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Remedial Action Work Plan

Bisonite Paint Company
Brownfield Cleanup Program
2266 Military Road and 2268 Military Road
Tonawanda, New York 14510
Site No. C915010

Prepared for:
Tonawanda Storage Properties, LLC
1400 Crossroads Building
2 State Street
Rochester, New York 14614

Prepared by:
Marsh Engineering D.P.C.
271 Marsh Road, Suite 2
Pittsford, New York 14534

April 26, 2024

100.002

REMEDIAL ACTION WORK PLAN CERTIFICATION

Prepared for: Tonawanda Storage Properties, LLC
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Site: Bisonite Paint Company
BCP Site #C915010
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I, Steven J. Turybury, certify that I am currently a New York State Professional Engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan ("RAWP") was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Steven J. Turybury
Signature

14 June 2024
Date

TABLE OF CONTENTS

FIGURES

TABLES IN TEXT

APPENDICES

ACRONYMS AND ABBREVIATIONS

ACM	ACM Northfield CR#3, LLC
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
Bisonite	former Bisonite Paint Company
BTEX	benzene, toluene, ethylbenzene, and xylene
CAMP	Community Air Monitoring Plan
COC	Constituent of Concern
CSCO	Restricted Use Commercial Soil Cleanup Objective
DER-10	Technical Guidance for Site Investigation and Remediation
DPW	Department of Public Works
FSP	Field Sampling Plan
GPR/EM	Ground Penetrating Radar/Electro-magnetic
GWSCOs	Soil Cleanup Objectives protective of Groundwater
HASP	Health and Safety Plan
IDW	Investigation Derived Waste
LNAPL	light non-aqueous phase liquid
Leader	Leader Professional Services, Inc.
Marsh	March Engineering D.P.C.
MNA	monitored natural attenuation
mg/Kg	milligrams per kilogram
MRA	Military Road Associates
NYCRR	NYS Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCBs	polychlorinated biphenyls
PPE	Personal Protective Equipment
PSA	Preliminary Site Assessment
RAOs	Remedial Action Objectives
RI/RAAR	Remedial Investigation/Remedial Alternatives Analysis Report
RAWP	Remedial Action Work Plan
RIWP	Remedial Investigation Work Plan
SCG	Standards, Criteria, and Guidelines
SCOs	Soil Cleanup Objectives
SER	Site Evaluation Report
SES	Sessler Environmental Services, Inc.
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
TAMS	Tams Consultants, Inc.
SVOCs	semivolatile organic compounds
TOGS 1.1.1	NYS Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values
TSP	Tonawanda Storage Properties, LLC
VOCs	volatile organic compounds

1.0 INTRODUCTION

This Remedial Action Work Plan ("RAWP") has been prepared by Marsh Engineering D.P.C. ("Marsh") for the former Bisonite Paint Company site ("Site") in accordance with the New York State Department of Environmental Conservation's ("NYSDEC's") Brownfield Cleanup Program ("BCP"). ACM Northfield CR#3, LLC ("ACM") entered into a Brownfield Cleanup Agreement ("BCA") as a Participant on May 29th, 2019 (Site No. C915010). A BCP Application to Amend Brownfield Cleanup Agreement and Amendment dated March 14, 2023 was submitted to the NYSDEC advising that the Site was transferred from ACM to Tonawanda Storage Properties, LLC (TSP) and requested that TSP be added onto the BCA while the present party (ACM) also remain on the BCA as a Participant. Per Section IV, Item 12 of the BCA amendment application, TSP applied as a Volunteer.

This RAWP has been prepared in accordance with NYSDEC document titled "DER-10 Technical Guidance for Site Investigation and Remediation" (DER-10) issued on May 3, 2010, and presents a description and detailed procedures to implement the NYSDEC-approved remedy for the Site.

2.0 BACKGROUND

A summary of the Site background information, including a Site description, Site history, and a summary of previous environmental investigations, is presented below.

2.1 Site Description

The BCP Site is located on the west side of Military Road in Tonawanda, Erie County, New York approximately 0.25 miles north of the intersection of Military Road and Interstate 290. A Site Location Map is included as **Figure 1**. The Site is located on two tax parcels of land identified as:

- tax parcel 52.12-6-16.1 with the address listed as 2268 Military Road (approximately 0.30 acre), and
- tax parcel 52.12-6-16.2 with the address listed as 2266 Military Road (approximately 0.50 acre).

The combined parcels total 0.80 acres and are currently zoned as commercial and manufacturing properties. The BCP portion of the properties is referenced as the Bisonite Paint Company, NYSDEC Site C915010. A survey showing the limits of the Site is provided in **Appendix A**.

Land use surrounding the Site includes a commercial lumber yard and building owned by 84 Lumber to the north, a property owned by National Grid (formerly Niagara Mohawk Power Corporation), a railroad corridor, and a Town of Tonawanda Landfill to the west, a commercial storage space facility located to the south, and Military Road to the east. On the east side of Military Road, the current land use includes commercial developments, including a Kwik Fill service station and an office/warehouse building. A residential development exists east of the service station and office/warehouse building approximately 0.04 miles to the east of the Site. The Site is located within the Waterfront Industrial District as determined by the Town of Tonawanda.

The Site is part of the former Bisonite property. The former Bisonite building is currently used as a commercial warehouse/storage facility and office space. The former Bisonite building has concrete block walls and a flat roof. On the northwest corner of the building, two metal storage garages exist each measuring 20-feet ("ft.") by 20-ft, which tenants use to store equipment/belongings. The northern portion of the building is located within the BCP Site. The northern block portion of the building was previously rented to a fire sprinkler construction firm that used the space for material storage and offices. This northern block portion of the building is currently rented to two tenants; a flooring contractor, and a plumbing contractor. The flooring contractor rents the northern most space which

includes office space of approximately 1,200 ft^2 and warehouse space of approximately 4,800 ft^2. The plumbing contractor's rental space is approximately 1,800 ft^2. Approximately 650 ft^2 of the plumbing contractor's space is office space and is part of the BCP Site, with the remaining 1,150 ft^2 in the southern (i.e., off-Site) area of the building. Both tenants use their respective warehouse areas for material and tool storage typical of their respective businesses. The floorplan and layout of these areas has not changed. The current tenants have not altered the floor plans. A loading dock located on the eastern side of the building is shared by the flooring company and book warehousing company.

A portion of the building that shares a wall, floor and roof extends off-Site to the south. This southern (i.e., off-Site) portion of the building is currently used by multiple tenants for use as a book warehouse, estate sale company storage, construction materials storage, and catamaran construction/storage. The Southwest portion of the building located in the off-Site area was formerly leased to a furniture refinishing shop. This portion of the building has open storage areas including an area divided into individual office spaces with wood framing, drywall walls, and composite wood paneling. This office space has drop ceilings. The floor to ceiling height is approximately 8-feet in this area. The space is currently rented to a power tool retailer. This tenant purchases pallets of returned tools from eBay and Amazon and resells them through various online outlets. The space previously had a gas-fired forced air heating system; however, the system is no longer functioning. It is anticipated that future use of the facility will continue to be rented for storage or light industrial uses. As a result, the zoning for the former Bisonite facility, including the Site use, is not anticipated to change in the foreseeable future.

Approximately 25 percent of the Site footprint is covered with building space. The remainder of the Site is used for paved parking and a driveway for the tenants. An aerial photograph of the Site and the surrounding properties is presented as **Figure 2**. A separate building exists on the property west of the former Bisonite building and south of the BCP Site. The spaces in this building are used by approximately 10 tenants using small 8 feet by 10 feet rental spaces. At the time this RAWP was prepared, one tenant occupying the western-most part of the building uses the space to store gasoline powered equipment, trailer(s) and supplies. These spaces are unheated with only a portion of the building having electrical service.

2.2 Site History

The Site is a portion of the former Bisonite Paint Company property that operated from 1947 to 1991. Bisonite was located on four property parcels, two of which now form the subject Site. Bisonite manufactured water-based and oil-based paints on the property. Wastewater from the paint manufacturing plant was believed to have flowed from an open trench to an approximately 50-feet long, 30-feet wide, and 8 to 10-feet deep settling lagoon located at the west end of the Site. The approximate location of the former trench and settling lagoon are shown of **Figure 3**.

In addition to the trench and settling lagoon, Bisonite operated a tank farm and landspreading area to the south of the Site. Prior to 1978, paint pigments, spent solvents, and mineral spirits were landspread over a one-acre parcel of property for weed control. In 1978 NYSDEC notified Bisonite to cease landspreading operations and begin hauling the waste to an approved disposal facility. Operation of the settling lagoon was also terminated in 1978. The lagoon was subsequently decommissioned and covered; however, it is unknown if the lagoon was dredged, and the waste removed. Remediation of the tank farm and landspreading area was conducted in 1996 by 2251 Military Road Associates, Inc. (MRA) under the previous New York State Brownfield Program, the Voluntary Cleanup Program.

During a NYSDEC Investigation in 1985, it was noted that a portion of the lagoon cover had settled, and leachate was observed in small, ponded areas at the surface. Also observed was a small 3-feet by 7-feet area of stained ground on the side of the former lagoon sloping west toward the railroad tracks. It is unknown whether an engineered cap was placed over the lagoon.

2.3 Previous Environmental Investigations and Reports

2.3.1 Preliminary Site Assessment

In July and December 1990, Preliminary Site Assessments ("PSAs") were conducted by TAMS Consultants, Inc. ("TAMS") and Dunn Engineering Company, respectively, for the NYSDEC. No evidence of leachate from the former lagoon was found during the PSA inspections. However, several waste drums were observed along with stressed vegetation adjacent to the former drum storage pad/resin building. While conducting the PSA, an aerial photograph of the property from 1972 was discovered. The photograph displayed poor housekeeping practices at Bisonite, and this resulted in an inspection by NYSDEC's Hazardous Waste Division. During the inspection, waste containers with organic chemicals characterized as hazardous wastes were found. An Order on Consent was issued to Bisonite in December of 1991 requiring the company to remove the wastes, debris, and obvious contaminated surficial material. Treatment of groundwater was not addressed.

In 1993 an additional PSA field investigation was conducted by TAMS that included the collection of soil, waste, and groundwater samples. The investigation was focused on areas of the Site and adjacent off-Site areas to determine if surface and subsurface contamination was present and, if existing, if it posed a threat to public health and/or the environment.

TAMS prepared a Preliminary Site Assessment Report dated March 1993 based on historical information obtained from various NYSDEC and municipal inspections, field inspections, investigation findings, and sampling conducted between July 1990 and October 1993. The PSA Report concluded that several volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs) exceeded 6 NYCRR Part 375 (Part 375) residential soil cleanup objectives (SCOs), and that metals (specifically antimony, barium, chromium, lead, and mercury) exceeded background concentrations in the soil. PCBs were detected in the lagoon sediments but not at levels exceeding the Part 375 SCOs. Groundwater did not appear to have been impacted. NYSDEC concluded that hazardous waste as defined in 6 NYCRR Part 371 was present; however, it did not appear to be a significant threat to public health or the environment as defined in 6 NYCRR Part 375. As a result, NYSDEC classified the Site as a Class 3 Inactive Hazardous Waste Disposal Site.

2.3.2 Removal Action

In 1996, MRA submitted a Removal Action Work Plan to NYSDEC that provided a scope of work to excavate impacted soil from the former landspreading area and tank farm. MRA planned to delist portions of the property to redevelop it for commercial/industrial use. After this submission, MRA signed an Order on Consent with the NYSDEC (Index #B9-0389-91). The Removal Action Work Plan was approved and implemented in October 1996. MRA completed the tank farm remediation in a single day; however, MRA did not collect endpoint soil samples for laboratory analyses to confirm that the cleanup goals were achieved. MRA instead measured the soil contaminant levels using a portable organic vapor analyzer. NYSDEC did inspect the excavation and confirmed that the remediation was complete. Baron & Associates, P.C. prepared and submitted a Removal Action Implementation Report in December 1996 for the project.

2.3.3 Site Evaluation Report

In December 2008, NYSDEC prepared a Site Evaluation Report ("SER") for the Bisonite property. The SER was a review of the past regulatory activities and investigations of Bisonite focusing on an evaluation of the data associated with the former settling lagoon area. The SER indicated that as a result of sampling conducted during the PSAs, a determination could not be made that the lagoon

waste was a characteristic hazardous waste because samples did not exceed TCLP levels. However, NYSDEC determined that the settling lagoon contained a listed hazardous waste based on the significant total concentrations of individual VOCs, the presence of Toluene and Xylene in the soil samples and in waste drums, the reported spills and leaks, and the discovery of raw product in an open trench drain connecting the manufacturing building to the settling lagoon. Elevated levels of Barium, Chromium, Lead and Mercury were found in the settling lagoon waste samples. Groundwater samples from monitoring wells indicated elevated levels of Antimony, Iron, Magnesium Manganese and Sodium; however, the positions of the monitoring wells were not hydraulically down gradient from the lagoon area. The recommendations of the SER included:

- maintain the Site as a Class 3 Inactive Hazardous Waste Disposal Site,
- conduct additional assessment to characterize settling lagoon waste,
- install additional monitoring wells,
- sample shallow groundwater downgradient from the lagoon to investigate its quality.

2.3.4 Petroleum Cleanup Closure Report

On April 20, 2017, during an inspection of the property, NYSDEC discovered two containers of petroleum behind an off-Site storage building located on the Niagara Mohawk Power Corporation property near the west side of the Site. On May 1, 2017, Leader Professional Services, Inc. ("Leader") met with the NYSDEC at the Site and subsequently completed a removal of the impacted soil and cleanup of the adjacent concrete pad, and had the waste materials and containers sent for off-Site disposal. Verification sampling conducted after the soil removal indicated that the concentration of Indeno (1,2,3-cd) pyrene in one soil sample slightly exceeded the NYSDEC CP-51 Soil Cleanup Policy SCO. Leader prepared a Closure Report dated July 10, 2017. Based on the report, NYSDEC determined that no further action was necessary and closed the Spill file on July 13, 2017.

2.3.5 Geophysical Study of the Former Lagoon Area

On June 22, 2017, NYSDEC, Groundwater and Environmental Services, Inc., and Applus RTD prepared a report of a geophysical study conducted for the former settling lagoon located on the Site. The study indicated several anomalies that are within the suspected lagoon area; however, there was no evidence of the location of the reported trench drain from the former manufacturing building to the lagoon.

2.3.6 Remedial Investigation

A Remedial Investigation Work Plan (RIWP) was prepared by Leader on behalf of the former BCP Volunteer, ACM Northfield. The RIWP was approved by the NYSDEC on November 6, 2019. The remedial investigation activities were completed between December 2019 through January 2020. The environmental media sampled at the Site during the investigation included surface and subsurface soil, sediments, groundwater, and soil vapor. The results of the investigation, including the findings from previous investigations, found soil in areas to be impacted primarily by paint manufacturing related VOCs, specifically acetone, ethylbenzene, methylene chloride, toluene, and xylenes. Metals, including antimony, barium, chromium, lead, and mercury were also found in areas that exceeded their respective 6 NYCRR Part 375 Commercial SCOs (CSCOs) and Protection of Groundwater SCOs (GWSCOs). Total PCB concentrations above the CSCO of 1.0 mg/Kg were also detected in soil at depths primarily less than 6-feet below ground surface (bgs) in the settling lagoon sediments. The impacts to soil and groundwater appear to be concentrated in, and immediately adjacent to, the settling lagoon and former trench that was used to discharge paint related wastes to the lagoon. Exceedances of CSCOs in surface soil samples collected for analysis during the remedial investigation are presented on

Figure 4; exceedances of CSCOs and the project specific protection of groundwater SCOs (herein referred to as PSGW SCOs, and include Toluene, Ethylbenzene, Total Xylenes, Total PCBs, and Mercury) in subsurface soil are presented on **Figure 5**.

2.3.7 Supplemental Remedial Investigation

Following review of the results from the remedial investigation activities, the NYSDEC requested that Leader conduct a Supplemental Remedial Investigation (SRI) along the northern and western Site boundary. The objective of the SRI was to evaluate potential exposure from impacted media to the users of the north adjacent warehouse and office space occupied by 84 Lumber. An SRI Work Plan – Field Sampling was submitted and subsequently approved by the NYSDEC and NYSDOH on March 1, 2021. The SRI work was conducted in accordance with the SRI Work Plan. Results from the soil analyses indicated SVOC impacts were present exceeding CSCOs along the northern and western property lines, with the highest concentrations along the north side of the Site. Leader concluded that the prevalence of bituminous asphalt shards mixed with the soil contributed to the levels of SVOCs found rather than the result of past operations at the Bisonite facility. Regardless, the NYSDEC requested that the boundary soil be incorporated into a RAWP. Exceedances of CSCOs in surface soil samples collected for analysis during the SRI are also presented on **Figure 4**.

The SRI also evaluated indoor air and sub-slab conditions within a portion of the warehouse building south of the BCP boundary. Except for Methylene Chloride in the indoor air, none of the compounds that have NYSDOH indoor air guidelines were detected in the samples. Other compounds detected that do not have NYSDOH indoor air guidelines included Acetone, Benzene, Ethylbenzene, Methyl Ethyl Ketone, Toluene and Xylene. On June 30, 2021, Leader performed an inspection of the building interior to identify potential sources of the impacts identified in the indoor air. At the time of inspection, a wood furniture refurbishing shop was a tenant of the building. The inspection identified lacquer thinners, paint strippers, wood stains, paint thinner, and spray toners in the shop. Leader concluded that the presence of products containing Methylene Chloride, Acetone, Benzene, Methyl Ethyl Ketone, Toluene and Xylene observed in the furniture refurbishing shop was the probable source of the constituents detected in the building's indoor air during the remedial investigation and SRI. Subsequent to the 2021 visit, the lease for the wood furniture refurbishing shop was not renewed and the tenant no longer occupies the building.

Based on the remedial investigation and SRI findings, the SRI Report concluded that additional actions were not required at that time to address potential exposures related to soil vapor intrusion. However, improving housekeeping practices and/or implementing more effective engineering controls to improve the air quality within the building was recommended.

2.3.8 Remedial Investigation/Remedial Alternatives Analysis Report

A Final Remedial Investigation/Remedial Alternatives Analysis Report (RI/RAAR) dated November 2023 was prepared by Marsh and subsequently approved by the NYSDEC in a letter correspondence dated December 19, 2023. The RI/RAAR summarized the results from previous investigations, evaluated several remedial alternatives to address the constituents of concern in media at the Site, and presented the preferred remedial alternative for the Site. A Qualitative Exposure Assessment was included in the RI/RAAR that concluded that under both the current and future uses of the Site, utility workers or contractors entering the Site to conduct ground intrusive activities may create routes of exposure; however, the use of proper personal protective equipment (PPE) can be used to mitigate those potential exposures. Routes of potential exposure to off-Site personnel are restricted to the inhalation of dust created when Site soil is disturbed. Community air monitoring would be conducted during soil disturbance activities and engineering controls employed if required to eliminate potential

off-Site exposures. VOCs previously reported in indoor air were likely attributed to products used by a former tenant that no longer rents space at the facility. However, the SVI investigation is ongoing

Three potential remedial alternatives were developed for each medium, including surface soil, subsurface soil, soil vapor, and groundwater. The remedial alternatives were compared to the remedial action objectives (RAOs) and the nine evaluation criteria included in 6 NYCRR Subpart 375.1.8(f). Based on the evaluation of the various remedial alternatives to the evaluation criteria, a Track 4 Commercial Use cleanup was recommended. The recommended remedial alternative included:

- Limited excavation and off-Site disposal of unpaved surface soil exceeding part 375 CSCOs along the northern and western Site boundaries.
- Excavation and off-Site disposal of subsurface paint waste residuals and soil/gravel fill exceeding Part 375 CSCOs and PSGW SCOs. CSCOs and PSGW SCOs within the former paint waste lagoon and associated trench are the primary source of impacts to groundwater.
- Removal of impacted perched groundwater and light non-aqueous phase liquid (LNAPL) that is at or near the surface in the area of MW-4 via co-mingling during the excavation of the lagoon media.
- Installation of a cover barrier of DER-10 approved fill over the surface soil along the north and west Site boundaries and paint waste lagoon excavation. Restore lagoon excavation with asphalt cover.
- Implement monitored natural attenuation (MNA) of groundwater to document remedial effectiveness.
- Implement institutional controls to control Site activities and prevent the future use of groundwater at the Site.
- Implement active management, and periodic indoor air monitoring while the Site building spaces are used for occupied storage, warehousing, or office space.
- Preparation of a Site Management Plan (SMP) for the Site to describe sampling, monitoring, and inspection requirements and frequency.

2.3.9 Additional Soil Vapor Intrusion Sampling

Leader was retained by TSP to conduct an Additional Soil Vapor Intrusion (“SVI”) investigation at the Site. A Work Plan for Additional Soil Vapor Intrusion Sampling ("SVI Work Plan") dated June 22, 2023 was submitted to, and subsequently approved by the NYSDEC in a correspondence dated July 6, 2023. The SVI sampling was conducted on August 28, 2023 to evaluate the potential for exposure via soil vapor intrusion to current and future building occupants. Based on the location selection criteria presented in the SVI Work Plan, four (4) locations for indoor air sampling and four (4) locations for sub-slab sampling were selected. The locations of the “pairs” of sub-slab and indoor air samples were based on a final inspection of the building interiors, logistical issues, and in consultation with the tenants of the property and the NYSDEC. The SVI sampling was conducted in representative portions of the entire building as also described in the SVI Work Plan.

The samples were sent to for analysis of VOCs by US EPA Method TO-15. The laboratory provided ASP Category B data packages. Laboratory data packages were reviewed by a qualified individual; all data was determined to be usable.

An Additional Soil Vapor Intrusion Investigation Report dated November 2, 2023 was submitted to the NYSDEC, and of this writing is currently under review. The report indicated that none of the four (4) indoor air samples exceeded any of the NYSDOH guidelines for VOCs in indoor air presented in Table 3.1 of the SVI Guidance Document.

The indoor air results were compared to the Building Assessment and Survey Evaluation (BASE) Database (USEPA, 2001), 90th Percentile. Values from the EPA BASE 90th percentile can be used as a benchmark for evaluating indoor air for commercial buildings.

Results from the Additional SVI Investigation included the following:

- No VOC exceedances of the BASE Database 90th Percentile guidance values were reported in one (1) of the four (4) indoor air samples.
- One (1) VOC (2-Butanone) was reported at one (1) location at a concentration of 12 micrograms per cubic meter (ug/m^3) slightly above the BASE Database 90th Percentile guidance value of 13 ug/m^3. 2-Butanone was not detected in sub-slab "paired" sample collected from the adjacent location. Additionally, 2-Butanone was also reported in the ambient air sample at a concentration of 3.8 ug/m^3.
- At one (1) location, two (2) VOCs were reported above their respective BASE Database 90th Percentile guidance values. 2-Butanone and Ethyl Acetate were reported at concentrations of 16 ug/m^3 and 20 ug/m^3, respectively. The BASE Database 90th Percentile guidance value for Ethyl Acetate is 5.4 ug/m^3; however, Ethyl Acetate was also reported in the outdoor ambient air sample at a concentration of 5.7 ug/m^3 (i.e., above the BASE Database, 90th Percentile guidance value of 5.4 ug/m^3). Ethyl Acetate was also reported in each of the other 3 indoor air samples.
- Nine (9) VOCs were reported above their respective BASE Database 90th Percentile values at one (1) location, including 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, 2- Butanone, 4-Ethyltoluene, Carbon Disulfide, Ethylbenzene, Naphthalene, o-Xylene, and Styrene. Several of these VOCs were reported at concentrations only slightly over their BASE Database 90th Percentile values (e.g., 1,3,5-Trimethylbenzene, 4- Ethyltoluene, Naphthalene). Each of the 9 VOCs reported above their respective BASE Database 90th Percentile guidance values for indoor air were present in subslab soil vapor at concentrations less than the values reported for indoor air, with the exception of 2-Butanone (which was present in ambient air at a concentration above the BASE Database 90th Percentile value). Six (6) of the nine (9) VOCs were also detected in the outdoor ambient air sample.

The State of New York does not have any standards, criteria, or guidance values for concentrations of volatile chemicals in sub-slab vapors. Soil Vapor/Indoor Air decision matrices were developed by the NYSDOH to provide guidance on actions that should be taken to address current and potential exposures related to soil vapor intrusion. When the indoor air and sub-slab analytical data were compared to the risk management matrices, no further action was required for any of the analytes included in the tables, with the exception of Vinyl Chloride at one (1) location. The concentration of vinyl chloride was reported at 11 mg/m³ in one sub-slab soil vapor sample. While Vinyl Chloride was not detected above the laboratory method detection limit (MDL) at any of the indoor air samples, based on the presence of vinyl chloride at sub-slab location SV-3, Soil Vapor/Indoor Air Matrix C suggests "Monitor" as an action.

The Additional Soil Vapor Intrusion Investigation is part of an ongoing investigation. As stated in the Decision Document for the Site, a soil vapor intrusion evaluation will be completed during the 2023 –

2024 heating season due to a change in use by the current tenants. The 2023 – 2024 SVI sampling was conducted on March 19, 2024. A separate SVI report will be provided to the NYSDEC upon completion, which will include comparison of the data to the 2024 updated NYSDOH decision matrices.

3.0 SITE CHARACTERIZATION SUMMARY

Results from the previous investigations were collectively used to develop a conceptual model for the Site. The conceptual model for the Site was presented in detail in the RI/RAAR. The conceptual model included detailed discussions of the Site's physical conditions, subsurface conditions, the nature and extent of impacts, and the constituents of concern.

The BCP Site is almost completely covered with a concrete block building and asphalt pavement. Narrow paths of unpaved vegetated areas consisting of weeds, grass, and woody shrubs and trees exist on the north and west sides of the Site.

Brief summaries of the Site geology, hydrogeology, and nature and extent of impacts are presented below.

3.1 Geology

The overburden strata, in descending order from the ground surface is summarized below.

- Fill. The layer of fill includes a mixture of sand, clay, metal scrap, and concrete. At several soil boring locations paint residuals were also encountered. The thickness of the fill is not uniform and ranges in thickness from 8 to 16-feet bgs (west to east). The thickness of fill was found from 10 to 16-feet bgs in a north to south direction.
- Native Soil: Below the fill the native soil consists of stiff clay, silty clay, and clayey gravel.

3.2 Hydrogeology

As presented in the RI/RAAR, the hydrogeology at the Site consists of a shallow (perched) overburden groundwater, as summarized below.

- Static water levels in Site monitoring wells were recorded from approximately 5-inches to 4-feet bgs.
- The direction of groundwater flow appears to be to the west-northwest. The native clay mixtures appear to be limiting groundwater migration.

3.3 Nature and Extent of Impacts

The locations of surface soil samples exceeding CSCOs, and the levels of impacts are shown on **Figure 4.** Surface soil impacts exist along the northern and western Site boundaries. As presented in the RI/RAAR, PAHs are the constituents of concern in surface soil.

The locations of subsurface soil exceeding CSCOs and PSGW SCOs are shown on **Figure 5**. As presented in the RI/RAAR, Total PCBs, PAHs, VOCs, and Mercury are the constituents of concern in subsurface soil. The subsurface impacts appear to be concentrated in and immediately adjacent to the settling lagoon and former trench that was used to discharge paint related wastes to the lagoon. Seven (7) subsurface soil samples collected from four (4) locations (SB-2, SB-3, SB-5, and SB-7) were the only subsurface soil samples that exceeded the CSCOs and/or PSGW SCOs. Each of the four (4) sampling locations were located within the former lagoon or associated trench area; no exceedances of CSCOs and/or PSGW SCOs were reported in samples collected from outside the suspected former lagoon or associated trench areas.

The locations of groundwater exceeding New York State Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1) groundwater standards or guidance values are shown on **Figure 6**. Based on the groundwater results and Site geology, the extent of groundwater contamination appears to be limited to perched water on top of an impermeable clay layer within the footprint of the settling lagoon. As presented in the RI/RAAR, PCBs, VOCs, and several metals (including Lead, Cadmium, Chromium, Magnesium, and Mercury) are the constituents of concern in groundwater.

4.0 REMEDIAL ACTION OBJECTIVES

The RAOs for the Site were developed and presented in the RI/RAAR, and included in the Decision Document. As presented in the Decision Document, the selected remedy will eliminate or mitigate, to the extent practicable, all significant threats to public health and/or the environment. To achieve this goal, RAOs that have been established for the Site and presented below in **Table 4.1**.

Table 4.1
Remedial Action Objectives

Media	Remedial Action Objective	
	Protection of Public Health	**Environmental Protection**
Soil	• Prevent ingestion/direct contact with impacted soil. • Prevent inhalation of or exposure from contaminants volatilizing from soil.	• Prevent migration of impacts that would result in groundwater or surface water contamination.
Groundwater	• Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards. • Prevent contact with, or inhalation of volatiles, from contaminated groundwater.	• Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable. • Remove the source of groundwater or surface water contamination, to the extent practicable.
Soil Vapor	• Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.	• Not applicable.

5.0 IDENTIFICATION OF APPLICABLE STANDARDS, CRITERIA, AND GUIDANCE VALUES

The planned remedial activities would be performed in accordance with applicable, relevant, and appropriate Standards, Criteria, Guidelines (SCGs) and permit requirements.

The remediation contractor will be responsible for identifying and following all pertinent SCGs for the Site.

5.1 New York State SCGs

Chemical-, action-, and location-specific SCGs that are potentially applicable to the implementation of the NYSDEC-selected remedy include:

- NYSDEC Division of Water, Technical and Operating Guidance Series document "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (TOGS 1.1.1).
- Title 6 of New York State Codes, Rules and Regulations ("NYCRR") Part 360, regulations pertaining to Solid Waste Management Facilities.
- Title 6 of NYCRR Parts 370-372, Part 376, and Part 364, requirements applicable to the management and, identification of hazardous waste, and hazardous waste standards applicable to generators and transporters.
- Title 6 of NYCRR Part 375 which defines the SCOs and soil cover requirements for the project. For this project restricted residential SCOs will be followed.
- Title 6 of NYCRR Part 750 State Pollution Discharge Elimination System Requirements, especially Stormwater Permit for Construction Activity.
- Title 6 of NYCRR Parts 597, Hazardous Substances Identification, Release Prohibition and Release Reporting.
- NYSDEC's Division of Environmental Remediation, DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).
- NYSDEC Program Policy, DER CP-51/Soil Cleanup Guidance.
- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in New York State (2006) with updates.

5.2 Town of Tonawanda Standards, Criteria and Guidelines

The Town of Tonawanda will require Marsh's selected OSHA certified contractor, Sessler Environmental Services, Inc. (SES) to obtain the following permit prior to starting remediation work:

- Demolition Permit.

In addition, a discharge permit would be required if treated water is discharged to a municipal sewer. Water generated during the remedial action from dewatering, decontamination of equipment, etc. will be collected and containerized on Site in a Frac tank, or similar. At the end of the field work, water from the Frac/storage tank will be sampled and a determination will be made on its disposal requirements. The water will either be transported off-Site for disposal or treated on-Site and discharged into an existing storm sewer located on the Site. If treatment and discharge to the municipal is the selected alternative, an Erie County Division of Pure Waters short term permit will be obtained. Marsh will contact the Erie County Department of Engineering prior to the start of the project so an agreement on the analysis, filtration, discharge rate, and discharge location can be determined to shorten the approval time. Marsh will notify the NYSDEC Project Manager when sample results are received and when the discharge will occur. The permit will be submitted to the NYSDEC prior to discharge of any water.

Note that SES recently updated their Contractor's License with the Town of Tonawanda. The Demolition Permit will be provided to the NYSDEC prior to the start of field work.

5.3 Site-Specific Requirements

Site specific requirements include the following documents:

- Site- and task-specific Health and Safety Plan (HASP), included as **Appendix B**
- Community Air Monitoring Plan, included as **Appendix C**
- Quality Assurance Project Plan, included as **Appendix D**

These plans have been developed as part of the RI and were revised to reflect task-specific activities required to implement the Site remedy.

6.0 SITE REMEDY

6.1 Basis of Design

The RI/RAAR and Decision Document were used as the basis of design for the Site.

6.2 Description of Site Remedy

The RI/RAAR and the Decision Document identified a Track 4 excavation of the source of impacts and evaluation of indoor air/soil vapor intrusion to be the appropriate remedy to meet the RAOs for the Site. The Track 4 soil removal to CSCOs approach was deemed to be fully protective of public health and the environment given the current and anticipated future use of the Site and adjacent properties. Descriptions of the remedial activities to be completed in support of the Site remedy are presented below.

In December 2023, a Decision Document was issued by the NYSDEC that identified the elements of the Site remediation. The Decision Document provides a detailed description of the remedy and is included as **Appendix F**. A summary of the remedial elements is provided below, and includes:

- Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and Site management of the remedy per DER-31.
- Limited excavation and off-Site disposal of an estimated 200 tons of unpaved shallow surface soil (i.e., 0 to 1 foot bgs) exceeding Part 375 CSCOs along the northern and western Site boundary to facilitate installation of a cover system. Collection and analysis of documentation samples at the remedial excavation extents will be used to document the soil conditions remaining after excavation.
- A Site cover is required where the upper 1 foot of exposed surface soil exceeds applicable SCOs to allow for future commercial or industrial uses. Clean fill meeting the requirements of 6NYCRR Part 375-6.7(d) can be brought in as backfill placed over a demarcation layer to establish final grades at the Site, with the upper 6-inches of soil sufficient quality to maintain a vegetative layer. Substitution of other materials may be allowed where such components already exist or are a component of the tangible property to be placed as part of Site development (e.g., pavement, concrete, paved surface parking areas, sidewalks, foundations, building slabs, etc.).
- Excavation and off-Site disposal of an estimated 750 tons of subsurface source area paint waste residuals, and soil/fill exceeding Part 375 CSCO and PSGW SCOs within the former paint waste lagoon and associated trench that are the primary source of impacts to groundwater. Source area materials are materials that meet any of the following criteria:
    - Grossly contaminated soil, as defined in 6NYCRR Part 375-1.2(u)

- Nonaqueous phase liquids (NAPL)
- Soil containing visual waste material or NAPL
- Soil that exceeds the GWSCO as defined in 6 NYCRR Part 375-6.8 for contaminants found in Site groundwater above standards (Mercury, Total PCBs, Ethylbenzene, Toluene, and Total Xylenes).

Collection and analysis of confirmation samples at the remedial excavation limits will be used to verify that SCOs have been achieved.

Waste characterization sampling will be completed for contaminated Site material for the purpose of off-Site disposal in a manner acceptable to receiving facilities, and in conformance with applicable laws, rules, regulations, and facility-specific permits.

Soil that does not exceed the above criteria or the GWSCOs for any constituent may be used anywhere beneath the cover system, including below the groundwater table, to backfill the excavation of re-grade the Site. Clean fill meeting the requirements of 6NYCRR Part 375-6.7(d) can be brought in to complete the backfilling of the excavation and establish the design grades.

- SES will provide, mobilize, install, operate, and maintain a temporary onsite water collection and treatment system to manage water generated during the excavation activities. While anticipated to be minimal, groundwater that enters the excavation will be pumped into the water storage FRAC tank. At the end of the project, it is anticipated that the water will be pumped through two granular activated carbon (GAC) vessels in series for removal of organics. The treated water will be sampled for discharge requirements, then discharged to an on-Site sewer upon approval from the WWTP.
- Monitoring of groundwater conditions. Each of the on- and off-Site monitoring wells will be sampled for VOC, PCBs, SVOCs, metals, and natural attenuation parameters. Monitoring will be required until reductions in monitoring are approved by the NYSDEC. Monitoring wells will be replaced in-kind if damaged or removed during the remedial action.
- A soil vapor intrusion evaluation will be completed in the on-Site building. The evaluation will include a provision for implementing actions to address any exposures related to soil vapor intrusion.
- Implementation of an institutional control in the form of an environmental easement for the Site that will:
  - Require the Site owner to complete and submit to the NYSDEC a periodic certification of institutional controls in accordance with Part 375-1.8(h)(3).
  - Allow the use and development of the Site for commercial or industrial 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 Department of Health.
  - Require compliance with the NYSDEC-approved SMP that will be prepared for the Site.

