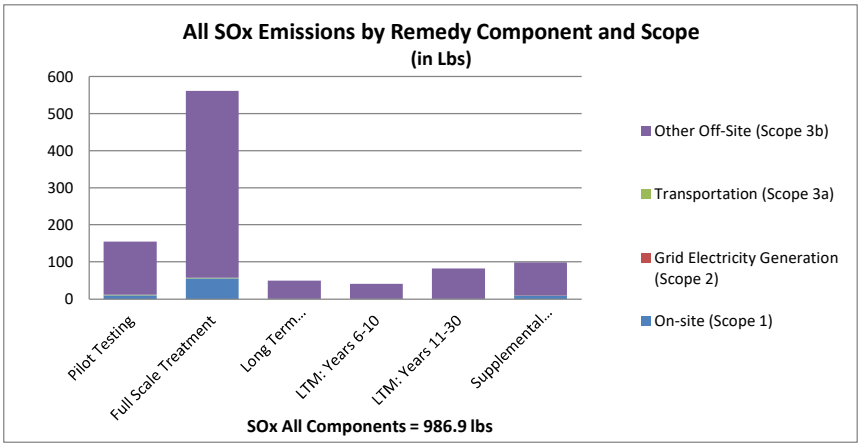

All GHG Emissions by Remedy Component
Pilot Testing = 12.5%
Full Scale Treatment = 75.1%
Long Term Monitoring (LTM): Years 3-5 = 0.5%
LTM: Years 6-10 = 0.4%
LTM: Years 11-30 = 0.9%
Supplemental Injections & Site Closure = 10.5%
GHG All Components = 269.9 Tons CO2e

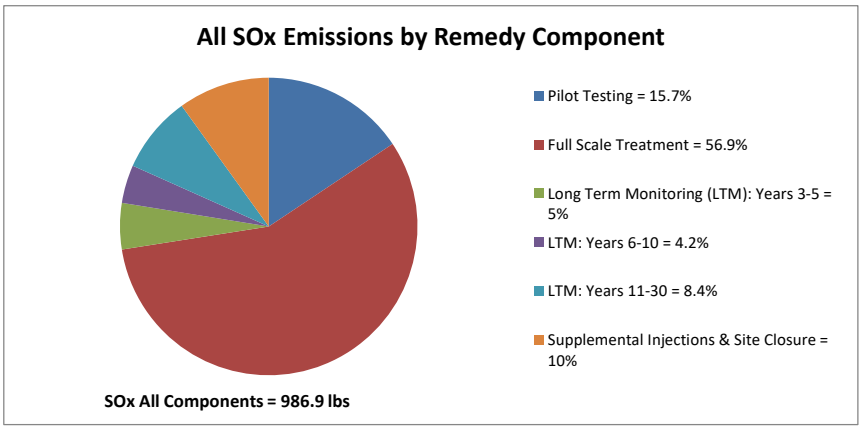

All GHG Emissions by Scope
On-site (Scope 1) = 56.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 4.4%
Other Off-Site (Scope 3b) = 39.4%
GHG All Scopes = 269.9 Tons CO2e

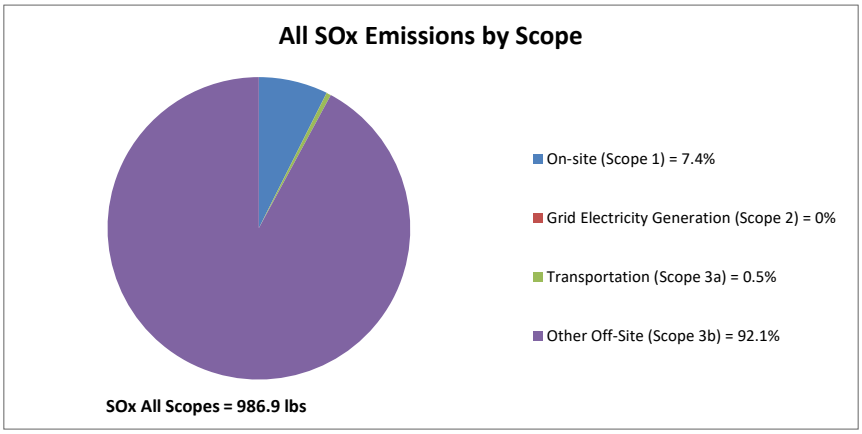

All NOx Emissions by Remedy Component by Scope
(in Lbs)
2500
2000
1500
1000
500
0
Pilot Testing
Full Scale Treatment
Long Term...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 2910.5 lbs

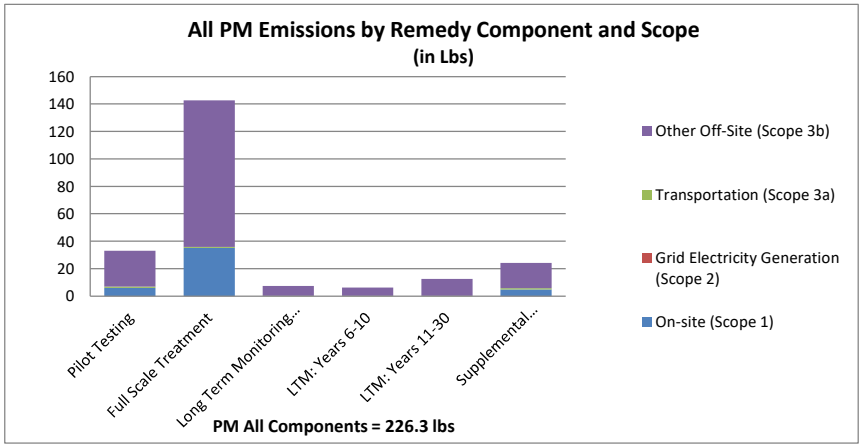

All NOx Emissions by Remedy Component
Pilot Testing = 14.5%
Full Scale Treatment = 71.1%
Long Term Monitoring (LTM): Years 3-5 = 0.8%
LTM: Years 6-10 = 0.7%
LTM: Years 11-30 = 1.4%
Supplemental Injections & Site Closure = 11.5%
NOx All Components = 2910.5 lbs

