Long Island Rail Road

Delineation Phase II
Site Assessment Remedial Action Work Plan
Hempstead Substation: Site No. V00390-1

October 2014

Dvirka and Bartilucci Consulting Engineers
A Division of D&B Engineers and Architects, P.C.

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

DELINEATION PHASE II SITE ASSESSMENT
FOR
HEMPSTEAD SUBSTATION

REMEDIAL ACTION WORK PLAN

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK

OCTOBER 2014

CERTIFICATIONS

I, Brian Veith, certify that I am currently a New York State registered professional engineer licensed by the State of New York. I certify that this Remedial Action Work Plan (RAWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the New York State Department Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) and 6NYCRR Part 375.

NYS Professional Engineer #	Date	Signature
	10/24/2014	Brian Veith

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT FOR
HEMPSTEAD SUBSTATION
REMEDIAL ACTION WORK PLAN

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1.0 INTRODUCTION

The Long Island Rail Road (LIRR) has entered into a Voluntary Cleanup Agreement (VCA) with the New York State Department of Environmental Conservation (NYSDEC) in order to investigate and remediate potential mercury contamination associated with the operation and subsequent decommissioning and removal of mercury-containing rectifiers at the Hempstead Electric Substation.

Between 1999 and 2000, the LIRR conducted environmental assessments at 20 of its electric substations which were identified as having previously utilized mercury-containing rectifiers. Among the substations investigated was the Hempstead Substation, at which mercury was detected at concentrations above NYSDEC recommended cleanup objectives in soil at the facility. In order to further delineate and remediate impacted soil at the 20 substations, the LIRR agreed to undertake and complete what is referred to as "Delineation Phase II Site Assessments" under the NYSDEC's Voluntary Cleanup Program (VCP). As part of this Delineation Phase II Site Assessment program, an investigation was undertaken at the Hempstead Substation in September of 2005. Additional follow-up investigative work was also completed from May 2009 to May 2010. The results of these investigations were documented in a report prepared by D&B entitled, "Delineation Phase II Site Assessment Investigation Report for the Hempstead Substation," dated November 2012.

This Remedial Action Work Plan (RAWP) has been prepared by Dvirka and Bartilucci Consulting Engineers (D&B), under contract with the LIRR, to address mercury, as well as lead contamination identified in several areas of the Hempstead Substation, as documented in the November 2012 "Delineation Phase II Site Assessment Investigation Report."

As an agency under the Metropolitan Transportation Authority (MTA), the LIRR operates under the auspices of the Public Authorities Law. Section 1266, paragraph 11 of this law exempts the LIRR from the requirements of the State Environmental Quality Review Act (SEQRA) for projects, "which will not change in a material respect the general character of such

prior transportation use." With this in mind, the LIRR is proceeding with the remediation of contaminated soil at the Hempstead Substation without SEQRA evaluation.

1.1 Project Background

The LIRR initiated the operation of electric substations with mercury rectifiers from approximately the early 1930's through 1951. The rectifiers allowed the LIRR to receive 60-cycle, alternating current (AC) from local utilities and convert it to direct current (DC) for use as a source of electric power for its locomotives and electric passenger car fleet. Based on a detailed review of its operating records, the LIRR identified 20 substations located throughout Queens, Nassau and Suffolk Counties (including the Hempstead Substation) that once utilized mercury containing rectifiers.

It is believed that, during the early 1980s, the mercury rectifiers were taken out of service and physically removed from these LIRR substations and replaced with non-mercury containing solid state equipment. However, due to uncertainties surrounding the work practices that may have been employed when managing the operation, maintenance and decommissioning of these mercury rectifiers, the LIRR believed it necessary to conduct environmental assessments at these 20 electric substations to determine the potential effects that may have occurred to the surrounding environment.

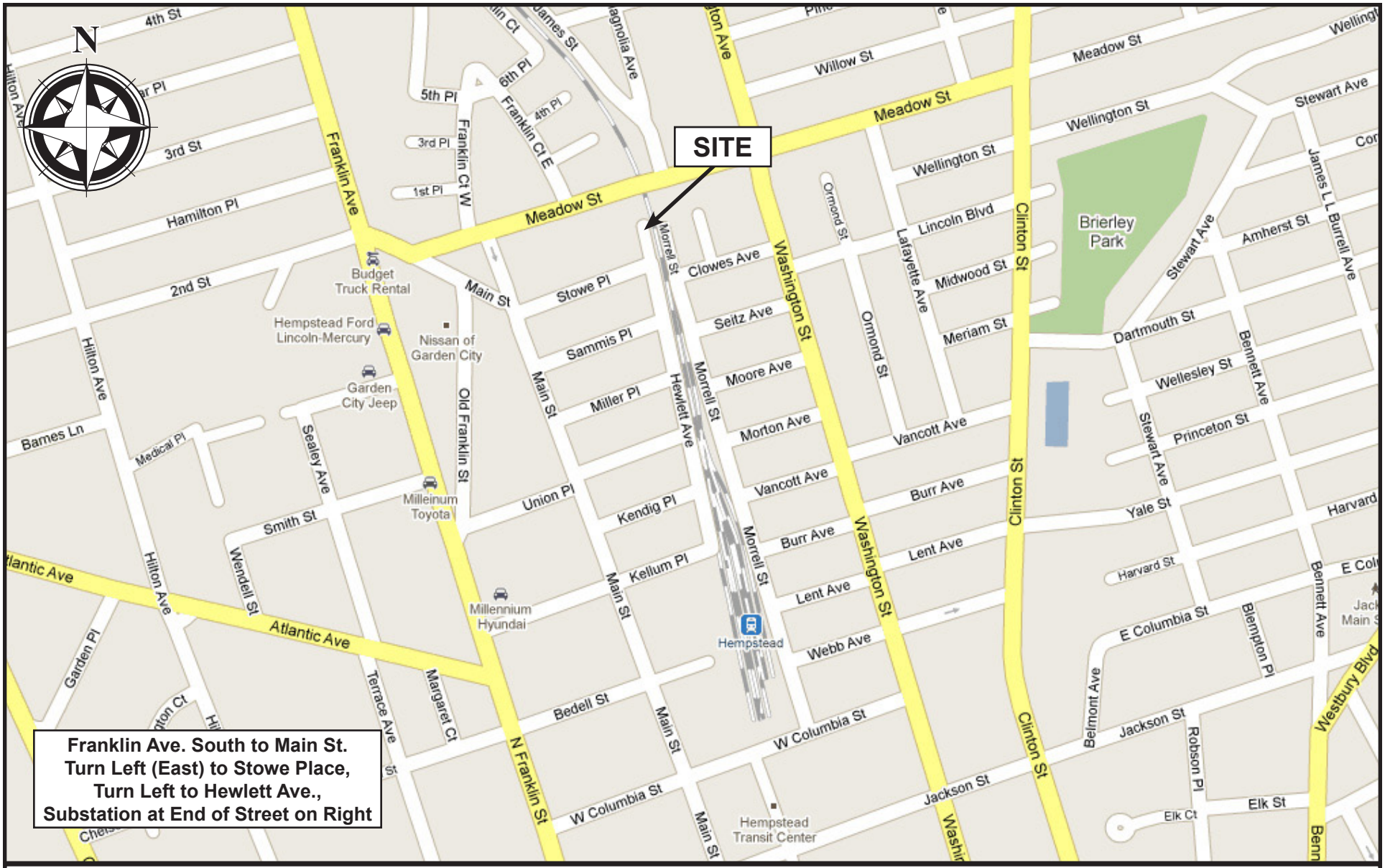
As mentioned above, in 1999, the LIRR conducted environmental assessments at 20 of its electric substations, which previously utilized mercury-containing rectifiers. The results of these assessments were documented in a report prepared by D&B entitled, "Site Assessment of 20 Substations for Mercury Contamination," dated December 2000. Based on the findings of that report, mercury was identified in soil at all 20 substations, including the Hempstead Substation, at concentrations above NYSDEC recommended cleanup objectives. In order to further delineate and remediate impacted soil at the 20 substations, the LIRR agreed to undertake and complete Delineation Phase II Site Assessments under the NYSDEC's VCP. In support of this VCP, the LIRR completed Delineation Phase II Site Assessment activities at the Hempstead Substation by May 2010. Section 1.3 provides a summary of key findings associated with this investigation.

