REMEDIAL WORK PLAN

Long Island Rail Road Yaphank Site
East of River Road and South of Railroad Tracks
Suffolk County, Yaphank, NY 11980
Site No. C152146

November 2021

Quality information

Prepared by	Checked by	Verified by	Approved by
AECOM	Amit Haryani	Reeti Doshi	Shail Pandya

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Distribution List

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Prepared for:

Metropolitan Transportation Authority
Long Island Rail Road
146-01 Archer Avenue MC 1428
Jamaica, New York 11423

Prepared by:

AECOM
125 Broad Street
New York, NY 10004

Submitted to:

Tara Rutland
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A
625 Broadway, 12th Floor
Albany, New York

REMEDIAL WORK PLAN

LIRR YAPHANK

EAST OF RIVER ROAD AND SOUTH OF RAILROAD TRACKS

SUFFOLK COUNTY, YAPHANK, NY 11980

SITE NO. C152146

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY

LONG ISLAND RAIL ROAD

146-01 ARCHER AVENUE MC 1428

JAMAICA, NEW YORK 11423

Prepared by:

AECOM
125 BROAD STREET, 15th FLOOR
NEW YORK, NY 10004

Submitted To:

TARA RUTLAND
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
REMEDIAL BUREAU A
625 BROADWAY, 12TH FLOOR
ALBANY, NEW YORK

November 2021

CERTIFICATION

I, Amit Haryani, certify that I am currently a New York State registered Professional Engineer and that this Remedial Work Plan (RWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the requirements of New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Brownfield Cleanup Program (6 NYCRR Subpart 375-3), 6 NYCRR Subpart 375-3.8(g)(4) and NYSDEC DER Technical Guidance for Site Investigation and Remediation (DER-10).

NYS Professional Engineer #	Date	Signature
	November 12, 2021	

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Executive Summary

The Metropolitan Transportation Authority-Long Island Rail Road (LIRR) has entered into a Brownfield Cleanup Agreement (BCA) (Index Number C152146-01-19) with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) under the Brownfield Cleanup Program (BCP) in order to investigate and remediate the LIRR Yaphank site (Site Number C152146). This Remedial Work Plan (RWP) has been prepared in accordance with the requirements set forth in NYSDEC's NYCRR Subpart 375-3, Subpart 375-3.8(g)(4), as well as NYSDEC DER-10 to address the surface and subsurface soil contamination within the LIRR property and adjoining properties (Nicolia property, ATC property, and one undeveloped residential property) associated with historical disposal operations.

Based on the findings of the January 2005 Site Investigation Report and the June 2008 Supplemental Site Investigation Report, historical fill related material was identified at the site. The historic fill was identified at depths ranging in thickness from 2.5 to 24 feet and covering a total area of approximately 7.5 acres. Various metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc, were also identified within the surface and subsurface fill material at concentrations that exceed the NYSDEC Part 375 Industrial Use Soil Cleanup Objectives (SCOs).

Exposure to metals in the surface soil, especially in the westernmost portion of the LIRR property, remains the most significant issue with respect to potential routes of exposure either through direct ingestion or through the inhalation of wind-blown dust. Secondly, exposure to metals and, to a lesser extent, PAHs in subsurface soil during excavation activities, is another potential route of exposure. Given the minimal impacts to groundwater quality and that shallow groundwater is not utilized as a potable water source, the use of groundwater is not considered a potential exposure pathway. Further, as confirmed via groundwater sampling in September 2018, no emerging contaminants such as Per- and Polyfluorinated Alkyl Substances (PFAs) were present at detectable concentrations or were detected at minimal concentrations, well below the United States Environmental Protection Agency (USEPA)-issued drinking water health advisory concentrations for Perfluorooctanoic acid (PFOAs) and Perfluorooctanesulfonic acid (PFOS).

Based on the Remedial Action Objectives (RAOs) defined for the site, three different potential remedial alternatives were evaluated against the nine remedy selection factors presented in NYSDEC DER-10 Guidance. Based on this alternatives analysis, it is recommended that the remediation of the site include the placement of a 1-foot semi-permeable soil cover over the historic fill material on the LIRR property and the Nicolia property, excavation of fill material above Residential Use SCOs from the adjacent residential property and replacement with clean fill, consolidation of any excavated fill material on the western portion of the LIRR property, the

placement of a 12-inch asphalt cover on the adjoining Asbestos Transportation Company, Inc. (ATC) property, drainage enhancements and the implementation of institutional controls.

The proposed remedy includes the excavation of surficial soil before the placement of the certified clean fill cover in areas where the existing ground surface elevation cannot be significantly altered. This includes the ATC property and portions of the Nicolia property. Any excavated soil will be placed on the western portion of the LIRR property before placement of the final cover. Additionally, after the placement of the historic fill material in the western 2-acre portion of the LIRR property, it will be capped with an impermeable geomembrane cap. This cap will be protected on the top or the "crown" of the consolidated fill by asphalt and a fabric-formed concrete revetment/retaining wall on the side slopes. This will serve as an effective low permeable cap in the portion of the site that has previously exhibited the highest metal concentrations. Additional drainage enhancements are incorporated into the cap design to convey the additional storm water from this area to several off-site drainage basins.

This alternative is the recommended remedial alternative for the site, given it would:

- Be protective of human health and the environment;
- Prevent direct exposure to the metals-contaminated surface soil;
- Prevent the off-site migration of fill due to windblown dust and erosion;
- Meet applicable NYSDEC Standards, Criteria, and Guidance (SCGs) and RAOs;
- Provide for a reduction in the mobility of fill-related contaminants;
- Significantly reduce the potential for contaminants present in the fill to leach into groundwater;
- Be significantly more feasible to implement compared to other alternatives;
- Be effective in the short-term and long-term;
- Provide for less short-term sustainable environmental impacts compared to other alternatives;
- Be significantly less costly to complete compared to other alternatives;
- Is anticipated to be acceptable to the community;
- Provide for the intended future use of the LIRR property as an active rail line; and
- Allow for the continued use of the adjoining properties.

1.0 Introduction

1.1 Project Background

The Metropolitan Transportation Authority (MTA)- Long Island Rail Road (LIRR) has entered into a Brownfield Cleanup Agreement (BCA) (Index Number C152146-01-19) with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) in order to investigate and remediate the LIRR Yaphank site (Site Number C152146), hereafter referred to as the "site". This Remedial Work Plan (RWP) has been prepared by AECOM USA, Inc. (AECOM) for the MTA-LIRR in accordance with the requirements set forth in NYSDEC's NYCRR Subpart 375-3, Subpart 375-3.8(g)(4), as well as NYSDEC DER-10 and to address the surface and subsurface soil contamination at the site associated with historical disposal operations, as presented in the January 2005 Site Investigation Report and the June 2008 Supplemental Site Investigation Report.

1.2 Site Description

The site is located in Yaphank, Town of Brookhaven, Suffolk County, New York (see ***Figures 1, 2, and 3***). The site is comprised of the following: Long Island Rail Road (LIRR)-owned portion approximately 4 acres in size (LIRR property); the Nicolia portion (Nicolia Ready-Mix, Inc., a concrete mixing plant) of 1.9 acres; the Asbestos Transportation Company, Inc. (ATC) portion of 1.6 acres; and, one undeveloped residential property located immediately south of the westernmost end of the LIRR property of 0.02 acres. The ATC property located immediately to the east of the LIRR property was originally owned by the LIRR. The site is located in Yaphank, Town of Brookhaven, Suffolk County, New York. The LIRR property is a relatively long and narrow parcel running parallel on the south of the LIRR main line track, located immediately east of River Road. The overall site is identified on the Suffolk County Tax Maps (SCTM) as Section 640 Block 1 Lot 2 (4-acres); Section 641 Block 1 – Lots Nos. 12, -21 and 44 (3.5+- acres).

The LIRR property was historically used by the LIRR for fill operations and is currently undeveloped and is primarily an open space with sparse vegetation fenced on its perimeter; however, the eastern most portion of the LIRR property is utilized by Nicolia for the storage of stone and sand aggregate. Nicolia also uses this portion of the LIRR property to unload stone/sand aggregate from a rail siding hopper located adjacent to the mainline track. As the majority of the LIRR property is fenced, the primary access route is via River Road or from Colin Drive via the entrance to Nicolia Ready-Mix, Inc. The site is zoned for industrial, commercial, and residential uses.

The following surrounding land uses are present within the immediate site vicinity:

North: To the north of the main line track, only undeveloped woodland is present, which is also owned by the LIRR. Further to the north is additional woodland that is privately owned.

South: A mix of undeveloped land and residential properties are located to the south of the site. The Carmans River is situated approximately 1,000 feet southwest of the site.

East: To the east is the LIRR right-of-way and a mix of undeveloped land and residential properties.

West: Across River Road, is Southaven County Park, which is operated by the Suffolk County Department of Parks. As indicated above, the Carmans River is approximately 1,000 feet southwest of the site.

Brookhaven National laboratory, a National Priority List (NPL) site, is located approximately 1 mile to the north of the site.

1.3 Site History

There are no known records regarding the prior disposal operations conducted at the LIRR property, but anecdotal information indicates that it was possibly used as a general disposal area for railroad-related materials generated from railroad track maintenance activities, as well as from electric and diesel train repair shops, from the 1950's to the early 1970's. Records of the actual type and/or quantities of materials that were landfilled at the LIRR property do not exist. However, based on borings and test pits completed during the investigation phase, varying amounts of anthropogenic materials including: glass, brick, concrete, coal, ash and wood were encountered in the underlying fill material. In addition, the fill at the site also contains a slag-like material of unknown origin.

The ATC property located immediately to the east of the LIRR property was originally owned by the LIRR and was part of the disposal operations described above. This portion of the LIRR property was sold sometime in the 1970's; however, documents of this sale are not available. Fill material underlies the majority of the ATC property.

1.4 Site Geology and Extent of Fill Material

1.4.1 Site Topography

The site can be divided into two distinct topographic regions. The first consists of a relatively small area on the western end of the LIRR property adjacent to River Road at an elevation of between 30 and 34 feet above mean sea level (msl) and consistent with the natural surrounding topography along River Road. It is likely that this portion of the LIRR property represents the

"pre-filling" elevation of the "native" ground surface. The remainder of the LIRR property has been filled and is between 36 and 52 feet above msl. A relatively steep slope exists along the western and southern property boundaries. The majority of the LIRR property is relatively flat and gently sloping uphill to the east. Based on the completed soil boring program, it is evident that the steep slopes along the western and southern property boundary represent the transition from the original "pre-filling" topography to the area that has been built up by the landfilling activities that took place between the 1950's and early 1970's.

1.4.2 Site Stratigraphy and the Extent of Fill Material

Based on the soil borings completed at the site, shallow site stratigraphy can be divided into a fill unit and an underlying glacial sand unit. According to historical reports, the fill material can be observed on-site as an outcrop exhibiting sharp, almost vertical relief, on the southwestern portion of the LIRR property. The coloration of the outcropping ranges from pale yellow to light purple with some green, brown and black. It is believed that this coloration of the outcrop is due, in part, to the oxidation of the metals present in the fill material. However, based on prior soil boring and test pit programs, the vast majority of the fill material which is not exposed to the atmosphere generally consists of brown to black, poorly sorted sand and gravel with varying amounts of anthropogenic materials such as glass, brick, concrete, coal, ash clinker and wood. Due to the variability of grain size, the fill unit likely exhibits highly variable permeability.

In addition, the fill material contains a hard, dense slag-like material which is most prevalent in the westernmost portion of the LIRR property and is observed within the outcrop described above. The physical characteristics of this slag-like material vary but can be described as two basic types. The first type of slag-like material is generally black, hard, dense and, in some cases, slightly vesicular. When found at grade and exposed to the atmosphere, this slag-like material exhibits a white and/or red precipitate or oxidation on its surface. The second type of slag-like material has more of a brown and tan color, is less dense, not vesicular and can be easily broken by hand. This second type has the characteristics of hardened wood pulp.

Figure 4 provides an estimated extent and thickness of the fill material. The fill unit ranges in thickness from 2.5 to 24 feet across the site; however, the fill unit is typically between 10 to 20 feet thick throughout the majority of the site. Moving from west to east, the fill unit clearly begins at the steep embankment and "fill outcrop" located in the southwest portion of the LIRR property, and continues underlying nearly the entire ATC property adjacent to the eastern boundary and appears to "pinch out" approximately 40 feet west of Moriches Middle Island Road. As shown on ***Figure 4***, the fill material extends into the Nicolia property to the south. In addition, a relatively small portion of fill material appears to extend into the northeastern corner of a residential property that is located adjacent to the westernmost part of the LIRR property. Based on ***Figure 4***, the total area containing the fill material, including the LIRR property, ATC and Nicolia's property, is approximately 7.5 acres. The fill materials can be observed at grade within the southwestern portion of the LIRR property. However, throughout most of the central

and eastern areas of the LIRR property, as well as the Nicolia property, the fill material is covered with a yellow brown colored sand and gravel layer between 6 and 12 inches thick. In general, the property to the east of the LIRR property, which is occupied by ATC, is primarily covered with asphalt. However, fill material is present at grade within several areas of the ATC property, including along the northern property boundary and the loading pit ramp.

Relatively coarse-grained quartz sand, with traces of silt and fine to medium gravel, is present throughout the site immediately below the fill unit. This sand unit is believed to be native glacial outwash sand. The glacial sand unit ranges in color from light brown to yellow with traces of orange and red banding. Within off-site borings that were advanced north and south of the LIRR property, the sand unit was observed at grade. Similarly, the sand unit was observed at grade within the "low-lying" portion of the LIRR property. The glacial sand present within this area of Long Island exhibits good groundwater transmitting properties with hydraulic conductivities as high as 270 feet per day.

1.4.3 Groundwater Flow and Hydraulic Gradients

Based on depth to water measurements collected in November-December 2003, groundwater at the site is approximately 30 feet below ground surface (bgs) and between 10 and 15 feet bgs within the southwestern "low-lying" portion of the LIRR property. Off-site, depth to groundwater generally decreases with the water table being between 2 and 3 feet bgs at monitoring wells (MW-15 and MW-16) located on the southwest side of River Road. Groundwater generally appears to flow in a southerly direction at the site and the hydraulic gradient varies from approximately 0.0016 to 0.0053 feet per foot.

1.5 Summary of Environmental Conditions at the Site

Soil and groundwater samples were collected from in and around the LIRR property in the early 1990's. A NYSDEC Preliminary Site Assessment (PSA) was conducted in 1998-1999. The results of the PSA indicated that fill disposed on the LIRR property had also extended to areas adjacent to the LIRR property. The LIRR property was accepted into the Voluntary Cleanup Program (VCP) in 2002 (Index Number W1-0907-02-02). The current site (LIRR property, Nicolia property, ATC property and the one undeveloped residential property) was accepted into the Brownfield Cleanup Program (BCP) as per the executed BCP agreement dated March 20, 2019. Several investigations have been conducted on and adjacent to the LIRR property dating back to the early 1990's through 2018, including the following:

- A preliminary soil and groundwater sampling program (early 1990s);
- A Ground Penetrating Radar (GPR) Investigation (January 1993);
- A Preliminary Site Assessment (PSA) (April 1998);

- A Supplemental PSA (1999) inclusive of a public and private water supply survey;
- An investigation on and adjacent to the LIRR property (results summarized in January 2005 Site Investigation Report);
- A supplemental investigation on and adjacent to the LIRR property (results summarized in June 2008 Supplemental Site Investigation Report); and
- Sampling of Emerging Contaminants (November 2018).

