MTA Long Island Rail Road

Delineation Phase II
Site Assessment Remedial Action Work Plan
Bayside Substation: Site No. V00386-2

May 2011

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

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Helena E. Williams
President

Long Island Rail Road

May 24, 2011

Robert H. Filkins, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A
625 Broadway, 11th Floor
Albany, NY 12233-7016

Re: LIRR Bayside (NYSDEC VCA No. V00386-2)
Remedial Action Work Plan

Dear Mr. Filkins:

Enclosed please find one hard copy and one electronic copy of the Work Plan entitled:

"LIRR Bayside Substation
Remedial Action Work Plan
(NYSDEC VCA No. V00386-2)"

Please be advised that the LIRR will be decommissioning the Bayside Substation as part of an overall capital program system upgrade project. A new substation building will be constructed to the east of the existing substation building and the existing substation building will be utilized for storage.

Please do not hesitate to contact me at (718) 558-3636 if you have any questions or comments.

Very truly yours,

Matthew Bowman
Assistant Project Manager

AW/SET/lf
cc: C. Doroski (NYSDOH)
C. Hillenbrand (USEPA)
C. Channer (MTA)
G. Russo (LIRR)
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♦2801\MISC11LTR.DOC-09(R01)

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

DELINEATION PHASE II SITE ASSESSMENT
FOR
BAYSIDE SUBSTATION

REMEDIAL ACTION WORK PLAN

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

Prepared by:

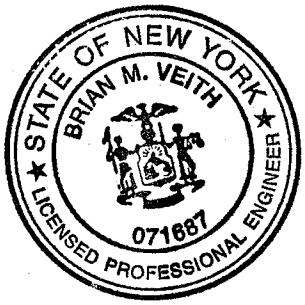
DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK

MAY 2011

CERTIFICATIONS

I, Brian Veith, certify that I am currently a New York State registered Professional Engineer and that this Remedial Action Work Plan (RAWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

071687	5/19/2011	Brian Veith
NYS Professional Engineer #	Date	Signature



LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT FOR
BAYSIDE 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 Bayside Electric Substation.

In 1999, 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 Bayside 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 Bayside Substation in September of 2005. Additional follow-up field work was also completed in March 2009. The results of these investigations were documented in a report prepared by D&B entitled, "Delineation Phase II Site Assessment Investigation Report for the Bayside Substation," dated November 2009.

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 and arsenic contamination identified in several areas of the Bayside Substation, as documented in the November 2009 "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 Bayside 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 Bayside 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 Bayside 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 Bayside Substation by March 2009. Section 1.3 provides a summary of key findings associated with this investigation.

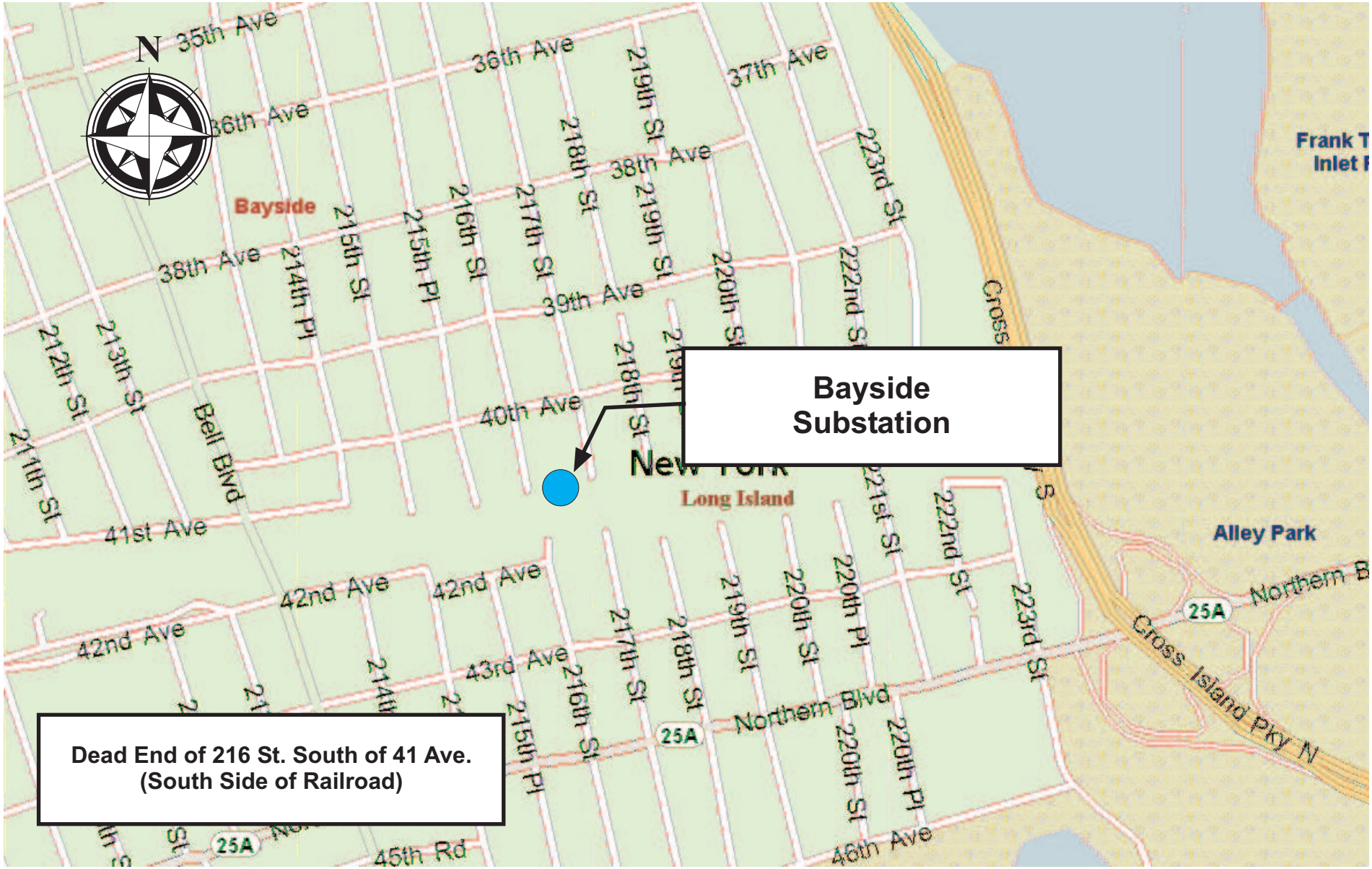
1.2 Site Description

The Bayside Substation site is located in Bayside, Queens County, New York (see Figure 1-1). The substation consists of an approximately 1,800-square foot one-story brick building shown on Figure 1-2. An approximately 3,600-square foot transformer yard is located to the east of the substation building and is enclosed by a chain-link fence. The substation building and transformer yard are presently utilized to convert alternating current to direct current. The areas surrounding the substation and the transformer yard are currently utilized as an LIRR right-of-way, vehicular parking and residential areas. Note that as discussed in the following subsections, a small area to the north of the substation property is not fenced; however this area is currently covered in approximately 2 inches of crushed stone.

The Bayside Substation is equipped with a basement, sanitary and water services and a utility trench system, as well as an office area utilized by LIRR personnel. The interior of the substation consists of an active solid-state rectifier located over a pit leading to the basement that once serviced a mercury-containing rectifier. In addition, the substation contained a second wooden covered rectifier pit not currently in use. It should also be noted that the Bayside substation contains a bank of active lead-acid batteries located in a room in the northwest corner of the substation to provide back-up electricity.

