Long Island Rail Road

Delineation Phase II
Site Assessment Remedial Action Work Plan
Cedar Manor Substation: Site No. V00388-2

June 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

June 23, 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 Cedar Manor (NYSDEC VCA No. V00388-2)
Remedial Action Work Plan

Dear Mr. Filkins:

Enclosed please find an electronic copy of the final Work Plan entitled:

"LIRR Cedar Manor Substation
Remedial Action Work Plan
(NYSDEC VCA No. V00388-2)"

Please be advised that the LIRR will be decommissioning the Cedar Manor Substation as part of an overall capital program system upgrade project. A new substation building will be constructed and the existing substation building will be utilized for storage. In addition, new solid state transformers have already been installed to the north of the existing substation building.

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

MB/LP/lf
cc: C. Doroski (NYSDOH)
C. Hillenbrand (USEPA)
C. Channer (MTA)
G. Russo (LIRR)
A. Wilson (LIRR)
T. Fox (D&B)
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METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

DELINEATION PHASE II SITE ASSESSMENT
FOR
CEDAR MANOR SUBSTATION

REMEDIAL ACTION WORK PLAN

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK

JUNE 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 appalicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT FOR
CEDAR MANOR 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 Cedar Manor 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 Cedar Manor Substation, at which mercury was detected at concentrations in exceedance of the NYSDEC Part 375 soil cleanup objectives (SCOs) 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 Cedar Manor Substation in October of 2005. Additional follow-up field work was also completed through May 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 Cedar Manor Substation," dated December 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 contamination identified in several areas of the Cedar Manor Substation, as documented in the December 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 the

existing substation and construction of the new substation building at the Cedar Manor 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 Cedar Manor 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 Cedar Manor 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 Cedar

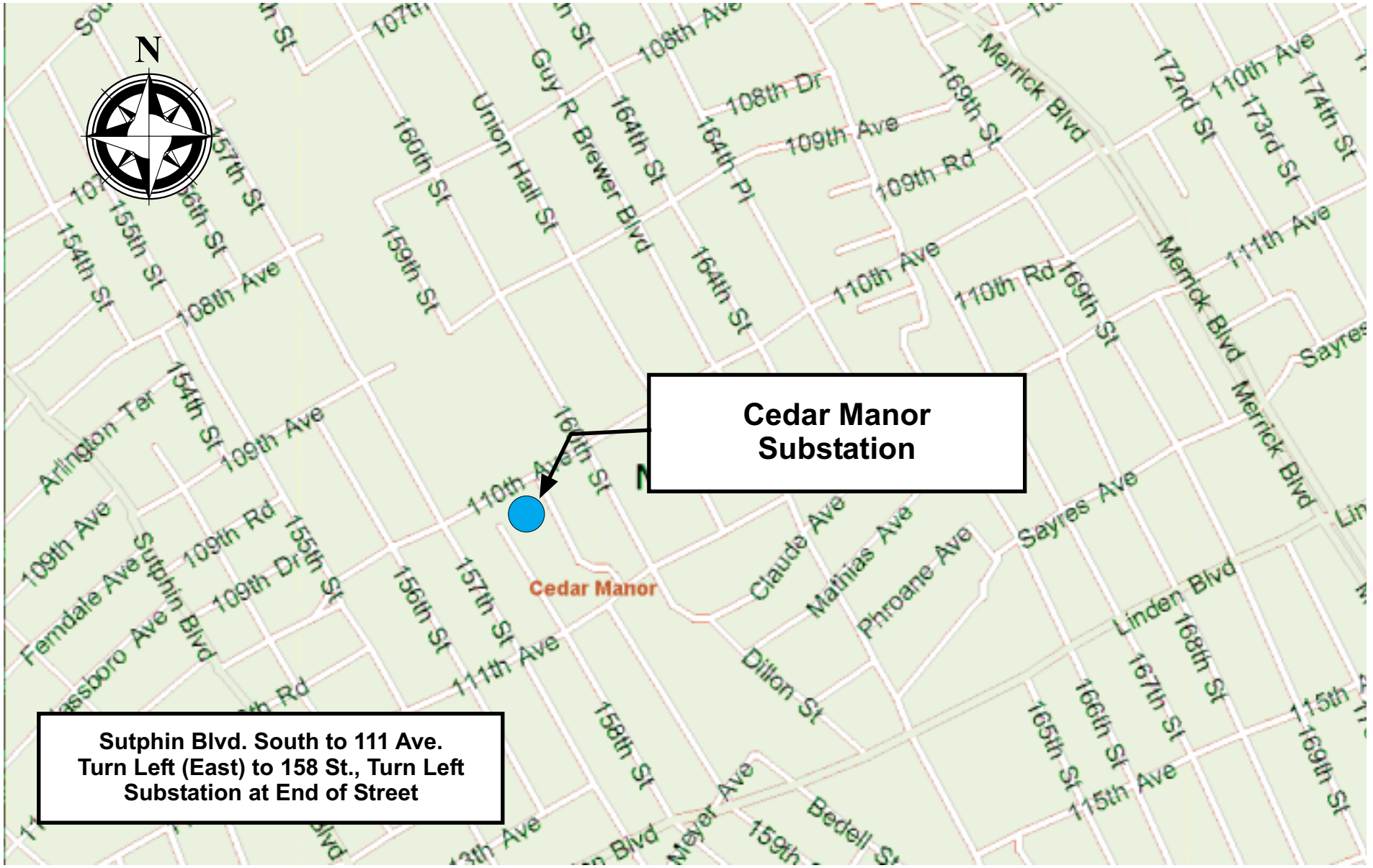
Manor Substation which were completed by May 2009. Section 1.3 provides a summary of key findings associated with this investigation.