1.2 Site Description

The Hempstead Substation site is located in Hempstead, Nassau County, New York (see Figure 1-1). The substation building will be decommissioned and demolished as part of an overall substation redevelopment project. Note that a new solid-state transformer equipped substation building has already been constructed to the east of the rail tracks which is presently utilized to convert alternating current to direct current for the LIRR electrified railway.

The existing substation consists of an approximately 625 square foot one-story brick building as depicted on Figure 1-2. An approximately 2,100 square foot transformer yard is located adjacent to the substation to the north and is enclosed with a chain-link fence. The areas surrounding the substation and the transformer yard consist of residential areas.

At the time of the site investigations, the existing Hempstead Substation was equipped with water service and a slop sink. The interior of the substation was observed to consist of one active solid-state rectifier located over a separate pit that once serviced a mercury-containing rectifier. The substation was observed to be equipped with a second pit, which was covered by a metal utility plate, referred to as a "water trough" on LIRR construction drawings. During the initial site investigation in 1999, it was observed that the rectifier pit contained one drain pipe and the water trough contained another drain pipe. According to LIRR construction drawings, a dry well was located approximately 4 feet south of the substation building. However, this structure was not located during the Initial Site Assessment. The Hempstead Substation was not equipped with a basement or a utility trench system; however, a slop sink is located along the northern wall that discharges to surface soil within the transformer yard. It should also be noted that the Hempstead Substation is equipped with a bank of active lead-acid batteries located in the southwest corner of the substation, which provide back-up electricity. In addition, the site inspection identified the presence of a pipe trench with a solid bottom located in the southwest corner of the substation.



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LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SITE LOCATION MAP
HEMPSTEAD SUBSTATION (V00390-1)

Not to Scale

FIGURE 1-1

2801-09 - Site Location Map (Hempstead).indd (10/23/12 - 4:29 PM)

LEGEND

CHAIN LINK FENCE

EXISTING ELEVATED TRAIN TRACKS

THIRD RAIL CABLE PASS

CONCRETE RETAINING WALL

CONTROL PANEL

SLOP SINK

WEST SLOPING TRENCH

PVC ROOF DRAINAGE TO GRADE

DRY WELL

EARTHEN AREA

COMMUNICATIONS MANHOLE

SLOP SINK DISCHARGE TO GRADE

EARTHEN DEPRESSION

WATER TROUGH PIT

DRAIN PIPES

DOUBLE–SWING WOOD PLANK DOORS

DRY WELL

METAL FLOOR COVER PLATE

CONDUIT PIT

WEST SLOPING TRENCH

RECTIFIER PIT

METER PIT (FILLED WITH SAND TO GRADE)

TRANSFORMER YARD

DRAIN PIPES

SLIDING CHAIN LINK FENCE

BATTERY AREA

PVC ROOF DRAINAGE TO GRADE

SOIL AREA

HEWLETT STREET

RESIDENTIAL PROPERTY

SIDEWALK

SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

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LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SITE PLAN
HEMPSTEAD SUBSTATION (V00390-1)

0 5 10
SCALE IN FEET

FIGURE 1-2

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The initial site inspection identified a meter pit covered by a metal plate along the southern wall of the substation. This pit was observed to be filled to grade with sand. There was also a conduit pit located approximately 40 feet south of the substation that contained a floor drain. In addition, there was a communications manhole with a floor drain located approximately 10 feet north of the substation within the transformer yard. It should also be noted that an "earthen depression" was observed in the central portion of the transformer yard.

1.3 Summary of Prior Investigations

The LIRR completed an Initial Site Assessment of the Hempstead Substation in 1999, as documented in the report entitled, "Site Assessment of 20 Substations for Mercury Contamination," dated December 2000. Investigation methods utilized during the Initial Site Assessment included a site inspection, mercury vapor measurements and drainage determinations. In addition, samples of various environmental media were collected at the site for laboratory analysis. Samples collected for laboratory analysis included three surface soil samples, 14 subsurface soil samples and two concrete core samples.

As discussed in Section 1.1 and subsequent to the Initial Site Assessment, a Delineation Phase II Site Assessment was completed in May 2010. As part of this investigation, a total of 129 surface soil samples, 176 subsurface soil samples and three groundwater samples were collected for chemical analysis. In addition, five below grade structures were investigated for Underground Injection Control (UIC) applicability.

Mercury was detected in surface and subsurface soil surrounding the substation building, to the west of the substation property and in several below grade structures. As approved by the NYSDEC, all soil samples collected from fenced portions of the substation property were compared to the Industrial SCOs and all soil samples collected from non-fenced areas of the substation property were compared to the Residential SCOs. In addition, elevated concentrations of mercury were detected in surface and subsurface soil at the residential properties located to the northwest and southwest of the substation property. The highest residential mercury concentrations were detected in surface soil at the residential property located to the southwest of

the substation building, with a maximum mercury concentration of 17.6 mg/kg. Note that the Industrial SCO for mercury is 5.7 mg/kg and the Residential SCO for mercury is 0.81 mg/kg.

Additionally, elevated concentrations of lead were detected in surface soil to the north and west of the substation building. The most significant lead concentrations were identified in surface soil located to the northwest of the substation building, with a maximum lead concentration of 7,080 mg/kg. In addition, note that elevated concentrations of lead were detected in surface soil at the residential property located to the northwest of the substation property, with a maximum lead concentration of 3,320 mg/kg. Note that the Industrial SCO for lead is 3,900 mg/kg and the Residential SCO for lead is 400 mg/kg.

The depth to groundwater beneath the Hempstead Substation is approximately 35 feet below ground surface. Mercury was not detected in any of the filtered groundwater samples.

The five below grade structures investigated for UIC applicability during the Phase II Delineation Site Assessment included the communications manhole located approximately 7 feet north of the substation building, a conduit pit located approximately 42 feet south of the substation building, a dry well located approximately 4 feet south of the substation building, a dry well located approximately 20 feet south of the substation building and a water meter pit located adjacent to the southwest corner of the substation building. Note that, at the time of the Phase II Delineation Site Assessment, all analytical data collected from these structures was compared to the TAGM RSCOs based on direction from the USEPA. As TAGM was replaced by the NYSDEC's CP-51 Soil Cleanup Guidance, these and all future samples to be collected from these and other UIC structures at the Site will be compared to the more appropriate use-based CP-51 and Part 375 SCOs. Below is a discussion of the investigation of the above-referenced below grade structures.

Communications Manhole

The communications manhole located approximately 7 feet north of the substation building was visually inspected for the presence of a solid bottom and discharge piping during

the Delineation Phase II Site Assessment. A storm water drain hole was observed in the communications manhole bottom; however, discharge piping was not observed in this structure. Therefore, the communications manhole was not designed as a drainage structure, and as such, its primary function is not to accept fluids and is not classified as a UIC structure.

The communications manhole was investigated as part of the Initial Site Assessment completed in 1999 and one surface soil sample (HSSS-03) was collected from this structure for mercury analysis. Mercury was detected at a concentration of 3.1 mg/kg, exceeding the TAGM SCO for mercury of 0.1 mg/kg. In addition, one subsurface soil sample (HSSB-15 [0 to 2 feet]) was collected for UIC parameter analysis from the storm water drain hole in this structure during the Delineation Phase II Site Assessment. As the communications manhole is not a UIC structure, the sample results were compared to the Industrial SCOs. No analyte was detected at concentrations exceeding their respective Industrial SCOs, with the exception of benzo(a)pyrene, detected at a concentration of 2,900 ug/kg, exceeding its Industrial SCO of 1,100 ug/kg.

Conduit Pit

The conduit pit located approximately 42 feet south of the substation building was investigated during the Initial Site Assessment, and a floor drain was noted in the structure; however, no samples were collected from this structure. A follow-up investigation of this structure was completed during the Delineation Phase II Site Assessment and the structure was visually inspected for the presence of discharge piping. Note that the Initial Investigation indicated that a storm water drain hole was located in this structure; however, a solid bottom was observed in this structure during the Delineation Phase II Site Investigation. In addition, discharge piping was not present in this structure. Therefore, the conduit pit is not classified as a UIC structure.

One sediment sample (HSSS-09) was collected from the sediment accumulated on the bottom of this structure for mercury analysis and was compared to the Industrial SCO for mercury. Mercury was detected at a concentration of 33.9 mg/kg, exceeding its Industrial SCO of 5.7 mg/kg.