Based on the results of investigation activities, historical fill-related materials were identified at the site, ranging in thickness from 2.5 feet to 24 feet and covering a total area of approximately 7.5 acres. Various metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc, were also identified within the surface and subsurface fill material at concentrations that exceed the NYSDEC Part 375 Industrial Use SCOs.

The contaminated fill area does not extend west beyond River Road and does not extend east beyond Moriches Middle Island Road. The contaminated fill extends not more than 240 feet south of the railroad tracks. Where the contaminated fill is up to 25 feet thick, it is still separated from the underlying shallow groundwater by about five to ten feet of native soils. Lead exceeded drinking water standards in one on-site groundwater monitoring well but did not exceed drinking water standards off-site. Depth to groundwater ranges from 10 to 30 feet bgs depending on the surface elevation with a confirmed flow direction to the south-southwest. No threats to fish and wildlife resources were identified in the historic studies. Additionally, it was confirmed that the site is not within the Carmans River Corridor or within a regulated wetland area. Off-site groundwater (including groundwater in the direction of the Carman's River) has not been impacted by site-related contaminants**.** Exposure to metals in the surface soil, especially in the westernmost portion of the LIRR property, remains the most significant issue with respect to potential routes of exposure either through direct ingestion or through the inhalation of wind-blown dust. Secondly, exposure to metals and, to a lesser extent, PAHs in subsurface soil during excavation activities, is another potential route of exposure. The use of groundwater is not considered a potential exposure pathway.

The summary presented below has been organized into specific on-site and off-site areas. These areas include:

- Fill Area
- Western Lowland Area
- Off-Site Drainage Swale
- On-Site Dry Well
- Groundwater

1.5.1 Fill Area

Over 60 surface soil samples were collected within the fill area at the site. A number of metal compounds were detected at elevated concentrations, exceeding NYSDEC SCOs, including arsenic, copper, lead and zinc, and to a lesser extent, mercury and nickel. The highest concentrations of the above listed metals were detected within surface soil within the western half of the LIRR property where fill material was determined to be present at the ground surface. Surface soil samples collected from unpaved areas of the ATC property also exhibited several metals above the NYSDEC SCOs. Surface soil samples collected from the easternmost portion of the LIRR property exhibited detectable levels of an asbestos mineral where the property was formerly used by ATC, an asbestos abatement/management company without consent from the LIRR. The metal concentrations detected in the surface soil samples collected from the Nicolia property were found to be relatively low. However, arsenic and copper were detected at concentrations that exceed the NYSDEC SCOs in several samples collected in the westernmost portion of the Nicolia property.

A total of 175 subsurface samples were collected from the fill area for laboratory analysis. Based on this analysis, Semi-Volatile Organic compounds (SVOCs) Polyaromatic Hydrocarbons (PAHs) (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and dibenzo(a,h)anthracene) (ranging from 0.17 mg/kg to a maximum of 152.2 mg/kg) and metal compounds (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) were detected at elevated concentrations above NYSDEC SCOs. However, PAHs were found to be nondetectable within the underlying glacial sand. Volatile Organic Compounds (VOCs) were not detected. These data demonstrated that the highest concentrations of metals and PAHs were present in the fill material whereas the underlying glacial outwash sand metal concentrations were found to be consistent with the background subsurface soil data. Therefore, metals and PAHs are restricted to the fill material and are not impacting the underlying glacial outwash sand.

1.5.2 Western Lowland Area

As a result of the presence of the site-related fill material, elevated concentrations of metals, including arsenic, copper and lead, have been identified in surface soil throughout this portion of the LIRR property. In general, the highest concentrations of the above-listed metals were observed in samples collected at the foot of the slope adjacent to the fill area. Concentrations of these metals tend to decrease significantly toward River Road.

The metals that were most frequently detected at elevated concentrations in subsurface soil within the western lowland area included arsenic, copper, lead, selenium and zinc. The highest concentrations of the above-listed metals were observed in soil samples located along the foot of the slope adjacent to the western lowland area. PAHs, phenol and pentachlorophenol were

not detected in any of the three samples analyzed for these compounds with the exception of fluoranthene.

1.5.3 Off-Site Drainage Swale

The off-site drainage swale encompasses the wooded area to the south of the western lowland area, along the east side of River Road. It is believed that years of surface water runoff from the western lowland area and fill area has resulted in the erosion and deposition of fill material within this off-site area. Note that the LIRR completed an Interim Remedial Measure (IRM) of this area in the spring of 2007 in order to remove all significantly impacted soil.

1.5.4 On-Site Dry Well

The analysis of soil samples collected from an on-site dry well installed by the owners of the adjoining ATC property indicated that all metals and SVOCs, with the exception of benzo(a)pyrene, were found below their SCOs for industrial land use. The water sample collected from the dry well exhibited lead and antimony, as well as several PAHs above NYSDEC Class GA groundwater standards; however, follow-up groundwater samples collected downgradient of the dry well did not indicate that the dry well is a source of groundwater contamination.

1.5.5 Groundwater

VOCs and PAHs were not detected in the on-site or the off-site groundwater. In general, the majority of metals detected in on-site and downgradient groundwater were at concentrations comparable to upgradient groundwater quality. In addition, the metals detected most frequently in the site-related fill material, including arsenic, cadmium, chromium, copper, lead and zinc were generally found below NYSDEC Class GA Groundwater Standards or Guidance Values (SGVs) in on-site groundwater. One exception was the presence of lead that was detected above the NYSDEC Class GA Groundwater Standard of 25 ug/l at three monitoring wells (MW-07, MW-09 and MW-10). However, lead did not exceed drinking water standards off-site and a 10 to 15-foot vertical buffer of unimpacted sand separates the fill material from the local shallow and unconfined water table. In addition, the Public and Private Water Supply Survey completed in 1999 did not identify any public or private supply wells within a 1/2-mile radius downgradient of the site. Based on these findings, groundwater was not considered a potential exposure pathway for site-related contaminants.

Lastly, as documented in a November 2018 report, groundwater samples were collected in September 2018 from seven monitoring wells to evaluate emerging contaminants such as Per- and Polyfluorinated Alkyl Substances (PFAs). According to the report findings, the groundwater samples did not contain detectable levels of 1,4 dioxane. PFAS compounds were also either non-detect or were detected at minimal concentrations, well below the United States

Environmental Protection Agency (USEPA)-issued drinking water health advisory concentrations for Perfluorooctanoic acid (PFOAs) and Perfluorooctanesulfonic acid (PFOS).

1.6 Completed Interim Remedial Measures

Interim Remedial Measures (IRM) activities were conducted at the LIRR property and the adjoining residential property between July and November 2007 in accordance with the NYSDEC-approved IRM Work Plan dated September 2005. The LIRR retained EnviroTrac Environmental Services (EnviroTrac) to perform the IRM activities. EnviroTrac was responsible for conducting all excavation activities, collecting fill characterization and endpoint samples, loading and transporting excavated material for off-site disposal and backfilling the excavated areas. In addition to excavation activities, EnviroTrac was responsible for the installation of erosion control and windscreen materials, the installation of crushed stone in targeted areas of the LIRR property where site-fill was observed at ground level and the upgrading of site fencing in targeted areas of the site. A MTA-LIRR Engineer Consultant provided oversight during all excavation field activities and selected portions of the remaining IRM implementation.

Figure 5 provides the limits and depths of the soil excavation completed as part of the IRM. Excavations were accomplished with the use of track excavators and backhoes. All remedial excavation activities were completed in accordance with the Construction Health and Safety Plan (CHASP), developed by EnviroTrac and approved by the LIRR. Full-time air monitoring during all intrusive activity consisting of upwind and downwind aerosol meters and photoionization detectors (PIDs) was performed in accordance with the Community Air Monitoring Plan (CAMP) included in the CHASP during all intrusive activities. EnviroTrac provided and maintained suitable safeguards (i.e., chain-link fence and snow fencing) surrounding the excavations until these areas were safely restored.

Approximately 873 cubic yards of nonhazardous soil were removed from portions of the off-site western lowland area and the drainage swale located on the adjoining residential property with proper transportation and off-site disposal performed by EnviroTrac. All nonhazardous soil was properly transported by Freehold Cartage, Inc. and Soil Safe, Inc. to Clean Earth in South Kearny, New Jersey and Soil Safe, Inc. in Logan Township, New Jersey. In addition, approximately 140 cubic yards of hazardous soil was removed from the LIRR property for proper site disposal by EnviroTrac. All hazardous soil was transported by Freehold Cartage, Inc. to Clean Earth in South Kearny, New Jersey.

After the removal of all contaminated soil and the collection of confirmatory endpoint samples, the excavation areas were backfilled with certified-clean, coarse sandy soil similar to the underlying native soil. The excavation areas were finished with 6 inches of top soil. Finally, a number of trees and grass were planted to complete the site restoration. In order prevent unauthorized access to the LIRR property, the existing site fencing and swing gates were upgraded/repaired and extended approximately 1,680 feet in order to completely surround the

LIRR property. All newly installed 8-foot high chain-link fencing and locking swing gates were constructed of completely galvanized materials. Fence posts were installed a minimum of 3 feet below grade in domed concrete footings.

In order to reduce the potential for on-site worker exposure to site related fill material on the LIRR property, a layer of unwoven geotextile, overlain by 6 inches of RCA material was also installed in targeted areas adjacent to the LIRR rail siding.

1.7 Human Health Exposure Assessment

Based on the nature and extent of contamination as detailed above and the overall site configuration, the most significant potential route of exposure at the site is the exposure of site trespassers and, to a lesser degree, on-site workers to metal contamination present in on-site surface soil. While, this potential route of exposure was significantly reduced with the upgrading of the site fencing as part of the IRM's, completed in 2007, exposure to metals in the surface soil, especially in the westernmost portion of the LIRR property remains the most significant issue with respect to potential routes of exposure either through direct ingestion or through the inhalation of wind-blown dust. Secondly, exposure to metals and, to a lesser extent, PAHs in subsurface soil during excavation activities, is another potential route of exposure.

Given the minimal impacts to groundwater quality and that shallow groundwater is not utilized as a potable water source, the use of groundwater is not considered a potential exposure pathway.

Complete exposure pathways have the following five elements: 1) a contaminant source; 2) a contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. A discussion of the five elements comprising a complete pathway as they pertain to the site is provided below with respect to current, proposed construction and remediation activities, and future use conditions.

1.7.1 Current Conditions

A potential current exposure pathway exists with respect to metal and PAH impacted soil as discussed above. The routes of exposure are inhalation, ingestion and dermal contact. The potential for exposure is likely minimal given that the site is secure from the public with controlled access only allowed to LIRR-trained maintenance workers and authorized guests.

1.7.2 Construction/Remediation Activities

Potentially complete exposure pathways will exist for impacted soil during the required construction for remediation activities for site workers and any authorized guests. Again, the

routes of exposure would be inhalation, ingestion and dermal contact. The potential for exposure would be minimal given that the site is secure from the public with controlled access. All work and operations will be performed in accordance with the approved Remedial Contractors Health and Safety Plan (CHASP). The CHASP will outline safety measures to be implemented and protective equipment to be used during operations involving the contaminated media. Further dust and/or vapor suppression techniques will be employed to limit potential for off-site migration of site soils and vapors.

The potential off-site migration of site contaminants will not result in a complete exposure pathway during construction and remediation as air monitoring will be conducted for particulates (i.e., dust) and VOCs during all intrusive activities as part of a Community Air Monitoring Program to be developed for the implementation of this RWP.

1.7.3 Proposed Future Use Conditions

As the recommended remedial plan includes a cap for remaining impacted fill material, the potential future exposure pathways for inhalation, ingestion and dermal contact will not exist. A Site Management Plan will be put into effect for the site in the event additional work needs to be completed that would expose the impacted soil in the future, mitigating this concern.

1.8 Proposed Future Use

Currently, the LIRR does not utilize the LIRR property for active operations. However, periodically LIRR workers will continue to access the LIRR property in the future to perform track maintenance and landfill cap maintenance after the implementation of the RWP. The existing site fence that was upgraded as part of the 2007 IRM to prevent unauthorized entry into the LIRR property will be maintained.

Nicolia will continue to use the easternmost portion of the LIRR property for aggregate storage and to access the rail siding and hopper. In addition, this area may be further utilized by Nicolia and/or ATC for equipment and material storage in the future. ATC will continue to utilize their property immediately to the east of the LIRR property as an asbestos transfer facility.

1.9 Remedial Action Objectives

Remedial Action Objectives (RAOs) are goals developed for the protection of human health and the environment. Definition of these objectives requires an assessment of the contaminants and media of concern, migration pathways, exposure routes and potential receptors. Typically, remediation goals are established based on Standards, Criteria and Guidelines (SCGs) to protect human health and the environmental. SCGs for the site, which were developed as part of the site characterization, include NYSDEC SCOs as specified under NYSDEC 6NYCRR

Subpart 375-6 and the NYSDEC Technical and Operational Guidance Series (TOGS) (1.1.1) Ambient Water Quality Standards and Guidance Values, and Groundwater Effluent Limitations (1998). As directed by the NYSDEC in their March 11, 2009 letter, the RAOs for the site included the following:

1.9.1 Groundwater

- Public Health Protection
  - Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Environmental Protection
  - Restore the groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
  - Prevent the discharge of contaminants to surface water.
  - Remove the source of ground or surface water contamination.

1.9.2 Soil

- Public Health Protection
  - Prevent ingestion/direct contact with contaminated soil.
- Environmental Protection
  - Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.0 Remedial Alternatives Analysis

2.1 Introduction

The purpose of this section is to provide an engineering evaluation of potential remedial alternatives for the site. The goal of this evaluation is to demonstrate how the selected remedy would be protective of human health and the environment. The LIRR property is currently undeveloped and is primarily open space with sparse vegetation and is expected to remain as is. A portion of the LIRR property is utilized by Nicolia. ATC, located immediately to the east of the LIRR property, operates an asbestos transfer facility. As discussed in the site characterization section, the fill material extends throughout the majority of the ATC property as well as the northern portion of the Nicolia property and covers a total area of approximately 7.5 acres. In addition, a relatively small portion of fill material appears to extend into an undeveloped residential property located to the south of the western end of the LIRR property. Given the fill material extends into the ATC and Nicolia property and the residential property, the selected remedial alternative will need to include these adjoining parcels.