In addition, note that a mercury vapor evaluation was conducted in the existing substation building in December 1999. The mercury vapor evaluation consisted of a 62-point mercury vapor survey, with 21 vapor sample locations surrounding the exterior of the substation building and 41 vapor sample locations collected from within the substation building. All mercury vapor samples were collected with a Jerome 431X mercury vapor analyzer (MVA) and compared to the Public Employee Safety & Health (PESH) 8-hour time-weighted average (TWA) concentration of 0.050 mg/m^3, for reference purposes only. Mercury vapor was not detected in any mercury vapor sample. A table summarizing the mercury vapor measurement results is provided in Appendix A.

1.2 Site Description

The Cedar Manor Substation site is located in Cedar Manor, 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 1,600-square foot transformer yard is located adjacent to the north of the substation building and is enclosed by a chain-link fence. The substation building and transformer yard is presently utilized to convert alternating current to direct current for the LIRR Far Rockaway branch. There is also a 90-square foot Consolidated Edison transformer area located to the west of the substation. The land surrounding the substation and the transformer yard consists of residential areas.

The Cedar Manor Substation is equipped with a basement, sanitary and water services and a utility trench system. The substation interior consists of two active solid-state rectifiers located over two pits leading to the basement that once serviced mercury-containing rectifiers. The substation is also equipped with a water pipe trench with an earthen bottom located in the



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

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

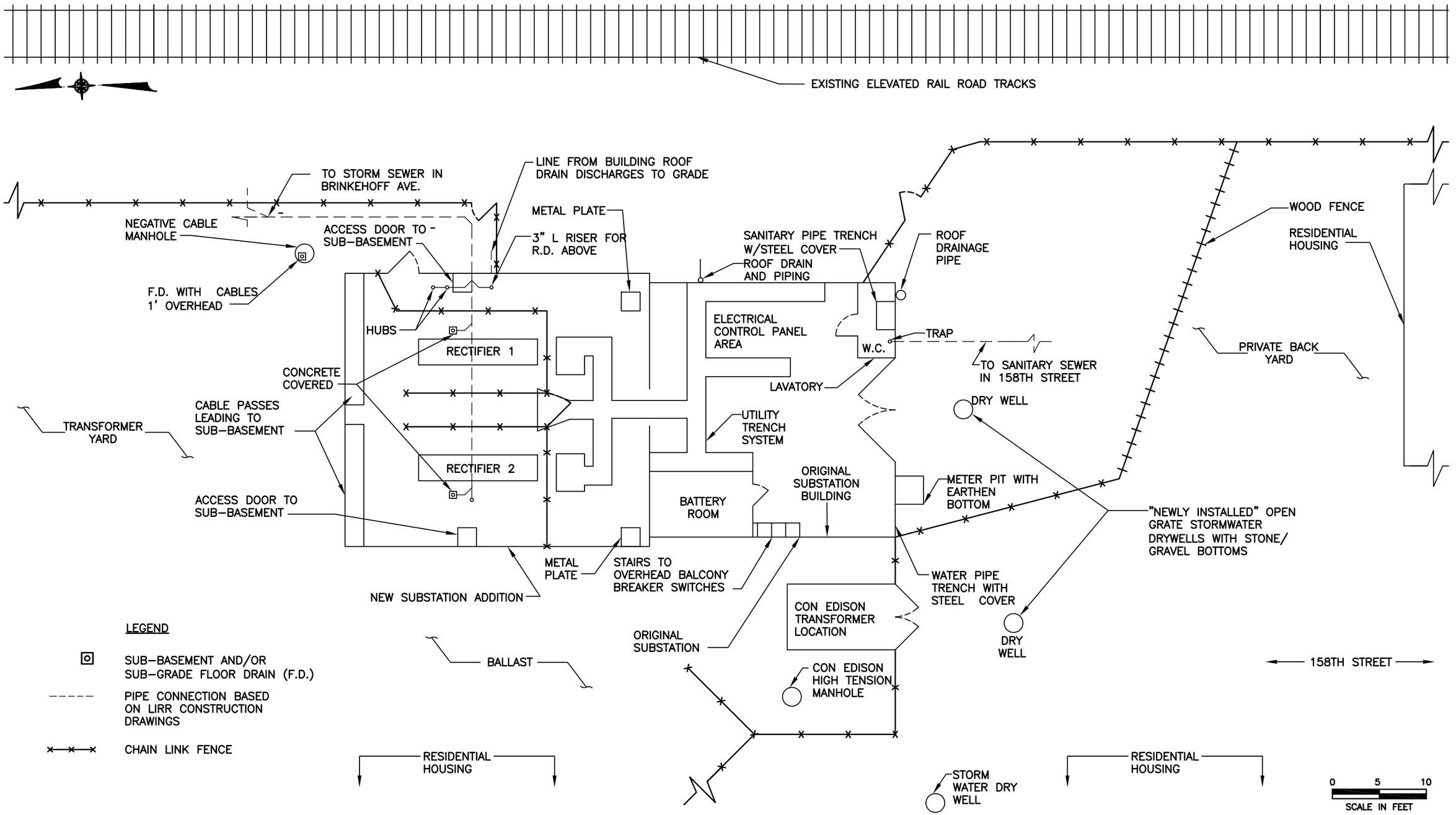
LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SITE LOCATION MAP