Dry Well Located Approximately 4 Feet South of the Substation Building

During the Phase II Site Assessment, an excavation was performed in order to locate a suspected dry well approximately 4 feet south of the substation building, and a dry well was identified in this area. Note that, as the dry well accepted discharge water and was constructed with a soil bottom, the dry well is classified as a UIC structure. The dry well was observed to be completely filled with soil and debris. Subsurface soil boring HSTP-01 was advanced in the dry well and five subsurface soil samples were collected from approximately ground level to approximately 10 feet below ground level, in 2-foot continuous intervals for UIC parameter analysis, and compared to the Industrial SCOs. No analyte was detected at concentrations exceeding their respective Industrial SCOs in any sample, with the exception of mercury and three PAHs: benzo(a)anthracene, benzo(a)pyrene and chrysene.

Of the five subsurface soil samples collected in the dry well, one sample (HSTP-01 [6 to 8 feet]) exhibited detectable concentrations of mercury in exceedance of the Industrial SCO of 5.7 mg/kg, at a concentration of 56.6 mg/kg.

Dry Well Located Approximately 20 Feet South of the Substation Building

The dry well located approximately 20 feet south of the substation building was investigated during the Initial Site Assessment and one subsurface soil boring (HSSB-03) was advanced in the dry well and two subsurface soil samples were collected from 17 to 19 and 21 to 23 feet below grade for mercury analysis. Mercury was detected at a concentration of 2.1 mg/kg from 17 to 19 feet bgs and at a concentration of 45.6 mg/kg from 21 to 23 feet bgs, exceeding the TAGM SCO for mercury of 0.1 mg/kg.

In order to further investigate the dry well, one subsurface soil boring (HSSB-03A) was advanced in the dry well during the Delineation Phase II Site Assessment and four subsurface soil samples were collected from approximately 25 feet below ground surface to approximately 31 feet below ground surface, in 2-foot continuous intervals for UIC parameter analysis, and

compared to the Industrial SCOs. No analyte was detected at concentrations exceeding its respective Industrial SCO in any collected subsurface soil sample.

Water Meter Pit

The water meter pit located adjacent to the southwest corner of the substation building was investigated during the Initial Site Assessment, when one subsurface soil boring (HSSB-04) was advanced in the structure and two subsurface soil samples were collected from 4 to 6 feet bgs and 8 to 10 feet bgs for mercury analysis. Mercury was detected at a concentration of 8.3 mg/kg from 4 to 6 feet bgs and at a concentration of 1.2 mg/kg from 8 to 10 feet bgs, exceeding the TAGM SCO for mercury of 0.1 mg/kg.

In order to further investigate the water meter pit, one subsurface soil boring (HSSB-04A) was advanced in the water meter pit during the Delineation Phase II Site Assessment and three subsurface soil samples were collected from approximately 10 feet below ground surface to approximately 16 feet below ground surface, in 2-foot continuous intervals for UIC parameter analysis. Note that, although the water meter pit was filled with soil at the time of the investigation, discharge piping is not typically associated with such structures. As such, the water meter pit was not designed as a drainage structure, and is not classified as a UIC structure. Therefore, the soil samples collected from subsurface soil boring HSSB-04A were compared to the Industrial SCOs. No analyte was detected at concentrations exceeding its respective Industrial SCO in any collected water meter pit subsurface soil sample.

Rectifier Pit

In addition, the rectifier pit located within the substation building was investigated during the Initial Site Assessment. Soil samples collected from this structure (0 to 2 and 2 to 4 feet below the pit bottom) were compared to the TAGM SCO for mercury of 0.1 mg/kg. Both subsurface soil samples exhibited mercury concentrations in exceedance of the TAGM SCO, ranging in concentration from 1.7 mg/kg to 13.8 mg/kg. The greatest mercury concentration was

detected in subsurface soil sample HSSB-07 (0 to 2 feet). Based on the Initial Site Assessment data, additional delineation was not warranted during the Phase II Site Assessment.

Water Trough Pit

The water trough pit located within the substation was investigated during the Initial Site Assessment. One soil boring (HSSB-06) was advanced in the water trough pit located inside the substation building and two subsurface soil samples were collected from 0 to 2 and 4 to 6 feet below the pit bottom for mercury analysis. As this structure was designed to drain waste fluids, this is a UIC structure. Therefore, these soil samples were compared to the TAGM SCO for mercury of 0.1 mg/kg. Both subsurface soil samples exhibited mercury concentrations in exceedance of the TAGM SCO, ranging in concentration from 0.39 mg/kg to 1.7 mg/kg. However, as these mercury concentrations do not exceed the Industrial SCOs, remediation of this structure is no longer warranted.

As detailed in the Delineation Phase II Site Assessment Report, a mercury vapor survey consistent with the New York State Department of Health's (NYSDOH's) Soil Vapor Intrusion Guidance (SVIG), was completed at the site in November 1999. Mercury vapor was only detected in one of 27 samples, and did not exceed the Public Employee Safety and Health (PESH) 8-hour time weighted average (TWA) concentration of 0.050 mg/m^3. Therefore, further mercury vapor investigation associated with this Site is not warranted.

Additional details regarding the above findings are presented in the Site Assessment of 20 Substations for Mercury Contamination, submitted to the NYSDEC in December 2000 and the Delineation Phase II Site Assessment Report for the Hempstead Substation, submitted to the NYSDEC in November 2012.

IRM Endpoint Sampling

In May 2000, the LIRR conducted an Interim Remedial Measure (IRM), consisting of the removal of 6 inches of contaminated soil and replacement with poly sheeting and crushed stone

in a targeted area to the south of the Hempstead Substation in order to reduce the potential for exposure to mercury in surface soil in this area. Note that this area is enclosed by a locked chain-link fence.

IRM activities were conducted in the vicinity of the swing-out doors located on the south side of the substation building. Two post-excavation soil samples (HSEP-01 and HSEP-02) were collected from a depth of 6-inches below ground surface. Both post excavation soil samples exhibited detectable concentrations of mercury in exceedance of the Industrial SCO for mercury of 5.7 mg/kg, ranging in concentration from 226 mg/kg to a maximum concentration of 238 mg/kg. The maximum concentration of mercury was detected in HSEP-02, collected approximately 3-feet south of the swing-out doors on the south side of the substation building.

1.4 Summary of Environmental Conditions at the Site

This section briefly describes the current and future conditions of the Hempstead Substation. As described in Section 1.2, the existing Hempstead Substation will be decommissioned. A new solid-state transformer equipped substation has been installed to the east of the rail tracks, which is presently used by the LIRR to convert alternating current obtained from the local electrical provider, Long Island Power Authority (LIPA).

The substation property is bound by fence on all sides, limiting public access to the property. The areas immediately surrounding the existing substation building are partially covered by crushed stone. The transformer yard, located to the north of the substation building is covered with approximately two inches of crushed stone/clinker, surrounding the electrical equipment. The Hempstead Substation is located in a residential area; however, the substation property is only accessible by authorized LIRR personnel and their subcontractors. In addition, the substation is not occupied by LIRR personnel on a continuous or full-time basis. Under normal operating conditions, access to the substation property only occurs when equipment requires monitoring, maintenance or repair. The substation building is locked at all times and all associated outside electrical equipment (i.e., transformers) are secured by a locked fence. In

addition, the property surrounding the substation is bounded by track to the east, residential property to the west, a LIRR right-of-way to the south and a LIPA right-of-way to the north.

Note that, the areas where mercury and lead have been detected on the residential property abutting the substation to the west are currently covered by a maintained lawn. In addition, these areas will be isolated by temporary fencing during the implementation of the proposed remedy.

As part of the LIRR's overall system upgrade in response to increased ridership, the existing Hempstead Substation will be demolished as part of future LIRR Capital Programs. Demolition activities will include the removal of all on-site electrical equipment, equipment racks and abatement of all asbestos-containing materials (ACM). Prior to the substation demolition, and in order to provide a temporary barrier to the mercury and lead-impacted soil for the demolition contractor, recycled concrete aggregate (RCA) will be placed over any exposed ground where elevated mercury and lead concentrations have been detected in substation property surface soil.