  Institutional controls to be placed on the Site are legal/administrative requirements, which if followed allow the use of the Site for a restricted commercial use.
- Preparation of a SMP to actively manage and periodically monitor the effectiveness of the

remedy, that includes:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Site.
- Excavation Work Plan that details the provisions for management of future excavations in areas of remaining impacted materials.
- Monitoring Plan to assess the effectiveness of the remedy, that includes:
  - Monitoring of groundwater sampling and analytical program to document that MNA is effective.
  - A schedule of monitoring and frequency of submittals.
  - Monitoring of soil vapor intrusion for on-Site buildings.
  - Implementation of a management and inspection program for the identified engineering control (asphalt cover).

Detailed discussions of the work-flow components associated with implementation of the Site remedy tasks are presented in the following sections. Additionally, details of how groundwater generated during the excavation activities will be managed are included in Section 9.6.

7.0 PRE-REMEDIATION ACTIVITIES

The pre-remediation tasks that will be completed prior to initiating excavation activities are described below.

7.1 Geophysical Investigation – Ground Penetrating Radar/Electromagnetic Survey

Leader will rely upon multiple lines of evidence to ensure to the maximum extent practicable that subsurface features are identified prior to commencement of intrusive work. Leader will conduct a geophysical investigation using a qualified subcontractor to conduct a ground penetrating radar/electromagnetic (GPR/EM) survey to locate possible piping, utilities, and underground obstructions prior to any intrusive activities in any areas of the Site. GPR/EM are non-destructive and non-intrusive geophysical exploration techniques that uses radar and electromagnetic waves to detect subsurface objects and anomalies, such as tanks, metal containers, and piping. The GPR/EM survey is also capable of detecting discontinuities in the subsurface materials indicative of excavated and backfilled areas. The objective of conducting this survey is not only to protect utilities, but also to identify possible additional sources of impacts that may remain on the Property. Anomalies identified during the GPR/EM survey will be marked out in the field and provided on a figure by the subcontractor.

7.2 Notifications and Permits

The following notifications will be made prior to Site mobilization:

- The NYSDEC will be notified by Marsh a minimum of 7 calendar days prior to Site mobilization and/or the start of any field activities, including those planned activities conducted by site management.
- The appropriate Dig-Safely New York One Call center will be notified by Marsh's selected OSHA certified contractor, SES a minimum of three (3) days prior to the start of remedial activities to initiate a subsurface utility clearance request to identify and mark the locations of underground utilities that may be within the proposed excavation limits. Ticket request numbers will be recorded and maintained in the project files.

Based on the remedial activities to be conducted at the Site, the following permits have been identified, at a minimum, as potentially applicable to the remedial activities:

- The Town of Tonawanda Building and Code Enforcement Office will be notified by SES, and a construction permit will be obtained (if required) prior to project commencement.
- Town of Tonawanda WWTP Discharge Permit – A permit will be required to discharge treated water generated during construction activities to an onsite sanitary sewer manhole, as appropriate. SES will coordinate with the WWTP to obtain the permit.

The Site is located on property owned by TSP; therefore, no access agreements are required to implement the Site remedy. SES will be responsible for identifying and obtaining any additional local permits necessary to complete the remedial construction activities.

8.0 REMEDIATION CONTRACTOR PRE-MOBILIZATION SUBMITTALS

Following contract approval, SES will be required to prepare pre-mobilization submittals for review by Marsh. The submittals will, in turn, be provided by SES to the NYSDEC and/or NYSDOH prior mobilization to the Site. SES will not be allowed to mobilize to the Site prior to review and approval of all required pre-mobilization submittals. These submittals will include, but not necessarily be limited to, the following:

- Insurance Certificate – SES will provide an insurance certificate identifying TSP as primary insured (certificate holder). Policy limits required for the remedial activities are identified in Marsh's standard terms and conditions for environmental remediation work. SES will not begin work prior to Marsh's approval of the insurance certificate. The insurance policy shall be primary and non-contributory basis.
- Health and Safety Plan (HASP) – SES will prepare and submit a site-specific HASP for use by SES's onsite personnel during the remedial activities to provide a mechanism for establishing safe working conditions at the Site. The HASP will be prepared in accordance with all applicable rules and regulations, including 29 Code of Federal Regulations (CFR) 1910 and 29 CFR 1926, and will be prepared and/or approved by a Certified Industrial Hygienist. SES is required to take all necessary precautions for the health and safety of on-Site personnel in compliance with all applicable provisions of federal, state, and local health/safety laws and the provisions associated with the HASP. SES will assume sole responsibility for the accuracy and content of its HASP; Marsh will only document that a HASP has been prepared. SES will be responsible for conducting worker health and safety and worker breathing zone air monitoring for employees.

  SES will also conduct community air monitoring for the duration of the project, in accordance with the Community Air Monitoring Plan ("CAMP").
- Construction Permits – SES will be responsible for obtaining any local permits (e.g., city building and/or construction permits) necessary to complete the remedial construction activities.

9.0 REMEDIATION TASKS

The following sections provide detailed descriptions of the remedial approach.

9.1 Project Meetings and Inspections

Project meetings to be attended by Marsh, SES, and SES's subcontractors are described below. The NYSDEC will be notified at least 7 days in advance of the meetings and allowed to attend the meetings. Anticipated onsite project meetings will consist of:

- Pre-Construction Conference
- Daily Site Safety (Tailgate Safety) Meetings
- Weekly Construction Progress Meetings, as required
- Final Inspection and Close-out Meeting, to be conducted on-Site

9.2 Mobilization and Site Preparation

SES will complete the mobilization and Site preparation tasks listed below. SES will coordinate with Marsh to develop a work schedule and obtain Site access. SES will mobilize after notification from Marsh to proceed. In general, mobilization activities include bringing personnel, equipment, and materials to the Site to support the remedial construction activities. Mobilization and Site preparation tasks activities to be conducted by SES include, but are not limited to, the following:

- Utility Protection. The presence and location of utilities that may impact implementation of the selected remedy will be identified prior to Site mobilization. Prior to implementing intrusive activities, the following activities will be conducted to identify/locate overhead and subsurface utilities in the immediate vicinity of the proposed remediation limits:
  - Reviewing available drawings
  - Performing a visual Site inspection
  - Contacting Dig Safely New York at least three working days, but not more than 10 working days, before subsurface work is initiated to identify and mark locations of all underground utilities at, and in the immediate vicinity, of the proposed work areas.
- Clearing and Grubbing. Vegetation, brush, and small trees along northern and western sides of the Site will be removed in the areas shown on **Figure 7** by SES. The Vegetation, brush, and small trees will be chipped and disposed of along with the non-hazardous soil.. The four (4) mature trees that exist along the northern Site border adjacent to the 84 Lumber building will remain.
- Installing temporary erosion and sedimentation controls. Temporary erosion and sedimentation controls will be installed and include, but are not limited to, silt fencing, filter socks, straw bales, straw wattles, and/or water diversion structures, as necessary. The anticipated locations of the temporary erosion and sedimentation controls are shown on **Figure 8**; however, final locations will be determined in the field with agreement with the NYSDEC.
- Providing project signage. SES will install and maintain project signs and no trespassing signs along the perimeter of the support and work areas.
- Providing dewatering equipment. Significant dewatering is not anticipated; however, SES will mobilize an appropriate water storage tank (Frac tank) and associated pumps and piping to the Site to support the collection and temporary storage of construction fluids.
- Installing security fencing. SES will be responsible for maintaining site security, controls, and access associated with each work task. Access to remedial work areas will be restricted. An approximately 60 linear feet of temporary 4-feet (minimum) tall chain link or plastic/composite

fence will be erected to secure the work area as shown on **Figure 8**. Traffic safety cones and caution tape will also be used to identify the boundaries of the work zone. The temporary security fencing will be able to be moved to allow renters access to their storage units as required and as safe conditions allow.

In addition, SES will set up temporary fencing and/or caution tape, along with warning signage, around any open excavation at the end of each work day.

- Saw cutting of Asphalt. The asphalt will be cut at the anticipated perimeter of the lagoon and trench excavations and removed from the Site for recycling or reused as backfill (with NYSDEC approval).
- Construction of vehicle decontamination pad. A bermed decontamination pad measuring approximately 20-feet by 50-feet will be constructed for vehicle decontamination where vehicles can be inspected, and loose soil and materials can be removed from the vehicles before leaving the Site. The truck loading area will be on asphalt so there is very little possibility that loose soil and materials will be on truck tires. The decontamination pad will be constructed on an area of existing asphalt, and will be constructed of 12 millimeter polyethylene (or 2 layers of 6 millimeter polyethylene). SES will be responsible for maintaining the remediation support areas (including the integrity of the liner systems) as necessary during implementation of the remedial activities.
- Construction of equipment decontamination pad. A dedicated decontamination station will be provided for small equipment/hand tools that can be picked up by a worker (e.g., shovels, tripods, picks, wheel burrows, etc.). The equipment decontamination pad will be bermed with a sump for fluids collection. Plastic liners used in the decontamination pads will have a minimum thickness of 6 millimeters. Collected fluids will be containerized for further evaluation or pumped into the Frac tank. Containers will be labeled before being used for decontamination fluids. Empty containers will be provided for the storage of spent PPE for subsequent disposal. In lieu of constructing an equipment decontamination pad, SES can provide a decontamination trailer.
- Construction of soil staging areas. During excavation material will be segregated based on apparent levels of impacts, and temporarily staged in stockpiles on polyethylene sheeting. Two staging area will be constructed of polyethylene that are bermed around the perimeter to allow for water collection. The soil staging pad will be constructed as follows:
    - the area will be level and free of rock, metals or wood
    - a berm composed of soil or another suitable material (e.g., straw bales, lumber, sandbags, etc.) will be constructed surrounding the stockpile area
    - the area will be lined with plastic to a thickness of 12 millimeters (this can be a single sheet or multiple, overlapped sheets)
    - the soil pile(s) will be covered with 6-millimeter or greater plastic daily as needed to control dust and at night when work has ceased for the day
    - the covers will be secured so they remain in place - covers will be replaced when damaged.

9.3 Monitoring Well Decommissioning

Two existing monitoring wells (MW-3 and MW-4) are located within the anticipated excavation limits of the former lagoon and associated trench. Per NYSDEC Policy CP-43; Groundwater Monitoring

Well Decommissioning Policy, and addendum (CP-43), the wells must be decommissioned in a manner to prevent cross contamination.

Both MW-3 and MW-4 are constructed of 2-inch diameter, PVC well screen and riser. The methods for decommissioning the wells presented below were selected based on review of well construction and environmental parameters. Well construction logs for MW-3 and MW-4 are included as **Appendix E**.

Decommissioning will be documented using the Well Decommissioning Record provided as Figure 3 in CP-43.

9.3.1 Decommissioning of MW-3

The soil boring log for MW-3 identified impacts at 5 to 6 feet bgs. The well is screened from 5 to 15 feet bgs. To eliminate the potential for cross contamination, MW-3 will be decommissioned by grouting and pulling the casing. The grout will be added as the casing is pulled, as described in Section 2.3 of CP-43. A standard grout mixture consisting of Type I Portland cement, powdered bentonite and water will be used as described in Section 6.1 of CP-43.

9.3.2 Decommissioning of MW-4

Per the existing figures, monitoring well MW-4 appears to be located at the southern end of the former waste lagoon (i.e., within the former lagoon). The soil boring log for MW-4 indicates that fill material exists from grade to approximately 8-feet bgs. At the time of installation (December 2019), visual impacts were documented at the intervals from 4 to 5-feet bgs and 6 to 7-feet bgs. These intervals appear to be in the fill area. Tight clay was encountered at approximately 8-feet bgs. No visual impacts were documented within the clay to the bottom of the boring (15-feet bgs). Soil samples were collected for laboratory analyses from the two intervals with visual evidence of impacts (i.e., 4 to 5-feet bgs and 6 to 7-feet bgs) and from the just above the bottom of the bore hole (10 to 12-feet bgs). As shown on **Figure 9**, several analytes exceeded their respective CSCOs in the upper two intervals; however, there were no exceedances within the deepest interval (i.e., within the clay layer).

During the 2020 groundwater sampling event, light non-aqueous phase liquid (LNAPL) was observed in MW-4. As a result, it appears that contamination is present from the top of groundwater to approximately 7-feet bgs, above the clay layer at MW-4.

Prior to decommissioning MW-4, LNAPL will be removed from the well by manual bailing, and containerized. Based on the conditions documented at MW-4, and consistent with the relevant requirements of Section 2.3 (second paragraph) of CP-43, MW-4 will be decommissioned by pulling the well screen and riser while grout is added during pulling. The grout will fill the space once occupied by the material being withdrawn. Puncturing the bottom of the well or a casing cutter will be used to cut away the screen, and the casing will be lifted out using a backhoe. Additional grout will be added to the casing as it is withdrawn. Grout mixing and placement procedures will be consistent with the requirements provided in Section 6 of CP-43.

It is anticipated that excavation of soil above SCOs in the lagoon area (i.e., surrounding MW-4) will occur after the well is decommissioned.

9.4 Vapor and Dust Air Monitoring

Marsh will be responsible for monitoring potential impacts to workers, NYSDEC personnel visiting the site, and the surrounding community throughout the remedial construction. SES will be responsible for implementing:

- Vapor and dust perimeter air monitoring as described in the CAMP included in **Appendix C**.
- Worker breathing zone air monitoring.

Marsh will also be responsible for implementing corrective actions in consultation with SES and the NYSDEC in the event of an exceedance. Vapor and dust perimeter air monitoring requirements, action levels, appropriate corrective actions, and reporting requirements are detailed in the project CAMP.

The CAMP requires continuous, real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area when intrusive activities are being conducted and when the covers of stockpiled/staged soil are not in place. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling (i.e., loading of trucks for disposal). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes.

A compressed data file that contains the raw data files from the individual monitors will be kept at the Marsh offices, and provided to the NYSDEC upon request. CAMP data summary tables will be provided to both the NYSDEC and NYSDOH project managers on a weekly basis. All CAMP data will be included in the FER. Any CAMP exceedances and/or corrective measures will be reported to the NYSDEC and NYSDOH within 24 hours.

In the event of an exceedance of an air monitoring action level for either total VOCs or particulates, the Marsh will notify SES and NYSDEC (via telephone) as soon as the exceedance is identified. Marsh will send a follow-up e-mail to NYSDEC and NYSDOH within 24 hours of an exceedance that summarizes the data, the cause of the exceedance, and corrective measures implemented (or to be implemented) in response to the exceedance. Work will not continue until exceedances are addressed, or levels return to below exceedance criteria. Marsh will address exceedances in real time (i.e., immediately).

Information regarding worker breathing zone monitoring requirements will be included in SES's HASP.

9.5 Soil Excavation and Staging

Materials to be excavated by SES as part of the remedial activities include:

- Surface/shallow soil along the northern and western property boundaries
- Subsurface soil within the anticipated lagoon and trench areas

The estimated horizontal extent of excavation of surface/shallow soil and subsurface soil to be excavated from the former paint waste lagoon, associated trench, and Site northern and western perimeters are shown on **Figure 8**.

SES will conduct excavation and backfilling activities in a manner that minimizes the disruption to on-Site operations, to the extent practicable. The general excavating and staging tasks to be performed include:

- SES will begin to excavate and remove material from within the former lagoon to a depth where visual observation of impacts do not exist. A PID will also be used to monitor for the presence of VOCs during excavation. Both the depth and lateral extent of excavation will be determined based on visual observation of conditions and PID monitoring results unless existing information/data indicates that exceedances of COCs exist at deeper intervals. Confirmatory samples will be collected to document that remaining soil meets the excavation criteria included in the Decision Document. The lateral extent of the lagoon area is estimated to

be approximately 40-feet by 50-feet, and the trench area is estimated to be approximately 110-feet long and 6-feet wide. As described in the RAAR, the depth of the excavation in the former lagoon and trench areas is anticipated to be a maximum of 8-feet bgs. Approximately 750 to 850 tons of material is anticipated to be removed from these areas.

- Asphalt will be segregated for off-site C&D disposal.
- Excavation of soil/surface material along the northern and western property boundary perimeter will be to a depth of 1-foot below the existing surface (after clearing and grubbing have been completed). Per 6 NYCRR Part 375-3.8(e)(4)(iii)(b), for commercial use, a minimum of 1-foot of clean fill is required. As presented in the RI/RAAR, the soil along the northern Site boundary consist of an approximate 415 linear feet of vegetated area separating the Site's paved surface from the adjacent 84 Lumber warehouse building. The vegetated area ranges in width from approximately 5-feet at the western end of the Site to approximately 10-feet at the eastern portion of the Site. To not disturb the 84 Lumber building/foundation/drainage, the width of the shallow soil removal will be 3 to 4-feet at the western end, gradually increasing to 5-feet at the eastern end. The shallow excavation will always remain a minimum of 2-feet from the building. Shallow material will also be removed from approximately 75 liner feet along the western property boundary at an average width of 4-feet. The estimated area of surface material that will be removed from the northern and western areas shown on **Figure 8**. An estimated total of approximately 200 tons of shallow material will be removed. If areas exist along the property boundaries where soil cannot be safely excavated, they will be sampled to demonstrate that they meet the cover requirements, or additional cover will be placed over the area.
- Excavated material will be temporarily staged in stockpiles on polyethylene sheeting. The sheeting will be constructed with a bermed perimeter. Stockpiles will be covered with 6-mil poly sheeting when not in use and anchored with sandbags, or similar weighted materials. A typical soil staging area construction is described in Section 9.2.
- Excavated materials will be segregated based on apparent level of impacts. Grossly impacted soil exhibiting excessively high PID readings or soil containing high volumes of paint residuals, paint derived sludge, or excessive vapor odors will be segregated onto a separate stockpile. Excavated material that does not visually exhibit gross contamination or excessively high PID readings will be staged in a separate pile(s). Excavated materials will remain staged until waste characterization sample results determine their disposal or re-use destination. If pre-characterization of soil was completed, and approvals received from the disposal facility, soil can be removed from the Site and transported to the approved disposal facility as logistically convenient.

Dust controls and material handling procedures will be strictly enforced by Marsh. Exclusion zones will be established and understood by all subcontractors, Site workers, and visitors.

9.6 Fluids Treatment and Disposal

SES will provide, mobilize, install, operate, and maintain a temporary onsite water collection and treatment system to manage water generated during the excavation activities. Perched groundwater in the western portion of the Site was measured at between 0.45 to 0.52-feet bgs; therefore, it is anticipated that excavated soil will require drainage. However, due to the tight nature of the soil, it is not anticipated that significant fluids will be generated.

Fluids generated during excavation activities may include, but is not limited to, the following:

- Groundwater and perched water from the excavation.

- Precipitation and surface-water runoff that enter the excavation.
- Water generated by gravity dewatering of excavated materials.
- Water generated by decontamination of equipment, trucks, and personnel.

Marsh anticipates that groundwater intrusion will be minimal and co-mingled with the impacted soil during excavation activities, without concern of excessive water runoff from the stockpiles. However, the stockpile staging pads will have water collection capabilities.

While anticipated to be minimal, groundwater that enters the excavation will be pumped into the water storage FRAC tank (Section 9.2). At the end of the project it is anticipated that the water will be pumped through two granular activated carbon (GAC) vessels in series for removal of organics. The treated water will be sampled for discharge requirements. Upon approval from the WWTP the fluids will be discharged. The temporary water management system will be installed at a location that will not interfere with excavation operations and provides suitable discharge to a sanitary sewer or truck access to support offsite haulage, if necessary. SES, with support from Marsh, will be responsible for obtaining the discharge permit with the WWTP and conducting sampling required under the permit.

9.7 Confirmatory Soil Samples

Once field observation and monitoring indicate that the impacted soil has been successfully removed from the excavations, end-point confirmatory soil samples will be collected by Marsh and submitted to a NYSDOH ELAP-certified analytical laboratory. The samples will be analyzed in accordance with NYSDEC ASP Category B laboratory data deliverable format. The samples will be analyzed for:

- TCL VOCs
- TCL SVOCs
- TAL Metals, including Mercury and Cyanide
- TCL Herbicides/Pesticides
- PCBs

The number of samples collected will be in accordance with DER-10 Section 5.4(b)(5). Protocols and procedures for the collection and analysis of the soil samples are included in the project Quality Assurance Project Plan ("QAPP"). The QAPP that was prepared for the Site's RI Work Plan has been revised, where appropriate, for use during the remediation activities. The QAPP is included as **Appendix D**.

Duplicate samples will be collected at a rate of 20% and matrix and matrix spike duplicates will be collected at a rate of 1 per 20 samples. A trip blank will be submitted for VOCs with each sample shipment and an equipment blank will be submitted for analysis during the sampling event. The contract laboratory will be asked to expedite the analysis and results for the confirmatory soil samples.

The post-excavation soil sample analytical data will be compared to the NYSDEC CSCOs, and Protection of Groundwater SCOs identified in 6 NYCRR Part 375-6.8(b).

As provided in DER-10, Section 5.4(b)2.i, it is DEC's goal that all confirmatory samples demonstrate that the remedy has achieved the DEC-approved soil cleanup levels. However, recognizing the heterogeneity of contaminated sites and the uncertainty of sampling and analysis, the DEC project manager has discretion under certain conditions to judge that remediation is complete where some discrete samples do not meet the soil cleanup levels established for a Site.

9.8 Installation of Demarcation Material

Prior to backfilling in the waste lagoon and trench, the bottom of the excavations will be lined with an orange plastic mesh, or similar, to be used as a demarcation barrier. A demarcation barrier will also be installed in the excavated areas along the northern and western property boundaries.

9.9 Import and Placement of Clean Fill

SES will be responsible for identifying a supply of clean fill that meets the Site's SCOs. The fill must meet the analytical requirements of DER-10, Section 5.4 and 6NYCRR Part 375-6.7(d) (Table 375-6.8(b) for Commercial Use).

Fill material will consist of one, or a combination of the following:

- Virgin soil from an approved source to be used for depths from approximately 1.5 to 4-feet bgs in the former waste lagoon and associated trench areas.
- If existing, clean, dry backfill from the soil staging area that has been tested and approved by the NYSDEC for backfilling can be used from 1.5 to 4-feet bgs in the waste lagoon and associated trench areas.
- Type 2 crushed stone from a NYSDEC permitted source(s) for use in areas to be paved. The stone will be delivered and placed into the lagoon and trench excavations a minimum of 1-foot thick and compacted as an asphalt subbase to a depth of 6-inches below the height of the surrounding asphalt and be fine graded.
- Clean gravel fill and clean stone that will be placed above the demarcation barrier in the shallow excavations. The gravel fill will be placed in the shallow excavation in a 6-inch lift and compacted, and covered with 6-inches of clean stone.

All materials in areas to be paved will be placed in 1-foot lifts and compacted with a vibratory roller or plate tamper. Typical cross sections for backfill of the shallow soil, trench, and lagoon areas are provided on **Figure 9**.

Request to Import/Reuse Fill Forms (examples included in DER-10) will be submitted by Marsh to NYSDEC for approval prior to importation of backfill material to the Site.

9.10 Dust and Odor Control

Dust suppression techniques will be employed as necessary to limit fugitive dust generated during intrusive activities. These suppression techniques may be employed even if the air monitoring results indicate that particulate levels are below action levels. No visible emissions will be permitted to leave the work area. Dust suppression techniques may include, but not limited to:

- Applying water obtained from a spigot inside the existing building using a hose on excavation surfaces to wet the soil.
- Hauling materials in properly tarped trucks or use of watertight containers.
- Limiting the size of exposed excavations by collecting confirmatory samples and then backfilling as the excavation progresses (note that if confirmatory samples require additional soil removal, the area will be re-excavated for additional removal).
- Covering excavated areas and materials by tarping.

Odor suppression will be implemented if odors can be detected at the perimeter of the property or if ambient air VOC concentrations at the downwind perimeter of the work area persist at levels in excess

of 5 part per million (ppm) above background for the 15-minute average. If odors exceed the action criteria, a solution of BioSolve^{TM} odor suppressant will be sprayed directly onto the exposed soil surface(s) or stockpiles where volatilization is occurring. BioSolve creates a foam barrier that keeps vapors in the soil.

9.11 Decontamination

Material decontamination will be required for all equipment and vehicles used on-Site before leaving the work area. SES will construct the vehicle decontamination pad near the area where potentially impacted materials will be handled. The decontamination pad will be an area where decontamination fluids and dirt can be collected. Decontamination will include removal of soil, then a wash with potable water using a pressure washer. If an excavator is located on the asphalt or clean fill, but is excavating into potentially impacted material, only the bucket of the excavator needs to be cleaned. The fluids will be containerized for further evaluation and/or added to the Frac tank. The containers used will be labeled before it is put into use for decontamination fluids.

All equipment and small tools will be decontaminated prior to leaving the work zone. Small equipment/hand tools, including shovels, picks, wheel burrows, etc. that touch potentially impacted soil will be decontaminated. Decontamination will include removal of soil, then a brush wash with potable water. The fluids will be drummed for further evaluation. The containers will be labeled before being used for decontamination fluids.

9.12 Management of Waste

Disposal of project derived waste is anticipated to include soil, debris (asphalt, concrete, stone, etc.), and water/liquids. Each of these material types will have special handling instructions.

Stained material, that which gives off odors or organic vapors, or has other waste-like qualities, will be placed in the soil staging area.

Debris will be segregated into piles containing wood, stone, concrete, brick, and asphalt, and piles of scrap metals that could be recycled. These stockpiles will be staged on polyethylene sheeting in a cleared area of the Site. The piles will be covered to control dust. When the piles require removal, SES will evaluate the piles to characterize the waste in accordance with the potential disposal facility and recycling requirements.

As stated above, liquids generated during the project will be staged, as appropriate. The liquids anticipated include decontamination fluids, rainwater accumulated in excavations, and dewatering fluids/groundwater.

Liquids may be suitable for discharge into the municipal sewer using the Erie County Division of Pure Waters short term permit process. Marsh will contact the Erie County Department of Engineering prior to the start of the project so an agreement on the analysis, filtration, rate, and discharge location can be determined to shorten the approval time. Marsh will notify the NYSDEC Project Manager when sample results are received and when the discharge will occur.

At the completion of excavation activities waste characterization samples from the segregated stockpiles of soil will be collected by SES and sent to the contract laboratory for the following analyses:

- Full RCRA TCLP including herbicides and pesticides,
- TCL Polychlorinated biphenyls (“PCBs”)
- Corrosivity, Ignitability, pH, percent solids, and total cyanide.

It is anticipated that soil deemed non-hazardous will be disposed at the Republic Services Pine Avenue Landfill, a NYCRR Part 360 permitted landfill facility located in Niagara Falls, New York.

It is anticipated that soil deemed hazardous will be brokered and disposed either by Ross Environmental Services, Republic, or Englobe, depending upon the analytical results.

Stockpiled soil identified for off-site disposal will be loaded into permitted trucks for off-Site transportation via appropriate waste manifest or bills of lading.

The polyethylene sheeting used to construct the soil staging and decontamination pads and associated materials will be loaded into the last haul truck for disposal as construction/demolition debris.

The NYSDEC will be notified a minimum of five (5) days in advance of any shipments for disposal or recycling. The notification will include, at a minimum, the waste characterization results, the receiving facility name/permit information, and the transporter name/permit information.

9.13 Site Restoration

SES will restore disturbed areas and remove decontaminated equipment from the Site following completion of Site activities. SES will also:

- Restore in-kind all support and ancillary areas disturbed during remedial activities, if any.
- Restore all features disturbed, damaged, or destroyed during the remedial activities to preconstruction conditions.

Marsh will retain a paving contractor to restore approximately 7,000 square feet of the parking area and install a 6-inch asphalt layer.

Per Remedial Element 5 of the Decision Document, any monitoring wells removed or damaged during the remedial action will be replaced in-kind. An evaluation will be conducted as part the SMP to determine the best location(s) of the replacement monitoring wells to collect Site groundwater data. The location(s) of replacement monitoring wells will be selected in concert with the NYSDEC.

9.14 ALTA/NSPS Land Title Survey

Marsh will contract with a New York State licensed surveyor to complete an ALTA/NSPS Land Title Survey ("ALTA survey"). The ALTA survey will be conducted following requirements identified in DER-10 and will be applicable for determining the Site's final elevation, and construction record drawings. The northings and eastings of the locations used for determining spot elevations will be recorded. All elevations will be determined to the nearest 0.05-foot and all horizontal distances will be determined to the nearest 0.1-foot. The survey will be conducted using the latest National Geodectic Vertical Datum 1983 or more recent.

The surveyor will be provided with appropriate and, when possible, legible data that can be relied upon in the preparation of the survey. To complete an ALTA survey, the surveyor will be provided with the current record description of the real property to be surveyed or the current record description of the parent parcel that contains the property to be surveyed. Any recorded easements benefitting the property to be surveyed and/or any recorded easements, servitudes, or covenants burdening the property to be surveyed will be provided.

10.0 SITE RECORDS

During the completion of the project, written and electronic records will be maintained each day during the remediation. Field notes will be maintained by all field team members and include field measurements, daily summary of activities, observations, and corrective actions, if required. Daily

field reports will include a summary of the CAMP-related activities (e.g., exceedances, if any, and measures taken to address those exceedances, movement of the monitoring station(s) based on changes in wind direction, etc.). At the completion of each week, a brief weekly report will be prepared summarizing work progress, air monitoring results (including downloaded data from the monitoring equipment), and any sampling results, estimates of materials excavated, and details of any materials removed from the Site.

Electronic records from air monitoring devices or sample results will be copied and maintained on the project computer and a separate flash drive. These records will be backed up weekly on Marsh's office server.

11.0 POST-CONSTRUCTION ACTIVITIES

This section describes the anticipated activities to be completed following completion of the remedial action. Following remedial construction activities, post-construction activities are anticipated to include preparation of a SMP, establishing institutional controls, and preparation of a Final Engineering Report.

11.1 Site Management Plan

A SMP will be prepared and submitted for review in a format consistent with the NYSDEC's Site Management Plan template. The primary components of the SMP will consist of the following sections, as appropriate:

- Institutional and Engineering Control Plan – describes the use of restrictions and engineering controls that will be established. It is anticipated that the primary institutional control will consist of an environmental easement (as described in Section 6.2) and the primary engineering control will consist of the Site cover.
- Monitoring and Sampling Plan – used to assess the effectiveness of the remedial activities. Potential monitoring plan components are described in Section 6.2.
- Periodic Assessment and Reporting Plans – the SMP will include requirements for post-remedial action Site inspection schedules, along with NYSDEC report submittal requirements.

11.2 Final Engineering Report

A Final Engineering Report ("FER") will be prepared, signed by Marsh's Professional Engineer, and will include the following components per DER-10:

- A description of the remedy, as constructed.
- A summary of the remedial action completed, including:
  - descriptions of any problems encountered during remediation and the associated resolutions
  - descriptions of any changes to the RDWP with justifications
  - quantities of impacted material removed
  - listings of the waste streams, quantities of materials disposed, and disposal facilities
  - restoration actions, including imported soil volumes
- Summary tables and figures indicating post-excavation confirmatory soil analytical data showing the successful completion of the soil removals.
- A description of the applicable areas of remedial action compliance.

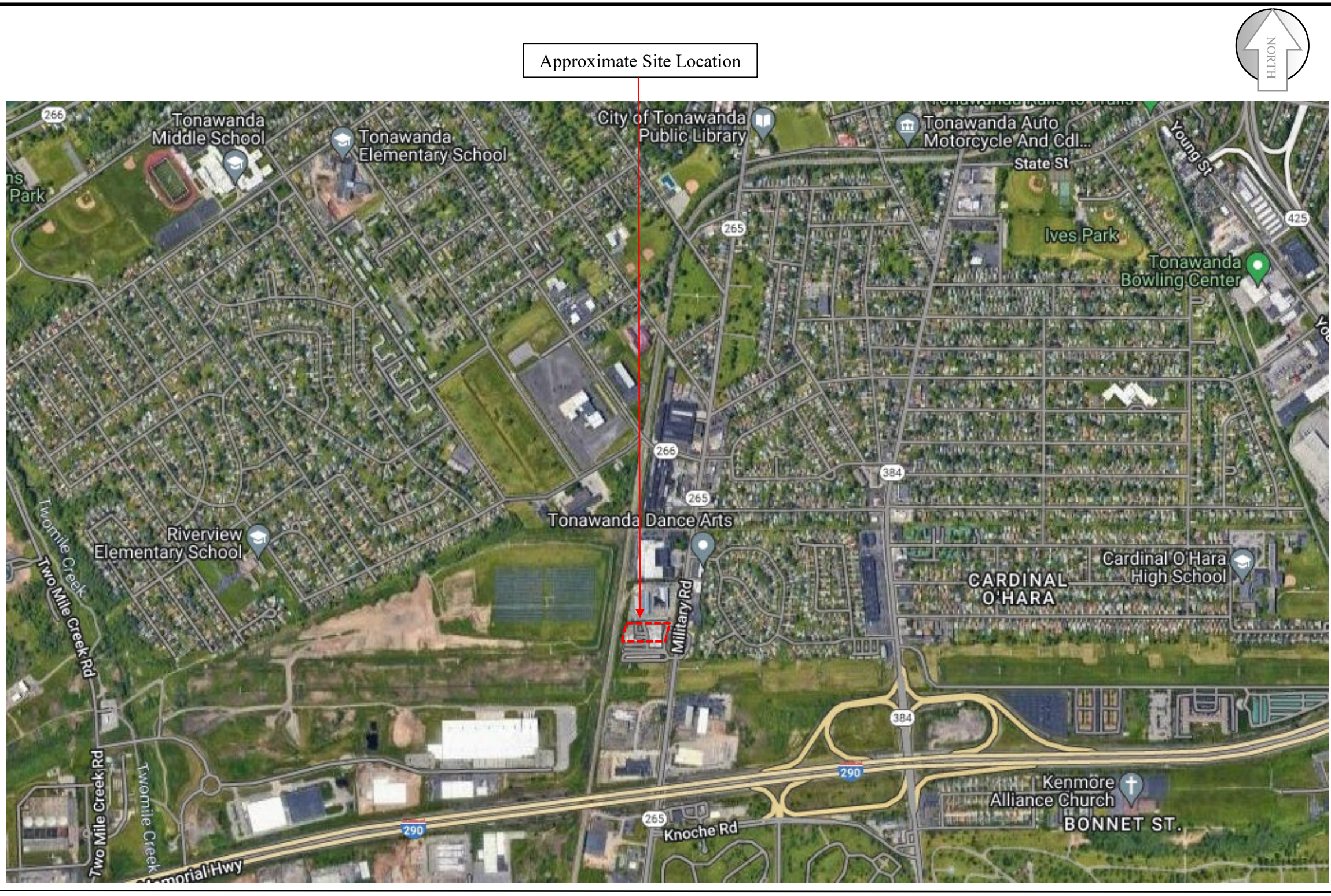
- Documentation supporting the permanent removal and/or replacement of any monitoring wells.
- An As-Built drawing of the work, including all soil removals with surveyed limits of the excavations and locations of final confirmatory samples.
- A Photograph log of the remedial events.
- Daily field reports and CAMP data will be included as appendices.

The FER will be submitted in an electronic format that complies with NYSDEC's Electronic Data Warehouse Standards ("EDWS") and all confirmatory analytical data will be submitted in an electronic data deliverable ("EDD") to the NYSDEC FTS site.

12.0 SCHEDULE

Upon receipt of the NYSDEC's approval of the RAWP, Marsh will immediately schedule implementation of the Site remedy. It is Marsh's intent/objective to provide the required notification to the NYSDEC, and begin remedial activities in April 2024.