The LIRR does not currently utilize the LIRR property for active operations; however, periodically LIRR workers will continue to access the LIRR property in the future to perform track maintenance and landfill cap maintenance after the implementation of the RWP. Consistent with its current use, the eastern portion of the LIRR property will remain undeveloped and used by Nicolia for the storage of sand and gravel. ATC will continue to use their property as an asbestos transfer facility. Similarly, Nicolia will continue to use their property as a concrete mixing plant, with continued access to the LIRR rail siding. The undeveloped residential property will remain a residential property and could potentially be developed in the future. Based on this future use, three remedial alternatives were developed for consideration and are summarized below. Note that in all remedial alternatives, the fill material would not be removed from the ATC property since this would require the complete demolition of the ATC facility, which is not feasible.

- Alternative 1: No Further Action with Institutional Controls
- Alternative 2: Partial Fill Consolidation, Placement of a Geomembrane Cap, and Placement of a Semi-Permeable Soil Cover/Asphalt Cover on Remaining Areas and Institutional Controls
- Alternative 3: Complete Excavation and Off-Site Disposal of All Fill Material Exceeding NYSDEC SCOs and Placement of Asphalt Cover.

Later in this section, the alternatives described briefly above will be evaluated against the following nine remedy selection factors in accordance with the NYSDEC DER-10 Guidance. The nine remedy selection factors are summarized below:

2.1.1 Overall Protection of Public Health and the Environment

Protection of public health and the environment is evaluated on the basis of estimated reductions in the potential for both human and environmental exposure to contaminants for each remedial alternative. The evaluation focuses on whether a specific alternative achieves adequate protection under the conditions of the future use of the site and how site risks are eliminated, reduced or controlled through removal, treatment, containment, engineering controls or institutional controls. An integral part of this evaluation is an assessment of long-term residual risks to be expected after remediation has been completed. Evaluation of the human health and environmental protection factor is generally based, in part, on the findings of the exposure assessment presented in the January 2005 Site Investigation Report.

2.1.2 Conformance to Standards, Criteria and Guidance (SCGs)

This remedy selection factor requires an evaluation of the alternatives with respect to the federal and New York State SCGs identified for the site. This evaluation also considers the RAOs developed for the site. These standards are considered a minimum performance specification for each remedial alternative under consideration. The following is a list of major SCGs that may apply to the site:

- NYSDEC – Brownfield Cleanup Program Guide (2004);
- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010);
- NYSDEC CP-51 - Soil Cleanup Guidance (2010);
- NYSDEC DER-31 – Green Remediation (August 2010);
- NYSDEC TAGM No. 4031– Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Waste Sites (1989);
- NYSDEC TOGS 1.1.1 – Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998);
- NYSDEC TOGS 5.1.8 – New York State Stormwater Management Design Manual (2008);
- NYSDEC TOGS 5.1.10 – New York Standards and Specifications for Erosion and Sediment Controls (2005);
- New York State Codes, Rules and Regulations (NYCRR) Title 6 Part 364 – Waste Transporter Permits

- 6 NYCRR Part 370 – Hazardous Waste Management System;
- 6 NYCRR Part 375 – Environmental Remediation Program (December 2006);
- 6 NYCRR Part 376 – Land Disposal Restrictions;
- 6 NYCRR Part 750 State Pollutant Discharge Elimination System (SPDES) Regulations;
- Code of Federal Regulations (CFR) Title 29 Part 1910.120 - Hazardous Waste Operations and Emergency Response Standard;
- CFR Title 29 Part 1926 - Safety and Health Regulations for Construction;
- 6 NYCRR Parts 700 through 705 – Surface Water and Groundwater Classifications and Standards;
- 29 CFR Part 1926 – Safety and Health Regulations for Construction; and
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan.

2.1.3 Long-Term Effectiveness and Permanence

The examination of long-term impacts and effectiveness of each alternative requires an estimation of the degree of permanence afforded by each alternative. To this end, the anticipated service life of each alternative must be estimated, together with the estimated quantity and characterization of residual contamination remaining at the site at the end of this service life. The magnitude of residual risks must also be considered in terms of the amount and concentrations of contaminants remaining following implementation of a remedial action, considering the persistence, toxicity and mobility of these contaminants, and their propensity to bioaccumulate. This evaluation also includes the adequacy and reliability of institutional and/or engineering controls required for the alternative, if required. An evaluation of the alternative's long-term sustainability will also be considered as part of this remedy selection factor.

2.1.4 Short-Term Impact and Effectiveness

The evaluation of short-term impact and effectiveness of each alternative examines the potential human exposures, adverse environmental impacts and nuisance conditions likely to exist during the implementation of a particular remedial alternative. Principal factors for consideration include the expediency with which a particular alternative can be completed, potential impacts on the nearby community, on-site workers and the environment, and mitigation measures for short-term risks required by a given alternative during the necessary implementation period. An evaluation of the alternative's short-term sustainability will also be considered as part of this remedy selection factor.

2.1.5 Reduction in Toxicity, Mobility or Volume of Contamination

Reduction in toxicity, mobility or volume of contamination is evaluated on the basis of the estimated quantity of contamination treated or destroyed, together with the estimated quantity of waste materials produced by the treatment process itself. Furthermore, this evaluation considers whether a particular alternative would achieve the irreversible destruction of contaminants, treatment of the contaminants or merely removal of contaminants for disposal elsewhere. Reduction of the mobility of the contaminants at the site is also considered in this evaluation.

2.1.6 Implementability

The evaluation of implementability examines the difficulty associated with the installation and/or operation of each alternative at the site and the proven or perceived reliability with which an alternative can achieve performance goals. The evaluation examines the potential need for future remedial action, the level of oversight required by regulatory agencies, the availability of certain technology resources required by each alternative and community acceptance of the alternative.

2.1.7 Cost Effectiveness

This document includes a qualitative assessment of the relative capital costs associated with implementation of each remedial alternative, as well as long term operation, monitoring and maintenance (OM&M) costs.

2.1.8 Community Acceptance

Community acceptance evaluates the technical and administrative issues and concerns that the community may have regarding each of the alternatives.

2.1.9 Land Use

Evaluation of land use examines whether the alternative is suitable for the site, based on current, intended and reasonably anticipated future use of the site and its surroundings, and factors such as:

- zoning;
- any applicable comprehensive community master plans or land use plans;
- surrounding property uses;
- citizen participation;
- environmental justice concerns;
- land use designations;
- population growth patterns;

- accessibility to existing infrastructure;
- proximity to cultural resources;
- proximity to natural resources;
- off-site groundwater impacts;
- proximity to floodplains;
- geography and geology of the site; and
- current institutional controls.

The following sections provide a more detailed description of the remedial alternatives.

2.2 Description of Remedial Alternatives

2.2.1 Alternative 1: No Further Action with Institutional Control

The no further action alternative will serve as a baseline to compare and evaluate the effectiveness of the other alternatives. Since the fill material would not be removed from the site or consolidated and will be placed under a soil or asphalt cover as part of this alternative, institutional controls would be required to restrict use of the site.

This would include establishment of a deed restriction, which would:

- Ensure appropriate future use/control of the site that would protect human health and the environment;
- Include a restriction prohibiting use of groundwater to ensure there would not be any future exposures to groundwater;
- Include required notifications prior to any ground-intrusive activities that may encounter fill materials (notification of NYSDEC and on-site workers would be required prior to excavating);
- Include a Soil Management Plan (SMP) identifying requirements in the event of excavation of contaminated soil, which would be included as part of a SMP;
- Include a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) for use during future ground-intrusive activities, which would be described in a SMP;
- Include an annual inspection program to ensure appropriate use of the site and minimize the potential for exposures, which would be included as part of a SMP; and
- Include an annual certification program requiring the owner to certify that the institutional and/or engineering controls such as fencing, are in place, have not been altered and are still effective, which would be described in a SMP.

As part of this alternative, the existing chain-link fence would have to be maintained.

While groundwater impacts have been shown to be minimal, a long-term groundwater monitoring program would also be required. The groundwater monitoring program will include periodic updates to the private well survey (completed in 1999) to ensure new supply wells, if installed, are addressed under the ongoing program.

Finally, this alternative would also require access agreements between the LIRR and the adjoining property owners.

2.2.2 Alternative 2: Partial Fill Consolidation, Placement of a Geomembrane Cap, Semi-Permeable Soil Cover/Asphalt Cover and Institutional Controls

This alternative would include: the placement of a 1-foot semi-permeable soil cover on the eastern portion of the LIRR property and the majority of the Nicolia property including excavation, grading and filling as necessary to obtain proposed final grades; excavation of all fill material above Residential Use SCOs from the undeveloped residential property; consolidation of excavated fill (approximately 7,000 cubic yards) on the western portion of the LIRR property; installation of an impervious geomembrane cap on the westernmost 2 acres of the LIRR property effectively encapsulating the consolidated fill; full regrading of the LIRR property to promote run-off; placement of backfill to grade on the undeveloped residential property; and final restoration with vegetation or crushed stone. A minimum of 1-foot of soil from the western lowland area and areas north of the proposed cap will be excavated and placed under the impervious cap. These areas will then be covered with a 1-foot semi-permeable soil cover or aggregate. Since fill material would remain on the eastern portion of the LIRR property and the Nicolia property, a demarcation layer material will also be installed, prior to placement of the 1-foot soil cover, in order to provide a physical boundary between the remaining fill material and the overlying clean backfill material. Note that a demarcation layer would not be placed within the area of the Nicolia property that would not be disturbed as this portion of the Nicolia property is currently covered with concrete.

A 12-inch thick asphalt cover would also be placed over the entire ATC property (approximately 1.5 acres). This will require removal of the existing degraded asphalt and some fill material, to accommodate the new asphalt and the associated underlying base layer. This excavated material, approximately 2,500 cubic yards, would be consolidated on the western portion of the LIRR property prior to placement of the geomembrane cap.

This alternative would also include the construction of several recharge basins to the north of the LIRR main rail line to manage post-construction storm water runoff from the LIRR property, as well as the ATC property.

Alternative 2 would require the excavation of surficial soil before placement of the soil cover in areas where the existing ground surface elevation cannot be significantly altered. This includes

portions of the LIRR property, the ATC property and portions of the Nicolia property. Any excavated soil will be placed on the western portion of the LIRR property before placement of the geomembrane cap.

The potential for the generation of dust would exist during implementation of this alternative, and as a result, implementation of appropriate controls would be necessary. Air monitoring would be conducted during remediation activities in accordance with NYSDEC and NYSDOH requirements to protect the health and safety of on-site workers and the surrounding community. Dust controls would be implemented in conformance with the remedial contractor's CHASP and CAMP. Standard fugitive emission control techniques include:

- Installing gravel pads at vehicle egress points;
- Application of wetting agents to soil;
- Tarping/covering containers;
- Restricting vehicle speeds to 10 miles per hour;
- Using spray misters;
- Covering of consolidated fill and inactive excavations; and
- Establishment of temporary or permanent vegetation.

Areas excavated as part of fill consolidation would be backfilled with clean fill from an off-site, NYSDEC approved source in accordance with NYSDEC DER-10.

Consistent with Alternative 1, an institutional control in the form of a deed restriction would be required to restrict use of groundwater on all properties, restrict ground-intrusive activities that would disturb contaminated material without notification of the NYSDEC and ensure long-term maintenance of the covers. As discussed for Alternative 1, the deed restriction would require preparation of a Site Management Plan that would include an annual inspection/certification program requiring the LIRR to certify that the institutional and/or engineering controls are in place on all properties, have not been altered and are still effective, include a Soil Management Plan and include requirements for a long-term groundwater monitoring program, consistent with the program detailed under Alternative 1. This alternative would also require access agreements between the LIRR and adjoining property owners.

2.2.3 Alternative 3: Complete Excavation and Off-Site Disposal of All Fill Exceeding NYSDEC SCOs and Placement of Asphalt Cover

As required by NYSDEC DER-10, this alternative would include the removal of, to the extent practical, all fill material that exceeds NYSDEC SCOs for Industrial Use on the LIRR and Nicolia properties and the small portion of fill that exceeds NYSDEC SCOs for Residential Use on the undeveloped residential property. Based on samples collected from the fill material, a large majority of the fill material would need to be excavated and transported off-site as part of this alternative. In addition, excavation to a depth of 20 feet below grade would be necessary in

some locations. Substantial backfilling and site restoration would be required once the fill material has been removed. Although the material underlying the ATC property is also fill material, it is not technically or practically feasible to remove this material without the demolition of the entire ATC facility. Therefore, as noted in Alternative 2, the ATC property would be capped with a 12-inch asphalt cover. In addition, a portion of the Nicolia concrete plant facility would have to be completely dismantled and relocated and a substantial amount of concrete would need to be demolished, in order to excavate all the fill material from the Nicolia property.

As discussed for Alternative 2, the potential for generation of dust would also exist during implementation of this alternative, and as a result, implementation of appropriate controls in accordance with standard fugitive emission control techniques would be necessary.

Consistent with Alternative 1, an institutional control in the form of a deed restriction would be required to restrict use of groundwater on all properties, restrict ground-intrusive activities that would disturb fill material without notification of the NYSDEC and ensure long-term maintenance of the covers. As discussed for Alternative 1, the deed restriction would require preparation of a SMP that would include a Soil Management Plan, include requirements for a long-term groundwater monitoring program (consistent with Alternative 1), and include an annual inspection/certification program requiring the LIRR to certify that the institutional and/or engineering controls are in place on all properties, have not been altered and are still effective. This alternative would also require access agreements between the LIRR and adjoining property owners.

2.3 Comparative Evaluation of Remedial Alternatives

The following is an evaluation of the proposed remedial alternatives based on the evaluation criteria listed below as required under NYSDEC DER-10 Subpart 4.2. The first two criteria are considered "threshold criteria" and the remaining criteria are "balancing criteria". At a minimum, a remedial alternative must meet the "threshold criteria" in order to be considered and evaluated further under the balancing criteria.

A. Protection of Human Health and Environment;
B. Standards, Criteria, and Guidance (SCG);
C. Short-Term Effectiveness and Permanence;
D. Long-Term Effectiveness and Permanence;
E. Reduction of Toxicity, Mobility, or Volume;
F. Implementability;
G. Cost Effectiveness;
H. Community Acceptance; and

I. Land Use

Based on this detailed evaluation, a remedial plan for the site.

2.3.1 Overall Protection of Public Health and the Environment

Alternative 1 - No Further Action with Institutional Controls would not be protective of human health or the environment since there remains the potential for direct exposure to metal contamination present in surface soil at the site, as well as the potential for exposure due to off-site windblown dust and erosion. Alternative 1 would require that all future intrusive activities be undertaken with proper notification of the NYSDEC, appropriate personal protective equipment and proper handling of fill material; however, limiting unwanted access to the site may be difficult and, therefore, the potential to exposure remains.

Alternative 2 would significantly reduce the potential for human health and environmental exposures to contaminants through the construction of an impervious geomembrane cap over consolidated areas, placement of a minimum 1-foot soil cover throughout all fill areas, installation of drainage enhancements and through the placement of institutional and engineering controls on the LIRR and adjoining properties. The impervious geomembrane cap on the consolidated fill on the western portion of the LIRR property would also cover the areas of the site that have exhibited the highest metal concentrations; significantly reducing the potential for these contaminants to leach into groundwater. Furthermore, all fill material would be removed from the undeveloped residential property. This alternative would also allow for the intended future use of the site and would mitigate the potential direct exposure to metal contamination present in on-site surface soil, as well as the potential for exposure due to off-site windblown dust and off-site soil erosion. This alternative includes provisions to consolidate and/or cover fill material from the Nicolia property and as necessary for the asphalt cover placement at the ATC property. This would further mitigate future exposure to metal contamination in on-site surface soil, off-site windblown dust and off-site soil erosion.

