REMEDIAL INVESTIGATION WORKPLAN

FORMER PORT MOBIL TERMINAL
4101 ARTHUR KILL ROAD
STATEN ISLAND, NEW YORK
SITE NUMBER: 243016
CONSENT ORDER ID: 12-111-A-SBC

Prepared for:

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LIST OF ACRONYMS

°C	degrees Celsius
µg/m^3	micrograms per cubic meter
3-D	three-dimensional
AOC	area of concern
API	American Petroleum Institute
AST	aboveground storage tanks
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
CAMP	Community Air Monitoring Plan
CMI	Corrective Measures Implementation
COC	contaminant of concern
COPC	contaminant of potential concern
CPT	cone penetration testing
CSM	Conceptual Site Model
DER	Division of Environmental Remediation
DNAPL	dense non-aqueous phase liquid
DUSR	Data Usability Summary Report
EDD	Electronic Data Delivery
ELAP	Environmental Laboratory Approval Program
FDNY	Fire Department of New York
FSC	Focused Site Characterization
ft	foot/feet
ft^2	square feet
FWRIA	Fish and Wildlife Resource Impact Analysis
GCM	Grossly Contaminated Media
GPS	Global Positioning System
GWI	Groundwater Interface
HASP	Health and Safety Plan
HDPE	High-Density Polyethylene
HI	Hazard Index

LIST OF ACRONYMS (CONTINUED)

HMCB	Hydrocarbon Monitor Catch Basin
HQ	hazard quotient
HT-1	Historic Tank 1
HT-2	Historic Tank 2
IDW	investigation-derived waste
LF	linear feet
LNAPL	light non aqueous phase liquid
MOSF	major oil storage facility
MS/MSD	matrix spike/matrix spike duplicate
MVRU	Marine Vapor Recovery Unit
NAD83	North American Datum of 1983
NAPL	non-aqueous phase liquid
NGVD	National Geodetic Vertical Datum
NP LLC	NP Staten Island Industrial, LLC
NWI	National Wetlands Inventory
NYC	New York City
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSWER	Office of Solid Waste and Emergency Response
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PE	Professional Engineer
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS (CONTINUED)

RFA	RCRA Facility Assessment
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
SCO	Soil Cleanup Objectives
sCPT	seismic CPT
SD	surface discharge
SPDES	State Pollutant Discharge Elimination System
SPT	standard penetration testing
SWMU	Solid Waste Management Unit
TAL	target analyte list
TCL	target compound list
TIC	tentatively identified compound
TOC	total organic carbon
TOGS	Technical and Operational Guidance Series
UCL	upper confidence level
UFP-QAPP	Uniform Federal Policy- Quality Assurance Project Plan
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
VI	vapor intrusion
VISL	vapor intrusion screening level
VOC	volatile organic compound
Weston®	Weston Solutions, Inc of New York.
WTS	water treatment system
WW	Wastewater

1. INTRODUCTION

1.1 PLAN OVERVIEW

Weston Solutions, Inc. of New York (Weston®) is pleased to submit this Remedial Investigation Work Plan (RIWP) on behalf of NP Staten Island Industrial, LLC (NP LLC) for the Former Port Mobil Terminal aka Kinder Morgan Staten Island Terminal located at 4101 Arthur Kill Road in Staten Island, New York (Site). The Site was formerly a major oil storage facility (MOSF) that was decommissioned in November 2019.

1.2 PURPOSE

The purpose of the RIWP is to investigate the Site to pre-release conditions and to delineate contamination on-site and emanating from the site. The Site is defined as all contiguous land, structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste or for managing hazardous secondary materials prior to reclamation. Previous investigations and corrective actions were performed under the purview of an active MOSF. Under the closure of the MOSF site, the entire site and all SWMUs must be investigated. Contamination must be delineated to pre-release conditions. The remedial investigation (RI) is proposed to be conducted in a phased approach to assure that the investigation of resources that may have been impacted by contamination emanating from the industrial area of the Site is designed in conformance with the results of the initial phase of the RI. This initial RI phase will address the following:

- Identify and delineate Solid Waste Management Units (SWMUs) and potential areas of concern (AOCs) on the Site;
- Identify and delineate non-aqueous phase liquid (NAPL);
- Evaluate the on-site wetlands sediment in accordance with Division of Environmental Remediation (DER)-10 Section 3.8.2, and the on-site stream in the southwestern portion of the Site;
- A groundwater study to evaluate for the presence/absence of perched water, define groundwater flow, and assess the presence of dense non-aqueous phase liquid (DNAPL) in areas where No. 6 fuel oil was stored;

- Baseline investigation of off-site resources (i.e., the adjacent tidal strait [Arthur Kill]), its sediment, and any identified wetlands. This will include targeted locations for sample collection and analysis based on the completion of the groundwater study; and,
- Geotechnical investigation.

The results of this initial RI phase will then be utilized to develop the subsequent RI phases including investigating any further potential for contamination emanating from the Site.

As mentioned above, the purpose of the RIWP is to investigate the Site to pre-release conditions and to delineate contamination on-site and emanating from the site. Several AOCs and SWMUs have been identified to be investigated as part of the on-site source evaluation. The 2009 U.S. Environmental Protection Agency (USEPA) Administrative Order on Consent issued pursuant to Section 3008(h), 42 U.S.C. 6928 (h) of the Resource Conservation and Recovery Act (RCRA) identified 62 SWMUs and one AOC (AOC A – Polychlorinated Biphenyl [PCB] Transformers) at the Site subject to RCRA regulations and requiring corrective measures. A summary of the SWMUs is provided below in **Table 1**.

Table 1 Description of SWMUs

SWMU Number	SWMU Name	Current Investigative/Remedial Status
1	Road Trench	Requires further investigation as proposed in section 4.1.10.
2	Wastewater (WW) Transfer Lines	1993 RCRA Facility Assessment (RFA) indicated no further investigation, a follow up evaluation of this SWMU will be conducted as detailed in Section 4.1.6.
3	Tank Farm Catch Basins	1993 RFA indicated no further investigation; however, further investigation has been conducted as part of the 2021 Focused Site Characterization (FSC) (Weston, 2021), and an additional investigation is proposed in Section 4.1.3 and 4.2.1. in this RIWP.
4	Former American Petroleum Institute (API) Separator	Investigated in 1996 and will be addressed as part of the Area 7 Remediation and additional investigation is proposed in Section 4.1.21 of this RIWP.
5	Primary API Separator	Investigated in 1996 and will be addressed as part of the Area 7 Remediation and

Table 1 – Description of SWMUs (Continued)

SWMU Number	SWMU Name	Current Investigative/Remedial Status
		additional investigation is proposed in Section 4.1.21 of this RIWP.
6	Utility API Separator	Investigated in 1996 and will be addressed as part of the Area 7 Remediation and additional investigation is proposed in Section 4.1.21 of this RIWP.
7	Vacuum Tank 1 (High Flash Tank)	Investigated in 1996 and will be addressed as part of the Area 7 Remediation and additional investigation is proposed in Section 4.1.21 of this RIWP.
8	Vacuum Tank 2 (Low Flash Tank)	Investigated in 1996 and will be addressed as part of the Area 7 Remediation and additional investigation is proposed in Section 4.1.21 of this RIWP.
9	Hydrocarbon Monitor Catch Basins	Requires further investigation as proposed in section 4.1.1.
10	Waste Storage Tank T41	Further investigation has been conducted as part of the FSC, and an additional investigation is proposed in Section 4.1.3 and 4.2.1. in this workplan.
11	Waste Storage Tank 48	1993 RFA indicated no further investigation, however, further investigation has been conducted as part of the FSC, and an additional investigation is proposed in Sections 4.1.3 and 4.2.1 in this RIWP.
12	Tank 60	1993 RFA indicated no further investigation; however, further investigation has been conducted as part of the FSC, and an additional investigation is proposed in Sections 4.1.3 and 4.2.1. in this RIWP.
13	Lower Holding Pond	Investigated in 2002, 2011, and 2012; further investigation is proposed in Section 4.1.11 in this RIWP.
14	Upper Holding Pond	Investigated in 2002, 2011, and 2012; further investigation is proposed in Section 4.1.11 in this RIWP.
15	Dravo Water Treatment System	1993 RFA no further investigation; however, a follow up evaluation of this SWMU is proposed as detailed in Section 4.1.19 in this RIWP.

Table 1 – Description of SWMUs (Continued)

SWMU Number	SWMU Name	Current Investigative/Remedial Status
16	Container Storage Pad	1993 RFA indicated no further investigation; however, this SWMU will be addressed as part of the Area 7 and additional investigation is proposed in Section 4.1.21 of this RIWP.
17	Excavated Soils Area	Requires further investigation as detailed in Section 4.1.2 in this RIWP.
18	North Beach Recovery Wells	1993 RFA indicated no further investigation; however, this SWMU will be addressed as part of the Area 3 Remediation provided in the 2017 CMI.
19	North Beach Recovery Well Holding Tank	1993 RFA indicated no further investigation; however, this SWMU will be addressed as part of the Area 3 Remediation provided in the 2017 CMI.
20	Southern Groundwater Plume Recovery Well	Investigated in 1999; further investigation is proposed as part of the delineation of LNAPL at monitoring well ICM-10.
21	Boiler House Recovery Well	1993 RFA indicated no further investigation; however, this SWMU will be addressed as part of the Area 5 Remediation provided in the 2017 CMI.
22	Tank T41 Dike	Investigated various times, most recently in 2016; LNAPL Remediated in 2016.
23 – 60, and 62	Tank Farm Dikes	Requires further investigation however, further investigation has been conducted as part of the FSC, and an additional investigation is proposed in Sections 4.1.3 and 4.2.1. in this RIWP.
61	Former Lube Tanks 26 through 33	Closure and removal completed in 200.5 An additional investigation for potential DNAPL is proposed below in Section 4.1.18 in this RIWP.
AOC A	Former PCB Transformers	Investigated as part of the FSC, and no detections of PCBs were identified. No further investigation is proposed.

In addition to the above SWMU’s requiring further investigation, the following potential AOCs have been identified to require further investigation:

- Four historic aboveground storage tanks (ASTs);
- Eight ASTs associated with building structures;
- Piping - aboveground transfer and subgrade transfer;
- MOSF Structures - loading areas, pump stations, manifolds, and valves;
- Underground storage tank (UST) 2;
- Non-operational areas A through D; and,
- Former site infrastructure (i.e., storm drains, storm water trenches, storm water pipes, historic storm water basins, and site utilities).

Together with existing data and documentation, along with the results of the recently completed FSC (Weston, 2021a), this RI will provide the analytical and hydrogeological information necessary to complete a robust Conceptual Site Model (CSM) for the Site.

The RI data and resulting CSM will define the full nature and extent of any residual sources of contamination in both operational and nonoperational areas for the purpose of source removal and remediation.

The above SWMUs and potential AOCs have been detailed further in Section 2.1 below.

1.3 SITE DESCRIPTION AND HISTORY

The Site consists of an approximately 240-acre waterfront facility located at 4101 Arthur Kill Road in Staten Island, New York (Block 7427, Lot 1 and Block 7207, Lot 60) and is depicted on **Figure 1**. The facility operated as a MOSF from 1934 to November 2019 when the existing ASTs and pipe systems were closed in accordance with the MOSF permit and Fire Department of New York (FDNY) requirements. During the years of operation, the storage capacity at the facility was 125 million gallons with an annual throughput of approximately 1.4 billion gallons. The facility previously stored and transferred gasoline, No. 6 fuel oil, and distillate fuels such as No. 4 fuel oil, No. 2 fuel oil, marine lubricating oils, and kerosene. Former MOSF operations historically took place on approximately 120 acres of the property. The remaining 120 acres consist of underwater lands within the Arthur Kill, a portion of land developed on the southern boundary with a ground-mounted solar array operated by a third-party under a ground lease, and undeveloped areas on the eastern, southern, and western portions of the property which contain wetlands and vegetated areas.

1.3.1 Physical Setting

The project site is located at 4101 Arthur Kill Road, Staten Island, Richmond County, NY 10309, and consists of an out-of-service MOSF with buildings, tanks, and utilities common to an oil storage terminal that are situated on 120-acres of the 240-acre Site.

The Site is bounded on the north and west by the Arthur Kill tidal strait; on the south and east by Arthur Kill Road and various commercial properties, and on the south by Ellis Road (a private road), a residential property, and other vacant properties. Site grades are largely gentle but broken up by 10-to-15-foot-high secondary containment berms. There is a general 1% slope to the north and west with up to 10 (horizontal):1 (vertical) slope outside of the tank farm area leading to the buildings and nearby forested areas. Secondary containment berm slopes are largely between 2:1 and 3:1.

1.3.2 Site Geology

The primary surficial soil types within the Project Area, include the following:

- Fill material, consisting of:
  - Historical fill material brought to the Site to fill the low elevation area; and,
  - Backfill material in the former excavation areas.
- Surface Sands – consisting of a medium to very dense layer of sand and varying amounts of silt and clay. The thickness of the surface layer varies between 15 and 35 feet (ft), and occasionally contains a clay layer.
- Silt/Clay - underlying the sand layer is clay or silt, typically stiff to hard. This silt/clay layer is generally less than 10 ft thick. Fine sand layers were observed to be interbedded within the silt/clay.

Geologic cross-sections for the upper portion of the overburden were generated based on information collected during the most recent site investigation activities and are included in **Appendix A**.

1.3.3 Hydrology

1.3.3.1 Surface Water

On-site surface water may travel by overland flow downgradient across the ground surface until it reaches areas of equal energy, namely wetlands and streams, that are located on and surrounding the site.

The Arthur Kill runs west and north of the site, adjacent to the tidal flat and Bulkhead Area. Waters within the Arthur Kill near the former MOSF have been designated as saline surface water as defined in New York Codes, Rules and Regulations (NYCRR), Title 6, Chapter X, subpart 701.14. This designation refers to saline surface water conditions with a restricted use. Based on topography (the Site slopes from east to west), overland storm water runoff is expected to flow from the east, towards the Arthur Kill (Louis Berger, 2017). **Figure 2** provides the current overland flow at the Site.

1.3.3.2 Wetlands

A wetlands delineation survey has been completed as part of ongoing permit applications. The delineation survey of on-site wetlands (Matrix New World, 2020) and incorporated National Wetlands Inventory (NWI) data for on-site and adjacent off-site wetlands has been included as **Appendix B.** A list of on-site wetlands has been provided below in **Table 2**.

Table 2 On-Site Wetlands

Wetland Area	Classification	Size (Acres)
1	PFO1E E2EM5P E2USN	7.8108
2	PFO1E	0.1243
3	PFO1E E5EM5P E2USN E2US2P	2.1735
4	E2USN	0.0077
5	E2USN	0.0220
6	E2USN	0.0127

Table 2 – Onsite Wetlands (Continued)

Wetland Area	Classification	Size (Acres)
7	PFO1E PEM	1.3370
8	PFO1E PEM	0.6482
9	PFO1E	0.6045
10	PEM	0.3439
11	PFO1E PEM	6.2146
12	PEM	0.0581
13	PFO1E	0.1893
14	PEM	0.0580

1.3.4 Hydrogeology

1.3.4.1 Regional Groundwater Flow

Groundwater occurs regionally in the unconsolidated overburden soils, and bedrock at significant depths. A summary of groundwater flow in these formations is provided below:

- **Native Unconsolidated Deposits:** Groundwater flow in unconsolidated materials is controlled by permeability and flow through the connected pore spaces in the soil matrix. In this zone, groundwater is mostly unconfined, but may be semi-confined to confined in areas with complex stratigraphy consisting of alternating layers of less and more permeable materials. Groundwater generally flows horizontally in these soils but may be influenced by local recharge and discharge zones.
- **Bedrock:** Groundwater flow in bedrock formations occurs within interconnected cracks and fractures and bedding planes in the rock. Yields are generally decreasing with depth.

1.3.4.2 Project Area Groundwater Flow

The subject property hydrogeology consists of an unconfined water table aquifer in the fill/upper native geologic deposits. The depth to the groundwater table varies from approximately 1 ft in the lower elevations of the subject property adjacent to the Arthur Kill to as much as 29 ft below grade in the upper elevations of the subject property. Groundwater flows to the northwest, toward the Arthur Kill, and generally follows Site topography. The bottom of this surficial water bearing zone is apparently bounded by a clay unit encountered during the installation of several deep borings

(Woodard & Curran, 2007). The depth to the top of this clay unit varies across the subject property and increases in the west-northwest direction.

The general groundwater flow direction at the site has consistently been toward the Arthur Kill with hydraulic gradients generally ranging from 0.005 to 0.04 (Woodard & Curran, 2007). A local mounding is observed in the vicinity of monitoring well MW-112.

The most recent groundwater contour maps developed for the subject property (March 2020) are provided in **Appendix C**.

2. SWMUS/POTENTIAL AREAS OF CONCERN/RESOURCES

This section describes the SWMUs identified historically, potential areas of concerns identified at the Site, and a summary of on-site and off-site resources. The purpose of the RIWP is to investigate the Site to pre-release conditions and to delineate contamination on-site and emanating from the site. The Site is defined as all contiguous land, structures, appurtenances, and other improvements on the land, used for treating, storing, or disposing of hazardous waste or for managing hazardous secondary materials prior to reclamation. This RIWP will serve to provide information to evaluate and delineate environmental conditions in the identified AOCs/SWMUs. as well as include the following:

- A baseline sampling of the on-site wetlands, sediments, and surface waters in accordance with Section 3.8 of DER-10;
- A groundwater study to develop a robust conceptual site model; evaluation of presence/absence of perched groundwater; definition of presence or absence of DNAPL in areas where No. 6 and No 4 fuel oils was stored, and overall assessment concerning whether groundwater contamination is emanating from the Site;
- An off-site baseline surface water and sediment investigation in the Arthur Kill following the completion of the groundwater evaluation to ensure the appropriate sample locations are targeted; and,
- A geotechnical investigation.

In the event additional AOCs are identified during the RI activities, the RIWP will be amended to ensure the nature and extent of all contamination is evaluated. This RIWP includes detailed investigations of the remaining SWMUs and potential AOCs, as well as the necessary delineation activities in Section 4. A figure identifying the remaining SWMUs and potential AOCs is provided as **Figure 3**.

2.1 SMWUS AND POTENTIAL AREAS OF CONCERN

2.1.1 SWMUs:

2.1.1.1 SWMU 1 Road Trench

SWMU 1 Road Trench runs along the west side of the main facility in the western portion of the facility and consists of a reinforced concrete trench and associated conduit. It is approximately 4 ft wide by 5 ft deep by 2,300 ft long, split into two (2) sections. It consists of six (6) sump/pumping stations. The Road Trench historically received separated wastewater from the oil/water separators (OWS) (SWMUs 5 and 6) and pumpable sludge from the Dravo water treatment system (WTS) (SWMU 15) via WW transfer lines (SWMU 2). The Road Trench also historically received leachate from tank dikes before installation of the Claymax liners at the dikes in 1990/1991. As of 1993, all piping from the OWS was connected directly to the WTS. Since the change, the only material collected in the Road Trench was precipitation which falls on the bulkhead and Tank Farm areas.

The investigation into SWMU 1 is detailed in Section 4.1.10.

2.1.1.2 SWMU 2 WW Transfer Lines

SWMU 2 transfer lines are located primarily aboveground in the dock area and throughout the WW treatment areas. The WW transfer lines consist of wrapped concrete piping with flanges and steel transfer piping. The lines transferred barge cleaning water to Tanks T48 and T60 (SWMUs 11 & 12), OWSs (SWMUs 5 & 6), water from vacuum truck unloading pad to Tank T48, and WW from Tanks T48 and T60 to holding ponds (SWMUs 13 &14).

The WW Transfer lines have been removed from the Site by others. The 1993 RFA indicated that no further actions were required for this SWMU as the piping was concrete lined and located above ground. This piping was similar to the aboveground product transfer piping and will be investigated in accordance with the above grade transfer piping detailed in Section 4.1.6.

2.1.1.3 SWMU 3 Tank Farm Catch Basins

SWMU 3 consists of in-ground concrete basins that are approximately 6 ft x 10 ft x 10 ft deep and were installed prior to the installation of impermeable liners in 1990/1991. They received tank bottom water which was pumped to vacuum truck and then discharged to Tank T48 (SWMU 11). There are approximately three catch basins in each tank farm.

SWMU 3 has been identified adjacent to the perimeter of each AST, and the investigation of this these structures will be incorporated with the AST investigation detailed in Sections 4.1.3 and 4.2.1. Previously the 1993 RFA suggested that no further actions besides routine integrity inspections as the catch basins were created of concrete with a low potential for release.

2.1.1.4 SWMU 4 Former API Separator Site

SWMU4 is located adjacent to and partially covered by the container storage pad (SWMU 16) on the western portion of the facility. The API Separator was located aboveground, constructed of concrete, and contained no lining. It was estimated to be 12 ft x 80 ft and was demolished in the late 1970s.

The 1993 RFA indicated no further investigation was required for this SWMU, however, this SWMU is located in the footprint of USEPA Area 7 and was investigated as part of the Area 7 investigation. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.5 SWMU 5 Primary API Separator

SWMU 5 was installed in 1975, with an impervious lining installed in 1990. It is located west of the lower holding pond (SWMU 13) and south of Dravo WTS (SWMU 15). The Primary API Separator is aboveground and constructed of reinforced concrete with an impervious lining. It is 10 ft by 65 ft by 4.5 ft deep located on a concrete pad with 6-inch curbing. The pad drained to the Road Trench (SWMU 1). It was used to separate hot water rinse collected through Vacuum Tank 1 (SWMU 7) from barge cleaning, and WW discharged from Tank T48 (SWMU 11). It separated WW discharged to the Road Trench to the lower holding pond (SWMUs 13). It separated oil discharged via WW transfer lines (SWMU2) to Waste Storage Tanks T41 (SWMU 10) and T48 (SWMU 11). It was reported as being emptied and cleaned every two years. The sludge from the separator was contained in 55-gallon drums and stored at SWMU 16. It was non-hazardous. In 1993, all piping from the separator was connected directly to the WTS instead of the Road Trench (SWMU 1).

This SWMU is included in the footprint of USEPA Area 7. Further investigation was completed as part of the Area 7 investigation. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.6 SWMU 6 Utility API Separator

SWMU 6 was installed in 1975, with an impervious lining installed in 1990. The API Separator is located west of the lower holding pond (SWMU 13) and south of Dravo WTS (SWMU 15). It is aboveground and is constructed of reinforced concrete with an impervious lining. It is 12 ft by

70 ft by 4.5 ft deep located on a concrete pad with 6-inch curbs. The pad drains to the Road Trench (SWMU 1). It was used to separate hot water rinse collected through Vacuum Tank 1 (SWMU 7) from barge cleaning and WW discharged from Tank T48 (SWMU 11). It separated WW discharged to the Road Trench to holding ponds (SWMUs 13 &14). It also separated oil discharged via WW transfer lines (SWMU 2) to Waste Storage Tanks T41 (SWMU 10) and T48 (SWMU 11). It was reportedly emptied and cleaned every 2 years. The sludge from its cleaning was contained in 55-gallon drums and stored at SWMU16. The sludge from the cleanout was non-hazardous. In 1993, all piping from the separator connected directly to the WTS instead of the Road Trench (SWMU 1).

This SWMU is located within the footprint of USEPA Area 7. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.7 SWMU 7 Vacuum Tank 1 (High Flash Tank)

SWMU 7 was installed in 1986 and replaced a steel riveted box tank. It is located south of the Dravo WTS (SWMU 15) in the western portion of the Site. It is a cylindrical steel tank, 8 ft 6 in diameter, 12 ft high and mounted on a 4 ft tall steel base within a concrete containment dike with 4 ft tall walls and a sump. It received petroleum product residue from barge cleaning operations via product piping. The petroleum product was transferred to Tank T48 (SWMU 11) for separation and settling. Steam was pumped through the tank with condensation released to the sump below. The water in the containment was pumped back into the tank.

This SWMU is located within the footprint of USEPA Area 7. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.8 SWMU 8 Vacuum Tank 2 (Low Flash Tank)

SWMU 8 was installed in 1976. It is located south of Vacuum Tank 1 (SWMU 7) and the Dravo WTS (SWMU 15) in the western portion of the facility. It is a cylindrical steel tank, 7 ft diameter, 15 ft long, and cradle-mounted horizontally on 4 ft concrete pilings within a concrete containment dike with 2 ft tall walls and a sump. It received petroleum product residue from barge cleaning operations via product piping. The petroleum product was transferred to Tank T48 (SWMU 11) for separation and settling. This area was excavated in November 1998.

This SWMU is located within the footprint of USEPA Area 7. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.9 SWMU 9 Hydrocarbon Monitor Catch Basins (HMCB)

SWMU 9 was installed in 1981. They are located adjacent to the holding pond inlets. They are two in-ground concrete tanks that are 20 ft by 20 ft by 10 ft deep. They received WW from the Tank Farm Dikes (SWMUs 23 through 62) via the Tank Farm Drainage System. If hydrocarbons were detected, the feed to the pond was stopped. WW from the two basins was then pumped to the waste storage tank for off-site disposal.

The investigation into this SWMU is detailed in Section 4.1.1.

2.1.1.10 SWMU 10 Waste Storage T41

Installed in 1937. It was a steel AST; 125 ft in diameter by 45 ft high with a capacity of 4,212,600 gallons. This tank was used for storage and separation (by gravity) of waste petroleum product and water. Water from the bottom was sent to the lower holding pond (SWMU 13). Oil on top was shipped off-site. The unit was taken out of service in 1989. The unit was planned to be used in lieu of the holding ponds for storage of characteristic wastes and was fitted with a double bottom. It contains an earthen dike.

The investigation into this SWMU was initiated as part of the FSC and will be further investigated in accordance with the proposed sampling detailed in Sections 4.1.3 and 4.2.1.

2.1.1.11 SWMU 11 Waste Storage T48

SWMU 10 was installed in 1943. It was a steel AST; 100 ft in diameter by 35 ft high with a capacity of 2,058,000 gallons. The sidewalls (to 6 ft) and bottom of the tank were covered with an epoxy. It was used for collection and storage of WW contaminated with petroleum product. It received the following:

- Drippings from drip pans and tank bottom water from the catch basins (SWMU 3) collected by vacuum truck, transported to Tank T48, and unloaded at the vacuum truck unloading pad;
- Petroleum product and petroleum product/water mixtures from barge cleaning pumped through the WW transfer lines (SWMU 2); and

- Oil layer from separators (SWMUs 5 & 6).