The initial site inspection identified a water meter pit with an earthen bottom located along the western wall of the substation, as well as a communications manhole filled with water and debris located off the northwest corner of the substation. In addition, a steel covered manhole conduit filled with water and debris was observed approximately 5 feet north of the substation and a steel covered conduit pit containing a floor drain filled with ballast was observed within the transformer yard.

Based on the results of the Delineation Phase II Site Assessment, the depth to groundwater at this site is approximately 75 feet below ground surface.



2801(LIRR)/Work Plan Site Maps.cdr/hw(12/16/08)

Dvirka and Bartilucci
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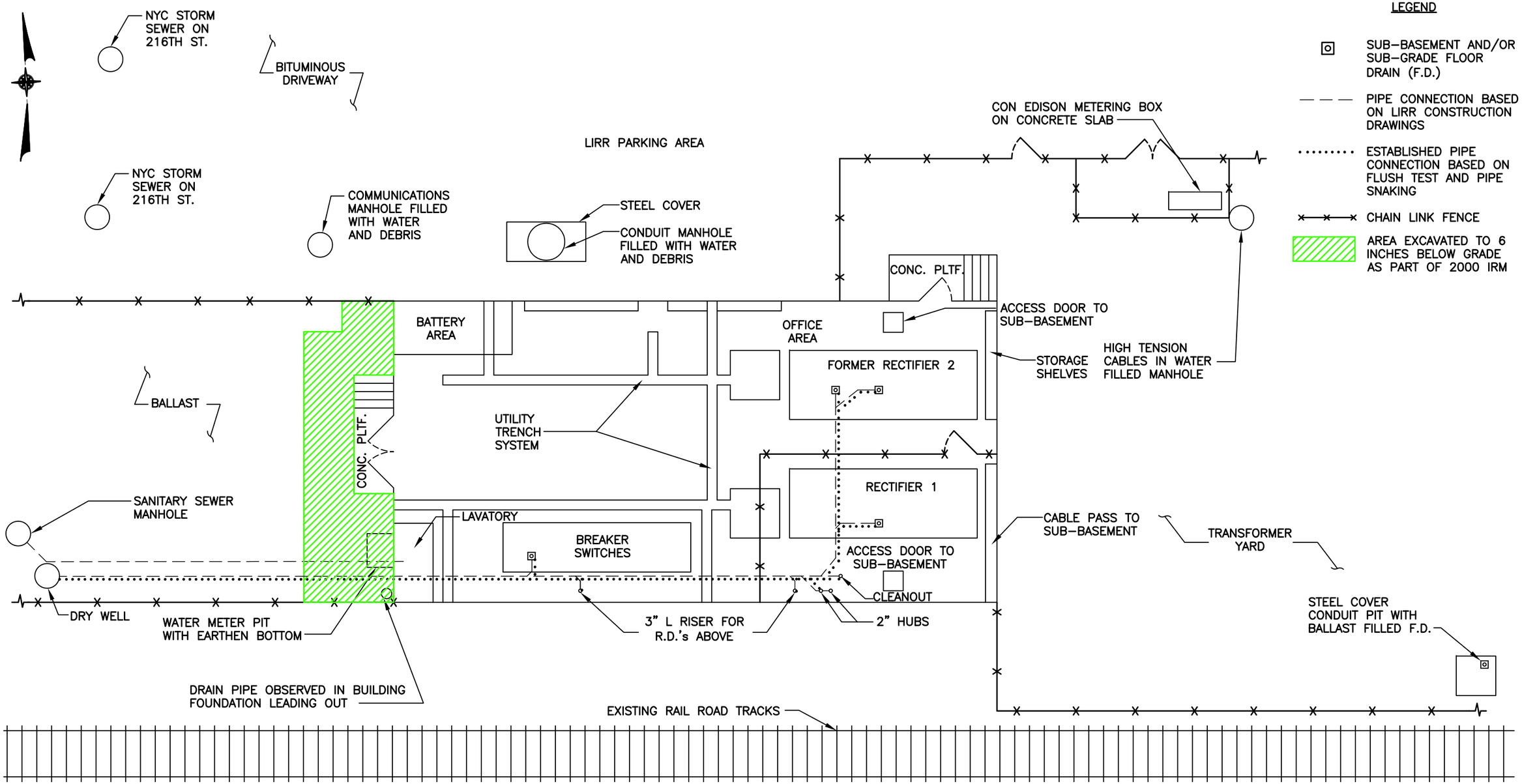
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SITE LOCATION MAP
BAYSIDE SUBSTATION (V00386-2)

NOT TO SCALE

FIGURE 1-1



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
BAYSIDE SUBSTATION (V00386-2)

FIGURE 1-2

F:\2229\BAYSIDE\2229-FIG 1-2 Site Plan.dwg, 5/17/2011 10:04:33 AM, Adobe PDF

1.3 Summary of Prior Investigations

The LIRR completed an Initial Site Assessment of the Bayside 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, an exploratory excavation and drainage determinations. In addition, samples of various environmental media were collected at the site for laboratory analysis. Samples collected for laboratory analysis included four surface soil samples, ten 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 March 2009. As part of this investigation, a total of 42 surface soil samples, 59 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. The five below grade structures investigated for UIC applicability included a communications manhole located off the northwest corner of the substation building, a conduit manhole located north of the substation building, a high tension cable manhole located off the northeast corner of the substation building and the lavatory discharge and rectifier discharge piping, which according to available LIRR construction drawings, were suspected to discharge through the southwest wall of the substation building.

Mercury was detected in surface and subsurface soil to the west and east of the substation building and elevated arsenic concentrations have been detected in surface and subsurface soil to the east of the substation building. The most significant mercury concentrations were identified in surface soil located in the vicinity of the concrete platform and steps located on the northeast corner of the substation building, with a maximum mercury concentration of 158 mg/kg. In addition, elevated concentrations of arsenic were detected in surface and subsurface soil located in the transformer yard to the east of the substation building. The highest arsenic concentrations were detected in surface soil located in the transformer yard, with a maximum arsenic concentration of 69.0 mg/kg. The arsenic concentrations detected throughout the substation transformer yard are not likely associated with the historical operation of the substation, but are

more likely associated with the coal combustion by-products (i.e., coal ash and clinker) present in the soil located throughout the transformer yard, to the east of the substation building.

The communications manhole located approximately 8 feet northwest of the substation building was visually inspected for the presence of a solid bottom and discharge piping during the Delineation Phase II Site Assessment. Discharge piping was not observed in this structure. In addition, it was observed that the communications manhole was constructed with a solid bottom and no sediment was observed in the structure; therefore, samples were not collected from the communications manhole.

The conduit manhole located approximately 5 feet north of the substation building was not inspected due to a trailer being located on the manhole throughout the duration of the Delineation Phase II Site Assessment. Note that the conduit manhole structures investigated at the various other LIRR substation sites were designed as access points for power and communication cables and were not designed as drainage structures; as such, their primary function is not to accept fluids. Therefore, it is assumed that the conduit manhole located approximately 5 feet north of the substation building is not a UIC structure.