CEDAR MANOR SUBSTATION (V00388-2)

NOT TO SCALE

FIGURE 1-1



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

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

LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SITE PLAN
CEDAR MANOR SUBSTATION (V00388-2)

FIGURE 1-2

southwest corner of the substation. It should be noted that the Cedar Manor Substation contains a bank of lead-acid batteries located in a room along the west side of the substation to provide back-up electricity.

The initial site inspection identified two open grate dry wells located to the south of the substation, as well as a water meter pit with an earthen bottom located along the southwest corner of the substation. In addition, a roof drainage line was observed to discharge to surface soil along the east side of the substation. It should also be noted that a clean-out and vent was observed off the northwest corner of the substation.

According to LIRR representatives and available LIRR construction drawings, the Cedar Manor substation was expanded in approximately 1947. The original substation consisted of a rectifier pit and a water trough pit, which are thought to have been backfilled during the substation building expansion, and two new rectifiers were relocated over two new pits which lead to the basement. D&B targeted concrete corings and soil borings in the likely locations of the original rectifier and water trough pits based on a review of the drawings.

It should be noted that, according to LIRR representatives, the Cedar Manor substation has been renovated in the last 10 to 15 years. Renovation activities included the installation of new storm water dry wells, the addition of ballast to the substation grounds and interior painting of the substation building.

Based on the results of the Delineation Phase II Site Assessment, the depth to groundwater at this site is approximately 16 feet below ground surface.

1.3 Summary of Prior Investigations

The LIRR completed an Initial Site Assessment of the Cedar Manor 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 four surface soil samples, two subsurface soil samples and five concrete cores.

As discussed in Section 1.1 and subsequent to the Initial Site Assessment, a Delineation Phase II Site Assessment was completed in May 2009. As part of this investigation, a total of 42 surface soil samples, 130 subsurface soil samples and three groundwater samples were collected for chemical analysis. In addition, four below grade structures were investigated for Underground Injection Control (UIC) applicability. These structures included three dry wells with one storm water dry well located approximately 27 feet southwest of the substation building, one dry well located approximately 14 feet off the southwest corner of the substation building and one dry well located approximately 6 feet south of the substation building. In addition, the negative cable manhole located approximately 5 feet off the northeast corner of the substation building was investigated.

Mercury was detected in surface and subsurface soil on the southeast of the Cedar Manor Substation. The most significant mercury concentrations were identified in subsurface soil located off the southwest corner of the substation building, with a maximum mercury concentration of 969 mg/kg. Note that, while still part of the overall substation property, this area is only partially fenced. However, this area is fully covered with approximately 2 inches of crushed stone.

Based on sampling completed as part of the Delineation Phase II Site Assessment, groundwater has not been impacted by the presence of mercury on-site soil.

Note, all samples collected from the UIC structures were initially compared to the TAGM 4046 SCOs. However, effective December 3, 2010, the NYSDEC officially replaced TAGM with the Part 375 SCOs. As such, all UIC sample data has been re-evaluated and compared to the Industrial and Residential SCOs, as appropriate.

Two subsurface soil samples were collected from the storm water dry well located approximately 27 feet southwest of the substation building for mercury analysis. One of the two dry well samples exhibited a mercury concentration of 2.4 mg/kg, in exceedance of the Residential SCO for mercury of 0.81 mg/kg.

Seven subsurface soil samples were collected from the dry well located approximately 14 feet off the southwest corner of the substation building for UIC parameter analysis. No analytes were detected in exceedance of their respective Residential SCOs in any collected sample.

Seven subsurface soil samples were collected from the dry well located approximately 6 feet south of the substation front entrance doors for UIC parameter analysis. Mercury was detected in exceedance of the Industrial SCO of 5.7 mg/kg in one of the seven collected samples, at a concentration of 7.6 mg/kg.