Alternative 3 would reduce the potential for human health and environmental exposures to contaminants through the excavation and off-site disposal of fill material above the Industrial Use SCOs at the LIRR and Nicolia properties, above the Residential Use SCO at the undeveloped residential property and, through the placement of institutional and engineering controls on the LIRR and adjoining properties. This alternative would also allow for the intended future use of the site and would mitigate the potential direct exposure to metal contamination present in on-site surface soil, as well as the potential for exposure due to off-site windblown dust and off-site soil erosion. This alternative also includes provisions to place a 12-inch asphalt cover at the ATC property. This would further mitigate future exposure to metal contamination in on-site surface soil, off-site windblown dust and off-site soil erosion.

All of the alternatives would provide protection of public health and the environment, and reduce the potential exposure pathways, with the exception of Alternative 1. Alternatives 2 and 3 would equally provide protection of public health and the environment since fill material would be consolidated and covered with an impervious geomembrane cap or 1-foot of clean backfill material on the LIRR property and an asphalt cover would be provided at the ATC property; however, the removal of all of the fill material above applicable SCOs at the LIRR, Nicolia and the undeveloped residential properties and providing an asphalt cap at the ATC property in Alternative 3 would be the most protective to human health and the environment. Therefore, Alternative 3 would be the most protective of human health and the environment, followed by Alternatives 2 and 1, respectively.

2.3.2 Conformance to Standards, Criteria and Guidance

Currently available data indicates that fill contaminant concentrations are above Industrial Use SCOs on the LIRR property, Nicolia property and ATC property and above Residential Use SCOs on the undeveloped residential property; therefore, Alternative 1 would not meet the applicable SCGs and RAOs.

Alternative 2 would be compliant with the applicable SCGs and RAOs, since this alternative would consolidate and/or cover fill material from the LIRR property, Nicolia property and ATC property and all fill material from the undeveloped residential property, on the western portion of the LIRR property. An impervious geomembrane cap will be placed over the consolidated fill material in the western portion of the LIRR property. The remaining portions of the LIRR property would be covered by a 1-foot soil cover. Appropriate dust suppressant, erosion control and storm water control methods would be utilized during the excavation and consolidation of contaminated soil. In addition, the contractor would comply with all applicable safety and health regulations for construction and handling of on-site contaminants. Finally, institutional controls would also be placed on the site to restrict future use as provided in NYCRR Part 375 and the Site Management Plan.

Alternative 3 would be compliant with the applicable SCGs and RAOs, since this alternative would remove all fill material, to the extent practicable, above the Industrial Use SCOs from the LIRR and Nicolia properties and above the Residential Use SCOs from the undeveloped residential property. Appropriate dust suppressant, erosion control and storm water control methods would be utilized during the excavation and off-site transportation of fill material. In addition, the contractor would comply with all applicable safety and health regulations for construction and handling of on-site contaminants, as well as applicable waste transporter and disposal facility requirements. Finally, institutional controls would also be placed on the site to restrict future use as provided in NYCRR Part 375 and the Site Management Plan.

Alternatives 2 and 3 would be protective of on-site workers and the surrounding community and would comply with the applicable SCGs and RAOs, while Alternative 1 would not provide any

protection. Given that Alternative 2 would require less fill material handling and overall construction, compared to Alternative 3, it will be easiest to fully comply with all SCGs. Therefore, Alternative 2 would provide the most conformance with the SCGs and RAOs, followed by Alternatives 3 and 1, respectively.

2.3.3 Long-Term Effectiveness and Permanence

Alternative 1 is not considered an effective long-term or permanent remedial action since there remains the potential for direct exposure to metal contamination present in on-site surface soil at the site, as well as the potential for exposure due to off-site windblown dust and erosion.

Alternative 2 is considered an effective long-term and permanent remedial action. Consolidation and/or covering fill material with an impervious geomembrane cap/1-foot soil cover and placement of a geotextile demarcation layer and clean fill material within all fill excavation areas provides a permanent alternative since the potential for direct exposure to metal contamination present in on-site surface soil and exposure to off-site windblown dust and erosion would be significantly reduced. Institutional controls would be established for the LIRR property, Nicolia and ATC properties to protect future workers from the potential for exposure to fill materials below the 1-foot soil and asphalt covers. The long-term sustainable impacts to the environment for Alternative 2 would be minimal, since long-term OM&M activities at the site would be limited to maintenance and repair associated with the geomembrane cap and associated structures, the 1-foot soil cover, drainage system and the ATC property asphalt, and groundwater monitoring.

Alternative 3 is considered an effective long-term and permanent remedial action. Removal of soil exceeding Industrial Use SCOs to the extent practicable from the LIRR and Nicolia properties and exceeding Residential Use SCOs from the undeveloped residential property would be “effective” and “permanent,” since the potential for exposure to this soil would be significantly reduced. Institutional controls would still be required for fill material that cannot be removed or that is above Unrestricted Use SCOs. The long-term sustainable impacts to the environment for Alternative 3 would be minimal, since long-term OM&M activities at the LIRR and Nicolia properties would be limited to maintenance and repair of the soil cover and ATC property asphalt, and groundwater monitoring. As compared to Alternative 2, Alternative 3 would not require any long-term OM&M activities associated with an on-site fill consolidation area and drainage system.

Alternatives 2 and 3 are considered long-term and permanent remedial actions, while Alternative 1 is not considered a long-term and permanent remedial action. Alternative 3 would permanently remove all fill material and it would effectively remove the potential for exposure to contaminants. Alternative 2 would also effectively limit the potential for exposure and drastically reduce the potential for contaminants in the fill to leach into groundwater, since all fill material would be consolidated and/or covered with a geomembrane cap,1-foot soil cover or covered by

an asphalt cover. Therefore, Alternative 3 would provide the most long-term effectiveness, followed by Alternatives 2 and 1, respectively.

2.3.4 Reduction in Toxicity, Mobility or Volume of Contamination

Alternative 1 would not reduce the toxicity, mobility and/or volume of fill material, since no work would be completed at the site as part of this alternative and the fill material would remain in place.

Alternative 2 would not reduce the toxicity or volume of fill material, since it would be consolidated and covered, but not removed. However, this alternative would significantly reduce the mobility of metal contamination present in on-site surface soil, due to off-site windblown dust and erosion, by covering it with a geomembrane cap, soil or asphalt. Again, the capping of the consolidated fill on the western portion of the LIRR property will drastically reduce the potential for contaminants present in the fill to leach into groundwater. Providing for management of runoff to on-site recharge basins, will also limit the amount of water which may leach through the fill material.

Alternative 3 would reduce the toxicity, mobility and volume of on-site fill material at the LIRR and Nicolia properties through the removal of contaminated soil that is found to exceed the Industrial Use SCOs and at the undeveloped residential property through the removal of contaminated soil that is found to exceed the Residential Use SCOs. However, contaminated soil would still be required to be disposed and/or treated at an off-site facility.

Alternative 2 would provide for a reduction in mobility of on-site fill material, Alternative 3 would provide for a reduction in toxicity, mobility and volume of on-site fill material, and Alternative 1 would not provide for any reduction. Alternative 3 would provide the most reduction in on-site fill material volume, since all fill material above Industrial Use SCOs would be removed from the LIRR and Nicolia properties and above Residential Use SCOs from the undeveloped residential property, compared to Alternative 2, which would only consolidate and cover the fill material with a soil or asphalt cover; however, all fill material would ultimately be disposed and/or treated at an off-site facility. Alternative 2 would provide for a significant reduction in the mobility of the on-site fill contamination, since the majority of site fill and the areas containing the highest metal concentrations would be covered by an impervious geomembrane cover. Therefore, Alternative 3 would provide for the most on-site reduction, followed by Alternatives 2 and 1, respectively.

2.3.5 Short-Term Effectiveness and Impacts

Alternative l would not have any short-term construction-related impacts and can be implemented immediately; however, this alternative would not be effective in the short-term since the potential for exposure to fill material would remain. However, Alternative 1 would be the most short-term sustainable alternative since no work would be completed.

Alternative 2 would be immediately effective in the short term through the consolidation and covering of the fill material. However, this alternative would require excavation and handling of fill material and would have some short-term impacts during implementation, including construction-related truck traffic and noise, as well as the potential for off-site migration of dust and off-site soil erosion. However, compared to Alternative 3, this alternative would require significantly less time to complete, due to the overall smaller volume of fill material that will need to be consolidated and covered. This alternative would also create some amount of short-term impact to the Nicolia property; however, as compared to Alternative 3, the impact will be much less since on-site structures would not have to relocated or demolished and only a small amount of business stoppage may be required. This alternative would also create some short-term impact to the business operations of ATC, due to the installation of drainage structures and a new asphalt cover throughout the ATC property. Alternative 2 would also have some short-term impacts to the environment, due to the large amount of on-site consolidation and handling of fill materials; however, as compared to Alternative 3, the impact would be significantly less, due to the overall shorter time period for construction and would require less import of off-site clean backfill material.

Alternative 3 would be immediately effective in the short term through the excavation and off-site disposal of all fill materials above Industrial Use SCOs at the LIRR and Nicolia properties and above Residential Use SCOs at the undeveloped residential property. However, this alternative would require excavation and handling of fill material and would have a large amount of short-term impacts during implementation, including on-site and off-site construction-related truck traffic and noise, as well as the potential for off-site migration of dust and off-site soil erosion. This alternative would also create a large amount of short-term impact to the Nicolia property. Excavation of all fill material above Industrial Use SCOs on the eastern portion of the Nicolia property would require temporary relocation and demolition of structures on the property and, as a result, significantly disrupt the business operations for the property owner. This alternative would also create some short-term impact to the business operations of ATC, due to the installation of drainage structures and a new asphalt cover throughout the ATC property. Alternative 3 would also have the greatest amount of short-term impacts to the environment due to the large amount of on-site consolidation and handling of fill materials, as well as off-site truck traffic due to the off-site disposal of the material. This alternative would also require a large amount of off-site clean backfill material.

Overall, Alternative 1 would have the least amount of short-term impact and would also be the most short-term sustainable; however, the potential for exposure to fill material would remain. Alternative 2 and 3 would both have a large amount of short-term construction related impacts, due to the consolidation, covering and/or off-site disposal of fill material; however, Alternative 2 would provide for a shorter overall construction period. Alternative 2 would also provide for the least amount of disruption to the Nicolia property, compared to Alternative 3, which would require temporary relocation and demolition of structures on the Nicolia property and would also substantially disrupt the business operations. Finally, Alternative 2 would provide for the least

amount of short-term sustainable environmental impacts, followed by Alternative 3. Therefore, Alternative 2 would be the most effective in the short term, provide for the least amount of short-term construction related impacts and short-term sustainable environmental impacts, followed by 3 and 1, respectively.

2.3.6 Implementability

Implementation of Alternative 1 would not require any labor, equipment, materials or supplies. The execution of institutional controls under this alternative assumes that the adjacent property owners will negotiate a fair and reasonable compensation value for the access to their property and the placement of any required deed restriction onto their property.

The necessary labor, equipment, materials and supplies for implementation of Alternative 2 are readily available. It is also expected that it would be possible to obtain necessary permits without adversely impacting the implementation of the alternative. However, implementation of Alternative 2 would require a small amount of impact to the Nicolia facility and some coordination with the property owner, to facilitate excavation and/or covering of the fill material from the western portion of their property. However, it is not expected that this will have an adverse impact on the business operations of the property owner. The execution of institutional controls under this alternative assumes that the adjacent property owners will negotiate a fair and reasonable compensation value for the access to their property and the placement of any required deed restriction onto their property.

The necessary labor, equipment, materials and supplies for implementation of Alternative 3 are readily available. It is also expected that it would be possible to obtain necessary permits without adversely impacting the implementation of the alternative. However, implementation of Alternative 3 would require a substantial impact to the Nicolia facility and a large amount of coordination with the property owner, to facilitate temporary relocation and demolition of structures on the eastern portion of Nicolia's property in order to excavate all fill materials above the Industrial Use SCOs, as well as restoration of the disturbed portions of their property. In addition, excavation of all fill material above Industrial Use SCOs on the LIRR property would also require a large amount of effort due to the difficulty with excavation adjacent to the LIRR tracks, as well as the necessary shoring that may be necessary in order to excavate the material between the western low land area and the elevated area. The execution of institutional controls under this alternative assumes that the adjacent property owners will negotiate a fair and reasonable compensation value for the access to their property and the placement of any required deed restriction onto their property.

Overall, Alternative 1 would be the easiest alternative to implement, since no work activities will be necessary. Alternative 3 would be the most difficult to implement, due to the substantial amount of disturbance that will be necessary on the eastern portion of the Nicolia property and the large amount of coordination and effort to excavate all the fill material. Alternative 2 would also require

effort to implement, but overall would require less effort to complete, due to the smaller amount of disturbance to the Nicolia property and on the LIRR property. Therefore, Alternative 1 would be the easiest to implement, followed by Alternatives 2 and 3, respectively.

2.3.7 Cost Effectiveness

This document includes a qualitative assessment of the relative capital costs associated with implementation of each remedial alternative, as well as long term operation, monitoring and maintenance (OM&M) costs.

Alternative 1 would be the least costly to implement, since no construction related activities would be required and long-term OM&M would include groundwater sampling and inspections, repair/maintenance of site fencing, a certification program to ensure compliance with the Site Management Plan and applicable institutional controls.

Alternative 2 would be more costly to implement compared to Alternative 1; however, it would be substantially less costly to implement compared to Alternative 3, due to a smaller amount of fill material that would need to be handled, consolidated and covered. Alternative 2 would impact the operations of the Nicolia property, however it would not be nearly as disruptive as Alternative 3, since only the western portion of their property would need to be accessed. Alternative 2 would require a certain amount of long-term OM&M, similar to Alternatives 1 and 3, including groundwater sampling, inspection of the site to ensure compliance with the Site Management Plan and applicable institutional controls, and maintenance of the cap and cover systems and drainage system.

Alternative 3 would be the most costly to implement, since a substantial amount of fill material would need to be excavated and transported off-site or consolidated and covered on-site. In addition, a large amount of off-site clean backfill material would need to be imported. Finally, impacts to the Nicolia property would be very substantial, due to the need to temporarily relocate or demolish and restore structures at the eastern portion of their property and the business operations of the property owner would be severely impacted, which would require compensation to Nicolia. Alternative 3 would require less long-term OM&M compared to Alternative 2, since it would be limited to groundwater sampling, inspection of the site to ensure compliance with the Site Management Plan and applicable institutional controls, and maintenance of the backfilled areas, compared to Alternative 2, which would require the same OM&M, as well as maintenance of the cap and cover systems and drainage system.