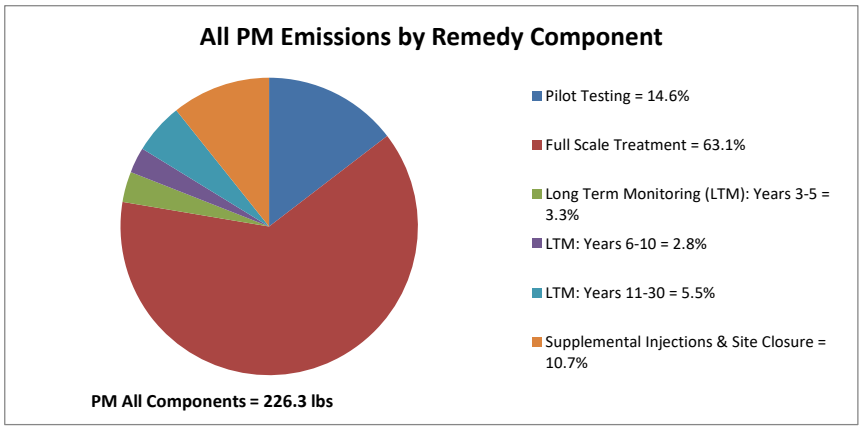

All NOx Emissions by Scope
On-site (Scope 1) = 78.6%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.3%
Other Off-Site (Scope 3b) = 16%
NOx All Scopes = 2910.5 lbs

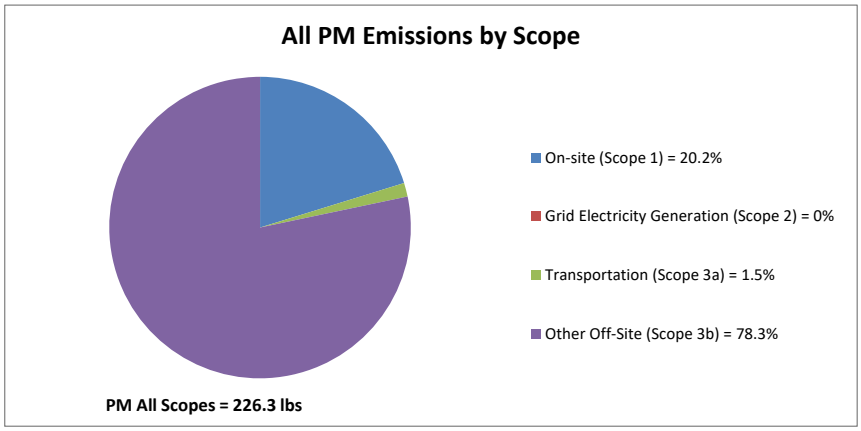

All SOx Emissions by Remedy Component and Scope
(in Lbs)
600
500
400
300
200
100
0
Pilot Testing
Full Scale Treatment
Long Term...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 986.9 lbs

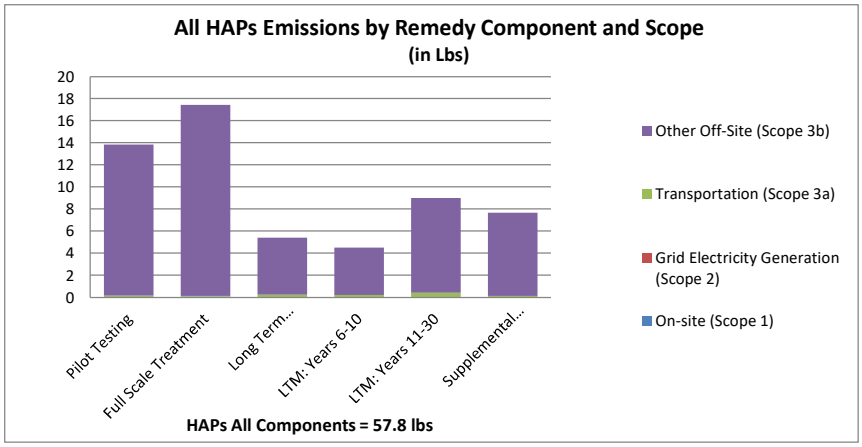

All SOx Emissions by Remedy Component
Pilot Testing = 15.7%
Full Scale Treatment = 56.9%
Long Term Monitoring (LTM): Years 3-5 = 5%
LTM: Years 6-10 = 4.2%
LTM: Years 11-30 = 8.4%
Supplemental Injections & Site Closure = 10%
SOx All Components = 986.9 lbs

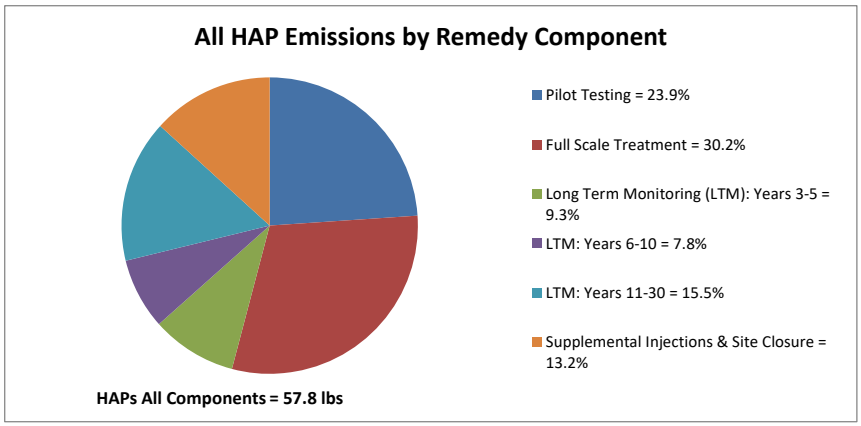

All SOx Emissions by Scope
On-site (Scope 1) = 7.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 0.5%
Other Off-Site (Scope 3b) = 92.1%
SOx All Scopes = 986.9 lbs