Based on the results of a 1999 investigation, it was determined that the water meter pit, located adjacent to the southwest wall of the substation building, was not designed to accept waste fluids and as such, did not meet the definition of UIC structure. As such, two subsurface soil samples were collected from the water meter pit for mercury analysis and compared to the Industrial SCOs. One of the two collected samples exhibited a mercury concentration in exceedance of the Industrial SCO for mercury of 5.7 mg/kg, at a concentration of 13.8 mg/kg.

Additional details concerning the above findings are presented in the Delineation Phase II Site Assessment Report for the Cedar Manor Substation, submitted to the NYSDEC in December of 2009.

1.4 Summary of Environmental Conditions at the Site

This section briefly describes the current and future conditions of the Cedar Manor Substation. The Cedar Manor Substation is actively used by the LIRR to convert alternating current obtained from the local electrical provider, Consolidated Edison (Con Ed), to direct

current for use in powering the LIRR's electric train fleet. The substation has been used for this purpose since 1948.

The Cedar Manor 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.

The majority of the LIRR property located immediately surrounding the substation building is covered by crushed stone and asphalt. The transformer yard, located to the north of the substation building is fenced and covered with approximately 2 inches of crushed stone. However, direct contact exposure to mercury contamination of LIRR workers (on-site receptors) who are required to periodically enter the site for equipment maintenance and repair is possible in locations other than the transformer yard. 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 controls and procedures in place to avoid the excavation and handling of contaminated soil without undertaking appropriate health and safety measures. These controls and procedures are detailed in the LIRR's Excavating Soils at Railroad Locations document, as provided in Appendix F of the Delineation Phase II Site Assessment for the Cedar Manor Substation. This document outlines the required actions to be completed prior to and during any future excavation work and provides LIRR system safety contact information.

The substation property is bounded by fencing to the north and west and the majority of the south, and by an elevated track berm to the east, limiting public access to the property. Note that residential areas surround the substation building to the north, south and west. However, areas to the south of the substation which are not fully fenced have been covered in approximately 2 inches of crushed stone, limiting the potential for soil in these areas to become airborne.

While elevated mercury concentrations have been detected in surface and subsurface soil to the south and east of the substation building, and as detailed above, 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 or contaminated soil without undertaking appropriate health and safety measures.

The Cedar Manor 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, six areas to the south and one area to the east of the substation building will require remediation. Due to an irregular distribution of mercury in site soil, the remedial areas have been divided into excavation areas of different depths. The remedial areas have been divided into one 1-foot area, one 2-foot area, one 4-foot area, one 6-foot area and two 10-foot areas. In addition, the storm water dry well located approximately 27 feet southwest of the substation building, the dry well located approximately 6 feet south of the substation building and the water meter pit located adjacent to the southwest corner of the substation building will be properly remediated and/or closed in accordance with all applicable United States Environmental Protection Agency (USEPA) UIC closure regulations, as appropriate. Note that the use of sheeting and shoring will be determined by the remedial contractor.

The areas requiring remediation and the below grade structures requiring remediation and/or closure are depicted on Drawing 1 in a "conceptual fashion" and are described in the NYSDEC-approved Initial Site Assessment dated December 2000 and the NYSDEC-approved "Delineation Phase II Site Assessment Investigation Report for the Cedar Manor Substation," dated December 2009. Specific details regarding the soil excavation and below grade structure remediation/closure 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 Cedar Manor Substation will be decommissioned and utilized for storage. New solid state transformers have already been installed to the north 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 and abatement of the Cedar Manor Substation building will be performed by a qualified 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). Areas to be excavated as part of the remedial excavation activities will be covered by 6 inches of crushed stone prior to commencement of the decommissioning and abatement to prevent the disturbance of any contaminated soil. 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 abatement consultant will conduct air monitoring throughout decommissioning activities. All debris generated from the decommissioning and abatement of the substation building 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.

Following the substation property remediation, the LIRR will evaluate the potential for soil vapor intrusion. After installation of the new substation building, the LIRR will not be disturbing or excavating in the Cedar Manor Substation for the foreseeable future. The LIRR has no plans to modify the post remedial action layout or infrastructure of the Cedar Manor 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 Cedar Manor Substation property for any non-industrial applications at this time.

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 six areas 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 the 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 Cedar Manor Substation site. Typically, only the SCOs for Industrial Use are used to define areas requiring remediation, however, since a small portion of the southwestern substation property is not located within the substation fencing, it poses a potential risk to off-site receptors. Therefore, the SCOs for Residential Use are utilized to define areas requiring remediation outside of the existing fenced area. However, note that this area is covered by approximately 2 inches of crushed stone. As such, and pursuant to the RAOs provided below, the proposed remedial action soil cleanup goal is to remove all site soil exhibiting exceedances of the Industrial and Residential SCOs, as appropriate.