FIGURES



Title:	Site Location Map 2266 and 2268 Military Road Tonawanda, New York
Prepared For:	Tonawanda Storage Properties, LLC 2600 Innovation Square, 100 South Clinton Avenue Rochester, New York

MARSH ENGINEERING D.P.C.
271 Marsh Road-Suite 2
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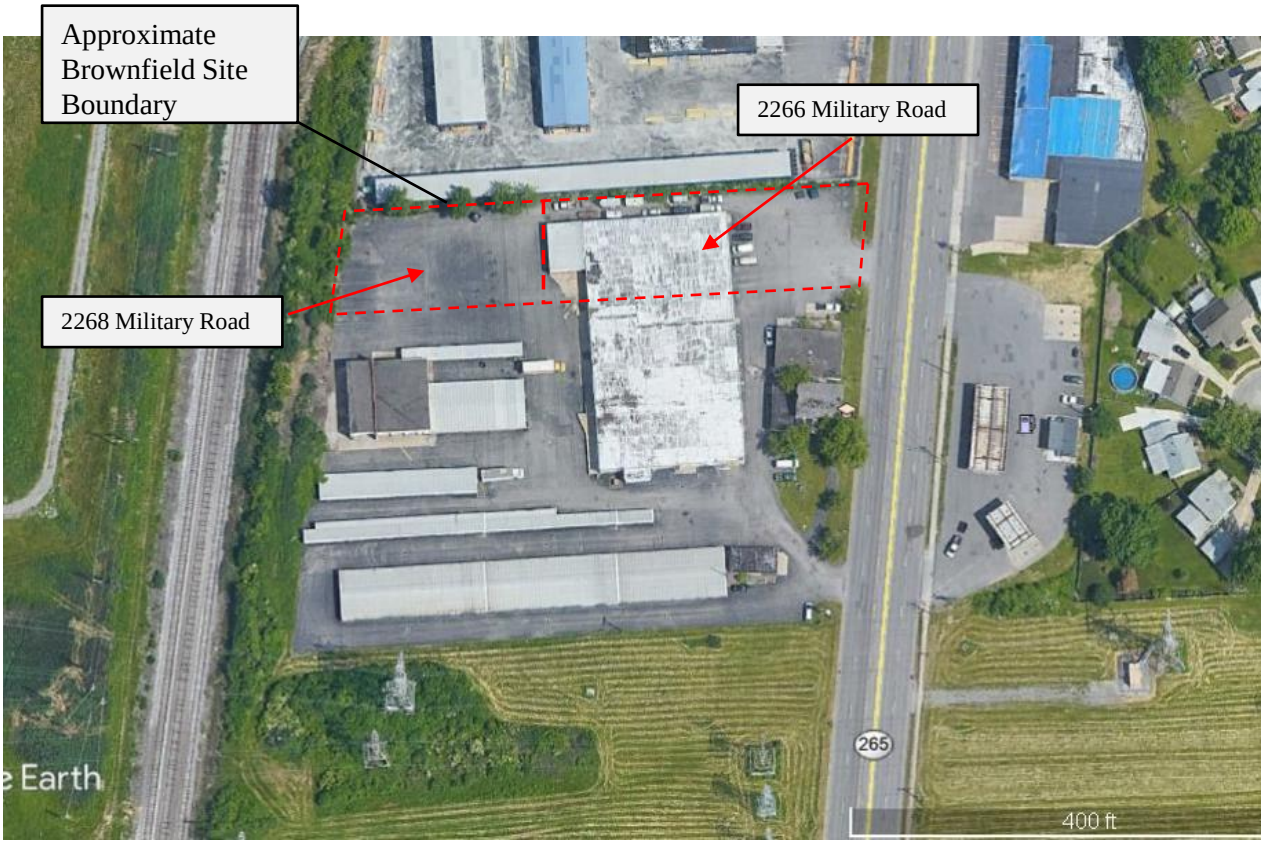
Project	1077.003
Date	10/9/2023
Scale	Not to Scale
Drawn	BWA
Checked	MPR
File Name	Site Location Map
Figure	1



Title	2017 Aerial View of Site 2266 and 2268 Military Road Tonawanda, New York
Prepared For	Tonawanda Storage Properties, LLC 2600 Innovation Square, 100 South Clinton Avenue Rochester, New York

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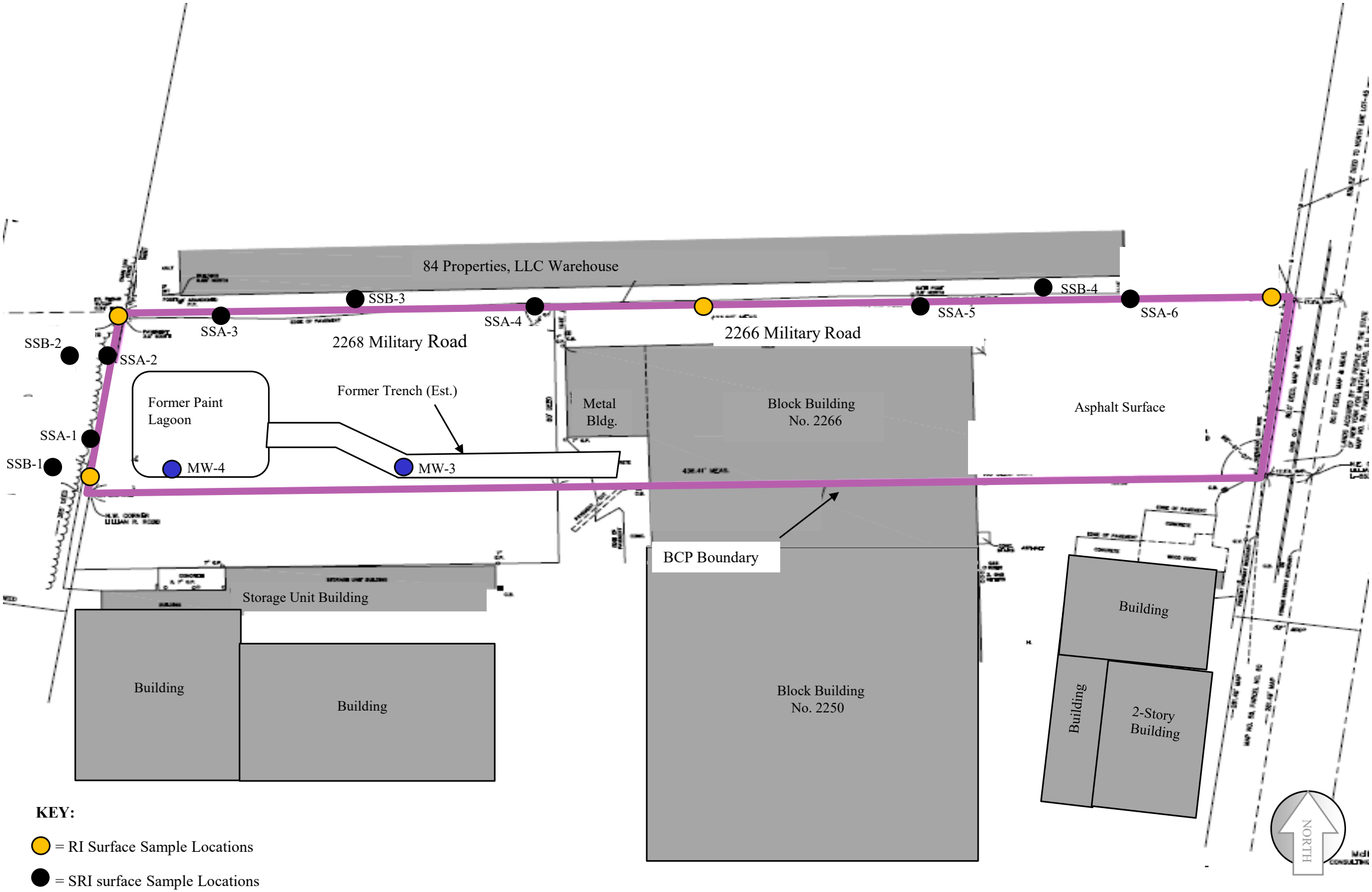
Project	1077.003
Date	11/28/2023
Scale	Not to Scale
Drawn	PVS/SF
Checked	MPR
File Name	2017 Photo
Figure	2



KEY:

● = RI Surface Sample Locations

● = SRI surface Sample Locations

Title:	Site Map 2266 and 2268 Military Road Tonawanda, New York
Prepared For:	Tonawanda Storage Properties, LLC 2600 Innovation Square, 100 South Clinton Avenue Rochester, New York

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Project	1077.003
Date	11/30/2023
Scale	Not to Scale
Drawn	FRT/BWA
Checked	MPR
File Name	Site Map
Figure	3

SSA-3

Analyte	RSCO	Result
Benzo(a)anthracene	5.6	4. 0
Benzo(a) Pyrene	1.0	6.1
Benzo(b)fluorathene	5.6	7.6
Dibenz(a,h)anthracene	0.56	0.92
Indeno(123-cd)pyrene	5.6	4.6

SSA-4

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	53
Benzo(a) Pyrene	1.0	89
Benzo(b)fluorathene	5.6	120
Dibenz(a,h)anthracene	0.56	12
Indeno(123-cd)pyrene	5.6	61

SSA-5

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	1.8
Benzo(a) Pyrene	1.0	3.3
Benzo(b)fluorathene	5.6	4.1
Dibenz(a,h)anthracene	0.56	0.44
Indeno(123-cd)pyrene	5.6	2.3

SSA-6

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	30
Benzo(a) Pyrene	1.0	48
Benzo(b)fluorathene	5.6	59
Dibenz(a,h)anthracene	0.56	6.8
Indeno(123-cd)pyrene	5.6	38

SS-2

Analyte	RSCO	Result
Benzo(a)anthracene	5.6	6.3
Benzo(a) Pyrene	1.0	8.2
Benzo(b)fluorathene	5.6	13
Dibenz(a,h)anthracene	0.56	1.4
Indeno(123-cd)pyrene	5.6	6.8

SSB-3

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	4.9
Benzo(a) Pyrene	1.0	8.7
Benzo(b)fluorathene	5.6	12
Dibenz(a,h)anthracene	0.56	1.3
Indeno(123-cd)pyrene	5.6	6.7

SS-3

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	52
Benzo(a) Pyrene	1.0	70
Benzo(b)fluorathene	5.6	110
Dibenz(a,h)anthracene	0.56	11
Indeno(123-cd)pyrene	5.6	64

SSB-4

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	15
Benzo(a) Pyrene	1.0	24
Benzo(b)fluorathene	5.6	31
Dibenz(a,h)anthracene	0.56	3.0
Indeno(123-cd)pyrene	5.6	16

SS-4

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	36
Benzo(a) Pyrene	1.0	45
Benzo(b)fluorathene	5.6	69
Dibenz(a,h)anthracene	0.56	7.1
Indeno(123-cd)pyrene	5.6	42

84 Properties, LLC Warehouse

SSB-3

SSA-3

SSA-4

Surface excavation

SSA-5

SSB-4

SSA-6

SSB-2

SSA-2

Former Paint Lagoon Depicted in 1972 Aerial Photograph

Metal Bldg.

Block Building No. 2266

Asphalt Surface

SSA-1

SSB-1

Tonawanda Storage Properties LLC

BCP Boundary

SSA-1

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	1.5
Benzo(a) Pyrene	1.0	2.4
Benzo(b)fluorathene	5.6	3.4
Dibenz(a,h)anthracene	0.56	0.30
Indeno(123-cd)pyrene	5.6	1.6

SS-1

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	7.1
Benzo(a) Pyrene	1.0	9.8
Benzo(b)fluorathene	5.6	17
Dibenz(a,h)anthracene	0.56	1.8
Indeno(123-cd)pyrene	5.6	8.5

SSA-2

Analyte	RCSCO	Result
Benzo(a)anthracene	5.6	7.2
Benzo(a) Pyrene	1.0	9.4
Benzo(b)fluorathene	5.6	12
Dibenz(a,h)anthracene	0.56	1.3
Indeno(123-cd)pyrene	5.6	6.4

Building

Building

Block Building No. 2250

Building

Building

2-Story Building

NORTH

KEY:
= RI Surface Sample Locations
= SRI Surface Sample Locations

Title: Surface Soil Exceedances of CSCOs
2266 and 2268 Military Road
Tonawanda, New York

Prepared For: Tonawanda Storage Properties LLC
1400 Crossroads Building
2 State Street, Rochester, New York

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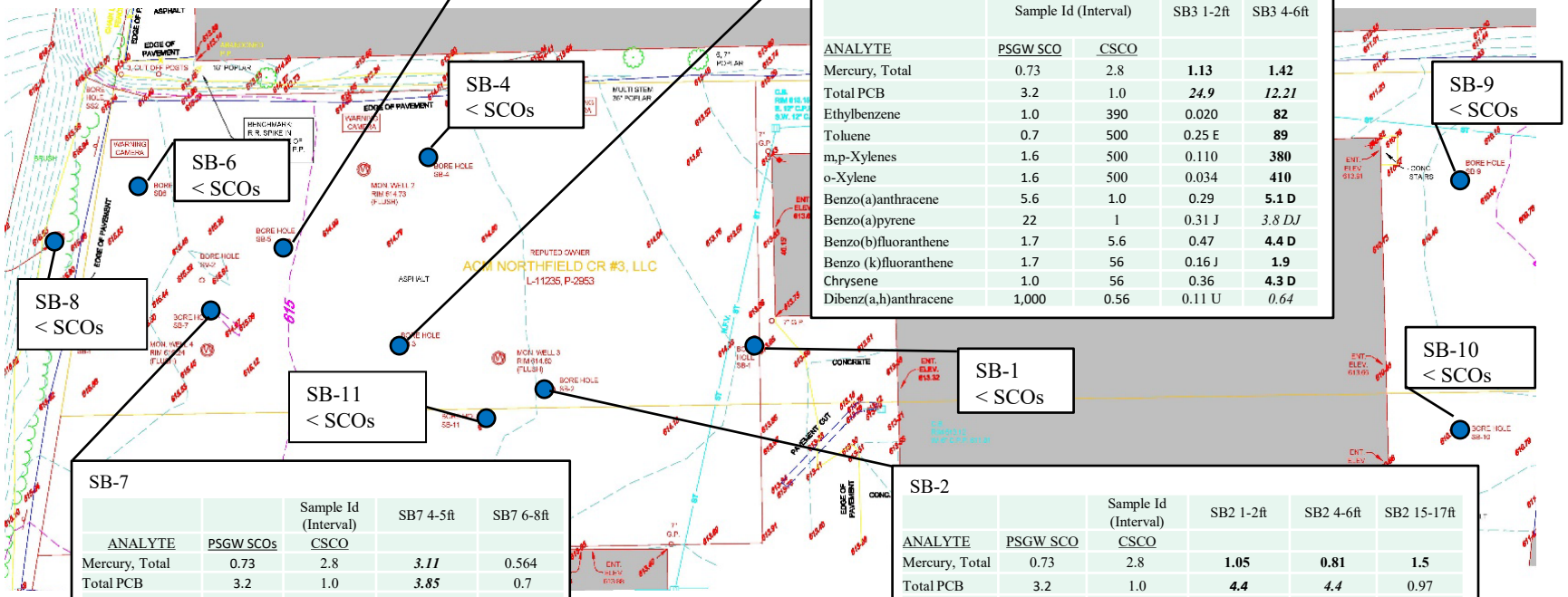
Project 1077.003
Date 11/2/2023
Scale Not to Scale

Drawn FRT
Checked MPR
File Name Surface Soil Exceedances of CSCOs

Figure 4

- Soil borings - SB-9 and SB-10 locations are approximate
< SCOs = All analyte concentrations were below both CSCOs and PSGW SCOs
Italic font = Analyte value exceeded its CSCO
Bold font = Analyte value exceeded its PSGW SCO
Bold and Italic font = Analyte value exceeded both its CSCO and PSGW SCO



SB-5

	Sample Id (Interval)		SB5 3-5ft	SB5 7-8ft
ANALYTE	PSGW SCO	CSCO		
Total PCB	3.2	1.0	0.284	*1.82*

SB-3

	Sample Id (Interval)		SB3 1-2ft	SB3 4-6ft
ANALYTE	PSGW SCO	CSCO		
Mercury, Total	0.73	2.8	**1.13**	**1.42**
Total PCB	3.2	1.0	***24.9***	***12.21***
Ethylbenzene	1.0	390	0.020	**82**
Toluene	0.7	500	0.25 E	**89**
m,p-Xylenes	1.6	500	0.110	**380**
o-Xylene	1.6	500	0.034	**410**
Benzo(a)anthracene	5.6	1.0	0.29	**5.1 D**
Benzo(a)pyrene	22	1	0.31 J	*3.8 DJ*
Benzo(b)fluoranthene	1.7	5.6	0.47	**4.4 D**
Benzo (k)fluoranthene	1.7	56	0.16 J	**1.9**
Chrysene	1.0	56	0.36	**4.3 D**
Dibenz(a,h)anthracene	1,000	0.56	0.11 U	*0.64*

SB-7

		Sample Id (Interval)	SB7 4-5ft	SB7 6-8ft
ANALYTE	PSGW SCOs	CSCO		
Mercury, Total	0.73	2.8	***3.11***	0.564
Total PCB	3.2	1.0	***3.85***	0.7
Ethylbenzene	1.0	390	***680***	***730 E***
Toluene	0.7	500	***1500***	**120**
m,p-Xylenes	1.6	500	***2900***	***2800 E***
o-Xylene	1.6	500	***970***	***550***

SB-2

		Sample Id (Interval)	SB2 1-2ft	SB2 4-6ft	SB2 15-17ft
ANALYTE	PSGW SCO	CSCO			
Mercury, Total	0.73	2.8	**1.05**	**0.81**	**1.5**
Total PCB	3.2	1.0	***4.4***	***4.4***	0.97
Ethylbenzene	1.0	390	0.24 J	***790***	**40**
Toluene	0.7	500	0.51	***12,000 E***	***570 E***
m,p-Xylenes	1.6	500	**2.4**	***3,300***	**170**
o-Xylene	1.6	500	0.13 J	***1,200***	**59**

Title: Subsurface Soil Exceeding CSCOs and PSGW SCOs
2266 and 2268 Military Road
Tonawanda, New York

Prepared For: Tonawanda Storage Properties, LLC
2600 Innovation Square, 100 South Clinton Avenue
Rochester, New York

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Project: 1077.003
Date: 10/06/2023
Scale: As shown

Drawn: FRT
Checked: BWA
File Name: Subsurface > CSCOs

Figure: 5

MW-1

ANALYTE	UNITS	NYSDEC TOGS	MW1
Metals			
Iron, Total	ug/L	300	4070
Magnesium, Total	ug/L	35000	89200
Manganese, Total	ug/L	300	220
Mercury, Total	ug/L	0.4	0.49
Sodium, Total	ug/L	20000	47000

MW-2

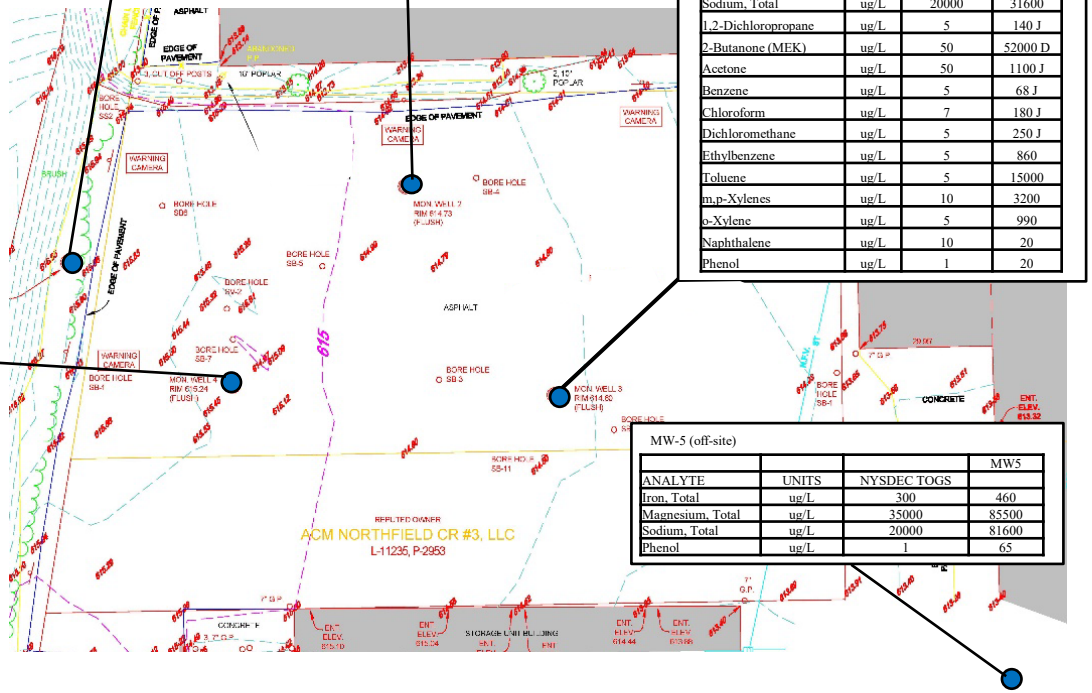
ANALYTE	UNITS	NYSDEC TOGS	MW2	MW2 DUP
Trichloroethene (TCE)	ug/L	5	8.1	1.8
cis-1,2-Dichloroethene	ug/L	5	13	2.8

MW-3

ANALYTE	UNITS	NYSDEC TOGS	MW3
Metals			
Antimony, Total	ug/L	3	6 J
Iron, Total	ug/L	300	4940
Lead, Total	ug/L	25	41 J
Magnesium, Total	ug/L	35000	35300
Manganese, Total	ug/L	300	488
Sodium, Total	ug/L	20000	31600
1,2-Dichloropropane	ug/L	5	140 J
2-Butanone (MEK)	ug/L	50	52000 D
Acetone	ug/L	50	1100 J
Benzene	ug/L	5	68 J
Chloroform	ug/L	7	180 J
Dichloromethane	ug/L	5	250 J
Ethylbenzene	ug/L	5	860
Toluene	ug/L	5	15000
m,p-Xylenes	ug/L	10	3200
o-Xylene	ug/L	5	990
Naphthalene	ug/L	10	20
Phenol	ug/L	1	20

MW-4

ANALYTE	UNITS	NYSDEC TOGS Std	MW4	MW4 FP
Antimony, Total	ug/L	3	105	95
Arsenic, Total	ug/L	25	22	26
Barium, Total	ug/L	1000	1050	955
Cadmium, Total	ug/L	5	8.5	8.6
Chromium, Total	ug/L	50	55	73
Iron, Total	ug/L	300	63800	44800
Lead, Total	ug/L	25	2830	2260
Magnesium, Total	ug/L	35000	129000	130000
Manganese, Total	ug/L	300	6430	6060
Mercury, Total	ug/L	0.4	3.19	2.14
Sodium, Total	ug/L	20000	961000	927000
Zinc, Total	ug/L	2000	160000	155000
4,4'-DDE	ug/L	0.2	3.0	2.3
4,4'-DDT	ug/L	0.2	1.6 P	1.3 P
Dieldrin	ug/L	0.004	0.51 J	0.48 J
Heptachlor	ug/L	0.05	0.63 J	0.46 J
Total PCB	ug/l	0.09	222.0	179
1,2-Dichloropropane	ug/L	5	140 J	100 U
2-Butanone (MEK)	ug/L	50	850000 D	590000 D
Acetone	ug/L	50	15000	10000
Bromodichloromethane	ug/L	50	110 U	260 J
Chloroform	ug/L	7	380 J	980
Dichloromethane	ug/L	5	310 J	250 J
Ethylbenzene	ug/L	5	1800	2000
Toluene	ug/L	5	45000	25000
m,p-Xylenes	ug/L	10	7400	7800
o-Xylene	ug/L	5	1400	1100
Bis(2-ethylhexyl) Phthalate	ug/L	5	97 U	830
Naphthalene	ug/L	10	11 J	11 U
Phenol	ug/L	1	350	250



MW-5 (off-site)

ANALYTE	UNITS	NYSDEC TOGS	MW5
Iron, Total	ug/L	300	460
Magnesium, Total	ug/L	35000	85500
Sodium, Total	ug/L	20000	81600
Phenol	ug/L	1	65

Title: Exceedances of Groundwater Standards or Guidance Values
2266 and 2268 Military Road
Tonawanda, New York

Prepared For: Tonawanda Storage Properties, LLC
2600 Innovation Square, 100 South Clinton Avenue
Rochester, New York

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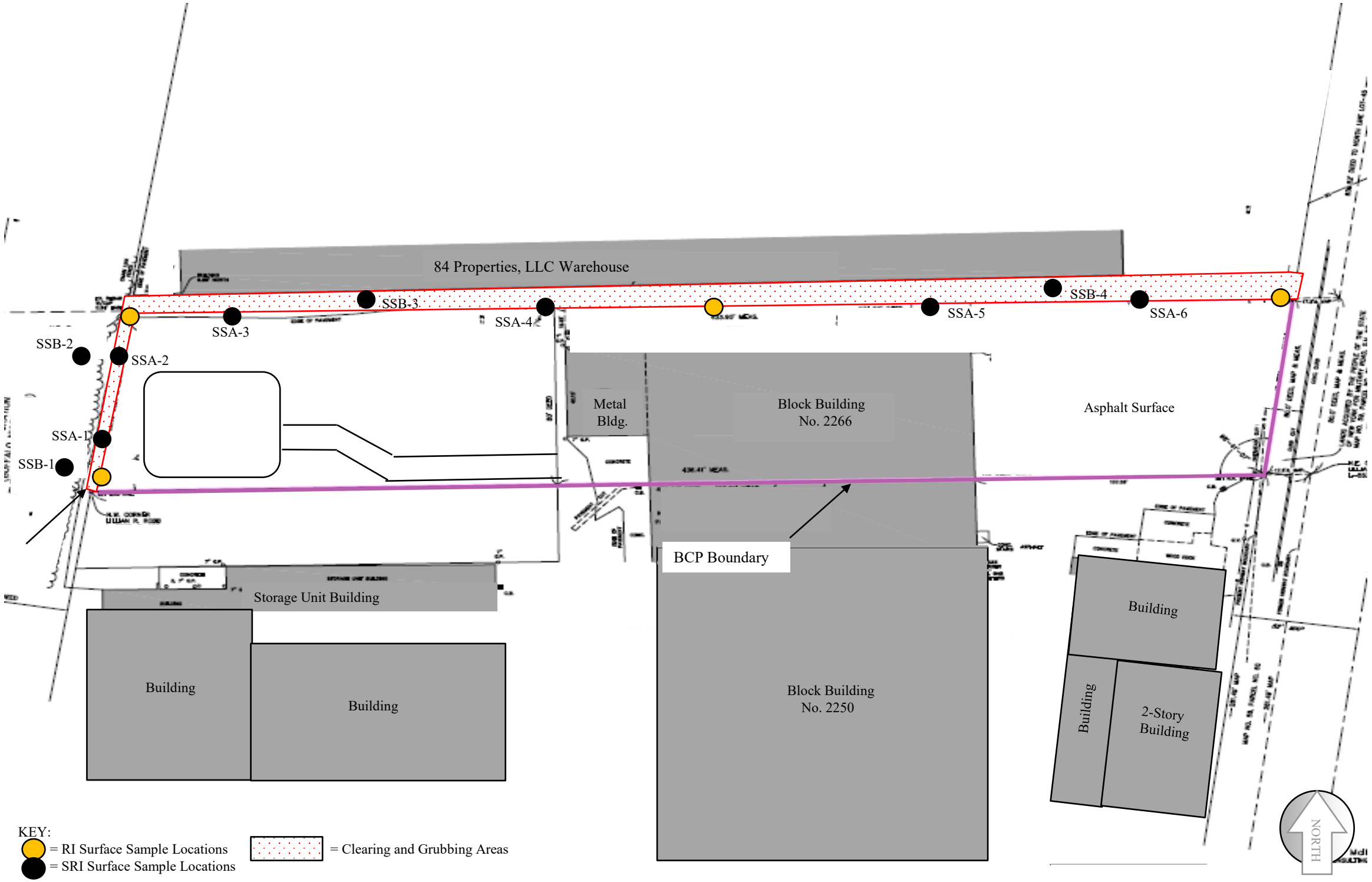
Project: 1077.003
Date: 10/06/2023
Scale: Not To Scale
Drawn: PVS
Checked: MPR
File Name: Exceedances of Groundwater Standards
Figure: 6



Title: Clearing and Grubbing Areas
2266 and 2268 Military Road
Tonawanda, New York

Prepared For: Tonawanda Storage Properties, LLC
2600 Innovation Square, 100 South Clinton Avenue
Rochester, New York

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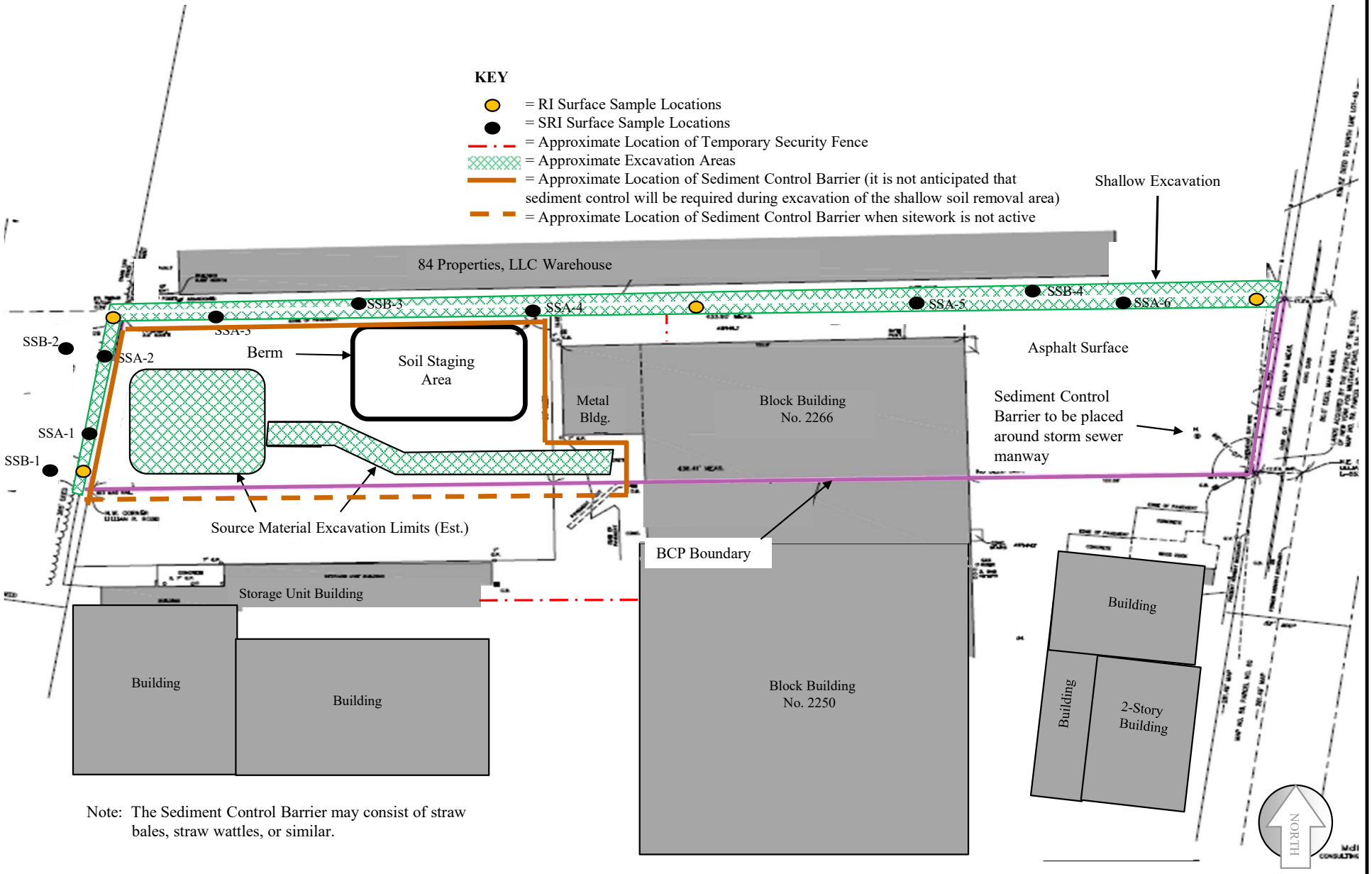
Project 1077.003
Date 10/06/2023
Scale Not to Scale

Drawn FRT
Checked BWA
File Name Clear & Grub Areas

Figure 7

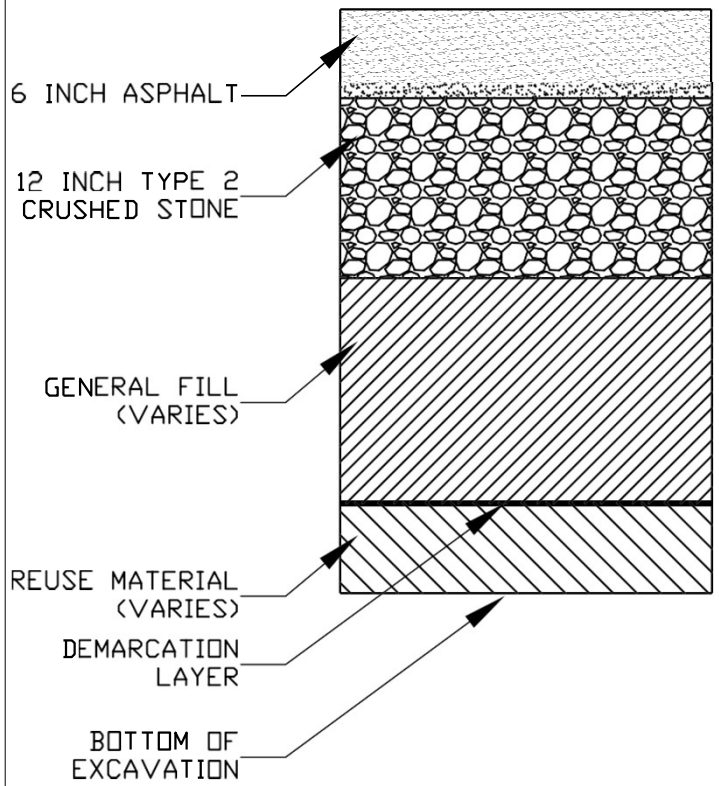


Note: The Sediment Control Barrier may consist of straw bales, straw wattles, or similar.