The high tension manhole located approximately 22 feet northeast of the substation building was visually inspected for the presence of a solid bottom and discharge piping during the Delineation Phase II Site Assessment. Due to the manhole being partially filled with debris and water and potential electrical safety concerns, the bottom surface of the manhole could not be investigated. As a result, one soil boring was advanced to the immediate east of the manhole, downgradient of the manhole with respect to groundwater flow. One subsurface soil sample was collected from 6 to 8 feet below ground surface for UIC parameter analysis and compared to the TAGM SCOs. No analyte was detected at concentrations exceeding their respective TAGM SCOs in the collected subsurface soil sample. In addition, one water sample was collected from the storm water within the high tension manhole for UIC parameter analysis. Due to the lack of applicable storm water standards, the data was compared to the Class GA Groundwater Standards and Guidance Values. No analyte was detected at concentrations exceeding their

respective Class GA standards or guidance values, with the exception of lead, which was detected at a concentration of 35.4 ug/l, exceeding its Class GA standard of 25.0 ug/l.

Flush testing and mechanical snaking were performed during the Initial Site Assessment in order to investigate the lavatory discharge piping exiting the southwest corner of the substation building. The discharge point of the lavatory was unable to be determined at that time. As such, the discharge point of the lavatory piping was further investigated during the Delineation Phase II Site Assessment. A geophysical survey, consisting of a ground penetrating radar (GPR), an electromagnetic (EM) survey, and a flush test were performed in order to further investigate the lavatory discharge piping. The geophysical survey identified a sewer manhole cover located approximately 38 feet west of the substation building. A flush test later confirmed that the substation lavatory discharges to this sewer manhole. Samples were not collected as part of this investigation, as sediment was not present in the sewer manhole structure.

An exploratory excavation was performed during the Initial Site Assessment in order to investigate the rectifier discharge piping exiting the southwest corner of the substation building. The discharge point of the rectifier piping was unable to be determined during this excavation. As such, the discharge point of the rectifier pit piping was further investigated during the Delineation Phase II Site Assessment. A geophysical survey, consisting of a GPR and EM survey, was performed in order to further investigate the rectifier discharge piping. The geophysical survey was unable to identify the rectifier discharge piping at that time. During the April 2008 additional delineation field work, an exploratory excavation was performed, in which the rectifier discharge piping was uncovered and tracked to a dry well located approximately 35 feet west of the substation building. One soil sample was collected for UIC parameter analysis from the sediment located within the dry well and compared to the TAGM SCOs. No analyte was detected at concentrations exceeding their respective TAGM SCOs, with the exceptions of mercury and benzo(a)pyrene. Mercury, at a concentration of 2.2 mg/kg, was detected at a concentration exceeding its TAGM SCO of 0.10 mg/kg. Benzo(a)pyrene, at a concentration of 210 ug/kg, was detected at a concentration exceeding its TAGM SCO of 61.0 ug/kg.

Additional details regarding the above findings are presented in the Delineation Phase II Site Assessment Report for the Bayside Substation, submitted to the NYSDEC in November of 2009.

Note that a mercury vapor evaluation, consistent with the NYSDOH's Soil Vapor Intrusion Guidance (SVIG), was completed in the existing substation building in November 1999. The mercury vapor evaluation consisted of a 56-point mercury vapor survey, with 32 mercury vapor sample locations collected from within the substation building and 24 mercury vapor sample locations collected from the exterior of the substation building. All mercury vapor samples were collected with a Jerome 431X mercury vapor analyzer (MVA) and have been re-evaluated and compared to the Public Employee Safety and Health (PESH) 8-hour time-weighted average (TWA) concentration of 0.050 mg/m^3, for reference purposes only. Mercury vapor was detected in one of the 56 mercury vapor samples: a mercury vapor concentration of 0.060 mg/m^3 was detected in one mercury vapor sample location collected from the southeast corner of the sub-basement of the substation building. As only one of the 56 mercury vapor samples exhibited a mercury vapor concentration and the observed mercury vapor concentration only slightly exceeded the PESH concentration of 0.050 mg/m^3, no further mercury vapor investigation or action is warranted. A table summarizing the mercury vapor measurement results is provided in Appendix A.

IRM Activities

In April 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 adjacent to the west of the Bayside Substation in order to reduce the potential for exposure to mercury in surface soil in this area. As depicted on Figure 1-2, IRM activities were conducted in the vicinity of the concrete platform and steps located on the west side of the substation building. Three post-excavation soil samples were collected from a depth of 6-inches below ground surface. Mercury was detected at concentrations ranging from 8.0 mg/kg to 68.4 mg/kg in the post-excavation samples. Note that soil in this area is proposed to be removed as part of the remedial activities described below.

1.4 Summary of Environmental Conditions at the Site

This section briefly describes the current and future conditions of the Bayside Substation. The Bayside Substation is actively used by the LIRR to convert alternating current obtained from the local electrical provider, Consolidated Edison (Con Ed). The substation has been used for this purpose since 1948.

The substation is bounded by track to the south and bounded by fencing to the east, west and a portion of the north, limiting public access to the property. Note that a small portion of the northern substation property exhibiting elevated concentrations of mercury is not located within the substation fencing. However, this area has been covered by approximately 2 inches of crushed stone in order to limit the risk to off-site receptors. Note, this area will be fenced during the implementation of the remedy. A residential area bounds the substation to the north; however, the residential area is separated from the site by site fencing and a road. The substation property is isolated by a chain-link fence and the majority of the substation property is covered with crushed stone. The transformer yard, located to the east of the substation building, is covered with approximately 2 inches of crushed stone. The majority of the Bayside Substation 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 electric equipment (i.e., transformers) are secured by a locked fence.

As described above, the majority of the areas where mercury and arsenic concentrations were detected in exceedance of their respective SCOs are covered with crushed stone. As such, direct contact exposure to mercury and arsenic contamination of LIRR workers (on-site receptors) who are required to periodically enter the site for equipment maintenance and repair is possible in limited locations other than the transformer yard. LIRR workers and subcontractors and the public (off-site receptors) 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.

As discussed above, elevated mercury and/or arsenic concentrations have been detected in surface and subsurface soil to the north, west and east of the substation building and in the dry well located to the west of the substation building, and elevated arsenic concentrations have been detected in surface and subsurface soil to the east of the substation building. However, 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 Bayside substation property is secured with a locked chain-link fence eliminating the potential of trespassers entering the site. As described above, areas exhibiting concentrations of site contaminants in exceedance of their respective SCOs, and not secured by site fencing, have been covered in approximately 2 inches of crushed stone.

The Bayside Substation is serviced by public water and on-site groundwater is not used for any purpose.

Based on the results of the Delineation Phase II Site Assessment Report, one area to the west, one area to the east and one area to the north of the substation building will require remediation. Due to an irregular distribution of mercury and arsenic in site soil, and as described in the following sections, the remedial areas have been divided into three excavation areas with depths ranging from 1 to 4 feet below ground surface. In addition, due to a mercury concentration of 2.2 mg/kg detected in the sediment of the dry well located to the west of the substation building, the LIRR recommends that this structure be remediated and closed. The dry well will require remediation and closure in accordance with all applicable United States Environmental Protection Agency (USEPA) UIC regulations.

The areas requiring remediation and the UIC structure requiring remediation and closure are depicted on Figure 1-3 in a “conceptual fashion” and are described in the NYSDEC-approved Initial Site Assessment dated December 2000 and the NYSDEC-approved “Delineation Phase II

LEGEND

BSSS-01 ○ COMPLETED SURFACE SOIL SAMPLE

BSSB-03 ● COMPLETED SOIL BORING

BSCC-01/ BSSB-01 ◉ COMPLETED CONCRETE CORING/SOIL BORING

BSWC-01 ● COMPLETED WASTE CHARACTERIZATION SAMPLE LOCATION

BSEP-01 ▲ PROPOSED ENDPOINT SAMPLE LOCATION

SUB-BASEMENT AND/OR SUB-GRADE FLOOR DRAIN (F.D.)