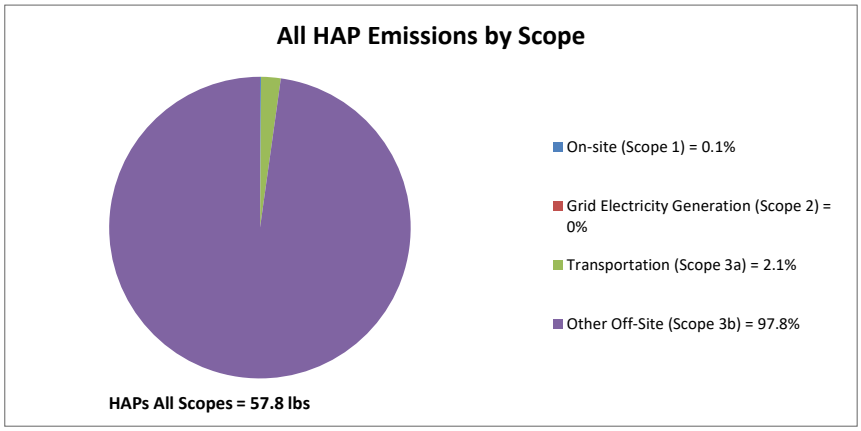

All PM Emissions by Remedy Component and Scope
(in Lbs)
160
140
120
100
80
60
40
20
0
Pilot Testing
Full Scale Treatment
Long Term Monitoring...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 226.3 lbs


All PM Emissions by Remedy Component
Pilot Testing = 14.6%
Full Scale Treatment = 63.1%
Long Term Monitoring (LTM): Years 3-5 = 3.3%
LTM: Years 6-10 = 2.8%
LTM: Years 11-30 = 5.5%
Supplemental Injections & Site Closure = 10.7%
PM All Components = 226.3 lbs


All PM Emissions by Scope
On-site (Scope 1) = 20.2%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 78.3%
PM All Scopes = 226.3 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
20
18
16
14
12
10
8
6
4
2
0
Pilot Testing
Full Scale Treatment
Long Term...
LTM: Years 6-10
LTM: Years 11-30
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 57.8 lbs


All HAP Emissions by Remedy Component
Pilot Testing = 23.9%
Full Scale Treatment = 30.2%
Long Term Monitoring (LTM): Years 3-5 = 9.3%
LTM: Years 6-10 = 7.8%
LTM: Years 11-30 = 15.5%
Supplemental Injections & Site Closure = 13.2%
HAPs All Components = 57.8 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 2.1%
Other Off-Site (Scope 3b) = 97.8%
HAPs All Scopes = 57.8 lbs

ATTACHMENT 4

SEFA ANALYSIS OUTPUT – ALTERNATIVE G3 (GROUNDWATER)