The water from the bottom was released through the WW transfer lines (SWMU 2) to separators (SWMUs 5 & 6). The oil on top was shipped off-site twice a year. The unit was planned to be used in lieu of the holding ponds for storage of characteristic wastes prior to treatment.

The investigation into this SWMU is detailed in Section 4.1.19.

2.1.1.12 SWMU 12 Petroleum Tank 60 (T60)

SWMU 12 was installed in 1950. It is a steel AST; 60 ft in diameter by 48 ft high with a capacity of 1,012,200 gallons. The sidewalls (to 6 ft) and bottom of the tank were covered with epoxy. The unit was originally used for the collection and storage of WW and waste oil. The unit received WW and slop oil from the barge cleaning and ballast lines. Water from the bottom was released directly to the lower holding pond (SWMU 13) and to T48 (SWMU 11) through WW transfer lines (SWMU 2). The oil on top was shipped off-site two times per year. The unit was planned to be used in lieu of the holding ponds for storage of characteristic wastes prior to treatment (based on draft State Pollutant Discharge Elimination System [SPDES] permit).

The investigation into this SWMU was initiated as part of the FSC and will be further investigated in accordance with the proposed sampling detailed in Sections 4.1.3 and 4.2.1.

2.1.1.13 SWMU 13 Lower Holding Pond (aka Lower Surface Impoundment)

SWMU 13 is located northwest of the Tank Farm and southeast of Dravo WTS (SWMU 15). It is a RCRA-regulated lined surface impoundment for the collection of stormwater and WW prior to treatment in the Dravo WTS (SWMU 15). It has a capacity of 1,305,000 gal and is 13,125 square feet (ft^2) in size. The Lower Holding Pond was originally constructed with a soil base and a high-density polyethylene (HDPE) liner was installed in 1981. At that time, 1 to 5 ft of soil was removed to add capacity to the pond. In 1981, the Hydrocarbon Monitor Catch Basin (HMCB) (SWMU 9), settling basin (as part of the unit and made of concrete, 15 ft x 15 ft x 11 ft deep with sloped bottom), and energy dissipation chamber were installed. The WW from the Road Trench (SWMU 1) first went through the settling basin. The energy dissipation chamber is at the effluent of the pond to keep flow even to the Dravo WTS (SWMU 15). The energy dissipation chamber is concrete, 15 ft by 18 ft by 11.5 ft deep, with a removable baffle. The WW was pumped to the

WTS on an as needed basis. If near capacity, WW was diverted to the upper holding pond (SWMU 14) via WW transfer lines (SWMU 2). This holding pond received contaminated water from North Beach Recovery wells (SWMU 18), WW from barge cleaning, stormwater from the Tank Farm Drainage System (SWMU 12) and Road Trench (SWMU 1), Tank T60 bottom water (SWMU 12), and effluent from the upper holding pond (SWMU 14).

According to the Surface Impoundment Closure Report, prepared by Woodard & Curran, Inc., dated September 2002, between September 25, 2000, and February 16, 2001, draining and cleaning of each pond was conducted. This also included an inspection, wipe sampling, rinsate sampling, and repair of the HDPE liners. Following the removal of water and sediment from the ponds, an independent Professional Engineer (PE) licensed to practice in the State of New York, inspected the liners. Tears were noted and repaired as detailed in the PE's report provided in the Closure Report. Prior to repairing the liner, representative soil samples were obtained from beneath the tears for analysis of benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbon (PAHs), and lead (Pb).

According to the Surface Impoundment Investigation Report, prepared by Woodard & Curran, Inc., dated November 2012, a post-closure subsurface investigation was conducted of the Lower Holding Pond in June-July 2012 pursuant to the USEPA consent order. The objective of the investigation was to determine whether subsurface contamination was present below the holding pond. Sampling included ten locations immediately below the liners and gravel base. Samples were analyzed for BTEX, PAHs, and lead. One or more BTEX constituents, PAHs, and/or lead were detected in most samples collected from beneath the lower holding pond.

A further investigation of this SWMU is detailed in Section 4.1.11.

2.1.1.14 SWMU 14 Upper Holding Pond (aka Upper Surface Impoundment)

SWMU 14 is located northwest of the Tank Farm. It is a RCRA-regulated, lined surface impoundment used for the collection of stormwater and WW prior to release to the lower holding pond (SWMU 13) and treatment in the Dravo WTS (SWMU 15). It has a capacity of 1,750,000 gallons and is 10,000 ft^2 in size. Its location was formerly part of the Tank T41 Dike (SWMU 22). The Upper Holding Pond was installed in 1981 and the original soil bottom was excavated and replaced with clean, compacted soil and HDPE liner. The Upper Holding Pond received WW from Tanks T41 & T48 (SWMU 10 & 11), stormwater from Tank Farm Drainage System (SWMU 12), the Road Trench (SWMU 1), and effluent discharged to the lower pond (SWMU 13) on an as needed basis. According to the 2002 Surface Impoundment Closure Report, between September 25, 2000, and February 16, 2001, draining and cleaning of each pond was conducted. This also included an inspection, wipe sampling, rinsate sampling, and repair of the HDPE liners. Following the removal of water and sediment from the ponds, an independent PE licensed to practice in the State of New York, inspected the liners. Tears were noted and repaired as detailed in the PE's report provided in the Closure Report. Prior to repairing the liner, representative soil samples were obtained from beneath the tears for analysis of BTEX, PAHs, and lead.

According to the 2012 Surface Impoundment Investigation Report, a post-closure subsurface investigation was conducted of the Upper Holding Pond in October 2011 pursuant to the consent order. The objective of the investigation was to determine whether subsurface contamination is present below the holding pond. Sampling included four locations immediately below the liners and gravel base and deeper depths to delineate historic exceedances. Samples were analyzed for BTEX, PAHs, and lead. PAHs, specifically benzo(a) pyrene and dibenzo(a,h)anthracene, were detected in most samples collected from beneath the upper holding pond.

A further investigation of this SWMU is detailed in Section 4.1.11.

2.1.1.15 SWMU 15 Dravo WTS

SWMU 15 is made up of two Dravo resin bed filters and a sludge reclamation tank located in a concrete block building with concrete floor. Four-inch concrete curbing is located at all entrances to the building. Floor drains are located in the WTS that lead to the Road Trench (SWMU 1). WW from the lower holding pond (SWMU 13) went through the two filters (2 cylindrical tanks 15 ft tall and 13 ft diameter) then discharged to a SPDES permitted outfall. The filters were backwashed periodically, and the backwash waste was discharged to a sludge reclamation tank (cylindrical tank; 10-12 ft diameter and 21 ft high with a capacity of 23,000 gallons). Supernatant was discharged to an outfall and sludge was historically pumped to the Road Trench (SWMU 1) and lower holding pond (SWMU 13) via WW Transfer Lines (SWMU 2). Non-pumpable materials were removed by vacuum truck for off-site disposal. Discharge to the Arthur Kill was monitored for oil and grease. The treatment plant received water and tank bottoms from other sites. It should be noted, the Road Trench (SWMU 1) formerly received both stormwater runoff and water which had been discharged from the OWS. As of 1993, all piping from the OWS was connected directly to the WTS. Since that change, the only material collected in the Road Trench was precipitation which fell on the bulkhead and Tank Farm areas.

A further investigation into this SWMU is provided in Section 4.1.20. Previously the 1993 RFA suggested that no further actions were necessary as these units were located in a fully enclosed building with a concrete floor.

2.1.1.16 SWMU 16 Container Storage Pad

SWMU 16 is a 6-inch thick concrete pad. The pad is uncovered and measures 25 ft by 25 ft. It slopes to a concrete secondary containment surrounding the separators (SWMUs 5 & 6).

This SWMU is located within the footprint of USEPA Area 7. It was investigated as part of the Area 7 investigation, and any necessary remedial activities will be completed as part of the remediation of Area 7. Additional investigation is proposed for this SWMU in Section 4.1.21 of this RIWP.

2.1.1.17 SWMU 17 Excavated Soils Area

SWMU 17 is located on the southeast side of the facility across the road from Tanks T52 and T55. It consists of an area of about 200 ft by 300 ft. The Excavated Soils Area was an area of storage and disposal of fill removed from excavations across the facility (e.g., dirt piles located along the hill on the east side of the facility from a tank dike upgrade in 1990 and 1991), sand from sandblasting, broken-up asphalt, and general construction debris. Due to the completion of the work over 30 years ago, no historic documentation is available documenting the soil removal, disposal, or placement.

Further investigation of this SWMU is detailed in Section 4.1.2.

2.1.1.18 SWMU 18 North Beach Recovery Wells

SWMU 18 consists of two groundwater recovery wells (LRW-1 and LWR-2) installed to remediate the North Beach groundwater plume in 1980. LRW-1 was only used for a short time.

LRW-2 was active until 1991 when it collapsed. As of March 4, 1991, approximately 991,357 gallons of product were recovered. The location of this SWMU is within the footprint of the USEPA Area 3 and will be included as part of the remediation of Area 3. Based on the description of this SWMU, the wells were installed to recover LNAPL and no longer exist at the Site. However, as part of this investigation, LNAPL in this area will be delineated as detailed in Section 4.6.2.

2.1.1.19 SWMU 19 North Beach Recovery Well Holding Tank

SWMU 19 was installed in 1980. It is a steel horizontal storage tank with no secondary containment and a capacity of 550 gallons. The product was transported to Tank T48 (SWMU 11) by vacuum truck. The North Beach Recovery Well Holding Tank has been inactive since 1991.

The location of this SWMU is within the footprint of the USEPA Area 3 and will be included in the remediation of Area 3. As part of this investigation, LNAPL in this area will be delineated as detailed in Section 4.6.2.

2.1.1.20 SWMU 20 Southern Groundwater Plume Recovery Well

SWMU 20 is located at the southwest end of the facility near the terminal office and warehouse. The plume was identified in 1981. It was speculated that the source was the Tank Farm area drainage conduit associated with the Road Trench (SWMU 1), which is believed to have been partially submerged. In August 1999, a soil and groundwater investigation were conducted in the Former Southern Recovery Area. No significant concentrations were detected, and no further remediation was warranted.

This SWMU is located adjacent to monitoring well ICM-10 which is being delineated as detailed in Section 4.6.2. Any impacts from this SWMU will be captured as part of the ICM-10 investigation.

2.1.1.21 SWMU 21 Boiler House Recovery Well

The SWMU 21 Boiler House Recovery Well, NRW-2, was installed in 1982 on the east side of Boiler House. Gasoline had been observed in some of the borings in the area in late 1981. The source of the gasoline is undetermined.

The location of this SWMU is within the footprint of the USEPA Area 3 and will investigated as part of the Area 3 investigation and remediation of Area 3. Based on the description of this SWMU, the well was installed to recover LNAPL and no longer exists at the Site. However, as part of this investigation, LNAPL in this area will be delineated as detailed in Section 4.6.2.

2.1.1.22 SWMU 22 Tank 41 (T41) Dike

The SWMU 22 Tank T41 dike was operational in 1937. It is located on the northwest portion of the facility. It was originally constructed as secondary containment for Tank T41. In 1981, this dike area was modified and expanded to accommodate the construction of the upper surface impoundment (SWMU 14). T41 Dike was a combined containment area that also served as overflow for the impoundments. Liquid collected in this dike was stormwater and it was discharged to the Road Trench (SWMU 1). This SWMU is incorporated as part of Remediation Area 1.

The investigation into this SWMU was initiated as part of the USEPA CMI Workplan, and will be further investigated in accordance with the proposed sampling detailed in Sections 4.1.3

2.1.1.23 SWMUs 23 through 62 Tank Farm Dikes

The tank farm dikes are earthen berms surrounding product storage tanks. The Tank Farm Drainage System, Tank Farm Catch Basins (SWMU 3), and impermeable liners were operational from 1990 through 2019, when MOSF operations at the facility ceased. Soil excavated from the units during installation of the liners was placed in the Excavated Soils Area (SWMU 17).

The investigation into this SWMU was initiated as part of the FSC and will be further investigated in accordance with the proposed sampling detailed in Sections 4.1.3 and 4.2.1.

2.1.1.24 SWMU 61 Former Lube Tanks

In review of historic documentation of the Site, lube oils were previously managed as SWMU 61 which was investigated 2005 and included in the remediation of USEPA Area 6.

Further investigation into this SWMU has been detailed in Section 4.1.18.

2.1.2 ASTs Associated with Structures

There are eight smaller ASTs (Tanks 100 – 105, 109, and 24A), ranging in capacity from 55 to 12,768 gallons, utilized for terminal operations (i.e., diesel powered water or foam pumps, emergency generator fuel, and heating oil-supplied boilers). These tanks have been cleaned and removed from the Site.

2.1.3 Historic ASTs

Four formerly operational ASTs were identified in reviewing historic aerials of the Site. These ASTs no longer exist, and were identified as former Tank 19, former Tank 40, and Historic Tank 1 (HT-1) and Historic Tank 2 (HT-2). Closure documentation for these four tanks is unavailable. Further investigation is proposed to evaluate the tanks to assess if there have been any impacts.

2.1.4 Transfer Piping

There are two categories of transfer piping present at the facility, as discussed below:

- **Aboveground Product Transfer Piping Outside Secondary Containment:** The terminal formerly contained approximately 20,000 linear feet (LF) of overhead piping and racking that was utilized to transfer product from barges to the on-site tanks. Approximately 50% of the aboveground transfer piping was located outside dike areas. Surface cover beneath the piping racks varies from concrete to exposed soils. In 2019, the overhead product transfer piping was removed from the facility. It should be noted that the former steam lines (wrapped in insulation) and foam lines (painted red) are not included in this investigation of transfer piping as they did not move petroleum products throughout the Site.
- **Subgrade Product Transfer Piping:** Subgrade piping runs were typically between 25 and 75 ft in length. In 2019, the subgrade piping was cleaned and capped in-place.

2.1.5 MOSF Structures – Loading Areas, Pump Stations, Manifolds, Valves

The MOSF structures include the former loading areas, pump stations, manifolds, and valves. Each represent potential former operational release points. The footprint of these former structures varies greatly with some being only a singular valve to the largest being the Marine Vapor Recovery Unit (MVRU) which covers an area of approximately 6,000 ft^2. The MVRU is located east of Tank 20 and is on **Figure 4**. In total, there are four former loading areas, eight pump stations, and 13 manifold/valve areas throughout the former operational area as depicted on **Figure4**.

2.1.6 UST 2

UST 2 is located along the roadway, just outside of the berm containment area for Tank 58. UST 2 is of unknown use and history and was discovered while conducting MOSF closure activities. In 2019, UST 2 was inspected, filled with water to evaluate for potential leaks, and then abandoned in place due to its location being under a stormwater drainage trench.

2.1.7 Non-Operational Areas

The remaining portions of the Site are considered non-operational areas and are broken into five areas, Areas A through D, and the tidal flat, as depicted on **Figure 5**. There is no evidence of historic uses or operations in these areas. Area A is a wooded area in the north portion of the Site located along the Arthur Kill. Area B is a wooded area on the southern side of the property; a portion of this area has been developed with a solar farm. Area C is the area around the main office and garage. Area D is a wooded area along the eastern side of the property and is adjacent to Johnson Street and commercial development areas. In addition, a portion of the non-operational area is located on the northern side of the property extending into the Arthur Kill and consists of a tidal flat.

2.1.8 AST Farm Area

The Site contains 38 out of service ASTs which were formerly utilized for the commercial storage of petroleum during historical MOSF operations at the Site. The tanks range in size from 60 to 135 ft in diameter, and 35 to 60 ft in height, and formerly contained #2 fuel oil, #6 fuel oil, gasoline, and trans mix. The 38 ASTs were installed between 1934 and 1954. Each AST is surrounded by an earthen berm/dike, lined with either a Claymax, HDPE, or polyurea liner.

2.1.9 Site Infrastructure

In accordance with DER-10 Section 3.3(c)1(iv), any major infrastructure (storm drains, sewers, underground utility lines, piping tunnels, subways, etc.) should be documented and a discussion of whether such infrastructure may influence contaminant migration should be included in the RIWP. In review of the site infrastructure, the following constitutes the major infrastructure identified that may influence contaminant migration:

- Storm drains;

- Storm water trenches;
- Stormwater conveyance piping;
- Historic surface water basin; and,
- Site utilities (gas, water, septic).

These components of the Site infrastructure are discussed in further detail below. A figure detailing the stormwater conveyance system has been provided as **Figure 2**.

2.1.9.1 Storm Drains

In review of the Site infrastructure and the storm water drainage plans included as **Figure 2**, storm drains were able to be separated into two categories: storm drains connected to the conveyance system, and storm drains not connected to the conveyance system.

Storm drains with stormwater conveyance system discharge: A total of nine storm drains were identified on facility mapping included as **Figure 2** to be discharging to the existing stormwater conveyance system. Stormwater discharges through these storm drains originate from overland flows from the Site. It should be noted that all AST berm areas are connected exclusively to the site conveyance system and are not freely allowed to drain. Further investigation into these storm drains is discussed in Section 4.1.12.

Storm drains with non-conveyance system discharge: A total of six storm drains were identified on facility mapping not connected to the Site storm water conveyance system as shown on **Figure 2.** The stormwater discharging through these storm drains originates from overland flows from the Site roadways. Five of the six storm drains have been identified to discharge along the southern boundary of the tank farm, however discharge has not been identified to leave the property. One storm drain was identified on the northeastern portion of the property and discharge occurs through appropriate protective erosion controls. Further investigation into these storm drains is discussed in Section 4.1.13.

2.1.9.2 Stormwater Management System

Storm water conveyance trenches: Approximately 3,900 LF of storm trenching has been identified on the Site as part of the storm water conveyance system. Of the 3,900 LF, approximately 1,900 LF are associated with the Road Trench which is being investigated as SWMU 1. Investigation proposed for these storm water trenches is discussed in Section 4.1.14.

Subsurface storm water conveyance piping: The storm water conveyance system is comprised of approximately 8,300 LF of subgrade piping, which discharges to the surface water impoundments (investigated separately as SWMUs 13 and 14). Stormwater is pumped from the impoundments to the existing OWS for treatment prior to discharging to the Arthur Kill in accordance with the current SPDES permit. Storm water is individually controlled from each berm with two post indicator valves. Investigation proposed for the storm water conveyance piping is discussed in Section 4.1.15.

2.1.9.3 Historic Storm Water Basin

In review of historic maps and aerial photographs, the site formerly operated a storm water basin on the southwestern portion of the tank farm. No additional information was available to determine management processes for this storm water collected, however additional investigation of this storm water basin is proposed in Section 4.1.16.

2.1.9.4 Site Utilities

Subsurface potable water line: The Site office is currently operating on New York City (NYC) potable water. This potable water line has been identified to be approximately 2,500 LF of subsurface piping. No further investigation is warranted for the potable water line, as it has only delivered NYC potable water to the Site and the line was installed outside all tank berms/active areas of product transfer.

Subsurface natural gas: The Site was previously heated via steam from the boiler house which was powered by natural gas supplied by National Grid. This natural gas line has been identified to be approximately 2,700 LF of subsurface piping and is no longer active. No further investigation is warranted for the natural gas line, as no leak has ever been detected and the line was installed outside all tank berms/active areas of product transfer.

Subsurface hydrant line: Former Site operations utilized a private hydrant system which is connected to the NYC water supply on Arthur Kill Road. This hydrant system encompasses approximately 15,000 LF of subsurface pipe. This hydrant piping is separate from the former foam system which is being investigated separately as part of the per- and polyfluoroalkyl substances (PFAS) RI scope submitted under separate cover. No further investigation is warranted for the hydrant system, as it has only delivered NYC water to the Site and the line was installed outside all tank berms/active areas of product transfer.

Site septic system: The Site currently and historically has operated a septic system to manage sanitary waste from the office building and the boiler house building. The septic system consists of a septic tank and two septic disposal fields. This septic system is routinely maintained, and only sanitary waste has been captured by this system.

2.2 GROUNDWATER STUDY

2.2.1 Potential DNAPL Locations

Heavy fuels such as No. 6 fuel oil have been historically stored on-site in ASTs 1, 2, 3, 4, 41, and 48. This fuel oil may act as a DNAPL instead of a light non aqueous phase liquid (LNAPL).

2.2.2 Potential Perched Groundwater

The March 2020 groundwater contours, the varying depth of groundwater across the Site, and known mounding in the southeastern portion of the Site, indicate the potential for a perched groundwater zone to be present in portions of the Site. Further investigation to determine the nature and extent of perched groundwater is proposed in Section 4.3.2.

2.2.3 Evaluation of Emanating Groundwater

As part of the RI, a groundwater study will be completed to assess potential groundwater contamination that may have emanated or is currently emanating from the Site. This study will incorporate groundwater data from the perimeter of the Site, as well as advanced 3-D modeling of the site conditions incorporating groundwater flux and tidal changes. This groundwater investigation will be completed as part of the initial RI phase and will provide the framework for any necessary off-site investigations.

2.3 ON-SITE NATURAL RESOURCES

A baseline investigation of on-site surface water, sediments, and wetlands will be performed in accordance with DER-10 Section 3.8.2 as part of the initial phase of the RI activities. One small stream was identified in the southeast corner of the site, as well as 14 individual wetland areas as detailed in the Wetlands Delineation Report included as **Appendix B** and shown on **Figure 6**.

2.4 FISH AND WILDLIFE RESOURCE IMPACT ANALYSIS

As part of the Remedial Investigation, on-site streams, wetlands, and tidal flats are proposed to be sampled in accordance with the following requirements. Information from the initial sampling of on-site natural resources will be compiled into a two-step Fish and Wildlife Resource Impact Analysis (FWRIA) contaminant specific impact assessment in accordance with DER-10 Section 3.10.2. A Step I and Step II FWRIA will be submitted to the NYSDEC and USEPA for review and evaluation to determine sampling requirements on- and off-site.

2.5 OFF-SITE NATURAL RESOURCES

As discussed in Section 1.4.2.1, Arthur Kill runs west and north of the site. As part of the proposed initial phase of the RI, a baseline off-site surface water and sediment investigation will be completed following the completion of the groundwater evaluation to ensure the appropriate sample locations are selected for the subsequent RI phase. This baseline investigation of off-site resources will be performed in accordance with DER-10 Section 3.8. Results of the on-site natural resource sampling will be provided to the NYSDEC and USEPA for review and to establish requirements of off-site sampling.

3. SAMPLING PROCEDURES AND METHODOLGY

3.1 SOIL SAMPLING

Soil samples are proposed to be collected as part of this RI to evaluate the nature and extent of potential soil contamination at the Site and to inform the development of the Site conceptual model. The methodology for soil sampling and determining the presence of grossly contaminated media is described below.

3.1.1 Methodology

A One Call Utility Mark Out Request (811) in accordance with NYS Code Rule 753 call will be placed before any subsurface work is performed. In addition, a private utility mark out by a subsurface evaluator will be performed. All proposed sampling will be completed via properly decontaminated hand tools (i.e., stainless steel hand augers, posthole diggers and shovels) or direct-push technology tools (i.e., macrocores, cutting shoes, split spoons).

Soil borings will be installed utilizing direct push methods (e.g., Geoprobe®) or hand auger methods as necessary per field conditions and the required depth of the boring. Surface soil (0.0 to 1.0 ft below ground surface [bgs]) and near surface soils (1.0 to 2.0 ft bgs) will be collected via hand augers and other soft digging measures (i.e., posthole digger and shovels). Per DER-10 3.5.1(b) surface soil sampling (except for samples designated for volatile organic compound [VOC] analysis) will be collected based upon the type of exposure or disposal to be assessed by the sample. To assess the human exposure resulting from soil contamination related to incidental soil ingestion, inhalation of soil vapor, or dermal contact, soil samples will be collected from a depth of 0 to 0.5 feet bgs and analyzed for the Site contaminants of concern (COCs). Specifically, SVOCs and metals will be collected from 0 to 2 inches bgs and VOCs from 0 to 6 inches bgs. Surface samples will be collected directly below any liner if present.

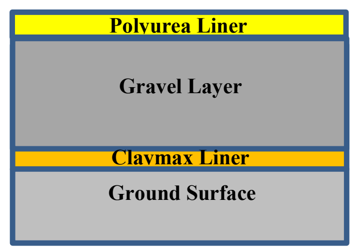
Based upon the NYSDECs review of the FSC Summary Report, the following contaminants have been identified as COCs for the Site (excluding PFAS):

- Benzene;
- 1,2,4-Trimethylbenzene;
- 1,3,5-Trimethylbenzene;

- Ethylbenzene;
- Toluene;
- O-Xylene;
- PM-Xylene;
- Naphthalene;
- Benzo(a)anthracene;
- Benzo(a)pyrene;
- Benzo(b)fluoranthene;
- Chrysene;
- Indeno(1,2,3-cd)pyrene;
- Lead; and,
- Zinc.

All AST berms were updated with the installation of a Claymax liner in 1990/1991. ASTs 4, 9, 44, 50, 53, 54, 57, 58 and 59 have an additional polyurea liner. ASTs 43, 56 and 60 have an additional HDPE liner. A typical cross-sectional view of the berm liners is as follows:

- Ground surface;
- Claymax liner installed above ground surface;
- Six to twelve inches of gravel to protect the Claymax liner; and,
- In some instances, newer HDPE and polyurea liners are installed above the gravel layer.



Borings requiring soil collection greater 2.0 ft bgs will be completed via direct push technology. Soil samples proposed at the shallow and intermediate soil boring locations will be collected according to the procedures described herein. Soil cores will be screened for grossly contaminated media (GCM) as defined in 6-NYCRR Part 375-1.2(u) as soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2 (ac), that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis. Any trace of NAPL in a shake test is evidence of NAPL and GCM. If multiple distinct intervals exhibit contamination within a soil boring, samples will be collected from each separate interval. A sample will be collected from the groundwater interface (GWI) of each boring. If GCM is identified at the GWI, the boring must be advanced to delineate GCM. If there is no indication or evidence of soil contamination, only one sample from the boring will be collected from the GWI.

Soil samples will be collected using discrete soil sampling procedures (i.e., macro-cores) and soil borings will be continuously logged to document if any contamination is present. Additionally, all soil boring logs will include soil/geologic descriptions. Soil borings will be continuously logged to document if any contamination is present, and all soil boring logs will include soil/geologic descriptions. Logging will be performed by a geologist utilizing a photoionization detector (PID) to assess VOC contamination. Evidence of contamination (olfactory, discoloration, etc.) will be documented in soil boring logs.