PIPE CONNECTION BASED ON LIRR CONSTRUCTION DRAWINGS

ESTABLISHED PIPE CONNECTION BASED ON FLUSH TEST AND PIPE SNAKING

CHAIN LINK FENCE

AREA REMEDIATED AS PART OF IRM TO 6 INCHES BGS

AREA OF PROPOSED REMEDIATION TO 1 FOOT BGS

AREA OF PROPOSED REMEDIATION TO 4 FEET BGS

AREA OF PROPOSED REMEDIATION TO 2 FEET BGS

UIC STRUCTURE TO BE REMEDIATED

RESIDENTIAL AREA

NYC STORM SEWER ON 216TH ST.

BITUMINOUS DRIVEWAY

ASSUMED GROUNDWATER FLOW DIRECTION

NYC STORM SEWER ON 216TH ST.

COMMUNICATIONS MANHOLE FILLED WITH WATER AND DEBRIS

LIRR PARKING AREA

TRAILER

STEEL COVER

CONDUIT MANHOLE FILLED WITH WATER AND DEBRIS

CON EDISON METERING BOX ON CONCRETE SLAB

BSEP-04

BSEP-06

BSSS-06 BSSB-10

BSSS-07 BSSB-11

BSEP-07

BSWC-01

BSSW-01

BSSB-35

BSSS-08 BSSB-12

BSSB-13

BSSS-01

BSSS-09 BSSB-14

BSSS-11 BSSB-17

BSSS-12 BSSB-18

CONC. PLTF.

BSSB-15

BSSS-02 BSSB-16

BSEP-05

BSSB-03

BSSS-22 BSSB-28

BSEP-03

BSSS-23 BSSB-29

ACCESS DOOR TO SUB-BASEMENT

BSSS-15 BSSB-22

BSSS-20 BSSB-26

BSSS-03

BSEP-01

BSSB-06

BSSB-05

BSEP-01

BATTERY AREA

OFFICE AREA

FORMER RECTIFIER 2

BSCC-01/ BSSB-01

BSSS-13 BSSB-19

STORAGE SHELVES

BSSS-14 BSSB-20

HIGH TENSION CABLES IN WATER FILLED MANHOLE

BSEP-10

BSEP-11

BSSS-16 BSSB-21

BALLAST

BSSS-05 BSSB-07

BSSB-08

BSEP-02

CONC. PLTF.

UTILITY TRENCH SYSTEM

BSSS-19 BSSB-25

BSSS-24 BSSB-30

BSSS-21 BSSB-27

BSEP-08

BSEP-09

BSSS-17 BSSB-23

RECTIFIER 1

BSCC-02/ BSSB-02

SANITARY SEWER MANHOLE

BSSS-04

BSEP-02

BSSB-04

BSEP-03

BSSB-09

LAVATORY

BREAKER SWITCHES

ACCESS DOOR TO SUB-BASEMENT

BSDW-01

TRANSFORMER YARD

BSSS-18 BSSB-24

BSSS-25 BSSB-31

CLEANOUT

STEEL COVER CONDUIT PIT WITH BALLAST FILLED F.D.

BSSS-28 BSSB-34

BSSS-26 BSSB-32

3" L RISER FOR R.D.'s ABOVE

2" HUBS

BSSS-27 BSSB-33

WATER METER PIT WITH EARTHEN BOTTOM

BASEMENT DRAIN PIPE

DRAIN PIPE OBSERVED IN BUILDING FOUNDATION LEADING OUT

EXISTING RAIL ROAD TRACKS

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

BAYSIDE SUBSTATION (V00386-2)
ENDPOINT SAMPLE LOCATIONS AND REMEDIAL AREAS

0 5 10
SCALE IN FEET

FIGURE 1-3

F:\2229\BAYSIDE\2229-F ig 1-3 RAWP.dwg, 5/17/2011 10:03:40 AM, Adobe PDF

Site Assessment Investigation Report for the Bayside Substation," dated November 2009. Specific details regarding the soil excavation and UIC 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 Bayside Substation will be decommissioned and utilized for storage and a new substation building will be constructed to the east of the existing substation building. This upgrade will occur in three phases: decommissioning of the existing substation building, remediation of contaminated soil consisting of excavation and replacement with clean fill and construction of a new substation building.

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 B. Specific details regarding remedial activities will be included in the plans and specifications.

The decommissioning of the Bayside Substation will be performed by a qualified abatement contractor and supervised by the LIRR's abatement consultant. The decommissioning activities include removal of all on-site electrical equipment racks and abatement of all asbestos containing material (ACM). The LIRR's abatement consultant will be on-site at all times to ensure that all work is performed in accordance with applicable codes and regulations. The consultant will conduct air monitoring throughout decommissioning activities. All debris generated from the decommissioning of the substation property will be properly characterized and disposed of by the abatement contractor in accordance with all applicable regulations. In addition, the LIRR will have on-site a full-time representative to observe the decommissioning of the building and to identify and document any mercury-related contamination that may be uncovered during the decommissioning process. If mercury contamination is identified, this

contamination will be remediated by the remediation contractor in accordance with the procedures set forth in this RAWP.

Once remedial activities are completed, the existing substation building is demolished and the new substation building is constructed, the LIRR will not be disturbing or excavating in the Bayside Substation for the foreseeable future. The LIRR has no plans to modify the post remedial action layout or infrastructure of the Bayside Substation at this time. As a result, future exposure to residual contamination, if any, is not expected. In addition, the LIRR intends to maintain the current industrial nature of the site, and has no current or future plans to utilize the Bayside Substation property for any non-industrial purposes at this time.

Institutional controls in the form of a deed restriction and/or environmental easement will be implemented to maintain the industrial nature of the property. In addition, as the new substation building is planned to be constructed in an area where exceedances of mercury were not detected, a mercury vapor intrusion investigation is not warranted within the new substation building.

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 three areas west, east and north of the substation building and in the dry well located to the west of 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 Section 2.1 below.

2.1 Remedial Goals and 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 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 Soil Cleanup Objectives (SCOs) for Industrial Use and for Residential Use. These SCOs have been utilized to define areas requiring remediation at the Bayside Substation. Typically, only the SCOs for Industrial Use are used to define areas requiring remediation. However, a small portion of the northern substation property exhibiting elevated concentrations of mercury is not located within the substation fencing, and as such, poses a potential risk to off-site receptors. Therefore, the SCOs for Residential Use are utilized to define the small area requiring remediation outside of the existing fenced area. As described above, this area has been covered by approximately 2 inches of crushed stone in order to limit the risk to off-site receptors. Note, this area will be fenced during the implementation of the remedy. As such, and pursuant to the RAOs provided below, the proposed remedial action soil cleanup goal is to remove all site soil within substation fencing exhibiting exceedances of the Industrial SCOs, and all site soil outside of the fenced area exhibiting exceedances of the Residential SCOs.