GROUNDWATER EXTRACTION AND TREATMENT, IN-SITU TREATMENT, AND PERMEABLE REACTIVE BARRIER

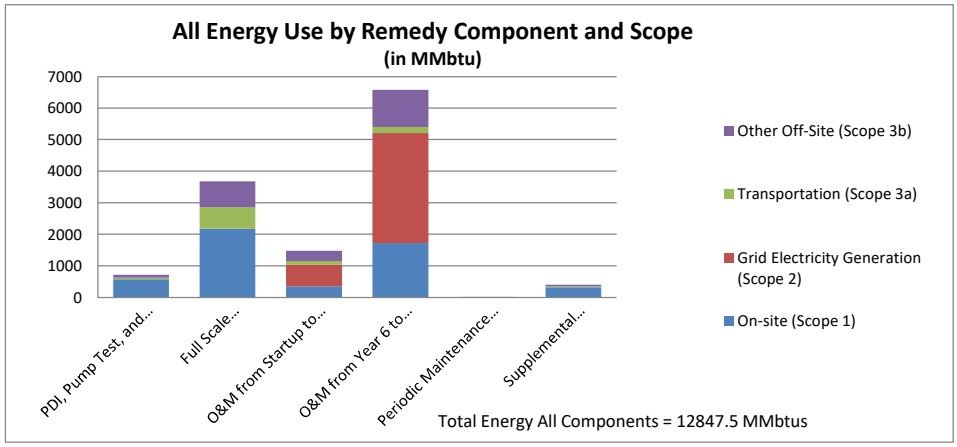
Environmental Footprint Summary

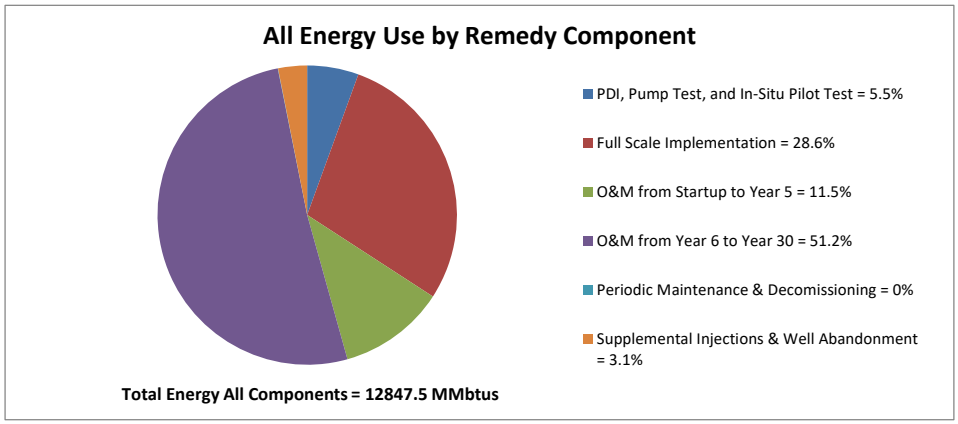
Core Element	Metric		Unit of Measure	Footprint						
				PDI, Pump Test, and In-Situ Pilot Test	Full Scale Implementation	O&M from Startup to Year 5	O&M from Year 6 to Year 30	Periodic Maintenance & Decomissioning	Supplemental Injections & Well Abandonment	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	2.9	22.1	5.5	12.1	0.0	2.9	45.4
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	2.5%	100.0%	100.0%		0.0%	39.9%
	M&W-3	Unrefined materials used on-site	Tons	0.6	945.0	0.0	0.0	0.0	0.0	945.6
	M&W-4	% of unrefined materials from recycled or reused material	%	0.0%	0.0%					0.0%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	60.0	0.0	0.0	0.0	0.0	60.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	1,075.0	0.0	0.0	0.0	0.0	1,075.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	5.5	12.1	0.0	0.0	17.6
	M&W-8	% of total potential waste recycled or reused	%		0.0%	100.0%	100.0%			1.5%
Water (used on-site)	W-1	Public water use	MG	0.00	0.08	0.00	0.00	0.00	0.01	0.10
	W-2	Groundwater use	MG	0.00	0.00	26.28	115.63	0.00	0.00	141.91
	W-3	Surface water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-4	Reclaimed water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-5	Storm water use	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W-6	Wastewater generated	MG	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	711.5	3,675.2	1,478.6	6,577.3	2.0	402.9	12,847.5
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.0	0.0	100.7	503.7	0.0	0.0	604.4
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	736.7	2,794.8	0.0	0.0	0.0	407.7	3,939.2
	A-2	On-site HAP emissions	Pounds	0.0	0.1	0.0	0.0	0.0	0.0	0.1
	A-3	Total NOx, SOx, and PM emissions	Pounds	912.7	4,864.0	1,065.9	3,852.3	1.9	502.8	11,199.7
	A-3A	Total NOx emissions	Pounds	793.1	3,843.5	403.6	1,401.2	1.8	445.6	6,888.9
	A-3B	Total SOx emissions	Pounds	90.4	435.9	614.4	2,304.0	0.1	41.7	3,486.5
	A-3C	Total PM emissions	Pounds	29.1	584.6	47.9	147.1	0.1	15.5	824.4
	A-4	Total HAP emissions	Pounds	7.9	29.6	35.0	103.3	0.0	2.9	178.7
	A-5	Total greenhouse gas emissions	Tons CO2e*	59.8	301.5	44.8	158.3	0.2	34.9	599.3
Land & Ecosystems	Qualitative Description									

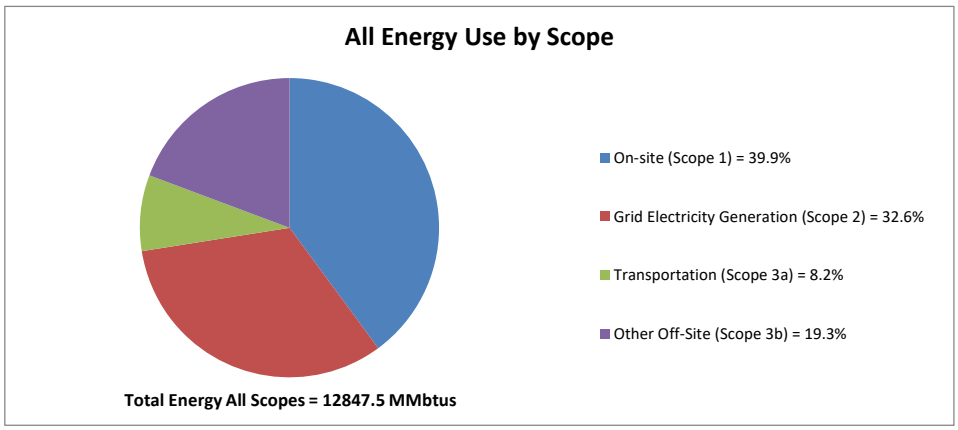
** Total greenhouse gases emissions (in CO2e) include CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)
"HAP" = hazardous air pollutants
"PM" = particulate matter
"NOx" = nitrogen oxides
"SOx" = sulfur oxides
"CO2" = carbon dioxide
"CH4" = methane
"N2O" = nitrous oxide

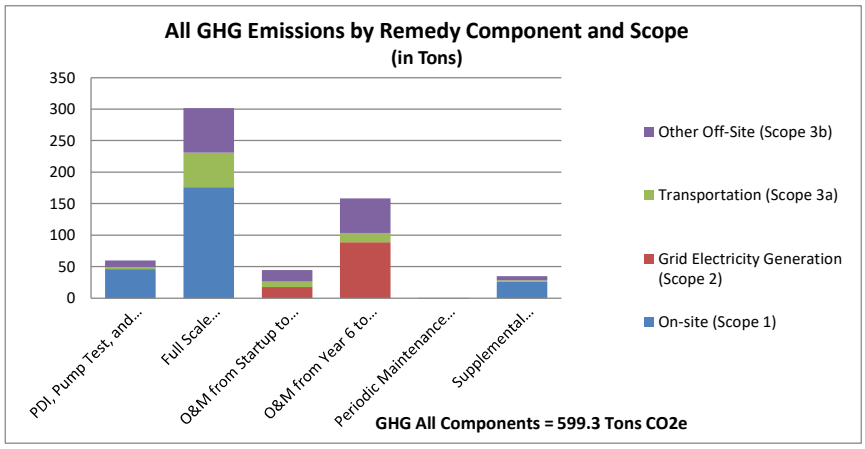
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

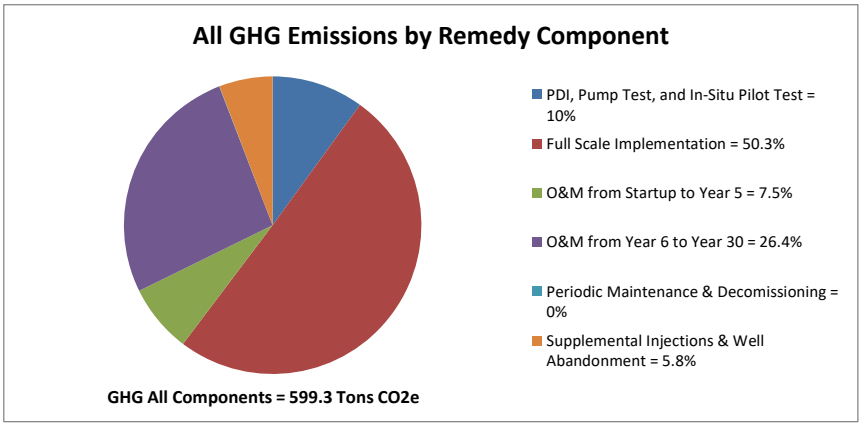
Notes:

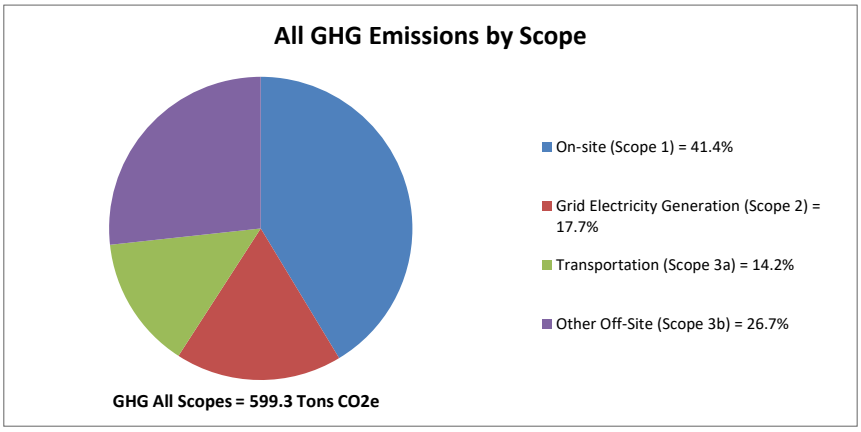

All Energy Use by Remedy Component and Scope
(in MMbtu)
7000
6000
5000
4000
3000
2000
1000
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic Maintenance...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 12847.5 MMbtus

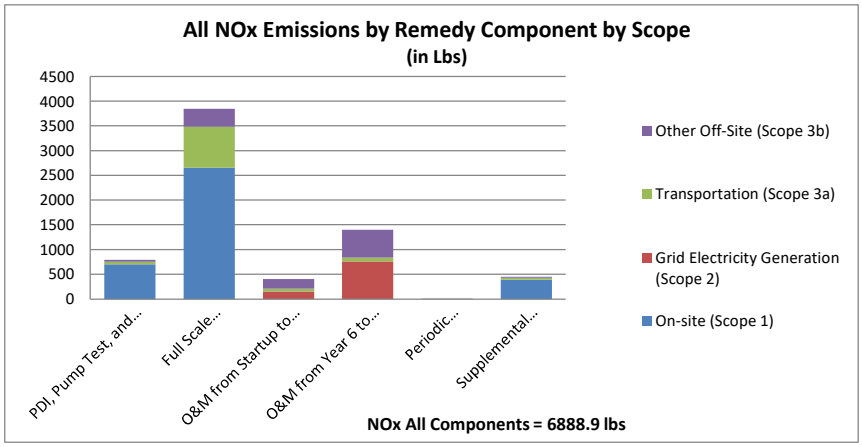

All Energy Use by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 5.5%
Full Scale Implementation = 28.6%
O&M from Startup to Year 5 = 11.5%
O&M from Year 6 to Year 30 = 51.2%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 3.1%
Total Energy All Components = 12847.5 MMbtus

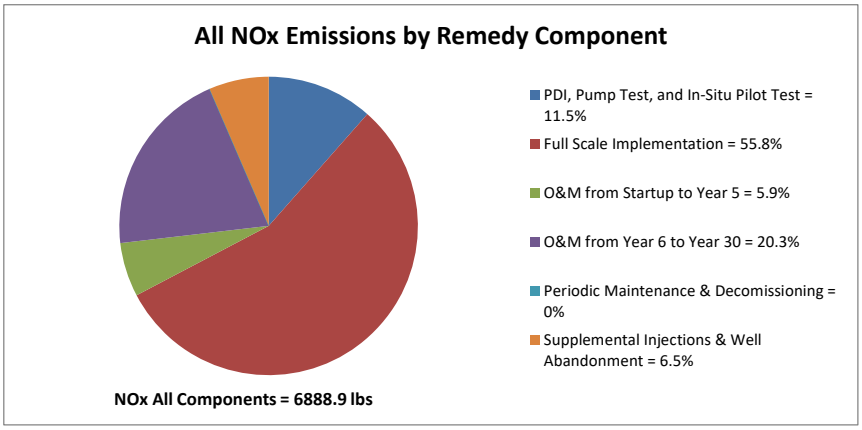

All Energy Use by Scope
On-site (Scope 1) = 39.9%
Grid Electricity Generation (Scope 2) = 32.6%
Transportation (Scope 3a) = 8.2%
Other Off-Site (Scope 3b) = 19.3%
Total Energy All Scopes = 12847.5 MMbtus

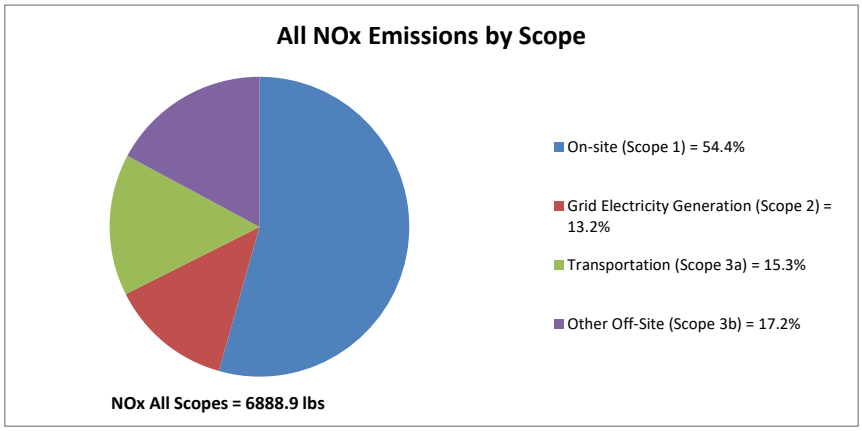

All GHG Emissions by Remedy Component and Scope
(in Tons)
350
300
250
200
150
100
50
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic Maintenance...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 599.3 Tons CO2e