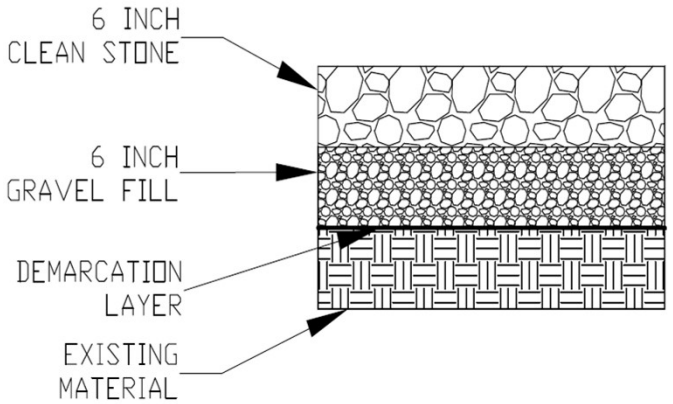
Title:	Surface and Subsurface Excavation Areas 2266 and 2268 Military Road Tonawanda, New York
Prepared For:	Tonawanda Storage Properties, LLC 2600 Innovation Square, 100 South Clinton Avenue Rochester, New York

MARSH ENGINEERING D.P.C.
271 Marsh Road-Suite 2
Pittsford, New York 14534
(585) 248-2413
FAX (585) 248-2834

Project	1077.003
Date	04/17/2023
Scale	Not to Scale
Drawn	FRT
Checked	BWA
File Name	Surface & Subsurface Excavation Areas
Figure	8



TRENCH AND LAGOON
RESTORATION CROSS SECTION



SHALLOW EXCAVATION
RESTORATION CROSS SECTION

Title: Restoration Details 2266 and 2268 Military Road Tonawanda, New York	Prepared For: Tonawanda Storage Properties, LLC 2600 Innovation Square 100 South Clinton Avenue Rochester, New York	MARSH ENGINEERING D.P.C. 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project Date 10/9/2023 Scale Not to Scale	Drawn BWA Checked MPR File Name Site Location Map	Figure 9

APPENDIX A

SITE SURVEY

OPERATING AUTHORITY FOR UTILITIES

1) TELEPHONE SERVICE------ VERIZON
65 FRANKLIN STREET
BUFFALO, NY 14202-4074 (716) 398-5788

2) ELECTRIC SERVICE------ NATIONAL GRID
300 ERIE BOULEVARD
SYRACUSE, NY 13202 (315) 428-6319

3) GAS SERVICE---------- NATIONAL FUEL GAS CORPORATION
6863 MAIN STREET
AMHERST, NY 14221 (716) 857-7435

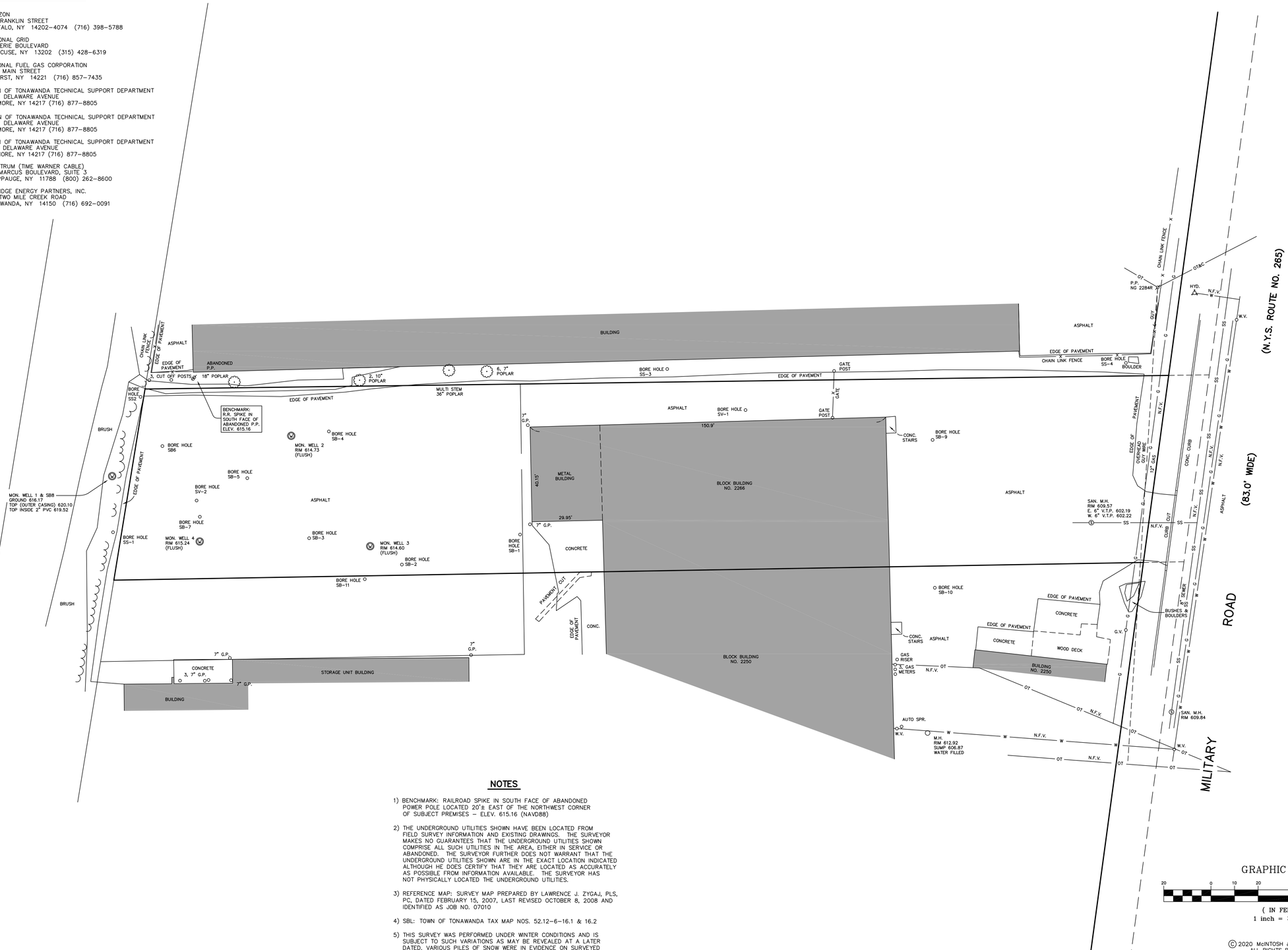
4) SANITARY SEWER SERVICE -TOWN OF TONAWANDA TECHNICAL SUPPORT DEPARTMENT
2919 DELAWARE AVENUE
KENMORE, NY 14217 (716) 877-8805

5) WATER SERVICE -------- TOWN OF TONAWANDA TECHNICAL SUPPORT DEPARTMENT
2919 DELAWARE AVENUE
KENMORE, NY 14217 (716) 877-8805

6) STORM SEWER SERVICE--- TOWN OF TONAWANDA TECHNICAL SUPPORT DEPARTMENT
2919 DELAWARE AVENUE
KENMORE, NY 14217 (716) 877-8805

7) CABLE SERVICE -------- SPECTRUM (TIME WARNER CABLE)
100 MARCUS BOULEVARD, SUITE 3
HAUPPAUGE, NY 11788 (800) 262-8600

8) PETROLEUM SERVICE ---- ENBRIDGE ENERGY PARTNERS, INC.
860 TWO MILE CREEK ROAD
TONAWANDA, NY 14150 (716) 692-0091



LEGEND

OT&C	OVERHEAD TELPPHONE & CABLE
OT	OVERHEAD TELEPHONE
SS	SANITARY SEWER
ST	STORM SEWER
W	WATER
G	GAS
X	FENCE
P.P.	POWER POLE
C.B.	CATCH BASIN
SAN. M.H.	SANITARY MANHOLE
G.P.	GUARD POST
G.V.	GAS VALVE
W.V.	WATER VALVE
HYD.	HYDRANT
AUTO SPR.	AUTO SPRINKLER
MON. WELL	MONITORING WELL
M.H.	MANHOLE
	SIGN
N.F.V.	NOT FIELD VERIFIED
	CURB WITH ELEVATIONS

NOTES

1) BENCHMARK: RAILROAD SPIKE IN SOUTH FACE OF ABANDONED POWER POLE LOCATED 20'± EAST OF THE NORTHWEST CORNER OF SUBJECT PREMISES – ELEV. 615.16 (NAVD88)

2) THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

3) REFERENCE MAP: SURVEY MAP PREPARED BY LAWRENCE J. ZYGAJ, PLS, PC, DATED FEBRUARY 15, 2007, LAST REVISED OCTOBER 8, 2008 AND IDENTIFIED AS JOB NO. 07010

4) SBL: TOWN OF TONAWANDA TAX MAP NOS. 52.12-6-16.1 & 16.2

5) THIS SURVEY WAS PERFORMED UNDER WINTER CONDITIONS AND IS SUBJECT TO SUCH VARIATIONS AS MAY BE REVEALED AT A LATER DATED. VARIOUS PILES OF SNOW WERE IN EVIDENCE ON SURVEYED PREMISES.

6) FOR SURVEY INFORMATION SEE SURVEY MAP PREPARED BY McINTOSH & McINTOSH, P.C., DATED FEBRUARY 26, 2020 AND IDENTIFIED AS JOB NO. 9602.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

McINTOSH & McINTOSH, P.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS
429 PINE STREET, LOCKPORT, NEW YORK 14094
PHONE 433-2535 PHONE 625-8360

REVISION	REVISION
	REMOVE VARIOUS ENTITIES MARCH 30, 2023

NOTE: UNAUTHORIZED ALTERATION OR ADDITION TO THIS MAP IS A VIOLATION OF SECTION 7209, PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

TOPOGRAPHICAL MAP OF PART OF LOT-45, TWP.-12, R.-8, HOLLAND PURCHASE

LOCATION TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK

JOB No. 9602-A | SCALE: 1"= 20' | DATE: FEBRUARY 26, 2020

DRAWN: MAS.
COMP.: JEM, III
DESC.:
CADFILE: 9602A.DWG

APPENDIX B

HEALTH AND SAFETY PLAN

Former Bisonite Paint Company
2268 Military Road and 2266 Military Road
Tonawanda, New York
NYSDEC BCP Site #C915010

Prepared for:

Tonawanda Storage Properties, LLC
2600 Innovation Square
100 South Clinton Avenue
Rochester, New York

Prepared by:

Marsh Engineering
271 Marsh Road, Suite 2
Pittsford, New York 14534

October 2023

Table of Contents

FIGURES

TABLES

Table of Contents

APPENDICES

1.0 Project Personnel Responsibilities

1.1 Principle-In-Charge

The Principal-In-Charge for this project will be Michael Rumrill. Mr. Rumrill will act in a supervisory capacity for Marsh Engineering, D.P.C.. (Marsh) employees and their subcontractors and the planned site activities with respect to the project site.

1.2 Project Manager and Project Supervisor

The Project Manager will be Bruce Ahrens of Marsh. The Project Manager will have the authority to direct site operations including the performance of this Health and Safety Plan. The Project Supervisor will be Mary Legawiec, an employee of Marsh. The Project Supervisor will oversee all field and related activities specific to the project. The Project Supervisor will have 29 CFR 1910.120 40-Hour Training and have an updated 8-Hour Refresher Training Certificate.

1.3 Health and Safety Officer (HSO)

Ms. Mary Legawiec, will be the site's Health and Safety Officer ("HSO"). Ms. Legawiec will have the authority to stop work if any operation threatens the health and safety of workers or the public. The HSO may designate a member of the work party for site health and safety responsibilities when the HSO cannot be on site. The HSO will have 29 CFR 1910.120 40-Hour Training and have an updated 8-Hour Refresher Training Certificate.

1.4 Project Team

Personnel and subcontractors on the project team will be responsible for the completion of the Work plan's required tasks. All personnel on the project team will comply with the site safety plan and ensure the site safety and health officer or supervisor is notified of any unsafe conditions. It is anticipated that the project team will consist of two to three Marsh individuals. This may vary due to any changes that occur during the actual site work. All personnel on the project team participating in field work will have 29 CFR 1910.120 40-Hour Training and participate in daily tailgate health and safety meetings. Subcontractors will supply their own HASPs.

2.0 Site Standard Operating Safety Procedures

Standard operating and safety procedures include safety precautions and operating practices that all personnel will follow. These include:

2.1 Personal Precautions

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated contaminated.

- Hands and face must be thoroughly washed upon leaving the work area.

- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

- It is not anticipated that respirators will be required; however, if required based on field monitoring, no facial hair that interferes with a satisfactory fit of the mask-to-face seal is allowed on personnel required to wear respirators. Personnel will use the negative pressure fit test prior to each use of the equipment.

- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit or place equipment on drums, containers, or the ground.

- Medicine and alcohol can enhance or mask the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by field personnel where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverages should be avoided, in the off-duty hours, during the project.

2.2 Operations

- All personnel working on-site must be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.

- Any required respiratory protection and chemical protective clothing must be worn by all personnel going into areas designated for wearing protective equipment.

- Personnel on-site must use the buddy system when wearing respiratory protection. As a minimum, one person, suitably equipped, is required as safety backup during initial entry.

- Visual contact must be maintained between pairs on-site and safety personnel. Entry team members should remain together to assist each other during emergencies.

- During continual operations, on-site workers act as safety backup to each other. Off-site personnel provide emergency assistance.

  Communications using radios, hand signals, signs, or other means must be maintained between team members at all times.

- Personnel and equipment in the contaminated area should be minimized to reduce the potential for cross contamination and the generation of decontamination waste.

- Work areas for various operational activities will be established by the Project Supervisor, or responsible designee, and the HSO.

- Procedures for leaving a contaminated area must be planned and implemented prior to going on-site. Work areas and decontamination procedures have been established based on expected site conditions and are described in the project Remedial Action Work Plan (RAWP).

3.0 Health and Safety Hazards

The potential hazards that may be experienced during the performance of the RAWP include:

- chemical exposures from contact with contaminated soil and/or groundwater
- hazards associated with working in an active facility where vehicular traffic may exist
- slip, trip and fall hazards
- cold and heat stress from performing heavy work while working in cold temperatures and wearing protective clothing.

Monitoring for the presence of organic vapors will be conducted. To prevent unnecessary exposures to vapors and to limit the potential for cross-contamination, all work areas will be limited from general access. The formation of distinctive work zones will assist in reducing the potential hazards that may exist when working at this facility. To further reduce the potential for accidents to involve moving vehicles, Marsh will coordinate each field activity with Tonawanda Storage's Site Manager(s) so tenants and delivery drivers know where remedial activities are occurring on the Site. To reduce accidents from occurring that involve slip, trip and fall hazards and hypothermia, work will be monitored by the Site HSO, and workers will be encouraged to use the "buddy-system" while lifting heavy tools or items to reduce early fatigue while wearing protective clothing.

Table B-1 list potential health and safety hazards that may be encountered based on general site tasks. This list has been compiled based on the scheduled activities and potential site conditions.

4.0 Personal Protective Equipment

4.1 Protective Equipment

All personnel will be provided with appropriate personal safety equipment and protective clothing. Each individual will be properly trained in the use of safety equipment before the start of field activities. All equipment and clothing will be cleaned and maintained in proper condition by the personnel. The Site HSO will monitor the maintenance of personnel protective equipment (PPE) to ensure proper procedures are followed.

PPE will be worn at all times designated by this HASP. Levels of protective clothing and equipment are not expected to exceed Level C. Results from the previous investigations and on-site instrument readings will be used to set action levels and levels of personal protection.

The PPE levels designated below are in conformance with EPA criteria for Level A, B, C, and D protection. All respiratory protective equipment used will be approved by National Institute for Occupational Safety and Health ("NIOSH") and Mine Safety and Health Administration ("MSHA"). Monitoring will be completed at all times; however, it is not anticipated that levels of protection will exceed Level D.

4.2 Level C Protection

A. Personal Protective Equipment:

- Half-face, air-purifying, canister-equipped respirator (MSHA/NIOSH approved) for acid/gas/organic vapor with particulate filter
- Chemical-resistant clothing (overalls and long sleeved jacket; coveralls or hooded, one piece or two-piece chemical-splash suit; disposable chemical resistant one-piece suits)
- Work Clothes (long sleeve shirt and pants)
- Gloves (outer), chemical resistant
- Gloves (inner), chemical resistant
- Boots (inner), leather work shoe with steel toe and shank
- Boots (outer), chemical resistant (disposable*)
- Hard Hat (face shield*)
- Safety Glasses or goggles
- Taping between suit and gloves, and suit and boots
- High visibility vest

*Optional

B. Criteria for Selection

- Meeting all of these criteria permits use of Level C Protection.
- Measured air concentration of identified substances will be reduced by the respirator to, at, or below the substance's Threshold Limit Value (TLV)/Permissible Exposure Limits (PEL) and the concentration is within the service limit of the canister.
- Atmospheric contaminant concentrations do not exceed IDLH levels.
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical resistant clothing.

4.3 Level D Protection

A. Personal Protective Equipment

- Work Clothes (long sleeve shirt and pants)
- Leather, steel-toed safety boots
- High visibility vest
- Hard hat
- Safety glasses/goggles
- Hearing protection, as required
- Gloves, as required

B. Criteria for Selection

Meeting all of these criteria permits the use of Level D Protection.

- Measured air concentrations of identified substances are below the substances Permissible Exposure Limit (PEL) or TLV.
- Oxygen content is > 19.5%.
- No unknown substances are present.

5.0 Decontamination

It is expected that the usual level of protection to be Level D. Level C will be used when potential exposures to contaminants justify increased protection. A decontamination zone will be set up at the entrance of each work zone. Based on the level of expected exposure to contaminants, the following decontamination protocol will be used.

5.1 Personnel Decontamination

It is expected that a minimum of Level D decontamination will be continually in effect at the site. On these occasions when higher levels of protection are required, appropriate decontamination procedures will be used. The extent of the decontamination procedures will be at the discretion of the site HSO.

In general, decontamination involves removing potentially contaminated soil from gloves and clothing, followed by scrubbing with a non-phosphate soap/water solution and clean water rinses. As a general rule, protective clothing will be removed in the reverse order as it was put on: gloves and boots off first, followed by protective suits and then breathing apparatus. As the different types of waste are generated, the team members will segregate the waste into different drums. Potentially contaminated soil and sediment will be placed into one drum and decontamination waste fluid into a second drum. All disposable items will be placed into a dry goods drum.

Certain parts of contaminated respirators, harness assemblies and leather or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. In addition to being decontaminated, all respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again unless they are assigned to individuals. The

manufacturer's instruction should be followed in sanitizing the respirator masks. The Site HSO will be responsible for supervising the proper protective equipment.

All decontamination wastewaters will be collected and disposed of according to applicable regulations. This disposal will be done at the direction of the Project Manager.

5.2 Equipment Decontamination

Decontamination will be applicable to all activities on site and be completed in the contamination reduction zone ("CRZ") section of the exclusion zone. All equipment (i.e., tools, monitoring equipment, etc.) will receive initial decontamination. All equipment that has been in contact with contaminants shall be stored in an area within the limits of the existing exclusion zone or shall be thoroughly decontaminated prior to leaving the area. Decontamination will consist of cleaning of the entire piece of equipment to the satisfaction of the Site Supervisor or the HSO. Decontamination will be a multi-process task, first all loose dirt or other foreign materials will be removed from equipment surface. Scrubbing with a synthetic wire brush may be required to remove materials that adhere to the surfaces. After the loose dirt is removed, the equipment will be washed using a detergent and water solution and a wire brush followed by successive rinses with clean water. Washing with hot water from a power washer may be substituted for a synthetic wire brush.

All dirty equipment will be stored on plastic sheeting in such a manner that decontamination waters can be collected and disposed of in accordance with applicable regulations. Clean equipment not in use will be covered with plastic and stored at a designated storage area.

Air monitoring equipment will be protected with an outer coating (i.e. plastic), if there is a potential for the equipment to come into contact with potentially contaminated materials prior to the initial entry into the exclusion zone. Decontamination will then consist of removal of the protective coating in a manner that will not contaminate the air monitoring equipment.

6.0 Site Air Monitoring

Field activities associated with the work tasks at the Site could potentially create hazardous conditions, such as the release of hazardous substances into the worker's breathing zone. These substances may be in the form of vapors, dusts, or mists that can enter the body through ingestion, inhalation, or direct skin or eye contact. If the HSO, relying on instrument observations and odor, determines that a condition exists in which workers may be exposed to airborne hazardous materials, the HSO will upgrade the team's level of respiratory protection and complete chemical specific monitoring.

The following paragraphs describe the monitoring parameters to be evaluated during the start of the project. As the project continues, other site-specific monitoring may be required based on site conditions and experience at the site. All instruments to be used during site activities will meet the established requirements set forth by OSHA, MSHA, NIOSH, and state agencies where applicable.

Field instrument measurements will be made during work progress with a direct reading organic vapor meter (i.e., photoionization detector [PID]). Monitoring will take place in the work zone and worker breathing zone. Additional requirements for up- and down-wind monitoring at the site perimeter are included in the Community Air Monitoring Plan (Appendix C to the RAWP). Monitoring within the work zone will be taken at least every 15 to 30 minutes. If elevated readings are obtained the monitoring frequency will be increased.

Dust monitoring will be conducted each day as conditions warrant from strategic locations up and down hill of the site's work areas as specified in the site CAMP (Appendix C to this RAWP). Dust monitoring will not be required when it is raining or snowing.

All readings obtained will be recorded in a dedicated site notebook maintained by the field personnel. Monitoring instruments will be maintained throughout the remedial action to ensure their reliability and proper operation. All site monitoring will be conducted by or under the direction of the Site HSO.

7.0 Action Levels

Action levels have been established for the upgrade and downgrade in the levels of personal protective equipment. Table B-2 lists the action levels, airborne concentrations, and their respective personal protection for unknown sources of organic vapor concentrations. Section 8.0 discusses the minimal personal protection required for specific site activities based on current information. Changes to these specified levels are dependent on the result of air monitoring as outlined below.

8.0 Site Activities and Associated PPE Requirements

The levels of protection have been assigned for anticipated Site activities (below) and represent a best estimate of exposure potential and PPE needed for that exposure. The site HSO will revise levels of protection, up or down, based on air monitoring results, and on-site assessments of actual exposures.

- *Level D* - General site work with limited physical contact with contaminated soil by personnel. If workers must pick up contaminated tools or a soil samples, protective chemical resistant gloves will be worn. Respiratory protection is not required when contaminant action levels cited on Table B-2 are not exceeded.

- *Modified Level D* - General site work where personnel will be in direct contact with contaminated soil or groundwater, but respiratory protection is not required because contaminant action levels cited on Table B-2 are not exceeded.

- *Level C* - General site work where personnel will be in direct contact with contaminated soil or groundwater, and organic vapor measurements or dust measurements are greater than those action levels cited on Table B-2.

9.0 Contingency Plan

The Project Manager/Supervisor or HSO is responsible for implementing the Contingency Plan whenever there is either a threat to human health or an environmental hazard. Possible Contingency Plan situations include actual or imminent fires, explosions, or spills.

The individual discovering the emergency situation is to notify the Project Supervisor or HSO who will then notify the facility manager for TSP and/or the appropriate organizations as described in Table B-3.

9.1 Assessment

The Project Manager/Supervisor is responsible for ascertaining any possible health or environmental hazards and determining the need for evacuation and notification of the proper authorities.

9.2 Control Procedures

The team member or site employee discovering a fire, explosion, spill, or other emergency situation is responsible for notifying the Project Supervisor or Site HSO and, as much as possible, provide the information listed in Table B-3. The Project Supervisor or HSO will assess the situation and notify the TSP representative to determine if it can be adequately handled by yard personnel or if additional assistance is needed.

Before any team member attempts to extinguish a fire, clean-up and contain a spill, or take any action, they must be aware of the properties of the material involved and its associated hazards. All team members will be familiarized with this information during the initial tail grate safety meeting.

Table B-3 includes a list of the organizations that are available to provide emergency assistance.

9.3 Fire and/or Explosion

The most serious emergency situation that could be faced at the site would be a chemical release or major fire. In the event of a fire or explosion, the Project Supervisor or HSO should be notified as described in the preceding section. The Project Supervisor or HSO will notify the Fire Department immediately and work with the representative from the facility manager to notify tenants.

The Fire Department should be notified immediately once a fire is detected. Small fires can be extinguished using a fire extinguisher located at the site. Larger fires will require the assistance of the fire department. The fire department will be informed of the nature of the fire and wastes at the site, and if water can be used to extinguishing fire.

9.4 Spill and/or Material Releases

The procedure for notification of the Project Manager/Supervisor and, or HSO are described in Section 9.2. Immediately following the discovery of a spill, the NYSDEC will be notified. In addition, the Comprehensive Environmental Response, Compensation, and Liability act of 1980 (CERCLA, or Superfund) requires that the National Response Center be notified of any release in excess of the reportable quantity of a listed material.

Spill clean-up poses no danger under normal conditions. The first step is to determine the source of the spill and correct it. This may involve patching a leaking drum, closing a valve or turning off a pump. In the event of a small spill, absorbent granules or sorbent pads will be utilized to soak up the spilled material. The granules would then be swept up and containerized in NYS Department of Transportation- (NYSDOT-) approved drums.

In the event a large spill occurs, TSP's preferred remedial contractor will be called to bring in pumps and vacuum trucks and transfer spilled material from the collection area into storage tanks or drums. All absorbent materials will be placed in NYSDOT-approved drums.

Any contaminated structures and equipment must be properly cleaned before being returned to service. This procedure will include use of pressure washers and sorbent materials. All affected floors and equipment, pumps and hoses, will be cleaned with an appropriate detergent and rinsed with clear clean water.

10.0 Work Areas

The Project Manager/Supervisor, HSO, the representative from ACM, and the Contractor will clearly layout and identify work areas in the field and will limit equipment, operations, and personnel as defined in the following areas:

a) Exclusion Zone ("EZ") - This area will include all areas where environmental monitoring has shown, or it is suspected that a contamination may exist and be a potential exposure problem to workers. The level of PPE required in these areas will be determined by the Site HSO. The area will be clearly delineated from the decontamination area. As work within the EZ proceeds, the delineating boundary will be relocated as necessary. The EZ will be delineated by plastic caution tape, barriers, or temporary fencing.

b) Contamination Reduction Zone (CRZ) - This zone will occur at the interface of "Contaminated" and "Clean" areas and will provide for the decontamination of equipment and materials and the transfer of equipment from the Clean Area to the EZ. This area will contain all required emergency equipment, etc. This area will be clearly delineated by plastic tape, barriers, or temporary fencing.

c) Support Zone ("Clean" Area) - This area is the remainder of the work site and project site. The "Clean" area will be clearly delineated, and procedures implemented to prevent active or passive contamination from the work site.

The function of the "Clean" area includes:

1) An entry area for personnel, material, and equipment to the "Contaminated Zone" area of site operations through the neutral zone.

2) An exit for decontaminated personnel, materials, and equipment from the "CRZ" area of site operations; and

3) A clean storage area for safety and work equipment.

11.0 Safety Equipment and Protective Clothing Specifications

All field team members will have the following safety equipment:

- Air purifying respirator with appropriate cartridges
- Protective clothing including, but not limited to:
    - Tyvek coveralls
    - Gloves
    - Boots
- Safety glasses
- Hearing protection
- Hard hats
- High visibility vest.

12.0 Air Emissions Control

The Project Team and subcontractor shall have on site all equipment to monitor and control air emissions.

It is not expected that air emissions will pose a significant risk to health and safety or to the environment due to the nature of the contaminants on this project.

The Project Manager/Supervisor and/or the HSO will make the determination for requiring monitoring and control of air emissions with the assistance of the following monitoring equipment and the action levels cited on Table B-2. It is anticipated that an organic vapor analyzer will be used to measure the concentration of most organic contaminants in the air.

13.0 Additional Health and Safety Comments

1) The Site HSO will ensure that all safety equipment and PPE is kept clean and well maintained.

2) All prescription eyeglasses in use on this project will be safety glasses and will be compatible with respirators. No contact lenses shall be allowed on-site.

3) During periods of prolonged respirator usage in contaminated areas, respirator filters will be changed upon breakthrough and at a minimum filters will be changed daily.

4) Footwear used on-site will be covered by rubber over-boots when entering or working in the EZ or CRZ, as required. Boots will be washed with water and detergents to remove dirt and contaminated sediment before leaving the CRZ.

5) All PPE used on-site will be decontaminated or disposed of at the end of the workday.

6) All air purifying respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.

7) Any team member or Contractor unable to pass a fit test as a result of facial hair or facial configuration shall not enter or work in an area that requires respiratory protection.

8) Team members found to be disregarding any provision of this plan will, at the request of the HSO, be barred from the project.

9) Used disposable outerwear will be removed upon leaving CRZ and will be placed inside containers labeled for that purpose. These containers will be staged at the site at the designated staging area. Marsh's subcontractor will be responsible for proper disposal of these materials at the completion of the project.

10) Tyvek or PVC rain suits that become torn or badly soiled will be replace immediately.

11) Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited on the Site.

12) All personnel will thoroughly cleanse their hands, face, forearms, and other exposed areas prior to eating, smoking, or drinking.

13) All personnel will wash their hands, face, and forearms before using toilet facilities.

14) No alcohol, firearms, or drugs (without prescription) will be allowed on-site at any time.

14.0 Miscellaneous Health and Safety Items

14.1 Hypothermia

When the ambient air temperature dips below 40^{o} F the field team and Site HSO will be aware of the signs of hypothermia. Cautions for signs of hypothermia will be discussed during the daily team kick-off meetings.

Signs of hypothermia include:

- Shivering.
- Exhaustion or feeling very tired.
- Confusion.
- Fumbling hands.
- Memory loss.
- Slurred speech.
- Drowsiness.

A fluid/electrolyte replacement will be available and used as necessary to minimize fluid loss. This liquid supplement will be stored in a cooler or thermos at the edge of the decontamination zone.

14.2 Retention On-Site

During the course of the project, it is expected that waste materials will be retained on-site until removed by TSP or its subcontractor. All waste containers will be labeled according to DOT and other regulations where appropriate. Waste materials, both containerized and bulk, will be staged in designated areas. All waste containers will be sealed before they are moved from the exclusion zone.

14.3 Equipment and Material Decontamination

All equipment and material used in this project shall be thoroughly decontaminated before it is removed from the project site. Debris and contaminated clothing and tools which cannot be decontaminated, shall be properly disposed.

14.4 Communications

Communication procedures are outlined in the Contingency Plan in Section 9.0 of this HASP.

Table B-3 contains an emergency call list and will be maintained on site and in the Tonawanda Self Storage office.

14.5 On-Site Hygiene Facilities

The TSP lavatories will be available for decontaminated team members and subcontractors. Water will be available in the CRZ for decontamination.

A first aid kit will be kept in the support zone at the Site at all times.

15.0 Tailgate Safety Meetings

The HSO or the designated representative will conduct daily tailgate safety meetings each workday and will be mandatory for all project personnel. The meetings will provide information on the anticipated site conditions and the work to be completed that day. Appendix B-1 contains a form for documenting Safety Meetings. Completed forms will be retained in Marsh's project file.

Additional safety meetings will be held on an as-required basis.

16.0 Medical Surveillance

All team members and subcontractors that may potentially have contact with hazardous substances at concentrations above the permissible exposure level (PEL) will be part of a Medical Monitoring Program as outlined in 29CFR 1910.134 and 29CFR 1910.120.

TABLE B-1

KNOWN AND POTENTIAL HEALTH AND SAFETY HAZARDS
BISONITE PAINT COMPANY
TONAWANDA, NEW YORK

Known and Potential Site Hazards: *Chemical* (See Appendix B-1 for information sheets and/or SDSs)

1) Contaminants

- PAHs
- Xylene
- Toluene
- Antimony
- Barium
- Chromium
- Lead
- Mercury

2) Review of Symptoms

Symptoms of exposure to hazardous wastes and in particular to the contaminants above will be reviewed with all site personnel. Symptoms of both acute and chronic exposures will be covered. In addition, the on-site coordinators will be advised to watch for outward evidence of changes in workers' health. These outward symptoms may include fatigue, tremor, insomnia, skin irritations or discoloration, eye, nose and throat irritation, cough, or abdominal soreness.

Note the number and nature of potential contaminants mandate that contact of waste materials with the exposed skin must not be allowed to occur under any circumstances.

Known and Potential Site Hazards: *Non-Chemical*

- General Physical Hazards. Since the project will take place at an active site, the physical hazards include:

  Vehicular traffic
  Underground and aboveground utilities
  Slip, trip, and fall

TABLE B-2

ACTION LEVELS
BISONITE PAINT COMPANY
TONAWANDA, NEW YORK

Unknown Organic Vapor Concentrations (ppm)[1]	Level of Protection
< 1	Level D
≥ 1 < 10	Level C
>10	Level B
Anticipated Chemical Contaminants[2]	**Time Weight Average (ppm)**
Xylene	100
Toluene	100
Metals (as Mercury dust)	<0.025 mg/cubic meter

Note:

1 Unknown organic vapor action levels are based on the lowest known exposure limits for chlorine (PEL = 1 ppm, IDLH = 30 ppm). The air purifying cartridge limitation for chlorine is 10 ppm.

TABLE B-3

EMERGENCY CALL LIST
BISONITE PAINT COMPANY
TONAWANDA, NEW YORK

Fires - Spills	
Tonawanda Fire Department	911
Public Services	
Tonawanda Police Emergency	911
Emergency Medical Services	
Kenmore Mercy Hospital (Emergency Department)	(716) 447-6121
Route to hospital in included as Figure B-1	

SPILL NOTIFICATION

Agencies

National Response Center	(800) 424-8802
Local DEC Office Region 9	(716) 851-7220
Spill Hotline	(800) 457-7362

Provide the following information to the agencies:

- Name of person making the call
- Company and location
- Nature of fire (fire calls only)
- Name and estimated amount of chemical released to the environment (spills only)
- Time of release
- Remedial action taken to correct the problem

Site Contacts

Michael Keller (NYSDEC Project Manager)	(716) 851-7218
Shaun Surani (Public Health Specialist, NYSDOH)	(518) 402-7860
Bruce Ahrens (Marsh Engineering-Rochester)	(585) 248-2413
Michael Rumrill (Marsh Engineering – Rochester)	(585) 248-2413

APPENDIX B-1

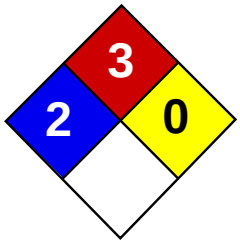
SAFETY MEETING SIGN-OFF SHEETS

SAFETY MEETING ATTENDENCE SIGN-OFF SHEET

Person/Company	Date

APPENDIX B-2

Safety Data Sheets



Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:54 PM

Last Updated: 05/21/2013 12:00 PM

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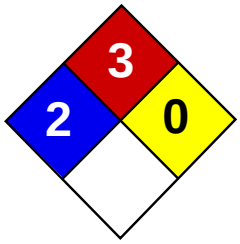

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 05/21/2013 12:00 PM

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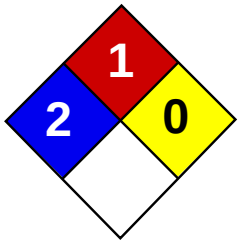

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Antimony MSDS

Section 1: Chemical Product and Company Identification

Product Name: Antimony

Catalog Codes: SLA1453, SLA4462

CAS#: 7440-36-0

RTECS: CC4025000

TSCA: TSCA 8(b) inventory: Antimony

CI#: Not available.

Synonym: Stibium

Chemical Name: Not available.

Chemical Formula: Sb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Antimony	7440-36-0	100

Toxicological Data on Ingredients: Antimony: ORAL (LD50): Acute: 7000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 121.75 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 1635°C (2975°F)

Melting Point: 630°C (1166°F)

Critical Temperature: Not available.

Specific Gravity: 6.691 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 7000 mg/kg [Rat].

Chronic Effects on Humans: Causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Antimony powder UNNA: UN2871 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Antimony Massachusetts RTK: Antimony TSCA 8(b) inventory: Antimony

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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SAFETY DATA SHEET
North American Version

BARIUM CARBONATE

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Identification of the substance or mixture

Product name	:	BARIUM CARBONATE
Product grade(s)	:	A , B , C , D Barium Carbonate Granular Barium Carbonate Powder
Chemical Name	:	Barium carbonate
Synonyms	:	Barium salt
Molecular formula	:	$BaCO_3$
Molecular Weight	:	197.3 g/mol

1.2. Use of the Substance/Mixture

Recommended use :

- Use in the manufacturing of other barium substances
- Use as reactive processing aid (sulfate removal)
- Glass industry
- Manufacture of ceramic materials
- Manufacture of electro-ceramic materials
- Manufacture of glazes, frits and enamels
- Use in welding electrode coating
- Use in the preparation of slurry
- Manufacture of pyrotechnical products
- Welding in industrial and professional settings
- For further information, please contact: Supplier

1.3. Company/Undertaking Identification

Address : SOLVAY CHEMICALS, INC.
3333 RICHMOND AVENUE
HOUSTON TX 77098-3099
United States

1.4. Emergency and contact telephone numbers

Emergency telephone number	:	**1 (800) 424-9300 CHEMTREC ® (USA & Canada)** **01-800-00-214-00 (MEX. REPUBLIC)**
Contact telephone number (product information):	:	**US: +1-800-765-8292 (Product information)** **US: +1-713-525-6500 (Product information)**

2. HAZARDS IDENTIFICATION

2.1. Emergency Overview:

NFPA	:	H= 2 F= 0 I= 1 S= None
HMIS	:	H= 2 F= 0 R= 1 PPE = Supplied by User; dependent on local conditions

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SOLVAY Chemicals

SOLVAY

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General Information

Appearance	:	powder, pellets
Colour	:	white
Odour	:	odourless

2.2. Potential Health Effects:

Inhalation
- May cause irritation of the mucous membranes.

Eye contact
- Contact with eyes may cause irritation.

Skin contact
- Prolonged skin contact may cause skin irritation.

Ingestion
- Acute intoxication by inhalation or ingestion of water soluble barium salts causes vomiting, diarrhoea, convulsive tremors and muscular paralysis.
- Risk of convulsions, pulmonary arrest.
- Risk of cardiac rhythm alteration, sudden cardiac failure.
- Risk of shock.

Other toxicity effects
- See section 11: Toxicological Information

2.3. Environmental Effects:
- See section 12: Ecological Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Barium carbonate

CAS-No.	:	513-77-9
Concentration	:	**>= 97.0 %**

4. FIRST AID MEASURES

4.1. Inhalation
- Move to fresh air.
- If symptoms persist, call a physician.

4.2. Eye contact
- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

4.3. Skin contact
- Remove and wash contaminated clothing before re-use.
- Wash off with plenty of water.
- If symptoms persist, call a physician.