Elevated concentrations of mercury were detected within surface soil and shallow subsurface soil to the south and east of the substation building. The highest mercury concentrations at the Cedar Manor substation were detected in subsurface soil located off the southwest corner of the substation building, with a maximum mercury concentration of

969 mg/kg. A small portion of this section of the substation property is not located within the substation fencing. As a result, this portion of the site is accessible to off-site receptors. Therefore, off-site receptors could be potentially exposed to these contaminants if the soil were to be disturbed. However, as noted above, this area is covered in approximately 2 inches of crushed stone.

The Cedar Manor 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.

The majority of the LIRR property located immediately surrounding the substation building is covered by crushed stone and asphalt. The transformer yard, located to the north of the substation building is fenced and covered with approximately 2 inches of crushed stone. However, direct contact exposure to mercury contamination of LIRR workers (on-site receptors) who are required to periodically enter the site for equipment maintenance and repair is possible in locations other than the transformer yard. 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 procedures in place to avoid the excavation and handling of contaminated soil without undertaking appropriate health and safety measures.

The substation property is bounded by fencing to the north and west and the majority of the south, and by an elevated track berm to the east, limiting public access to the property. Note that residential areas surround the substation building to the north, south and west. However, areas to the south of the substation which are not fully fenced have been covered in approximately 2 inches of crushed stone.

While elevated mercury concentrations have been detected in surface and subsurface soil to the south and east 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 or contaminated soil without undertaking appropriate health and safety measures.

A February 2006 Fish and Wildlife Resources Impact Analysis (FWRIA) determined that there are no significant or special habitats or wildlife within or surrounding the substation property and, therefore, the presence of the soil contaminants do not represent a significant concern with regard to environmental resources. Based on the nature of the contaminants associated with the site and the findings of the exposure assessment and the FWRIA, the RAOs of this RAWP include the following:

RAOs for Public Health Protection

- Mitigate ingestion/direct contact with contaminated soil and dust; and
- 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; and
- 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, provided in a map pocket at the end of this section. The six proposed excavation areas are approximately 1,187 square feet in total area.

As shown on Drawing 1, the areas to be excavated include the following:

- One area to the south of the substation building will be excavated to a depth of 1 foot below ground surface. This area is approximately 322 square feet in area and will require the removal of approximately 12 cubic yards of soil.
- One area to the south of the substation building will be excavated to a depth of 2 feet below ground surface. This area is approximately 85 square feet in area and will require the removal of approximately 6 cubic yards of soil.
- One area to the south of the substation building will be excavated to a depth of 4 feet below ground surface. This area is approximately 39 square feet in area and will require the removal of approximately 6 cubic yards of soil.
- One area to the south of the substation building will be excavated to a depth of 6 feet below ground surface. This area is approximately 664 square feet in area and will require the removal of approximately 148 cubic yards of soil.
- Two areas to the south of the substation building will be excavated to a depth of 10 feet below ground surface. These areas are approximately 77 square feet in total area and will require the removal of approximately 29 cubic yards of soil. Note that the use of sheeting and/or shoring will be determined by the remedial contractor.

As part of this remediation, approximately 201 cubic yards of soil will be excavated and removed and the LIRR intends to close and/or remediate soil associated with two dry wells located to the south of the substation building and the water meter pit located adjacent to the southwest corner of the substation building. The excavated soil will be replaced with clean fill from an off-site approved source meeting the Allowable Constituent Levels for Imported Fill or Soil requirements, as provided in Appendix 5 of DER-10, 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 fill material utilized to backfill the Cedar Manor Substation will be a "virgin" soil obtained from a facility where no historic industrial activities have taken place.

Soil removal will be conducted prior to construction of the new substation building. In the event that additional soil will require removal as part of the installation of the new substation building, this soil will be properly characterized and disposed of by the new substation building contractor in accordance with the requirements of the RAWP.

Generation of dust during the implementation of the remedy will be monitored 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.

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

Endpoint samples CMEP-01 through CMEP-12 and sidewall samples CMSW-01 and CMSW-02 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 and sidewall sample is shown on Drawing 1. Endpoint and sidewall samples collected from fenced portions of the substation property will be compared to the Industrial SCOs, endpoint samples collected from unfenced portions of the substation property will be compared to the Residential SCOs. Endpoint 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 and sidewall sampling, determination will be made between the LIRR and the NYSDEC with regard to 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.

Following construction of the new substation building, a mercury vapor intrusion survey of the new substation building will be completed to determine the potential for mercury vapor intrusion. All mercury vapor samples will be collected with a Jerome 431X MVA, and compared to the PESH 8-hour TWA concentration of 0.050 mg/m^3. In the event that the PESH 8-hour TWA is exceeded, additional mercury vapor sampling will be completed and, based on these sampling results, the need for further action will be evaluated.

As detailed in Section 1.1, further mercury vapor testing is not warranted in the existing substation building.

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
- 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
- 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 201 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.

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

Considering the volume of soil requiring excavation and off-site disposal, it is anticipated the remedy will be completed in less than 2 weeks; however, the schedule will be coordinated with the upgrade of the substation property. Remedial activities will only occur during normal business hours and noise levels will be maintained to meet local noise ordinances.