The remaining areas immediately surrounding the substation building are partially covered by crushed stone, and the fenced transformer yard, located to the north of the substation building, is covered with approximately two inches of crushed stone/clinker. Therefore, direct contact exposure to mercury and lead contamination of LIRR workers (on-site receptors) who may enter the site is unlikely. LIRR workers and subcontractors could potentially be exposed to this contaminant source during excavation activities as the result of dermal contact and inhalation of windblown dust. However, the LIRR has in place procedures to avoid the excavation and handling of contaminated soil without undertaking appropriate health and safety measures.

While elevated concentrations of mercury and lead have been detected in surface and subsurface soil surrounding the substation building, the LIRR maintains strict control over conducting soil excavation activities within LIRR properties known to contain contaminants in order to avoid the excavation and handling of contaminated soil without undertaking appropriate

health and safety measures. In addition, the majority of the Hempstead Substation property is secured with a chain-link fence, limiting the potential of trespassers entering the site.

Groundwater is not used for any purpose at the Hempstead Substation Site.

Based on the results of the Delineation Phase II Site Assessment Report, nine areas of the substation property and properties abutting the substation building to the west will require remediation. Due to an irregular distribution of mercury and lead in site soil and as described in the following sections, the remedial areas have been divided into three 1-foot excavation areas, three 2-foot excavation areas, two 4-foot excavation areas and one 8-foot excavation area.

In addition, the conduit pit, the dry wells, rectifier pit and water meter pit will be properly remediated and/or closed.

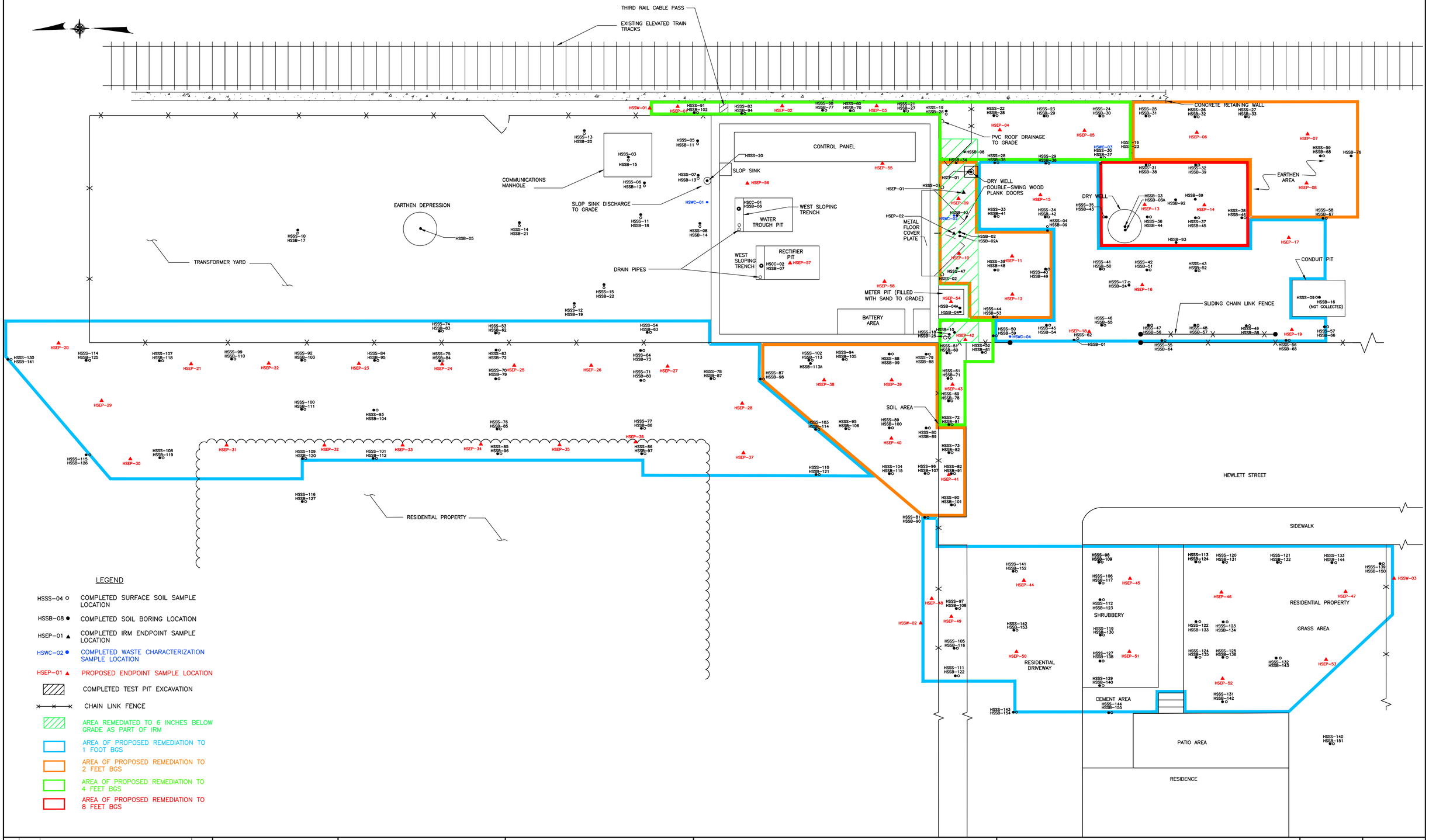
The areas and below grade structures requiring remediation are depicted on Drawing 1 in a "conceptual fashion" and are described in the Delineation Phase II Site Assessment Investigation Report for the Hempstead Substation, dated November 2012. Specific details regarding the soil excavation and below grade structure removal will be included in the plans and specifications prepared for implementation of the remedy.

1.5 Contemplated Use of the Site

As part of the LIRR's overall system upgrade in response to increased ridership, the existing Hempstead Substation will be demolished. As stated above, a new pre-fabricated substation building including solid-state transformers has already been installed to the east of the rail track. Prior to the existing substation building demolition, and in order to provide a temporary barrier to the mercury and lead-impacted soil for the demolition contractor, RCA will be placed over exposed ground where elevated mercury and lead concentrations have been detected in substation property surface soil. All decommissioned electrical transformers and equipment will be removed from the site.

The remediation of contaminated soil on-site will consist of excavation and replacement with clean fill. All remedial excavation activities will be overseen by a LIRR representative and will be completed in accordance with the Contractor's Construction Health and Safety Plan (CHASP) as detailed in Section 5.0. In addition, full-time air monitoring will be performed by the remedial contractor in accordance with the CHASP and the Community Air Monitoring Plan (CAMP), as detailed in Appendix A. Specific details regarding remedial activities will be included in the plans and specifications.

As the new substation building was not constructed on the former substation property, a mercury vapor evaluation of the new substation building is not warranted. Once remedial activities are completed, the LIRR will not be disturbing or excavating in the former Hempstead Substation property for the foreseeable future. As a result, future exposure to residual contamination, if any, is not expected.



LEGEND

- HSSS-04 ○ COMPLETED SURFACE SOIL SAMPLE LOCATION
- HSSB-08 ● COMPLETED SOIL BORING LOCATION
- HSEP-01 ▲ COMPLETED IRM ENDPOINT SAMPLE LOCATION
- HSWC-02 ● COMPLETED WASTE CHARACTERIZATION SAMPLE LOCATION
- HSEP-01 ▲ PROPOSED ENDPOINT SAMPLE LOCATION
- COMPLETED TEST PIT EXCAVATION
- CHAIN LINK FENCE
- AREA REMEDIATED TO 6 INCHES BELOW GRADE AS PART OF IRM
- AREA OF PROPOSED REMEDIATION TO 1 FOOT BGS
- AREA OF PROPOSED REMEDIATION TO 2 FEET BGS
- AREA OF PROPOSED REMEDIATION TO 4 FEET BGS
- AREA OF PROPOSED REMEDIATION TO 8 FEET BGS

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.

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A DIVISION OF D&B ENGINEERS AND ARCHITECTS, P.C.