4.4. Ingestion
- Call a physician immediately.
- Take victim immediately to hospital.
- If swallowed, rinse mouth with water (only if the person is conscious).
- Artificial respiration and/or oxygen may be necessary.

4.5. Notes to physician

Exposure to decomposition products :

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- Give to drink 30 grams of sodium sulphate in 250 ml of fresh water.
- Immediate medical attention is required.
- Medical examination necessary even only on suspicion of intoxication.

5. FIREFIGHTING MEASURES

5.1. Suitable extinguishing media
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2. Extinguishing media which shall not be used for safety reasons
- None.

5.3. Special exposure hazards in a fire
- Not combustible.

5.4. Hazardous decomposition products
- Barium oxide
- Other hazardous decomposition products may be formed.

5.5. Special protective equipment for firefighters
- In the event of fire, wear self-contained breathing apparatus.
- Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. Advice for non-emergency personnel
- Evacuate personnel to safe areas.

6.1.2. Advice for emergency responders
- Use personal protective equipment.
- Prevent further leakage or spillage.

6.2. Environmental precautions
- Should not be released into the environment.
- Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and materials for containment and cleaning up
- Pick up and transfer to properly labelled containers.
- Keep in suitable, closed containers for disposal.

6.4. Reference to other sections
- Refer to protective measures listed in sections 7 and 8.

7. HANDLING AND STORAGE

7.1. Handling
- Ensure adequate ventilation.
- Avoid contact with skin and eyes.

7.2. Storage
- Store in original container.
- Keep in a well-ventilated place.
- Keep in a dry place.
- Keep in properly labelled containers.
- Keep container closed.

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- Keep away from Incompatible products.

7.3. Packaging material

- Paper + PE.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure Limit Values

Barium carbonate

- US. ACGIH Threshold Limit Values 2009
  time weighted average = 0.5 mg/m3
  Remarks: as Ba
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 0.5 mg/m3
  Remarks: as Ba
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 0.5 mg/m3
  Remarks: as Ba
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 0.5 mg/m3
  Remarks: as Ba

Strontium carbonate

- US. ACGIH Threshold Limit Values
  Remarks: none established

Barium sulfate

- US. ACGIH Threshold Limit Values 12 2010
  time weighted average = 10 mg/m3
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 5 mg/m3
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 15 mg/m3
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 5 mg/m3
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 10 mg/m3
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 5 mg/m3
  Remarks: respirable dust fraction
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 10 mg/m3
  Remarks: Total dust

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.
SAEL = Solvay Acceptable Exposure Limit, Time Weighted Average for 8 hour workdays. No Specific TLV STEL (Short Term Exposure Level) has been set. Excursions in exposure level may exceed 3 times the TLV TWA for no more than a total of 30 minutes during a workday and under no circumstances should they exceed 5 times the TLV TWA.

8.2. Engineering controls

- Apply technical measures to comply with the occupational exposure limits.

8.3. Personal protective equipment

8.3.1. Respiratory protection

- In case of insufficient ventilation, wear suitable respiratory equipment.
- Self-contained breathing apparatus (EN 133)

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- Respirator with a dust filter
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.

8.3.2. Hand protection

- Impervious gloves
- Suitable material: PVC, Neoprene, Natural Rubber

8.3.3. Eye protection

- Dust proof goggles, if dusty.

8.3.4. Skin and body protection

- Long sleeved clothing

8.3.5. Hygiene measures

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General Information

Appearance	:	powder, pellets
Colour	:	white
Odour	:	odourless

9.2. Important health safety and environmental information

pH	:	5 - 7
Boiling point/boiling range	:	*Remarks*: not applicable, Thermal decomposition
Flash point	:	*Remarks*: not applicable
Flammability	:	*Remarks*: The product is not flammable.
Explosive properties	:	*Explosion danger*: *Remarks*: Not explosive
Oxidizing properties	:	*Remarks*: Non oxidizer
Vapour pressure	:	*Remarks*: not applicable
Relative density / Density	:	4.31
Bulk density	:	from 400 - 2,000 kg/m3
Solubility(ies)	:	14 mg/l (Water) *Temperature*: 20 °C (68 °F)
Partition coefficient: n-octanol/water	:	*Remarks*: not applicable
Vapour density	:	*Remarks*: not applicable
Evaporation rate	:	*Remarks*: not applicable

9.3. Other data

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Melting point/range	:	>= 900 °C (1,652 °F) *Remarks*: Thermal decomposition
Auto-flammability	:	*Remarks*: not applicable
Granulometry	:	2.32 - 14.6 µm (powder) *Remarks*: d 50
Decomposition temperature	:	1,380 °C (2,516 °F)

10. STABILITY AND REACTIVITY

10.1. Stability
- Stable under recommended storage conditions.

10.2. Conditions to avoid
- none
- Keep at temperature not exceeding: 1,380 °C (2,516 °F)

10.3. Materials to avoid
- Acids

10.4. Hazardous decomposition products
- Barium oxide, Other hazardous decomposition products may be formed.

11. TOXICOLOGICAL INFORMATION

Toxicological data

Acute oral toxicity
- LD50, rat, < 300 mg/kg (Barium chloride anhydrous)
- LD50, rat, > 300 mg/kg, Remarks. practically insoluble

Acute inhalation toxicity
- LC50, , Remarks study scientifically unjustified

Acute dermal irritation/corrosion
- LD50, rat, > 2,000 mg/kg (Barium chloride anhydrous)

Skin irritation
- rabbit, No skin irritation

Eye irritation
- rabbit, No eye irritation

Sensitisation
- Did not cause sensitization. (Barium chloride anhydrous)

Chronic toxicity
- Inhalable dust, Repeated exposure, rat, Target Organs: cardio-vascular system, hematology system, Respiratory system, NOEL: 5.2 mg/m3, observed effect
- Inhalable dust, NOEL: 1 mg/m3, NOAEL
- Oral, Repeated exposure, rat/mouse, Target Organs: cardio-vascular system, hematology system, renal system, adrenal glands, NOEL: 87.8 mg/kg, NOAEL

Carcinogenicity
- Oral, Prolonged exposure, rat/mouse, Animal testing did not show any carcinogenic effects., (Barium chloride anhydrous)

Genetic toxicity in vitro
- in vitro, Animal testing did not show any mutagenic effects. (Barium chloride anhydrous)

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Reproductive toxicity

- Effect on fertility, Repeated exposure, Target Organs: Oral, 258 - 290 mg/kg, NOAEL, Barium chloride anhydrous)

Remarks

- Harmful if swallowed.
- The toxicity is mainly linked to the barium ion (nervous, cardiovascular, respiratory and gastro-intestinal troubles).
- Risk of effect on the liver, the cardiovascular system, the hematological system and the adrenals
- Irritating to eyes and skin.

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity effects

Acute toxicity

- Remarks: Aquatic toxicity is unlikely due to low solubility.
- Fishes, Brachydanio rerio, LC50, 96 h, > 152 mg/l (Barium chloride anhydrous)
- Crustaceans, Daphnia magna, LC50, 48 h, 14.5 mg/l (Barium chloride anhydrous)

Chronic toxicity

- Crustaceans, Daphnia magna, EC50, 21 Days, 2.9 mg/l
- Pseudokirchneriella subcapitata (green algae), growth rate, 72 h, >= 61 mg/l
  Remarks: NOEC
- Pseudokirchneriella subcapitata (green algae), EC50, growth rate, 72 h, > 100 mg/l

12.2. Mobility

- Air
  Remarks: mobility as solid aerosols
- Water/soil
  Remarks: low solubility and mobility

12.3. Persistence and degradability

Abiotic degradation

- Water/soil
  Result: slow ionization and cation precipitation in presence of sulfates or carbonates

Biodegradation

- Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

12.4. Bioaccumulative potential

- Bioconcentration
  Result: potential accumulation of the cation

12.5. Other adverse effects

- no data available

12.6. Remarks

- Ecological injuries are not known or expected under normal use.
- Persistent product mainly in its inert form.

13. DISPOSAL CONSIDERATIONS

13.1. Waste from residues / unused products

- In accordance with local and national regulations.
- Use a solution of sodium or magnesium sulphate or possibly a dilute solution of sulphuric acid to form a sulphate precipitate.

P 21544 / USA
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Distributed by:
Laguna Clay Company
14400 Lomitas Ave
City of Industry, CA 91746
1-800-4Laguna
info@lagunaclay.com
www.lagunaclay.com

- Dispose of wastes in an approved waste disposal facility.

13.2. Packaging treatment

- Containers that cannot be cleaned must be treated as waste.
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.

13.3. RCRA Hazardous Waste

- Listed RCRA Hazardous Waste (40 CFR 302) - No
- Unlisted RCRA Hazardous Waste (40 CFR 302) - Yes
- D005 (barium containing waste)

14. TRANSPORT INFORMATION

- not regulated

15. REGULATORY INFORMATION

15.1. Inventory Information

Toxic Substance Control Act list (TSCA)	: -	In compliance with inventory.
Australian Inventory of Chemical Substances (AICS)	: -	In compliance with inventory.
Canadian Domestic Substances List (DSL)	: -	In compliance with inventory.
Korean Existing Chemicals Inventory (KECI (KR))	: -	In compliance with inventory.
EU list of existing chemical substances (EINECS)	: -	In compliance with inventory.
Japanese Existing and New Chemical Substances (MITI List) (ENCS)	: -	In compliance with inventory.
Inventory of Existing Chemical Substances (China) (IECS)	: -	In compliance with inventory.
Philippine Inventory of Chemicals and Chemical Substances (PICCS)	: -	In compliance with inventory.
New Zealand Inventory of Chemicals (NZIOC)	: -	In compliance with inventory.

15.2. Other regulations

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

- not regulated.

SARA Hazard Designation (SARA 311/312)

- Acute Health Hazard: Yes.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

- not regulated.

US. EPA CERCLA Hazardous Substances (40 CFR 302)

- not regulated.

P 21544 / USA
Issuing date 03/09/2012 / Report version 1.1

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

- yes.

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

- yes.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

- not regulated.

16. OTHER INFORMATION

Ratings :

NFPA (National Fire Protection Association)

Health = 2 Flammability = 0 Instability = 1 Special =None

HMIS (Hazardous Material Information System)

Health = 2 Fire = 0 Reactivity = 1 PPE : Supplied by User; dependent on local conditions

Further information

- Update
  This data sheet contains changes from the previous version in section(s): 8 , 11 , 12 , 15
- Distribute new edition to clients

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of the company mentioned in section 1 in North America. If you are located in a country other than Canada, Mexico or the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location.

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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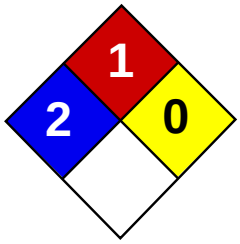

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:
Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 (mg/m3) from OSHA (PEL) [United States] TWA: 0.5 (mg/m3) from NIOSH [United States] TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 0.5 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- !0 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:
Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation , sneezing, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 05/21/2013 12:00 PM

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Lead

SAFETY DATA SHEET

1 PRODUCT AND SUPPLIER IDENTIFICATION

Product Name: Lead - pellets, shot, sheet, foil, rod, wire, target

Formula: Pb

Supplier: ESPI Metals

1050 Benson Way

Ashland, OR 97520

Telephone: 800-638-2581

Fax: 541-488-8313

Email: sales@espimetals.com

Emergency: Infotrac 800-535-5053 (US) or 352-323-3500 (24 hour)

Recommended Uses: Scientific Research

2 HAZARDS IDENTIFICATION

GHS Classification (29 CFR 1910.1200): Acute toxicity, category 4, Carcinogenicity, category 2, Reproductive toxicity, category 2.

GHS Label Elements:

Signal Word: Warning

Hazard Statements: H302 Harmful if swallowed, H332 Harmful if inhaled, H351 Suspected of causing cancer, H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements: P260 Do not breath dust/fume/gas/mist/vapors/spray, P264 Wash hands thoroughly after handling, P281 Use personal protective equipment as required, P301+P304+P312 IF SWALLOWED OR INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient: Lead

CAS#: 7439-92-1

%: 100

EC#: 231-100-4

4 FIRST AID MEASURES

General Measures: Under normal handling and use, exposure to solid forms of this material present few health hazards. Subsequent operations such as grinding, melting or welding may produce hazardous dust or fumes which can be inhaled or come in contact with the skin or eyes. Emergency responders should take care to avoid secondary exposure to lead particulate. Wear appropriate protective equipment.

INHALATION: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult. Seek immediate medical attention.

INGESTION: Rinse mouth with water. Do not induce vomiting. Seek immediate medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, wash affected area with soap and water. Seek medical attention. Wash contaminated clothing before reusing.

EYES: Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation. See section 11 for more information.

Indication of Immediate Medical Attention and Special Treatment: No other information available.

5 FIREFIGHTING MEASURES

Extinguishing Media: Use suitable extinguishing agent for surrounding materials and type of fire.

Unsuitable Extinguishing Media: No information available.

Specific Hazards Arising from the Material: This product does not present fire or explosion hazards as shipped. Fine dust from processing is a weak to moderate fire hazard if allowed to accumulate and subjected to an ignition source. Under fire conditions toxic fumes of lead oxide may be released.

Special Protective Equipment and Precautions for Firefighters: Full face, self-contained breathing apparatus and full protective clothing when necessary.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures: Wear appropriate respiratory

and protective equipment specified in section 8. Avoid creating dusts. Avoid breathing dust or fume. Isolate spill area and provide ventilation.

Methods and Materials for Containment and Cleaning Up: For larger pieces - pick up mechanically. For chips or dust - vacuum using a HEPA filter. Place in properly labeled closed containers. Avoid creating dusts. Do not use compressed air.

Environmental Precautions: Do not allow to enter drains or to be released to the environment.

7 HANDLING AND STORAGE

Precautions for Safe Handling: Handle in a well-ventilated area. Avoid creating dust. Avoid exposure to high temperature. Avoid breathing dust or fumes. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking. See section 8 for information on personal protection equipment.

Conditions for Safe Storage, Including Any Incompatibilities: Store in a sealed container. Store in a cool, dry area. Protect from moisture. Do not store together with strong oxidizers or acids. See section 10 for more information on incompatible materials.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Lead

OSHA/PEL: 50 µg/m^3

ACGIH/TLV: 0.05 mg/m^3

Appropriate Engineering Controls: Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Clothing worn in areas of exposure to lead dust or fume should be restricted to the workplace and laundered regularly.

Individual Protection Measures, Such as Personal Protective Equipment:

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used.

Eye Protection: Safety glasses

Skin Protection: Wear impermeable gloves, protective work clothing as necessary.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Form: Solid in various forms

Color: Silvery metallic

Odor: Odorless

Odor Threshold: Not determined

pH: N/A

Melting Point: 327.5 ^{O}C

Boiling Point: 1740 ^{O}C

Flash Point: N/A

Evaporation Rate: N/A

Flammability: No data

Upper Flammable Limit: No data

Lower Flammable Limit: No data

Vapor Pressure: 1 mm Hg @ 973 ^{O}C

Vapor Density: N/A

Relative Density (Specific Gravity): 11.34 g/cc

Solubility in H_2O: Insoluble

Partition Coefficient (n-octanol/water): Not determined

Autoignition Temperature: No data

Decomposition Temperature: No data

Viscosity: N/A

10 STABILITY AND REACTIVITY

Reactivity: No data

Chemical Stability: Stable under recommended storage conditions.

Possibility of Hazardous Reactions: High temperatures will generate toxic lead oxide fumes.

Conditions to Avoid: Avoid creating or accumulating fines or dusts. Avoid high temperatures.

Incompatible Materials: Strong acids, strong oxidizers, halogens and interhalogen compounds.

Hazardous Decomposition Products: Lead oxide fume.

Other: Freshly cut or cast lead surfaces tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

11 TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

Symptoms of Exposure: Skin or eye contact with dust or fume may cause local irritation. Inhalation of dust or fumes may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss,

anemia, and pain in legs, arms, and joints. An acute short-term dose of lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposure of this magnitude is rare. Kidney damage, as well as anemia, can occur from acute exposure. Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also be expected to occur.

Acute and Chronic Effects: Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels above the exposure limits of lead dust or fumes. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal system.

Acute Toxicity: No data

Carcinogenicity: **NTP**: R - Reasonably anticipated to be a carcinogen **IARC**: 2B - Possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12 ECOLOGICAL INFORMATION

Ecotoxicity: No data

Persistence and Degradability: No data

Bioaccumulative Potential: No data

Mobility in Soil: No data

Other Adverse Effects: Do not allow material to be released to the environment. No further relevant information available.

13 DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Product: Dispose of in accordance with Federal, State and Local regulations.

Packaging: Dispose of in accordance with Federal, State and Local regulations.

14 TRANSPORT INFORMATION

DOT/ADR/IATA/IMDG Regulations: Not regulated

UN Number: N/A

UN Proper Shipping Name: N/A

Transport Hazard Class: N/A

Packing Group: N/A

Marine Pollutant: No

Special Precautions: N/A

15 REGULATORY INFORMATION

TSCA Listed: All components are listed.

Regulation (EC) No 1272/2008 (CLP): Acute toxicity, category 4, Carcinogenicity, category 2, Reproductive toxicity, category 2.

Canada WHMIS Classification (CPR, SOR/88-66): Class D, Division 2, Subdivision A - Very toxic material causing other toxic effects.

HMIS Ratings: **Health**: 1 **Flammability**: 0 **Physical**: 0

NFPA Ratings: **Health**: 1 **Flammability**: 0 **Reactivity**: 0

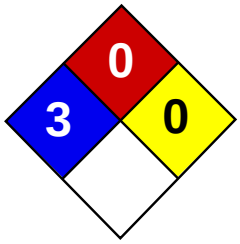
Chemical Safety Assessment: A chemical safety assessment has not been carried out.

16 OTHER INFORMATION

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI Metals shall not be held liable for any damages resulting from handling or from contact with the above product.

Prepared by: ESPI Metals

Revised/Reviewed: September 2014



Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

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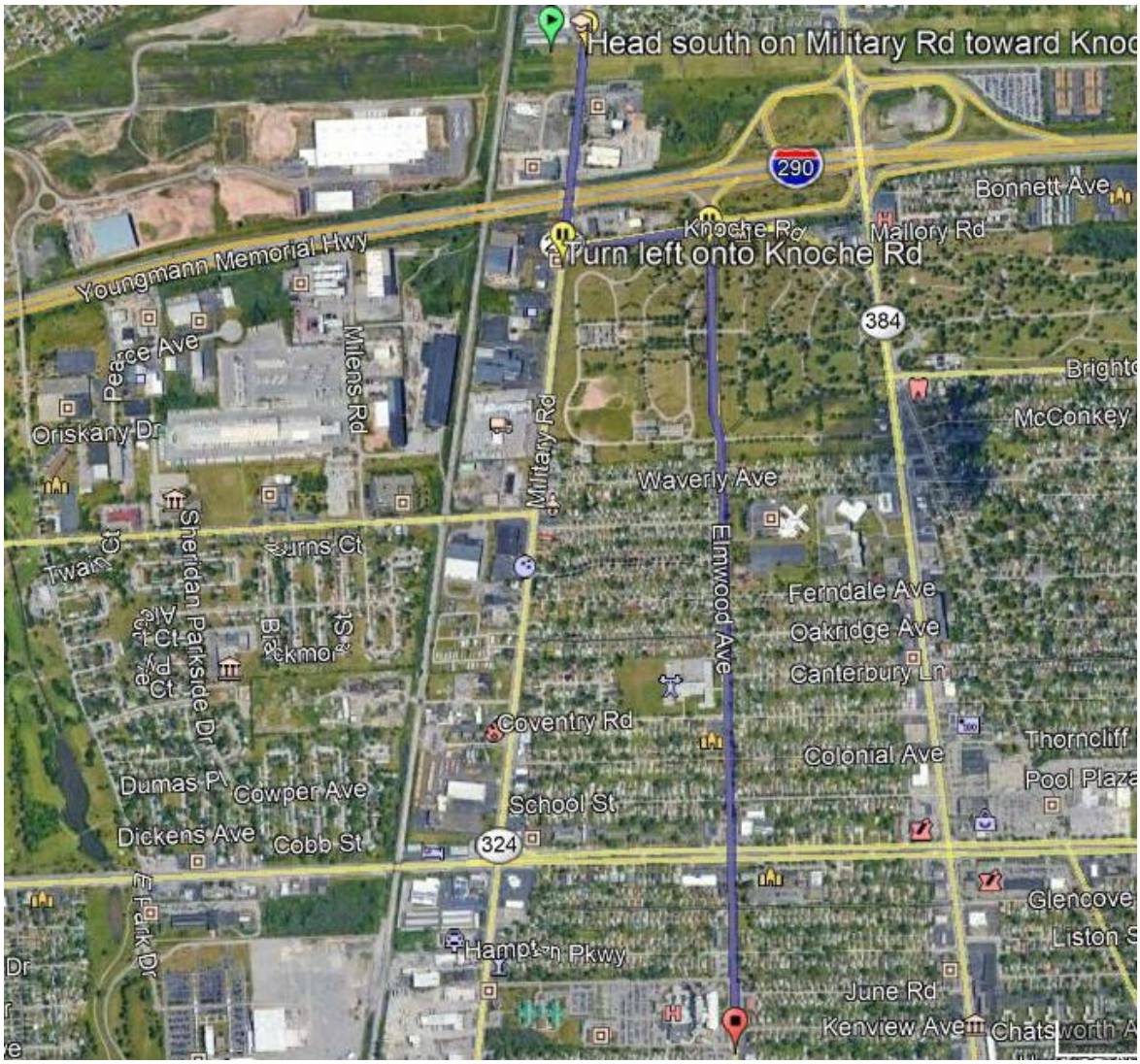
FIGURES



Route to Hospital
Leaving the Site, make a right turn on Military Road.
Travel south approximately 0.3 miles and make a left (first traffic light south of Rt. 190) onto Knoche Road.
From Knoche Road travel east 0.2 miles and make left onto Elmwood Avenue (first traffic light).
From Elmwood Avenue travel south 1.15-miles to the hospital which on the right
(west) side of the road. The second entrance into the hospital leads to the Emergency Department
(716) 447-6121.

Title	Route to Hospital 2950 Elmwood Avenue Buffalo, New York
Prepared For	ACM Northfield CR#3, LLC 3144 South Winton Road Rochester, New York

Leader Professional Services
271 Marsh Road, Suite 2
Pittsford, NY 14534
(585) 248-2413
FAX (585) 248-2834

Project	235.198
Date	11/26/18
Scale	Not to Scale
Drawn	PVS
Checked	MPR
File Name	Hospital Map
Figure	B-1

APPENDIX C

COMMUNITY AIR MONITORING PLAN

Appendix C

COMMUNITY AIR MONITORING PLAN

Overview

This Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when intrusive activities are in progress. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Real-time air monitoring for particulate levels at the perimeter of the work area will be necessary.

Continuous particulate monitoring will be required during ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil samples. Periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while overturning soil, and taking a reading prior to leaving a sample location.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during intrusive activities. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring equipment should be calibrated daily. If site conditions change, or if continuous monitoring is required by the NYSDEC, the equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate

emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

APPENDIX D

QUALITY ASSURANCE PROJECT PLAN

Former Bisonite Paint Company
2268 Military Road and 2266 Military Road
Tonawanda, New York
Site #C915010

Prepared for:
Tonawanda Storage Properties, LLC
2600 Innovation Square
100 South Clinton Avenue
Rochester, New York

Prepared By:
Marsh Engineering D.P.C.
271 Marsh Road, Suite 2
Pittsford, New York 14534

October 2023
Revised February 26, 2024

1077.003

TABLE OF CONTENTS

Tables

Appendices

1.0 INTRODUCTION

This Quality Assurance Project Plan ("QAPP") contains information pertaining to the collection, handling, analysis, and documentation standards for the collection and analysis of site data. Sampling results will be used to confirm the extent of remediation and prepare a Construction Completion Report for the Bisonite Paint Company, LLC site ("Site") located in Tonawanda, New York.

This QAPP focusses on the activities associated with the Site remediation activities described in the Remedial Action Work Plan ("RAWP"). In addition, it also includes guidance for potential additional activities that may be identified during the Site remediation and/or completed at the Site in the future (e.g., monitoring well installation, groundwater sampling, soil vapor sampling, etc.).

2.0 PROJECT DESCRIPTION

This QAPP was prepared to support the field activities and soil sampling to confirm that the extent of excavation was successfully completed for the Site. The Site is located on two parcels identified on the Erie County Tax Map as parcels 52.12-6-16.1 and 52.12-6-16.2. The parcels are identified with the following street addresses, respectively: 2268 Military Road and 2266 Military Road in Tonawanda. This QAPP provides procedures for the collection, handling, analysis of samples and documentation standards of the Site activities.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The responsibilities of each project individual is described below.

NYSDEC Project Manager – Michael Keller, Division of Environmental Remediation, located in Buffalo, New York (716) 851-7218. Mr. Keller's responsibility is to manage the project and NYSDEC personnel who are assigned to the project for technical review and oversight, and to ensure that all aspects of the project are completed. Mr. Keller will be notified prior to deviations from the protocols presented herein and if there has been a problem with the procedures or analyses because of Site-specific conditions.

Leader Professional Services, Inc. Principal-in-Charge - Michael Rumrill, 271 Marsh Road, Suite 2, Pittsford, New York 14534 (585) 248-2413. Mr. Rumrill's responsibility is for overall quality control and to ensure that adequate resources are dedicated to this project.

Leader Professional Services, Inc. Project Manager – Bruce Ahrens, 271 Marsh Road, Suite 2, Pittsford, New York 14534, (585) 248-2413. Mr. Ahrens' responsibility is to ensure that the project and QA/QC Project Plan are adhered to and to enforce any corrective actions needed and be a point of contact for all technical issues regarding the project. Mr. Ahrens will be notified by Leader's Site Manager or by the analytical laboratory of any deviations from the protocols presented herein or if there has been a problem with implementing the procedures or analyses because of Site-specific conditions.

Leader Professional Services, Inc. Project Supervisor/Site Manager –Emma Spirito, 271 Marsh Road, Suite 2, Pittsford, New York 14534, (585) 248-2413. Ms. Spirito's responsibility is to manage the field aspects of the project and to ensure that the project is completed in accordance with the RAWP, and to manage the field investigation.

4.0 SAMPLING PLAN DESIGN AND RATIONALE

The sampling requirements are described in the RAWP and discussed in the following sections.

5.0 TARGET PARAMETERS

5.1 Laboratory Parameters

Soil samples will be analyzed for Chemicals of Potential Concern (COPC). The COPC are:

- Target Compound List (TCL) volatile organic compounds (VOCs),
- TCL semi-volatile organic compounds (SVOCs)
- TCL pesticides/polychlorinated biphenyls (PCBs)
- Target Analyte List (TAL) inorganics plus cyanide and mercury
- PFAS and 1,4-Dioxane

All soil samples will be reported on a dry weight basis.

A summary of the analytical procedures and preservation requirements is provided in **Table D-1**.

5.2 Field Parameters

Soil sampling will use a photoionization detector ("PID") to evaluate undisturbed and disturbed soil conditions.

6.0 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) were determined based on the use of the data, and the analytical reporting limits that can be achieved with the analytical methods specified. The results of the soil sample analyses obtained will be compared to the NYSDEC's Part 375 Soil Cleanup Objectives ("SCOs") for restricted commercial use ("CSCOs"), which is consistent with the current and anticipated future site use. Soil sample collected for disposal purposes will be compared to the disposal facility requirements.

The results from the water/fluids samples will be compared to disposal facility requirements.

7.0 PROCEDURES FOR THE COLLECTION OF ENVIRONMENTAL SAMPLES

The procedures in this document have been standardized to make them applicable to the anticipated site field conditions and potential future activities. It must be recognized that under certain conditions, the procedures discussed herein may not be appropriate given the site conditions at the time of sample collection, or the objective of the sampling event. In such cases, it will be necessary to adapt the procedures given the specific conditions of the Site and the sampling objective. Changes will be discussed with NYSDEC before sampling.

7.1 Surface Soil Sampling

When required, surface soil samples will be collected as grab samples. The sampling procedures to be used are provided in **Appendix D-1** of this plan and limited to the upper two inches of soil. The purpose of limiting the depth of investigation is to obtain data on the immediate environmental and health risks associated with the surface soil.

The potential objective for surface soil sampling is to:

- Document that areas have not been impacted by the previous Site activities.

Information pertinent to the sampling procedures used and observations of the environmental conditions at the time of sampling will be entered into a field logbook with an indelible ink marker. The samples will be visually inspected for staining, color, and texture following the Unified Soil Classification System ("USCS"). The sample will be screened with portable organic vapor analyzers using photoionization detector ("PID").

7.2 Subsurface, Confirmation, and Documentation Soil Sampling

The sampling procedures that may be used are provided in **Appendix D-2**. The sampling will be conducted using direct push or split spoon sampling tools, or collected as grab samples.

The potential objectives of the subsurface soil sampling are to:

- Obtain data on the extent of soil impacts within specific intervals in the former lagoon and trench areas.
- Confirm the Site remedy (excavation) was completed (i.e., confirmatory samples at the limits of excavation)

The intervals to be sampled may include the following:

- Fill/Waste, because fill is suspected across the Site to an unknown depth below the asphalt pavement. The goal is to characterize the subsurface materials, and/or confirm that the remedy is completed.
- Native soil to characterize the conditions below the fill/waste to a depth where monitoring well screens may be placed, approximately 14 to 20 feet below the ground surface.

The quantity of confirmatory soil samples will be collected as described in the RAWP and DER-10 Section 5.4(b)(5). Information pertinent to the sampling procedures used and

observations of the environmental conditions at the time of sampling will be entered into a field logbook with an indelible ink marker. The samples will be inspected to evaluate organic vapor readings, color, staining, and texture following the USCS, including any location of stains and the location of saturated soil. The information gathered during the collection of subsurface soil samples collected using a sampling device and a borehole drilling method (e.g. hollow stem augers or direct push tools) or a trowel during a test pit excavation will be recorded in the field notebook but also on a boring log, if appropriate.

7.3 Headspace Soil Sampling

A portion of each sample will be retained for head space screening using a PID. These samples will be retrieved as soon as possible after the initial visual inspection. The samples will be placed into a clean plastic bag or a clean glass container. If the ambient air temperatures are below 70 degrees Fahrenheit ("^{o}F") the samples will be warmed either by placing them into the sunlight or in a warm area for approximately five minutes before they are screened with the PID. The screening results will be recorded in the field logbook.

7.4 Procedures for the Installation of Monitoring Wells

The objectives for the installation of groundwater monitoring wells is to obtain data on the groundwater quality and groundwater elevation data. The installation process will be completed in two parts: drilling and sampling of test borings, and the construction and sampling of the monitoring wells.

Prior to the start of the drilling process, all equipment will be decontaminated to limit the introduction of contaminants into the environment and to limit the carryover of contaminants from one location to the other.

The drilling of test borings will be started by the split spoon/direct push sampling of the overburden soil in 2 to 4-feet intervals. Each sampled interval will be followed by the augering of the soil from the ground surface to increase the hole size. Soil sampling will be completed in consecutive sequence from the ground surface to a point described in a task-specific work plan. Soil sampling will be conducted in accordance with the procedures found in **Appendix D-2**. The information gathered during the collection of subsurface soil samples will be recorded in the field notebook but also on a boring log/test pit log.

Once the bottom of the targeted depth is reached, the drilling contractor will begin the well installation process following procedures in **Appendix D-3**. The monitoring wells will be constructed using 2-inch diameter flush joint threaded PVC monitoring well screen and riser pipe. The monitoring wells will be constructed using a conventional monitoring well design following the well construction figure in **Appendix D-3**.

Monitoring wells will be constructed to produce a representative sample of the shallow groundwater zone and will use a screen no longer than ten feet. The location of the screen will depend on the depth of the groundwater zone, the presence of a semi or impermeable layer (clay), the presence of stains, non-aqueous phased liquids, or volatile organic vapors. Ideally the screen will be positioned to intersect the water table surface.

Each monitoring well will be completed with a flush to the pavement/ground surface road box. The casing/road box which will be installed flush to the ground surface to allow continued use of the pavement for parking and building access. The casing will be fitted

with a watertight gasket and the monitoring well will have a watertight locking plug inside the casing. A layer of sand will be used inside the casing and extend below the casing's sides to allow any storm water to flow back into the soil. The outside of the casing will be secured in concrete. The metal cap will facilitate locating the well when covered with snow or dirt with a metal detector.

Following construction, the monitoring wells will be developed to remove silt and clay and to produce a water sample with a turbidity value of less than 50 NTU. Each monitoring well will be surveyed to locate the monitoring well's position and to calculate its elevation.

7.5 Groundwater Sampling Procedures

Subsequent to completion of the Site remedy, and as defined in the Site Management Plan ("SMP"), groundwater sampling will be completed at each of the monitoring well locations. The sampling procedures to be used are detailed in **Appendix D-4**. Groundwater samples will be collected for analyses as described in the SMP. PFAS and 1,4-Dioxane and will require special sampling and handling procedures; **Appendix D-4** describes these procedures.

Information pertinent to the sampling procedures used and observations of the environmental conditions at the time of sampling will be entered into a field logbook with an indelible ink marker. Prior to the collection of samples field parameters will be measured during the pre-sampling well purging: water level depth below ground surface, dissolved oxygen, pH, turbidity, specific conductance, oxidation-reduction potential, temperature, and the presence of sheens and non-aqueous phase liquids. The collection of the groundwater sample will be conducted after three measurements are taken at 10 minute intervals and the measurements do not vary more than 20 percent.

7.6 Soil Vapor Sampling

The soil vapor and sub-slab sampling probe construction and sampling procedures to be used are detailed in **Appendix D-5** of this plan. The purpose of the soil vapor sampling is to obtain data on the chemical composition of the soil vapor and to evaluate the potential for vapor intrusion impacts within the Site building.

Information pertinent to the sampling procedures used and observations of the environmental conditions at the time of sampling will be entered into a field logbook with an indelible ink marker and on the sampling form. Any samples collected during the drilling process of the soil vapor probe locations will be visually inspected for color, staining, and texture following the Unified Soil Classification System, the presence of stains and the amount of soil moisture present. The samples will also be screened with a PID to measure the presence of organic vapors.

The construction of sub-slab sampling points does not require drilling through the soil column, so no soil samples are generally collected. Important information about the building and the Site conditions will be gathered and documented. Once the concrete floor is penetrated a PID will be used to monitoring the sub-slab vapor conditions. The hole created will be used to construct the sampling point. Before the drilling is completed, the field geologist will inspect the building and complete the questionnaire included in the NYSDOH's guidance document entitled "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006, and revisions. The inspection will

identify areas of possible sub-slab infiltration, penetrations to the building envelop, sources of contamination, heating system type and operation at the time of sampling, and to verify the sampling location makes sense for the investigation.

7.7 Field Equipment Cleaning

All non-disposable equipment used for the collection, preparation, and preservation of the environmental samples must be cleaned prior to their use. Unless the equipment and materials used are disposable, or there are a sufficient number to be used during any one sampling period, cleaning will have to be conducted in the field. Field cleaning can be inefficient and lead to cross contamination problems compared to cleaning in a controlled environment. If possible, attempts will be made to minimize field cleaning. To avoid cross contamination between sampling points, dedicated disposable sampling equipment will be used when possible.

The materials needed to clean sample equipment are dependent upon the type of equipment needing cleaning. A sampling trowel will have a different requirement than the probes used in a flow-through cell. The following is a generalized list of materials to be used during cleaning:

- Cleaning solutions. Non-phosphate detergents will be used to clean sampling re-usable equipment.
- Water. In some cases, tap water may be adequate for initial or intermediate rinses. The final rinses, however, will be with deionized/distilled water.
- Buckets and washbasins. For use in the washing and rinsing of equipment.
- A drying rack. All materials and equipment must be dried prior to additional use. Paper towels will be used when necessary for drying equipment.

Drilling equipment, direct push, or split spoon sampling tools will be decontaminated between sample locations. The decontamination methods used will include use of potable water obtained from either the Site building or the Town's hydrant, high pressure spray wash using hot water from a steam generator, and drying of equipment.

Split spoons or geoprobe soil sampling tools used for the collection of soil samples will be decontaminated using the same process used for drilling equipment or hand washed using soap and water and a stiff brush. The tools will be then rinsed with potable water and dried.