Since the vast majority of the property is fenced at the Cedar Manor Substation, these areas are only accessible by authorized LIRR personnel and its subcontractors. Access to these portions of the site is limited and, therefore, impacts to the community from these areas during implementation of the remedy would be negligible. However, public access may be possible to the small unfenced area located to the southwest of the site; therefore, temporary fencing will be placed around this area to minimize public exposure during implementation of the remedy. In addition, note that this area is currently covered with approximately 2 inches if crushed stone. Impacts to the on-site workers 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 inside the existing fenced area and for Residential Use 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 for Residential Use outside the existing fenced area will be removed from the site, the results of endpoint and sidewall 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.

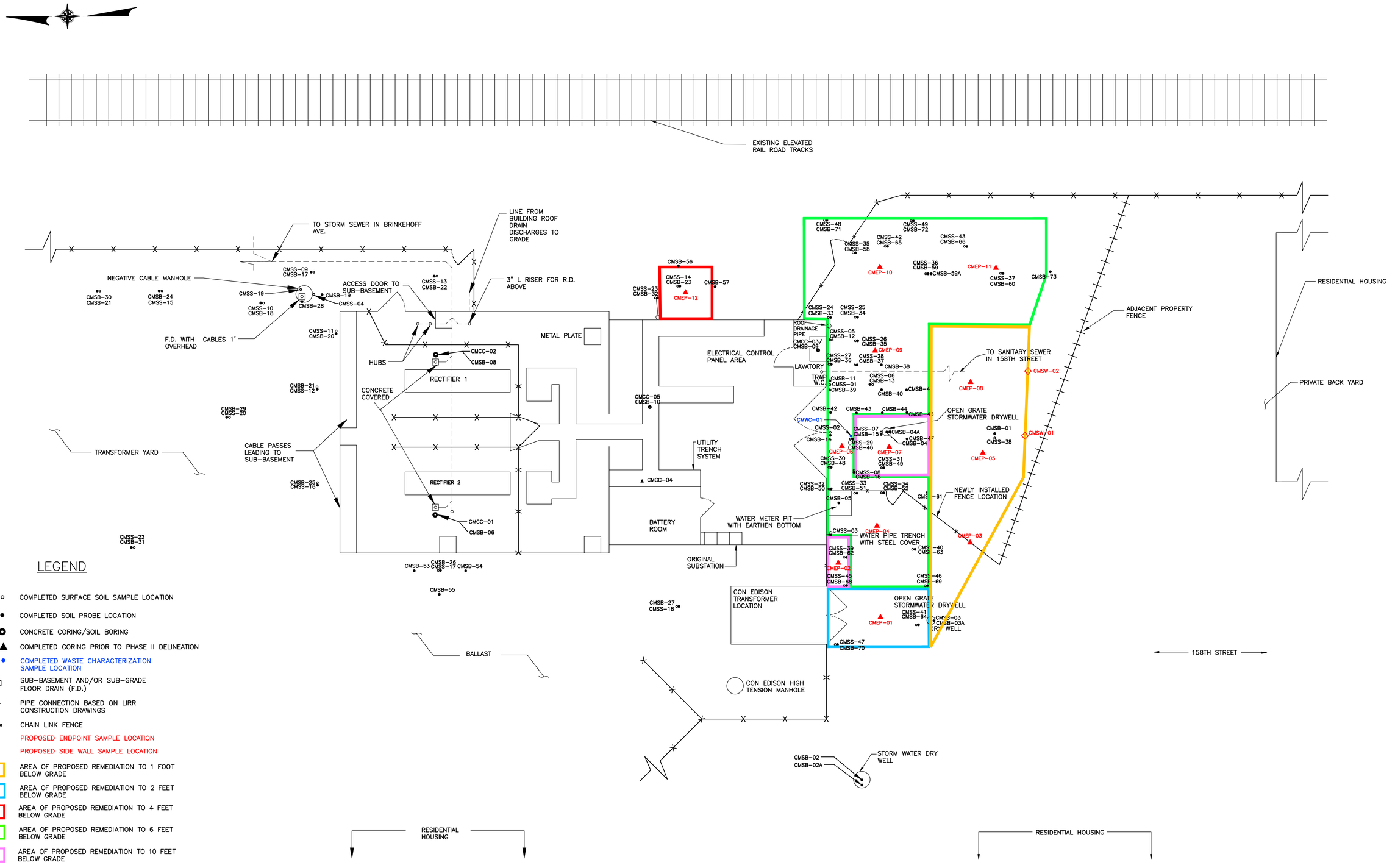
Reduction of Toxicity, Mobility or Volume

Removal of approximately 201 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 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.