LONG ISLAND RAIL ROAD

NASSAU COUNTY — NEW YORK

HEMPSTEAD SUBSTATION

ENDPOINT SAMPLE LOCATIONS AND REMEDIAL AREAS

2801

DATE: 04/01/13

SCALE: 1"=5'

1

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2.0 REMEDIAL ACTION SELECTION

The purpose of this section is to provide an engineering evaluation of the selected remedial alternative to address the surface and subsurface soil contamination in the nine areas of the Hempstead Substation and abutting residential properties, the conduit pit located south of the substation building, the two dry wells located south of the substation building, the water meter pit located adjacent to the southwest corner of the substation building and the rectifier pit located in the substation building, as defined in the Delineation Phase II Site Assessment Investigation Report. The goal of this evaluation is to demonstrate how the selected remedy would meet the remedial goals and remedial action objectives presented in NYSDEC's DER-10 Section 4.1(c)2 and NYCRR Part 375 Section 1.10(c), as detailed below.

2.1 Remedial Goals and Remedial Action Objectives

Per the requirements outlined in NYSDEC's DER-10 Section 4.1(c)2, remedial action objectives (RAOs) are goals developed for the protection of human health and the environment, and definition of these objectives requires an assessment of the media of concern, migration pathways, exposure routes and potential receptors. Typically, remedial goals are established based on standards, criteria and guidelines (SCGs) to protect human health and the environment. SCGs for the site, which were developed in the Site Assessment Investigation Report, include New York Codes, Rules and Regulations Title 6 (6 NYCRR), Part 375 Environmental Remediation Programs. Within Part 375, Soil Cleanup Objectives (SCOs) for Commercial use and for Residential use re presented and are typically applied to a site based on the current, intended and reasonably anticipated future use of the Site. As approved by the NYSDEC, these SCOs have been utilized to define areas requiring remediation at the LIRR substations. Site-specific clean-up levels were not necessary to implement at the site. Groundwater sampling did not identify contaminant concentrations in groundwater which would warrant remedial activities.

Typically, only the SCOs for Industrial Use are used to define areas requiring remediation on-site. However, since areas exhibiting elevated concentrations of mercury and lead have been identified on residential properties outside of the substation fencing to the west of

the substation property, these areas pose a risk to off-site receptors. Therefore, the SCOs for Residential Use were utilized to define the areas requiring remediation on residential properties surrounding the substation property. Note that these areas are generally covered by a maintained lawn and will be isolated by temporary fencing during the implementation of the remedy.

Elevated concentrations of mercury were detected in surface and subsurface soil surrounding the substation building, to the west of the substation property and in several below grade structures. All soil samples collected from fenced portions of the substation property were compared to the Industrial SCOs and all soil samples collected from non-fenced portions of the substation property were compared to the Residential SCOs. The most significant mercury concentrations detected on the substation property were identified in surface soil located to the south of the substation building, with a maximum mercury concentration of 1,490 mg/kg. The Industrial SCO for mercury is 5.7 mg/kg. In addition, elevated concentrations of mercury were detected in surface and subsurface soil at the residential properties located to the northwest and southwest of the substation property. The highest residential mercury concentrations were detected in surface soil at the residential property located to the southwest of the substation building, with a maximum mercury concentration of 17.6 mg/kg. The Residential SCO for mercury is 0.81 mg/kg.

Elevated concentrations of lead were detected in surface and subsurface soil to the north and east of the substation building on the substation property. The most significant lead concentrations were identified in surface soil located to the northwest of the substation building, with a maximum lead concentration of 7,080 mg/kg. The Industrial SCO for lead is 3,900 mg/kg. In addition, elevated concentrations of lead were detected in surface soil at the residential property located to the northwest of the substation property, with a maximum lead concentration of 3,320 mg/kg. The Residential SCO for lead is 400 mg/kg.

The substation property is bounded by track to the east, residential property to the west, a LIRR right-of-way to the south and a Long Island Power Authority (LIPA) right-of-way to the north. The substation is fenced on all sides, limiting public access to the property. Therefore, the Hempstead Substation is only accessible by authorized LIRR personnel and their

subcontractors. The areas immediately surrounding the substation building are partially covered by crushed stone. The transformer yard, located to the north of the substation building is covered with approximately 2 inches of crushed stone/clinker, surrounding the electrical equipment, limiting actual or potential receptor exposure contaminant mobility. The substation is not occupied by LIRR personnel on a continuous or full-time basis. The Hempstead Substation will be decommissioned and demolished as part of future LIRR Capital Programs. As described above, a new substation building including solid-state transformers has already been constructed to the east of the rail tracks. The substation building is locked at all times and all associated outside electrical equipment (i.e., transformers) are secured by a locked fence.

The areas immediately surrounding the substation building are partially covered by crushed stone, and the fenced transformer yard, located to the north of the substation building, is covered with approximately 2 inches of crushed stone/clinker. Therefore, direct contact exposure to mercury and lead contamination of LIRR workers (on-site receptors) who may enter the site is unlikely. LIRR workers and subcontractors could potentially be exposed to this contaminant source during excavation activities as the result of dermal contact and inhalation of windblown dust. However, the LIRR has in place procedures to avoid the excavation and handling of contaminated soil without undertaking appropriate health and safety measures.

While elevated concentrations of mercury and lead have been detected in surface and subsurface soil surrounding the substation building, to the west of the substation property and in several below grade structures, the LIRR maintains strict control over conducting soil excavation activities within LIRR properties known to contain contaminants in order to avoid the excavation and handling of contaminated soil without undertaking appropriate health and safety measures.

Based on the nature of the contaminants associated with the site and the findings of the exposure assessment, the RAOs of this RAWP include the following:

<u>RAOs for Public Health Protection</u>

- Mitigate ingestion/direct contact with contaminated soil and dust.

- Mitigate inhalation of or exposure to contaminants volatilizing from soil.

RAOs for Environmental Protection

- Mitigate migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

2.2 Summary of Remedy

The approximate locations and limits of areas requiring remediation are depicted on Drawing 1. Remediation of soil and below grade structures will be completed in two separate phases in order to facilitate the building demolition and the removal of on-site equipment. It is currently anticipated that soil to the south of the substation building will be remediated prior to the building demolition. Soil remediation in the remaining areas will be completed following the building demolition.

The nine proposed excavation areas are approximately 4,196 square feet in total area. As shown on Drawing 1, the areas to be excavated include the following:

- Three areas to the northwest, south and southwest of the substation building will be excavated to a depth of 1 foot below ground surface. These areas are approximately 3,041 square feet in area and will require the removal of approximately 113 cubic yards of soil.
- Three areas to the south and west of the substation building will be excavated to a depth of 2 feet below ground surface. These areas are approximately 727 square feet in area and will require the removal of approximately 54 cubic yards of soil.
- Two areas to the southwest and southeast of the substation building will be excavated to a depth of 4 feet below ground surface. These areas are approximately 256 square feet in area and will require the removal of approximately 38 cubic yards of soil.
- One area to the south of the substation building will be excavated to a depth of 8 feet below ground surface. This area is approximately 172 square feet in area and will require the removal of approximately 51 cubic yards of soil.

In addition, the LIRR intends to close and/or remediate soil associated with the conduit pit, the two dry wells, the rectifier pit and the water meter pit, as described in Section 3.6.

As part of site remediation, a total of approximately 256 cubic yards of soil will be removed from the substation property and properly disposed of off-site. The excavated soil will be replaced with clean fill from an off-site approved source which will meet the requirements of the Restricted Residential Use SCOs on the substation property and the abutting residential properties, at a minimum.

Generation of dust during the implementation of the remedy will be monitored by utilizing a digital dust monitor and, if necessary, dust controls will be implemented in accordance with the CHASP. Air monitoring is discussed further in Section 5.0 of this report.

Endpoint samples (HSEP-01 through HSEP-58), as well as sidewall samples (HSSW-01 through HSSW-03) will be collected from the excavation areas to determine the characteristics of the remaining soil prior to site restoration. The proposed location of each endpoint sample is shown on Drawing 1. Endpoint samples HSEP-01 through HSEP-19 and HSEP-38 through HSEP-58, as well as the sidewall soil samples will be analyzed for mercury. Due to the lead exceedances detected to the northwest of the substation building, endpoint soil samples HSEP-20 through HSEP-37 will be analyzed for lead. Endpoint samples HSEP-55 through HSEP-58 will be collected for mercury analysis from beneath the former substation building.

Endpoint and sidewall samples collected from the fenced substation property will be compared to the Industrial Use SCOs; endpoint and sidewall samples collected from each of the residential properties will be compared to the Residential Use SCOs. Endpoint and sidewall sample results will be provided to the NYSDEC and the New York State Department of Health (NYSDOH) for review. Based on the results of the endpoint sampling, determination will be made between the LIRR and the NYSDEC with regard to the need for additional excavation. In addition, institutional controls in the form of a deed restriction and/or environmental controls will be implemented to maintain the industrial nature of the property.