Soil samples will be evaluated for potential petroleum impacts using the following field screening methods.

- Operational records for each tank will be reviewed to determine if/where historical releases have occurred.
- Screening of surface soils for visual/olfactory observations will be conducted and PID readings will be collected around the circumference of the AST at the following locations:
    - Locations where historical releases have occurred;
    - Beneath valves, piping, and any other ancillary connections to the AST; and,
    - At 50-foot intervals where valves/piping connections do not exist, and historical releases have not occurred.

As stated above, PID readings will be collected to assess possible soil contamination throughout the recovered soil column. Measurement of soil PID readings will be completed using the steps listed below.

- Fill half of a jar or sealable bag with soil;
- Seal the container; if using a jar, place a foil layer over the mouth of the jar before sealing;
- Vigorously shake the contents;
- Quickly insert the PID sampling probe though the foil seal or into the sealable bag; and,
- Document maximum meter response.

Soil borings will be completed using direct push technology advancing 5-ft macrocores suitable for recovery to obtain an adequate volume of soil for analysis within a 2-ft sample run. If an insufficient volume of soil is recovered for field observations and laboratory analysis, a second boring shall be offset from the first and a sample will be collected from the same interval which exhibited inadequate recovery.

Decontamination procedures for any non-dedicated hand tools and sampling equipment will be performed between sampling locations as follows:

1) Remove caked-on soils with a brush;
2) Clean equipment with an Alconox-based solution (or equivalent);
3) Rinse with deionized water; and,
4) Steam clean equipment.

Methodology pertaining to the installation of geotechnical soil borings is provided in Section 5.1.

3.1.1.1 Grossly Contaminated Media (GCM)

GCM will be investigated as described below. Delineation of GCM is detailed in Section 4.6.3. Grossly contaminated media is defined by DER-10 and 6 NYCRR 375-1.2(u) as soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL that is identifiable either visually, through strong odor, by elevated contaminant vapor levels and/or is otherwise readily detectable without laboratory analysis.

- Visual inspection: A visual observation of soils with product seeping out of the soil pore spaces.
- Olfactory inspection: The presence of odors will be documented when identified in the field as part of the soil screening.
- Evaluation of contaminant vapors: Soil vapors will be assessed where olfactory and visual impacts are identified utilizing a PID as described in this RIWP.
- Evaluation of NAPL through Shake Testing: Per DER-10 Section 2.1(f)1, soil-water agitation testing is an approved approach in determining the presence of grossly contaminated soils. Shake testing methodology incorporates mixing soil with water and observing whether NAPL is present.

3.2 MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

The installation of monitoring wells and the collection of groundwater samples are proposed to evaluate if groundwater has been impacted by historic uses of the Site, as well as provide a complete groundwater evaluation as described in Section 4.3. The groundwater sampling methodology and determination of LNAPL presence is described below.

3.2.1 Methodology

Monitoring wells will be installed and sampled to assess the nature and extent of potential groundwater contamination. Monitoring wells installed will follow best management practices as found in applicable ASTM and USEPA guidance as described below. An example well construction log and schematic has been included in **Appendix D**.

- Monitoring wells will be constructed of 2-inch polyvinyl chloride (PVC) well screen and riser. When wells are designed as clusters, each monitoring well must have a minimum of 2 inches of annular space surrounding the well casing. For a single monitoring well, a 6" borehole is required.
- For GWI wells, the screen interval shall extend at least 2 ft above the observed groundwater table to allow for variations in hydraulic head.
- The annular space surrounding the screen will be filled with No. 00 Morie sand or equivalent filter sand to an elevation of 2 ft above the well screen interval.
- Directly above the sand pack, a 1-foot (minimum) hydrated bentonite seal will be installed to isolate the sampling interval.
- The remainder of the borehole will be filled with soil cuttings (in accordance with DER-10) or cement bentonite grout, and the monitoring wells will be completed to grade
- The monitoring well will be sealed in place with a concrete pad and protective casing.
- Monitoring well locations and elevations will be surveyed as described in Section 4.8 to a known datum so that the groundwater elevation can be accurately calculated. The elevation must be to a 0.01-foot accuracy.
- No less than 24 hours after the monitoring well has been completed to grade, the monitoring well will be developed or pumped until the column of water in the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized.
- Prior to sample collection, all monitoring wells will be purged in accordance with NYSDEC DER-10, Section 2.1. No less than seven days post monitoring well development, baseline groundwater monitoring and sampling for NYSDEC Target

Compound List/Target Analyte List or site COCs, as applicable, must be completed on monitoring wells.

Each monitoring well will be purged and sampled using low flow purging and sampling techniques. Prior to sample purging, each well will be checked with an interface probe to evaluate potential NAPL. The interface probe will be slowly lowered into the water column and observed for variations in the audible tone, which indicates the presence of NAPL. Initially, LNAPL will be evaluated for, then the probe will be lowered to the well bottom to check for DNAPL. Care will be taken to minimize disturbance of the water column and the equipment will be decontaminated between each well. If NAPL is identified, a groundwater sample will not be collected.

All groundwater samples will be collected via low flow sampling methodology. Low flow sampling for the monitoring wells will be conducted in accordance with ASTM Standard Practice D6771-02 to minimize groundwater drawdown and to obtain a representative sample of groundwater conditions. Low flow purging of the monitoring wells will include collection of the following water quality indicator parameters:

- Water level drawdown;
- Temperature;
- pH;
- Dissolved oxygen;
- Specific conductivity;
- Oxidation reduction potential; and,
- Turbidity.

Decontamination procedures for any non-dedicated tools and sampling equipment will be performed between sample locations as follows:

1) Clean equipment with an Alconox-based solution (or equivalent);
2) Rinse with deionized water; and,
3) Steam clean equipment.

3.2.1.1 NAPL Assessment

To provide an accurate assessment of NAPL, monitoring wells will be installed, as described in Section 3.2.1, in the intermediate and shallow borings to evaluate the presence of NAPL. Per DER-10 Section 2.1(f) NAPL is suspected to be present in groundwater when: 1) concentration is equal to or greater than 1% of the water solubility of the contaminant; or 2) a mixture of such contaminants in (1) above is present, then the effective water solubility of the contaminant should be estimated for this determination.

Monitoring wells are proposed as the primary detection tool for NAPL and will be installed as described in Section 3.2.1. Each monitoring well will be gauged for NAPL using an oil/water interface probe and confirmed with a bailer at low tide. NAPL assessment will not be performed until a monitoring well has been installed for a minimum of 72 hours and development is completed. Further, the monitoring wells will remain in place and secured until such time that construction in the area necessitates their removal. If NAPL is detected in a well, a product finger-print sample will be collected to evaluate the type of petroleum product encountered and the thickness of NAPL will be recorded. If NAPL is observed at a location, further investigation will be performed as detailed in Section 4.6.2. NYSDEC approval will be obtained prior to decommissioning, removing, or abandoning a monitoring well.

3.3 WETLAND/SEDIMENT SAMPLING

Sediment and wetland samples are proposed to be collected as part of this investigation to evaluate potential releases or impacts to the sediment and/or wetland areas. Wetland sampling will be targeted towards areas of known, suspected historical, or on-going contamination or discharges. These areas may be identified by evidence of stressed vegetation, sheens, seeps, discolored sediment, and will be targeted toward depositional areas. The sediment and wetland sampling methodology is described below.

3.3.1 Methodology

A One Call Utility Mark out Request (811), in accordance with NYS Code Rule 753 call, will be placed before any subsurface work is performed. In addition, a private utility mark out by a subsurface evaluator will be performed where accessible. All proposed wetland and sediment sampling will be completed using properly decontaminated hand tools (i.e., stainless steel hand augers, sediment coring devices or shovels) or via vibracoring technologies from a boat or tripod where possible.

Sampling of the wetlands and sediment is proposed in accordance with DER-10 Section 3.8.2(c) 2 (iii) (4) to include sampling to be placed as follows:

- In an array moving away from the point source or site border;
- Along any areas of probable flow through the wetland; or
- At any identifiable point where water discharges from the wetland.

Wetland and sediment borings will be installed utilizing vibracore or hand coring methods as necessary per field conditions and the required depth of the boring. Surface/near surface sediments from the 0.0 to 0.5 ft bgs, 0.5 to 1.0 ft bgs, and 1.0 to 2.0 ft bgs intervals, if present, will be collected via hand augers or sediment coring devices. If deeper sediment is present, borings will be advanced and samples collected in 1 ft intervals of distinct sediment layers, as well as from any interval where free product, NAPL, or grossly contaminated media is found. Grossly contaminated media is defined in Section 3.1.1.1.

Wetland/sediment samples will be collected using discrete core sampling procedures (i.e., sediment coring devices) and soil borings will be continuously logged to document if any contamination is present. Additionally, all wetland/sediment boring logs will include soil/geologic descriptions. Logging will be performed by a geologist utilizing a PID to assess VOC contamination.

PID readings will be collected to assess possible wetland/sediment contamination where olfactory and visual impacts are identified. Measurement of the soil PID readings will be completed as detailed in Section 3.1.

Sediment samples will be collected concurrently with surface water samples. Sediment sampling will follow *in-situ* surface water measurements collected at each location and will also follow surface water sample collection where applicable as detailed in Sections 4.4.2 and 4.5.2. These sediment samples will be collected with either a decontaminated stainless-steel auger, Ponar dredge, or vibracore, whichever is most effective at a given location. Following collection, the sediment will be transferred to a decontaminated stainless-steel bowl or other appropriate homogenization container and fully mixed. The homogenized sediment will be portioned into the appropriate sample containers, labeled, and secured. Samples then will be placed in a cooler, chilled to 4 degrees Celsius ($^{\circ}$C), and prepared for shipping to the subcontracted laboratory under standard chain-of-custody procedures.

Decontamination procedures for any non-dedicated hand tools and sampling equipment will be performed between sampling locations as follows:

1) Remove caked-on sediment with a brush;
2) Clean equipment with an Alconox-based solution (or equivalent);
3) Rinse with deionized water; and
4) Steam clean equipment.

3.4 SURFACE WATER SAMPLING

Surface water samples are proposed to be collected as part of this investigation to evaluate potential releases or impacts to the on-site and adjacent surface water bodies. The initial phase of the RI will include the investigation of the on-site stream, originating from the southern side of Arthur Kill Road flowing on the southwestern portion of the site. The adjacent Arthur Kill will also be sampled. Surface water sampling is described in Sections 4.5.1.

3.4.1 Methodology

All proposed surface water sampling will be completed via properly decontaminated equipment (i.e., dippers or water sampling bottles) or via dedicated polyethylene tubing and a peristaltic pump with the intake of the tubing placed approximately at one-third of the water depth at each sampling location. Prior to surface water sample collection, in-situ water quality parameters (i.e., pH, temperature, hardness, conductivity, etc.) will be measured. Pre-preserved sample bottles will then be filled directly from the peristaltic pump and dedicated tubing.

Surface water samples, including filtered samples, will be collected to characterize the dissolved constituents and evaluate the impact of turbidity. The samples for dissolved analysis will be field-filtered using an in-line 0.45-micron filter. Samples then will be placed in a cooler, chilled to 4 $^{\circ}$C, and prepared for shipping to the subcontracted laboratory under standard chain-of-custody procedures.

4. PROPOSED REMEDIAL INVESTIGATION

The purpose of the RIWP is to investigate the Site to pre-release conditions and to delineate contamination on-site and emanating from the site. To provide an overview of the overall sampling approach for soil investigation per the request of the NYSDEC and USEPA, all proposed surface soil samples have been provided on **Figure 7**. In addition to all surficial soil samples, soil borings that will be advance to or beyond the ground water interface either identified as a shallow or intermediate soil boring are shown on **Figure 8**.

A statistical assessment of the results consistent with current USEPA guidance demonstrating that sufficient data was collected to define the extent of contamination will be conducted to ensure an appropriate number of samples were collected.

4.1 PRE-DEMOLITION REMEDIAL INVESTIGATION OF SWMUS/AOCS

4.1.1 Hydrocarbon Monitor Catch Basins Investigation

Four shallow soil borings will be advanced; two adjacent to each of the two HMCBs, as depicted on **Figure 9.** At each boring, soil will be inspected from grade to a depth of 10 ft bgs, the expected depth of the bottom of the HMCB. The soil sampling intervals will be biased toward any evidence of apparent contamination, such as soil discoloration, odor, and screening with a calibrated PID. In addition,, one soil sample will be collected from approximately 6 inches below the bottom of the structure. Samples will be analyzed for the Site COCs described in Section 4.7, and 15% of samples will be analyzed for target compound list (TCL)/target analyte list (TAL) (except for PFAS, which is being addressed separately). In the event GCM is identified in the soil boring, the GCM impacts will be delineated in accordance with Section 4.6.3. If NAPL is identified to be present in any boring, NAPL will be delineated in accordance with Section 4.6.2.

4.1.2 Excavated Soil Area Investigation

The excavated soil piles associated with SWMU 17 are no longer present, and a solar panel farm has been installed in the area of the former soil piles. To address this SWMU, six shallow soil borings will be advanced to the GWI within the location of the former piles, as depicted on **Figure 10**, to evaluate whether potential petroleum impacts to soils from the former piles remain. One soil sample will be collected biased to the highest apparent contamination based on soil discoloration, odor, field-screening result, or other field indicators within the first 5-ft interval and one sample will be collected from the 6-inch interval above the GWI. Samples will be analyzed for the Site COCs described in Section 4.7, and 15% of samples will be analyzed for target compound list (TCL)/target analyte list (TAL). In the event GCM is identified in the soil boring, the GCM impacts will be delineated in accordance with Section 4.6.3.

4.1.3 AST Dike Areas Investigation

Each AST dike area will be divided into four quadrants, and one shallow boring will be advanced to the GWI in each of the four quadrants below the base of the liner as shown on **Figure 11**. As discussed, and illustrated in Section 3.1, liners in the bermed areas consist of a Claymax liner beneath a gravel layer. In some instances, a newer HDPE or polyurea liner was installed above the gravel layer. The sampling location within each quadrant will be biased toward locations downgradient of the tank catch basins (SWMU 3), areas of potential petroleum impacts, based on soil discoloration, odors, history of repairs (based on available records or observations), and presence of valves or low areas where spills or leaks may have accumulated.

Soil samples from each boring will be collected from the 0-0.5-foot interval, the interval directly above the GWI, and any interval exhibiting contamination. The samples will be analyzed for the Site COCs. In addition, TCL/TAL analysis (except for PFAS) will be performed on 15% of samples collected. Proposed samples and analysis are summarized in **Table 3.** In the event GCM is identified in the soil boring, the GCM impacts will be delineated in accordance with Section 4.6.3.

Currently there is no anticipated reuse of the dike material as backfill proposed for the Site. In the event the dike material is proposed to be used, an addendum to this RIWP will be submitted to the NYSDEC and USEPA.

4.1.4 Historic ASTs

The investigation of Former Tank 19 (SWMU 62), Former Tank 40 (part of SWMU 59), Former Tank HT1, and Former Tank HT2 will include the following sampling activities as shown on **Figure 11**:

- One shallow boring within each of the footprints of the tanks will be advanced and analyzed for Site COCs;

- One surface soil sample from within the footprint of each SWMU/AST below the gravel layer or liner, if present, to be analyzed for Site COCs;
- One shallow boring downgradient of each SWMU/AST footprint to the depth of groundwater. The soil sampling intervals at the shallow soil boring location will be biased toward elevated PID readings and evidence of apparent contamination, such as soil discoloration and odor. A sample will be collected from each distinct interval exhibiting evidence of contamination. If no evidence of soil contamination is observed, the sample will be collected from the 0.5-ft interval directly above the water table to be analyzed for Site COCs; and,
- In accordance with DER-10 Section 3.9, if there is no evidence if soil contamination, a groundwater sample will be collected from zero to one-foot interval below the current water table elevation. A groundwater sample will be collected from a monitoring well to be installed hydraulically downgradient of each historic AST. If no LNAPL is observed, the groundwater will be sampled for the Site COCs. In the event LNAPL is recoverable a fingerprint sample will be collected to assess the make-up of the LNAPL. The sample locations are shown on **Figure 11**.

4.1.5 ASTs 100 to 105, 109, and 24A

Existing tanks 100 through 105 are located within building structures. For each of these ASTs, the following assessment will be completed pursuant to DER-10, Section 3.9:

- Examination of the concrete surface beneath the AST to assess evidence of prior releases (i.e., staining) as well as note the condition of the concrete surface; and
- One surface soil sample will be collected adjacent to each AST beneath the concrete per 100 LF of each AST's perimeter with a minimum two surface soil samples;
- The surface soil samples will be collected from locations where the concrete surface has either deteriorated or stained and will be biased to possible contamination based on screening with a PID as well as visual and olfactory inspection. The surface soil samples collected will be analyzed for Site COCs;
- One shallow soil boring will be advanced to the GWI within 2 ft of the AST perimeter on the downgradient side and analyzed for Site COCs; and,
- Sampling of these AST structures will be consistent with the methodology provided in Section 3.1.1.

The investigation related to Tanks 109 and 24A will include soil and groundwater sampling due to the location outside a building structure, as described below.

One surface soil sample will be collected adjacent to Tanks 109 and 24A per 100 LF of each AST's perimeter (minimum two surface soil samples). The surface soil samples will be collected from areas of soil discoloration, areas of known history involving releases, equipment/infrastructure repairs, near valves or other structures where unreported leaks may have occurred and will be biased to possible contamination based on screening with a PID as well as visual and olfactory inspection. The surface soil samples collected will be analyzed for Site COCs (except for VOCs) from a depth of 0 to 2 inches, and BTEX, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene from 0 to 6-inch interval. Surface sample collection will begin below the gravel layer and where present directly below any liner surrounding the AST.

One shallow soil boring will be advanced within 2 ft of the AST perimeter on the downgradient side and analyzed for Site COCs. One shallow boring will be advanced downgradient of each AST to the depth of groundwater (up to an approximate maximum depth of 20 ft bgs). The soil sampling interval at the shallow soil boring location will be biased toward elevated PID readings and evidence of apparent contamination, such as soil discoloration and odor. If no evidence of soil contamination is noted, the sample will be collected from the 6-inch interval directly above the water table.

In accordance with DER-10 Section 3.9, if there is no evidence of soil contamination, a groundwater sample will be collected from zero to one-foot interval below the current water table elevation. A groundwater sample will be collected from a well point to be installed hydraulically downgradient of each historic AST. If no LNAPL is observed, the groundwater will be sampled for the Site COCs. In the event LNAPL is recoverable a fingerprint sample will be collected to assess the make-up of the LNAPL. The sample locations are shown on **Figure 11**.

4.1.6 Piping Investigation

Two categories of product transfer piping are present at the facility as discussed below.

Aboveground Transfer Piping Inside/Outside Secondary Containment: Surface cover beneath the piping racks varies from concrete to exposed surface soils. In accordance with DER 10 Section 3.9(a)(5), the entire length of the former piping was evaluated in areas underlain by surface soils for evidence of petroleum or other impacts on August 30, 2021. The results of the evaluation conducted did not indicate any areas of potential petroleum impacts, soil discoloration, odors, or areas of spills. It was also noted that the ground was typically gravel covered or asphalt. Photos taken during the evaluation are included in **Appendix E**.

Additionally, during MOSF operation, inspection of the transfer piping was routinely conducted, and any release would have been documented. The previous property owner followed rigorous best management practices to ensure minimal to no impacts to the environment. In review of the former aboveground piping areas and the information provided by the former property owner, there does not appear to be a likelihood of contamination impacts from the above ground piping, therefore, one soil sample is proposed to be collected every 100- linear feet of former aboveground transfer piping biased to locations of former connections. Per the letter in response to comments received September 7, 2021, NYSDEC and USEPA have agreed that initial sampling locations can be completed every 200 feet and upon receipt of the preliminary data and a written proposal, NYSDEC and USEPA will evaluate proposed modifications to the sampling frequency.

Surface soils samples will be collected in areas of soil, and soil samples from areas of asphalt or gravel will be collected from a depth of 0.0 to 0.5 ft and 1.0 to 2.0 ft below the gravel layer or asphalt for Site COCs. Soils samples will be screened with a PID and assessed for the presence of GCM. If GCM is identified, it will be delineated vertically via a soil boring advanced to the GWI and in accordance with Section 4.6. In addition to analyzing all samples for Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). Aboveground piping sample locations are identified on **Figure 12.**

Subgrade Transfer Piping: At each location where subgrade transfer piping exists, a soil boring will be advanced on the hydraulically downgradient side at the approximate midpoint of the piping run to a depth beneath the pipe. Soil samples will be analyzed for Site COCs from 0.0 – 0.5 ft below the invert of the pipe, and within 2 ft of the pipe laterally. In addition to analyzing all samples for the Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). Proposed subgrade piping samples are summarized on **Table 3** and locations are identified on **Figure 12**.

4.1.7 MOSF Structures Investigation

The proposed sampling for the MOSF structures will be based on the footprint size of each structure and in accordance with NYSDEC DER-10 guidance. Soil beneath each structure (**Figure 4**) will be visually examined and field screened with a PID for evidence of a release or the presence of GCM as defined in 6-NYCRR Part 375-1.2(u), and any area exhibiting evidence of a release will be selected for surficial soil sampling 0.0 to 0.5 feet bgs. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified in the surface soil sample, then a soil boring will be advanced vertically to delineate GCM. Any additional GCM impacts will be delineated in accordance with Section 4.6.3. For the loading areas, manifolds, and valves, the number of soil sampling locations are biased to one location for every 900 ft^2 of footprint in accordance with DER-10, Section 3.9(e)1. A minimum of one surficial soil sample 0.0 to 0.5 feet bgs will be collected from each location. Proposed soil sample locations are depicted on **Figure 4** and the number of samples and analysis per MOSF structure is included in **Table 3**. TCL/TAL analysis (except for PFAS) will be performed on 15% of samples collected.

The pump stations are located on concrete pads; therefore, consistent with DER-10, Section 3.9(b)1, one surficial soil sample 0.0 to 0.5 feet bgs will be collected from each side of the concrete pad for each 30-foot length. Proposed soil sample locations are depicted on **Figure 4** and the number of samples and analysis per MOSF structure is included in **Table 3**). TCL/TAL analysis (except for PFAS) will be performed on 15% of samples collected.

4.1.8 UST 2 Investigation

UST 2 is currently closed in place. Sampling will include the advancement of four shallow soil borings to the GWI: one on each of the four sides of UST 2. Sampling will be consistent with DER-10, Section 3.9(a)4 and the methodology detailed in Section 3.1.1. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified at the GWI, the soil boring will be advanced vertically to delineate GCM. Any additional GCM impacts will be delineated in accordance with Section 4.6.3.

Soil sample will be collected from intervals exhibiting contamination and the 6-inch interval above the GWI. If no evidence of contamination is observed, each analytical soil sample will be collected from the 6-inch interval above the GWI. Samples will be analyzed for analysis of Site COCs. In addition to analyzing all samples for Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). UST sample locations are indicated on **Figure 11**.

In addition, a monitoring well will be installed within 5 ft hydraulically downgradient of the tank. If no LNAPL is observed, the groundwater will be sampled for the Site COCs. In the event LNAPL is recoverable, a fingerprint sample will be collected to assess the make-up of the LNAPL. This sample location is shown on **Figure 11**.

4.1.9 Non-Operational Areas Investigation

As discussed in Section 1.2, the Site is defined as all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste, or for managing hazardous secondary materials prior to reclamation. "Non-operational areas" refers to areas of the Site outside of the 120 acres former MOSF area as shown on **Figure 4**, that are generally densely wooded and where the Site wetlands are present. The non-operational areas at the Site have been organized into five separate areas (Areas A through D and the tidal flats) for investigation. The investigation of the tidal flat is included in Section 4.4.1.

To investigate the non-operational areas, shallow soil borings will be advanced on a 100-foot grid throughout the areas, with the exception of wetlands will be investigated in accordance with the Balduck Method as described in the NYSDEC Screening and Assessment of Contaminated Sediment Guidance. Subject to access, one soil boring will be advanced within each 100-foot grid section (10,000 sf) to the GWI biased toward areas of potential petroleum impacts, soil discoloration, odors, low areas where spills may have accumulated, and/or areas where historical ground disturbance and filling operations may have occurred based on a review of historical aerial photographs.

Per the letter in response to comments received September 7, 2021, NYSDEC and USEPA have agreed that initial sampling locations will be completed in a 200 ft grid. Upon receipt of the preliminary data, a written proposal evaluating a reduction in sampling frequency will be submitted, and NYSDEC and USEPA will evaluate proposed modification to the sampling frequency. Further delineation will be conducted if contamination is identified in accordance with Section 4.6. In the event GCM, as defined in 6-NYCRR Part 375-1.2(u), is detected at the GWI, the soil boring will be advanced vertically to delineate GCM. Any additional GCM impacts will be delineated in accordance with Section 4.6.3. Soil samples from each boring will be collected from the 0-0.5-foot interval, 1.0-2.0-foot interval, the interval directly above the GWI, and any interval exhibiting contamination. The samples will be analyzed for the Site COCs and 15% of samples will be analyzed for TCL/TAL (except for PFAS). Proposed soil sample locations are depicted on **Figure 13** and the number of samples and analysis is summarized in **Table 3**

4.1.10 Road Trench Investigation

To investigate potential petroleum impacts to soil underlying the Road Trench, soil samples will be collected every 50 feet on the hydraulically downgradient side of the trench at a depth directly below the concrete bottom of the trench. Sample locations will be biased toward areas of cracks and pumps/sumps in the concrete. Proposed sample locations are depicted on **Figure 14**. Per the letter in response to comments received September 1, 2021, NYSDEC and USEPA have agreed that initial sampling locations will be completed every 150 feet. Further, upon receipt of the preliminary data and a written proposal, NYSDEC and USEPA will evaluate a proposed modification to the sampling frequency. In the event GCM, as defined in 6-NYCRR Part 375-1.2(u), is identified, the boring will be advanced vertically to delineate GCM. Any further GCM impacts will be delineated in accordance with Section 4.6.3. Soil samples will be collected from a depth of 0.0 to 0.5 ft below the concrete and will be analyzed for Site COCs. Additionally, 15% of the samples will be analyzed for TCL/TAL (except for PFAS).