Elevated concentrations of mercury were detected in surface soil and subsurface soil to the north, west and east of the substation building. The highest mercury concentrations at the Bayside substation were detected in surface soil located in the vicinity of the concrete platform and steps located on the northeast corner of the substation building, with a maximum mercury concentration of 158 mg/kg. In addition, elevated concentrations of arsenic were detected in surface and subsurface soil to the east of the substation building. The highest arsenic concentrations were detected in surface soil located in the transformer yard to the east of the substation building, with a maximum arsenic concentration of 69.0 mg/kg. The arsenic concentrations detected throughout the substation transformer yard are not likely associated with the historical operation of the substation, but are more likely associated with the coal combustion by-products (i.e., coal ash and clinker) present in the soil located throughout the transformer yard, to the east of the substation building.

While elevated mercury and arsenic concentrations have been detected in surface and subsurface soil to the west, east and north of the substation building and in the dry well located to the west of 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.

The substation is bounded by track to the south and bounded by fencing to the east, west and a portion of the north, limiting public access to the property. Note that a small portion of the northern substation property is not located within the substation fencing. However, this area has been covered by approximately 2 inches of crushed stone in order to limit the risk to off-site receptors. Note, this area will be fenced during the implementation of the remedy. A residential area bounds the substation to the north; however, the residential area is separated from the site by site fencing and a road. The substation property is isolated by a chain-link fence and the majority of the substation property is covered with crushed stone. The transformer yard, located to the east of the substation building, is covered with approximately 2 inches of crushed stone. The majority of the Bayside Substation 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 electric equipment (i.e., transformers) are secured by a locked fence.

As described above, the majority of the areas where mercury and arsenic concentrations were detected in exceedance of their respective SCOs are covered with crushed stone. As such, direct contact exposure to mercury and arsenic contamination of LIRR workers (on-site receptors) who are required to periodically enter the site for equipment maintenance and repair is possible in limited locations other than the transformer yard. LIRR workers and subcontractors and the public (off-site receptors) 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.

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:

RAOs for Public Health Protection

- Mitigate ingestion/direct contact with contaminated soil.
- Mitigate inhalation of or exposure to contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Mitigate migration of contaminants that would result in groundwater or surface water contamination.

2.2 Summary of Remedy

The approximate locations and limits of the three areas requiring remediation are based on the Industrial and Residential SCOs, as provided in 6 NYCRR Part 375, and are depicted on Figure 1-3. The three proposed excavation areas are approximately 1,973 square feet in total area.

As shown on Figure 1-3, the areas to be excavated include the following:

- One area to the north of the substation building will be excavated to a depth of 1 foot below ground surface. This area is approximately 445 square feet in area and will require the removal of approximately 17 cubic yards of soil.
- One area to the west of the substation building will be excavated to a depth of 2 feet below ground surface. This area is approximately 455 square feet in area and will require the removal of approximately 34 cubic yards of soil.
- One area to the east of the substation building will be excavated to a depth of 4 feet below ground surface. This area is approximately 1,073 square feet in area and will require the removal of approximately 159 cubic yards of soil.

In addition, the LIRR intends to close and remediate soil associated with the dry well located to the west of the substation building. Soil will be removed from the dry well structure to a depth of 2 feet below the dry well bottom. In addition, the dry well cover and support rings will be removed and disposed of and the discharge piping will be plugged with a concrete cap. It is anticipated that approximately 4 cubic yards of soil will be removed from this structure. The excavated soil from the dry well structure will be replaced with clean fill from an off-site approved source. Following removal of the dry well structure and all associated soil one endpoint soil sample will be collected for UIC parameter analysis.

As part of the site remediation, a total of up to approximately 214 cubic yards of soil will be excavated and/or removed from the substation property and properly disposed of off-site. Soil removal will be conducted prior to the construction of the new substation building.

The excavated soil will be replaced with clean fill from an off-site approved source meeting the Commercial and Residential SCOs in fenced and unfenced areas, respectively, at a minimum. The LIRR will require the remedial contractor to provide a written "clean fill certification" document from the fill material supplier, which will certify that the material utilized to backfill the Bayside Substation will be a "virgin" soil obtained from a facility where no historical industrial activities have taken place.

Endpoint soil samples (BSEP-01 through BSEP-11) will be collected from the excavation areas to determine the characteristics of the remaining soil prior to site restoration. Endpoint soil samples BSEP-01 through BSEP-07 will be analyzed for mercury and endpoint soil samples BSEP-08 through BSEP-11 will be analyzed for arsenic. Endpoint soil samples collected from beneath the dry well will be analyzed for UIC parameter analysis. The proposed location of each endpoint and sidewall sample is shown on Figure 1-3. Endpoint samples collected from fenced portions of the substation property (BSEP-01, BSEP-02, BSEP-05 and BSEP-07 through BSEP-11) will be compared to the Industrial SCOs, endpoint samples collected from unfenced portions of the substation property (BSEP-03, BSEP-04 and BSEP-06) will be compared to the Residential SCOs. The endpoint samples collected from beneath the UIC structure will be compared to the TAGM SCOs.

Endpoint sample results will be provided to 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 LIRR and NYSDEC with regard to the need for additional excavation.

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. Based on the mercury vapor survey performed as part of the Initial Site Assessment and the mercury vapor soil screening performed as part of the Delineation Phase II Site Assessment, mercury vapor is not a concern at this site. Therefore, it is not expected that the volatilization of mercury during the completion of excavation activities will be a health risk. However, the remedial contractor will monitor for mercury vapor concentrations in air during the

completion of all intrusive activities. Air monitoring is discussed further in Section 5.0 of this report.

Institutional controls in the form of a deed restriction and/or environmental easement will be implemented to maintain the industrial nature of the property. Soil removal will be conducted prior to the construction of the new substation building. In the event that additional soil will require removal, this soil will be properly characterized and disposed of by the new substation building contractor in accordance with the requirements of the RAWP.

2.3 Evaluation of Remedy

The following discussion presents the engineering evaluation of the remedy against the six remedy selection criteria. 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 inside the existing fenced area and for Residential Use outside the existing fenced area. 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
- NYSDEC 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
- TAGM 4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites
- NYSDOH Generic CAMP
- USEPA 40 CFR – UIC Regulation Program
- NYSDEC draft VCP Guide - May 2002

As described above, since the remedy will remove the soil exhibiting contaminants above the Part 375 SCOs for Industrial Use inside the existing fenced area and for Residential Use outside the existing fenced area, 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 approximately 214 cubic yards of soil 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 1 week; however, the schedule will be coordinated with the upgrade of the substation. Remedial activities will only occur during normal business hours and noise levels will be maintained to meet local noise ordinances.

Based on the mercury vapor survey performed as part of the Initial Site Assessment and the mercury vapor soil screening performed as part of the Delineated Phase II Site Assessment, mercury vapor is not a concern at this site. However, the remedial contractor will monitor for mercury vapor concentrations in air during the completion of all intrusive activities.

Since the majority of the property is fenced at the Bayside Substation, these areas are only accessible by authorized LIRR personnel and its subcontractors. A small portion of the northern substation property is not located within the substation fencing. However, in order to limit the risk to off-site receptors, this area has been covered with approximately 2 inches of crushed stone. In addition, this area will be fenced during the implementation of the remedy. Therefore, impacts to the community from these areas during implementation of the remedy would be negligible. 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 and the erection of temporary fencing in areas not currently fenced. 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 inside the existing fenced area and the Residential Use SCOs outside the existing fenced area 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 inside the existing fenced area and the Residential Use outside the existing fenced area 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 up to approximately 214 cubic yards of 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 upgrade 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.