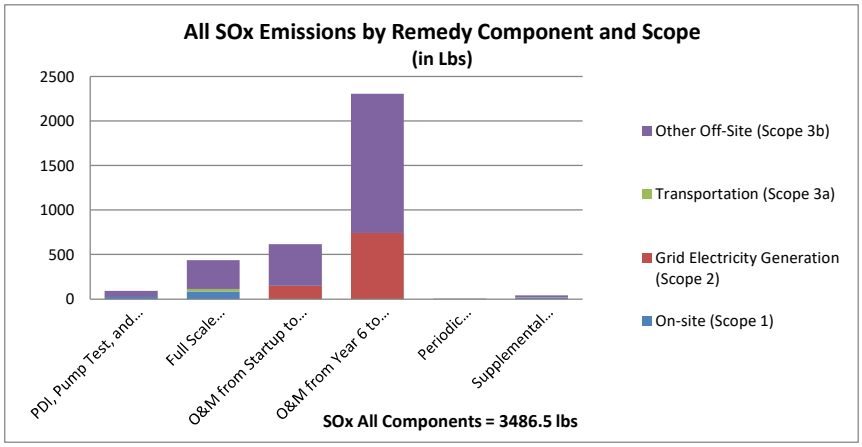

All GHG Emissions by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 10%
Full Scale Implementation = 50.3%
O&M from Startup to Year 5 = 7.5%
O&M from Year 6 to Year 30 = 26.4%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 5.8%
GHG All Components = 599.3 Tons CO2e

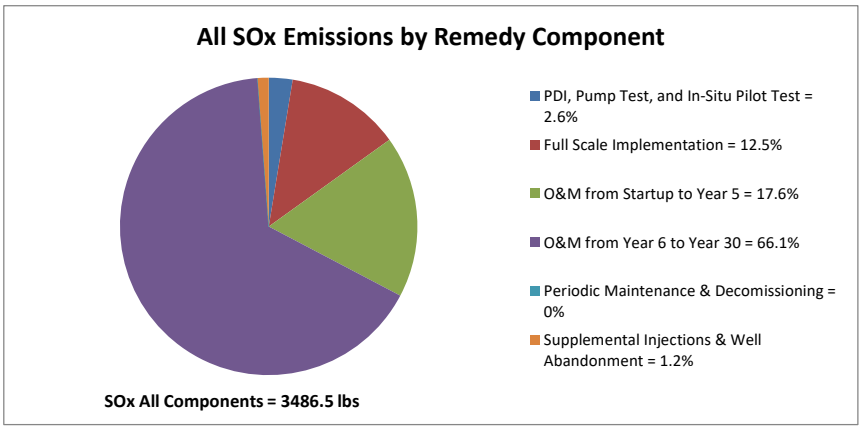

All GHG Emissions by Scope
On-site (Scope 1) = 41.4%
Grid Electricity Generation (Scope 2) = 17.7%
Transportation (Scope 3a) = 14.2%
Other Off-Site (Scope 3b) = 26.7%
GHG All Scopes = 599.3 Tons CO2e

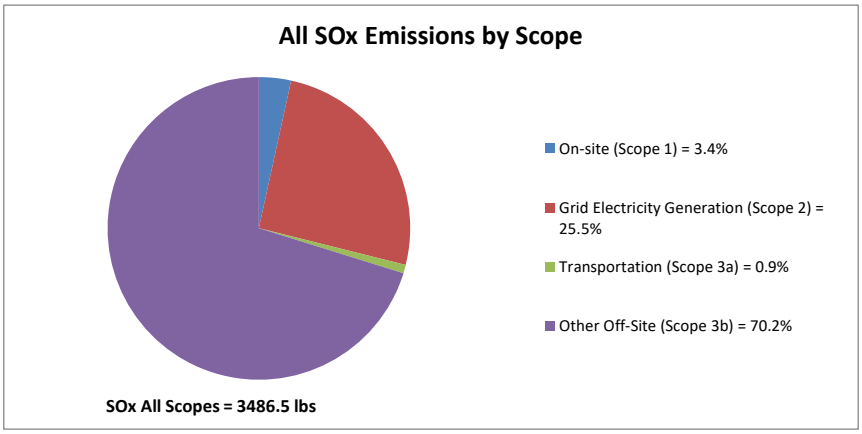

All NOx Emissions by Remedy Component by Scope
(in Lbs)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 6888.9 lbs

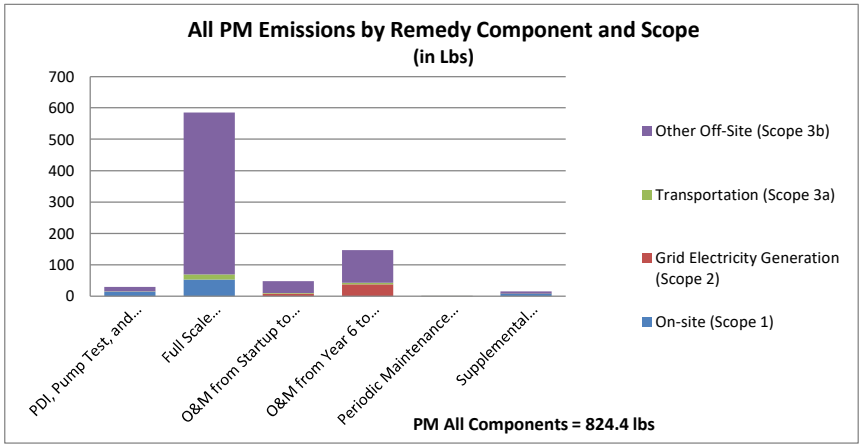

All NOx Emissions by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 11.5%
Full Scale Implementation = 55.8%
O&M from Startup to Year 5 = 5.9%
O&M from Year 6 to Year 30 = 20.3%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 6.5%
NOx All Components = 6888.9 lbs