4.1.11 Surface Water Impoundments Investigation

A total of six surface soil samples will be collected from 0.0 – 0.5 feet below the 4-millimeter-thick HDPE liner at each of the upper and lower surface impoundments and analyzed for Site COCs. All surface soil samples will be collected using a hand auger method or an alternate shallow hand excavation tool. One sample from each impoundment (equivalent to 15% to total samples per impoundment) will be analyzed for TCL/TAL (except for PFAS). The proposed sampling locations are depicted on **Figure 9**. Following the completion of the sampling, the liners will be repaired to re-institute the on-site cover prior to utilizing the surface impoundment.

4.1.12 Storm Drains with Conveyance System Discharge

One sample is proposed to be collected adjacent to each of the ten storm drains connected to the conveyance system at the depth directly below the storm drain bottom. Eight samples will be analyzed for the Site COCs. Two samples (equivalent to 15% of total samples) will be analyzed for TCL/TAL (except for PFAS). The TCL/TAL sample will be biased to the location exhibiting evidence of highest apparent contamination. If GCM is defined in 6-NYCRR Part 375-1.2(u) is identified, the boring will be advanced vertically to delineate GCM. Any further delineation of GCM impacts will be delineated in accordance with Section 4.6.3. Proposed sample locations are depicted on **Figure 15**, and a sample summary is included as **Table 3**.

4.1.13 Storm Drains with Non-Conveyance System Discharge

One surficial sample from 0.0 to 0.5 ft bgs and a near surface sample, from 1.5 to 2.0 ft bgs will be collected at the discharge location of each of the six storm drains not connected to the conveyance system. This sampling will be completed in accordance with DER-10, Section 3.9(e)1 "sample frequency should be at least 1 sample for every 900 ft^2 for areas up to 300 ft in perimeter". Five samples are proposed to be analyzed for the Site COCs, and one sample will be analyzed for TCL/TAL (except for PFAS). The TCL/TAL sample will be biased to the location exhibiting evidence of highest apparent contamination. Proposed sample locations are depicted on **Figure 15**, and a sample summary is included as **Table 3**.

4.1.14 Storm Water Conveyance Trenches

The length of the conveyance trenching (approximately 2,000 ft) will be investigated at a sampling frequency of one sample per 100 LF of conveyance trench on the hydraulically downgradient side of the trench at a depth corresponding to directly below the concrete bottom of the trench. Sample locations will be biased toward areas of cracks and pumps/sumps in the concrete. Per the letter in response to comments dated September 1, 2021, NYSDEC and USEPA have agreed that initial sampling locations can be completed every 200 feet. Upon receipt of the preliminary data and a written proposal, NYSDEC and USEPA will evaluate a proposed modification to the sampling frequency. One sample will be collected from each location and analyzed for the Site COCs, plus 15% of samples will be analyzed for TCL/TAL (except for PFAS). The TCL/TAL samples will be biased to the location exhibiting evidence of highest apparent contamination. Proposed sample locations are depicted on **Figure 15**, and a sample summary has been included as **Table 3**.

4.1.15 Subsurface Storm Water Conveyance Piping

Storm water is individually controlled from each berm with two post indicator valves. Sampling is proposed at the location of the pipe invert at the post indicator valve outside each of the 38 AST containment areas. In review of the conveyance system, the valve locations serve as a point of highest probability of potential release and will therefore be investigated to assess potential impacts. The sampling will result in the collection of 38 samples. The conveyance piping (approximately 5,200 linear feet) will be investigated at a sampling frequency of one sample per 100 LF. Samples will be collected from the hydraulically downgradient side of the conveyance pipe at a depth of 0.0 to 0.5 ft below the pipe invert within 2 ft of the pipe, laterally, in accordance with DER 10 Section 3.9 (a) 6. Per the letter in response to comments dated September 1, 2021, NYSDEC and USEPA have agreed that initial sampling locations will be completed every 200 feet. Upon receipt of the preliminary data and a written proposal, NYSDEC and USEPA will evaluate a proposed modification to the sampling frequency.

Samples will be analyzed for the Site COCs and 15% of the total number of samples will be analyzed for TCL/TAL (except for PFAS). Sample locations are depicted on **Figure 15**, and a sample summary has been included as **Table 3**.

4.1.16 Historic Stormwater Basin

To assess the historic stormwater basin, one surficial sample from 0.0 to 0.5 ft bgs and a near surface sample, from 1.5 to 2.0 ft bgs is proposed to be collected from two locations within the former footprint of the stormwater basin. This sampling will be completed in accordance with DER-10, Section 3.9(e)1 “sample frequency should be at least 1 sample for every 900 ft^2 for areas up to 300 ft in perimeter”. The samples are proposed to be analyzed for the approved COCs and one sample will be analyzed for TCL/TAL (except for PFAS). The TCL/TAL sample will be biased to the location exhibiting evidence of highest apparent contamination. Proposed sample locations are depicted on **Figure 15**, and a sample summary has been included as **Table 3**.

4.1.17 Site Septic System

To assess the Site septic system, sampling is proposed in accordance with DER-10 Section 3.9 (e) 3 (i) and (ii). The septic system consists of a septic tank and a disposal field estimated to be approximately 500 sf, as depicted on the Site survey included as **Appendix F**. Prior to sampling activities, the area and location of the septic disposal fields will be verified utilizing geophysical investigation methods or shallow test pit activities. Two samples, one aqueous and one sludge sample, will be collected from within the tank and analyzed for TCL/TAL (except for PFAS). Additionally, based on the size of the disposal field, 5 shallow borings will be advanced to the GWI. In the event the disposal field is determined to be larger based on the geophysical investigation, a 100-foot grid (1 per 10,000 sf) of soil borings to the GWI will be performed. Further delineation will be required if contamination is identified and will be conducted in accordance with Section 4.6.

The shallow borings will be located within two feet of the edge of the bed area but will be angled below the infiltrative surface and directly below laterals. One soil sample will be collected approximately 0-0.5 ft below the bottom of the infiltrative surface, intervals exhibiting contamination, and one directly above the GWI. The samples are proposed to be analyzed for the Site COCs, plus 15% of total samples will be analyzed for TCL/TAL (except for PFAS).

4.1.18 Former Lube Oil Tanks

To assess the former lube oil tanks, sampling will include the advancement of four shallow soil borings to the GWI, one on each of the four sides of the former lube tank area. Sampling will be consistent with the methodology detailed in Section 3.1.1. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified at the GWI, the soil boring will be advanced vertically to delineate GCM. Any contamination identified will be delineated in accordance with Section 4.6.

One soil sample will be collected from each soil interval exhibiting contamination as well as from the GWI. If no evidence of contamination is observed, the soil sample will be collected from the 6-inch interval above the GWI. Samples will be analyzed for analysis of Site COCs. In addition to the Site COCs, TCL/TAL (except for PFAS) will be analyzed on 15% of samples collected. Lube tank area sample locations are indicated on **Figure 16**. In addition, one intermediate boring will be installed within 5 ft hydraulically downgradient of the of the former lube tank area to assess the potential pathway for DNAPL. If no contamination is detected to be migrating vertically, then no monitoring well will be installed at these locations. In the event contamination migration is detected, the soil boring will be continued vertically until impacts detections are obsolete. The DNAPL investigation will be conducted in accordance with Section 4.3.1. This sample location is shown on **Figure 16**.

4.1.19 Waste Storage Tank 48 Staging Area

To assess the waste storage tank 48 staging area, proposed sampling will include the advancement of four shallow soil borings: one on each of the four sides of the Tank 48 staging area minimally advanced to the GWI. Sampling will be consistent with the methodology detailed in Section 3.1.1. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified at the GWI, the soil boring will be advanced vertically to delineate GCM. Any contamination identified will be delineated in accordance with Section 4.6.

One soil sample will be collected from each soil interval exhibiting contamination as well as from the GWI. If no evidence of contamination is observed, each analytical soil sample will be collected from the 6-inch interval above the GWI. Samples will be analyzed for analysis of Site COCs. In addition to analyzing all samples for Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). Tank 48 staging area sample locations are indicated on **Figure 16**.

4.1.20 Dravo Water Treatment System

To assess the Dravo water treatment system, proposed sampling will include the advancement of four shallow soil borings: one on each of the four sides of the Dravo building, minimally advanced to the GWI. Sampling will be consistent with the methodology detailed in Section 3.1.1. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified at the GWI, the soil boring will be advanced vertically to delineate GCM. Any contamination identified will be delineated in accordance with Section 4.6.

One soil sample will be collected from each soil interval exhibiting contamination as well as from the GWI. If no evidence of contamination is observed, each analytical soil sample will be collected from the 6-inch interval above the water table. Samples will be analyzed for Site COCs. In addition to analyzing all samples for Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). Dravo building sample locations are depicted on **Figure 16**.

4.1.21 SWMUs Associated with USEPA Area 7

The following SWMUS are located within the footprint of USEAP Area 7 and will be investigated as detailed in the section:

- SWMU 4 Former API Separator;
- SWMU 5 Primary API Separator;
- SWMU 6 Utility API Separator;
- SWMU 7 Vacuum Tank 1 (High Flash Tank);
- SWMU 8 Vacuum Tank 2 (Low Flash Tank); and,
- SWMU 16 Container Storage Pad.

Sampling is proposed for each of these SWMUs to include the advancement shallow soil borings to the GWI. Six shallow borings are proposed to investigate the former, primary, and utility API separators (SWMUs 4, 5, and 6). Seven shallow borings are proposed to investigate the vacuum tanks (SWMUs 7 and 8). Due to the overlap with SWMUs 4, 5, and 6, four shallow borings are proposed to investigate the container storage pad (SWMU 16).

Sampling will be consistent with the methodology detailed in Section 3.1.1. In the event GCM as defined in 6-NYCRR Part 375-1.2(u) is identified at the GWI, the soil boring will be advanced vertically to delineate GCM. Any contamination identified will be delineated in accordance with Section 4.6.

One soil sample will be collected from each soil interval exhibiting contamination and above the GWI. If no evidence of contamination is observed, each analytical soil sample will be collected from the 6-inch interval above the GWI. Samples will be analyzed for Site COCs. In addition to analyzing all samples for Site COCs, 15% of samples collected will be analyzed for TCL/TAL (except for PFAS). Proposed sample locations are depicted on **Figure 16**.

4.2 PROPOSED POST-DEMOLITION REMEDIAL INVESTIGATION OF AOCS

Following the completion of the pre-demolition sampling, and as the sequenced demolition of ASTs and other structures advances, post-demolition sampling will commence. This post-demolition sampling will entail the investigation of areas inaccessible without demolition of a structure or object.

4.2.1 AST Farm Area Investigation

Two intermediate soil borings will be advanced below each AST as depicted on **Figure 11** per the direction of the NYSDEC, in their email dated June 17, 2021. The borings will be advanced below the bottom of each AST following the completion of Demolition Phase 1, and in accordance with the Demolition Workplan (Weston, 2021b).

Four samples will be collected from each intermediate boring: a surficial sample, one from the interval evidencing the highest apparent contamination based on soil discoloration, odor, field-screening result, or other field indicator, one sample from the GWI, and one additional sample will be collected from the intermediate borings below the GWI. If no evidence of contamination is observed in the soil column, one sample will be collected from the GWI. Samples will be analyzed for the Site COCs, plus 15% of total samples will be analyzed for TCL/TAL (except for PFAS). If GCM as defined in 6-NYCRR Part 375-1.2(u) is identified, the boring will be advanced vertically to delineate GCM. In the event that NAPL/GCM is observed or if analytical results indicate SCO exceedances, delineation will be conducted in accordance with Section 4.6.

Additionally, a baseline transect for DNAPL delineation will be established on-site. To establish the baseline, the transects for DNAPL delineation and migration pathways are proposed as follows:

- Initial boring locations will be installed in areas with elevations below mean sea level el. 20 elevation and +/- 200 ft. inland; and,
- Initial borings will extend to a depth no less than ten feet below the low-tide elevation of the Arthur Kill, or ten feet below the deepest observed contamination, or three feet into the next deepest aquitard (whichever is greatest).

As shown on **Figure 11**, two intermediate borings and one monitoring well is proposed to be advanced in each AST which formerly contained No. 4 or No. 6 heating oil. The area of the No. 6 fuel oil ASTs and piping will include a transect towards the Arthur Kill crossing through ASTs 2 and 3 as depicted on **Figure 11**. For ASTs and piping that formerly contained No. 4 fuel, three transects are proposed through the AST locations (ASTs 9, 10, 15, 16, 53, 59) towards the Arthur Kill following the path of potential migration as shown on **Figure 11**. A total of 25 borings are proposed along the transects. DNAPL will be evaluated in accordance with Section 4.3.1.

4.3 GROUNDWATER INVESTIGATION

To evaluate current groundwater conditions at the Site, the following activities will be implemented as part of this RIWP. Proposed monitoring wells are identified on **Figure 17**.

- All monitoring wells will be installed in accordance with the methodology in Section 3.2.1;
- If NAPL is identified, the extent of NAPL will be delineated in accordance 4.6.2;
- The newly installed monitoring wells and pre-existing monitoring wells will be gauged in a single synoptic event;
- The newly installed monitoring wells will be surveyed by a NY-licensed surveyor;

- Groundwater samples will be collected and analyzed for Site COCs plus 15% of total samples will be analyzed for TCL/TAL (except for PFAS) as described below and compared to the compared to Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA and surface discharge (SD) standards;
- Contaminants detected exceeding the TOGS 1.1.1 Class GA and SD standards will be delineated per the approach detailed in Section 4.6.2;
- Generated purge water will be collected in five-gallon buckets and then containerized in 55-gallon drums for off-site disposal as described in Section 4.9 below; and,
- All groundwater samples will be collected via low flow sampling methodology as detailed in Section 3.2.1. Low flow sampling for the monitoring wells will be conducted in accordance with ASTM Standard Practice D6771-02 to minimize groundwater drawdown and to obtain a representative sample of groundwater conditions.

Monitoring wells are proposed to be installed across the entire site and off-site to delineate groundwater contamination exceeding TOGS 1.1.1 Class GA and SD. The groundwater investigation will include the installation and sampling of shallow and intermediate monitoring wells and sampling of existing wells to support delineation of groundwater contamination. The locations of proposed monitoring wells and proposed sampling of existing monitoring wells are depicted on **Figure 17**.

A total of 19 intermediate monitoring wells, one below each AST which contained No. 4 or 6 Fuel Oil, are proposed to be installed above the first true confining layer as described in Section 4.3.1 of the RIWP. Twenty-two shallow groundwater bisecting monitoring wells are proposed to be installed on the Site and eight existing shallow monitoring wells are proposed to be sampled. A summary of the proposed sampling is provided on **Table 4**.

Monitoring wells will be installed per the methodology provided in Section 3.2.1 of the RIWP. These monitoring well locations will be biased to locations where soil contamination was identified when completing the remedial investigation activities provided in Section 4.1. Groundwater samples will be collected and analyzed for Site COCs, plus 15% of total samples will be analyzed for TCL/TAL (except for PFAS) and compared to the compared to TOGS 1.1.1 Class GA and SD standards. In the event contamination is identified at this depth interval, the groundwater will be further delineated vertically and horizontally in accordance with Section 4.6.2 of the RIWP. The exact depth and location will be biased based on on-site data collected during initial well installation activities.

To evaluate and ensure the absence of off-site impacts, a total of eight monitoring wells are proposed to be installed off-site based on the groundwater flow directions and neighboring off-site properties. Monitoring wells will be installed per the methodology provided in Section 3.2.1. In the event contamination is identified at this depth interval, the groundwater will be further delineated vertically and horizontally in accordance with Section 4.6.2. The exact depth and location will be biased based on on-site data collected during initial well installation activities. Prior to advancing off-site, property access will be obtained from the neighboring properties and NYSDEC and USEPA will be included in such correspondence. Prior to installation of these monitoring wells, soil will be screened in accordance with the methodology provided in Section 3.1.1. The locations of proposed monitoring well are depicted on **Figure 17** and included on **Table 4**.

4.3.1 DNAPL Evaluation

As part of this remedial investigation, two intermediate soil borings/monitoring wells will be advanced at ASTs (1, 2, 3, 4, 41, 43, and 48) that historically stored No.6 fuel oil and ASTs that historically stored No.4 fuel oil (7, 9, 10, 13, 14, 15, 16, 17, 18, 20, 58, and 59) to assess the potential for the presence of DNAPL. One of the two intermediate borings under these ASTs will be advanced to a terminus approximately 1 ft into the first-encountered confining material such as clay or silt. One discrete soil sample will be collected from the 6-inch interval directly above the confining layer, and one sample will be collected from the bottom 6-inch interval of each of these borings. Soils will be screened as proposed in Section 3.1, and sampling will be conducted for the Site COCs detailed in Section 4.7.

Following the completion of this soil boring, a monitoring well (19 in total) will be installed utilizing a 5-ft length of screen capturing the deeper GWI to assess the presence of DNAPL. A monitoring well will be utilized for assessment of DNAPL to isolate the zone directly above the confining layer to ensure the intermediate groundwater zone can be evaluated for DNAPL. Monitoring well installation will be conducted in accordance with the methodology detailed in Section 3.2.1.

Each monitoring well will be assessed for DNAPL using an oil/water interface probe. DNAPL assessment will be performed 72 hours after the monitoring well has been installed to ensure stabilization. The monitoring wells will remain in place and secured until such time that construction in the area necessitates their removal. If DNAPL is detected in a well, a product finger-print sample will be collected to evaluate the type of petroleum product encountered and the thickness of DNAPL will be recorded. If no DNAPL is present, a groundwater sample will be collected for the Site COCs.

4.3.2 Evaluation of Groundwater Hydrology and Emanating Groundwater Contamination

A groundwater evaluation will be performed to evaluate the presence or absence of perched groundwater; to define the direction and speed of groundwater flow; and, together with the results of the DNAPL investigation, assess the potential for contamination to emanate from the Site. The results of the groundwater study will be used to refine the baseline investigation in the Arthur Kill as part of the initial phase of the RI. In addition, the groundwater evaluations will be evaluated to identify the need and as applicable, the scope/locations of off-site sampling of wetlands, surface waters, and sediment to be performed in subsequent phases of the RI.

Dr. Dong Ding, P.G., a Principal Hydrogeologist and Technical Manager at Weston Solutions of NY will complete updates to the groundwater model following the collection of the following additional data. A copy of his resume is attached as **Appendix G**.

- Additional borings and monitoring wells as noted in the overall scope of work for the RI to better understand the aquifer framework and distribution of contamination;
- Water levels over time at wells for the hydraulic graphs to delineate perched groundwater and model calibration update;
- Hydraulic testing to characterize hydraulic properties; and,
- Precipitation data to track groundwater recharge.

The groundwater model will be updated utilizing the data collected during the FSC, the proposed additional soil borings and monitoring wells, and the geotechnical drilling program as previously described. The collection of this additional site geologic and hydrogeologic information will provide a comprehensive understanding of groundwater flow horizontally and vertically and identify the presence or absence of a perched groundwater zone(s).

Groundwater Vistas 6 will be used to interface the industry standard MODFLOW finite difference code for simulating groundwater flow and contaminant transport. An advanced version of this code, called MODFLOW-SURFACT, will be used because of its ability to handle variable saturation (i.e., both vadose and saturated zones), density-dependent flow, and NAPL support.

MODFLOW-SURFACT has the functions to simulate the transport in both Air and Water Phases with a residual or immobile NAPL (HGL, 1996). N+1 component will be used to simulate initial saturations for the NAPL phase where N is the total number of components for dissolved chemical transport. Using the functions, both immobile and dissolved phase of NAPL can be simulated in the model.

The following are the modules that will be likely included in the model:

- .BAS: Basic Package;
- .LFP: Layer-Property Flow Package;
- .BCF: Block-Centered Flow Package;
- .DRN: Drain Package;
- .EVT: Evapotranspiration Package;
- .GHB: General Head Boundary Package;
- .CHD: Constant Head Boundary Package;
- .FHB: Time Varying Flow and Head Boundary Package with Step Function;
- .RCH: Recharge Package;
- .BTN: Basic transport input;
- .PCN: Prescribed concentration Package;
- .HCN: Prescribed-Head-Concentration Boundary Package;
- .PCG5: The Preconditioned Conjugate Gradient Solver; and,
- SEAWAT module, if needed.

MODFLOW is a modular three-dimensional (3-D) finite-difference modeling code first developed by the U.S. Geological Survey (USGS) to simulate saturated groundwater flow. The MODFLOW model will be utilized to construct a numerical groundwater flow model to provide the applicable hydrogeologic and geological conceptual model for the site. A calibration of the model will be completed by adjusting hydraulic parameters (including hydraulic conductivity, storage properties, etc.) and boundary conditions (such as recharge, evapotranspiration, and the elevation and conductance of model boundaries) within known ranges to represent a groundwater flow field at a site.

Based on data available for the Site from prior to the completion of the FSC, Weston conducted an initial steady state flow calibration for the model that represents the average water level condition. For the calibration, groundwater level measurements from 61 existing piezometers and monitoring wells were used as targets. In addition, surface elevations of four locations with ponded water identified from aerial photo were included as additional groundwater level targets for the calibration.

Based on the preliminary model developed for the Site in 2020 using existing information, the following assumptions are noted:

- The Raritan clay unit is an aquitard that it limits impact from underlying units to the shallow aquifer;
- Hydraulic heads along Arthur Kill are generally stable. The interface along Arthur Kill will be simulated with the constant head boundary. Depending on the tidal conditions, hydraulic head on the boundary can be varied with time;
- The streams/creeks are discharge points;
- Groundwater divide upgradient of the site is a no-flow boundary;
- The principal source of fresh ground-water recharge in the Staten Island is precipitation that infiltrates the land surface and percolates to the water table (Soren 1988). Approximately 10% of average precipitation will be applied to the area with grass or vegetation cover, and less than 5% of average precipitation rate will be applied to the area covered by buildings or paved surfaces;
- Based on a review of aerial photographs, vegetation density of 50% of the overall area will be applied;
- The transport and fate of the chemical compounds follow the advection-dispersion-reaction equation;
- Chemical parameters, including dispersion, diffusion, adsorption/desorption, reaction rates, will be based on available site data and literature; and,

- The initial concentrations (both dissolved phase and attached to aquifer solids) will be estimated using interpolation of available field measurements.

The groundwater model will provide the following interpretations on groundwater/surface water interface (1), saline and freshwater boundary conditions (2), and perched groundwater (3):

1) The interface along Arthur Kill will be simulated with the constant head boundary. Depending on the tidal conditions, hydraulic head on the boundary can be varied with time. In addition, the interface depth between the saline water and groundwater will be calculated based on the saline profile based on saline sampling or Ghyben–Herzberg relation. The module SEAWAT may be used to evaluate if saline water/seawater intrusion is significant at the Site. The interface with streams/creeks will still be simulated with Drain Boundary Condition because flow in stream channels removes groundwater discharge (e.g., groundwater seeps, groundwater sustained base flow).

2) Based on the findings from saline water profiling, the interface/boundary between seawater and groundwater will be simulated with density-dependent flow and transport equation. In MODFLOW-SURFACT, the flow of a mixture fluid of variable density in an aquifer system can be simulated in terms of an equivalent freshwater head via a buoyancy term, which accounts for different density and viscosity of freshwater and seawater. As part of this RI, samples will be collected along transects perpendicular to the Arthur Kill to provide a saline water profile. Samples will be collected from select new and existing monitoring wells.

3) The perched water can be identified through a few means, for instance: significant vertical hydraulic gradient in the area; significant higher water level fluctuations in the perched aquifer with precipitation compared to the regional. Once the extents of the perched water zone are delineated, model layers will be refined to separate the perched zone and underlying low permeable materials from the shallow aquifer. The geologic materials that may form the perched zone will be simulated as model zones with relatively low hydraulic conductivities (K), particularly low vertical K.

4.4 ON-SITE SURFACE WATER, SEDIMENT, AND WETLAND INVESTIGATION

4.4.1 Surface Water and Sediment

As part of the initial RI, the on-site stream originating from the southern side of Arthur Kill Road and located on the southwestern portion of the Site will be investigated. Pursuant to DER-10 Section 3.8.2, the collection of surface water and sediment samples from the stream will include at least one upgradient, one downgradient and one discharge point water sample location. The samples will be biased to areas where groundwater concentrations are identified above the TOGS 1.1.1 SD standards.

To further assess the on-site surface water and sediments (tidal flat), the Balduck Method provided in the NYSDEC Screening and Assessment of Contaminated Sediment was calculated to evaluate the minimum number of samples to characterize a contaminated sediment site. In order to complete the Balduck calculation, an estimate of the areal extent (longest length times longest width) of the tidal flat was calculated. The surface water and sediment in this case corresponds to the northeastern nearshore area of the site within the project boundary (see **Figure 6**). The estimated area is 222,903 square yards. Utilizing the Balduck calculation with a DF of 2, 39 surface water and sediment locations will be collected as shown on **Figure 18**.

Sediment samples will be analyzed for TCL/TAL (except for PFAS), total organic carbon (TOC), and grain size. Surface water samples will be analyzed for TCL/TAL (except for PFAS), TOC and turbidity. Sediment samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, based on the material depth encountered. In the event grossly contaminated material is identified in sediments, a sample will be collected from that interval. Proposed sample locations are depicted on **Figure 18** and a sample summary has been included as **Table 5.**

4.4.2 Wetlands

The 14 on-site wetlands will be investigated in accordance with DER-10 Section 3.8.2(c) and sampling volume will be consistent with the Balduck Method utilizing a DF of 2 provided in the NYSDEC Screening and Assessment of Contaminated Sediment Guidance.

In order to complete the Balduck calculation, an estimate of the areal extent of the total wetlands (longest length times longest width) was calculated. The wetlands in this case corresponds to the total area of all 14 wetlands identified on the site within the project boundary (see **Figure 6** and **Appendix B**). The estimated area in is 19.6046 acres or 94,885 square yards. Utilizing the Balduck calculation with a DF of 2, 26 wetland locations will be sampled as shown on **Figure 18**. Sediment samples will be analyzed for TCL/TAL (except for PFAS), TOC, and grain size. Surface water samples will be analyzed for TCL/TAL (except for PFAS), TOC and turbidity. A sample summary has been included as **Table 5**. The exact sample locations will be chosen based on the following provided in DER-10 Section 3.8.2(c):

- As close as possible to discharge points, groundwater entry, erosional areas, or other locations where contaminants were likely to have been released to the water body or wetland;
- Adjacent to the border of the terrestrial portion of the site and the water body or wetland;
- At the first most likely location of major sediment deposition. Sediment and wetland samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals if feasible based on the as the material depth encountered;
- If sediment layers are identified to be deeper, regular interval sampling will be developed; and,
- In the event grossly contaminated material is identified, a sample will be collected from that interval.