Overall, Alternative 1 would be the least costly to implement in the short term, followed by Alternatives 2 and 3, respectively. Alternative 1 would also have the least amount of long-term OM&M, followed by Alternatives 2 and 3, respectively. However, note that while there may be a difference in the long-term costs associated with Alternatives 2 and 3, given the substantial

amount of short-term costs associated with Alternative 3, Alternative 2 should still result in an overall lower combined cost to implement.

2.3.8 Community Acceptance

Alternative 1 would not likely be acceptable to the community since there would still remain the potential for exposure, since no engineering controls would be implemented as necessary for future protection of human health and the environment.

Alternatives 2 and 3 would likely be acceptable to the community since fill material will be covered on-site or removed for off-site disposal and institutional and engineering controls would be implemented as necessary for future protection of human health and the environment. However, Alternative 2 would likely be more acceptable to the community due to the overall shorter period of construction and would result in less potential for off-site migration of dust and off-site erosion.

Overall, Alternative 2 would likely be the most acceptable to the community, followed by Alternatives 3 and 1, respectively.

2.3.9 Land Use

Since the LIRR intends to maintain the current use of the LIRR property, Nicolia and ATC intend to continue using their properties for industrial type use, and the undeveloped residential property may be developed, Alternative 1 would not be an appropriate alternative since fill material above the Industrial Use SCOs on the LIRR, Nicolia and ATC properties and above the Residential Use SCOs on the undeveloped residential property would remain accessible. Alternatives 2 and 3 would cap, cover and/or remove fill material containing contaminants above the Industrial Use SCOs on the LIRR, Nicolia and ATC properties and above the Residential Use SCOs on the undeveloped residential property, and would allow for all properties to be used for their intended or possible future uses.

2.4 Institutional/Engineering Control Evaluation

As noted above, all alternatives evaluated for the site include institutional controls. Alternative 2 includes engineering controls in the form of an impervious geomembrane cap, a soil cover and an asphalt cover and Alternative 3 includes engineer controls in the form of an asphalt cover and clean backfill to grade. A Deed Restriction is an institutional control that will be issued for the LIRR and adjoining properties. The Deed Restriction will require compliance with the SMP for the LIRR property, Nicolia property and ATC property. An SMP to manage any remaining contamination at the adjacent residential property will not be required. The SMP, which is discussed further in Section 6.0, will be prepared at the completion of the remedy selection concurrent with the remedial design phase. The SMP will describe in detail the institutional and engineering controls to be implemented at the LIRR and adjoining properties and will specify the

inspection requirements and frequency of the inspections and reporting for all engineering controls installed at the LIRR and adjoining properties.

The Deed Restriction will ensure that the following institutional controls are implemented:

- The use of groundwater underlying the site without proper treatment is prohibited.
- Vegetable gardens and farming will be prohibited on the site.
- Producing animal products for human consumption is prohibited on the site.
- All future activities that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with the SMP.
- The LIRR, Nicolia and ATC properties may be used for Industrial Use provided that the long-term Engineering and Institutional Controls are employed.
- The undeveloped residential property may be used for Residential Use provided that the long-term Engineering and Institutional Controls are employed.
- The LIRR, Nicolia and ATC properties may not be used for a higher use level than industrial (i.e. residential, restricted-residential or commercial) without undertaking further remedial efforts.
- The site owner submits to appropriate regulatory agencies a written statement that certifies that: (1) controls employed at the site are unchanged from the previous certification or that any changes to the controls were approved by the regulatory agencies; and (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a failure to comply with the SMP. This certification shall be submitted annually, unless otherwise approved by regulatory agencies.

Adherence to these institutional controls is required by the Deed Restriction. The institutional controls will not be discontinued without an amendment to or termination of the Deed Restriction.

2.5 Recommended Remedial Alternative

Based on the evaluation of the remedial alternatives described above, Alternative 2, Partial Fill Consolidation, Placement of a Geomembrane Cap and a Semi-Permeable Soil Cover/Asphalt Cover and Institutional Controls is the recommended remedial alternative for the site, given it would:

- Be protective of human health and the environment;
- Prevent direct exposure to metals contaminated surface soil;

- Prevent off-site migration of fill due to windblown dust and erosion;
- Meet applicable SCGs and RAOs;
- Provide for a reduction in the mobility of fill related contaminants;
- Significantly reduce the potential for contaminants present in the fill to leach into groundwater;
- Be significantly more feasible to implement compared to Alternative 3;
- Be effective in the short term and long term;
- Provide for less short-term sustainable environmental impacts compared to Alternative 3;
- Be significantly less costly to complete compared to Alternative 3;
- Anticipated to be acceptable to the community;
- Provide for the intended future use of the LIRR property as an active rail line; and
- Allow for the continued use of the adjoining properties.

Although Alternative 3 also meets the remedy selection criteria for the site, this alternative is not recommended, since as compared to Alternative 2, it would require substantially more short-term construction-related disturbance, greater difficulties associated with full excavation and off-site disposal of all fill material and a substantially higher overall capital cost. Alternative 1 is also not recommended, since it does not meet the remedy selection criteria and would not be protective of public health and the environment.

3.0 Proposed Remedy

This section describes the activities to be undertaken to complete the implementation of the recommended remedial alternative. While Section 2.0 provided a "conceptual design level" discussion, specific details regarding remedial activities will be developed during a detailed design phase and during the generation of the plans and specifications that will be prepared for the implementation of the remedy. ***Figure 6*** provides the proposed conceptual design based on the recommended alternative. ***Figure 7*** provides key details of the proposed conceptual design. Note that it may be necessary to complete additional test pits and/or borings as part of a Pre-Design Investigation to verify the full extent of fill-related material to be excavated, consolidated and/or covered. In addition, one round of groundwater samples will be collected from the existing groundwater monitoring network before undertaking construction activities. These samples will be analyzed for metals and SVOCs in order to establish baseline conditions for site groundwater.

3.1 Mobilization

Site mobilization activities by the remediation contractor will occur prior to initiation of the implementation of the site remediation. Staging areas for construction equipment and material storage and handling, decontamination areas and temporary facilities will be established in areas of the site, as approved by the LIRR, and agreed to by the adjoining property owners.

3.2 Site Preparation

Following mobilization to the site, the Contractor will be required to perform several activities, prior to initiating remedial activities. This will include, but not be limited to, the following:

- Coordination with the LIRR and adjacent property owners;
- Locating and identifying underground utilities in coordination with the LIRR and in accordance with local and state requirements;
- Clearing and grubbing of vegetation, brush and trees as necessary to facilitate access to all areas of the site;
- Installation of construction and access roads;
- Installation of temporary construction fence around all work areas;
- Installation of temporary utilities and controls;
- Consolidation and off-site disposal of any debris identified on-site;
- Preparation of required environmental submittals such as CAMP, Contractors HASP (CHASP), Field Sampling and Waste Characterization, etc.; and

- Completion of a site survey to supplement the existing site survey, as necessary, and to mark out the extent of area to be consolidated and/or covered.

3.3 Security, Control and Access

Security for the work, equipment, materials, supplies, facilities, personnel and incidentals, including the office trailers, will be provided throughout the performance of the work. The LIRR property is surrounded by a fence. The fences and gates will be closed and locked when there is no activity on-site, and any breaks or gaps will be repaired immediately.

All personnel and visitors will be required to sign in and sign out upon arrival and departure. Construction personnel and other designated workers entering the site will be required to have 40-hour HAZWOPER training, Occupational Safety and Health Administration (OSHA) 30-Hour Construction Safety training and participate in a medical surveillance program. A log of vehicles and equipment entering and leaving the site will be maintained. Warning signs will be placed approximately every 200 linear feet on the perimeter fence to alert passersby and discourage trespassing. At the site entrance and egress points, signs stating, "Proper Personal Protective Equipment Must Be Worn," "No Eating, Drinking or Smoking," and "Restricted Area - No Unauthorized Access" will be posted. Additionally, each access and egress point will be indexed with a unique number.

Within the limits of the site, work zones consisting of a Clean Zone, a Contaminant Reduction Zone, a Support Zone and an Exclusion Zone will be established. The Exclusion Zone will always be located adjacent to the excavation front. As the excavation front will be continuously changing, the location of this work zone will also change.

The Support Zone will be divided into two areas: the Material Processing Area (MPA) and the Materials Support Area (MSA). The MPA will be the location where materials are loaded onto transport vehicles or offloaded for on-site use. The MSA or lay down area will be used to store equipment that will be used in remedial operations.

Decontamination of trucks, hydraulic equipment and personnel will be performed within the limits of the Contaminant Reduction Zone. The Clean Zone will be a contaminant-free area designated for visitors and/or remedial staff. Personal protective equipment will not be required in the Clean Zone. The office trailer, if required, would be located within the limits of the Clean Zone.

3.4 Equipment and Personnel Decontamination Facilities

The Contractor will be required to install an equipment decontamination pad for the decontamination of equipment and vehicles during performance of the remedial construction. The decontamination pad will be large enough to contain wash water and debris from the

largest-sized vehicles to be utilized, have a curbed perimeter and be underlain by an impervious liner. The Contractor will be required to ensure that all heavy equipment is clean prior to crossing areas which do not require remediation or have already been remediated, handling clean fill materials and prior to demobilizing.

The water used to decontaminate the equipment will be containerized and disposed off-site, after waste characterization. Collected sediments will be managed and consolidated on-site with other fill material.

3.5 Surveys and As-Built Drawings

The Contractor will perform an initial survey to verify the existing conditions and establish the limits of fill material to be excavated and consolidated. Following the completion of the consolidation activities, a survey will be performed to document the extent of material excavated, consolidated and the soil cover system.

Following completion of the remedial work, the Contractor will prepare and submit as-built drawings showing the results of the remedial construction activities. The as-built drawings will show the final limits and elevation of the on-site consolidated material, soil cover, asphalt cover and clean backfill. The as-built drawings will be signed and sealed by a Professional Engineer licensed to practice in New York State. All surveys will be completed by a Land Surveyor licensed to practice in New York State.

3.6 Green Remediation Measures

The Contractor will be required to implement, to the greatest extent practicable, green remediation measures during the completion of all remedial activities on-site, in order to reduce the overall environmental footprint associated with the implementation of the remedy. Typical green remediation measures that the Contractor may implement, include, but are not limited to, the following:

- Minimize fresh water consumption and maximize water reuse during daily operations and treatment processes;
- Minimize habitat disturbance and create or enhance habitat or usable land;
- Prevent unintended soil compaction;
- Minimize waste or implement beneficial use of materials that would otherwise be considered a waste;
- Minimize equipment and truck idling and use sustainably produced biofuels to reduce discharges of pollutants and greenhouse gases to the atmosphere;

- Utilize clean diesel (new or retrofitted) equipment to reduce emissions to the atmosphere;
- Minimize on-site equipment travel to save energy, reduce emissions and reduce localized noise;
- Minimize use of heavy equipment to save energy and reduce emissions;
- Use native vegetation requiring little or no irrigation;
- Utilize electronic distribution of submittals and correspondence;
- Purchase of renewable energy credits to offset temporary electric supply;
- Use of recycled and/or repurposed items within the job trailer; and
- Establish ground cover within areas restored and backfilled, as soon as possible, to minimize off-site erosion.

3.7 Fill Consolidation

The approximate areas of surface and subsurface soils to be consolidated and/or covered as part of the remedial measures presented as part of this RWP are presented in ***Figure 6***. The proposed remedy will include the excavation of surficial soil before placement of the soil cover in areas where the existing ground surface elevation cannot be significantly altered. This includes the ATC property and portions of the Nicolia property. Any excavated soil will be placed on the western portion of the LIRR property before placement of the impervious geomembrane cap. The actual limits of the areas to be remediated will be staked and marked by a land surveyor in the field prior to excavation. Additional test pitting and/or soil borings may be required to confirm the limits of the fill material. As presented on ***Figure 6***, approximately 4.2 acres and 7,000 cubic yards of fill material will be consolidated within the western portion of the LIRR property.

Air monitoring, inclusive of CAMP, will be performed by the Contractor throughout the duration of the work and will dictate actions required to control emissions. A detailed air monitoring program including action levels for workers and the public will be included in the CHASP. If dust is generated during implementation of the remedy at levels that exceed minimum action levels, standard dust suppression techniques will be employed. Standard dust suppression techniques that may be employed during excavation activities, as well as any other material handling activities include:

- Application of wetting agents to soil, stockpiles, buckets and equipment; and
- Covering/tarping of containers, excavations and stockpiles.

If dust suppression techniques do not lower the particulate concentrations to an acceptable level, work will be suspended until acceptable corrective measures are implemented. As part of

the CHASP, the Contractor will prepare a Community Air Monitoring Plan (CAMP) prior to mobilization. The Contractor will be responsible for implementing the CAMP. The plan will comply with the requirements of the NYSDOH Generic CAMP included in ***Appendix A***.

3.8 Impervious Geomembrane Cap

Consolidated fill material placed on the western portion of the LIRR property will be used to create the subgrade on which an impervious geomembrane cap will be placed. The subgrade will need to be prepared prior to placement of the geomembrane to provide a smooth and unyielding surface. This capping system of the westernmost portion of the LIRR property will virtually eliminate the infiltration of precipitation into the underlying soil and fill material. This area contains the highest metal concentrations in soil at the site. Therefore, the proposed design meets the objective of significantly lowering the amount of infiltration in the area of highest contaminant concentrations and will also avoid the need for off-site disposal of soil/fill.

3.8.1 Side Slope Area

Side slope of subgrade is anticipated to be constructed to 2-1/2 feet horizontal to 1-foot vertical. The actual side slope will be determined during the design phase. The cap will then be placed over the consolidated fill material. A combination of either a 40 mil textured LLDPE or 60 mil textured HDPE geomembrane or another suitable material determined during the design phase placed beneath a 16 oz per square yard geotextile and a layer of articulating block matt (ABM) 4 inches in thickness will be installed on all side slopes of the fill area to provide an effective cap and drastically reduce the infiltration of precipitation into the area shown to contain the highest metal concentrations. The proposed capping system for the side slopes will effectively meet the same design requirements for a low permeable cap as specified in 6 NYCRR Part 360, except that the use of the fabric formed revetment mat in lieu of protective soil layers will allow the capping system to be installed at a steepened side slope of 1 vertical on 2.5 horizontal or determined during the design phase. The steeper side slopes in the fill area will provide the fill volume necessary to accommodate the excavation of surface soil from the remaining areas of the site. The use of the articulating block mat will provide an armored surface for protection of the geomembrane, help stabilize the side slopes and minimize the post-closure maintenance requirements typical of a Part 360 cap. The geomembrane will be covered by a non-woven geotextile as a protective layer before placement of the fabric formed revetment mat.

3.8.2 Crown Area

It is anticipated that an asphalt cover consisting of a geomembrane, a geocomposite drainage layer, and a 6-inch recycled concrete aggregate (RCA) base with a 4-inch asphalt top cover will be placed over the “crown” of the fill area. The actual cover will be designed during the design phase.