Cleaning of the equipment will be done in a dedicated bermed pad area lined with two layers of plastic to facilitate the collection of wastewater. Wastewater generated from the cleaning process will be containerized along with any solid material.

7.8 Waste Handling

The handling of investigation derived waste and any remediation waste generated will be handed following the procedures identified in **Appendix D-6**. All wastes will be secured in drums, roll-off boxes or on top of and covered with plastic sheeting so the waste is controlled at all times. Each container will be labeled to identify the waste, the location of generation (borehole or monitoring well number), and the date of generation. Before the end of a field secession the wastes will be sampled and analyzed for characterization. If the waste is determined to be hazardous then each of those containers, boxes or piles will be

appropriately labeled. All hazardous will be removed from the site within 90 days of its generation.

7.9 Documentation and Chain of Custody Procedures

7.9.1 Packaging and Shipping Procedures

Once the samples have been collected, the samples will be prepared and preserved in accordance with applicable procedures found in the Work Plan and this plan, and packaged for overnight shipment or delivery to the contract laboratory. **Table D-1** provides the container, preservation and holding time requirements for each sample media and the analysis conducted. Chain-of-custody procedures will be followed to ensure the proper handling and possession of the samples until the analytical laboratory has received the samples. This section outlines procedures for the packing and shipping of environmental samples, and the general chain-of-custody procedures.

All individual glass or plastic sample containers will be placed in a durable shipping container. It is recommended that for this purpose, an insulated plastic cooler be used. The following is an outline of the packing and shipping procedures to be followed:

- The drain plug at the bottom of the cooler will be sealed to ensure that water from sample container breakage or ice melting does not leak from the outside container.
- Check screw caps for tightness and mark the sample volume level on the outside of large containers.
- For breakable containers, packing peanuts or bubble wrap may be used to keep containers in place and to prevent breakage.
- When samples must be kept at 4 degrees C, ice sealed in plastic bags or cool packs will be placed in the cooler.
- Documents accompanying the samples will be sealed in a plastic bag attached to the inside of the cooler lid.
- The lid of the cooler will be closed and fastened.
- Duct tape or reinforced shipping tape will be wrapped around the cooler several times to ensure that the lid will not open if the latch becomes unfastened.
- The following information will be attached to the outside of the cooler: name and address of receiving laboratory, return address of the sampling team, arrows indicating "This End Up" on all four sides, and a "This End Up" label on the top of the lid.
- A custody seal will be affixed and signed across the lid of the cooler.

Samples will be shipped for next day delivery to the specified laboratory. Personnel will be prepared to open and reseal the cooler for inspection if the courier requires it.

7.9.2 Chain-of-Custody Procedures

The primary objective of these procedures is to create an accurate written record, which can be used to trace the possession and handling of the sample from the moment of its collection through analysis, and to its introduction as evidence.

The number of persons involved in collecting and handling samples should be kept to a minimum. Detailed field records will be kept in the project field logbook and will contain the following information:

- Sample identification and source (including sampler's name, sample location, and sample media).
- Dates and times of sample procurement, preparation, and shipping.
- Preservative used.
- Analyses required.
- Pertinent field data (pH, DO, ORP, specific conductance, temperature, etc.).

To help eliminate possible problems in the chain-of-custody procedures, one person will be appointed Field Custodian for each task. For tasks where sampling teams are used, all samples are to be turned over to the Field Custodian by the team members who collected the samples. The Field Custodian will then document each sampling event and the sample will remain in his/her custody until it is shipped to the laboratory. The Field Custodian is responsible for proper packaging and dispatching samples to the laboratory. The responsibility includes filling out, dating and signing the appropriate portion of the chain-of-custody record.

Labels will be firmly affixed to each sample container. The labels on each sample bottle will be filled out with waterproof ink prior to sample collection. Sample reference numbers identical to that recorded on the labels will be recorded on the chain-of-custody.

When transferring the samples, the individual relinquishing the samples will sign and record the date and time on the chain-of-custody record. Every person who takes custody will fill in the appropriate section of the chain-of-custody record form, and their affiliated company. To minimize custody records, the number of custodians in the chain-of-possession should be minimized.

8.0 SAMPLE ANALYTICAL PROCEDURES

8.1 Field Analytical Procedures

Field measurements will be conducted in accordance with the RAWP, and subsequent to completion of the remedy, by the SMP .

8.2 Laboratory Analytical Procedures

Chemical analyses for soil, groundwater, and air data will be performed by NYSDOH ELAP certified laboratories, unless otherwise specified in the RAWP, or subsequent to completion of the Site remedy, by the SMP or task-specific work plan. The laboratories will maintain current SOPs for extraction, cleanup, and analysis of soil, water, and air matrices and must have on file current method detection limits (“MDL”) studies to demonstrate their ability to meet the project required reporting limits within these matrices. The MDLs must be performed by the laboratories on a yearly basis to ensure their ongoing

ability to perform the methods, as specified. The MDLs will be performed in accordance with USEPA guidance described in 40 CFR 136, 1986, Appendix B, "Definition and Procure for the Determination of the Method Detection Limit -Revision 1.11".

8.2.1 Soil, Air, And Groundwater Methods

Using the methods specified in the RAWP, SMP, or site-specific work plan, the laboratories will perform analysis of soil, air, and groundwater.

8.3 Sample Documentation in the Laboratory

Upon receipt at the laboratory, the designated sample custodian will inspect the shipping cooler/container and the custody seal. The sample custodian will note the condition of the cooler/container and the custody seal on the Chain-of-Custody record sheet.

The sample custodian will record the temperature of one sample (or temperature blank) from each cooler and the temperature will be noted on the Chain-of-Custody. If the shipping cooler seal is intact, the sample containers will be accepted for analyses. The sample custodian will document the date and time of receipt of the container and sign the form.

If damage or discrepancies are noticed (including sample temperature exceedances), they will be recorded in the remarks column of the record sheet, dated, and signed. Any damage or discrepancies will be reported to the lab supervisor who will inform the lab manager and QA Officer before samples are processed.

9.0 CALIBRATION

Both field instrumentation and laboratory analytical instrumentation are to be used to provide project data. Both systems will require regular calibration in order to provide comparable and accurate information.

On-Site VOC field data will be obtained using portable organic vapor analyzer monitoring instruments, which will require daily calibration checks and weekly calibration. Other instruments needing calibration include: the water quality meter providing DO, ORP, field conductivity, turbidity meters, pH and temperature probes. Because these instruments will be rented from equipment vendors and used for on weekly basis, Leader will rely on equipment vendors to provide calibrated equipment; however, Leader will also have the manufacturer’s calibration instructions in the event that field calibration is required.

9.1 Field Instruments

9.1.1 Portable Organic Vapor Analyzer Calibration

The PID style equipment has a calibrated range of 0 to 2000 parts per million volume (“ppmv”) total hydrocarbons and can collect instantaneous and 15 minute average concentrations. These instruments are typically calibrated using isobutylene. A 10.2-eV lamp will be used, which ionizes many of the common air contaminants. The PID is highly sensitive to aromatic compounds such as benzene or toluene.

Calibration will be performed prior to taking the instrument into the field. Certified isobutylene-in-air (100 ppm) and zero-air standard gases are used for calibration, according

to the manufacturer's specifications. Calibration checks will be made daily (at a minimum) using the isobutylene calibration gas. If needed, the instrument will be re-calibrated when the calibration check falls below 10-percent of the isobutylene concentration of the calibration gas. Field calibration records will be kept in the project field logbook

9.1.2 Conductivity, pH Meter, Do, Turbidity, Temperature Calibration

A Horiba 22, or similar Water Quality Monitor is a multi-probe instrument that can measure most of the required field parameters using one hand-held instrument. The instrument will be provided by the equipment vendor along with operating manuals and calibration equipment. The calibration of the specific conductance, pH, dissolved oxygen ("DO"), and temperature will be checked prior to beginning work and again at the completion of sampling following the manufacturer's operating procedures, or if results do not make sense based on prior testing. Field calibration records will be kept in the project field logbook

Turbidity will be measured using a standalone device, such as the Lamotte 2020WE Turbidity meter, or similar. This device uses an optical sensor and utilizes manufacturer provided glassware to use a measurement container. The meter kit also come with calibration liquid for field calibration. Calibration of the meter will be completed at the beginning and at the completion of the workday. Field calibration records will be kept in the project field logbook.

9.2 Laboratory Equipment Calibration

All instruments used to perform chemical measurements must be properly calibrated prior and during use to ensure acceptable and valid results. The accuracy and traceability of all calibration standards used must be properly documented. Equipment must be checked daily, and the records kept in a logbook or calibration-specific log.

The laboratory must document the acceptance criteria for all such equipment (e.g., refrigerator temperature must be 4°C ± 2°C) and corrective actions must be taken for any out-of-control situation as described in the laboratory's Quality Manual

The equipment must not be used after corrective action until it has been recalibrated or verified through the successful analysis of a check standard.

Calibrations of other miscellaneous analytical equipment (e.g., automatic pipettes) must be performed according to manufacturer's recommendations

Implementation of the laboratory calibrations will be the responsibility of the Laboratory Manager and the analysts performing the procedures.

The procedures described in this QAPP are to be used in conjunction with specific instrument manufacturer's instructions, applicable analytical methodology requirements, and specific laboratory field procedures for instrument operation.

9.2.1 Laboratory Instrument Preventative Maintenance

As part of the laboratory QA/QC program, a routine preventative maintenance program is conducted by the laboratory to minimize the occurrence of instrument failure and other system malfunctions. Designated laboratory employees must regularly perform routine scheduled maintenance and repair of (or coordinate with the vendor for the repair of) all

instruments. All laboratory instruments are maintained in accordance with manufacturer's specifications. The preventive maintenance program should include:

- An inventory of replacement and spare parts for instruments that are maintained.
- Maintenance logbooks for each instrument with information on routine and non-routine procedures. The logbook records must include the instrument number, description of malfunction or problem, date of maintenance activity, the type of activity performed and final resolution.
- Training of laboratory staff in the maintenance requirements of the instruments. Preventive maintenance schedules and activities will be outlined in the laboratory SOPs.

9.2.2 Inductively Coupled Plasma Spectroscopy

The Inductively Coupled Plasma (ICP) Spectrometer should be maintained under service contract with the manufacturer. Routine preventive maintenance should include:

- Checking pump tubing and replacing when necessary
- Checking nebulizer for even "spray" and cleaning, as necessary
- Checking the torch for plasma height and shape and cleaning, as necessary
- Checking sensitivity of photomultiplier and replacing, as necessary

9.2.3 Gas Chromatograph Instruments

The Gas Chromatography (“GC”) and GC/Mass Spectometry (“MS”) systems will be maintained on a service contract or undergo in-house maintenance to provide routine preventive maintenance. Spare parts for the GC and GC/MS systems should include: filaments, electron multiplier, source parts, o-rings, ferrules, septa, injection port liners, and columns. Routine preventive maintenance for the systems should include:

- Checking the data systems (disk drives, hard drives etc.) and servicing, as necessary
- Changing oil and traps on mechanical and turbo pumps
- Conditioning of moisture traps, every two months or when the gas source is changed
- Carrier gas evaluation and leak checking of electron capture detector when the gas or column is changed
- Servicing the MS source through cleaning, replacement of filaments and other source parts, as necessary
- Replacement of injection port septa and liners, as necessary
- Clipping the front end of GC column or replacement of GC column, as necessary

9.3.4 Atomic Absorption Instruments

The atomic absorption (AA) systems will be maintained on a service contract or undergo in-house maintenance to provide routine preventive maintenance. Routine preventive maintenance procedures should include:

- Checking the plumbing connections
- Checking the auto-sampler and tubing

9.3.4 Thermometers

Thermometers for refrigerators and ovens are calibrated yearly against National Institute of Standards and Technology (NIST) certified thermometers. The Laboratory QA Officer will be responsible for the safekeeping of the NIST thermometers, and for the documentation asserting the accuracy of their measurements.

9.3.5 Analytical Balances

Virtually every analytical procedure requires the use of side-loading and/or top-loading balances. Many of these requirements involve standards preparation and are, therefore, crucial to accurate determination. Balances should be maintained on a service contract. A calibration status label is affixed to each balance after calibration during servicing.

10.0 INTERNAL QUALITY CONTROL CHECKS

10.1 Field Measurements

The type and frequency of field-generated QC samples are summarized in. **Table D-2.** Primarily, rinse blanks, trip blanks, and field duplicates are employed to verify the field sampling approach. When handling or sampling for PFOAs, the laboratory conducting those analyses will provide water free of those analytes for use in the field.

10.2 Laboratory Analysis

The type and frequency of laboratory generated QC samples are specified by the analytical method and the laboratory's quality assurance plan. Criteria that the laboratory must meet are presented in the analytical methods.

10.2.1 Laboratory Quality Control

Specific procedures related to internal laboratory QC samples are detailed in the analytical methods. The following QC samples will be analyzed, and the results will be used to assess overall analytical accuracy and precision.

- Reagent (Method) Blanks. Laboratory glassware and sample containers used to store and transport samples will be cleaned in accordance with method protocols.

  A reagent blank will be analyzed by the laboratory at a frequency of one blank per analytical batch. The reagent blank, an aliquot of analyte-free water or sand, will be carried through the entire sample preparation and analytical procedure, including all cleanup procedures. The reagent blank is used to document contamination resulting from the analytical process.

- Laboratory Control Samples (LCS)/ Blank Spike Analyses. The LCS or blank spike serves as a monitor of the overall performance of all steps in the analysis, including the sample preparation. LCS or blank spikes will be analyzed for each method using the same sample preparation and analytical procedures employed for the investigative samples.

- Matrix Spike/Matrix Spike Duplicate (MS/MSD). An MS/MSD sample will be analyzed for organic parameters and inorganic parameters at a minimum frequency of one per 20 investigative samples. For each matrix, percent recoveries will be used to evaluate analytical accuracy while the RPD between MS/MSD analyses will be used to assess analytical precision.

- Surrogate Analysis. Surrogates are organic compounds which are similar to the analytes of interest and are not normally found in environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Every blank, standard, and environmental sample analyzed by GC or GC/MS, including MS/MSD samples, will be spiked with surrogate compounds prior to sample preparation.

  The compounds that will be used as surrogates and the levels of recommended spiking are specified in the methods. Surrogate spike recoveries must fall within the laboratory control limits. If surrogate recoveries are excessively low (<10 percent), the laboratory will contact the QA/QC Officer for further instructions.

  Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantification limit. Reanalysis of these samples is not required. Assessment of analytical quality in these cases will be based on the MS/MSD sample analysis results.

10.2.2 Retention Time Window Determination

For organic analyses, determination of the target analyte retention time window will be made based on the procedure specified in the methods of analysis. Positive identification of an analyte will be made when its retention time falls within the window established during calibration.

10.2.3 Internal Standards

To ensure that changes in GC/MS response and sensitivity do not affect sample analysis results, internal standard compounds are added to all samples, blanks, and spike samples prior to VOC and SVOC analyses. All results are calculated as a ratio of the internal standard response. The criteria by which the internal standard results are assessed will be as follows:

- Internal standard area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated calibration standard.

- The retention time of the internal standard must not vary more than ±30 seconds from the associated calibration standard.

10.2.4 Cleanup Check Samples

Whenever a cleanup technique is employed to eliminate interferences that may prevent accurate determination of the targets of interest at the project required reporting limits, the cleanup procedure must be verified through the analysis of check standards. A standard containing some or all of the target analytes must be processed through the cleanup procedure and analyzed. The recovery of the target analytes in this check will indicate if the cleanup procedure was effective in elimination of interferences without impacting the target compounds of interest.

10.2.5 Sample Collection QC

Field QA/QC sample quantities are summarized in **Table D-2** and the use in the analysis of the data is discussed in **Table D-3**. Field duplicates will be submitted at a frequency of one per 20 investigative samples or one per sampling event. The duplicate results will be used to assess overall sampling and analytical precision and will be assessed against acceptance criteria of 50 percent RPD for water samples and 100 percent for soil samples.

Trip blanks for VOCs will be prepared by the laboratory using analyte-free water and submitted with the water sample collection containers. The trip blanks will be kept unopened in the field with sample bottles. One trip blank will be transported to the laboratory with each batch of aqueous VOC samples. The laboratory will analyze trip blanks as samples.

Rinse blanks will be used to assess decontamination procedures of collection equipment used for multiple samples. The rinse blank will be prepared using analyte-free deionized water when non-dedicated equipment is used in the field. The rinse blanks will be analyzed by the laboratory as samples. Rinse blanks will be prepared at a frequency of one per 20 investigative samples per equipment type.

Trip blanks and rinse blanks used when handling and submitting samples for PFOA analysis will use water free of those analytes. This water will be provided directly from the analytical laboratory.

11.0 DATA REDUCTION, VALIDATION, AND REPORTING

All data generated through field activities or by the laboratory operation shall be reduced and validated prior to reporting in accordance with the methods and the following procedures, unless otherwise noted in the task-specific work plan.

11.1 Data Reduction

11.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct read instrumentation will be employed in the field. The pH, conductivity, temperature, dissolved oxygen, and turbidity readings collected in the field will be generated from direct read instruments following calibration per manufacturer's recommendations. Such data will be written into field logbooks immediately after measurements are taken and/ or recorded on field forms. If errors are made, results will be legibly crossed out, initialed, and dated by the field member, and

corrected in a space adjacent to the original entry. Later, when the results forms required for this study are being filled out, the Field QA Officer will proof the forms to determine whether any transcription errors have been made by the field crew.

11.1.2 Laboratory Data Reduction Procedures

For this project, the equations that will be employed in reducing data are found in the appropriate chapters of SW-846, Third Edition. All calculations are checked at the conclusion of each operating day. Errors are noted, corrections are made, but the original notations are crossed out legibly. Analytical results for soil samples shall be calculated and reported on a dry weight basis.

Quality control data (e.g., laboratory duplicates, surrogates, matrix spikes, and matrix spike duplicates) will be compared to the method acceptance criteria. Data considered to be acceptable will be entered into the laboratory computer system. Data summaries will be sent to the Laboratory QA Officer for review. If approved, data are logged into the project database format. Unacceptable data shall be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data that fell outside acceptance limits, and any other anomalous conditions encountered during sample analysis.

11.2 Data Review/Validation

When required by the work plan, data review/validation will be conducted in accordance with "U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," EPA-540/R-99/008, October 1999, and the "U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA-540/R-94-013, February 1994. The data assessment will include a review of all technical holding times, instrument performance check sample results, initial and continuing calibration results, and all batch and matrix QC including rinse blanks, field duplicates, MS/MSD, matrix duplicates, surrogate recoveries, method blanks, LCS results, continuing and initial calibration checks, and the identification and quantitation of specific analytes of interest. Assessment of analytical and in-house data will include checks on data consistency by looking for comparability of duplicate analyses, adherence to accuracy and precision control criteria detailed in this QAPP, and anomalously high or low parameter values. The results of these data validations will be reported to the project manager and the contract laboratory, noting any discrepancies and their effect upon acceptability of the data.

Data review/validation reports will summarize the samples reviewed, parameters reviewed, any nonconformance with the established criteria, validation actions (including data qualifiers). Data qualifiers will be consistent with the validation guidelines and will consist of the following:

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample

UJ - The analyte was not detected above the sample reporting limit; however, the reporting limit is approximate

U - The sample was analyzed for, but was not detected above the sample reporting limit

R - The sample result is rejected due to serious deficiencies. The presence or absence of the analyte cannot be verified

11.3 Laboratory Data Reporting

The Laboratory will provide electronic copies of all laboratory data reports for project reporting purposes in a format consistent with NYSDEC/USEPA Contract Laboratory Program ("CLP") Category B deliverables.

EQuIS electronic deliverables will also be required for the project database.

11.4 Data Reconciliation with Requirements for Usability

The goal of this project is to produce data to be used in comparison to soil and groundwater quality cleanup criteria. As such, the data generated must meet the data user's needs as defined in the project DQOs in Section 6.0 of this QAPP. In summary, the primary objectives for assessing the usability of the data are:

1. To collect data that is representative of site conditions and comparable with prior data;
2. To produce data that meets the project reporting limit requirements; and
3. To produce data of the highest quality possible in order to accurately and precisely characterize the site.

Data review/validation personnel will apply the standard data validation qualifiers to data to indicate the level of uncertainty in the associated result. In general, for the purposes of this investigation, data that are left unqualified, data qualified "U" (non-detected), data qualified "J" (detected as an estimated result), and data qualified "UJ" (non-detected at an estimated reporting limit) are considered valid and usable for project objectives. Data that are qualified "R" (rejected) will be considered invalid and unusable.

The goal of this program is to generate valid, usable data. However, in environmental sampling and analysis, some data may be lost due to sampling location logistics, field or laboratory errors, or matrix effects that may cause the rejection of results for some compounds. The overall completeness goal for collection of valid data is 90 percent. If this goal is not met, data gaps may exist that may compromise the intended use of the data.

12.0 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits of both field and laboratory activities may be conducted in accordance with the task-specific work plan and this QAPP, to verify that sampling and analysis are performed in accordance with the procedures established.

Performance and system audits of both field and laboratory activities will be conducted to verify that sampling and analysis are performed in accordance with the procedures established in the QAPP and analytical methods. The audits of field and laboratory activities will include two independent parts: internal and external audits.

12.1 Field Performance and System Audits

12.1.1 Internal Field Audit Responsibilities

Internal audits of field activities include the review of sampling and field measurements conducted by the Field QA Officer. The audits will verify that all procedures are being followed. Internal field audits will be conducted once during each phase of the sampling and at the conclusion of the project. The audits will include examination of the following:

- Field sampling records, screening results, instrument operating records
- Sample collection
- Handling and packaging in compliance with procedures
- Maintenance of QA procedures
- Chain-of-custody reports

Follow up audits will be conducted to correct deficiencies and to verify that procedures are maintained throughout the investigation.

12.1.2 External Field Audit Responsibilities

External audits may be conducted by the NYSDEC or designee at any time during the field operations. These audits may or may not be announced and are at the discretion of the NYSDEC.

12.2 Laboratory Performance and System Audits

12.2.1 Internal Laboratory Audit Responsibilities

For the purpose of internal evaluation, performance evaluation check samples are analyzed periodically by the laboratory. Internally, the evaluation of data from these samples is done on a continuing basis over the duration of a given project.

The project QA Officer may carry out performance and/ or systems audits to ensure that data of known and defensible quality are consistently produced during this program.

Systems audits are qualitative evaluations of all components of laboratory quality control measurement systems. They determine if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after completion of the analytical report by the laboratory. Such audits typically involve a comparison of the activities given in the QA/QC plan described herein, with activities actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities, and can be used to track data generation and manipulation through the lab.

The performance audit is a quantitative evaluation of the measurement systems used for a monitoring program. It requires testing the measurement systems with samples of known composition or behavior to quantitatively evaluate precision and accuracy. A performance audit may be carried out by or under the auspices of the project QA Officer without the knowledge of the analyst during this program.

It should be noted, however, that any additional QA audits would only be performed if deemed necessary.

12.2.2 External Laboratory Audit Responsibilities

External audits will be conducted as required, by appropriate QA personnel of the NYSDOH.

12.3 Specific Routine Procedures to Assess Data Precision, Accuracy, Representativeness, and Completeness ("PARC")

The laboratory and the project QA/QC officer will evaluate data precision, accuracy and completeness.

The purpose of this Section is to define the goals for the level of QA effort; namely, accuracy; precision and sensitivity of analyses; and completeness, representativeness, and comparability of measurement data from the analytical laboratories. QA objectives for field measurements are also discussed.

DQOs have been established to ensure that the database developed during the monitoring activities meet the objectives and quality necessary for its intended use.

12.3.1 Precision

Precision is a measure of degree to which two or more measurements are in agreement.

$$\textit{Precision} = (D_2 - D_1) / (D_1 + D_2)/2 \times 100$$

D_1 = original result

D_2 = duplicate result

The method(s) precision (reproducibility between duplicate analyses) will be determined based on the duplicate analysis of matrix spike samples for organic parameters and duplicate sample analyses for inorganic parameters. Precision will be reported as Relative Percent Difference (RPD) between duplicate analyses. Sampling precision will be addressed through the collection and measurement of field duplicates at a rate of one per 20 investigative samples or one per sampling event, whichever is greater. Precision will be evaluated using the laboratory control limits.

12.3.2 Accuracy

Accuracy is the degree of agreement between an observed or measured value and an accepted reference or true value.

$$\textit{Accuracy} = [(A-B)/C] \times 100$$

A =The analyte determined experimentally from the spike sample.

B = The background level determined by a separate analysis of the unspiked sample.

C = The amount of spike added.

Accuracy will be determined for both field and laboratory activities through the use of field blanks and matrix spike samples.

Field (rinsate) blank samples will be collected and analyzed as a check on the efficiency of the sampling device cleansing protocols and to determine if the field, sample transporting procedures, preservatives, and environments have contaminated the sample. Rinse blanks will be collected at a frequency of one per 20 samples per equipment type.

The method accuracy (percent recovery) for water and soil samples will be determined by spiking selected samples (matrix spikes) with all representative spiking compounds, as specified in the analytical methods. Accuracy will be reported as the percent recovery of the spiking compound(s) and will be evaluated using the laboratory control limits.

12.3.3 Completeness

Completeness is a measure of the amount of valid (usable) data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions.

Completeness = (Number of useable data/Number of useable data planned) X 100

Completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. Laboratory completeness for this project will be 90 percent or greater.

12.3.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition within a defined spatial and/or temporal boundary.

Sampling protocols have been presented for the collection of a variety of samples exhibiting specific characteristics or conditions (i.e., the presence of stains or elevated PID readings or when field parameters collected during groundwater sampling stabilize). These conditions may not be representative of the site conditions, but possibly the worst case so the data might reflect what could potentially be on the site and drive risk assessment and eventual cleanup. In these cases, the term representativeness has a very small characteristic population and very small spatial area. Generically, representativeness may suggest a meaning of “typical” or “average” when in fact the sample was biased toward the worst case extreme.

12.3.5 Corrective Actions

Corrective action is the process of identifying and correcting unacceptable procedures or QC performance that can affect data quality and usability. Corrective actions, if necessary, will be implemented in accordance with the procedures presented below and the laboratory SOPs.

Corrective actions may be required for two classes of problems: analytical and equipment problems, and noncompliance problems. Analytical and equipment problems may occur during sampling and sample handling, sample preparation, and laboratory instrumental analysis.

For non-compliance problems, for example, USEPA methods or QC measures are not being followed, a formal corrective action will be implemented at the time the problem is identified. The person who identifies the problem is responsible for notifying the Project Manager. A description of the problem and the corrective action implemented will be confirmed in writing via e-mail, facsimile, or technical memorandum.

Any nonconformance with the established QC procedures in this QAPP will be identified and corrected.

13.0 FIELD NOTES

Field notes will be maintained during all field activities. The overall chronology of field activities as well as sampling details will be recorded in a bound logbook with an indelible ink marker. Each page will be consecutively numbered and signed by the Site Manager at the end of the workday. The following information, as appropriate, will be documented in the field notes:

- Date
- Weather conditions
- Personnel on or visiting Site
- Subcontractors on-Site
- Work performed
- Changes to planned work as discussed with NYSDEC
- Time at which work, sampling or analysis was performed
- Equipment calibration methods and time
- Problems with personnel or machinery
- Sample identification numbers
- Sampling sequence
- Types of sample containers used
- Parameters requested
- Field analysis methods and data
- Field observations during the sampling event
- Name of sampler

TABLE D-1

TABLE D-1
Sample Analytical Procedures and Sample Preservation Requirements

Sample Type	Analysis	Type and Size Container	# of Containers per Sample	Preservation	Holding Time
Soil	TCL Volatile Organics	Glass, 2-ounce jar with Teflon lined cap	2	Cool to 4-deg. C	10 days
	TCL Semivolatile Organics	Glass, 4-ounce jar with Teflon lined cap	1	Cool to 4-deg. C	10 days
	TCL Pesticides	Glass, 4-ounce jar with Teflon lined cap	1	Cool to 4-deg. C	10 days
	TAL Metals + Cyanide	Glass, 4-ounce jar with Teflon lined cap	1	Cool to 4-deg. C	180 days, Mercury 26 days
	Cyanide	Glass, 4-ounce jar with Teflon line cap	1	Cool to 4-deg. C	12 Days
Groundwater	TCL Volatiles	40-ml vial with Teflon septum	3	pH<2 adjusted with HCL Acid, Cool to 4 deg. C	10 days
	TCL Semivolatile Organics	Glass, 1-Liter amber bottle with Teflon lined cap	1	Cool to 4	5 days
	TCL Pesticides	Glass, 1-Liter amber bottle with Teflon lined cap	1	Cool to 4	5 days
	TAL Metals	Plastic, 1-Liter bottle with Teflon lined cap	1	pH<2 adjusted with Nitric Acid, Cool to 4	180 days, Mercury 26 Days
	Cyanide	Plastic, 500-ml with Teflon lined cap	1	pH >12 NaOH	12 days
	PFOAs	High Density Polyethylene 250 ml	1	Cool to 4-deg. C	14-days from extraction
	1,4-Dioxane	Amber glass 500 ml	2	Cool to 4-deg. C	7-days from extraction

TABLE D-2
Quality Control Sample Schedule

	Trip Blank[1]	**Equipment Rinse Samples[2]**	**Duplicates Samples[2]**	**Matrix Spike[2]**	**Matrix Spike Duplicates[2]**
Soil Vapor	N/A	N/A	N/A	N/A	N/A
Soil Samples	1 per sample shipment	1 per sampling tool	1:20 samples	1:20 samples	1:20 samples
Groundwater Samples	1 per sample shipment	1 per sampling tool	1:20 samples	1:20 samples	1:20 samples

N/A = not applicable

1. VOCs only.
2. All analyzed parameters.

TABLE D-3
Schedule of Quality Assurance Samples and Their Use

	Soil	Groundwater	Use
Trip Blank	√	√	Submitted with each sample shipment and analyzed for volatile organic compounds to determine if cross contamination has occurred between the samples and the laboratory equipment.
Matrix Spike and Matrix Spike Duplicate	√	√	Two samples submitted once per 20 samples for each matrix and analyzed for the same analytical parameters as the typical environmental sample. Is used to determine accuracy of analytical equipment and evaluate sample matrix interference problems.
Duplicates	√	√	One sample is submitted for 20 samples analyzed and analyzed for the same analytical parameters as the typical environmental sample. Is used to determine homogeneity of the sample and accuracy of analytical method and equipment.
Equipment Rinse Blank Samples	√	√	One sample is submitted for every sample tool used. Sample is analyzed for the same analytical parameters as the typical environmental sample. Is used to determine if decontamination procedures are impacting the sample or if procedures are cleaning the equipment.

APPENDIX D-1
SURFACE SOIL SAMPLING

Surface Soil Sampling Procedures

The collection of surface soil samples will be required to fulfill a variety of objectives including physical description, field screening, and laboratory chemical analysis. The task specific work plan specifies the data objective, location, depth, and analytical parameters for the soil sample program. The purpose of this field operation procedure is to describe the methods to be used during each of these activities.

This procedure will be used for the collection of surface soil samples. Surface soil samples will be collected using a direct push ("DP") sampling tool or a sample trowel to collect a sample. All surface soil samples will be collected from the upper 2-inches of overburden. In the event vegetation is growing in the sampling area, either a bare spot close to the original location will be selected for sampling or the vegetation will be removed and only the overburden material sampled. The data to be obtained will be used to assess the environmental quality of the ground surface and any impacts that may result from the contaminants that are present.

Field Screening for Volatile Organics

Soil samples collected for field screening will undergo the following handling procedures:

- The sample sleeve will be removed from the DP sampling tool or split spoon sampler will be opened and the soil screened with the PID.
- The observed organic vapor concentration will be recorded for future reference.
- The sample will be visually inspected for soil classification, moisture content, and the presence of debris, stains or waste like materials (sludge, non-aqueous phase liquids).
- The representative portions of the sample will be placed in a glass jars with screw on lids for chemical analysis following the parameter list for surface soil samples.

Physical Description

For each sample interval will be visually examined and described in accordance with the Unified Soil Classification System. This information, together with a record of the length of the recovered portion of the interval, will be entered into the field logbook. Information to be included follows:

- Date;
- Boring Location Number;
- Sample Number;
- Depth Interval;
- Orientation; and
- Job Number.

Soil Samples for Laboratory Analysis

The Project's Work Plan and, or Quality Assurance Plan specifies the sample containers to be used and the parameters to be analyzed. Samples to be analyzed shall be placed in the containers as quickly as possible. Furthermore, all samples for laboratory analysis shall be preserved and transported in accordance with the following procedures. All samples to be sent to the laboratory for chemical analysis must be maintained in a condition that is as close as possible to in situ conditions. The first consideration is the proper selection of containers, preservation, and associated holding times. Other considerations include proper field notes, proper chain-of-custody procedures, and proper labeling of the samples.

Containers

The Quality Assurance Plan specifies the containers to be used.

Preservation

The general purpose of preservation is to maintain the original characteristics (and thus validity) of the sample during the time required for shipping of the sample to the laboratory. For soil, the only preservation technique is cooling the sample to approximately 4°C. This will be done in the field using ice or cold packs in coolers. Samples which are visually (highly) contaminated will be kept in individual sample coolers prior to and during transportation to the laboratory.

Sample Custody Procedures

The goal of implementing chain-of-custody procedures is to ensure that the sample is traceable from the time it is collected until it, or its derived data, are used. Samples would be considered in "custody" under the following conditions:

1. It is in personal possession.
2. It is in personal view after being in personal possession.
3. It was in personal possession when it was properly secured.
4. It is in a designated secure area.

When transferring and/or shipping from the field, samples will be accompanied by the chain-of-custody record. The form includes the signatures of the relinquishers and the receiver as well as the date and time of the exchange, and any pertinent remarks. Since all samples will be immediately placed in coolers, shipment will also be made using these coolers. The samplers will complete the appropriate portion of the chain-of-custody form and deliver the cooler to the laboratory or to the shipping company. The receiving party will complete the remainder of the form and a copy will be retained by the sampler and kept with the field data sheets for that round of sampling. Each cooler will also be sealed using chain-of-custody tape.

Labels

The sample to be sent to the laboratory for chemical analysis will be identified with the following information:

- Date and time of collection;
- Location number;
- Sample number; and
- Sampler's name and affiliation.

Equipment Cleaning Methods

Equipment in actual contact with a laboratory sample will be cleaned prior to and between each use. The equipment will then be temporarily placed on clean racks, off the ground until it is used. Equipment such as DP samplers, sample trowels and soil knives will be cleaned with the following materials:

- Trisodium phosphate dissolved in clean water;
- Clean water rinse;
- Pesticide Grade Methanol rinse;
- Distilled/deionized water rinse; and
- Air dry.

APPENDIX D-2
SUBSURFACE SOIL SAMPLING

Soil Sampling Procedures

The collection of samples will be required to fulfill a variety of objectives including physical description, field screening, and laboratory chemical analysis. The task specific work plan specifies the data objective, location, depth, and analytical parameters for the soil sample program. The purpose of this field operation procedure is to describe the methods to be used during each of these activities.

This procedure will be used for the collection of subsurface samples. Soil samples will be collected using either a 4-foot-long by 2-inch-diameter direct push ("DP") sampling tool, a 2 to 3-inch diameter split spoon sampler, or grab samples from the sidewall of an excavation. A Geoprobe sampling rig will be used to advance DP tooling and a truck mounted drilling rig, using hollow stem augers, will be used to advance the split spoon sampler. The DP sampling tool will collect the samples within a clear acrylic sleeve. Grab samples will be taken directly from the undisturbed soil using a clean trowel or from disturbed soil from the backhoe bucket. Samples taken from the backhoe bucket will only collect samples which are less likely to have been impacted by the bucket. Taking the sample from undisturbed soil clumps. The selection of material for sampling will follow the procedures identified below.

Field Screening for Volatile Organics

Soil samples collected for field screening will undergo the following handling procedures:

- The sample sleeve will be removed from the DP sampling tool or split spoon sampler will be opened and the soil screened with the PID.
- The observed organic vapor concentration will be recorded for future reference.
- The sample will be visually inspected for soil classification, moisture content, and the presence of debris, stains or waste like materials (sludge, non-aqueous phase liquids).
- The representative portions of the sample will be placed in a glass jars with screw on lids.