4.5 OFF-SITE SURFACE WATER AND SEDIMENT BASELINE INVESTIGATION

In 2017, sampling of surface water and sediment was conducted at five locations in the Arthur Kill under the direction of the USEPA. Findings of this sampling event indicated no further investigation was warranted. A copy of this report has been included as **Appendix H**. Off-site surface water and sediment sampling will be conducted as part of the initial RI phase following the completion of the groundwater study and delineation of on-site sources.

4.5.1 Arthur Kill Surface Water

Pursuant to DER-10 Section 3.8.2, at a minimum, the off-site investigation will consist of surface water sampling at low tide and high tide and will include the following sampling:

- For each tidal change, one upgradient, one downgradient, and three discharge point water samples correlating with the sediment locations below; and,
- Biased to areas if/where groundwater contamination may be emanating the site above TOGS 1.1.1 SD standards and linked to the below proposed sediment sampling locations.

The Arthur Kill surface water samples will be analyzed for TCL/TAL (except for PFAS), TOC, and turbidity and are shown on **Figure 18**. A sample summary has been included as **Table 5**.

4.5.2 Arthur Kill Sediment

Pursuant to DER-10 Section 3.8.2, five sediment sample locations are proposed for baseline sampling. Samples will be collected at an upgradient location, downgradient location, and three site boundary locations. Samples are expected to capture both chemical and grain size variation important to the study as a representative baseline.

Samples will be collected from the 0-to-6-inch, 6-to-12-inch and 12-to-24-inch intervals, if feasible based on the material depth encountered. In the event grossly contaminated material is identified, a sample will be collected from that interval. All sediment and surface water samples will be analyzed for TCL/TAL (except for PFAS), grain size, and TOC. A sample summary has been included as **Table 5** and proposed sampling locations are shown on **Figure 18.**

4.6 DELINEATION

4.6.1 Soil

Horizontal and vertical delineation will be performed following the approach described below to ensure the nature and extent of contamination is appropriately delineated. A cross-sectional view of the Site is depicted in **Appendix A** providing details on the past sampling depths and lithology.

- Horizontal and vertical delineation of exceedances of Site COCs identified in the FSC above the Industrial Soil Cleanup Objectives (SCOs).
- Horizontal and vertical delineation of exceedances of Site COCs identified in the FSC above the Protection of Groundwater SCOs and Unrestricted SCOs.
- Horizontal and vertical delineation of Site COCs exceedances of the Industrial, Unrestricted and Protection of Groundwater identified during the completion of the proposed remedial investigation activities in this Workplan.

Horizontal and vertical delineation of exceedances of Site COCs above the Industrial SCOs will be performed as follows:

- Horizontal delineation will be completed at 20-foot step outs to the north, south, east, and west.
- Vertical delineation will include sample collection at a deeper interval in the location of the exceedance. In sample locations where the exceedance is detected at the 0-0.5-foot interval, a sample will be collected from the near-surface location, approximately 1.5-2-foot interval. In sample locations that exhibit an exceedance in the shallow boring directly above the groundwater table, an intermediate boring will be advanced, and collection of a soil sample will be collected below the GWI.
- Delineation will be completed on-site until the analytical results for the Site COCs are below industrial SCOs. Should delineation require off-site sampling it will be completed

in a subsequent RI phase(s) and a delineation plan addendum will be provided to NYSDEC/USEPA for approval, as required.

Based on the findings from the FSC, the concentrations of lead, zinc, and select PAHs from the Site COCs exceeded the Industrial SCOs in the following sample locations; therefore, delineation will be performed at these locations as described above:

- AST-54-SS001;
- AST-16-SS004;
- AST-57-SS003;
- AST-55-SS004;
- AST-07-SS004;
- AST-20-SS001; and
- AST-48-SS004.

The proposed horizontal and vertical delineation of samples collected as part of the FSC exceeding the Industrial SCOs for the approved Site COCs is shown in **Figure 19**.

Horizontal and vertical delineation will be performed at locations where Site COCs exceed the Protection of Groundwater or Unrestricted SCOs as follows:

- The horizontal delineation will be conducted at 200-ft step outs to the north, south, east, and west.
- Vertical delineation will include sample collection at a deeper interval in the location of the exceedance. In sample locations where the exceedance is detected at the 0 to 0.5 ft interval, a sample will be collected from a near-surface location (1.5 to 2 ft interval). In sample locations which exhibit an exceedance in the shallow boring directly above the groundwater table, an intermediate boring will be advanced, and a soil sample will be collected below the GWI.
- Delineation will be completed on-site until the analytical results for the Site COCs are below Protection of Groundwater SCOs and Unrestricted SCOs. Should delineation require off-site sampling it will be completed in a subsequent RI phase(s) and an updated delineation plan addendum will be provided to NYSDEC/USEPA for approval, as required.

The proposed horizontal and vertical delineation of samples collected as part of the FSC exceeding the Protection of Groundwater or Unrestricted SCOs for the approved Site COCs is shown in **Figure 20.**

4.6.2 Groundwater

Delineation of groundwater contamination will include horizontal and vertical delineation of the groundwater exceedance of the TOGS 1.1.1 Class GA and Class SD standards and/or in any areas where NAPL has been identified.

As part of the FSC and historic USEPA corrective measures activities, LNAPL has been identified in various locations across the Site. LNAPL identified as part of the USEPA corrective measures has been delineated and mapped on **Figure 21**. Detailed information on delineation of the LNAPL of each of the USEPA Areas (Area 2, Area 3, Area 5 and Area 7) is included as **Appendix I**. NAPL that was identified during the FSC and NAPL that may be identified during the implementation of the RI in accordance with this Workplan will be delineated. The delineation of identified NAPL will be performed as follows:

- Delineation will be completed at 20-foot step outs to the north, south, east, and west;
- LNAPL will be determined by the presence of either GCM at the GWI or through the installation of a 2" temporary PVC well point. The lack of LNAPL presence cannot be determined solely through soil cores;
- Well points utilizing direct push technology, and placement of 2-inch diameter screened PVC bridging the water table (accounting for tidal changes) will be installed to evaluate the presence and or absence of NAPL. Soil cores will be collected and logged in accordance with section 3.1.1;
- Based on the findings of this proposed RI scope, if the results indicate additional delineation of LNAPL is necessary, further delineation will be conducted until the extent of impact is defined, including potentially off-site. Should delineation require off-site well point installation, it will be completed in a subsequent RI phase(s) and a delineation plan addendum will be provided to NYSDEC/USEPA for approval, as required;
- Once a location has been determined to be free of NAPL or GCM, a monitoring well will be installed in accordance with the methodology detailed in section 3.2.1; and,
- The monitoring well will be developed and gauged for the presence of NAPL no sooner than 48 hours post development.

The areas where LNAPL was identified in the FSC and the proposed delineation of these LNAPL areas is presented on **Figure 21**.

In addition, the results of the groundwater sampling performed at the 53 monitoring wells sampled during the FSC identified several COCs above the TOGS 1.1.1 GA standard within the tank farm and along the southern boundary of the tank farm. To further delineate the exceedances of the GA standards to the appropriate extent, the following is proposed.

- To provide complete Site coverage and provide groundwater delineation, and 22 groundwater bisecting monitoring wells will be sampled including eight existing monitoring wells (RFI-11, ICM-1, ICM-2, ICM-3 ICM-9, N-25, N-32, and MW-114) as depicted on **Figure 17;**
- 19 intermediate monitoring wells will be installed to assess DNAPL and provide vertical delineation. These wells will be installed as detailed in section 4.3.1;
- Monitoring well installation and sampling will be conducted in accordance with the methodology provided in Section 3.2.1;
- Based on the findings of this proposed RI scope, if the results indicate additional delineation is necessary, further delineation will be conducted horizontally and vertically, until the extent of GA impacts are defined, including potentially off-site; and,
- Initial offsite monitoring well locations have been identified as detailed in section 4.3, and the exact locations will be biased based on the groundwater model. Should further off-site delineation be required, it will be completed in a subsequent RI phase(s) and a delineation plan addendum will be provided to NYSDEC/USEPA for approval, as required.

The proposed groundwater sample locations are based on the projected groundwater flow direction generally towards the north, with some areas indicating flow to the southeast and southwest. Proposed delineation locations for GA exceedances have been identified on **Figure 22**.

4.6.3 Grossly Contaminated Media (GCM)

Horizontal and vertical delineation of GCM will be performed as follows:

- Horizontal delineation will be completed at 20-foot step outs to the north, south, east, and west until GCM is no longer identifiable as detailed in Section 3.1.1.1;
- Vertical delineation will include advancing the boring in which GCM was identified to a deeper interval in the location until GCM is no longer identifiable as detailed in Section 3.1.1.1; and,
- Should delineation require off-site sampling it will be completed in a subsequent RI phase(s) and a delineation plan addendum will be provided to NYSDEC/USEPA for approval, as required.

4.7 LABORATORY ANALYSIS

Based upon the NYSDECs review of the FSC Summary Report, the following contaminants have been identified as contaminants of concern:

- Benzene;
- 1,2,4-Trimethylbenzene;
- 1,3,5-Trimethylbenzene;
- Ethylbenzene;
- Toluene;
- O-Xylene;
- PM-Xylene;
- Naphthalene;
- Benzo(a)anthracene;
- Benzo(a)pyrene;
- Benzo(b)fluoranthene;
- Chrysene;
- Indeno(1,2,3-cd)pyrene;
- Lead; and,
- Zinc.

PFAS have also been confirmed as COCs for the Site. A PFAS Summary Report and Investigation Workplan, dated April 2021, has been submitted to NYSDEC and USEPA for review. Results of this separate investigation will be included in the remedial investigation report discussed in Section 6.3.

All samples will be shipped under chain of custody in a pre-iced cooler to New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program certified laboratory for off-site testing using the following analytical methods for soil, groundwater, and LNAPL:

- VOCs via EPA method 8260 C;
- SVOCs via EPA method 8270 E;
- Metals via EPA method 6010 B; and,
- LNAPL via EPA method 8015C and/or 8015D.

The reported analytical results will highlight and report any tentatively identified compounds (TICs) and the rate of the presence throughout the sampling.

In addition to the sampling described in Sections 4.1 to 4.5 and on **Tables 3, 4,** and **5**, the following quality assurance/quality control (QA/QC) field samples will be collected for laboratory analysis:

- **Field duplicates:** collected at a frequency of one sample per 20 field samples per media;
- **Matrix spike/matrix spike duplicates (MS/MSD):** collected at a frequency of 1 sample per 20 field samples per media; and,
- **Trip blanks:** prepared and included at a frequency of one sample per shipment.

A NYSDEC Analytical Service Protocol Category B format data deliverable for the sample analyses will be reviewed by a qualified individual not directly associated with the project or the analytical laboratory and the output of the review will be in the form of a Data Usability Summary Report (DUSR) for analyzed samples in accordance with DER-10 guidance. Level 2B data validation will be performed on 20 percent of analyzed samples as implemented during the FSC. All data will be submitted to the NYSDEC in an Electronic Data Delivery (EDD) package to the EQuIS database.

A Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) has been included as **Appendix J**. This UFP-QAPP outlines the procedures to ensure that the data collected and analyzed meets project requirements. This UFP-QAPP documents the results of a project's technical planning process, providing in one place a clear, concise, and complete plan for managing data assessment, stating the quality objectives, and identifying key project personnel.

4.7.1 Sample Nomenclature

Each sample will be assigned a unique field sample ID and labeled accordingly. This field sample ID provides the tracing of the sample from the location in the field, through laboratory analysis, and finally to data evaluation and presentation, and contains information traceable to the type, location where the sample was collected, and other information appropriate to that sample. This ID will be used for references to this particular sample in field and project documentation and reports. It is essential that the integrity of the field sample ID is not compromised. The sample ID consists of five fields, separated by dashes, in the following general format. Note, the following sample ID nomenclature presented below is not intended to be all inclusive and may be modified to be consistent throughout the project as the work progresses.

Solid Samples

Soil Samples Nomenclature			
Sample Area	**Sample Number**	**QC Type**	**Depth**
HMCB = Hydrocarbon Monitor Catch Basin	SS### - Surface Soil Sample ##	0 - Primary Sample	#### - Depth at Bottom of Sample
ESA = Excavated Soil Area	SB### - Soil Boring ##	1 - Duplicate Sample	(e.g., 1.0 ft is 0010)
AST## = Above Ground Storage Tank ##	SD### - Sediment	MS - Matrix Spike	
AGPIPE = Above Ground Transfer Piping		MSD - Matrix Spike Duplicate	
BGPIPE = Below Ground/Subgrade Transfer Piping			
UST2 = UST 2			
MOSF## = Major Oil Storage Facility Area ## (Manifolds, Valves, Pump Station locations)			
NOAA = Non-Operational Area A			
NOAB = Non-Operational Area B			
NOAC = Non-Operational Area C			

Example ID: ***AST01-SS001-0-0005***

Aqueous Samples

Groundwater Samples Nomenclature			
Sample Locations	**Sample Type**	**QC Type**	**Date**
MW### - Monitoring Well No.	GW - Groundwater	0 - Primary Sample	YYMMDD = Year/Month/Date
SW### - Surface Water	FP - Fingerprint	1 - Duplicate Sample	
		MS - Matrix Spike	
		MSD - Matrix Spike Duplicate	

Example ID: ***MW01-GW-0-210301***

Field/Trip Blanks

Field/Trip Blanks Nomenclature		
Media	**Sample Type**	**Date**
SO - Soil	FB##- Field Blank ##	YYMMDD = Year/Month/Date
W - Water	TB## - Trip Blank ##	

Example ID: ***W-TB01-210301***

4.8 SITE SURVEY

All newly installed monitoring well locations will be surveyed by a NY-State licensed surveyor. Soil samples and soil vapor points will be surveyed using a handheld Global Positioning System (GPS) device by a competent person that has been trained and has experience in surveying. Per the request of the NYSDEC, the following measurement accuracy and survey control will be completed.

- For monitoring wells and soil sampling locations, the elevation will be determined to the nearest 0.01 ft. For surface soil sample and soil vapor locations, the sample elevation will be determined to the nearest 1 ft.
- For monitoring wells and soil sampling locations, the horizontal accuracy distance will be determined to plus or minus 0.01 ft. For surface soil sample and soil vapor locations, the sample location will be determined to within 2 ft.
- Provide a minimum of one permanent site control monument with elevations referenced to a National Geodetic Vertical Datum (NGVD) benchmark and coordinates referenced to the New York State Plane Datum (North American Datum of 1983 [NAD83]. The monument location(s) and elevations will meet the Federal Geodetic Control Committee Standard for second order (horizontal and vertical). All units will be reported in ft.

Each monitoring well will be surveyed for location and elevation. Elevations will be measured both from the center of each manhole cover and from the north side of each well's PVC casing. Horizontal and vertical control points will be identified in the drawings and referenced to the permanent site control monument(s), to an accuracy of 1 part in 10,000.

4.9 INVESTIGATION-DERIVED WASTE

It is anticipated that during the field investigation activities, investigation-derived waste (IDW) will be generated by the following activities:

- Soil boring installation and sampling activities;

- Groundwater well sampling activities; and,
- Decontamination of non-dedicated field sampling equipment.

IDW will be temporarily stored/staged at the predetermined location until the containers are properly disposed at an appropriately licensed disposal facility. If possible, soil cuttings will be placed back into the corresponding borehole location, and any excess soil cuttings will be placed on polyethylene sheeting near the borehole location. Liquids generated from any well sampling and decontamination fluids will also be drummed. Purged water from groundwater sampling will be drummed.

Any IDW waste will be segregated based on field observations and by matrix (e.g., aqueous, solid), containerized in 55-gallon drums, and sampled for waste characterization by the Toxicity Characteristic Leaching Procedure and Resource Conservation and Control Act characteristics, as necessary.

5. GEOTECHNICAL AND GROUNDWATER INVESTIGATION

As part of an ongoing evaluation of the Site subsurface features, requirements for a geotechnical assessment by the New York City Department of Buildings, and for the completion of the CSM (to include perched groundwater, if present), the below geotechnical investigation and groundwater evaluation are proposed for the Site.

The geotechnical investigation will be performed by others in close coordination with the Weston Team. Data from the geotechnical and groundwater investigations will be utilized to optimize the groundwater model, remedial investigation and development of the overall CSM.

5.1 METHODOLOGY

The geotechnical investigation entails standard penetration testing (SPT) and cone penetration testing (CPT) detailed on **Figure 23**. SPT borings will be installed via split spoon samplers every 2 ft for the first 12 ft, and then every 5 ft afterwards until the completion depth of either 60 ft bgs or 100 ft bgs is encountered depending on the location. These SPT soil borings will be advanced via mud rotary, and the initial 25 ft will be cased off to a depth of 25 ft below existing grade. All split spoon samples will be logged and then placed in sample jars for laboratory analysis consisting of:

- Grain Size Distribution – ASTM D422;
- Moisture Content – ASTM D2216;
- Atterberg Limits – ASTM D4318;
- Consolidation Properties – ASTM D2850;
- Triaxial Shear Strength – ASTM D2850; and,
- Permeability (Granular Soils) – ASTM D2434.

Shelby tube samples will also be collected in soft, fine-grained soils, as necessary. Any contamination documented on the exterior of the shelby tube will be recorded as detailed in Section 3.1. For CPT borings, a cone will be advanced via direct push technology to a dense native stratum and at a minimum provide a readout of tip resistance, sleeve friction and static and dynamic pore water pressure. In some instances, a seismic CPT will be completed where shear wave velocities will be measured in 3- to 5-ft intervals.

All monitoring wells will be completed in accordance with the methodology presented in Section 3.2 to assure that the data can be used for the groundwater study discussed in Section 4.3.

All geotechnical borings which are drilled without collecting soil samples will be observed by a geologist or geotechnical engineer who will record the presence of contamination identified in the drill cuttings. Geotechnical investigations are considered intrusive work and shall be observed by the NYSDEC oversight independent environmental monitor.

5.2 GEOTECHNICAL INVESTIGATION

To analyze potential settlement at the Site, evaluate foundation requirements, and analyze the potential for liquefaction, SPT and CPT borings will be completed. In total, 66 SPT borings, depicted on **Figure 23,** are proposed.

Additionally, 85 soil borings will be performed using CPT technology and 15 soil boring will be completed utilizing seismic CPT (sCPT) technology as depicted on **Figure 18**.

5.3 GROUNDWATER INVESTIGATION

As part of the installation of SPT borings, eight SPT locations will be completed as monitoring wells (**Figure 23**) to assess groundwater elevations and provide additional understanding of overall groundwater flow at the site. As part of this groundwater evaluation, up to eight test pits are proposed to evaluate the seasonal high groundwater levels via confirmation of mottling. Test pits will be completed to the groundwater table and soils will be stockpiled adjacent to the test pit and then placed back in 1-ft intervals to the same depths from which they were excavated. Test pits will not remain open for an extended period of time and excavation will not take place when precipitation is forecasted, eliminating any potential for stormwater infiltration. In the event accumulation of groundwater occurs any NAPL identified will be on extracted and disposed of by a vacuum truck which will be on standby during excavation activities. Any extracted NAPL will be disposed of at a NYSDEC approved facility LORCO Petroleum Services.

In addition, eleven monitoring wells will be installed in compliance with Section 3.2 as shown in **Figure 23** to evaluate a potential area of shallow groundwater in the southeastern portion of the Site. The work will include the following:

- Installation of 11 new groundwater observation wells to include shallow wells (approximately 10 to 15 ft bgs) and deep wells (about 30 to 40 ft bgs);
- Slug tests (to measure groundwater recharge) at new and existing wells;
- Performing 4 to 6 weeks of continuous groundwater level monitoring using data loggers in new and existing wells;
- Excavating a series of test pits/trenches to evaluate groundwater conditions as shown in **Figure 25**;
- Laboratory testing of select soil and water samples which are expected to consist of:
    - Grain Size Distribution – ASTM D422;
    - Moisture Content – ASTM D2216;
    - Atterberg Limits – ASTM D4318;
    - Consolidation Properties – ASTM D2850;
    - Triaxial Shear Strength – ASTM D2850; and,
    - Permeability (Granular Soils) – ASTM D2434.

The outputs of this groundwater evaluation include the following:

- Geologic cross-sections using new and existing data to define site geologic and hydro-geologic framework;
- Water level monitoring data evaluation to establish average, maximum, and minimum water table elevations during the period monitored and to assess the effect of snowmelt/rainfall;
- Water table elevation maps to assess changes in groundwater flow patterns during the period monitored and to use in model calibration;
- Aquifer slug tests data evaluation to estimate hydraulic conductivity for use in the groundwater flow model; and,
- Computer model development.

The data collected as part of this geotechnical groundwater investigation will contribute and be integrated into the Evaluation of Groundwater Hydrology and Emanating Groundwater Contamination Study detailed in Section 4.3.2.

6. SOIL VAPOR INVESTIGATION

Groundwater concentrations of COCs from recent sampling events of on-site monitoring wells were screened against USEPA media-specific vapor intrusion screening levels (VISLs) for commercial/industrial land use (https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator) (USEPA, 2020) to determine potential risks to future human receptors. The evaluation indicated that groundwater concentrations for certain volatile organic COCs exceeded the VISLs; therefore, based on a line of evidence approach a soil vapor intrusion investigation will be performed as presented below.

A total of 38 soil vapor locations were proposed as part of the focused site characterization (Weston, 2021a). However, some of the locations were unable to be completed based on access issues or high groundwater levels. The footprint of one of the proposed buildings is located in the area of the solar field, these soil vapor locations will be completed after the solar panels are removed. This building, referred to as Building 4 in the 2020 RI/IRM Work Plan, has a total of 215,000 ft^2 and 8 sample locations as presented on **Figure 24**. The soil vapor points that were inaccessible during the FCR are proposed to be completed during the RI as outlined below.

6.1.1 Soil Vapor Intrusion Evaluation

The soil vapor intrusion evaluation methodology and approach will be conducted in accordance with the NYSDOH, NYSDEC guidance, and USEPA guidance including:

- DER-13 / Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York;
- Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 (and updates);
- DER-10 / Technical Guidance for Site Investigation and Remediation, May 3, 2010 (and updates); and,
- USEPA Office of Solid Waste and Emergency Response (OSWER) Technical Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, June 2015.

6.1.2 Methodology and Approach

Soil vapor probes will be installed using direct-push technology. Soil vapor probes will be installed to at least 5 feet ft bgs but not deeper than 15 ft bgs. The target installation interval will be two feet above the capillary fringe zone to avoid LNAPL smearing from water-table fluctuations (USEPA, 2015). However, the depth to groundwater across the Site is variable and ranges from 2.0 to 20.0 ft. As such, soil vapor probes cannot be installed consistent with generally accepted protocol and hence, the soil vapor intrusion evaluation would be conducted following remedial activities (i.e., placement of interim cover material) at the building sites to ensure a minimum 5 ft separation between sample intervals and the surface and 2 feet between fringe/smear zone and high groundwater table. It is intended that samples will be collected from native material below fill material; however, if field adjustments are necessary, they will be clearly identified and addressed in the evaluation approach to assure a sound line of evidence approach to determine the need for any required vapor mitigation /control systems at the Site. Soil probes will be constructed in a similar manner and in accordance with NYSDOH guidance. A porous, inert backfill material (e.g., glass beads or coarse sand) will be used to create a sampling zone of 1 to 2 feet in length. The soil vapor probe implant will be connected to inert tubing (e.g., polyethylene, stainless steel, or Teflon®) of the appropriate size (typically 1/8 inch to 1/4-inch diameter) and of laboratory or food grade quality to the surface. The soil vapor probes will be sealed above the sampling zone with a minimum 3-feet of bentonite slurry. The remainder of the borehole will be backfilled with glass beads or coarse sand. Soil vapor probe(s) locations have been selected from within the proposed building footprints. The approximate sample locations for each proposed building are presented on **Figure 24**. The proposed minimum number of samples are based on the proposed building area and are summarized in the **Table 6**. Following USEPA (2015) guidance, a 100 feet lateral separation distance between sampling ports will be used.

Table 6
Proposed Soil Vapor Sample Points

Building	Area (square feet)	FSC Completed Locations	Number of Additional Samples
Building 1	230,000	5	3
Building 2	478,000	4	6
Building 3	1,225,000	8	4
Building 4	215,000	0	8

Although, sub slab soil gas is the preferred tool for evaluating the vapor intrusion (VI) pathway, as part of the RI, soil gas samples will be collected. The proposed approach includes collection of exterior soil gas data as an alternative VI evaluation prior to construction of the buildings. The number of soil gas samples is based on the size of the proposed footprint of the future buildings utilizing the recommended number of sub-slab soil samples in the NJDEP Vapor Intrusion Technical Guidance since sample count is not stipulated per New York or USEPA guidance.

It is recognized that exterior soil gas sampling should not be utilized as a stand-alone determination for VI evaluation; therefore, additional evaluation will be conducted during the project implementation. Additional VI evaluation will include completion of the following items:

- Collection of soil gas samples will be conducted following the installation of the interim cover. The proposed sampling will be conducted in accordance with the above methodology and sample frequency; and,
- Once construction is complete, additional evaluation will be conducted in the proposed buildings. Since workers will be present in the future warehouses, indoor air sampling will likely be required for all four buildings once they are built. The details of this VI evaluation will be included in the RAWP, if necessary.

6.1.3 Data Evaluation

The potential for human health risk will be evaluated using NYSDOH matrices and USEPA guidance. The default USEPA attenuation factors for soil gas (0.03) to indoor air will be adjusted to develop a site-specific attenuation factor that accounts for the large industrial warehouses planned for redevelopment using USEPA's (2017) Johnson and Ettinger Model Spreadsheet Tool Version 6.0 and/or USEPA's (2012) Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings. The VISL calculator (https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator) will also be utilized to evaluate the soil gas data as another method to determine potential risks to future human receptors. The soil gas data will be inputted into the "site-specific mode" of the VISL calculator to model the indoor air concentrations and calculate cancer risks and hazard quotients for the contaminants of concern. This method is advantageous since it uses site-specific data (soil gas and/or groundwater) to calculate potential risks and hazards to future workers.