3.8.3 Storm Water Controls

Storm water will be conveyed from the southern slope of the fill area to the west using a precast concrete drainage channel. The vast majority of the runoff from this area will be conveyed to a recharge basin, which will be constructed on the north side of the mainline track. Runoff from the western and southern slopes that cannot be conveyed to the north side recharge basin will drain to a shallow recharge basin located in the western lowland portion of the site. All storm water will flow under the force of gravity. The access road to the north of the capped area will also be sloped from the east towards the west and will also convey storm water to the northern recharge basin.

Concrete drainage swales/catch basins, yard inlets and drainage piping will convey storm water runoff generated from the cap to the proposed storm water management basins. The primary basin will be constructed immediately to the north of the LIRR tracks and the western end of the LIRR property. In addition, a smaller, secondary basin will be located in the westernmost portion of the LIRR property. This smaller basin will receive runoff from the southwestern portion of the LIRR property that cannot drain to the primary basin located north of the tracks. The storm water management basins are sized to provide enough storage capacity to handle a 100-year storm event which corresponds to a 24-hour rainfall of 7.5 inches.

3.9 Soil Cover

One to 2 feet of soil will be excavated from the western lowland area of the LIRR property (adjacent to River Road) and placed on the adjoining fill area before capping. After excavating this soil, the western lowland area will be covered with a 6-inch layer of select fill, a 6-inch vegetative growth medium, seed, and a rolled erosion control blanket. A detail with a cross section of the soil cover is provided on ***Figure 7***. The Remedial Contractor will ensure that all soil cover meets the requirements for imported fill set forth in DER-10 5.4(e). The clean fill would be segregated at a source/facility for verification sampling. Representative samples will be collected at a frequency consistent with NYSDEC DER-10 Table 5.4 (e)10 and analyzed for Part 375 compounds by an NYSDOH ELAP-certified laboratory. Acceptable backfill material must meet site required SCOs.

3.10 Select Fill/Gravel Cover

3.10.1 Nicolia Property and Eastern Portion of LIRR Property

On the Nicolia property and eastern portion of the LIRR property, existing fill material will be excavated, covered and/or graded as necessary to obtain proposed final grades, provide a minimum of 1-foot soil cover and ensure proper grading for drainage. In the case of the Nicolia property, the existing land surface elevation of the majority of the property will need to remain unchanged. As a result, up to 1 foot of surficial soil will be excavated from the Nicolia property

to maintain the existing grade and consolidated on the western portion of the LIRR property before placement of the soil cover. Excavated fill material will be replaced with clean backfill material consisting of select virgin fill and crushed gravel. The select fill and crushed gravel will be separated by a non-woven geotextile. A detail with a cross section of the select cover/gravel cover is provided on ***Figure 7***. All select fill/gravel utilized for cover material will meet the requirements in NYSDEC DER-10 Table 5.4(e)10 or be a demonstrated and acceptable virgin source. In addition, orange snow fence will also be embedded within the crushed gravel layer to serve as a telltale for wear, rutting and/or erosion of the gravel layer.

In order to facilitate the future use of the eastern portion of the LIRR property for additional equipment and material storage, a portion of the select fill/gravel cover may be replaced by an asphalt cover. If such a modification is undertaken, the asphalt cover would be constructed in accordance with Section 3.11 and appropriate storm water controls would also be constructed.

3.10.2 Access Road

As shown on ***Figure 6***, a gravel access road will also be installed directly adjacent to the LIRR spur that services the eastern portion of the LIRR property. This spur is currently utilized by Nicolia to facilitate the delivery of materials to their property. The gravel access road will be constructed in a similar fashion to the gravel cover, as described above, and as detailed on ***Figure 7***.

3.10.3 Areas Adjacent to Mainline Track

Currently, the portion of the fill material that may be present in the vicinity of the mainline tracks and the adjacent siding is covered by crushed stone (commonly known as track ballast). However, as part of the proposed site remedy, this crushed stone will be supplemented by additional stone, where needed, to ensure a minimum of 1-foot cover. Note that, in addition to serving as an effective cover and meeting the requirements of NYSDEC DER-10 Table 5.4(e), this crushed ballast will need to meet the requirements and specifications of the LIRR for stone that is placed adjacent to their tracks.

3.11 Asphalt Cover

The recommended alternative requires the removal of the existing asphalt pavement located on the ATC property and underlying fill material to a depth of 12 inches bgs (approximately 2,500 cubic yards). The excavated fill material will be consolidated on the western portion of the LIRR property and replaced with 6 inches of sub-base/Recycled Concrete Aggregate (RCA), 4 inches of asphalt concrete binder course (two, 2-inch layers) and 2 inches of asphalt concrete top course. A detail with a cross section of the asphalt cover is provided on ***Figure 7***.

Catch basins and associated drainage piping will collect and convey storm water runoff to a storm water management basin located directly to the north of the main line track and the ATC property. This storm water management basin will be dedicated to collecting storm water runoff

from only the ATC property and will be isolated from the drainage basins serving the LIRR property. The proposed storm water management basin is sized to provide storage for a 100-year storm event, which corresponds to a 24-hour rainfall total of 7.5 inches.

3.12 Storm Water Management, Soil Erosion and Sediment Control

Storm water management, soil erosion and sediment control will be performed in accordance with New York State Guidelines for Urban Erosion and Sediment Controls and the most recent NYSDEC Stormwater regulations (such as the SPDES General Permit for Stormwater Discharges for Construction Activities GP-0-15-002). The Contractor will be responsible for preventing off-site migration of storm water during implementation of the remedy and compliance with all stormwater soil and erosion measures.

If it will be necessary to stockpile fill material, it will be placed on bermed plastic liners and covered with plastic tarps to prevent erosion. Stockpiles of clean fill will also be placed on bermed liners and covered. Liners will be secured in place with stakes or concrete.

Following the completion of the consolidation and covering of the fill material, post-construction storm water management will be handled as detailed above in Sections 3.8 and 3.12.

3.13 Underground Injection Control Structure Closure

As shown on ***Figure 6,*** one Underground Injection Control (UIC) structure (the dry well located within the central portion of the LIRR property, near the ATC property) will be properly closed as part of the planned remediation. The closure procedures utilized to close the dry well will be performed in accordance with all USEPA and Suffolk County Department of Health (SCDOH) UIC regulations.

The liquid contents of the dry well, if present, will be pumped out and contained within Department of Transportation (DOT)-approved 55-gallon drums and/or a pump truck. Upon completion of any liquid removal, an endpoint sample will be collected at the sediment surface of the dry well. Upon approval of the endpoint sample results from the SCDOH, the dry well will be backfilled with clean fill meeting the Industrial Use SCOs, at a minimum.

3.14 Backfill

Backfill material to be utilized to cover consolidated fill material and backfill areas excavated as part of consolidation will be from an off-site source approved by the LIRR. The backfill will consist of clean sand meeting allowable constituent levels for imported fill or soil as provided in NYSDEC DER-10 Table 5.4(e)10. The Contractor will be responsible for collecting soil samples in accordance with the frequency specified in NYSDEC DER-10. The backfill will contain no

organic material, rubbish or debris and being capable of being compacted to a relative compaction of 90 percent.

The backfill material will be accompanied by a Certificate of Clean Fill certifying that the area from which the fill originated was never used for industrial purposes and that the fill is free of contaminants. Additional details regarding backfill requirements will be included in the plans and specifications for the remedial alternative. The Certificate of Clean Fill will be submitted with the name of the supplier, the source of fill, and the history of the location where the fill was obtained for approval by the LIRR prior to use of the fill. Upon receipt, the LIRR will review the information provided regarding the backfill and shall determine the acceptability of the material and its source. Copies of the Certificates of Clean Fill will be submitted in the Final Engineering Report.

3.15 Site Restoration

The excavated areas will be backfilled with clean fill as detailed in Sections 3.10 and 3.14. Areas of the soil cover and areas outside the fill consolidation cover disturbed during implementation of the remedy will be restored, as necessary, with topsoil and seed or gravel, all subject to the same clean fill requirements.

4.0 Quality Assurance/Quality Control (QA/QC)

A Construction QA/QC Plan will be prepared by the Remedial Contractor for review by the LIRR and review and acceptance by the NYSDEC. The plan will identify procedures to be utilized to ensure the quality of the work performed meets the objectives of this RWP. The QA/QC Plan will include, at a minimum, the following:

- A description of the quality control organization including a chart showing the lines of authority;
- The names, qualifications, duties and responsibilities of each person assigned a QC function;
- Procedures for scheduling and managing submittals including those from any subcontractors;
- The location, number and type of each sample to be collected and analysis to be performed for all samples to be collected, including waste characterization;
- Description of sample collection methods for each sample matrix including sample containers, sample custody, sample packaging, storage and shipping procedures;
- The analytical protocols to be utilized;
- Quality control methods and procedures for each specific test to be used during construction;
- The name, address and qualifications of each proposed testing laboratory and the intended project-specific function;
- A description of all instrumentation and equipment to be used for testing on-site, as well as operating and calibration procedures;
- Reporting procedures for quality assurance activities including proposed reporting formats; and
- Method for notification of changes.

The Contractor will be responsible for implementing the QA/QC Plan.

5.0 HEALTH AND SAFETY

The Remedial Contractor will prepare a Construction Health and Safety Plan (CHASP). Personnel performing remedial work will be required to read and comply with the requirements of the CHASP.

The CHASP will be submitted to LIRR and NYSDEC for review and acceptance prior to initiation of the project. The CHASP will be required to address all the appropriate federal, state and local regulatory requirements necessary to undertake and successfully complete implementation of the remedy. The CHASP will be prepared in accordance with 29 CFR 1910.129 and will include the following items:

- Health and safety organization, including résumés of personnel responsible for health and safety;
- Project description and task hazard assessment;
- Training requirements, including OSHA requirements;
- Medical surveillance requirements;
- Project control procedures;
- Standard Operating Procedures and engineering controls;
- Personnel protective equipment requirements;
- Personnel hygiene and decontamination protocols;
- Equipment decontamination procedures;
- Air monitoring requirements (worker and community);
- Emergency equipment/first aid requirements;
- Emergency responses/contingency procedures;
- Heat and cold stress procedures;
- Record keeping requirements; and
- Community protection plan.

The Contractor will be responsible for ensuring that the CHASP and all work associated with the implementation of the remedy is performed in accordance with safe working practices including all OSHA requirements. All personnel will be trained and certified in the proper use of personal protective equipment and will have knowledge and understanding of construction standards. Up

to date certifications regarding training and expertise will be required to be provided prior to the start of work.

As part of the CHASP, the remedial Contractor will prepare a CAMP prior to mobilization which will comply with the requirements of the NYSDOH Generic CAMP included as ***Appendix A***. The remedial Contractor will be responsible for the implementation of the CAMP.

6.0 Reporting and Documentation

Progress Reports, periodic reports and a Final Engineering Report (FER) will be required for this remedial project.

6.1 Documentation of Remedial Construction

The Remedial Contractor will be required to prepare progress reports each week during implementation of the remedy. Each report will include information on the work completed during the week, the anticipated schedule for the following weeks, and a description of any problems encountered which will impact project progress and their resolution. Progress reports will be available for regulatory agency review.

Throughout implementation of the remedy, records will be maintained by the Remedial Contractor and the Remedial Engineer performing construction inspection to document activities completed on-site. Records that will be maintained include the following:

- Daily field activity reports
- Visitor sign-in/sign-out logs
- Construction photographs
- Instrument calibration logs
- Chain of Custody forms
- Air monitoring forms
- Contractor submittals
- Measurements of material quantities for progress payments
- Incident/accident reports
- Meeting minutes

6.2 Periodic Reporting

Periodic progress reports will be provided to NYSDEC's Project Manager weekly during the remedial action, and monthly during general construction activities, until all ground surfaces have been capped in accordance with this RWP. Information included in the periodic progress reports will include the following, in accordance with NYSDEC DER-10:

- Reporting of all remedial actions accomplished during the reported period;
- Proposed modifications to the approved RWP, if any;
- Reporting of problems and delays to the RWP, along with proposed corrections and a revised schedule, if any;

- Planned remedial activities during the next work period;
- Listing of all types and quantities of waste generated and disposed of during the reporting period; and
- Supporting documentation as required.

6.3 Final Engineering Report

A FER is to be submitted to the NYSDEC Project Manager after the completion of the remedial action. This report will include the following:

- Description of remedy;
- Description of remedial actions performed;
- Deviations from the RWP or design documents, if any;
- Copies of records maintained during the remediation;
- Problems encountered during construction and their resolution;
- A discussion on the quantification and listing of removed quantities of materials from the site and the facilities where such materials were disposed, if applicable;
- Copies of the Certificates of Clean Fill;
- Identification of applicable institutional controls, description of institutional controls and mechanisms to implement, maintain, monitor and enforce such controls;
- Restoration activities;
- Detailed "as-built" drawings showing limits of the fill material consolidation and associated covers;
- Description of fill material remaining at the site to be managed by the Site Management Plan; and
- Boundaries of properties subject to deed restriction or other institutional controls.

Also in accordance with the NYSDEC DER-10, the report will include a certification by a Professional Engineer registered in New York State. All documents and reports submitted to the NYSDEC will be in both hard copy and in digital format on CD. These digital documents shall be in PDF form and, where appropriate, supplemented by photos and Microsoft Excel files. Laboratory analytical data, where provided, will be submitted in an electronic data deliverable (EDD) format that complies with the NYSDEC's electronic data warehouse standards.

6.4 Site Management Plan

The SMP will be developed near the completion of the proposed remedy, coinciding with the submission of the FER, in accordance with the applicable provisions of NYSDEC DER-10. The SMP will be designed to maintain the institutional and engineering controls and to provide inspection and evaluation frequencies to verify the protection of human health and the environment at the site. A draft SMP will be provided to the NYSDEC for review and comment, and will include:

- Introduction with purpose, summary of remediation, site conditions, notification requirements;
- List of required engineering and institutional controls;
- Monitoring plan that includes annual inspection and review requirements;
- Post-remediation groundwater monitoring plan;
- Site maintenance requirements;
- SMP Citizen Participation Plan;
- Personnel organization and responsibilities;
- Health and Safety Plan;
- Records, forms, notice to future property owners;
- Emergency Contingency Plan; and
- Copies of environmental easement and applicable site plans, referencing the required institutional controls, notices and requirements.

7.0 Project Management

7.1 Key Participants and Responsibilities

Key participants involved in the remediation of the site under the BCP include the following:

Key Participants	Primary Responsibilities
Participant: Long Island Rail Road	Oversee planning, implementation and reporting for remedial construction in accordance with approved RWP, including procuring and directing Contractors and consultants for design, remedial construction and development in accordance with approved RWP.
Regulatory Agencies: New York State Department of Environmental Conservation and New York State Department of Health	Regulatory oversight.
Remedial Engineer: [to be determined]	Construction inspection, record keeping, reporting and preparation of the Final Engineering Report.
Remedial Contractor: [to be determined]	Furnish labor, material, supplies, etc. for remedial construction in accordance with approved plans.

7.2 Project Communication and Management

Throughout the project, project meetings will be held to discuss work progress, plan upcoming activities for the week and discuss any unanticipated site conditions encountered. The Remedial Contractor's Superintendent, as well as LIRR's Project Manager, will be required to attend the project meetings. Representatives of NYSDEC and NYSDOH will be made aware of the schedule for project meetings. Following an initial pre-construction meeting, project meetings will be held once per week at the site during the remediation.