Physical Description

For each sample interval will be visually examined and described in accordance with the Unified Soil Classification System. This information, together with a record of the length of the recovered portion of the interval, will be entered into the field logbook. Information to be included follows:

- Date;
- Boring Location Number;
- Sample Number;
- Depth Interval;
- Orientation; and
- Job Number.

Soil Samples for Laboratory Analysis

The Project's Work Plan and, or Quality Assurance Plan specifies the sample containers to be used and the parameters to be analyzed. Samples to be analyzed shall be placed in the containers as quickly as possible. Furthermore, all samples for laboratory analysis shall be preserved and transported in accordance with the following procedures. All samples to be sent to the laboratory for chemical analysis must be maintained in a condition that is as close as possible to in situ conditions. The first consideration is the proper selection of containers, preservation, and associated holding times. Other considerations include proper field notes, proper chain-of-custody procedures, and proper labeling of the samples.

Containers

The Quality Assurance Plan specifies the containers to be used.

Preservation

The general purpose of preservation is to maintain the original characteristics (and thus validity) of the sample during the time required for shipping of the sample to the laboratory. For soil, the only preservation technique is cooling the sample to approximately 4°C. This will be done in the field using ice or cold packs in coolers. Samples which are visually (highly) contaminated will be kept in individual sample coolers prior to and during transportation to the laboratory.

Sample Custody Procedures

The goal of implementing chain-of-custody procedures is to ensure that the sample is traceable from the time it is collected until it, or its derived data, are used. Samples would be considered in "custody" under the following conditions:

1. It is in personal possession.
2. It is in personal view after being in personal possession.
3. It was in personal possession when it was property secured.
4. It is in a designated secure area.

When transferring and/or shipping from the field, samples will be accompanied by the chain-of-custody record. The form includes the signatures of the relinquishers and the receiver as well as the date and time of the exchange, and any pertinent remarks. Since all samples will be immediately placed in coolers, shipment will also be made using these coolers. The samplers will complete the appropriate portion of the chain-of-custody form and deliver the cooler to the laboratory or to the shipping company. The receiving party will complete the remainder of the

form and a copy will be retained by the sampler and kept with the field data sheets for that round of sampling. Each cooler will also be sealed using chain-of-custody tape.

Labels

The sample to be sent to the laboratory for chemical analysis will be identified with the following information:

- Date and time of collection;
- Boring number;
- Sample number; and
- Sampler's name and affiliation.

Equipment Cleaning Methods

Equipment in actual contact with a laboratory sample will be cleaned prior to and between each use. The equipment will then be temporarily placed on clean racks, off the ground until it is used. Equipment such as DP samplers, split spoon samplers and soil knives will be cleaned with the following materials:

- Trisodium phosphate dissolved in clean water;
- Clean water rinse;
- Pesticide Grade Methanol rinse;
- Distilled/deionized water rinse; and
- Air dry.

Non-dedicated drilling equipment, backhoe buckets, and sampling equipment in contact with soil or waste materials will be cleaned prior to use and between each boring location. Decontamination of this equipment will be accomplished using a brush and trisodium phosphate dissolved in clean water to remove large solid particles, followed by steam cleaning with clean water. The equipment will be placed on top of open bins, drums, or "luggers" which will collect all wash water. When full, the contents will be pumped into closed drums and left on the Site for a disposal contractor. The drilling rig will be steam-cleaned prior to site entry and prior to leaving the site.

APPENDIX D-3
MONITORING WELL CONSTRUCTION

Monitoring Well Construction Procedure

The purpose of this document is to explain the procedures that will be followed during the construction and installation of monitoring wells. The purpose of the monitoring well construction is to provide representative samples of the groundwater. Monitoring well construction should be designed based on conditions of the groundwater zone.

Monitoring Well Construction

The drilling of test borings will be started by the split spoon sampling of the surface soil followed by the augering of the soil from the ground. Split spoon sampling will be completed in consecutive sequence from the ground surface to a point approximately five feet below the water table. From this point forward, split spoon samples will be collected in 5-foot intervals. Soil sampling will be done in accordance with the procedures found in Appendix A. Augering will be completed as needed following each two foot or five foot sample interval. Drilling will continue until the bottom of the groundwater zone is found or to a point approximately 20-feet below the ground surface.

Once the field geologist has confirmed the bottom of the planned monitoring well, the Drilling Contractor will fill the interior portions of the hollow stem auger with water to place a positive pressure on the seal of the auger plug. If sand heaving is a problem the Drilling Contractor may add pure Bentonite clay to the water or drive casing with a disposable casing plug.

As the hollow stem auger flights are being filled the Drilling Contractor will construct the monitoring well using 2-inch diameter, clean PVC screen and riser. The monitoring well screen will be composted of slotted PVC with a minimum of 0.001-inch width slots. The slotted pipe will be approximately the length of the exposed groundwater zone thickness plus 2 feet, but will have a length of no more than 10-feet. The Drilling Contractor will then attach a sufficient length of 2-inch diameter PVC riser to extend the top of the monitoring well approximately 2-feet above the ground surface. Monitoring well sections will be joined using a threaded coupling.

Once the monitoring well is completed the Drilling Contractor will then remove the auger plug and insert the completed monitoring well. If the monitoring well does not reach the bottom of the hole, the Drilling Contractor will either push lightly onto the top of the monitoring well to force it into place or remove the monitoring well and re-drill that section of the test boring hole.

Once the monitoring well is in place the Drilling Contractor and field geologist will measure the monitoring well to ensure the depth of the bottom. Prior to removing the auger flights, the Drilling Contractor will slowly add sand to the annulus of the monitoring well to form a sand pack surrounding the monitoring well screen. With the addition of sand the Drilling Contractor will slowly begin removing the auger flights.

During this process the Drilling Contractor and field geologist will monitor the thickness of the sand pack and monitoring well depth. Sand will be added to the annulus of the monitoring well until the sand reaches a point two feet above the monitoring well screen, see Figure 8.

At this point the Drilling Contractor will remove approximately 5 to 10 gallons of water from the monitoring well to settle the sand pack. After the water has been removed the sand pack will be re-measured and if consistent with previous measurement, the Drilling Contractor will be directed to add Bentonite clay pellets or granular clay to the annulus to form a seal above the sand pack. The Bentonite will be added in the same manner as the sand, adding a small amount of material and lifting or removing an auger flight. If the seal is above the water table, the Drilling Contractor will be directed to add potable water to the annulus to help hydrate Bentonite clay. The seal will have a thickness of at least two feet.

The Drilling Contractor will be directed to tamp the surface of the Bentonite with a weight tape or rod to compact the clay before adding the grout mixture. The grout mixture will consist of one sack (90-pounds of Portland cement), 3-pounds Bentonite clay powder, and six gallons of potable water. The grout will be mixed until a smooth consistency is formed. The grout will be placed into the annulus using a Tremie pipe placed approximately 2-feet above the clay. The slurry will be pumped into the annulus until the annulus is filled to a point approximately 2.5 feet below the ground surface.

The grout will be allowed to solidify before installing a protective casing or developing the monitoring well. The type of protective casing will be dependent on the location of the monitoring well. High traffic areas will require flush mounted curb boxes while remote areas will be fitted with casing that stick up from the ground surface approximately 2.5 feet. Each casing type will have locking mechanism; either a keyed lock or bolted cover. Each monitoring well will be given a locking plug.

Well Development

Monitoring well development will be started at least 1 day after the monitoring well is completed. Development will be completed by surging and pumping or bailing groundwater from the monitoring well to remove sediment from the monitoring well screen and well bore. Development will continue until the turbidity of the groundwater is less than 50 NTU. During the development process, the field geologist will monitoring the pumped groundwater for water quality (presence of sheens) and monitor the ambient air and groundwater for the presence of volatile organic compounds.

Records

The field geologist will be responsible for taking notes on all samples collected during the sampling process and all measurements and quantities used during the construction

and development of the monitoring well. At the completion of the field activities, boring logs and constructions logs will be prepared for the final report, development records will be kept and water level measurements recorded.

APPENDIX D-4
GROUNDWATER SAMPLING

Procedures for Groundwater Quality Sampling

The purpose of this document is to explain the procedures that will be followed during all groundwater sampling activities at the Site.

The water quality sampling will take place over a period of one to several days. The first day will consist of the pre-sampling activities listed below. All of the water level measurements for the wells to be sampled during each round will be made in a single day. Wells will be evacuated and sampled during the same day.

PRE-SAMPLING ACTIVITIES

Well Maintenance Check

Prior to every sampling event, a routine inspection of the condition of the protective casing and surface seal will be performed. The protective casing will be inspected for the integrity of the locking cap and the surface seal. In addition, each well will be checked for any other signs of damage or inadvertent entry. Observations of any irregularities will be noted in the field log book, as well as the well number, date, and time.

Air Monitoring

In order to provide workers with the proper respiratory protection for sampling, air monitoring in the breathing zone and immediately over the wellhead will be performed immediately after the initial uncapping. Health and safety procedures that are appropriate to the ambient air conditions will be implemented. Readings for both the breathing zone and wellhead will be recorded in the field log book. See the Health and Safety Plan for respiratory protection action levels, and a description of the proper air monitoring equipment.

Water Level Measurements

The depth to groundwater will be measured with an electronic depth-indicating sounder. The probe will be lowered into the well until the meter indicates water is reached. The probe will be raised above the water level and slowly lowered again until water is indicated. The cable will be held against the side of the inner protective casing for water level measurements and a depth reading taken. The value will be recorded to the nearest 0.01 foot in the field log book. The measurement will be repeated three times and the measurement recorded. The probe will be raised to the surface and together with the amount of cable that was wetted in the well, will be decontaminated with a wipe followed by a distilled/deionized water rinse.

The calibrated cable on the depth indicator will be checked against a surveyor's steel tape once per quarter year. A new cable will be installed if the cable has changed by more than 0.01 percent (0.01 feet for a 100-foot cable).

WELL EVACUATION

Overburden Monitoring Wells

- The well will be purged with a low flow peristaltic pump. The pump's acrylic or PVC intake tubing will be lowered into the monitoring well to a point that is approximately in the center of the monitoring well screen or in the center of the water column. The discharge end of the tubing will be placed into a flow-through cell from which groundwater quality parameters will be measured. The discharge from the flow-through cell will be routed into a five-gallon bucket for discharge measurement. For sampling water flow will be approximately 0.25 liters per minute or until a constant stream of water is obtained. The water level in the monitoring well will also be monitored and not allowed to drop below 0.125 feet from the original pre-sampling static water level.
- When the groundwater quality is stable indicating that a representative sample of groundwater can be collected, the discharge end of the tubing will be disconnected from the flow-through cell and routed into a five-gallon bucket to collected spills from the filling of sample containers.
- The appropriate sample vials will be filled slowly and with a constant stream of water (flow) to avoid sample aeration and the field parameter tests conducted as described in "Field Measurements."

FIELD MEASUREMENTS

A portion of the groundwater collected during the sampling procedures will be subjected to the field tests of temperature, dissolved oxygen ("DO"), turbidity, specific electrical conductance, oxidation-reduction potential ("ORP") and pH. Field measurements will be conducted on the well purge water immediately prior to sample collection. Groundwater for these tests will be collected and measured in a plastic flow-through cell. All field test parameters will be measured with a portable water quality instrument such as a Horiba U-22 Water Quality Monitoring System. Temperature will be measured to the nearest tenth of a degree and the value recorded in the field log book. Turbidity will be measured in standardized nephelometeric turbidity units ("N.T.U."). After each measurement the N.T.U. value of the sample will be recorded. The goal of the well purging will be to reduce the turbidity of the groundwater extracted from the monitoring well to less than or equal to 50 N.T.U. In the event turbidity cannot be lowered sufficiently, the NYSDEC Project Manager will be notified and filtered and non-filtered samples may be required for analysis. The specific electrical conductance will be measured to the nearest 1unit and recorded in the field log book. The pH will be measured to the nearest 0.1 pH unit and the reading recorded in the field log book. The DO will be measured to the nearest 0.1 unit and the reading recorded in the field log book. The ORP will be measured to the nearest 1 millivolt and the reading recorded in the field log book. Calibration will be conducted according to manufacturer's specifications.

EQUIPMENT DECONTAMINATION

All of the sampling equipment (excluding the water quality probes) will be decontaminated between sampling events using the following procedures or disposed of, if dedicated equipment is used (i.e. sample tubing).

- An initial wash with trisodium phosphate dissolved in clean water;
- Clean water rinse;
- Pesticide Grade Methanol rinse;
- Air dry.

Decontamination wastewater will be collected in containers and disposed of properly.

SAMPLE LABELS

Sample labels will be placed on all samples and will contain the following information:

- Date and time of collection;
- Sample location;
- Sample number;
- Analysis to be performed; and
- Sampler's initials.

FIELD LOG BOOKS

The field log books used during sampling procedures will include the following information:

- Sampler's name (initials);
- Sampling location;
- Static water level (depth to water);
- Depth to bottom of the well;
- Calculated well volume;
- Actual evacuation volume;
- Date and time;
- Analyses to be performed;
- Preservation method;
- Field meter calibration information;
- General remarks (weather conditions, etc.); and
- Sample number.

All entries will be made in black indelible ink with a ball-point pen and will be written legibly. Entry errors will be crossed out with a single line, dated, and initialed by the person making the correction. Field log books will be reviewed by the Quality Assurance Officer on a weekly basis

SAMPLE CHAIN-OF-CUSTODY

A chain-of-custody form will be completed after sample collection event. The chain-of-custody forms will accompany the samples to the laboratory. The field personnel collecting the samples will be responsible for the custody of the samples until transportation to the laboratory. Sample transfer will require the individuals relinquishing and receiving the samples to sign, date, and note the time on the chain-of-custody forms.

APPENDIX D-5
SOIL VAPOR SAMPLING

Soil Vapor Sampling Procedure

The installation of probes for the collection of soil vapor samples will assist in the determination of whether or not there is a threat to on-site users and offsite receptors to vapor intrusion. The data will also be used to evaluate the subsurface soil and the groundwater quality since these samples are prone to evaluating only small areas and soil vapor data can represent the accumulation of impacts from the soil and groundwater over larger areas.

1.0 Sample Probes

The soil vapor samples will be collected from temporary sampling locations placed into the ground using direct push ("DP") sampling equipment or split spoon sample holes. The soil probes will be extended to a point approximately 5 feet below the ground surface. The water table in the site area is unknown and the depth of the probes may require adjustment to ensure groundwater is not entrained into the sample.

Each sample location will be built using the following procedure:

- A Site utility location survey will be requested from local utilities to identify where utilities enter and cross the property.
- A 2-inch diameter DP hole or split spoon hole will be advanced to the targeted depth using Geoprobe DP rods or drill rods. The DP tools will be pulled and a 0.5-foot slotted PVC screen attached to a 0.25-inch outside diameter PVC or polyethylene food grade tubing will be placed into the hole.
- The hole will be backfilled with clean quartz sand to a point approximately 6 inches above the top of the vapor well intake. On top of the sand and to the ground surface, the open hole will be backfilled with a grout slurry mixture of 2 to 3 percent Bentonite and Portland cement. The 0.25-inch diameter tubing or PVC pipe will extend above the grout approximately 3 feet so it can be accessed for sampling.
- The tubing will then be purged to remove gases trapped in the sand and in the monitoring point during placement. A plug will then be placed into the tubing unless sampling will begin immediately. Purging will be done for a period of 5 minutes or until one to three open space (pore) volumes have been removed at a rate not to exceed 0.2 liters per minute. Ideally, the soil vapor sample point will have a volume of approximately 0.2 liters. After purging the tubing will be plugged.

2.0 Sample Collection

Prior to the start of sampling time, weather conditions, air temperature, barometric pressure, wind direction and approximate wind velocity will be noted. In addition, all sample locations will be tested with a tracer gas, consisting of Helium gas or propane, to determine if ambient air is infiltrating the sample. The tracer test will be conducted using the following steps:

- Sample tubing will be connected to the brass fitting on the in-place sample tubing or PVC pipe. The tubing will be of sufficient length to extend beyond a bucket placed over the sample location.
- A ring of hydrated Bentonite clay will be placed around the sample location. The Bentonite ring will act as a seal between the ground and the bucket, which will be used to enclose the sample location and to confine the tracer gas.

- A bucket will be placed over the sample location and a hole placed into the top of the bucket with a diameter equal to the sample tubing. The sample tubing will be placed through the hole and inserted into a sampling pump. The sample pump will be connected to a Helium detector. A second hole will be placed on the side of the bucket near the ground surface. A second tube connected to a Helium/propane gas cylinder will be threaded through the bucket and placed next to the sample location. The tubing will be taped or sealed to the bucket using Silicone or modeling clay. The Helium will be released into the bucket, the sample pump started and the Helium detector monitored.
- The test will be performed for 10 minutes. If Helium/propane is not detected in the sampled gas, the sub-slab sample will be collected. If Helium/propane is detected, the surface seal and tubing connections will be examined and either repaired or replaced and the tracer test completed again until a successful test is performed.

Prior to sample collection, the time, weather conditions, air temperature, barometric pressure, and wind direction and approximate velocity will be noted. Ideally, sample collection will start at 10:00 AM and continue uninterrupted for one hour. During the sample collection period, the sampling technician will inspect the sampling train and gauges several times to ensure the regulator and sampling train are operating properly. Sampling of the soil vapor will follow these procedures:

- The sampling technician will label the Summa canister with a unique sample number and record the sample number in the field notebook. The sampling technician will record the identification number of each canister and assign a canister to each sampling location. The technician will also not have or use permanent markers or use other products containing VOCs during sampling.
- The technician will then connect the Summa canister to the sample tubing. The technician will note the time and open the Summa canister regulator. The laboratory will specify the collection time for the sample flow rate and the desired detection limit needed for the Site. At this time, a 6 liter Summa Canister will be used and the sample will be collected for a period of 1 hour at a flow rate of 0.1 Liters per minute.
- When the sampling is completed the technician will close the regulator noting the time and vacuum, and disconnect the sample canister from the sample tubing. The technician will label the canister with the sample time on the Summa canister and then complete the chain of custody and the field notebook with the sample information.
- The sampling technician will plug the sample tubing and place the Summa canister into the shipping container.
- The samples will be shipped overnight so the laboratory will receive the samples the next day.

APPENDIX D-6
WASTE HANDLING PROCEDURES

The procedures identified in this Appendix were prepared with the intent of providing instruction for the safe handling, temporary storage and disposal of investigation derived waste and waste possibly generated from the completion of an interim remedial measure ("IRM"). In general, for any of the wastes generated during this project, will be placed in containers compatible with the waste and appropriate containers the type of waste being handled. Health and safety of the site workers is not covered in this procedure.

Investigation Derived Waste

Investigation derived waste can include: drill cuttings, decontamination water, purge water from monitoring wells, solid waste consisting of personnel protective equipment, card board, plastic, and paper. How the waste is handled will be decided based on the expected volume and the consistency of the waste. Consequently the following acceptable containers have been identified:

Containers - Liquid

Steel or plastic 55-gallon containers with closed lids will be utilized to control decontamination water and purge water from monitoring wells. In general, decontamination water will be kept segregated from other liquid waste because of the potential for this waste stream to be handled as a non-hazardous waste. Decontamination water will be pumped from the decontamination area into the containers after sediment has been removed. This will be done to minimize the amount of sediment accumulating in a drum and the possible need to sample the sediment.

Groundwater pumped from monitoring wells during development and sampling will be containerized in steel or plastic closed lid containers. Since development waters may be heavily laden with sediment an open top drum may be used as an interim step before transferring the waste into closed containers. Sediment separated from development water will be temporarily held in an open top drum. In the event free product is found during the development or monitoring well purging, the free product will be placed in a separate drum and appropriately identified.

When each drum is full, a label will be placed on the drum indicating the type of waste, where it is from (monitoring well number, decontamination pit, etc.), and the date it was generated. The containers will be placed in a location where site equipment and trucks will not disturb them and a location where they can be easily managed. Caution tape and, or snow fencing will be used to warn passerby's of the materials being stored.

Containers – Solids

Steel or plastic open top 55-gallon containers will be used to containerize solids generated by the investigation activities. During the course of the field investigation waste solids will be generated and consist of unsoiled personnel protective equipment, paper, plastic, and card board ("dry waste"), and soil cuttings or sediment. Dry waste will

not be co-mingled with other waste and handled as household trash. Personnel protective equipment that has been contaminated with dirt or free product will be separated from the other non-contaminated dry waste and placed in a separate drum.

Soil cuttings or sediment from the decontamination area or development water will be placed into open top steel containers for temporary storage at work locations. At the completion of work at any particular location the drum will be brought to the temporary storage area.

When each drum is full, a label will be placed on the drum indicating the type of waste, where it is from (monitoring well number or decontamination pit), and the date it was generated. The containers will be placed in a location where site equipment and trucks will not disturb them and a location where they can be easily managed. Caution tape and, or snow fencing will be used to warn passerby's of the materials being stored.

Soil Cuttings and Sediment

Because the cost of the disposal of soil cuttings and sediment is significantly more when the waste is handled in containers, waste of similar quality will be placed on two layers of plastic sheeting. The temporary storage area will be located in an area where site equipment and trucks will not disturb the waste. The storage area will be constructed with a berm made from soil, sand bags or wood boards. The berm will be covered with a plastic sheet. A second plastic layer will drape over the first and have enough material so it can be folded over the waste. This layer will be secured in place with tires or water filled pails.

If some of the waste is stained, giving off volatiles as measured by the organic vapor analyzer, or odorous a second pile may be started. If only a small quantity of waste has these characteristics then it may remain in a drum.

The covered soil pile will be inspected for tears or the accumulation of rain or snow. Water will be drained from the plastic and onto the ground if there is no indication of a tear in the plastic. Water found mixed with the waste will be either pumped into a drum or absorbed and the plastic replaced of covered.

Soil piles will be posted or labeled indicating the type of waste, where it is from (monitoring well number or decontamination pit), and the date it was generated. The piles will be surrounded with caution tape and, or snow fencing to warn passerby's of the materials being stored.

IRM Waste

IRM waste will be handled like the investigation derived waste if the quantities expected to be generated remain relatively small: a few hundred gallons of water or less than 5-tons of soil. If the IRM will exceed those volumes and weights then tanks or a roll off box will be used to containerize the waste. However, regardless of the size of the container, the same procedures will

be used. Waters will be as sediment free as possible and waste in the roll off box will be covered. If the waste is anticipated to be wet, the roll off box will be lined. The containers will be located to facilitate removal and, or to minimize handling. The containers will be labeled indicating the type of waste, where it is from (monitoring well number, decontamination pit, etc.), and the date it was generated. The tanks will have valves locked to minimize the consequences of vandalism. Roll offs will be surrounded with caution tape and, or snow fencing to warn passerby's of the materials being stored.

Waste Characterization

It is anticipated that the waste characterization requirements will closely follow USEPA's RCRA regulations, but these may be changed based on the requirements of the facilities where the waste may be landfilled and, or treated. Samples of the generated waste will be collected at the completion of field work. The goal of the waste characterization will be to remove the waste from the site within 90-days.

APPENDIX E

WELL LOGS

LEADER PROFESSIONAL SERVICES

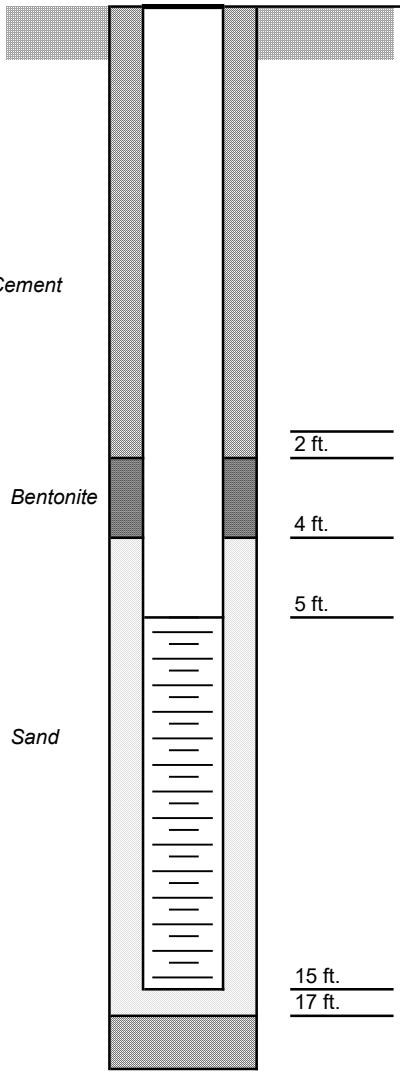
Environmental Engineers & Scientists

WELL CONSTRUCTION SUMMARY

Project: 1077.003 / 235.198A Location: Tonawanda NY Well No.: MW-4
Permit No.:

TOC elev.: -

TOC elev.:



DRILLING SUMMARY

Drilling Company:	Cascade	Drillers:	
Drill Rig/Model:	Geoprobe		
Borehole Diameters:	4.25	Drilling Fluid:	No
Bits/Depths:	0 to 15 ft.		
Total Depth:	15-17 ft.	Depth To Water:	0.5 ft.
Supervisor Geologist:	Matt Drury/Rob Murphy		

WELL DESIGN

Casing Material:	PVC	Diameter:	2-in.
Screen Size:	10 ft.	Diameter:	2-in.
Slot Size:	0.01-in.	Setting:	5 to 15 ft.
Backfill	Sand	Setting:	4 to 17 ft.
Filter Material:	Sand	Setting:	4 to 17 ft.
Seals Material:	Bentonite	Setting:	2 to 4 ft.
Sand Cap	None	Setting:	None
Grout:	Cement/Bentonite	Setting:	.5 to 2 ft.
Surface Casing Material:	Steel	Setting:	

TIME LOG

	Started	Completed
Drilling:	8-Jan-20	9-Jan-20
Installation:	8-Jan-20	9-Jan-20
Development:	21-Jan-20	21-Jan-20

WELL DEVELOPMENT

Method:	Bailing and pumping		
Static Depth to Water:	0.5 ft.		
Pumping Depth To Water:	Unk.		
Pumping Rate:	Unk.	Spec. Capacity:	N/A
Volume Pumped:	5 to 10-gallons		

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: SB-3

LOG OF BORING

Page 1 of 1

Project 235.198A | Location Bisonite Paint Military Road | Permit #:

Date Drilled 12/4/19 | Drilling Co.: Cascade | Job #: 235.198A

Total Depth 20' | Method Used: Geoprobe

Inspector Robert Murphy | Organic Vapor Inst: MiniRAE 3000 | Water elv: Unknown

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
	1	Push	0-5'		0.5	0-2' asphalt		
					1.1	**Sample 1'-2' Lab**		
					7.5	4'-5' clay, contaminated, stains	Fill	
5	2	Push	5'-10'		400	**Sample 4'-6' Lab**		
						5' dried paint found		
					10	6'-8' wet, 60% recovery	Fill to 8 ft.?	
						8'-10' moist, soft gravelly		
10	3	Push	10'-15'		9	10'-15' red clay silt		
						Sample 10'-12' Lab	CL	
					8			
					3			
15	4	Push	15'-20'		1	15-16 red dry clay		
						17-20 red wet clay	CL	
					1			
20					1			

LEADER PROFESSIONAL SERVICES

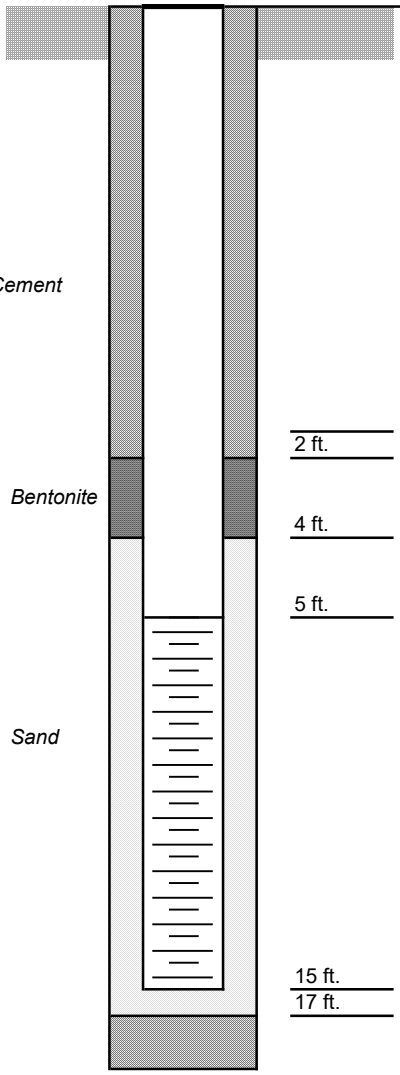
Environmental Engineers & Scientists

WELL CONSTRUCTION SUMMARY

Project: 1077.003 / 235.198A Location: Tonawanda NY Well No.: MW-3
Permit No.:

TOC elev.: -

TOC elev.:



DRILLING SUMMARY

Drilling Company:	Cascade	Drillers:	
Drill Rig/Model:	Geoprobe		
Borehole Diameters:	4.25	Drilling Fluid:	No
Bits/Depths:	0 to 15 ft.		
Total Depth:	15-17 ft.	Depth To Water:	0.5 ft.
Supervisor Geologist:	Matt Drury/Rob Murphy		

WELL DESIGN

Casing Material:	PVC	Diameter:	2-in.
Screen Size:	10 ft.	Diameter:	2-in.
Slot Size:	0.01-in.	Setting:	5 to 15 ft.
Backfill	Sand	Setting:	4 to 17 ft.
Filter Material:	Sand	Setting:	4 to 17 ft.
Seals Material:	Bentonite	Setting:	2 to 4 ft.
Sand Cap	None	Setting:	None
Grout:	Cement/Bentonite	Setting:	.5 to 2 ft.
Surface Casing Material:	Steel	Setting:	

TIME LOG

	Started	Completed
Drilling:	8-Jan-20	9-Jan-20
Installation:	8-Jan-20	9-Jan-20
Development:	21-Jan-20	21-Jan-20

WELL DEVELOPMENT

Method:	Bailing and pumping		
Static Depth to Water:	0.5 ft.		
Pumping Depth To Water:	Unk.		
Pumping Rate:	Unk.	Spec. Capacity:	N/A
Volume Pumped:	5 to 10-gallons		

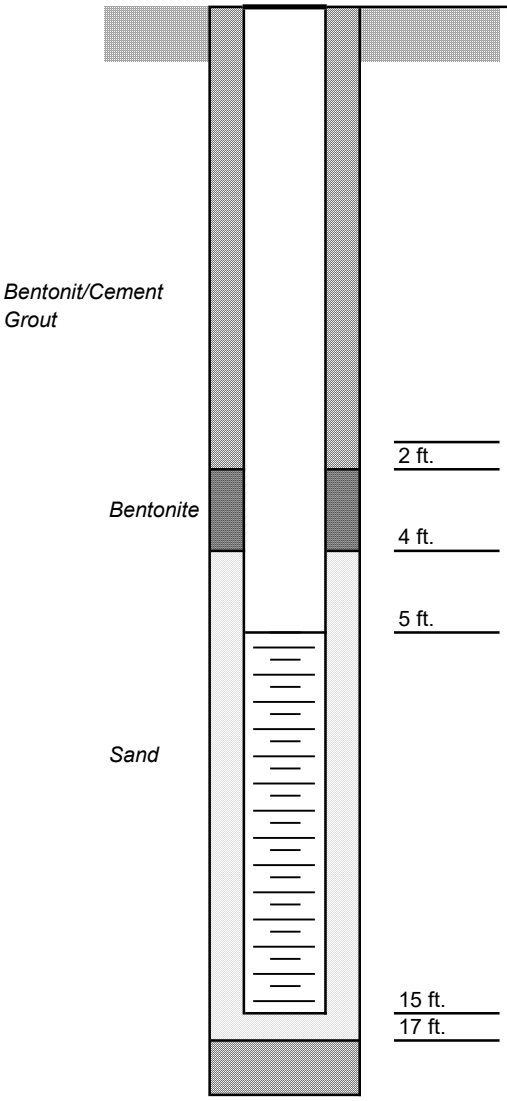
LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

WELL CONSTRUCTION SUMMARY

Project: 1077.003 / 235.198A Location: Tonawanda NY Well No.: MW-2
Permit No.:

TOC elev.: -



DRILLING SUMMARY

Drilling Company:	Cascade	Drillers:	
Drill Rig/Model:	Geoprobe		
Borehole Diameters:	4.25	Drilling Fluid:	No
Bits/Depths:	0 to 15 ft.		
Total Depth:	15-17 ft.	Depth To Water:	0.5 ft.
Supervisor Geologist:	Matt Drury/Rob Murphy		

WELL DESIGN

Casing Material:	PVC	Diameter:	2-in.
Screen Size:	10 ft.	Diameter:	2-in.
Slot Size:	0.01-in.	Setting:	5 to 15 ft.
Backfill	Sand	Setting:	4 to 17 ft.
Filter Material:	Sand	Setting:	4 to 17 ft.
Seals Material:	Bentonite	Setting:	2 to 4 ft.
Sand Cap	None	Setting:	None
Grout:	Cement/Bentonite	Setting:	.5 to 2 ft.
Surface Casing Material:	Steel	Setting:	

TIME LOG

	Started	Completed
Drilling:	8-Jan-20	9-Jan-20
Installation:	8-Jan-20	9-Jan-20
Development:	21-Jan-20	21-Jan-20

WELL DEVELOPMENT

Method:	Bailing and pumping		
Static Depth to Water:	0.5 ft.		
Pumping Depth To Water:	Unk.		
Pumping Rate:	Unk.	Spec. Capacity:	N/A
Volume Pumped:	5 to 10-gallons		

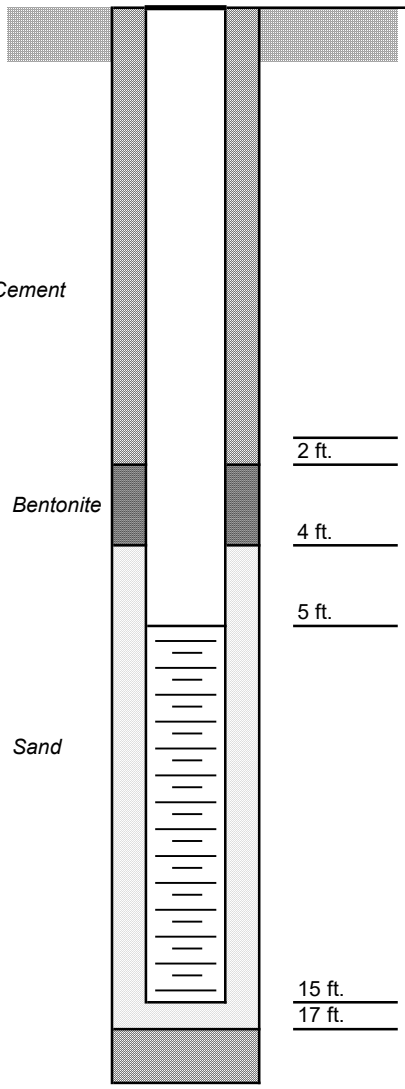
LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

WELL CONSTRUCTION SUMMARY

Project: 1077.003 / 235.198A Location: Tonawanda NY Well No.: MW-1
Permit No.:

TOC elev.: -



DRILLING SUMMARY

Drilling Company:	Cascade	Drillers:	
Drill Rig/Model:	Geoprobe		
Borehole Diameters:	4.25	Drilling Fluid:	No
Bits/Depths:	0 to 15 ft.		
Total Depth:	15-17 ft.	Depth To Water:	0.5 ft.
Supervisor Geologist:	Matt Drury/Rob Murphy		

WELL DESIGN

Casing Material:	PVC	Diameter:	2-in.
Screen Size:	10 ft.	Diameter:	2-in.
Slot Size:	0.01-in.	Setting:	5 to 15 ft.
Backfill	Sand	Setting:	4 to 17 ft.
Filter Material:	Sand	Setting:	4 to 17 ft.
Seals Material:	Bentonite	Setting:	2 to 4 ft.
Sand Cap	None	Setting:	None
Grout:	Cement/Bentonite	Setting:	.5 to 2 ft.
Surface Casing Material:	Steel	Setting:	

TIME LOG

	Started	Completed
Drilling:	8-Jan-20	9-Jan-20
Installation:	8-Jan-20	9-Jan-20
Development:	21-Jan-20	21-Jan-20

WELL DEVELOPMENT

Method:	Bailing and pumping		
Static Depth to Water:	0.5 ft.		
Pumping Depth To Water:	Unk.		
Pumping Rate:	Unk.	Spec. Capacity:	N/A
Volume Pumped:	5 to 10-gallons		

LEADER PROFESSIONAL SERVICES

Environmental Engineers & Scientists

BORING #: SB-4

LOG OF BORING

Page 1 of 1

Project 235.198A | Location Bisonite Paint Military Road | Permit #:

Date Drilled 12/4/19 | Drilling Co.: Cascade | Job #: 235.198A

Total Depth 17' | Method Used: Geoprobe

Inspector Robert Murphy | Organic Vapor Inst: MiniRAE 3000 | Water elv: Unknown

Depth (feet)	Sample No.	Blows/6" 140 lbs.	Sample Inter.	Adv/Rec (feet)	Org. Vap (ppm)	Sample Description	Unified Class.	Permeability
	1	Push	0-5'		0.0	0-1' asphalt **Sample 1'-2' Lab** 1'-3' born silty clay 3'-5' red clay		
5	2	Push	5'-10'		0.5 0.2 0.0 .5	6'-10' wet 6'-10' red silty clay 9'-10' fill	Poss. Fill 10'	
10	3	Push	10'-15'		2.0 2.0	10'-15' fill red clay wet	CL/ML	
15	4	Push	15'-17'		0.0	Sample 15'-16' Lab 15'-17' brown silty clay 15% gravel 17 ft end, black rock		
20								

APPENDIX F

DECISION DOCUMENT

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau E
625 Broadway, 12th Floor, Albany, NY 12233-7017
P: (518) 402-9813 I F: (518) 402-9722
www.dec.ny.gov

December 19, 2023

Tonawanda Storage Properties LLC
Attention: John Stevens
18 North Main Street
Pittsford, NY 14534

Re: Bisonite Paint Co. Site
Site ID No. C915010
Tonawanda, NY – Erie County
Remedial Investigation and Alternatives Analysis Report & Decision Document

Dear John Stevens:

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have reviewed the revised Remedial Investigation and Alternative Analysis Report (RI/AAR) for the Bisonite Paint Co. site dated November 30, 2023 as prepared by Marsh Engineering, D.P.C. on behalf of the Tonawanda Storage Properties, LLC. The RI/AAR is hereby approved. Please ensure that a copy of the approved RI/AAR is placed in the document repository. The draft plan should be removed.