New York State currently does not have specific standards, criteria, or guidance values for concentrations of the COCs at the Site in soil vapor (NYSDOH, 2006). NYSDOH has established a decision matrix for certain indoor air volatile organics and continues to do so for additional compounds. NYSDOH recognizes that the detection of volatile chemicals in soil vapor samples does not necessarily indicate soil vapor intrusion is occurring or actions should be taken to address exposures. Among other factors, the NYSDOH considers the soil vapor sampling results, human health risks (i.e., cancer and non-cancer health effects) and attenuation factors (i.e., the ratio of indoor air to sub-slab soil vapor concentrations) when making these decisions (NYSDOH, 2006).

Cumulative cancer risk estimates and non-cancer hazard index (HI) will be calculated for the concentrations detected in soil gas samples. The evaluation will be performed for excess cancer risk of one in one million (10-6) and one in one hundred thousand (10-5) for carcinogenic end points and a hazard index of one for non-cancer end points, except if it is demonstrated that such level would be protective of public health and the environment and is approved by the Department.

The cancer and noncancer health effects will be estimated from the soil vapor sampling results as follows:

Cancer Risk:

For cancer risk estimates, the soil gas concentration will be divided by the target soil gas VISL. This ratio will be multiplied by 10-6 and 10-5 to estimate chemical-specific risk for each receptor group. Cancer risks will be estimated using the following equation:

$$CRi = (SGCi \div VISLi) \times 10\text{-}6$$

Where:

Cri = Lifetime cancer risk for contaminant of potential concern (COPC) i (unitless)

SGCi = Soil gas concentration for chemical i (micrograms per cubic meter [$\mu g/m^3$])

cVISLi = Cancer-based VI screening level ($\mu g/m^3$)

10-6 = Value of the VISL at target cancer risk of 10-6 (unitless).

Since there are potentially multiple pollutants, the risks for the individual COPCs will be added to obtain a cumulative risk estimate. USEPA uses a 1x10-4 to 1x10-6 "target range" within which the Agency strives to manage risks as part of site cleanup; NYSDEC uses 1X10-6 as the baseline with ability to get site-specific approval for alternate excess cancer risk levels.

Non-Cancer Hazard Quotient:

A non-cancer hazard quotient (HQ) for a particular COPC is the ratio of the concentration of non-carcinogenic chemicals and the non-cancer VISL (based on a HQ of 1), as shown in the following equations:

$$HQi = SGCi / ncVISLi$$

Where:

HQi = Hazard quotient for COPCi (unitless)

SGCi = Soil gas concentration for chemical i (microgram per cubic meter [$\mu g/m^3$])

ncVISLi = Non-cancer based VI screening level ($\mu g/m^3$)

A screening level HI will then be calculated by summing HQs for all COPCs. If the HI exceeds 1, COPCs are segregated by target organ, and a separate HI value for each effect/target organ is calculated (USEPA, 1989).

The methodology used to evaluate non-carcinogenic health effects, unlike the methodology used to evaluate carcinogenic risk, is not a measure of quantitative risk. The HQ or HI are not a mathematical prediction of the incidence or severity of those effects (USEPA, 1989). If an HQ or HI exceeds unity (1), there might be a potential for non-carcinogenic health effects occurring under the defined exposure conditions. If the HQ for any individual chemical or the HI value for any effect/target organ exceeds 1, non-carcinogenic health effects are considered possible. Therefore, an HQ or HI of greater than 1 does not necessarily indicate that a non-carcinogenic adverse effect is likely to occur. Furthermore, a HI of less than or equal to 1 indicates that it is unlikely for even sensitive populations to experience adverse non-carcinogenic health effects. All cumulative risk estimates and HIs are expressed using one significant figure.

Risk estimates will be calculated for each individual sample probe and for the representative average concentration for each building. An average concentration will be considered as it recognizes the heterogeneity of contaminated sites and the uncertainty of sampling and analysis of samples (NYSDEC, 2006). The representative average concentration will be calculated as the 95% upper confidence limit on the mean concentration (95% upper confidence level [UCL]) using USEPA's ProUCL statistical software. If the findings of the soil vapor intrusion evaluation indicate vapor mitigation/controls are needed to address unacceptable exposure, the appropriate approach will be included in the design of the proposed buildings.

6.1.4 Laboratory Analysis

All VI investigation samples will be collected in accordance with NYSDOH guidance in a laboratory provided individually certified-clean SUMMA® canisters. During sampling activities, a tracer gas will be used as a QA/QC measure and to verify the integrity of the soil vapor probe seal. The same tracer will be used for all sampling probes. Samples will be shipped under chain of custody to a NYSDEC Environmental Laboratory Approval Program (ELAP) certified laboratory for off-site testing. All samples will be analyzed for full suite VOCs plus naphthalene via USEPA method TO-15.

At a minimum, two (2) rounds of sample data will be collected to evaluate fluctuations in concentrations due to seasonal effects and groundwater elevations. However, if an evaluation of the first round of soil vapor data indicates the need for soil vapor intrusion mitigation technologies, then the second round of samples will not be collected.

In addition to the vapor investigation samples described above, the following QA/QC field samples will be collected for laboratory analysis:

- Field Duplicates: collected at a frequency of one sample per 10 field samples
- Ambient Samples: A minimum of two ambient air samples will be collected per field event depending on the number of locations and the size of the area investigated.

All analytical data will be validated in accordance with NYSDEC guidance. A NYSDEC Analytical Service Protocol Category B format data deliverable for the sample analyses will be reviewed by a qualified individual not directly associated with the project or the analytical laboratory and the output of the review will be in the form of a DUSR in accordance with DER-10 guidance.

7. HEALTH AND SAFETY PROTOCOLS

A site-specific Health and Safety Plan (HASP) has been prepared for the implementation of this work. The site-specific HASP was developed in accordance with 29 CFR 1910.120 and includes all activities outlined in the workplan and will establish the health and safety requirements for the Site. Each company performing work at the Site will be responsible for the health and safety of its own employees within the work zone. The site-specific HASP will address the chemical and physical hazards associated with the constituents of concern and the Site location.

The HASP will specify monitoring and decontamination procedures for personnel and equipment. A copy of the Weston HASP has been included as **Appendix K.**

7.1 COMMUNITY AIR MONITORING PLAN (CAMP)

The Community Air Monitoring Plan (CAMP) details the monitoring for the potential presence of VOCs and particulate at the downwind perimeter of the site when the intrusive activities are in progress to ensure that off-site receptors are not impacted. The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., potential off-site receptors including residences and businesses, off-site worker population, and on-site workers) from potential airborne releases as a result of the activities.

In addition, the CAMP also addresses nuisance odors. Nuisance odors would be detected by on-site personnel who are either present at the Site perimeter or working within the active investigation areas. If nuisance odors are an issue; they will immediately be investigated utilizing a PID. A copy of the CAMP is included as **Appendix L**.

8. REPORTING AND SCHEDULE

Reporting throughout the execution of the Remedial Investigation will be conducted in accordance with the following sections.

8.1 DAILY REPORTS

During implementation of this investigation, daily field reports will be submitted to the NYSDEC and the NYSDOH by 11 AM the business day following any field activities. These daily reports will include a representative photolog, an updated site figure and description of work. In addition, CAMP results and field forms (i.e., gauging forms, soil and well logs) will be submitted weekly by 11 AM the Monday following any week when investigation activities are performed.

8.2 WEEKLY REPORTS

Weekly reports will be submitted to NYSDEC and NYSDOH Project Managers within 3 business days following the end of the week of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., samples collected, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

8.3 REMEDIAL INVESTIGATION REPORT

A Remedial Investigation Report (RIR) will be prepared in accordance with Section 3.14 of DER-10 and submitted to NYSDEC and USEPA. A NYSDEC Analytical Service Protocol Category B format data deliverable for the sample analyses will be reviewed by a qualified individual not directly associated with the project or the analytical laboratory and the output of the review will be in the form of a DUSR attached to the RIR.

In accordance with DER-10, the RIR will:

- Identify and characterize the source(s) of contamination;
- Detail the delineation of contamination in former SWMUs and areas of known historic releases to address the EPA Consent Order RCRA-02-2009-7306;
- Describe the amount, concentration, environmental fate and transport, including as necessary, phase (e.g., gas, solid, liquid), location, and other significant characteristics of the contaminant(s) present;
- Define hydrogeological factors, as needed, including grain size analysis, soil permeability, nature of any bedrock, depth to saturated zone, hydraulic gradients, depth to bedrock, bedrock permeability, proximity to a drinking water aquifer, surface water, floodplains, and wetlands;
- Provide a qualitative human exposure assessment, in accordance with Section 3/14 (17(c) of DER-10;
- Identify potential adverse impacts to fish and wildlife resources and to other environmental resources (mining, recreational etc.);
- Identify surface water classifications and existing use designations;
- Summarize the baseline on and offsite natural resources sampling; and,
- Recommend activities for the subsequent RIWP(s) to evaluate on and offsite natural resources in greater detail as required.

8.4 SCHEDULE

The RI effort is anticipated to take place over an approximate 4-month time period. The investigation detailed in this workplan will commence with the approval of this RIWP by NYSDEC and USEPA. A detailed schedule has been included as **Figure25** and will be updated as necessary and provided to the NYSDEC Project Manager and USEPA Project Coordinator for the duration of the scope of work.

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TABLES

Table 3
Proposed Soil Sample Summary
Former Port Mobil Terminal Facility
4101 Arthur Kill Road
Staten Island, New York

LOCATION	NUMBER OF BORINGS [1]	NUMBER OF SAMPLES	SAMPLE DEPTH (FT BGS)	TARGET SAMPLE INTERVAL	ANALYSIS	SAMPLE RATIONALE
SOIL						
Pre-Demo ASTs						
Tank 1 (SWMU 44)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 2 (SWMU 53)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 3 (SWMU 43)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 4 (SWMU 52)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 5 (SWMU 42)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 6 (SWMU 51)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 7 (SWMU 41)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 8 (SWMU 50)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 9 (SWMU 40)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 10 (SWMU 49)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 11 (SWMU 39)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 12 (SWMU 48)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 13 (SWMU 38)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 14 (SWMU 47)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 15 (SWMU 37)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 16 (SWMU 46)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 17 (SWMU 36)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 18 (SWMU 45)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 20 (SWMU 62)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 41 (SWMU 22)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 43 (SWMU 58)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 44 (SWMU 31)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 45 (SWMU 30)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 48 (SWMU 54)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 49 (SWMU 29)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 50 (SWMU 28)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 51 (SWMU 27)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 52 (SWMU 26)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 53 (SWMU 56)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 54 (SWMU 55)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 55 (SWMU 25)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 56 (SWMU 24)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 57 (SWMU 23)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 58 (SWMU 35)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 59 (SWMU 34)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 60 (SWMU 57)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 61 (SWMU 33)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Tank 62 (SWMU 32)	4	4	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected from each quadrant to assess potential petroleum impacts.
		4	TBD	GCM		Additional samples will be collected from areas that exhibit GCM to characterize potential impact to the soil.
		4	TBD	GWI		One sample will be collected from the six-inch interval above the GWI.
Former Tank 19 (SWMU 62)	1	1	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample from within the footprint of each SWMU/AST below the gravel layer or liner, if present.
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Former Tank 40 (SWMU 59)	1	1	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample from within the footprint of each SWMU/AST below the gravel layer or liner, if present.
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
HT-1	1	1	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample from within the footprint of each SWMU/AST below the gravel layer or liner, if present.
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	

Table 3
Proposed Soil Sample Summary
Former Port Mobil Terminal Facility
4101 Arthur Kill Road
Staten Island, New York

LOCATION	NUMBER OF BORINGS [1]	NUMBER OF SAMPLES	SAMPLE DEPTH (FT BGS)	TARGET SAMPLE INTERVAL	ANALYSIS	SAMPLE RATIONALE
HT-2	1	1	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample from within the footprint of each SWMU/AST below the gravel layer or liner, if present.
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Tank 100**	2	2	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample for every 100 LF of each AST perimeter (minimum of 2 samples)
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Tank 105**	2	2	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample for every 100 LF of each AST perimeter (minimum of 2 samples)
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Tank 109	2	2	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample for every 100 LF of each AST perimeter (minimum of 2 samples)
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Tank 24A	2	2	0-0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface soil sample for every 100 LF of each AST perimeter (minimum of 2 samples)
	1	1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
UST 2	4	4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil sample will be collected from all intervals exhibiting contamination and the groundwater interface. If no evidence of contamination is observed, each analytical soil sample will be collected from the 6-inch interval above the water table .
		4	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Total Tank Samples		492				
American Petroleum Institute (API) Separator - SMWUs 4, 5, and 6						
API Separator (SMWUs 4, 5, and 6)**	6	6	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		6	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Total API Separator Samples		12				
Vacuum Tank 1 and 2 - SWMUs 7 and 8						
Vacuum Tank 1 and 2 (SWMUs 7 and 8)**	7	7	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		7	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Total Vacuum Tank Samples		14				
Container Storage Pad - SWMU 16						
Container Storage Pad SWMU 16**	3	3	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample intervals will be biased toward observed GCM and the 0.5-ft interval directly above the water table.
		3	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Total Container Storage Pad Samples		6				
Surface Impoundments - SWMUs 13 and 14						
Surface Impoundment (SWMU 13 and 14)**	12	12	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Surface soil sample collected from below the liner in the base area of the surface impoundment.
Total Surface Impoundment Samples		12				
Road Trench - SWMU 1						
Road Trench (SWMU 1)**	40	40	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	To investigate potential petroleum impacts to soil underlying the Road Trench, soil samples will be collected every 50 feet on the hydraulically downgradient side of the trench at a depth corresponding to directly below the concrete bottom of the trench.
		40	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Total Road Trench Samples		80				
Excavated Soils Area - SWMU 17						
Excavated Soils Area (SWMU 17)**	6	6	0-5	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One soil sample will be collected biased to the highest apparent contamination based on soil discoloration, odor, field-screening result, or other field indicators within the first 5-ft interval
		6	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample will be collected from the six-inch interval above the GWI.
Total Ex Soil Area Samples		12				
HMCB - SWMU 9						
HMCB - SWMU 9 **	4	4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample depth based on field screening. If no evidence of impacts, collect sample 6 inches below structure depth. In the event GCM is identified in the soil boring, the GCM impacts will be delineated in accordance with section 4.6.3 of the RIWP.
		4	TBD	6-inches below structure	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample will be collected from the 6-inch interval below the structure regardless of the presence or absence of GCM.
Total HMCB-SWMU Samples		8				
MOSF Structures						
Former Loading Area**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample location for every 900 square feet of footprint
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	If GCM is identified at the soil boring, the soil boring will be advanced vertically to delineate GCM.
Former Marine Vapor Recovery Unit**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 1**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 2**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 3**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 4**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.

Table 3
Proposed Soil Sample Summary
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LOCATION	NUMBER OF BORINGS [1]	NUMBER OF SAMPLES	SAMPLE DEPTH (FT BGS)	TARGET SAMPLE INTERVAL	ANALYSIS	SAMPLE RATIONALE
Former Pump Station Location 5**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 6**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 7**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Pump Station Location 8**	4	4	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One surface sample will be collected on each side of the concrete pad for each 300-foot length
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One shallow soil boring will be advanced on the hydraulically downgradient side of the investigation area.
Former Valve Location**	13	13	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample location for every 900 square feet of footprint
		13	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	If GCM is identified at the soil boring, the soil boring will be advanced vertically to delineate GCM.
Total MOSF Structure Samples		106				
Piping						
Above grade Transfer Piping**	114	114	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	0-6 inches below the gravel layer or asphalt and 12 – 24 inches below the gravel or asphalt layer
	114	114	2.0	1.0-2.0	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Subgrade Piping**	40	40	TBD	0.0-0.5 below the pipe	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample collected at halfway point of subgrade piping length, collected within 2 ft of pipe at a depth 0-6 inches below the pipe depth
Total Piping Samples		268				
Site Infrastructure						
Storm Drains Non-Conveyance**	6	6	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Samples will be collected at the storm drain discharge location
		6	2.0	Near Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Storm Drains Conveyance**	10	10	TBD	0.0-0.5 below storm drain	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Samples will be collected adjacent to the storm drain at a depth correlating to the bottom of the basin.
Storm Water Trenches**	22	22	0.5	0-0.5' below the concrete bottom of the trench	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample on the hydraulically downgradient side of the trench at a depth corresponding to directly below the concrete bottom of the trench. Sample locations will be biased toward areas of cracks and pumps/sumps in the concrete.
Subgrade Piping**	90	38	TBD	0.0-0.5' below the post indicator valve	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Sample collected at halfway point of subgrade piping length, collected within 2 ft of pipe at a depth 0-6 inches below the pipe depth
		52	TBD	0.0-0.5 below the pipe	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Historic Stormwater Basin**	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Samples will be collected at the historic stormwater basin
		2	2.0	Near Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	
Site Septic System**	4	4	0.5	Below infiltrative surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Six-inch interval below the bottom of the infiltrative surface
		4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting contamination.
		4	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	The six-inch interval directly above the GWI.
Total Infrastructure Samples		150				
Lube Oil Tanks						
SWMU 61 Lube Oil Tanks**	4	4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One soil sample will be collected from each soil interval exhibiting contamination. If no contamination is observed, only the GWI sample will be collected.
		4	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One soil sample will be collected from the 6-inch interval above the groundwater interface.
	1	1	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One intermediate boring will be advanced to assess the potential pathway for DNAPL. I contamination is detected, samples will be collected at the GCM and where contamination is no longer observed.
		1	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One intermediate boring will be advanced to assess the potential pathway for DNAPL. I contamination is detected, samples will be collected at the GCM and where contamination is no longer observed.
		1	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One intermediate boring will be advanced to assess the potential pathway for DNAPL. I contamination is detected, samples will be collected at the GCM and where contamination is no longer observed.
		1	TBD	Below GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One intermediate boring will be advanced to assess the potential pathway for DNAPL. I contamination is detected, samples will be collected at the GCM and where contamination is no longer observed.
Total Lube Oil Samples		12				
Waste Storage Tank 48 Staging Area						
Waste Storage Tank 48 Staging Area**	4	4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One soil sample will be collected from each soil interval exhibiting contamination. If no contamination is observed, only the GWI sample will be collected.
		4	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One soil sample will be collected from the 6-inch interval above the groundwater interface in the absence of GCM.
Total Waste Storage Tank 48 Staging Area Samples		8				
Dravo Water Treatment System						
Dravo Water Treatment System**	4	4	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting contamination.
		4	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	The six-inch interval directly above the GWI.
Total Waste Storage Tank 48 Staging Area Samples		8				
Non-Operational Areas						
Area A**	47	47	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Surface sample
		47	2.0	1.0-2.0	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Near surface sample
		47	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting grossly contaminated media
		47	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Groundwater interface
Area B**	122	122	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Surface sample
		122	2.0	1.0-2.0	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Near surface sample
		122	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting grossly contaminated media
		122	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Groundwater interface

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Area C**	13	13	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Surface sample
		13	2.0	1.0-2.0	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Near surface sample
		13	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting grossly contaminated media
		13	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Groundwater interface
Area D**	71	71	0.5	0.0-0.5	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Surface sample
		71	2.0	1.0-2.0	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Near surface sample
		71	TBD	GCM	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Any interval exhibiting grossly contaminated media
		71	TBD	GWI	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Groundwater interface
Total Randomized Grid Samples		1012				
Post-Demo AST Sampling						
Tank 1 (SWMU 44)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 2 (SWMU 53)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 3 (SWMU 43)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 4 (SWMU 52)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 5 (SWMU 42)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 6 (SWMU 51)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 7 (SWMU 41)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 8 (SWMU 50)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 9 (SWMU 40)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 10 (SWMU 49)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 11 (SWMU 39)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 12 (SWMU 48)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 13 (SWMU 38)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		

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Tank 14 (SWMU 47)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 15 (SWMU 37)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 16 (SWMU 46)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 17 (SWMU 36)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 18 (SWMU 45)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 20 (SWMU 62)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 41 (SWMU 22)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 43 (SWMU 58)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 44 (SWMU 31)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 45 (SWMU 30)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 48 (SWMU 54)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 49 (SWMU 29)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 50 (SWMU 28)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 51 (SWMU 27)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		

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Tank 52 (SWMU 26)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 53 (SWMU 56)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 54 (SWMU 55)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 55 (SWMU 25)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 56 (SWMU 24)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 57 (SWMU 23)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 58 (SWMU 35)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 59 (SWMU 34)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 60 (SWMU 57)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 61 (SWMU 33)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Tank 62 (SWMU 32)	2	2	0.5	Surface	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	Soil samples to be collected below AST in coordination with Tank Demolition.
		2	TBD	GCM		
		2	TBD	GWI		
		2	TBD	Below GWI		
Total Tank Samples		304				
DNAPL						
DNAPL Transects Additional Locations	9	9	TBD	6-inch interval above first confining materials	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One discrete soil sample will be collected from the 6-inch interval directly above the confining layer
		9	TBD	Bottom 6-inches of boring	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs*, Lead*, Zinc*	One sample will be collected from the bottom 6 inches of each of these borings
Total DNAPL Samples		18				
Total Sample Count		2522				
QA/QC SAMPLES						
Duplicate	NA	127	NA	125	TBD based on analysis of samples being collected	1 per 20 samples per matrix
MS/MSD	NA	127	NA	125	TBD based on analysis of samples being collected	1 per 20 samples per matrix
Field Blank	NA	TBD	NA	TBD	TBD based on analysis of samples being collected	QA/QC, One Field Blank per Sample Date

Notes:
BTEX - Benzene, Toluene, Ethylbenzene, Total Xylenes
FT BGS - Feet Below Ground Surface
GCM - Grossly Contaminated Media
GWI - Groundwater Interface
NA - Not Applicable
PAHs - Polycyclic Aromatic Hydrocarbons
RIWP - Remedial Investigation Work Plan
TBD - To Be Determined

1 - Borings include both shallow borings (with shallow sample only) and deep borings.
* Analysis will be collected from the 0-2 inch interval when collected as part of a surface sample.
** 15 percent of samples will be analyzed for TCL/TAL with the exception of PFAS.

Table 4
Proposed Groundwater Sample Summary
Former Port Mobil Temrinal Facility
4101 Arthur Kill Road
Staten Island, New York

LOCATION	SCREENED INTERVAL DEPTH (FT BGS)	MATRIX	NUMBER OF SAMPLES	ANALYSIS	RATIONALE
Groundwater Sampling					
Former Tank 19 (SWMU 62)	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Former Tank 40 (SWMU 59)	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Tank 104	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Tank 105	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Tank 109	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Tank 24A	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
HT-1	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater beneath the tank.
HT-2	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater beneath the tank.
UST 2	TBD*	Groundwater	1	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Characterize the first encountered groundwater in the dominant downgradient flow direction from the tank.
Geotechnical Investigation Wells	TBD*	Groundwater	6	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Delineate groundwater impacts identified during the Focused Site Characterization
Additional Non-Operational Area Monitoring Wells	TBD*	Groundwater	8	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Delineate groundwater impacts identified during the Focused Site Characterization
DNAPL Characterization	TBD*	Groundwater	19	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Assess for DNAPL at Tanks that held No. 4 or No. 6 Fuel Oil
Existing Monitoirng Wells	TBD*	Groundwater	8	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Delineate groundwater impacts identified during the Focused Site Characterization
Off-site Wells	TBD*	Groundwater	8	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	Evalute and ensure the absense of offsite impacts
SepticSampling					
Septic Tank Contents	NA	Sludge	1	TCL/TAL (Except PFAS)	Evaluate the presence of potential impacts in the septic tank
	NA	Aqueous	1	TCL/TAL (Except PFAS)	Evaluate the presence of potential impacts in the septic tank
Total Sample Count			60		
QA/QC Samples					
Duplicate	TBD	Groundwater	3	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	QA/QC, One duplicate per 20 samples
MS/MSD	TBD	Groundwater	3	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	QA/QC, One duplicate per 20 samples
Field Blank	NA	Deionized Water	TBD	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene, PAHs, Lead, Zinc	QA/QC, One Field Blank per Sample Date
Trip Blank	NA	Deionized Water	TBD	BTEX ,1,2,4-trimethylbenzene, 1.3.5-trimenthylbenzene	QA/QC, One Trip Blank per Sample Shipment

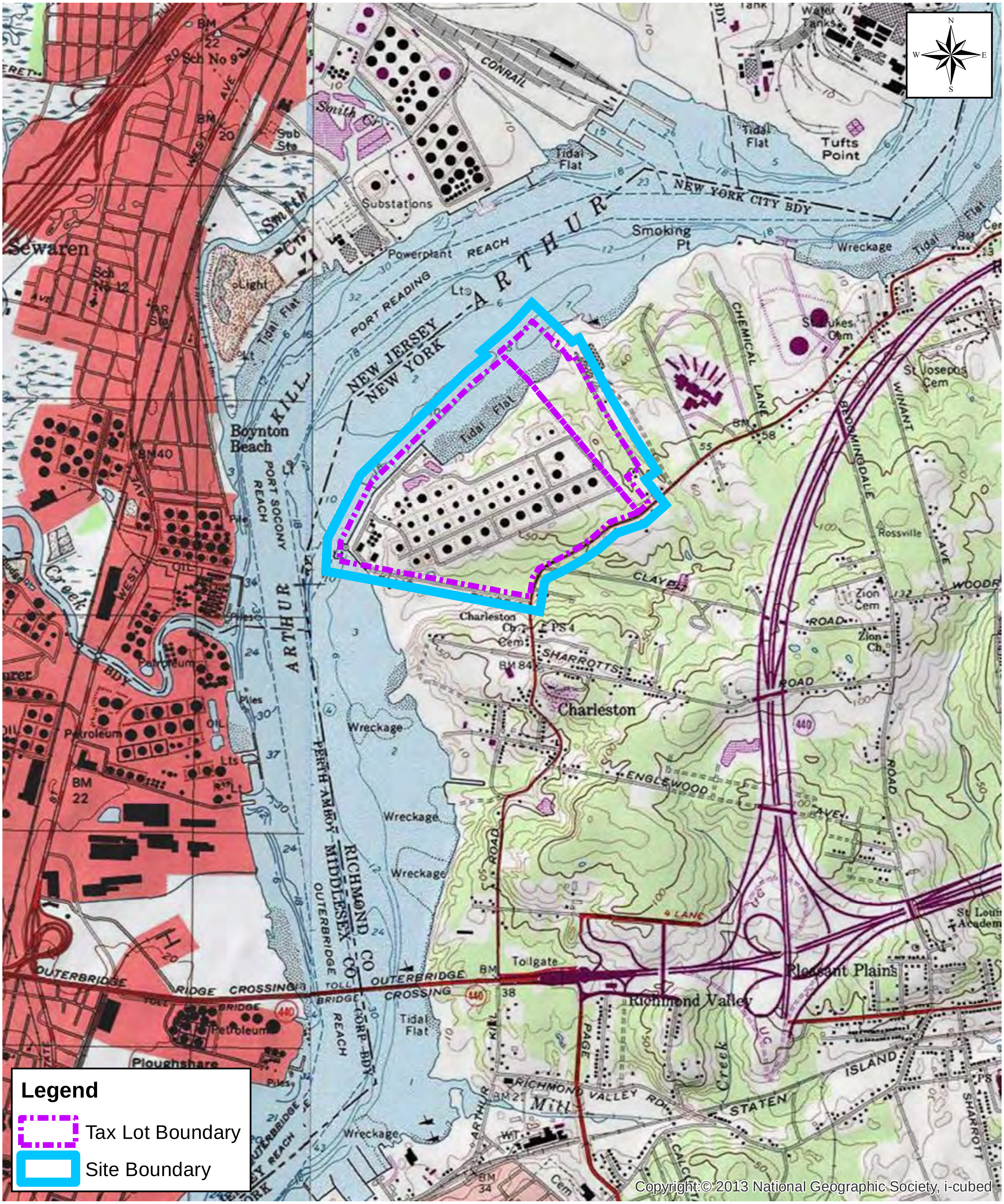
Notes:
BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
ft bgs - feet below ground surface
MS/MSD = Matrix Spike / Matrix Spike Duplicate
NA - Not Applicable
SWMU = Solid Waste Management Unit
TBD - To Be Determined
* In the event NAPL is detected, the anlytical sample will not be collected, however a fingerprint sample will be collected to assess the type of petroleum product.