LEGEND

- CMSS-01 ○ COMPLETED SURFACE SOIL SAMPLE LOCATION
- CMSB-01 ● COMPLETED SOIL PROBE LOCATION
- CMCC-01/ CMSB-01 ◉ CONCRETE CORING/SOIL BORING
- CMCC-01 ▲ COMPLETED CORING PRIOR TO PHASE II DELINEATION
- CMWC-01 ● COMPLETED WASTE CHARACTERIZATION SAMPLE LOCATION
- ⊡ SUB-BASEMENT AND/OR SUB-GRADE FLOOR DRAIN (F.D.)
- PIPE CONNECTION BASED ON LIRR CONSTRUCTION DRAWINGS
- CHAIN LINK FENCE
- CMEP-01 ▲ PROPOSED ENDPOINT SAMPLE LOCATION
- CMSW-01 ◇ PROPOSED SIDE WALL SAMPLE LOCATION
- AREA OF PROPOSED REMEDIATION TO 1 FOOT BELOW GRADE
- AREA OF PROPOSED REMEDIATION TO 2 FEET BELOW GRADE
- AREA OF PROPOSED REMEDIATION TO 4 FEET BELOW GRADE
- AREA OF PROPOSED REMEDIATION TO 6 FEET BELOW GRADE
- AREA OF PROPOSED REMEDIATION TO 10 FEET BELOW GRADE

NO.	DATE	REVISION	INT.

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

PROJECT ENGINEER:	DRAWN BY:
T.F.	A.R.S.
DESIGNED BY:	CHECKED BY:
S.T.	T.F.

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

LONG ISLAND RAIL ROAD

QUEENS COUNTY — NEW YORK

CEDAR MANOR SUBSTATION

ENDPOINT SAMPLE LOCATIONS AND REMEDIATION AREAS

PROJECT NO.	DRAWING NO.
2991	1
DATE: 06/2011	
SCALE: 1"=5'	

3.0 REMEDIAL CONSTRUCTION

As detailed in Section 2.0, the LIRR has identified six areas at the Cedar Manor Substation requiring 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.

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

As discussed in Section 2.0, excavation activities will commence following decommissioning of the substation building and prior to construction of the new substation building. 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, provided at the end of Section 2.0. 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.

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

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.

3.3 Soil Characterization

Pre-characterization sampling of the soil directly adjacent to the substation building was completed as part of the Site Assessment Investigation phase of the project to characterize the soil to be excavated and removed as part of the new substation building construction. 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, RCRA waste characteristics (ignitability, reactivity and corrosivity) and target compound list pesticides/herbicides. The results of the pre-characterization sample analysis are provided in 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 will be provided in the detailed plans and specifications 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 and southern sidewall of the excavation to determine the characteristics of the remaining soil prior to site restoration. Drawing 1, provided in a map pocket at the end of Section 2.0, provides the proposed location of each endpoint (CMEP-01 through CMEP-12) and

sidewall (CMWS-01 and CMSW-02) 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. Since each area is less than 900 square feet, 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 the endpoint samples exceed the SCOs, additional endpoint samples have been proposed. The proposed endpoint sample locations are shown on Drawing 1.

Samples collected from the excavation areas to the south and east of the substation building will be analyzed for mercury. 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 Part 375 SCOs will be used to screen the endpoint and sidewall samples collected from the fenced excavation areas and the Part 375 SCOs for Residential sites will be used to screen endpoint samples collected from the unfenced excavated 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 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 and Below Grade Structure Remediation and Closure

As shown on Drawing 1, three below grade structures located at the Cedar Manor Substation will be properly remediated and/or closed as part of the planned decommissioning and remediation of the existing substation property. The below grade structures are the storm water dry well located approximately 27 feet southwest of the substation building, the dry well located approximately 6 feet south of the substation building, which both are UIC structures and the water meter pit located adjacent to the southwest corner of the substation building, which, as described previously, is not a UIC structure. The remedial and/or closure procedures utilized to

remediate and/or close these structures will be performed in accordance with all USEPA UIC regulations.

The contents of the dry wells, if present, will be pumped out and contained within Department of Transportation (DOT)-approved 55-gallon drums and/or a pump truck.

Accumulated sediment within the storm water dry well located approximately 27 feet southwest of the substation building will be removed to the structure's solid bottom. It is recommended that this structure remain in place in order to manage storm water runoff from 158th Street and the surrounding areas. As all sediment is recommended to be removed from this structure, the collection of post-remediation soil samples will not be possible.

Soil will be excavated from beneath the dry well located approximately 6 feet south of the substation building, to a depth of 14 feet below ground surface or as deep as is safely possible. In addition, the dry well cover and ring structures and all soil located within the dry well will be removed. Following soil removal, all discharge pipes entering this structure will be capped with a concrete plug. One post-excavation sample will be collected from the soil underlying the dry well structure located south of the substation building, analyzed for UIC parameter analysis and compared to the Industrial SCOs. In addition, if groundwater is encountered during the closure, a groundwater sample will be collected and analyzed for RCRA metals and VOCs. The analytical results will be provided to the NYSDEC and, due to the depth of the proposed excavation, the excavation will be backfilled with clean fill to grade immediately following excavation. Note that the use of sheeting and shoring will be determined by the remedial contractor.