2.3 Evaluation of Remedy

The following discussion presents the engineering evaluation of the remedy against the remedial goals, remedial action objectives and remedy selection criteria outlined in 6NYCRR Part 375. In accordance with NYSDEC draft VCP Guide, the following discussion evaluates the remedy against the factors presented in 6 NYCRR 375-1.10(c), with the exception of cost effectiveness and community acceptance, which will be evaluated by the NYSDEC.

Protection of Human Health and the Environment

As described above, implementation of the remedy will include mitigation of the potential for the direct exposure to contaminated soil through the excavation and off-site transportation and disposal of soil exceeding Part 375 SCOs for Industrial Use throughout the substation property and the Residential use within the abutting residential property areas. The remedy will meet the RAOs for the site through the removal of contaminated soil and mitigating potential impacts to human health through removal of the potential for exposure through ingestion, direct contact and/or inhalation. The remedy will also meet the RAOs through the implementation of a CHASP that will provide protection of on-site workers and surrounding community during implementation of the remedy. This RAWP also provides information on proper management of contaminated soil and generated waste to mitigate impacts to surrounding community during implementation of the remedy. Therefore, this remedy will provide for the protection of human health and the environment.

Standards, Criteria and Guidance

The selected remedy will comply with applicable regulatory SCGs developed for the site. Applicable regulatory SCGs are considered minimum performance specifications for the remedy. The following is a list of major SCGs that apply to the site:

- 6 NYCRR Part 364 - Waste Transporter Permits

- 6 NYCRR Part 370 - Hazardous Waste Management Systems
- 6 NYCRR Part 375 - Environmental Remediation Programs
- CP-51 – Soil Cleanup Guidance
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard
- 29 CFR Part 1926 - Safety and Health Regulations for Consideration
- NYSDEC DER-10 – Technical Guidance for Site Investigations and Remediation
- NYSDOH Generic CAMP
- NYSDEC draft VCP Guide - May 2002

As described above, since the remedy will remove soil exhibiting contaminants above the Part 375 SCOs for Industrial Use within the Hempstead Substation property and the Restricted Use within the abutting residential property areas, and will be implemented in accordance with the above standards and guidelines, the remedy will meet the SCGs for the site.

Short-term Effectiveness and Impacts

Evaluation of short-term effectiveness and impacts includes defining potential health and environmental risks likely to exist during implementation of the remedy and the ability to control the risks during implementation. Excavation and off-site disposal of soil exhibiting exceedances of the applicable SCOs from the surface and subsurface of the site will pose a low risk to health and the environment. Generation of dust during excavation will be monitored and controlled through dust suppression techniques, if necessary. Considering the volume of soil requiring excavation and off-site disposal, the remedy will be completed in approximately 3 weeks; however, the schedule will be coordinated with the demolition of the substation building. Remedial activities will only occur during normal business hours and noise levels will be maintained to meet local noise ordinances.

Since the substation property is fenced on all sides, the substation property is only accessible by authorized LIRR personnel and its subcontractors. Access to the site is limited and, therefore, impacts to the community from these areas during implementation of the remedy would be negligible. As stated above, the property surrounding the substation is bounded by track to the east, residential property to the west, a LIRR right-of-way to the south and a LIPA right-of-way to the north, limiting public access to the property.

Impacts to the on-site workers and off-site receptors would include exposure to contaminated soil, vapors and dust; however, these impacts would be minimized through the implementation of the CHASP. Implementation of appropriate storm water management, soil erosion and sediment control techniques during construction will be designed to minimize the potential for migration of contaminated soil off-site. In addition, vehicles used to transport contaminated soil will be tarped before departing the site and equipment contacting contaminated soil would be properly decontaminated as per the CHASP, prior to moving off-site, also minimizing the potential for off-site migration of contaminated soil and impacts to the community.

Long-term Effectiveness and Permanence

Excavation and off-site disposal of soil exceeding the Part 375 SCOs for Industrial Use within the substation property and for Residential Use within the residential property areas will be a long-term permanent and effective remedy for the site. The potential for exposure to this contaminated soil at the site in the future will be eliminated. Although it is anticipated that a majority of the soil exceeding the Part 375 SCOs for Industrial Use within the substation property and for Residential Use within the residential property areas will be removed from the site, the results of endpoint sampling will be evaluated to determine the need for additional excavation. Institutional controls in the form of a deed restriction and/or environmental easement will be implemented to maintain the industrial nature of the property.

Reduction of Toxicity, Mobility or Volume

Removal of the identified and delineated contaminated soil from the site will effectively reduce the toxicity, mobility and volume of contamination at the site. The contaminated soil will be disposed of at a permitted off-site disposal facility, which would minimize the potential for mobility of the contaminants.

Implementability

Excavation and off-site disposal of contaminated soil at the site can be completed with standard equipment. Since the remedy will be implemented in conjunction with the redevelopment of the site, all utilities and structures in the area of the contaminated soil will be removed and, therefore, there will not be any impacts to existing utilities or structures. All necessary labor, equipment and supplies are readily available. This remedy will require coordination with the NYSDEC, which is not expected to impact implementation.

Land Use

The current intended and reasonably anticipated future use of the site will continue to be for industrial purposes as a LIRR substation and the surrounding areas will continue to be utilized as residential properties.

As described above, the excavation and disposal of soil exceeding the Part 375 SCOs for Industrial and Residential sites and replacement with clean fill meeting the Restricted Residential Use SCOs, at a minimum, meets the objectives of the remedial goals, remedial action objectives and remedy selection criteria, as defined in the draft VCP Guide and NYSDEC's 6NYCRR Part 375 Program.

3.0 REMEDIAL CONSTRUCTION

As detailed in Section 2.0, the LIRR has identified nine areas at the Hempstead Substation requiring remediation and six below grade structures requiring proper remediation. This section describes the activities to be undertaken to complete the implementation of the remedy. Specific details regarding soil excavation will be included in the plans and specifications prepared for the implementation of the remedy.

Endpoint soil samples will be collected following remedial activities to ensure that remediation has been successfully completed. In addition, as the new substation building was not constructed on the former substation property, a mercury vapor evaluation of the new substation building is not warranted.

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 excavated material storage and handling, decontamination areas and temporary facilities will be established in the area of the existing substation as directed by LIRR.

Equipment and personnel decontamination facilities will be described in detail in the CHASP to be provided by the contractor. All equipment exposed to contaminated soil will be decontaminated on-site in accordance with the CHASP and removed at the conclusion of remedial activities.

All personnel and visitors will be required to sign in and sign out upon arrival and departure. Personnel and visitors entering the site will be required to have 40-hour HAZWOPER training and participate in a medical surveillance program.

Prior to the initiation of the remedial activities, utilities will be identified and located by the contractor in coordination with the LIRR in accordance with local and state requirements.

3.2 Excavation and Material Handling

The approximate areas of surface and subsurface soil to be excavated as part of the remedial measures presented as part of this RAWP are presented in Drawing 1. The actual limits of the areas to be remediated will be staked and marked by a land surveyor in the field prior to excavation.

Air monitoring will be performed by the remedial contractor throughout the duration of the remedy and will dictate actions required to control emissions. A detailed air-monitoring program including action levels 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 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.

3.3 Soil Characterization

Pre-characterization sampling of the soil surrounding the existing substation building was completed as part of the Site Assessment Investigation phase of the project to characterize the soil to be excavated and removed. A total of four soil samples (HSWC-01 through HSWC-04) were selected for waste characterization analysis. All samples were analyzed for full Toxicity Characteristic Leaching Procedure (TCLP) parameters and RCRA waste characteristics

(ignitability, reactivity and corrosivity). Note that all analytes were either not detected or detected at concentrations below their respective regulatory limits. The results of the pre-characterization sample analysis are provided in Appendix B. All RCRA waste characterization results were compared to the appropriate criteria and no exceedances of these criteria were identified for any sample collected.

The results of this laboratory analysis are provided for reference purposes only. The remedial contractor will be required to collect and analyze waste characterization samples from the areas to be excavated prior to performance of the remedial work. The samples shall conform to the requirements of the permitted off-site LIRR approved disposal facility.