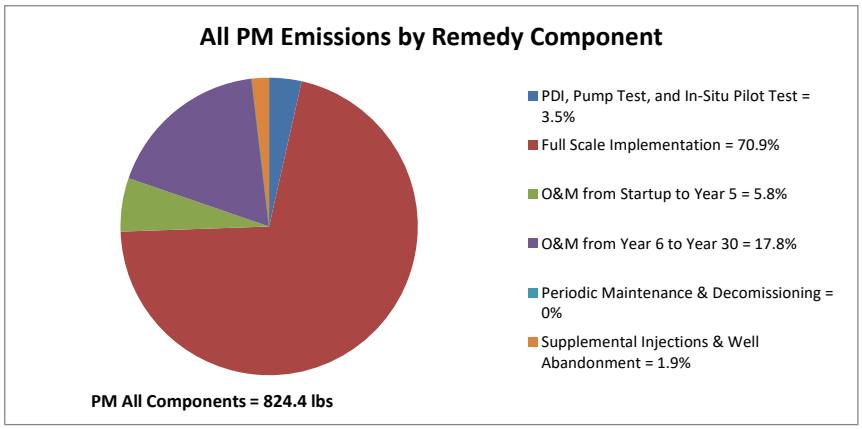

All NOx Emissions by Scope
On-site (Scope 1) = 54.4%
Grid Electricity Generation (Scope 2) = 13.2%
Transportation (Scope 3a) = 15.3%
Other Off-Site (Scope 3b) = 17.2%
NOx All Scopes = 6888.9 lbs

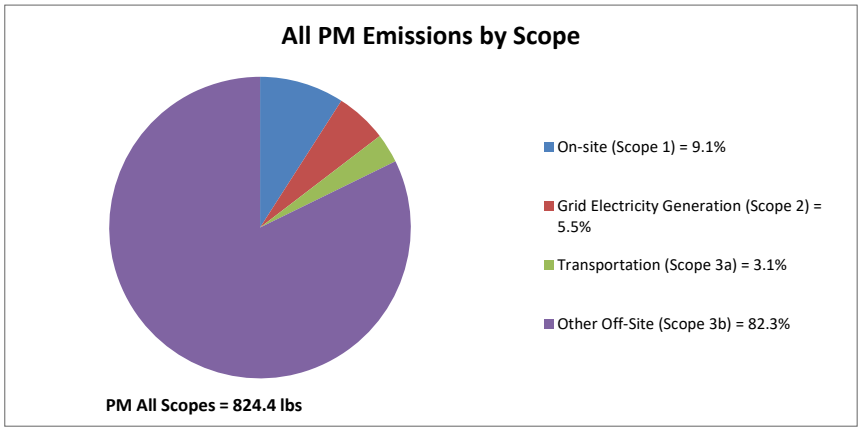

All SOx Emissions by Remedy Component and Scope
(in Lbs)
2500
2000
1500
1000
500
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 3486.5 lbs

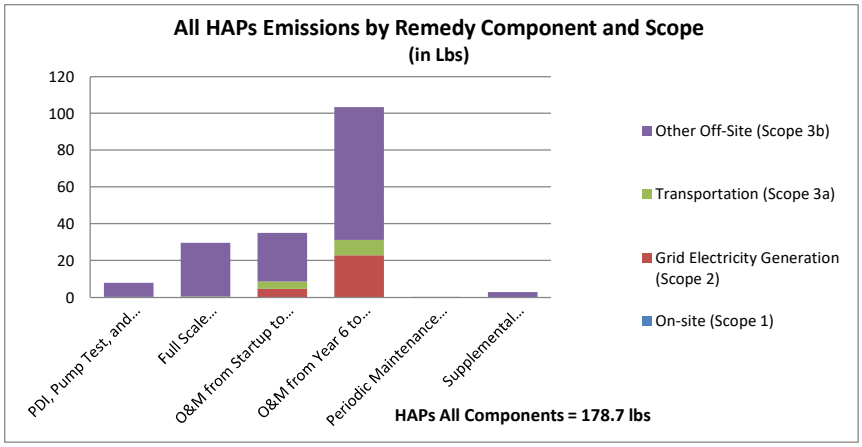

All SOx Emissions by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 2.6%
Full Scale Implementation = 12.5%
O&M from Startup to Year 5 = 17.6%
O&M from Year 6 to Year 30 = 66.1%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 1.2%
SOx All Components = 3486.5 lbs

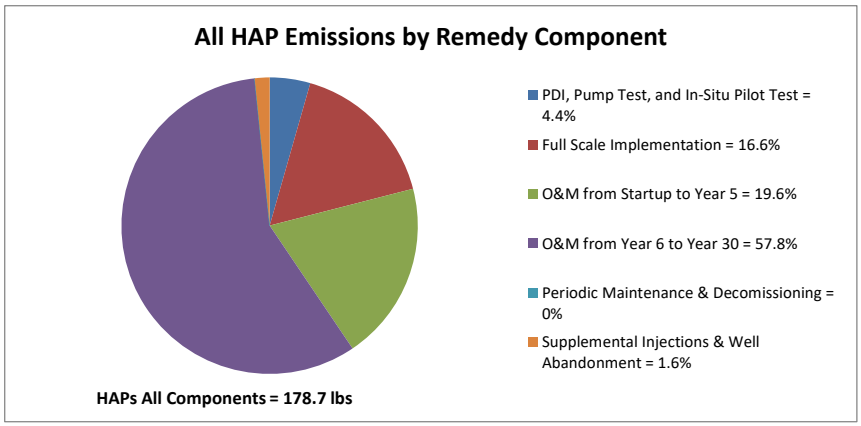

All SOx Emissions by Scope
On-site (Scope 1) = 3.4%
Grid Electricity Generation (Scope 2) = 25.5%
Transportation (Scope 3a) = 0.9%
Other Off-Site (Scope 3b) = 70.2%
SOx All Scopes = 3486.5 lbs