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 these respective SCOs, at a minimum, meets the objectives of the six remedy selection criteria as defined in the draft VCP Guide.

3.0 REMEDIAL CONSTRUCTION

As detailed in Section 2.0, the LIRR has identified three areas at the Bayside Substation requiring remediation and one UIC structure requiring proper remediation and closure. 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 from each remedial excavation to ensure that remediation has been successfully completed. In addition, once remedial activities and the new building construction are completed, the LIRR will not be disturbing or excavating at the Bayside Substation for the foreseeable future. As a result, future exposure to residual contamination, if any, is not expected. In addition, as the new substation building is planned to be constructed in an area where exeedances of mercury were not detected, a mercury vapor intrusion investigation is not warranted within the new substation building.

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 Figure 1-3. 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 work 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 B.

Based on the mercury vapor survey performed as part of the Initial Site Assessment and the mercury vapor soil screening performed as part of the Delineation Phase II Site Assessment, mercury vapor is not a concern at this site. Therefore, it is not expected that the volatilization of mercury during the completion of excavation activities will be a health risk. However, the

remedial contractor will monitor for mercury vapor concentrations in air during the completion of all intrusive activities.

3.3 Soil Characterization

Pre-characterization sampling of the soil directly adjacent to the substation building was completed as part of the Delineation Phase II Site Assessment phase of the project to characterize the soil to be excavated and removed as part of the remedial excavations. A total of two soil samples were selected for waste characterization. All samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals (including mercury), TCLP SVOCs, TCLP VOCs and RCRA waste characteristics (ignitability, reactivity and corrosivity). The results of the pre-characterization sample analysis are provided as Appendix C. All RCRA waste characterization results were compared to 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 material will be maintained in the project files.

3.5 Endpoint Sampling

Upon reaching the final excavation depth, samples will be collected by the contractor from the base of each excavation to determine the characteristics of the remaining soil prior to site restoration. Endpoint soil samples BSEP-01 through BSEP-07 will be analyzed for mercury and endpoint soil samples BSEP-08 through BSEP-11 will be analyzed for arsenic. Endpoint soil samples collected from the dry well excavation will be analyzed for UIC parameters. Figure 1-3 provides the proposed location of each endpoint sample location. Expedited 2-day turnaround analysis will be performed to determine the characteristics of remaining soil prior to completion of site redevelopment and site restoration.

Endpoint samples collected from fenced portions of the substation property (BSEP-01, BSEP-02, BSEP-05 and BSEP-07 through BSEP-11) will be compared to the Industrial SCOs. Endpoint samples collected from unfenced portions of the substation property (BSEP-03, BSEP-04 and BSEP-06) will be compared to the Residential SCOs. The endpoint sample collected from the dry well excavation will be compared to TAGM SCOs.

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. Two of the three excavation areas are less than 900 square feet and a minimum of one endpoint sample for each area would be required. However, in order to minimize the total amount of extra soil that would need to be removed in the event that the endpoint samples exceed the SCOs, additional endpoint samples have been proposed.

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 1 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 Underground Injection Control Remediation and Closure

As shown on Figure 1-3, one UIC structure located at the Bayside Substation will be properly remediated and closed as part of the planned remediation of the existing substation property. The UIC structure is the dry well located to the west of the substation building. The remediation and closure of the dry well will be performed in accordance with all USEPA UIC regulations.

The 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. Soil will be removed from this structure to a depth of 2 feet below the dry well bottom. In addition, the dry well rings and cover will be removed and disposed of and the discharge pipe will be plugged with a concrete cap. One post excavation soil sample will be collected from the dry well excavation and analyzed for UIC parameter analysis. The former dry well will then be backfilled with clean fill to grade.

All waste generated as part of the above-described remediation/closure 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 Bayside Substation will be from an off-site source approved by LIRR. The fill will consist of clean sand meeting the Industrial SCOs, at a minimum, 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 provided 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. 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 provided as Appendix B.

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 e-mailed to the NYSDEC on a weekly basis for 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 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, the report 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.

7.0 PROJECT MANAGEMENT

7.1 Key Participants and Responsibilities

Key participants involved in the remediation of the LIRR Bayside 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

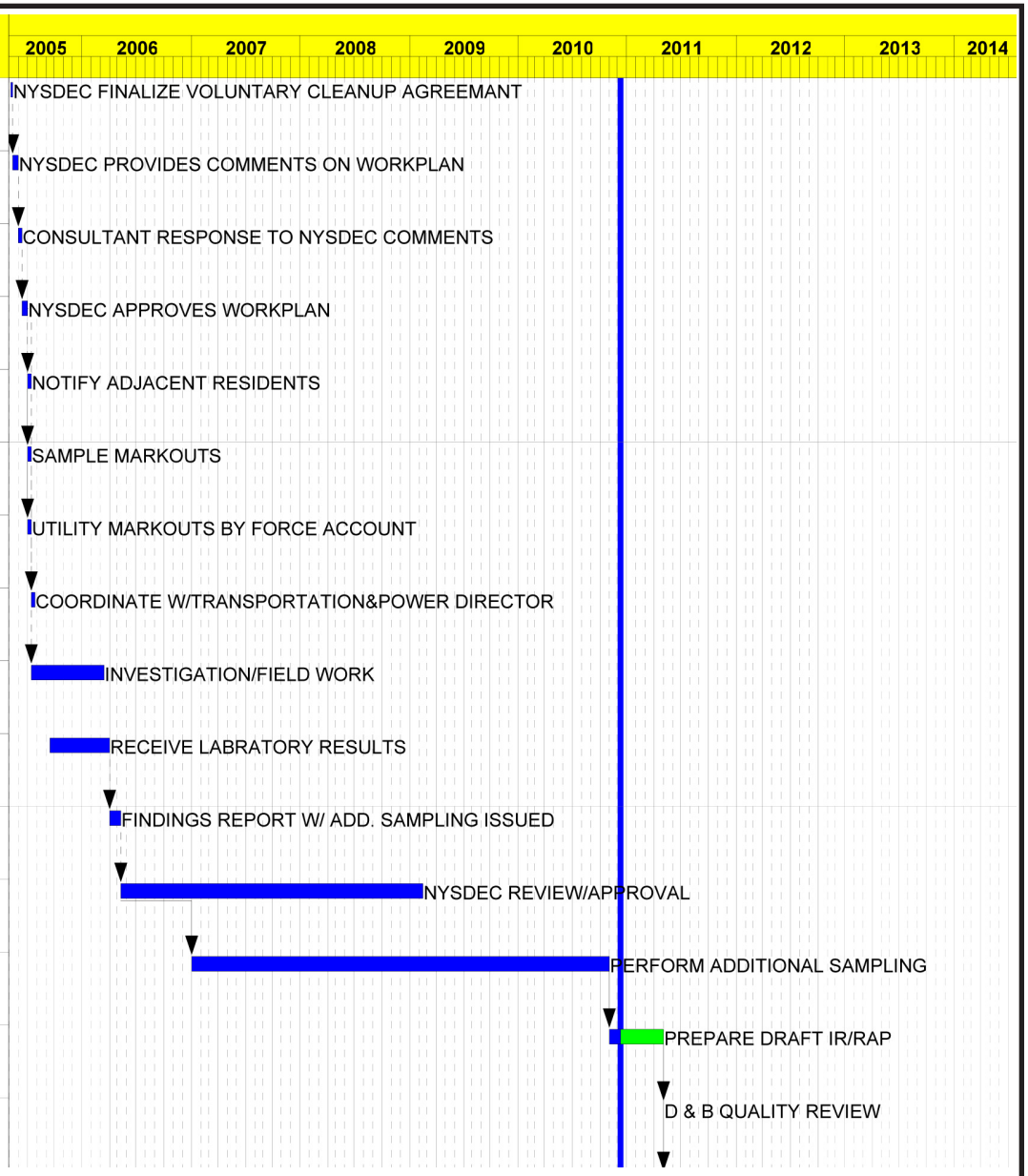
Throughout the project, project meetings will be held to discuss work progress, plan upcoming activities for the week and discuss any unanticipated site conditions encountered. The remedial contractor's superintendent, as well as LIRR's Project Manager, will be required to attend the project meetings. 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 depicted on Figure 8-1. The schedule details key milestones and current corresponding dates of completion for each activity to be completed throughout the remainder of the project.