3.4 Waste Transportation and Disposal

As discussed above, prior to the off-site transportation of the excavated material, the remedial contractor will need to obtain confirmation from the disposal facility that the contaminated soil will be accepted at the facility. Permitted transporters approved by the LIRR will transport the soil to permitted off-site LIRR approved disposal facilities. All trucks will have functional intact tarps to cover their loads.

LIRR will be the generator of record. Soil will not be transported for disposal without prior approval from the LIRR. Documentation of transportation and disposal of all materials will be maintained in the project files.

3.5 Endpoint Sampling

Upon reaching the final excavation limits, samples will be collected by the contractor from the excavations to determine the characteristics of the remaining soil prior to site restoration. Drawing 1 provides the proposed location of each endpoint (HSEP-01 through HSEP-58) and sidewall (HSSW-01 through HSSW-03) sample location. Although the draft NYSDEC VCP Guide does not provide guidance regarding endpoint sampling, the NYSDEC Draft DER-10 Technical Guidance recommends sampling from the bottom of the excavation

every 900 square feet. However, in order to minimize the total amount of extra soil that would need to be removed in the event the endpoint samples exceed the SCOs, additional endpoint samples have been proposed. The proposed endpoint and sidewall sample locations are shown on Drawing 1.

Endpoint soil samples HSEP-01 through HSEP-19 and HSEP-38 through HSEP-58, as well as sidewall soil samples HSSW-01 through HSSW-03 will be analyzed for mercury. In addition, due to the lead exceedances detected northwest of the substation property, endpoint soil samples HSEP-20 through HSEP-37 will be analyzed for total lead. Expedited 2-day turnaround analysis will be performed to determine the characteristics of remaining soil prior to completion of site redevelopment and site restoration. The Industrial Part 375 SCOs will be used to screen the endpoint samples collected from the excavations within the Hempstead Substation property and the Part 375 SCOs for Residential sites will be used to screen endpoint samples collected from the residential property areas.

The actual need for additional remediation will be determined by the LIRR in consultation with the NYSDEC. When available, the LIRR will transmit the data to the NYSDEC for review, along with a sample location map. The NYSDEC will be available for a conference call with the LIRR to discuss the provided data and to determine if additional remediation is necessary within one day of receipt of the endpoint sample analysis data. Field sampling procedures and quality assurance protocols will be conducted in accordance with the Quality Assurance/Quality Control (QA/QC) Plan prepared by the remedial contractor.

3.6 Below Grade Structure Remediation

As shown on Drawing 1, six below grade structures (the conduit pit, two dry wells, the rectifier pit and the water meter pit) will be properly remediated as part of the proposed remedial activities.

Conduit Pit

Due to a mercury concentration of 33.9 mg/kg detected in the sediment accumulated in the conduit pit located approximately 42 feet south of the substation building, the LIRR recommends that the sediment be removed from this structure and the structure be removed and disposed of. It is anticipated that a negligible amount of sediment will require removal from this structure. As the conduit pit is a solid-bottom structure, the collection of post excavation soil samples following removal is not warranted. The former conduit pit area will then be backfilled with clean fill to grade.

Dry Well Located Approximately Four Feet South of the Substation Building

Due to a mercury concentration of 56.6 mg/kg detected from 0 to 8 feet below the bottom of the dry well located approximately four feet south of the substation building, the LIRR recommends that soil be removed from this structure to a depth of 8 feet below the dry well bottom. Note that mercury was not detected in the subsurface soil sample interval collected from 8 to 10 feet below the dry well bottom. In addition, the top dry well support ring and cover will be removed and disposed of and the remaining discharge piping extending from the substation building will be plugged with a concrete cap. It is anticipated that approximately 19 cubic yards of soil will be removed from this structure. As mercury was not detected in the 8 to 10-foot sample interval, post excavation soil samples are not warranted to be collected following the dry well excavation and removal. The remaining dry well structure will then be backfilled with clean fill to grade.

Dry Well Located Approximately 20 feet South of the Substation Building

Due to a mercury concentration of 45.6 mg/kg detected from 21 to 23 feet below grade in the dry well located approximately 20 feet south of the substation building, the LIRR recommends that soil be removed from this structure to a depth of 23 feet below grade, or as much as is safely possible. Note that mercury was not detected in the subsurface soil sample interval collected from 23 to 25 feet below grade. In addition, the top dry well support ring and

cover will be removed and disposed of and the remaining discharge piping extending from the substation building will be plugged with a concrete cap. It is anticipated that approximately 30 cubic yards of soil will be removed from this structure. As mercury was not detected in the 23 to 25 foot sample interval, post excavation soil samples are not warranted to be collected following the dry well excavation and removal. The remaining dry well structure will then be backfilled with clean fill to grade.

Rectifier Pit

Due to a mercury concentration of 13.8 mg/kg detected from 0 to 2 feet below grade in the rectifier pit located in the substation building, the LIRR recommends that soil be removed from this structure to a depth of 4 feet below the pit bottom, as described below. The remediation of this structure is planned to be completed prior to the substation building demolition in order to ensure the soil below this structure is not mixed with non-contaminated soil beneath other areas of the substation building. Note that, in order to facilitate sample collection, the rectifier has already been removed from the rectifier pit. The closure procedures utilized to remediate the rectifier pit will be conducted in accordance with all USEPA and NCDOH UIC regulations.

The northern 2-foot section of the rectifier pit will be saw cut. The drain and associated concrete within the saw cut will be demolished and removed. Vacuum extraction will be used to remove soil to a depth of 4 feet below the saw cut bottom, or as much as is safely possible, without undermining the substation foundation.

One post-excavation sample will be collected from 4 feet below the saw cut bottom and will be analyzed for polychlorinated biphenyls (PCBs), RCRA metals, total petroleum hydrocarbons (TPHs), total VOCS and total SVOCs. Sample analytical results will be compared to the Industrial SCOs. Following sample collection, the excavation will be backfilled with clean fill to the rectifier pit bottom.

Water Meter Pit

Due to a mercury concentration of 8.3 mg/kg detected from 4 to 6 feet below grade in the water meter pit located on the southwest corner of the substation building, the LIRR recommends that soil be removed from this structure to a depth of 8 feet below grade. Note that mercury was detected below the Industrial SCO of 5.7 mg/kg in the sample interval collected from 8 to 10 feet below grade. As such, post-excavation soil samples are not warranted to be collected following the water meter pit remediation. The water meter pit will then be backfilled with clean fill to grade.

All waste generated as part of the above-described remediation activities will be characterized as per all NYSDEC regulations and disposed off-site by the remedial contractor at a State regulated disposal facility.

3.7 Backfill

Backfill material utilized during the remediation of the Hempstead Substation will be from an off-site source approved by LIRR. The fill will consist of clean sand meeting the Restricted Residential SCOs on both the substation property and adjacent residential property areas, containing no organic material, rubbish or debris and being capable of being compacted to a relative compaction of 90 percent.

The fill 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. Details regarding backfill requirements will be included in the plans and specifications. 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.

3.8 Site Restoration

The excavated areas will be backfilled with clean sand as detailed in Section 3.7. Areas outside the excavation area disturbed during implementation of the remedy will be restored as necessary to coincide with site redevelopment.

3.9 Erosion Controls

Storm water management, soil erosion and sediment control will be performed in accordance with New York State Guidelines for Urban Erosion and Sediment Controls. The contractor will be responsible for preventing off-site migration of storm water during implementation of the remedy.

If it will be necessary to stockpile contaminated soil, 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.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

A Construction QA/QC Plan will be prepared by the 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 RAWP. 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 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 and endpoint sampling requirements;
- 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 CHASP. Site 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 and associated remedial activities. 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 site description and hazard assessment;
- Training requirements;
- Medical surveillance requirements;
- Project site control procedures;
- Standard operating procedures and engineering controls;
- Personnel protective equipment requirements;
- Personnel hygiene and decontamination protocols;
- Equipment decontamination procedures;
- Air monitoring requirements;
- 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 Occupational Safety and Health Administration (OSHA) requirements. All site personnel will be trained and certified in the proper use of personal protective equipment and will have knowledge and understanding of construction standards. Certifications regarding training and expertise will be required prior to the start of work.