During remedial construction, the LIRR or its designated representative will provide full-time on-site inspection of the work, engage in day-to-day communications with the Remedial Contractor's superintendent and maintain records and prepare reports as described in Section 6.0.

8.0 Project Schedules and Milestones

A preliminary schedule of key milestones for the remedial construction is provided below. Note that the following schedule is generic in nature, given the unknown time period regarding review and approval of the RWP and the proposed remedial action. However, the LIRR will provide the NYSDEC with a date-specific schedule within 20 days of receiving final approval of the RWP. A bar-chart duration schedule from the date of NYSDEC approval of the RWP is included in Figure 8.

8.1 Schedule Milestone

- Submittal of Draft Remedial Work Plan for NYSDEC and Public Review
- NYSDEC/NYSDOH/Public Review Period
- Receive Comments from NYSDEC/NYSDOH
- Submittal of Final Draft Remedial Work Plan
- NYSDEC Approval of Final Draft Remedial Work Plan
- NYSDEC Approval of Final Remedial Work Plan
- Negotiation and Execution of Agreements with Adjacent Property Owners
- Develop Detailed Plans and Specifications
- Provide Detailed Plans and Specifications to the NYSDEC for Review and Comment
- Address NYSDEC Comments and Finalize Detailed Plans and Specifications
- Preparation of Contract Documents for Public Bidding
- Remedial Contractor Procurement
- Contract Award
- Implementation of Remedial Construction
- Submittal of the Draft Final Engineering Report and Draft Site Management Plan
- Regulatory Review of Draft Final Engineering Report and Draft Site Management Plan
- Receive Comments from NYSDEC/NYSDOH
- Submittal of Certified Final Engineering Report and Final Site Management Plan
- NYSDEC Approval of Certified Final Engineering Report and Final Site Management Plan

Figures

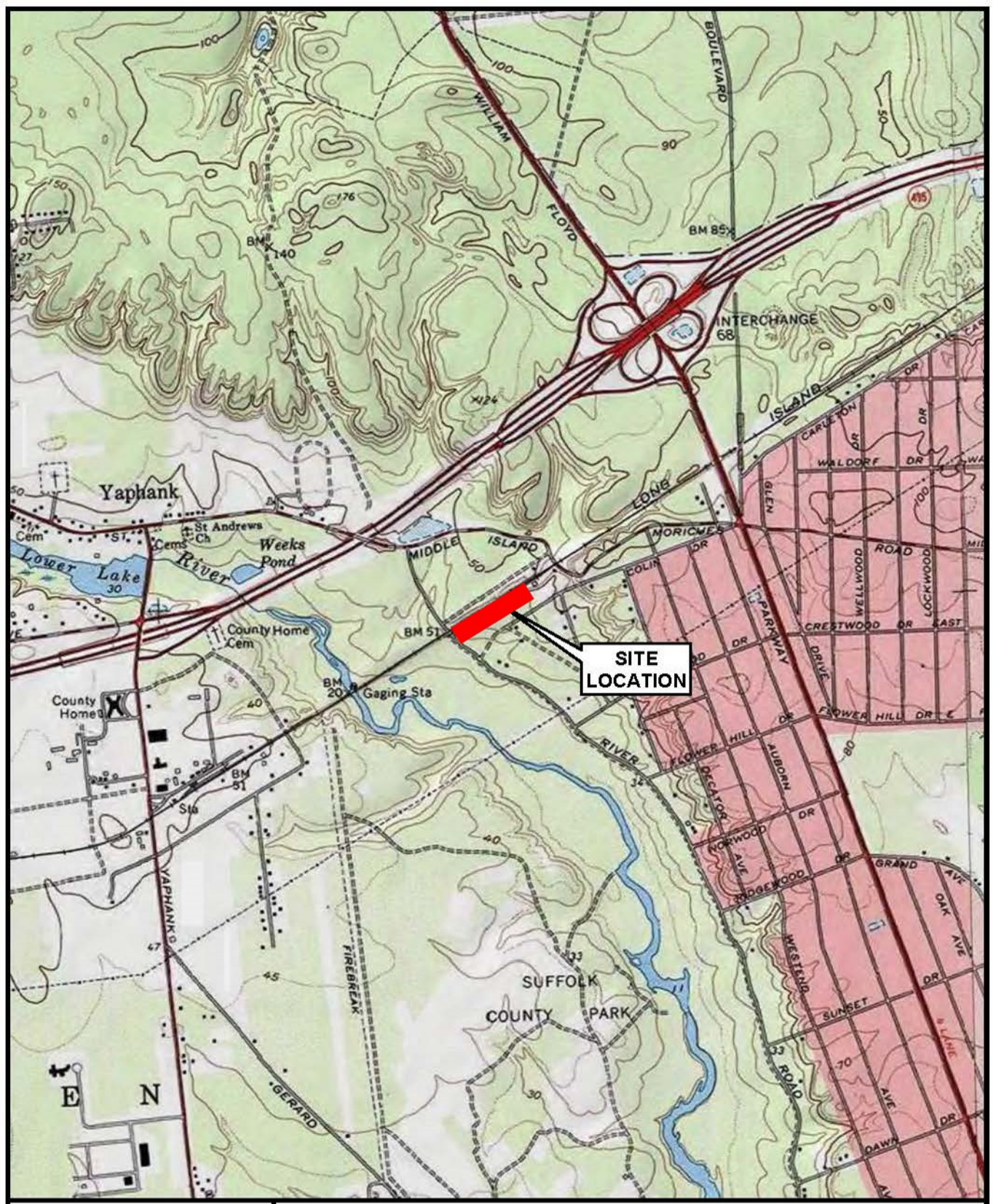


Figure 1

Site Location Map

Yaphank (LIRR)

Town of Brookhaven, Suffolk County

Site No. C152146

DEPARTMENT OF ENVIRONMENTAL CONSERVATION • NEW YORK STATE •

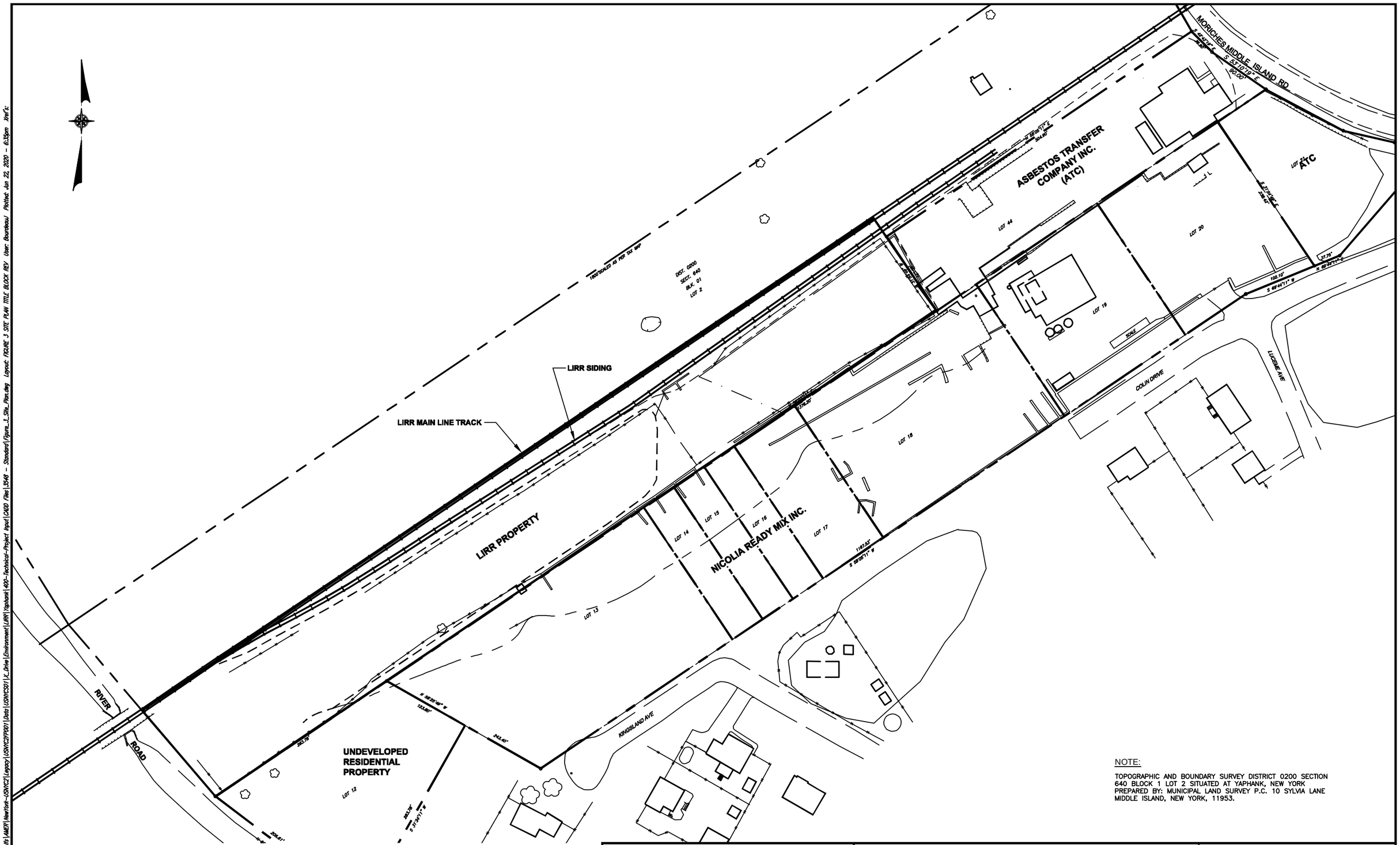
AECOM

Scale (Feet): 0 200

Figure 2 - Aerial Map

Site: LIRR Yaphank
East of River Road and South of RR Tracks
Suffolk County, Yaphank, NY 11980
Site No. C152146

Date: June 2020



NOTE:

TOPOGRAPHIC AND BOUNDARY SURVEY DISTRICT 0200 SECTION 640 BLOCK 1 LOT 2 SITUATED AT YAPHANK, NEW YORK
PREPARED BY: MUNICIPAL LAND SURVEY P.C. 10 SYLVIA LANE MIDDLE ISLAND, NEW YORK, 11953.

AECOM

Figure 3 - Site Plan	Site: LIRR Yaphank East of River Road and South of RR Tracks Suffolk County, Yaphank, NY 11980 Site No. C152146	Date: July 2019

File: \\na.aecomnet.com\ifs\AMER\NewYork-JSNYC2\Legacy\JSNYC279901\Data\JSNYCSD1\X_Drive\Environment\LIRR\Yaphank\400-Technical-Project Input\2400 Files\3546 - Standard\Figure_3_Site_Plan.dwg Layout: FIGURE 3 SITE PLAN TITLE BLOCK REV User: Bourdeau, Paotech: Jun 22, 2020 - 6:35pm Xref's:

NOTES.

1. *EASTERN U.S.A. BACKGROUND LEVEL

2. DATUMS:
VERTICAL – 1988 NAVD
HORIZONTAL – 1983 NAD

3. PROPERTY LINES SHOWN ARE TAKEN FROM A PLAN PROVIDED BY THE LONG ISLAND RAILROAD, DATED JUNE 30, 1916, LAST REVISED DECEMBER 31, 1958, TITLED RIGHT OF WAY AND TRACK MAP, STATION 3121+00 TO 3175+00.

4. BASE MAP PREPARED BY COTILLA ASSOCIATES, NORTHPORT, NEW YORK SURVEY DATA OBTAINED IN THE FIELD NOVEMBER 1997.

5. ADDITIONAL POINTS SURVEYED BY YEC,INC., VALLEY COTTAGE, NEW YORK ON JULY 12, 1999 AND ADDED TO THIS MAP. DATUMS: VERTICAL–1986 NAVD, HORIZONTAL–ASSUMED POINTS SURVEYED INCLUDE: MW–9 THROUGH MW–16; SB–6 THROUGH SB–16; SS–7 THROUGH SS–48, SS–50, SS–51, SS–52.

6. THE BASE MAP WAS UPDATED IN AUGUST 1999 BY YEC, INC. BASED ON 1999 SURVEYED LOCATIONS OF MW–9 AND MW–10. THE BASE MAP WAS REDUCED BY A FACTOR 0.7467 FROM THE BASE MAP 0,0 LOCATION.

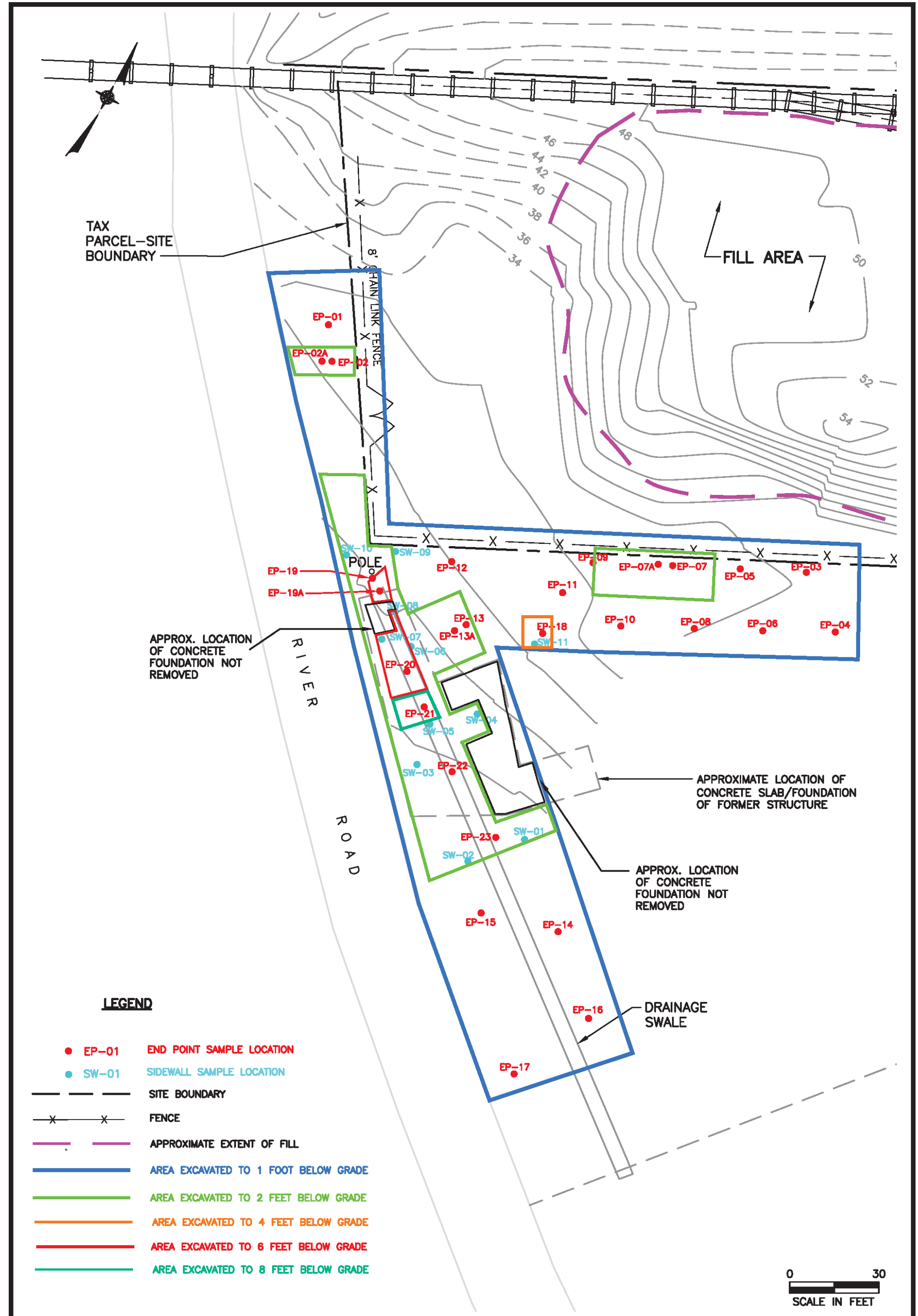
7. ADDITIONAL POINTS SURVEYED BY NELSON AND POPE, MELVILLE NEW YORK ON JANUARY 13, 2004 AND ADDED TO THIS MAP.