Table 5
Proposed Surface Water, Sediment, and Wetland Sample Summary
Former Port Mobil Temrinal Facility
4101 Arthur Kill Road
Staten Island, New York

AOC	Location	NUMBER OF LOCATIONS	NUMBER OF SAMPLES	ANALYSIS	RATIONALE
Surface Water, Sediment, and Wetlands					
On-site Stream	Upgradient	1	1	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
	Downgradient	1	1	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
	Discharge point	1	1	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
On-site Stream Sediment	Upgradient	1	3	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
	Downgradient	1	3	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
	Discharge point	1	3	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
On-site Wetlands	Upgradient	26	78	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
Off-site Stream (Arthur Kill)	Upgradient	1	1	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
	Downgradient	1	1	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
	Discharge point	3	3	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
Off-site Sediment (Arthur Kill)	Upgradient	1	3	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
	Downgradient	1	3	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
	Discharge point	3	9	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
Tidal Flat Area	Tidal Flat Surface Water	39	39	TCL/TAL (except PFAS), TOC, Turbidity	Samples collected to allow for overall assessment of surface water
	Tidal Flat Sediment	39	117	TCL/TAL (except PFAS), Grain Size, TOC	Samples will be collected from the 0 to 6-inch, 6 to 12-inch and 12 to 24-inch intervals, if feasible, based on the material encountered at depth
Total Sample Count			266		
QA/QC Samples					
Duplicate Sediment	Sediment	NA	11	TCL/TAL (except PFAS), Grain Size, TOC	QA/QC, One duplicate per 20 samples
MS/MSD Sediment	Sediment	NA	11	TCL/TAL (except PFAS), TOC	QA/QC, One duplicate per 20 samples
Duplicate Surface Water	Surface Water	NA	3	TCL/TAL (except PFAS), Turbidity, TOC	QA/QC, One duplicate per 20 samples
MS/MSD Surface Water	Surface Water	NA	3	TCL/TAL (except PFAS), TOC	QA/QC, One duplicate per 20 samples
Field Blank	Deionized Water	NA	TBD	TCL/TAL (except PFAS), Turbidity, TOC	QA/QC, One Field Blank per Sample Date
Trip Blank	Deionized Water	NA	TBD	VOCs	QA/QC, One Trip Blank per Sample Shipment

Notes:
MS/MSD - Matrix Spike / Matrix Spike Duplicate
NA - Not Applicable
TAL - Target Analyte List
TBD - To Be Determined
TCL - Target Compound List
TOC - Total Organic Carbon

FIGURES



SCALE:

2,000 1,000 0 2,000

Graphic Scale in Feet

TITLE:

SITE LOCATION
FORMER PORT MOBIL TERMINAL
4101 ARTHUR KILL RD
STATEN ISLAND, NY

PROJECT:

Remedial Investigation Workplan

CLIENT NAME:

NP Staten Island Industrial, LLC

WESTON SOLUTIONS

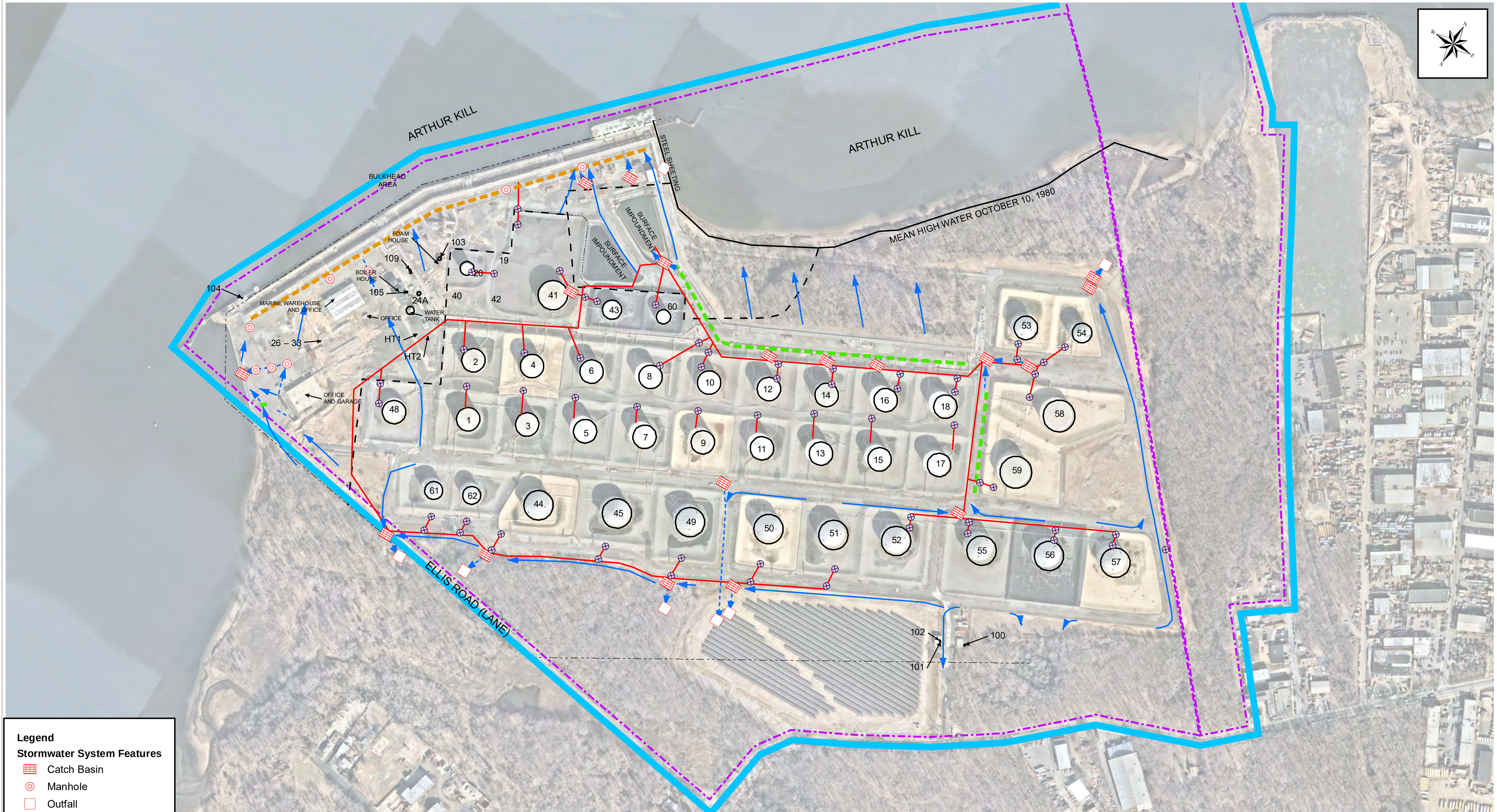
DATE:

September 2021

FIGURE #:

1

Path: P:\NorthPoint\GIS\MXD\2021_06_RIWP\27168_NorthPt_RIWP_Site_Loc_Map.mxd



Legend

Stormwater System Features

- Catch Basin
- Manhole
- Outfall
- Stormwater Valve
- Drainage Line
- Surface Flow
- Underground Line Flow
- Trench Drain
- Road Trench Drain
- Tax Lot Boundary
- Site Boundary

Notes:
1. Stormwater Drainage features are approximate.

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.

SCALE: 0 200 400 800 Scale in Feet

TITLE: Stormwater Conveyance System
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

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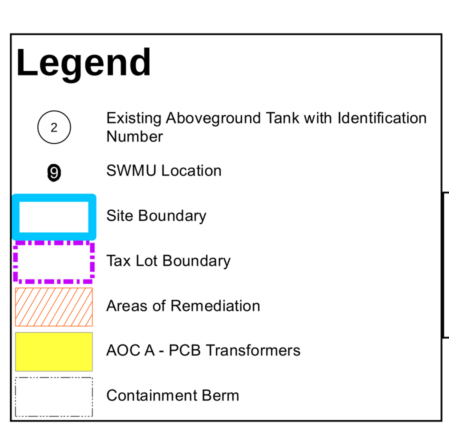
DATE: September 2021

FIGURE #: 2

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27133_NorthPt_RIWP_Site_Stormwater.mxd



Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

130 65 0 130
Graphic Scale in Feet

WESTON SOLUTIONS SM

Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: September 2021	PROJECT MANAGER: M. Afflitto	CLIENT NAME: NP Staten Island Industrial, LLC.	DRAWING TITLE: Site Plan and SWMU/Remediation Area Locations Former Port Mobil Terminal Staten Island, New York
DRAWING: 27160_NorthPoint_RIWP_Site_Plan.mxd PATH: P:\NorthPoint\GIS\MXD\2021_06_RIWP\	CHECKED BY: N. Diehl		
REVISION No.	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Remedial Investigation Work Plan	
WORK ORDER No. 15807.002.001.0008.01	DRAWN/MODIFIED BY: H. Bravo-Ruiz DATE CREATED: 7/23/2020		FIGURE: 3 SCALE: 1 " = 130 ' DATE: September 2021

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27170_NorthPoint_RIWP_Manifolds_Valves_Ect.mxd

Legend

- 2 Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Loading Area Location
- Marine Vapor Recover Unit
- Pump Station Location
- Valve Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE:

0 217.5 435 870

Scale in Feet

TITLE:

MOSF Structures Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Workplan

CLIENT NAME: NP Staten Island Industrial, LLC.

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DATE: September 2021

FIGURE #: 4

Legend

- Non-Operational Areas
- Site Boundary
- Project Site Boundary
- Containment Berm
- Surface Impoundment

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 450 225 0 450 Feet

TITLE: Non-Operational Area Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

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DATE: September 2021

FIGURE #: 5

Path: P:\NorthPoint\GIS\MXD\2021_06_RIWP\27159_NorthPoint_RIIRM_NonOp_Areas.mxd

Legend

- NYSDEC-mapped Stream
- Wetlands
- Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Containment Berm
- Surface Impoundment
- Buildings

Notes:
1. Proposed locations may be adjusted in the field based on visual inspection including any evidence of historical impacts.

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. National Wetlands Inventory, U.S. Fish and Wildlife Services, 2019
5. NYSDEC, Water Quality Classifications dataset.

SCALE: 0 200 400 800 Scale in Feet

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

TITLE: Onsite Wetlands, Surface Water, and Sediment
Former Port Mobil Terminal
Staten Island, NY

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DATE: September 2021

FIGURE #: 6

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27135_NorthPt_RIWP_Site_Wetlands.mxd

Legend

- Proposed Surfacial Soil Sample Location
- Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 0 150 300 600 Scale in Feet

PROJECT: Remedial Investigation Workplan

CLIENT NAME: NP Staten Island Industrial, LLC

TITLE:

Proposed Surficial Soil Sample Locations
Former Port Mobil Terminal
Staten Island, NY

WESTON SOLUTIONS

DATE: September 2021

FIGURE #: 7

P:\PSEGIS\MXD\2021_05_Rt22_Bridgewater\27363_NorthPt_Proposed_Surficial_Soil_Sample_Loc.mxd

Legend

- Proposed Shallow Soil Boring Sample Location
- Proposed Intermediate Soil Boring Sample
- Proposed UST Shallow Boring Location
- Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:

1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE:

0 150 300 600

Scale in Feet

PROJECT: Remedial Investigation Workplan

CLIENT NAME: NP Staten Island Industrial, LLC

TITLE:

Proposed Shallow & Intermediate Soil Sample Locations
Former Port Mobil Terminal
Staten Island, NY

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DATE: September 2021

FIGURE #: 8

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27364_NorthPt_Proposed_Shallow_Intermediate_Soil_Boring_Loc.mxd

Legend

- Proposed Shallow Boring Location
- Proposed Surfacial Soil Sample Location
- Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 0 100 200 400 Scale in Feet

TITLE: Proposed SWMU 9, 13, and 14 Sample Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Workplan

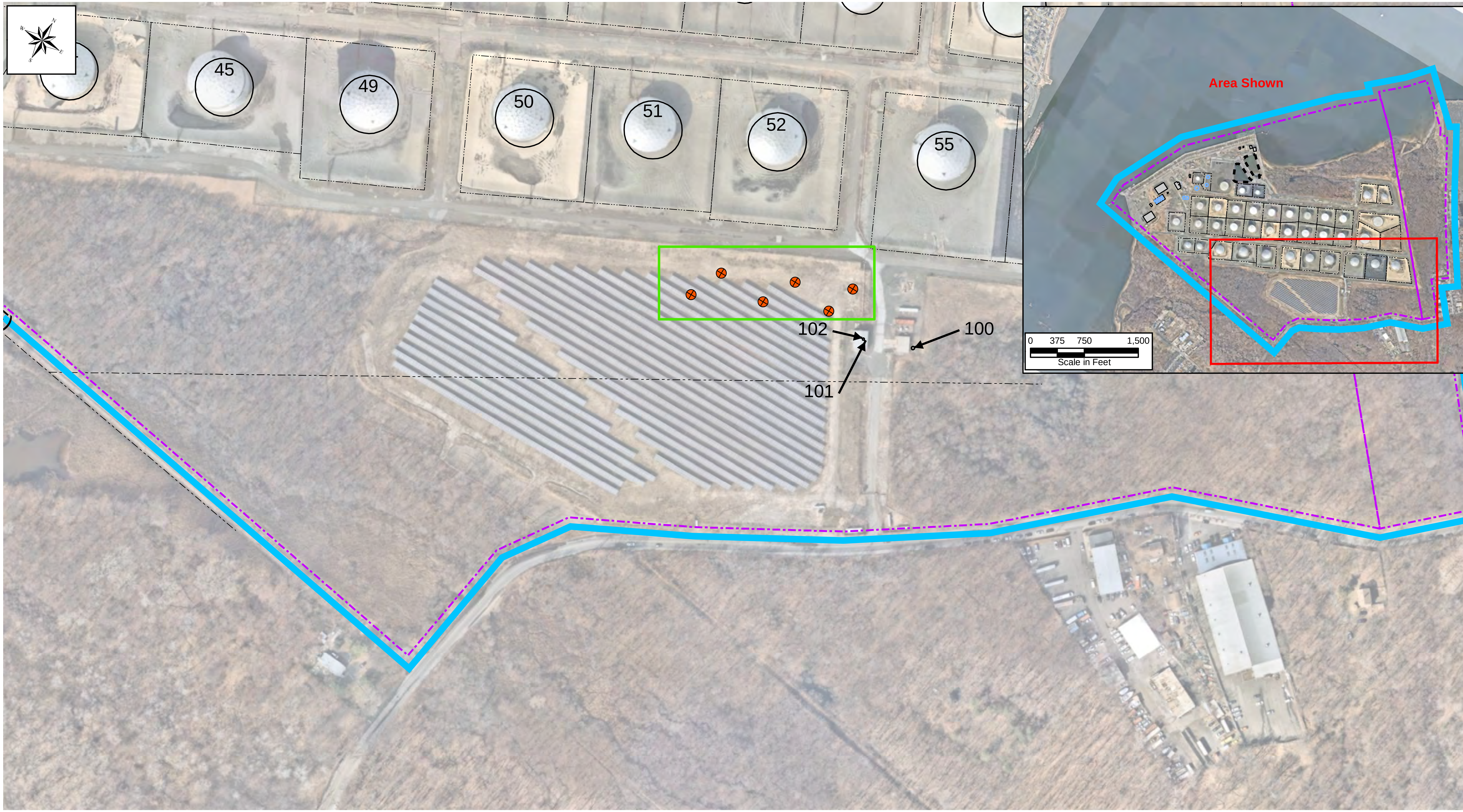
CLIENT NAME: NP Staten Island Industrial, LLC.

WESTON SOLUTIONS

DATE: September 2021

FIGURE #: 9

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27171_NorthPoint_RIWP_Prop_Sample_Locs_SWMU9.mxd



Legend

- Proposed Shallow Soil Boring
- Approximate Location of Soil Pile
- Site Boundary
- Project Site Boundary
- Containment Berm

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 0 100 200 400 Scale in Feet

TITLE: Proposed SWMU 17 Sample Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Workplan

CLIENT NAME: NP Staten Island Industrial, LLC.

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DATE: September 2021

FIGURE #: 10

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27172_NorthPoint_RIWP_Prop_Sample_Locs_SWMU17.mxd

Legend

- Proposed Monitoring Well
- Proposed Shallow Soil Boring Sample Location
- Proposed Intermediate Soil Boring Sample
- Proposed UST Shallow Boring Location
- DNAPL Transects
- 2 Existing Aboveground Tank with Identification Number
- Project Site Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE:

0 150 300 600

Scale in Feet

PROJECT:

Remedial Investigation Workplan

CLIENT NAME:

NP Staten Island Industrial, LLC

TITLE:

Proposed AST and UST 2 Sample Locations
Former Port Mobil Terminal
Staten Island, NY

WESTON SOLUTIONS SM

DATE: September 2021

FIGURE #: 11

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27149_NorthPt_Proposed_Remaing_AST_Sample_Loc.mxd

Legend

- Proposed Surficial Soil Borings (Aboveground Pipe)
- Proposed Shallow Soil Borings (Belowground Pipe)
- 2 Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE:

0 217.5 435 870

Scale in Feet

TITLE:

Proposed Above-grade and Sub-grade Piping Sample Locations Former Port Mobil Terminal Staten Island, NY

PROJECT: Remedial Investigation Workplan

CLIENT NAME: NP Staten Island Industrial, LLC.

WESTON SOLUTIONS SM

DATE: September 2021

FIGURE #: 12

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27173_NorthPoint_RIWP_Prop_Sample_Locs_Piping.mxd

Legend

- Proposed Shallow Soil Boring Locations
- Site Boundary
- Non-Operational Areas
- Tax Parcels Boundary
- Wetlands
- Containment Berm
- Surface Impoundment

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 450 225 0 450 Feet

TITLE: Non-Operational Area Sample Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

WESTON SOLUTIONS SM

DATE: September 2021

FIGURE #: 13

Path: P:\NorthPoint\GIS\MXD\2021_06_RIWP\27293_NorthPoint_RIIRM_NonOp_Areas_GRIDS.mxd

Legend

- Proposed Soil Borings
- Existing Aboveground Tank with Identification Number
- Site Boundary
- Tax Lot Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE:
0 100 200 400
Scale in Feet

TITLE:
Proposed SWMU 1 Sample Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT:
Remedial Investigation Work Plan

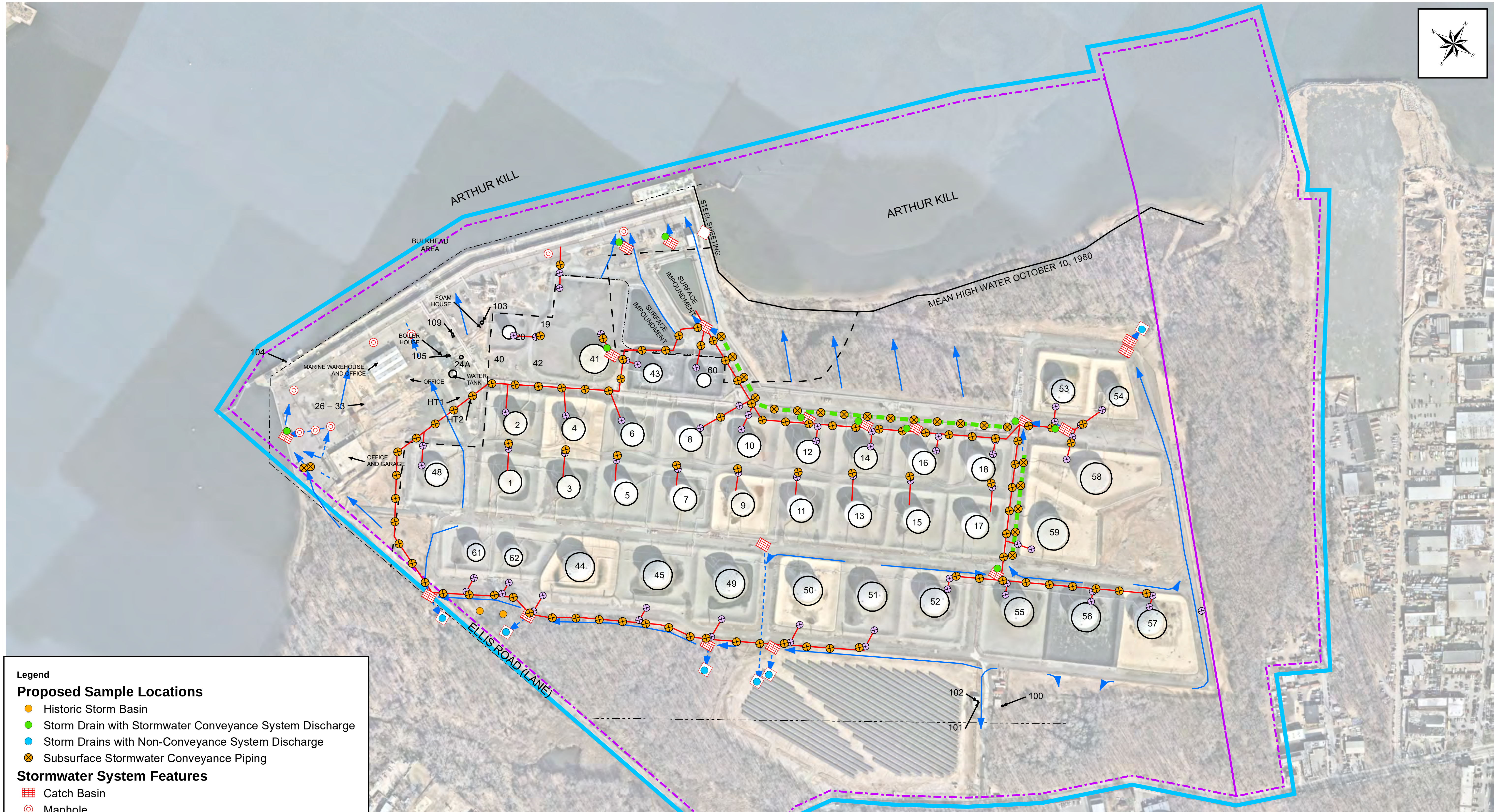
CLIENT NAME:
NP Staten Island Industrial, LLC.

WESTON SOLUTIONS SM

DATE:
September 2021

FIGURE #:
14

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27174_NorthPoint_RIWP_Prop_Sample_Locs_SWMU1.mxd



Legend

Proposed Sample Locations

- Historic Storm Basin
- Storm Drain with Stormwater Conveyance System Discharge
- Storm Drains with Non-Conveyance System Discharge
- Subsurface Stormwater Conveyance Piping

Stormwater System Features

- Catch Basin
- Manhole
- Outfall
- Stormwater Valve
- Drainage Line
- Surface Flow
- Underground Line Flow
- Trench Drain
- Site Boundary
- Tax Lot Boundary

Notes:
1. Stormwater Drainage features are approximate.

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.

SCALE: 0 200 400 800 Scale in Feet

TITLE: Storm Water Conveyance System Proposed Sample Locations Former Port Mobil Terminal Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

WESTON SOLUTIONS SM

DATE: September 2021

FIGURE #: 15

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27175_NorthPt_RIWP_Site_Stormwater_Proposed_Samples.mxd

Legend

- Proposed Intermediate Soil Boring Location
- Proposed Shallow Soil Boring Location
- Existing Aboveground Tank with Identification Number
- Tax Parcel Boundary
- Site Boundary
- Historical Tank Location
- Containment Berm
- Surface Impoundment
- Buildings

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. EPA. Final RCRA Facility Assessment. August 5, 1993.
5. Thew Associates, PLLC. Staten Island Terminal Property Survey. August 21, 2006.

SCALE: 0 100 200 400 Scale in Feet

TITLE: Additional SWMU Proposed Sampling Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC.