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

6.0 REPORTING AND DOCUMENTATION

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 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
- Waste manifests/bills of lading and disposal facility receipts
- Waste characterization sampling results and waste treatment/ disposal facility prequalification forms
- Chain-of-custody forms
- Air monitoring forms
- Contractor submittals
- Measurements of material quantities for progress payments
- Incident/accident reports
- Meeting minutes
- Endpoint sampling results

Following completion of the remedy, and in accordance with the draft VCP Guide, within 90 days of completion of the remedy, a Final Engineering Report (FER) will be prepared. This report will include the following:

- Description of remedial actions performed;
- Deviations from the RAWP, if any;
- Copies of records maintained during the remediation;
- Problems encountered during construction and their resolution;

- A discussion on the quantification and listing of soil removed from the site;
- Detailed "as-built" drawings showing limits of the excavation and the locations of documentation samples;
- Copies of the Certificates of Clean Fill;
- Copies of all records documenting off-site disposal of soil; and
- Endpoint sampling results.

Also in accordance with the draft VCP Guide and NYSDEC's Guidance document, the FER will include a certification by a Professional Engineer registered in New York State, stating that the work was implemented and construction activities were completed in substantial conformance with this RAWP.

In addition, the FER will include a Site Management Plan (SMP) that will include, but not be limited to the following components:

- An institutional and engineering control (IC/EC) plan that will include a description of all ICs and ECs for the Site and the requirements necessary to ensure these controls remain in-place and effective.
- A monitoring plan describing the measures for monitoring the effectiveness of the selected site remedy.
- A soil management plan detailing the procedures for the safe implementation of any future excavation and handling of excavation soil at the Site.
- A site management reporting plan detailing the necessary components and required frequency of Periodic Review Report preparation for the site.

7.0 PROJECT MANAGEMENT

7.1 Key Participants and Responsibilities

Key participants involved in the remediation of the LIRR Hempstead Substation site under the VCP include the following:

Key Participants	Primary Responsibilities
Volunteer: Long Island Rail Road	Oversee planning, implementation and reporting for remedial construction in accordance with approved RAWP, including procuring and directing contractors and consultants for design, remedial construction and site development in accordance with approved RAWP.
Regulatory Agencies: New York State Department of Environmental Conservation and New York State Department of Health	Regulatory oversight.
Remedial Engineer: Dvirka and Bartilucci Consulting Engineers	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, D&B 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 SCHEDULE AND KEY MILESTONES

A preliminary schedule for implementation of the remedy is provided below. Key milestones are identified in order to monitor work progress. Upon the LIRR's approval of the remedial schedule, a detailed schedule of remedial activities will be provided to the NYSDEC prior to the initiation of remedial activities.

Scheduled Milestone	**Estimated Days to Completion from Submittal of Draft Remedial Action Work Plan**
• Submittal of Draft RAWP for NYSDEC Review	0
• Receive Comments from NYSDEC	20
• Submittal of Final RAWP	35
• Complete Preparation of Specifications for Remedial Contractor	50
• NYSDEC to issue Fact Sheet	50
• Solicitation/Selection of Contractor	110
• Mobilization	140
• Completion of Remedial Measures	170
• Submit Remediation Report to NYSDEC	250

APPENDIX A

NEW YORK STATE DEPARTMENT OF HEALTH
GENERIC COMMUNITY AIR MONITORING PLAN

Appendix 1A
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

APPENDIX B

PRE-CHARACTERIZATION SOIL SAMPLING ANALYTICAL RESULTS

TABLE 37
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
HEMPSTEAD SUBSTATION
WASTE CHARACTERIZATION SOIL SAMPLE RESULTS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Toxicity Characteristic Leaching Procedure	HSWC-01 HSWC-01 3/19/2009	HSWC-02 HSWC-02(1-2) 3/19/2009	HSWC-03 HSWC-03(1-2) 3/19/2009	HSWC-04 HSWC-04(1-2) 3/19/2009
1,1-Dichloroethylene	(ug/l)	700	25U	25U	25U	25U
1,2-Dichloroethane	(ug/l)	500	25U	25U	25U	25U
Benzene	(ug/l)	500	25U	25U	25U	25U
Carbon tetrachloride	(ug/l)	500	25U	25U	25U	25U
Chlorobenzene	(ug/l)	100000	25U	25U	25U	25U
Chloroform	(ug/l)	6000	25U	25U	25U	25U
Tetrachloroethylene	(ug/l)	700	25U	25U	9.2J	25U
Trichloroethylene	(ug/l)	500	25U	25U	25U	25U
Vinyl chloride	(ug/l)	200	25U	25U	25U	25U
Methyl ethyl ketone	(ug/l)	200000	120U	120U	120U	120U
2,4,5-Trichlorophenol	(ug/l)	400000	100U	100U	100U	100U
2,4,6-Trichlorophenol	(ug/l)	2000	100U	100U	100U	100U
2,4-Dinitrotoluene	(ug/l)	130	100U	100U	100U	100U
Hexachlorobenzene	(ug/l)	130	100U	100U	100U	100U
Hexachlorobutadiene	(ug/l)	500	100U	100U	100U	100U
Hexachloroethane	(ug/l)	3000	100U	100U	100U	100U
Nitrobenzene	(ug/l)	2000	100U	100U	100U	100U
o-Cresol	(ug/l)	200000	100U	100U	100U	100U
PCP	(ug/l)	100000	100U	100U	100U	100U
p-Cresol	(ug/l)	200000	100U	100U	100U	100U
p-Dichlorobenzene	(ug/l)	7500	100U	100U	100U	100U
2,4-D	(ug/l)	10000	20U	20U	20U	20U
Chlordane	(ug/l)	30	5.0U	5.0U	5.0U	5.0U
Endrin	(ug/l)	20	0.50U	0.50U	0.50U	0.50U
Heptachlor	(ug/l)	8	0.50U	0.50U	0.50U	0.50U
Heptachlor epoxide	(ug/l)	8	0.50U	0.50U	0.50U	0.50U
Lindane	(ug/l)	400	0.50U	0.50U	0.50U	0.50U

ug/l: Micrograms per liter.
U: Not detected.
J: Estimated value.

TABLE 37
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
HEMPSTEAD SUBSTATION
WASTE CHARACTERIZATION SOIL SAMPLE RESULTS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Toxicity Characteristic Leaching Procedure	HSWC-01 HSWC-01 3/19/2009	HSWC-02 HSWC-02(1-2) 3/19/2009	HSWC-03 HSWC-03(1-2) 3/19/2009	HSWC-04 HSWC-04(1-2) 3/19/2009
Methoxychlor	(ug/l)	10000	4.6	23D	0.94	0.45J
Pyridine	(ug/l)	5000	200U	200U	200U	200U
Toxaphene	(ug/l)	500	5.0U	5.0U	5.0U	5.0U
Silvex	(ug/l)	1000	20U	20U	20U	20U
Arsenic	(ug/l)	5000	100U	100U	100U	100U
Barium	(ug/l)	100000	483J	508	332J	334J
Cadmium	(ug/l)	1000	30.0U	30.0U	30.0U	30.0U
Chromium	(ug/l)	5000	50.0U	50.0U	50.0U	50.0U
Lead	(ug/l)	5000	446	37.2J	60.0U	60.0U
Mercury	(ug/l)	200	2.0U	2.0U	2.0U	2.0U
Selenium	(ug/l)	1000	100U	100U	100U	100U
Silver	(ug/l)	5000	50.0U	50.0U	50.0U	50.0U

ug/l: Micrograms per liter.
U: Not detected.
J: Estimated value.

TABLE 38
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
HEMPSTEAD SUBSTATION
WASTE CHARACTERIZATION SOIL SAMPLE RESULTS
RCRA CHARACTERISTICS

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	HSWC-01 HSWC-01 3/19/2009	HSWC-02 HSWC-02(1-2) 3/19/2009	HSWC-03 HSWC-03(1-2) 3/19/2009	HSWC-04 HSWC-04(1-2) 3/19/2009
Corrosivity	(mg/kg)	8.3	6.6	7.4	6.5
Cyanide(reactive)	(mg/kg)	10.00U	10.00U	10.00U	10.00U
Ignitability	(mg/kg)	NOT	NOT	NOT	NOT
Sulfide	(mg/kg)	40.00U	40.00U	40.00U	40.00U

mg/kg: Milligrams per kilogram.
U: Not detected.