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
100	NYSDEC FINALIZE VOLUNTARY CLEANUP AGREEMANT	1	0	10MAY05A	10MAY05A
110	NYSDEC PROVIDES COMMENTS ON WORKPLAN	20	0	11MAY05A	30MAY05A
120	CONSULTANT RESPONSE TO NYSDEC COMMENTS	11	0	01JUN05A	11JUN05A
130	NYSDEC APPROVES WORKPLAN	20	0	12JUN05A	01JUL05A
140	NOTIFY ADJACENT RESIDENTS	12	0	02JUL05A	13JUL05A
150	SAMPLE MARKOUTS	12	0	02JUL05A	13JUL05A
160	UTILITY MARKOUTS BY FORCE ACCOUNT	12	0	02JUL05A	13JUL05A
170	COORDINATE W/TRANSPORTATION&POWER	12	0	14JUL05A	25JUL05A
180	INVESTIGATION/FIELD WORK	150	0	16JUL05A	15MAR06A
190	RECEIVE LABRATORY RESULTS	120	0	15SEP05A	01APR06A
200	FINDINGS REPORT W/ ADD. SAMPLING ISSUED	31	0	02APR06A	12MAY06A
210	NYSDEC REVIEW/APPROVAL	60	0	13MAY06A	16FEB09A
220	PERFORM ADDITIONAL SAMPLING	120	0	02JAN07A	31OCT10A
230	PREPARE DRAFT IR/RAP	90	139	01NOV10A	30APR11
235	D & B QUALITY REVIEW	5	5	01MAY11	05MAY11



Note: Substation Remediation Schedule Activities and Dates Provided by the LIRR

Dvirka and Bartilucci CONSULTING ENGINEERS
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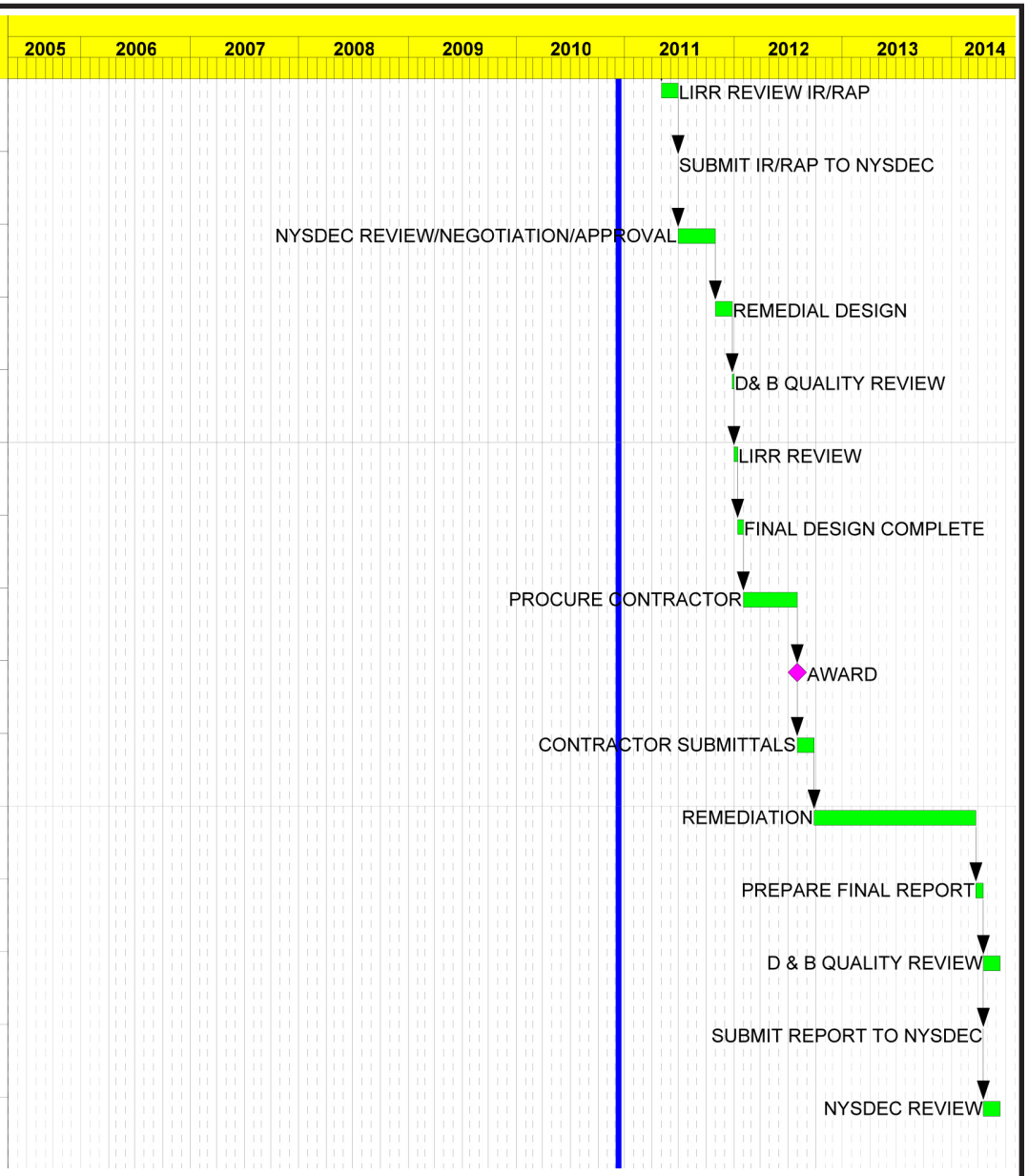
LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SUBSTATION REMEDIATION SCHEDULE
BAYSIDE SUBSTATION (V00386-2)

Figure 8-1

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
240	LIRR REVIEW IR/RAP	60	60	01MAY11	29JUN11
245	SUBMIT IR/RAP TO NYSDEC	1	1	30JUN11	30JUN11
250	NYSDEC REVIEW/NEGOTIATION/APPROVAL	120	120	01JUL11	28OCT11
260	REMEDIAL DESIGN	60	60	29OCT11	27DEC11
265	D& B QUALITY REVIEW	5	5	28DEC11	01JAN12
270	LIRR REVIEW	15	15	02JAN12	16JAN12
280	FINAL DESIGN COMPLETE	15	15	17JAN12	31JAN12
290	PROCURE CONTRACTOR	180	180	01FEB12	29JUL12
295	AWARD	0	0	30JUL12	
300	CONTRACTOR SUBMITTALS	60	60	30JUL12	27SEP12
310	REMEDIATION	540	540	28SEP12	21MAR14
320	PREPARE FINAL REPORT	27	27	22MAR14	17APR14
325	D & B QUALITY REVIEW	60	60	18APR14	16JUN14
330	SUBMIT REPORT TO NYSDEC	1	1	18APR14	18APR14
340	NYSDEC REVIEW	59	59	19APR14	16JUN14