WESTON SOLUTIONS SM

DATE: September 2021

FIGURE #: 16

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27361_NorthPoint_RIWP_Additional_SWMU_Locs.mxd

Legend

- Proposed Groundwater Sample Location
- Proposed Well Point
- Weston Proposed Intermediate Monitoring Well
- Weston Proposed Groundwater Bisecting Monitoring Well
- Proposed Geotechnical Shallow Monitoring Well
- Monitoring Well Location (Shallow)
- Site Boundary
- Project Site Boundary
- Wetlands

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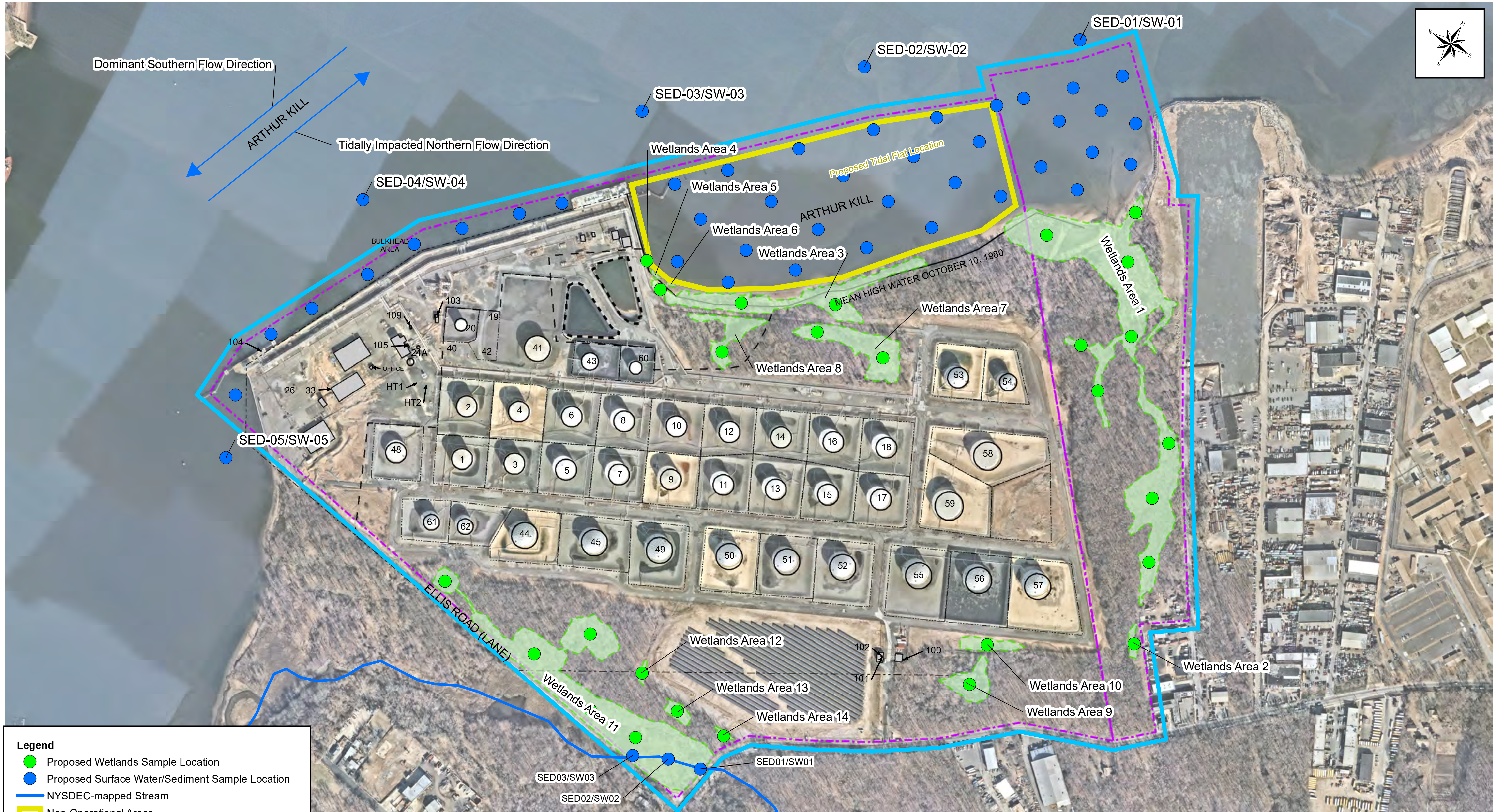
Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: August 2021	PROJECT MANAGER:	CLIENT NAME: NP Staten Island Industrial, LLC	DRAWING TITLE: Current & Proposed Monitoring Well Locations Former Port Mobil Terminal Staten Island, New York
DRAWING PATH:	CHECKED BY:	PROJECT NAME:	
REVISION No. REV#	CONTRACT No. DELIVERY ORDER NO.		
WORK ORDER No. 15807.002.001.0004	DRAWN/MODIFIED BY: B. Langlois DATE CREATED: March 2021		FIGURE: 17 SCALE: 1" = 150' DATE: September 2021



Legend

- Proposed Wetlands Sample Location
- Proposed Surface Water/Sediment Sample Location
- NYSDEC-mapped Stream
- Non-Operational Areas
- Site Boundary
- Wetlands
- Existing Aboveground Tank with Identification Number
- Tax Parcel Boundary
- Containment Berm
- Surface Impoundment
- Buildings

Notes:
1. Proposed locations may be adjusted in the field based on visual inspection including any evidence of historical impacts.

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. National Wetlands Inventory, U.S. Fish and Wildlife Services, 2019
5. NYSDEC, Water Quality Classifications dataset.

SCALE: 0 200 400 800 Scale in Feet

TITLE: Sediment, Surface Water, and Wetland Sample Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

WESTON SOLUTIONS

DATE: September 2021

FIGURE #: 18

P:\NorthPoint\GIS\MXD\2021_06_RIWP\27135_NorthPt_RIWP_Site_Wetlands_1.mxd

Legend

- Proposed Surficial Soil Sample Location
- Proposed Shallow Soil Boring Delineation
- Soil Sample Location (Result Exceeding Industrial SCO Criteria)
- Soil Sample Location (No Exceedances)
- Site Boundary
- Tax Parcel Boundary

Notes:
1. All results are compared against Industrial SCO Criteria.
2. All results are displayed in mg/kg (parts per million).

Sources:
1. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
2. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 2, 2020.

Analyte	Criteria (mg/kg)
1,2,4-Trimethylbenzene	380
Arsenic	16
Benz(a)anthracene	11
Benzo(a)pyrene	1.1
Benzo(b)fluoranthene	11
Chromium	800
Dibenz(a,h)anthracene	1.1
Indeno(1,2,3-cd)pyrene	11
Lead	3900
Zinc	10000

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http://www.westonsolutions.com

REPORT DATE: September 2021
DRAWING: 27162_NorthPt_RIWP_Soil_Exceed_Industrial_SCO
PATH: P:\NorthPoint\GIS\MXD\2021_06_RIWP
REVISION No. 0
WORK ORDER No. 15807.002.001.0004
PROJECT MANAGER: M. Afflitto
CHECKED BY: N. Diehl
CONTRACT No.
DELIVERY ORDER NO.
DRAWN/MODIFIED BY: K. Heulitt
DATE CREATED: 3/24/2021
CLIENT NAME: NP Staten Island Industrial, LLC
PROJECT NAME: Remedial Investigation Work Plan
DRAWING TITLE: Proposed Soil Delineation Samples for COCs Exceeding Industrial SCOs Former Port Mobil Terminal Staten Island, NY
FIGURE: 19
SCALE: 1 " = 150 '
DATE: September 2021

Legend

- Proposed Shallow Soil Sample Location
- Proposed Intermediate Soil Boring Location
- Proposed Surficial Soil Sample Location
- Soil Sample Location (Result Exceeding Unrestricted Soil Criteria or Protection of Groundwater Criteria)
- Soil Sample Location (No Exceedances)
- Site Boundary
- Tax Parcel Boundary

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TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: September 2021	PROJECT MANAGER: M. Afflitto	CLIENT NAME: NP Staten Island Industrial, LLC	DRAWING TITLE: Proposed Soil Delineation Samples for COCs Exceeding Protection of Groundwater and Unrestricted SCOs Former Port Mobil Terminal Staten Island, NY
DRAWING: 27165_NorthPt_Soil_Results_CoCs_PoGW_or_Unrestricted.mxd PATH: P:\NorthPoint\GIS\MXD\2021_06_RIWP\	CHECKED BY: N. Diehl		
REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Remedial Investigation Work Plan	
WORK ORDER No. 15807.002.001.0003.01	DRAWN/MODIFIED BY: J. Gardner DATE CREATED: 6/30/2021		FIGURE: 20 SCALE: 1 " = 100 ' DATE: September 2021

Legend

- Proposed Well Point
- Extent of Known LNAPL
- Well Location
- Existing Aboveground Tank with Identification Number
- Tax Parcel Boundary
- Containment Berm
- Surface Impoundment
- Buildings
- Site Boundary

Sources:
1. Louis Berger Area 6 (Former Lube Tanks) Facility Wide Site Plan, Kinder Morgan Liquids Terminals, Staten Island, New York.
2. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
3. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 26, 2019.
4. National Wetlands Inventory, U.S. Fish and Wildlife Services, 2019

SCALE: 0 200 400 800 Scale in Feet

TITLE: Proposed LNAPL Delineation Well Point Locations
Former Port Mobil
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

WESTON SOLUTIONS

DATE: September 2021

FIGURE #: 21

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Legend

- Proposed Delineation Sample Location
- Proposed GW Bisecting Well
- Groundwater Sample Location (Contaminants of Concern Exceed GA Criteria)
- Groundwater Sample Location (No Exceedances)
- Groundwater Sample Not Collected
- Geotech Proposed Monitoring Well
- Sitewide Monitoring Wells
- Direction of Groundwater Flow
- Site Boundary

Notes:
1. All results are compared against the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), June 1998 - Groundwater Effluent Limitations (Class GA)."
2. All results are displayed in ug/L (parts per billion).

Sources:
1. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
2. Nearmap Photomap TM. https://go.nearmap.com/. Photo Date: March 2, 2020.

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http://www.westonsolutions.com

REPORT DATE: September 2021	PROJECT MANAGER: M. Afflitto	CLIENT NAME: NP Staten Island Industrial, LLC	DRAWING TITLE: Proposed Groundwater Delineation Locations for COCs Exceeding GA Former Port Mobil Terminal Staten Island, NY
DRAWING: 27146_NorthPt_Mar2021_MW_Sampling_Results_COCs_GA.mxd PATH: P:\NorthPoint\GIS\MXD\2021_03	CHECKED BY: N. Diehl		
REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Remedial Investigation Workplan	
WORK ORDER No. 15807.002.001.0004	DRAWN/MODIFIED BY: J. Gardner DATE CREATED: 6/29/2021		FIGURE: 22 SCALE: 1" = 150' DATE: September 2021

Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: September 2021	PROJECT MANAGER: M. Afflitto	CLIENT NAME: NP Staten Island Industrial, LLC	DRAWING TITLE: Proposed Geotechnical Investigation Former Port Mobil Terminal Staten Island, NY
DRAWING: 27143_NorthPt_Soil_Results_Langan_Geotechnical_Proposed PATH: P:\NorthPoint\GIS\MXD\2021_06_RIWP	CHECKED BY: N. Diehl		
REVISION No.	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Remedial Investigation Work Plan	
WORK ORDER No. 15807.002.001.0003.01	DRAWN/MODIFIED BY: J. Gardner DATE CREATED: 6/24/2021		FIGURE: 23 SCALE: 1" = 200' DATE: September 2021

Legend

- Soil Vapor Sample Location (Exceeds Criteria)
- Soil Vapor Sample Location (No Exceedances)
- Proposed soil vapor locations not completed (due to high groundwater)
- Soil Vapor Sample Not Collected
- Proposed Vapor Samples
- Proposed Building Footprint
- Tax Parcel Boundary
- Site Boundary

Notes:
1. All results are compared to USEPA Commercial Vapor Intrusion Screening Levels (VISL) Target Sub-Slab and Near-Source Soil Gas Concentration.
2. All results are displayed in units of ug/m3 (parts per billion).

Sources:
1. Richmond_2018_Tax_Parcels_SHP_1907. NYS ITS GIS Program Office. August 23, 2018. http://gis.ny.gov/parcels/.
2. Nearmap Photomap ™. https://go.nearmap.com/. Photo Date: March 2, 2020.

SCALE: 300 150 0 300 Graphic Scale in Feet

TITLE: Existing and Proposed Soil Vapor Locations
Former Port Mobil Terminal
Staten Island, NY

PROJECT: Remedial Investigation Work Plan

CLIENT NAME: NP Staten Island Industrial, LLC

WESTON SOLUTIONS

DATE: September 2021

FIGURE #: 24

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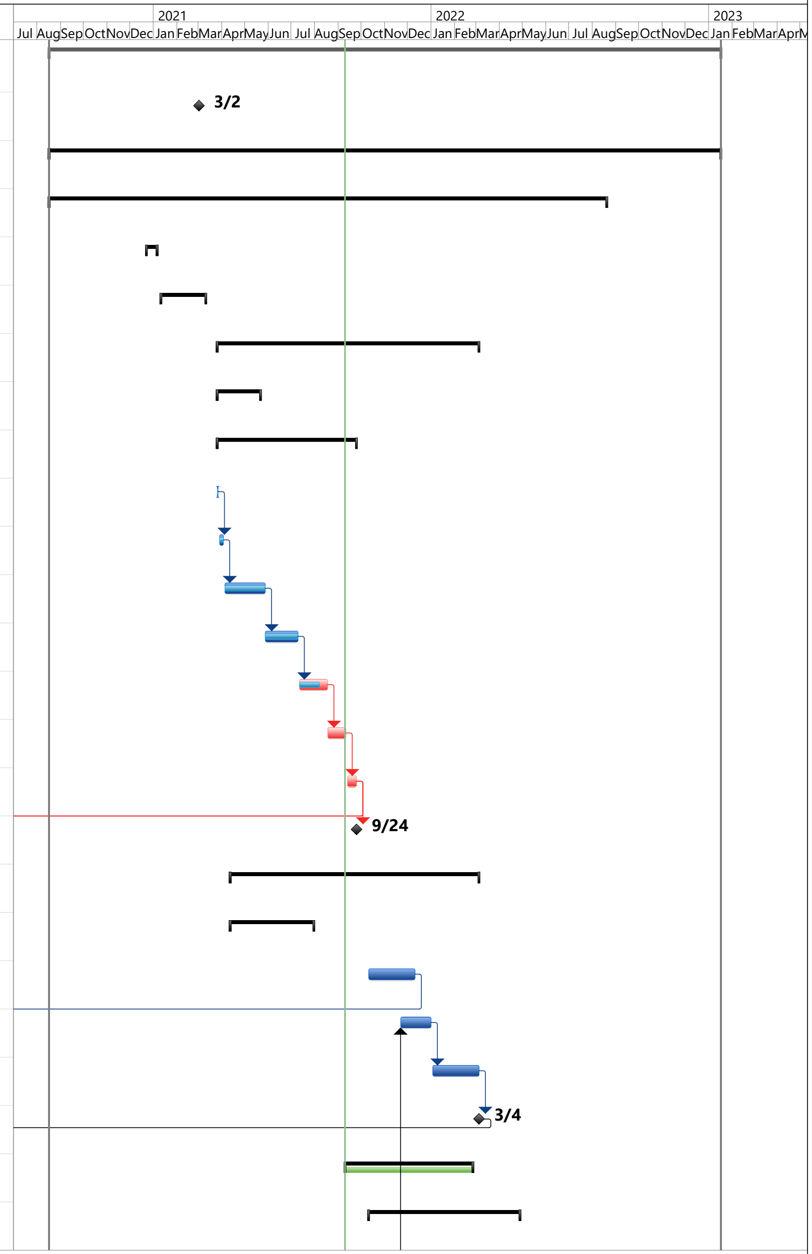
Figure 25
Proposed Remedial Investigation Schedule

ID	Task Name	Duration	Start	Finish
0	**NorthPoint RI Implementation**	**628 days**	**Mon 8/17/20**	**Mon 1/16/23**
1	**PHASE 00 - PROJECT / CONTRACT**	**0 days**	**Tue 3/2/21**	**Tue 3/2/21**
3	**PHASE 01 - PLANNING / PRE-CONSTRUCTION**	**628 days**	**Mon 8/17/20**	**Mon 1/16/23**
4	**NON-ULURP APPROVALS/CEQR**	**522 days**	**Mon 8/17/20**	**Fri 8/19/22**
17	**Focused Site Characterization Workplan**	**7 days**	**Wed 12/23/20**	**Tue 1/5/21**
20	**Focused Site Characterization**	**43 days**	**Mon 1/11/21**	**Wed 3/10/21**
23	**Site Characterization Summary Report and RI Workplan**	**246 days**	**Fri 3/26/21**	**Fri 3/4/22**
24	**Site Characterization Summary Report**	**41 days**	**Fri 3/26/21**	**Fri 5/21/21**
30	**RI Workplan**	**131 days**	**Fri 3/26/21**	**Fri 9/24/21**
31	Draft/Submit RI Workplan	1 day	Fri 3/26/21	Fri 3/26/21
32	DEC/EPA Review	5 days	Mon 3/29/21	Fri 4/2/21
33	Additional DEC/EPA Review	39 days	Mon 4/5/21	Thu 5/27/21
34	Received Additional Comments/Respond to Comments/Revise WP	31 days	Fri 5/28/21	Fri 7/9/21
35	Additional DEC/EPA Review	27 days	Mon 7/12/21	Tue 8/17/21
36	Comment Resolution	18 days	Wed 8/18/21	Fri 9/10/21
37	Revise Final RI Workplan and DEC/EPA Approval	10 days	Mon 9/13/21	Fri 9/24/21
38	**Key Milestone - RI Workplan Approval**	**0 days**	**Fri 9/24/21**	**Fri 9/24/21**
39	**PFAS Summary Report and RI Workplan**	**235 days**	**Mon 4/12/21**	**Fri 3/4/22**
40	Draft/Submit PFAS Summary Report and RI Workplan	80 days	Mon 4/12/21	Fri 7/30/21
44	DEC/EPA Review and Approval of PFAS Soil Work Plan	45 days	Mon 10/11/21	Fri 12/10/21
45	Prepare/Submit Revised PFAS Workplan Based Upon GW Study	30 days	Mon 11/22/21	Fri 12/31/21
46	DEC/EPA Review Final PFAS Summary Report and RI Workplan*	45 days	Mon 1/3/22	Fri 3/4/22
47	DEC/EPA Approval of Final PFAS Summary Report and RI Workplan	0 days	Fri 3/4/22	Fri 3/4/22
48	**Demolition**	**120 days**	**Fri 9/10/21**	**Thu 2/24/22**
50	**Remedial Investigion**	**143 days**	**Mon 10/11/21**	**Wed 4/27/22**

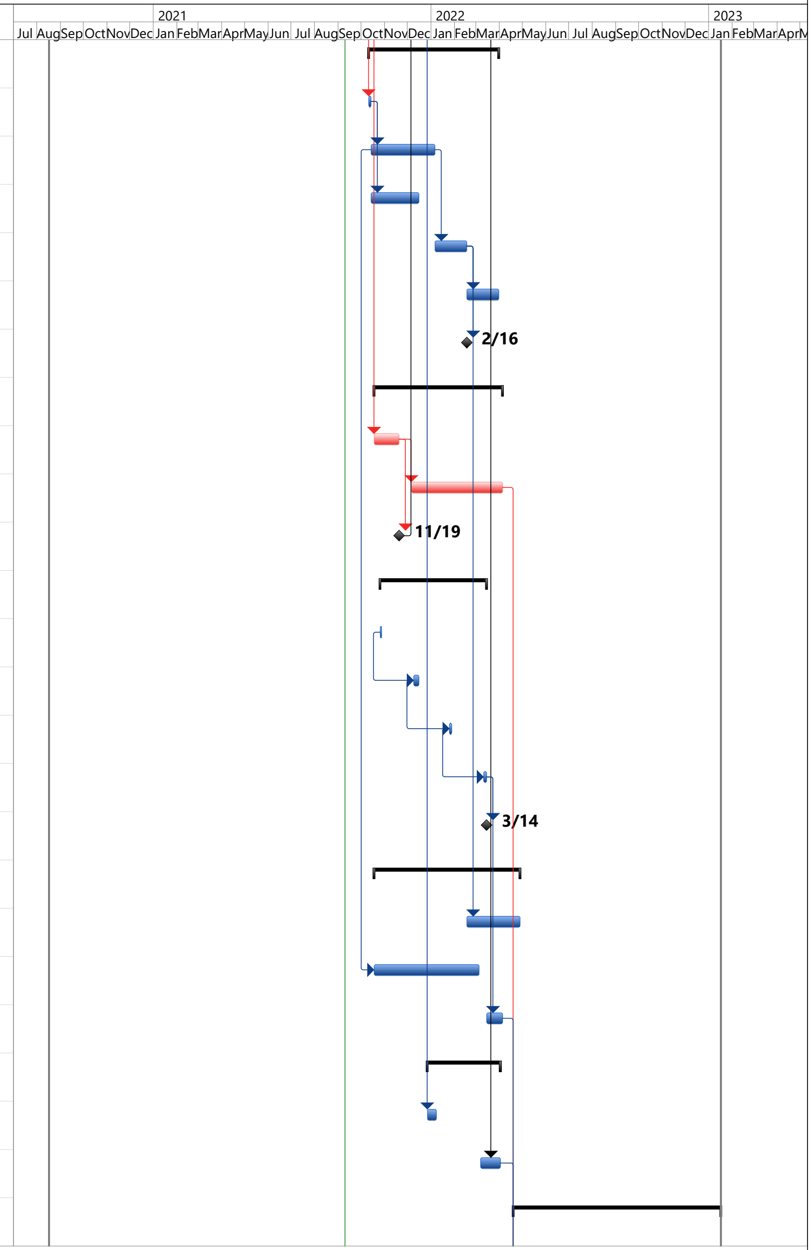


NorthPoint RI Implementation
Date: Fri 9/10/21

Task		Summary		Critical	
Milestone	◆	Project Summary		Progress	

Figure 25
Proposed Remedial Investigation Schedule

ID	Task Name	Duration	Start	Finish
51	**Pre-Demo Investigation - Outside Tank Footprint**	**123 days**	**Mon 10/11/21**	**Wed 3/30/22**
52	Mobilization and Site Setup	3 days	Mon 10/11/21	Wed 10/13/21
53	Soil Sampling (surface soil and borings)	60 days	Thu 10/14/21	Wed 1/5/22
54	Monitoring Well Installations, Sampling	45 days	Thu 10/14/21	Wed 12/15/21
55	Additional Boring and Sampling, Non-Operational Areas and Infrastructure	30 days	Thu 1/6/22	Wed 2/16/22
56	Surface Water, Sediment and Wetlands Sampling	30 days	Thu 2/17/22	Wed 3/30/22
57	**Key Milestone - On-site RI Fieldwork Complete**	**0 days**	**Wed 2/16/22**	**Wed 2/16/22**
58	Geotechnical Investigation (by Others)	121 days	Mon 10/18/21	Mon 4/4/22
59	Groundwater Investigation and Study (by Others)	25 days	Mon 10/18/21	Fri 11/19/21
60	SPT and CPT Borings (by Others)	86 days	Mon 12/6/21	Mon 4/4/22
61	**Key Milestone - Groundwater Study Provided by Others**	**0 days**	**Fri 11/19/21**	**Fri 11/19/21**
62	**Post-Demo Investigation - Inside Tank Footprint**	**100 days**	**Tue 10/26/21**	**Mon 3/14/22**
63	Phase 1 - Tanks 9, 10, 20 and 50	2 days	Tue 10/26/21	Wed 10/27/21
64	Phase 2 - Tanks 1, 2, 3, 4, 5, 6, 7, 8, 41, 43, 60, 48, 61, 62, 44, 45 and 49	5 days	Thu 12/9/21	Wed 12/15/21
65	Phase 3 - Tanks 11, 12, 13, 14, 15, 16, 17, 18, 51 and 51	3 days	Tue 1/25/22	Thu 1/27/22
66	Phase 4 - Tanks 53, 54, 58, 59, 55, 56 and 57	2 days	Fri 3/11/22	Mon 3/14/22
67	**Key Milestone - Post-Demo Investigation Complete**	0 days	Mon 3/14/22	Mon 3/14/22
68	**Delineation**	**138 days**	**Mon 10/18/21**	**Wed 4/27/22**
69	Delineation (200')	50 days	Thu 2/17/22	Wed 4/27/22
70	Delineation (20')	100 days	Mon 10/18/21	Fri 3/4/22
71	Post-Demo Delineation	15 days	Tue 3/15/22	Mon 4/4/22
72	**PFAS Investigation**	**70 days**	**Mon 12/27/21**	**Fri 4/1/22**
73	Soil Sampling	10 days	Mon 12/27/21	Fri 1/7/22
74	MW Installation and GW Sampling	20 days	Mon 3/7/22	Fri 4/1/22
75	**Remedial Investigation Report (RIR)**	**195 days**	**Tue 4/19/22**	**Mon 1/16/23**

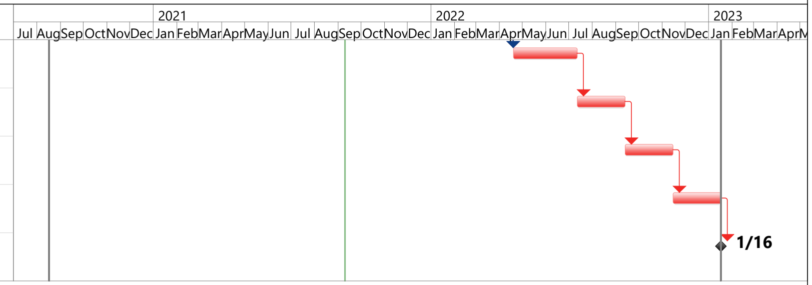


NorthPoint RI Implementation
Date: Fri 9/10/21

Task		Summary		Critical	
Milestone	◆	Project Summary		Progress	

Figure 25
Proposed Remedial Investigation Schedule

ID	Task Name	Duration	Start	Finish
76	Remedial Investigation Report Preparation/Submittal	60 days	Tue 4/19/22	Mon 7/11/22
77	DEC/EPA Review Draft Remedial Investigation Report	45 days	Tue 7/12/22	Mon 9/12/22
78	Response to Comments/Submit Revised Report	45 days	Tue 9/13/22	Mon 11/14/22
79	DEC/EPA Review Final Remedial Investigation Report	45 days	Tue 11/15/22	Mon 1/16/23
80	DEC/EPA Approve Final Remedial Investigation Report	0 days	Mon 1/16/23	Mon 1/16/23



NorthPoint RI Implementation
Date: Fri 9/10/21

Task		Summary		Critical	
Milestone	◆	Project Summary		Progress	