DATUMS: VERTICAL 1986 NAVD; HORIZONTAL – ASSUMED; ELEVATION NGVD 29 DATUM
POINTS SURVEYED INCLUDE: SS–53 THROUGH SS–100, SB–17 THROUGH SB–31 AND SB–33 THROUGH SB–75

SOURCE: 1997 SURVEY, COTILLA ASSOCIATES; 1999 SURVEY, YEC INC.; 2004 SURVEY, NELSON AND POPE; TAX MAPS; 1969 AERIAL PHOTOGRAPH, LKB

AECOM

Figure 4 - Estimated Extent of Fill	Site: LIRR Yaphank East of River Road and South of RR Tracks Suffolk County, Yaphank, NY 11980 Site No. C152146	Date: July 2019



AECOM

Figure 5 - Completed IRM Excavation Limits

Site: LIRR Yaphank
East of River Road and South of RR Tracks
Suffolk County, Yaphank, NY 11980
Site No. C152146

Date: July 2019

ATC STORM WATER MANAGEMENT FACILITY APPROXIMATE VOLUME REQUIRED 49,000 CUBIC FEET

ON ATC PROPERTY WASTE TO BE EXCAVATED 1 FOOT IN DEPTH AND REPLACED WITH PAVEMENT SECTION

DRAIN PIPE

JACK CASING PIPE UNDER LIRR TRACKS

DETAIL 4 (1 | 2) PAVEMENT COVER

JACK CASING PIPE UNDER LIRR TRACKS

DRAIN INLET (TYP.)

SWALE TO STORM WATER MANAGEMENT BASIN

DRAIN PIPE

PROPOSED FUTURE USE

PROPERTY LINE

CRUSHED STONE/BALLAST

DETAIL 2 (1 | 2) CRUSHED STONE COVER

LIRR STORM WATER MANAGEMENT FACILITY FOR EAST AND WEST COVERED AREAS APPROXIMATE VOLUME REQUIRED 60,000 CUBIC FEET

DETAIL 7 (1 | 2) PAVEMENT COVER

DETAIL 3 (1 | 2) 10' WIDE CRUSHED STONE ACCESS ROAD (TYP.)

SURFACE FLOW DIRECTION (TYP)

APPROXIMATE LIMIT OF WASTE AREA TO BE EXCAVATED TO A DEPTH OF 1'. EXCAVATED MATERIALS TO BE PLACED ON LIRR PROPERTY. EXCAVATION TO BE COVERED WITH 1' (MIN.) CLEAN FILL. (SELECT FILL/CRUSHED STONE)

EXCAVATE TO A DEPTH OF 1'–2' EXCAVATED MATERIALS TO BE PLACED ON LIRR PROPERTY AND COVERED WITH 1'–0" SOIL COVER AND SEED

DRAIN PIPE

JACK CASING PIPE UNDER LIRR TRACKS

DRAINAGE OUTLET (TYP.)

APPROXIMATE LIMIT OF WASTE

CONTOURS REPRESENT PREPARED CONSOLIDATED FILL WASTE AREA TO BE COVERED WITH A MINIMUM OF 1 FOOT OF COVER SOILS TO THE LIMITS SHOWN.

CONCRETE DRAINAGE CHANNEL

DETAIL 1 (1 | 2) SOIL COVER

DETAIL 8 (1 | 2) GEOMEMBRANE/ABM CAP

RIVER ROAD

DETAIL 5 (1 | 2) CONCRETE DRAINAGE CHANNEL

STORM WATER MANAGEMENT FACILITY APPROXIMATE VOLUME REQUIRED 3,500 CUBIC FEET

SCALE: 1"=50'

LEGEND

- ASPHALT PAVEMENT COVER
- SELECT FILL/CRUSHED STONE COVER
- SOIL COVER
- ACCESS ROAD
- CONCRETE DRAINAGE CHANNEL
- GEOMEMBRANE WITH ARTICULATED BLOCK MAT (ABM) CAP
- CRUSHED STONE BALLAST COVER

NOTES:

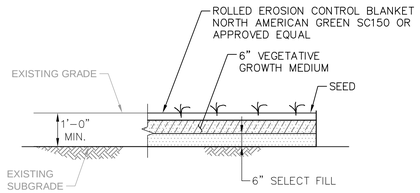
1. CONSOLIDATED FILL SURFACE IS "TOED IN" AT THE PERIMETER TO ACCOMMODATE PLACEMENT OF 1 FOOT OF COVER MATERIAL.
2. PROPERTY LINES SHOWN ARE TAKEN FROM A PLAN PROVIDED BY THE LONG ISLAND RAILROAD, DATED JUNE 30, 1916, LAST REVISED DECEMBER 31, 1958, TITLED RIGHT OF WAY AND TRACK MAP, STATION 3121+00 TO 3175+00.
3. BASE MAP PREPARED BY COTILLA ASSOCIATES, NORTHPORT, NEW YORK SURVEY DATA OBTAINED IN THE FIELD NOVEMBER 1997.
4. TOPOGRAPHIC AND BOUNDARY SURVEY DISTRICT 0200 SECTION 640 BLOCK 1 LOT 2 SITUATED AT YAPHANK, NEW YORK PREPARED BY: MUNICIPAL LAND SURVEY P.C. 10 SYLVIA LANE MIDDLE ISLAND, NEW YORK, 11953.

AECOM

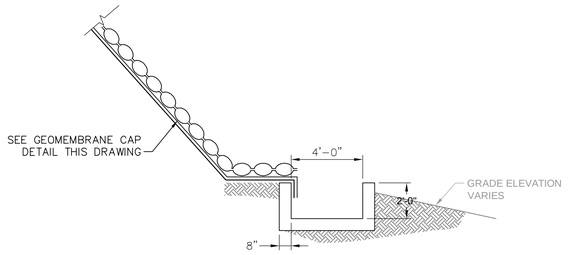
Figure 6 - Conceptual Remedial Design

Site: LIRR Yaphank
East of River Road and South of RR Tracks
Suffolk County, Yaphank, NY 11980
Site No. C152146

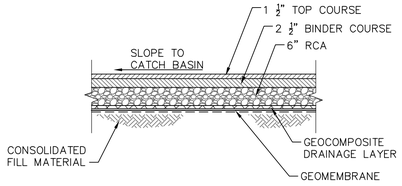
Date: July 2019



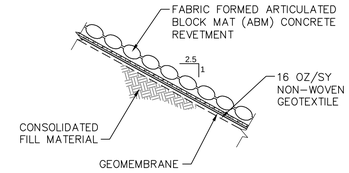
SOIL COVER CROSS SECTION (1 | 1 2)
N.T.S.



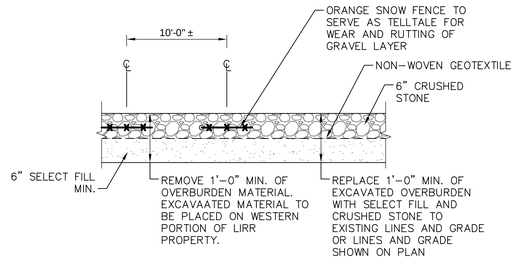
CONCRETE DRAIN SWALE (5 | 1 2)
N.T.S.



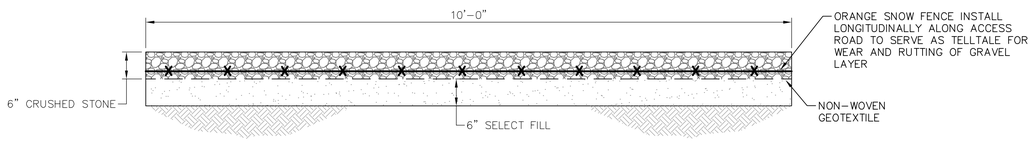
ASPHALT COVER AT LIRR PROPERTY (7 | 1 2)
N.T.S.



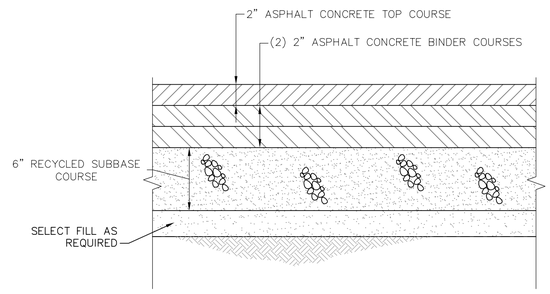
GEOMEMBRANE CAP (8 | 1 2)
N.T.S.



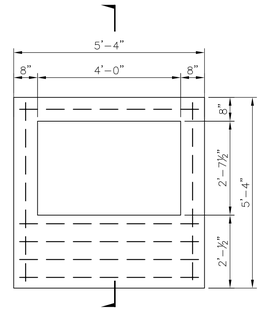
SELECT FILL/CRUSHED STONE COVER SYSTEM (2 | 1 2)
N.T.S.



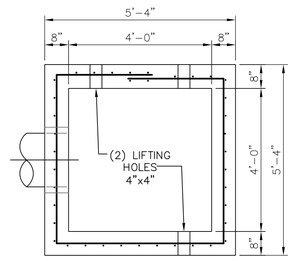
ACCESS ROAD DETAIL (3 | 1 2)
N.T.S.



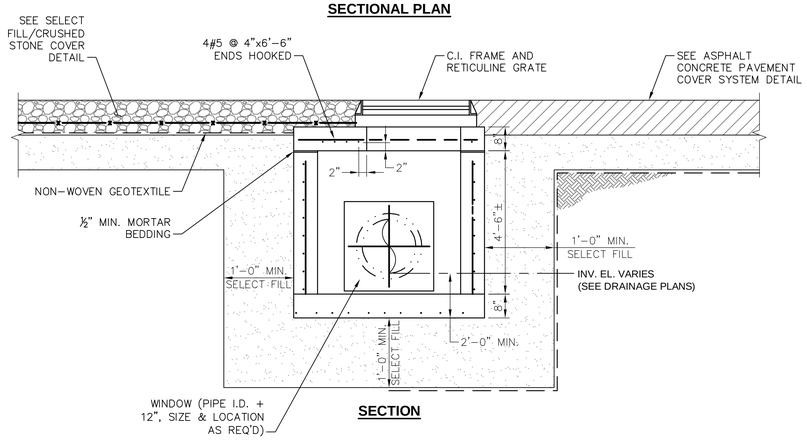
ASPHALT CONCRETE PAVEMENT SECTION (4 | 1 2)
AT ATC PROPERTY
N.T.S.



PLAN TOP SLAB



SECTIONAL PLAN

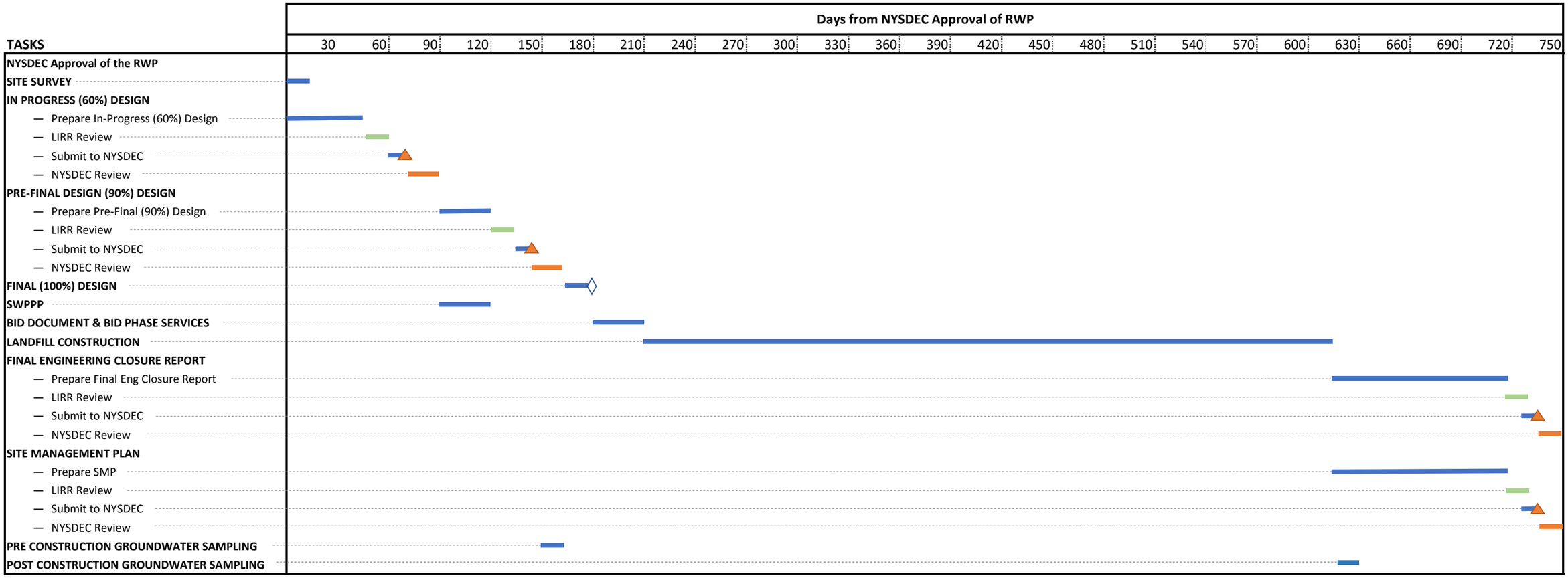


SECTION

CATCH BASIN-SINGLE (6)
N.T.S.

AECOM

Figure 7 - Cover Details	Site: LIRR Yaphank East of River Road and South of RR Tracks Suffolk County, Yaphank, NY 11980 Site No. C152146	Date: July 2019



One post groundwater monitoring rounds to be completed approximately 1 month after completion of contruction phase.

Figure 8
Project Schedule

Appendix A

Appendix A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

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

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009