Attached is a copy of the NYSDEC's Decision Document for the site. The remedy is to be implemented in accordance with this Decision Document. Please ensure that a copy of the Decision Document is placed in the document repository.

Please contact the NYSDEC's Project Manager, Michael Keller, at (716) 851-7218 or michael.keller@dec.ny.gov at your earliest convenience to discuss next steps. Please recall that NYSDEC requires seven days advance notice prior to the start of field work.

Sincerely,

Michael Cruden

Michael Cruden, P.E.
Director
Remedial Bureau E
Division of Environmental Remediation

NEW YORK STATE | Department of Environmental Conservation

Enclosure

ec *w/attachments*:

Andrew Guglielmi, Esq. – NYSDEC
David Harrington, P.E. – NYSDEC
Michael Cruden, P.E. – NYSDEC
Andrea Caprio, P.E. – NYSDEC
Benjamin McPherson, P.E. – NYSDEC
Michael Keller, EIT – NYSDEC
Gregory Scholand, Esq. – NYSDEC
Charlotte Bethoney – NYSDOH
Shaun Surani – NYSDOH
Timothy Sheehan, tsheehan@midwest-fac.com
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Alan Knauf, Esq., aknauf@nyenvlaw.com
Matt Gokey, matthew.gokey@tax.ny.gov
Paul Takac, paul.takac@tax.ny.gov

DECISION DOCUMENT

Bisonite Paint Co.
Brownfield Cleanup Program
Tonawanda, Erie County
Site No. C915010
December 2023

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

DECLARATION STATEMENT - DECISION DOCUMENT

Bisonite Paint Co.
Brownfield Cleanup Program
Tonawanda, Erie County
Site No. C915010
December 2023

Statement of Purpose and Basis

This document presents the remedy for the Bisonite Paint Co. site a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Bisonite Paint Co. site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected 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. 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.

2. Source Area Excavation

Excavation and off-site disposal of contaminant source areas in the former settling lagoon and associated trench meeting any of the below criteria:

- Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- Non-aqueous phase liquids;
- Soil with visual waste material or non-aqueous phase liquid; and
- Soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards (Mercury, Total PCBs, Ethylbenzene, Toluene, and Total Xylenes).

Approximately 750 tons of sub-surface material in the settling lagoon and associated trench meeting the above criteria will be excavated and transported for off-site disposal.

Collection and analysis of confirmation samples at the remedial excavation extents will be used to verify that SCOs for the site have been achieved. If confirmation/documentation sampling indicates that SCOs were not achieved, further remedial excavation will be necessary unless otherwise approved by the Department.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

On-site soil which does not exceed the above excavation criteria or the protection of groundwater SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site. If sufficient on-site material is not available for reuse, clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the design grades at the site.

3. Surficial Soil Excavation

Soil from the northern and western site boundary in the upper one foot which exceeds the commercial SCOs will be excavated to facilitate installation of the site cover in remedial element 4 and transported off-site for disposal. Approximately 200 tons of material meeting the above criteria will be excavated and transported for off-site disposal.

Collection and analysis of documentation samples at the remedial excavation extents will be used to document the soil conditions remaining after excavation. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

4. Cover System

A site cover will be required in areas where the upper one foot of exposed surface soil will

exceed the applicable soil cleanup objectives (SCOs), to allow for future commercial or industrial use of the site. Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to pavement, concrete, paved surface parking areas, sidewalks, building foundations, and building slabs.

5. Groundwater Monitoring

To monitor the groundwater conditions, each of the four on-site monitoring wells and one off-site monitoring well (MW-1) will be sampled for volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), and metals, in addition to natural attenuation parameters. Groundwater monitoring will be required until reductions in monitoring are approved by the NYSDEC. Groundwater monitoring wells will be replaced in-kind if damaged or removed during remedial activities.

6. Vapor Intrusion Evaluation

A soil vapor intrusion evaluation will be completed due to a change in on-site building use since completion of the Remedial Investigation (RI). The evaluation will include a provision for implementing actions recommended to address any exposures related to soil vapor intrusion.

7. Institutional Controls

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

- Require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allow the use and development of the controlled property for commercial or industrial 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 Erie County DOH; and
- Require compliance with the Department approved Site Management Plan.

8. Site Management Plan

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

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

Institutional Controls: The Environmental Easement discussed in remedial element 7 above and the groundwater monitoring system discussed in remedial element 5 above.

Engineering Controls: The cover system discussed in remedial element 4 above.

This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision that should a building foundation or building slab be removed in the future, a cover system will be placed in any area of the removed foundation or slab where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
- A provision for evaluation of the potential for soil vapor intrusion for any new occupied buildings on the site, including provision for implementing actions recommended to address any exposures related to soil vapor intrusion;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- The 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 of groundwater to assess the performance and effectiveness of the remedy;
- A schedule of monitoring and frequency of submittals to the Department;
- Monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

c. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- Procedures for operating and maintaining the remedy;
- Compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- Maintaining site access controls and Department notification; and
- Providing the Department access to the site and O&M records.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

12/19/2023
Date

Michael Cruden
Michael Cruden, Director
Remedial Bureau E

DECISION DOCUMENT

Bisonite Paint Co.
Tonawanda, Erie County
Site No. C915010
December 2023

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance, based on the reasonably anticipated use of the property.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repository:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C915010

Tonawanda Library
Attn: Mary Muscarella
333 Main Street
Tonawanda, NY 14150
Phone: (716) 693-5043

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 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 0.8-acre Bisonite Paint Co. site is located in a commercial/industrial area at 2266 and 2268 Military Road in the Town of Tonawanda, Erie County. It is approximately 0.3 miles north of Interstate Highway 290. The site is bounded by a property owned by Niagara Mohawk Power Corporation to the west, commercial rental space to the south, a lumber yard to the north, and a gasoline service station and warehouse across Military Road to the east.

Site Features:
The site consists of the northern portion of a commercial building surrounded by asphalt pavement and landscaped areas. A small portion of a separate concrete block building is located on the eastern part of the site. Immediately west of the site, the ground surface rises abruptly approximately four to six feet into a linear mound, which is just off-site, and separates the site from a railroad right-of-way. Further west is the Tonawanda Landfill.

Current Zoning and Land Use:
The site is zoned for commercial manufacturing and is currently used for commercial purposes. As of the time of this document the on-site portion of the building is occupied by office space and a carpet storage/installation company. The off-site portion of the building is occupied by various companies utilizing the space for minor office space and storage, and one vacant unit. Properties to the north, south, and east of the site have similar zoning and uses. The landfill and railroad corridor west of the site are zoned for landfill, railroad, and utility use. The nearest residential area is approximately 200-feet to the east.

Past Use of the Site:
Bisonite Paint Company, a manufacturer of water and oil-based paints, owned and operated the facility consisting of this site and two additional tax parcels from 1947 to 1991. The on-site building was used for paint manufacturing during this timeframe. A settling lagoon for on-site wastewater disposal was present west of the building and was connected to the building by an open trench. In 1994, Tonawanda Self Store began using the site for rental of commercial space and self-storage facilities.

Previous remedial actions have been taken on the off-site portion of the Bisonite Paint Company property. These areas were previously utilized for storage of materials (tank farm) and for

spreading paint pigments, solvents, and mineral spirits. In 1978, the DEC notified Bisonite Paint Company that all waste must be transported for disposal at an approved facility. The former settling lagoon was filled in, capped, and seeded between 1978 and 1983. In 1994, Tonawanda Self Store began using the site for rental of commercial space and self-storage facilities. In 1996, several "hot-spots" in the former spreading area and former tank farm area were voluntarily remediated by 2251 Military Road Associates, Inc. under the State Superfund Program (915010).

Site Geology and Hydrogeology:
The undisturbed soils beneath the site consist of fine glacial sediments of clay with lenses of gravel, sand, and silt mixtures. These are found directly below the surficial development except in the former lagoon area, where fill and waste are present. The fill in the former lagoon has a thickness of approximately eight feet and consists of reworked clay, construction debris, white chips, white powder, and resin overlying approximately two feet of paint pigments and other manufacturing waste.

The first observation of groundwater ranged in depth from 4-feet below ground surface (bgs) at SB-6 to 17-feet bgs at SB-1. Once monitoring wells were installed and developed, the static water was measured between 0.5 to approximately 3.5-feet bgs on-site. Based on monitoring wells from the site and others at the adjacent Tonawanda Landfill, groundwater flow appears to be from the southeast to the northwest.

A site location map is attached as Figures 1 and 2.

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) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria, and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

One or more of the Applicants under the Brownfield Cleanup Agreement is a Participant. The Participant(s) has/have an obligation to address on-site and off-site contamination. Accordingly, no enforcement actions are necessary.

Additionally, the Department has determined that the site does not pose a significant threat to public health or the environment.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

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

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- indoor air
- sub-slab vapor

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. 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 contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The

contaminant(s) of concern identified at this site is/are:

polychlorinated biphenyls (PCB)
methyl ethyl ketone
acetone
chloroform
ethylbenzene
toluene
xylene (mixed)
trichloroethene (TCE)
benzene
dichlorobromomethane
lead
chromium
mercury
petroleum products
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(b)fluoranthene
chrysene
indeno(1,2,3-cd)pyrene
dibenz[a,h]anthracene

The contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil
- soil vapor intrusion
- indoor air

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 Decision Document.

There were no IRMs performed at this site during the RI.

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. The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination:
During the remedial investigation soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, cyanide, polychlorinated biphenyls (PCBs), per- and polyfluoroalkyl substances (PFAS), and pesticides. Soil vapor, sub-slab soil vapor, and indoor air samples were also collected and analyzed for VOCs. Based on the investigations conducted to date, the primary contaminants of concern for the site are total PCBs, methyl ethyl ketone, acetone, chloroform, ethylbenzene, toluene, xylene (mixed), TCE, benzene, dichlorobromomethane, lead, chromium, mercury, petroleum products, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and dibenz[a,h]anthracene.

Shallow Soil:
44 total shallow soil samples (4 samples from the 2019 RI and 40 from the 2021 supplemental RI) were collected from 14 locations along the northern and western boundaries. 14 surface soil samples were taken from 0 to 2 inches in depth, 10 samples from 2 to 6 inches in depth, 10 samples from 6 to 12 inches in depth, and 10 samples from 12 to 24 inches in depth. The highest relative concentration of SVOCs were reported at locations SSA-4 and SS-3. The following contaminants of concern were detected exceeding commercial soil cleanup objectives (CSCOs):

- Benzo(a)anthracene (up to 53 parts per million (ppm)) exceeded the CSCO of 5.6 ppm at 10 sample locations.
- Benzo(a)pyrene (up to 89 ppm) exceeded the CSCO of 1.0 ppm at all 14 sample locations.
- Benzo(b)fluoranthene (up to 120 ppm) exceeded the CSCO of 5.6 ppm at 11 sample locations.
- Chrysene (up to 73 ppm) exceeded the CSCO of 56 ppm at four sample locations.
- Dibenz(a,h)anthracene (up to 12 ppm) exceeded the CSCO of 0.56 ppm at 11 sample locations.
- Indeno[1,2,3-cd]pyrene (up to 64 ppm) exceeded the CSCO of 5.6 ppm at 9 sample locations.

The above listed contaminants are all classified as PAHs. Based on the investigations completed to date, limited areas of surface soils are impacted with PAHs. Off-site migration of contaminants in surface soil has not been observed.

Subsurface Soil:
28 subsurface soil samples were collected from soil borings 11 locations ranging from 1 to 18 feet bgs at across the site. Contamination is primarily in the western portion of the site in the footprint of the former settling lagoon and the associated trench. The following contaminants of concern were detected exceeding CSCOs:

- Ethylbenzene (up to 790 ppm) exceeded the CSCO of 390 ppm at two sample locations.
- Toluene (up to 12,000 ppm) exceeded the CSCO of 500 ppm at two sample locations.
- Total Xylenes (up to 4,500 ppm) exceeded the CSCO of 500 ppm at two sample locations.
- Dibenz(a,h)anthracene (up to 0.64 ppm) exceeded the CSCO of 0.56 ppm at SB-3.
- Benzo(a)pyrene (up to 3.8 ppm) exceeded the CSCO of 1.0 ppm at SB-3.
- Total PCBs (up to 24.9 ppm) exceeded the CSCO of 1.0 ppm at four sample locations.
- Mercury (up to 3.11 ppm) exceeded the CSCO of 2.8 ppm at SB-7.

The following contaminants of concern were detected exceeding Protection of Groundwater Soil Cleanup Objectives (PGWSCO):
- Ethylbenzene (up to 790 ppm) exceeded the PGWSCO of 1.0 ppm at three sample locations.
- Toluene (up to 12,000 ppm) exceeded the PGWSCO of 0.7 ppm at three sample locations.

- Total Xylenes (up to 4,500 ppm) exceeded the PGWSCO of 1.6 ppm at three sample locations.
- Total PCBs (up to 24.9 ppm) exceeded the PGWSCO of 3.2 ppm at three sample locations.
- Mercury (up to 3.11 ppm) exceeded the PGWSCO of 0.73 ppm at three sample locations.

Based on the investigations completed to date, the majority of the soil contamination is present in the footprint of the former settling lagoon and the associated trench. Off-site migration of contaminants in subsurface soil has not been observed.

Groundwater:
Groundwater samples were collected from 5 overburden monitoring wells installed from 12 to 15 feet below ground surface. Groundwater was sampled during a single sampling event in January 2020. The following contaminants of concern were detected exceeding groundwater quality standards (GWQS):

- Methyl ethyl ketone (up to 850,000 micrograms per liter (mcg/L)) exceeded the GWQS of 50 mcg/L at two sample locations.
- Acetone (up to 15,000 mcg/L) exceeded the GWQS of 50 mcg/L at two sample locations.
- Chloroform (up to 380 mcg/L) exceeded the GWQS of 7.0 mcg/L at two sample locations.
- Ethylbenzene (up to 1,800 mcg/L) exceeded the GWQS of 5.0 mcg/L at two sample locations.
- Toluene (up to 45,000 mcg/L) exceeded the GWQS of 5.0 mcg/L at two sample locations.
- Total Xylenes (up to 8,800 mcg/L) exceeded the GWQS of 5.0 mcg/L at two sample locations.
- Trichloroethene (TCE) (up to 8.1 mcg/L) exceeded the GWQS of 5.0 mcg/L at MW-2.
- Cis 1,2-Dichloroethene (up to 13 mcg/L) exceeded the GWQS of 5.0 mcg/L at MW-2.
- Benzene (up to 68 mcg/L) exceeded the GWQS of 5.0 mcg/L at MW-3.
- Naphthalene (up to 20 mcg/L) exceeded the GWQS of 5.0 mcg/L at two locations.
- Total Phenol (up to 350 mcg/L) exceeded the GWQS of 1.0 mcg/L at three locations.
- Lead (up to 2,830 mcg/L) exceeded the GWQS of 25 mcg/L at two locations.
- Mercury (up to 3.19 mcg/L) exceeded the GWQS of 0.4 mcg/L at two locations.

Investigation results indicate that groundwater is impacted by VOCs, SVOCs, and metals in the vicinity of the former lagoon and associated trench. Off-site migration of contaminants in groundwater has not been observed.

MW-4 Free Product:
A free product layer less than one-inch in thickness was found to be on the water surface within monitoring well MW-4. During sampling, the water within the monitoring well appeared to have an amber color, with the free product exhibiting a slightly darker shade and an oily texture. The

free product was analyzed for VOCs, SVOCs, PCBs, Pesticides, Herbicides, Cyanide, and metals. The following contaminants of concern were detected:

- Methyl ethyl ketone (590,000 mcg/L).
- Acetone (10,000 mcg/L).
- Chloroform (980 mcg/L).
- Ethylbenzene (2,000 mcg/L).
- Toluene (25,000 mcg/L).
- Total Xylenes (8,900 mcg/L).
- Bromodichloromethane (260 mcg/L).
- Bis(2-ethylhexyl) Phthalate (830 mcg/L).
- Total phenol (250 mcg/L).
- Chromium (73 mcg/L).
- Lead (2,260 mcg/L).
- Mercury (2.14 mcg/L).

Based on the elevation of the product layer, it is likely caused by wastes that remain in the former lagoon. Any potential migration is expected to be minimal as no other wells have exhibited the same conditions as MW-4. No off-site migration of free product has been observed.

Soil Vapor Intrusion Investigation:
One soil vapor sample was collected from the former settling lagoon area, two sub-slab soil vapor samples were collected from below the building slab, and one indoor air sample was collected from inside the building. TCE was detected in four samples: SV-1 at a concentration up to 3.65 micrograms per cubic meter (mcg/m^3), Indoor-1 at a concentration up to 2.74 mcg/m^3, the duplicate sample inside at a concentration up to 2.71 mcg/m^3, and SS-1 at a concentration up to 2.86 mcg/m^3. During the supplemental RI, methylene chloride was identified in two indoor air samples, IA-1 at a concentration of 24 mcg/m^3 and IA-2 at a concentration of 16 mcg/m^3. The elevated detections of methylene chloride are attributed to the use of furniture stripper by the building occupant that contains methylene chloride.

As the building had limited occupation at the times of sampling, no current concern for exposures were expected. However, should the building use change, a re-evaluation of the potential for soil vapor intrusion should occur.

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.*

Direct contact with contaminants in the soil is unlikely because the majority of the site is covered with buildings and pavement, however persons who enter the site could contact contaminants along the northern and western site perimeters by walking, digging, or otherwise disturbing the soil. Contaminated groundwater at the site is not used for drinking or other purposes and the area

is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil), may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. As the building had limited occupation at the times of sampling, no current concern for exposures were expected. An evaluation of the potential for soil vapor intrusion to occur will be completed should the current use of the site or adjoining off-site warehouse space change. Furthermore, environmental sampling indicates soil vapor intrusion is not a concern for off-site buildings including the adjoining off-site warehouse space.

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.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or 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.

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Track 4: Restricted use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation and Cover System remedy.

The elements of the selected remedy, as shown in Figure 2, 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. 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.

2. Source Area Excavation

Excavation and off-site disposal of contaminant source areas in the former settling lagoon and associated trench meeting any of the below criteria:

- Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- Non-aqueous phase liquids;
- Soil with visual waste material or non-aqueous phase liquid; and
- Soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards (Mercury, Total PCBs, Ethylbenzene, Toluene, and Total Xylenes).

Approximately 750 tons of sub-surface material in the settling lagoon and associated trench meeting the above criteria will be excavated and transported for off-site disposal.

Collection and analysis of confirmation samples at the remedial excavation extents will be used to verify that SCOs for the site have been achieved. If confirmation/documentation sampling indicates that SCOs were not achieved, further remedial excavation will be necessary unless otherwise approved by the Department.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

On-site soil which does not exceed the above excavation criteria or the protection of groundwater SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site. If sufficient on-site material is not available for reuse, clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the design grades at the site.

3. Surficial Soil Excavation

Soil from the northern and western site boundary in the upper one foot which exceeds the commercial SCOs will be excavated to facilitate installation of the site cover in remedial element 4 and transported off-site for disposal. Approximately 200 tons of material meeting the above criteria will be excavated and transported for off-site disposal.

Collection and analysis of documentation samples at the remedial excavation extents will be used to document the soil conditions remaining after excavation. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

4. Cover System

A site cover will be required in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs), to allow for future commercial or industrial use of the site. Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to pavement, concrete, paved surface parking areas, sidewalks, building foundations, and building slabs.

5. Groundwater Monitoring

To monitor the groundwater conditions, each of the four on-site monitoring wells and one off-site monitoring well (MW-1) will be sampled for volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), and metals, in addition to natural attenuation parameters. Groundwater monitoring will be required until reductions in monitoring are approved by the NYSDEC. Groundwater monitoring wells will be replaced in-kind if damaged or removed during remedial activities.

6. Vapor Intrusion Evaluation

A soil vapor intrusion evaluation will be completed due to a change in on-site building use since completion of the Remedial Investigation (RI). The evaluation will include a provision for implementing actions recommended to address any exposures related to soil vapor intrusion.

7. Institutional Controls

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

- Require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allow the use and development of the controlled property for commercial or industrial 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 Erie County DOH; and
- Require compliance with the Department approved Site Management Plan.

8. Site Management Plan

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

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

Institutional Controls: The Environmental Easement discussed in remedial element 7 above and the groundwater monitoring system discussed in remedial element 5 above.

Engineering Controls: The cover system discussed in remedial element 4 above.

This plan includes, but may not be limited to:

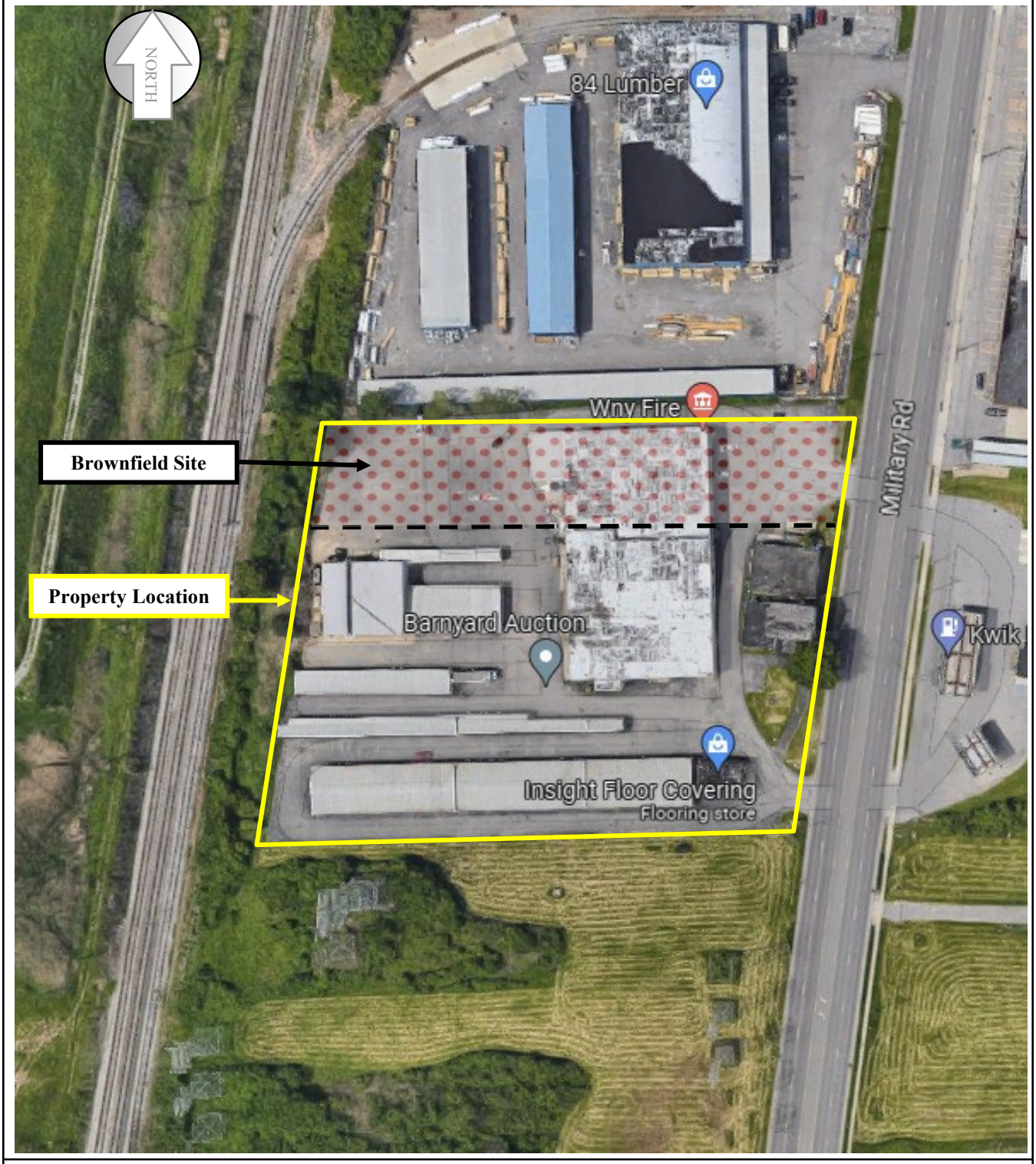
- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision that should a building foundation or building slab be removed in the future, a cover system will be placed in any area of the removed foundation or slab where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);

- A provision for evaluation of the potential for soil vapor intrusion for any new occupied buildings on the site, including provision for implementing actions recommended to address any exposures related to soil vapor intrusion;
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- The 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 of groundwater to assess the performance and effectiveness of the remedy;
- A schedule of monitoring and frequency of submittals to the Department;
- Monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

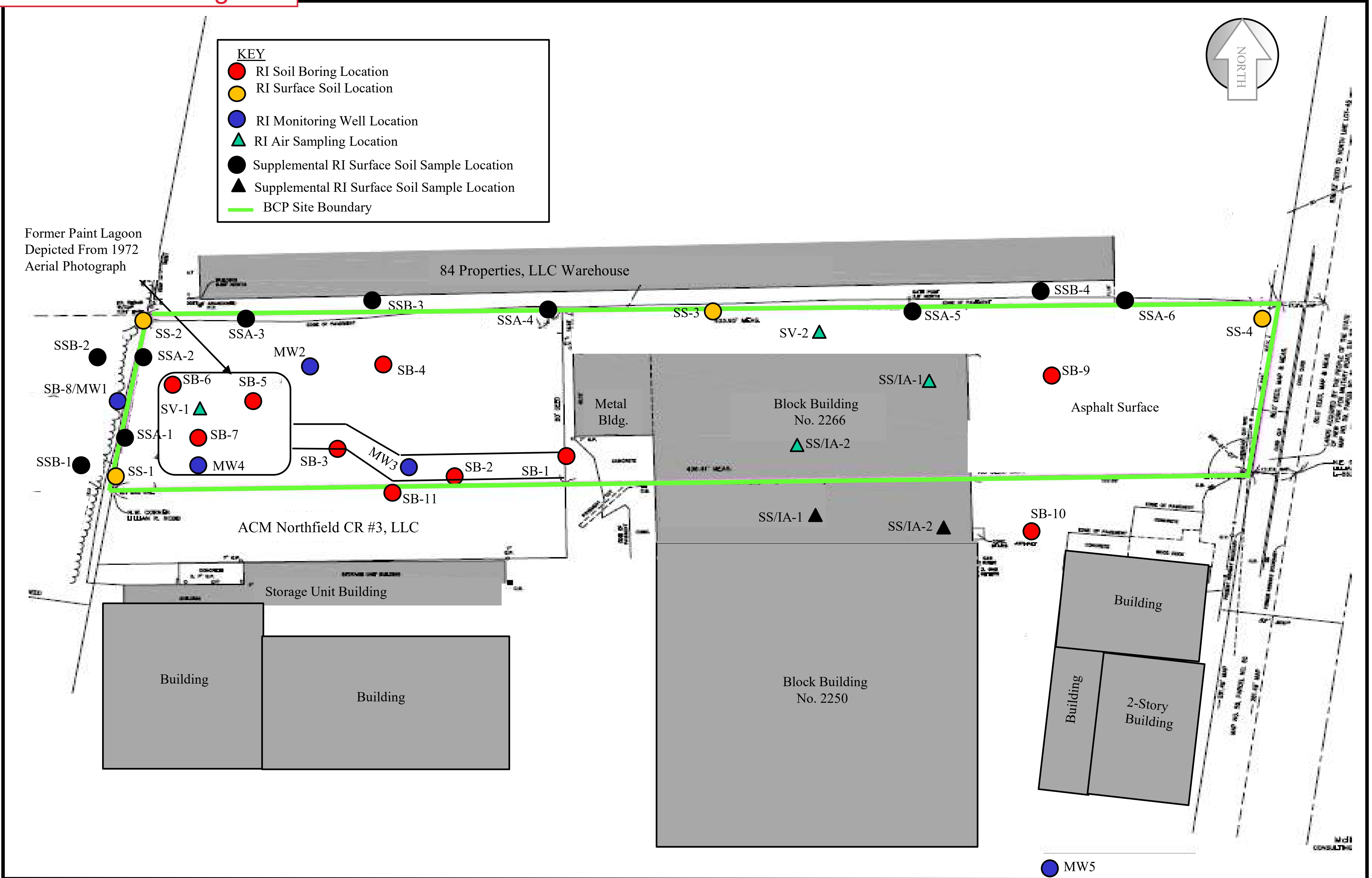
c. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:
- Procedures for operating and maintaining the remedy;
- Compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- Maintaining site access controls and Department notification; and
- Providing the Department access to the site and O&M records.

Decision Document Figure 1



Title: Site Plan 2266 and 2268 Military Road Tonawanda, New York	MARSH ENGINEERING D.P.C.	Project: 1077.003 Date: 8/14/2023 Scale: Not to Scale	Drawn: SF Checked: BWA File Name: Site Map	Figure: 2
Prepared For: Tonawanda Storage Properties, LLC 1400 Crossroads Building 2 State Street, Rochester, New York				

Decision Document Figure 2


KEY
RI Soil Boring Location
RI Surface Soil Location
RI Monitoring Well Location
RI Air Sampling Location
Supplemental RI Surface Soil Sample Location
Supplemental RI Surface Soil Sample Location
BCP Site Boundary
NORTH
Former Paint Lagoon
Depicted From 1972
Aerial Photograph
84 Properties, LLC Warehouse
SSB-3
SSB-4
SSA-4
SS-3
SSA-5
SSA-6
SS-4
SS-2
SSA-3
SV-2
SSB-2
SSA-2
MW2
SB-4
SB-9
SB-8/MW1
SB-6
SB-5
SS/IA-1
SV-1
Metal
Bldg.
Block Building
No. 2266
Asphalt Surface
SSA-1
SB-7
SS/IA-2
MW3
SSB-1
MW4
SB-3
SB-2
SB-1
SS-1
SB-11
SB-10
ACM Northfield CR #3, LLC
SS/IA-1
SS/IA-2
Storage Unit Building
Building
Building
Building
Block Building
No. 2250
Building
2-Story
Building
MW5

Title:	RI & SRI Investigation Sample Locations 2266 and 2268 Military Road Tonawanda, New York
Prepared For:	Tonawanda Storage Properties LLC 1400 Crossroads Building 2 State Street, Rochester, New York

MARSH ENGINEERING D.P.C.

Project	100.001
Date	10/12/2022
Scale	Not to Scale
Drawn	FRT
Checked	MPR
File Name	Sample Locations
Figure	5

Decision Document Figure 3

SS-2

Analyte	UURSCO	RCSCO	Result
inc	110	10000	176
Ben o a anthracene	1.0	5.6	6.3
Ben o a Pyrene	1.0	1.0	8.2
Ben o fluorathene	1.0	5.6	13
Ben o k fluoranthene	0.8	56	4.5
Chrysene	1.0	56	9.5
Di en a,h anthracene	0.33	0.56	1.4
Indeno 123-cd pyrene	0.5	5.6	6.8
4,4-DDT	0.0033	47	0.024

SS-3

Analyte	UURSCO	RCSCO	Result
Chromium	1/30	400/1500	40.1
Lead	63	1000	105
inc	110	10000	226
Ben o a anthracene	1.0	5.6	52
Ben o a Pyrene	1.0	1.0	70
Ben o fluorathene	1.0	5.6	110
Ben o k fluoranthene	0.8	56	19
Chrysene	1.0	56	73
Di en a,h anthracene	0.33	0.56	11
Indeno 123-cd pyrene	0.5	5.6	64
4,4-DDD	0.0033	92	0.014
Endrin	0.014	89	0.058

SS-4

Analyte	UURSCO	RCSCO	Result
Lead	63	1000	95.3
Mercury	0.18	2.8	0.225
inc	110	10000	218
Ben o a anthracene	1.0	5.6	36
Ben o a Pyrene	1.0	1.0	45
Ben o fluorathene	1.0	5.6	69
Ben o k fluoranthene	0.8	56	17
Chrysene	1.0	56	48
Di en a,h anthracene	0.33	0.56	7.1
Indeno 123-cd pyrene	0.5	5.6	42
4,4-DDD	0.0033	92	0.021
Endrin	0.014	89	0.046

84 Properties, LLC Warehouse

SSB-3

SSA-4

SSA-5

SSB-4

SSA-6

SSA-3

SSB-2

SSA-2

Alternative 2 - Track 4
Su surface Source Removal
E cavation Limits Est.

Former Paint Lagoon Depicted in 1972 Aerial Photograph

SSA-1

SSB-1

Metal Bldg.

Block Building No. 2266

Asphalt Surface

ACM Northfield CR #3, LLC

BCP Boundary

Building

Block Building No. 2250

Building

2-Story Building

SS-1

Analyte	UURSCO	RCSCO	Result
Lead	63	1000	199
Mercury	0.18	2.8	0.782
inc	110	10000	210
Ben o a anthracene	1.0	5.6	7.1
Ben o a Pyrene	1.0	1.0	9.8
Ben o fluorathene	1.0	5.6	17
Ben o k fluoranthene	0.8	56	5.1
Chrysene	1.0	56	9.9
Di en a,h anthracene	0.33	0.56	1.8
Indeno 123-cd pyrene	0.5	5.6	8.5
4,4-DDD	0.0033	92	0.011
4,4-DDE	0.0033	62	0.019
4,4-DDT	0.0033	47	0.028
Endrin	0.014	89	0.021
PCB Total	0.1	1.0	0.317

NORTH

KEY:

RI Surface Sample Locations / Surface & Su surface E cavation Limits
SRI Surface Sample Locations See SRI Report Appendi A, Ta le 1 for SVOC e ceedances

Title: Surface and Su surface Soils Track 4 E cavation Limits
2266 and 2268 Military Road
Tonawanda, New York

Prepared For: Tonawanda Storage Properties LLC
1400 Crossroads Building
2 State Street Rochester, New York

MARSH ENGINEERING D.P.C.

Project 100.001
Date 10/05/2022
Scale Not to Scale

Drawn FRT
Checked MPR
File Name Track 4 Removal

Figure 13