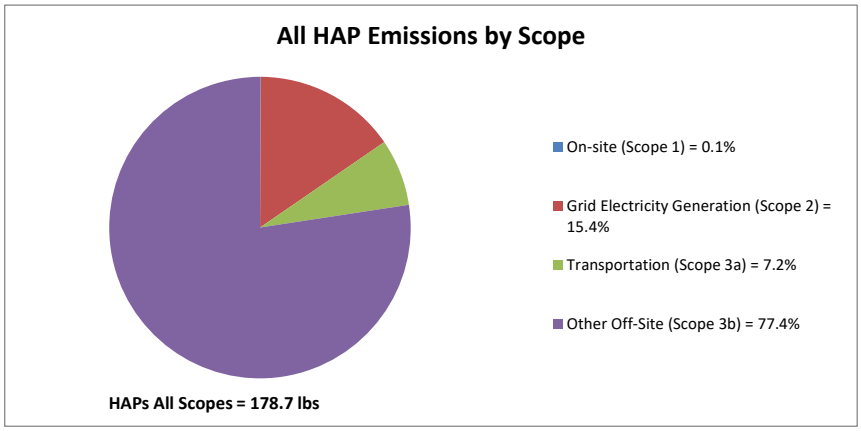

All PM Emissions by Remedy Component and Scope
(in Lbs)
700
600
500
400
300
200
100
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic Maintenance...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 824.4 lbs


All PM Emissions by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 3.5%
Full Scale Implementation = 70.9%
O&M from Startup to Year 5 = 5.8%
O&M from Year 6 to Year 30 = 17.8%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 1.9%
PM All Components = 824.4 lbs


All PM Emissions by Scope
On-site (Scope 1) = 9.1%
Grid Electricity Generation (Scope 2) = 5.5%
Transportation (Scope 3a) = 3.1%
Other Off-Site (Scope 3b) = 82.3%
PM All Scopes = 824.4 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
120
100
80
60
40
20
0
PDI, Pump Test, and...
Full Scale...
O&M from Startup to...
O&M from Year 6 to...
Periodic Maintenance...
Supplemental...
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 178.7 lbs


All HAP Emissions by Remedy Component
PDI, Pump Test, and In-Situ Pilot Test = 4.4%
Full Scale Implementation = 16.6%
O&M from Startup to Year 5 = 19.6%
O&M from Year 6 to Year 30 = 57.8%
Periodic Maintenance & Decomissioning = 0%
Supplemental Injections & Well Abandonment = 1.6%
HAPs All Components = 178.7 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 15.4%
Transportation (Scope 3a) = 7.2%
Other Off-Site (Scope 3b) = 77.4%
HAPs All Scopes = 178.7 lbs

ATTACHMENT 5

SEFA ANALYSIS OUTPUT – SUMMARY OF ALTERNATIVES

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
Former Air Force Plant 51 - OU2/OU3 Alternatives Comparison Table

Environmental Footprint Summary

Core Element	Metric	Unit of Measure	Total Footprint			
			Alternative S2	Alternative S3	Alternative G2	Alternative G3
Materials & Waste	Refined materials used on-site	Tons	0	0	76	45
	% of refined materials from recycled or reused material	%	0%	0%	0%	40%
	Unrefined materials used on-site	Tons	141,000	18,022	1	946
	% of unrefined materials from recycled or reused material	%	0%	0%	0%	0%
	On-site hazardous waste disposed of off-site	Tons	7,050	2,003	0	60
	On-site non-hazardous waste disposed of off-site	Tons	133,950	16,020	7	1,075
	Recycled or reused waste	Tons	0	0	0	18
	% of total potential waste recycled or reused	%	0%	0%	0%	2%
Water (used on-site)	Public water use	MG	0.01	0.01	0.36	0.10
	Groundwater use	MG	0.00	0.00	0.00	142
	Surface water use	MG	0.00	0.00	0.00	0.00
	Reclaimed water use	MG	0.00	0.00	0.00	0.00
	Storm water use	MG	0.00	0.00	0.00	0.00
	Wastewater generated	MG	0.00	0.00	0.00	0.00
Energy	Total energy used (on-site and off-site)	MMBtu	77,245	14,939	2,724	12,848
	Energy voluntarily derived from renewable resources					
	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0	0	0	0
	Voluntary purchase of renewable electricity	MWh	0	0	0	0
	Voluntary purchase of RECs	MWh	0	0	0	0
	On-site grid electricity use	MWh	17	15	0	604
Air	On-site NOx, SOx, and PM emissions	Pounds	6,880	4,483	2,407	3,939
	On-site HAP emissions	Pounds	2	2	0	0
	Total NOx, SOx, and PM emissions	Pounds	142,487	22,930	4,124	11,200
	Total NOx emissions	Pounds	63,304	12,375	2,911	6,889
	Total SOx emissions	Pounds	19,015	2,582	987	3,487
	Total PM emissions	Pounds	59,168	7,974	226	824
	Total HAP emissions	Pounds	580	133	58	179
	Total greenhouse gas emissions	Tons CO2e*	6,039	1,173	270	599

Notes
** Total greenhouse gases emissions (in CO2e) include CO2, CH4, and N2O (Nitrous oxide) emissions.*
MMBtu = millions of Btus
MG = millions of gallons
CO2e = carbon dioxide equivalents of global warming potential
MWh = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
Tons = short tons (2,000 pounds)
HAP = hazardous air pollutants
PM = particulate matter
NOx = nitrogen oxides
SOx = sulfur oxides
CO2 = carbon dioxide
CH4 = methane
N2O = nitrous oxide
The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012
Alternative S2 = Soil Excavation to Unrestricted Use (or Protection of Groundwater) Soil Cleanup Objectives and Offsite Disposal
Alternative S3 = Soil Excavation to Commercial Use Soil Cleanup Objectives, Offsite Disposal, Soil Cover, and Institutional Control
Alternative G2 = In-Situ Treatment and Permeable Reactive Barrier
Alternative G3 = Groundwater Extraction and Treatment, In-Situ Treatment, and Permeable Reactive Barrier