Note: Substation Remediation Schedule Activities and Dates Provided by the LIRR

Dvirka and Bartilucci CONSULTING ENGINEERS
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LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SUBSTATION REMEDIATION SCHEDULE
BAYSIDE SUBSTATION (V00386-2)

Start Date	01JAN05	Early Bar
Finish Date	16JUN14	Progress Bar
Data Date	13DEC10	Critical Activity
Run Date	16DEC10 11:09	

Figure 8-1

APPENDIX A

MERCURY VAPOR MEASUREMENT RESULTS

TABLE 1

LONG ISLAND RAIL ROAD SUBSTATION INVESTIGATION
MERCURY VAPOR MEASUREMENT RESULTS - BAYSIDE

(November 22, 1999)

Measurement I.D.	MVA (mg/m^3 Hg)
BSMV-01	0.000
BSMV-02	0.000
BSMV-03	0.000
BSMV-04	0.000
BSMV-05	0.000
BSMV-06	0.000
BSMV-07	0.000
BSMV-08	0.000
BSMV-09	0.000
BSMV-10	0.000
BSMV-11	0.000
BSMV-12	0.000
BSMV-13	0.000
BSMV-14	0.000
BSMV-15	0.000
BSMV-16	0.000
BSMV-17	0.000
BSMV-18	0.000
BSMV-19	0.000
BSMV-20	0.000
BSMV-21	0.000
BSMV-22	0.000
BSMV-23	0.000
BSMV-24	0.000
BSMV-25	0.000
BSMV-26	0.000
BSMV-27	0.000
BSMV-28	0.000
BSMV-29	0.000
BSMV-30	0.000
BSMV-31	0.000
BSMV-32	0.000
BSMV-33	0.000
BSMV-34	0.000
BSMV-35	0.000
BSMV-36	0.000
BSMV-37	0.000
BSMV-38	0.000
BSMV-39	0.000
BSMV-40	0.060
BSMV-41	0.000
BSMV-42	0.000
BSMV-43	0.000
BSMV-44	0.000
BSMV-45	0.000
BSMV-46	0.000
BSMV-47	0.000

Notes:
MVA: Mercury vapor analyzer
Mg/m^3 Hg: Milligrams per meter cubed mercury vapor
Instrument detection limit is 0.003 mg/m^3

TABLE 1 (continued)

LONG ISLAND RAIL ROAD SUBSTATION INVESTIGATION
MERCURY VAPOR MEASUREMENT RESULTS - BAYSIDE

(November 22, 1999)

Measurement I.D.	MVA (mg/m^3 Hg)
BSMV-48	0.000
BSMV-49	0.000
BSMV-50	0.000
BSMV-51	0.000
BSMV-52	0.000
BSMV-53	0.000
BSMV-54	0.000
BSMV-55	0.000
BSMV-56	0.000

Notes:
MVA: Mercury vapor analyzer
Mg/m^3 Hg: Milligrams per meter cubed mercury vapor
Instrument detection limit is 0.003 mg/m^3

APPENDIX B

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 C

PRE-CHARACTERIZATION SOIL SAMPLING ANALYTICAL RESULTS

TABLE 28
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
BAYSIDE SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

PERIOD: From 04/17/2008 thru 04/17/2008 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE SAMPLE ID DATE	TCLP Regulatory Levels	BSWC-01 BSWC-01 (S) 04/17/2008	BSWC-01 BSWC-01 (1-2) 04/17/2008
2,4,5-Trichlorophenol (TCLP)	(ug/l)	400000	2.5 U	2.5 U
2,4,6-Trichlorophenol (TCLP)	(ug/l)	2000	3.0 U	3.0 U
2,4-D (TCLP)	(ug/l)	10000		0.77 U
2,4-Dinitrotoluene (TCLP)	(ug/l)	130	3.7 U	3.7 U
Arsenic (TCLP)	(ug/l)	5000	2.5 U	3.2
Barium (TCLP)	(ug/l)	100000	321	210
Cadmium (TCLP)	(ug/l)	1000	20.2 U	5.9
Chlordane (TCLP)	(ug/l)	30	1.6 U	1.6 U
Chromium (TCLP)	(ug/l)	5000	1.6 U	1.6 U
Endrin (TCLP)	(ug/l)	20	0.060 U	0.060 U
Heptachlor (TCLP)	(ug/l)	8.0	0.023 U J	0.023 U J
Heptachlor epoxide (TCLP)	(ug/l)	8.0	0.026 U	0.026 U
Hexachlorobenzene (TCLP)	(ug/l)	130	3.2 U	3.2 U
Hexachlorobutadiene (TCLP)	(ug/l)	500	2.3 U	2.3 U
Hexachloroethane (TCLP)	(ug/l)	3000	2.4 U	2.4 U
Lead (TCLP)	(ug/l)	5000	486	49.2
Lindane (TCLP)	(ug/l)	400	0.023 U	0.023 U

ug/l: micrograms per liter

TABLE 28
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
BAYSIDE SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

PERIOD: From 04/17/2008 thru 04/17/2008 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE SAMPLE ID DATE	TCLP Regulatory Levels	BSWC-01 BSWC-01 (S) 04/17/2008	BSWC-01 BSWC-01 (1-2) 04/17/2008
Mercury (TCLP)	(ug/l)	200	0.021	0.022
Methoxychlor (TCLP)	(ug/l)	10000	0.43 U	0.43 U
Nitrobenzene (TCLP)	(ug/l)	2000	3.0 U	3.0 U
o-Cresol (TCLP)	(ug/l)	200000	4.0 U	4.0 U
PCP (TCLP)	(ug/l)	100000	2.4 U	2.4 U
p-Cresol (TCLP)	(ug/l)	200000	3.7 U	3.7 U
p-Dichlorobenzene (TCLP)	(ug/l)	7500	2.1 U	2.1 U
Pyridine (TCLP)	(ug/l)	5000	2.9 U	2.9 U
Selenium (TCLP)	(ug/l)	1000	15.7 U	20.0 J
Silver (TCLP)	(ug/l)	5000	1.2 U	1.2 U
Silvex (TCLP)	(ug/l)	1000		0.057 U
Toxaphene (TCLP)	(ug/l)	500	1.4 U	1.4 U

ug/l: micrograms per liter

Table 29

LONG ISLANSD RAIL ROAD - 17 SUBSTATIONS

BAYSIDE SUBSTATION

WASTE CHARACTERIZATION SOIL SAMPLE RESULTS

RCRA CHARACTERISTICS

Date: 06/09/2009

PERIOD: From 04/17/2008 thru 04/17/2008 - Inclusive

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	BSWC-01 BSWC-01 (S) 04/17/2008	BSWC-01 BSWC-01 (1-2) 04/17/2008
Cyanide(reactive)	(mg/kg)	1.1UJ	1.2UJ
Hydrogen ion	(ppm)	6.4	6.2
Ignitability	(ppm)	200U	200U
Sulfide	(mg/kg)	1.1U	1.2U

mg/kg: milligrams per kilogram
ppm: parts per million