As a result of mercury concentrations detected in exceedance of the Industrial SCOs in the water meter pit located adjacent to the southwest corner of the substation building, soil will be excavated to a depth of 6 feet below ground surface from this structure. Following soil removal from the water meter pit, one post-excavation sample will be collected from this structure for mercury analysis and compared to the Industrial SCOs.

3.7 Backfill

Backfill material utilized during the remediation of the Cedar Manor Substation will be obtained from an off-site source approved by LIRR. The fill will consist of clean sand meeting the Industrial SCOs in areas which are fenced and the Residential SCOs in areas which are unfenced, 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. 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 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. However, the remedial contractor will monitor for mercury vapor in air during the completion of all intrusive activities.

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 emailed 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:

- A Site Management Plan;
- 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 Cedar Manor 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

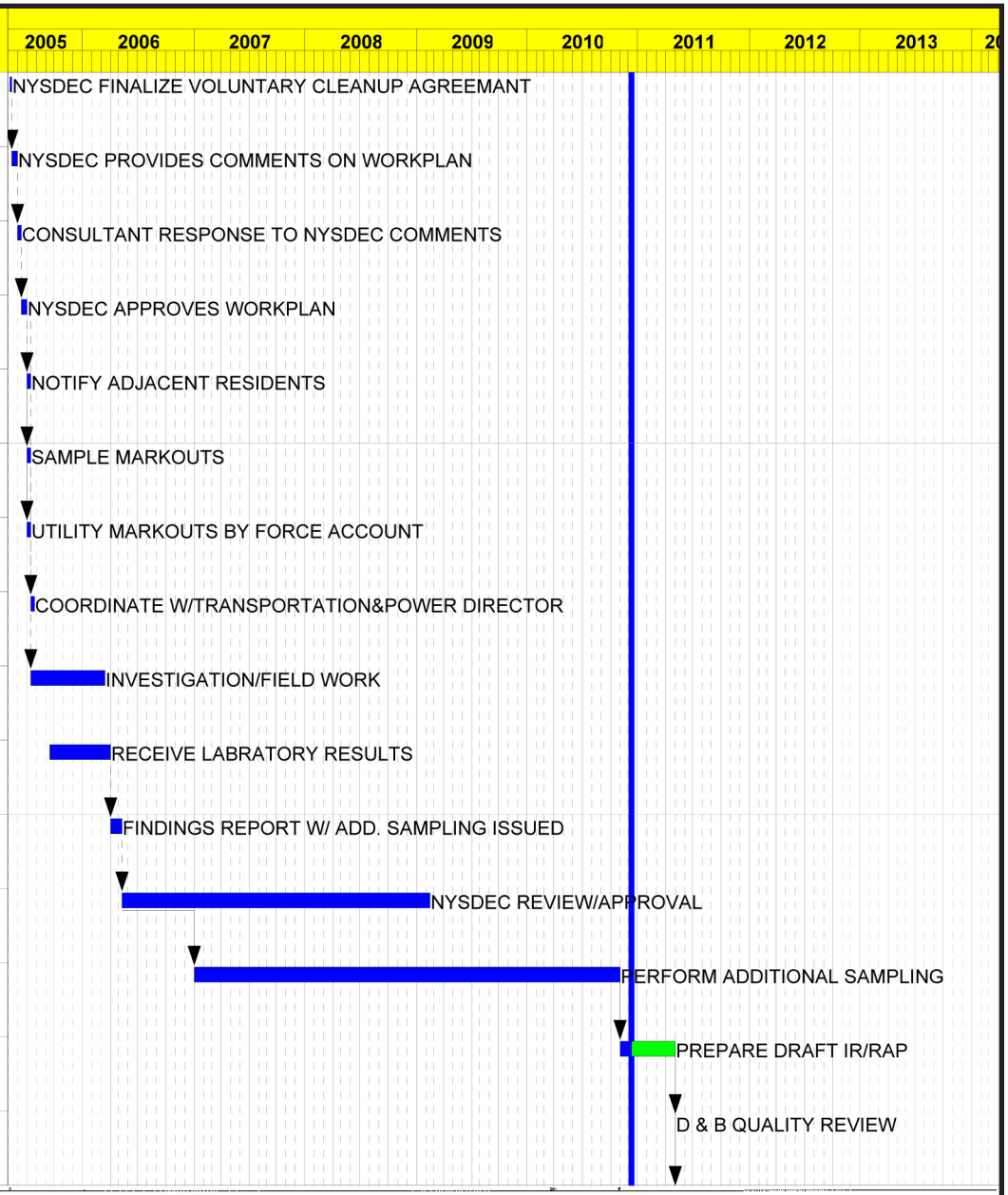
Throughout the project, project meetings will be held to discuss work progress, plan upcoming activities for the week and discuss any unanticipated site conditions encountered. The remedial contractor's superintendent, as well as LIRR's Project Manager, will be required to attend the project meetings. 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

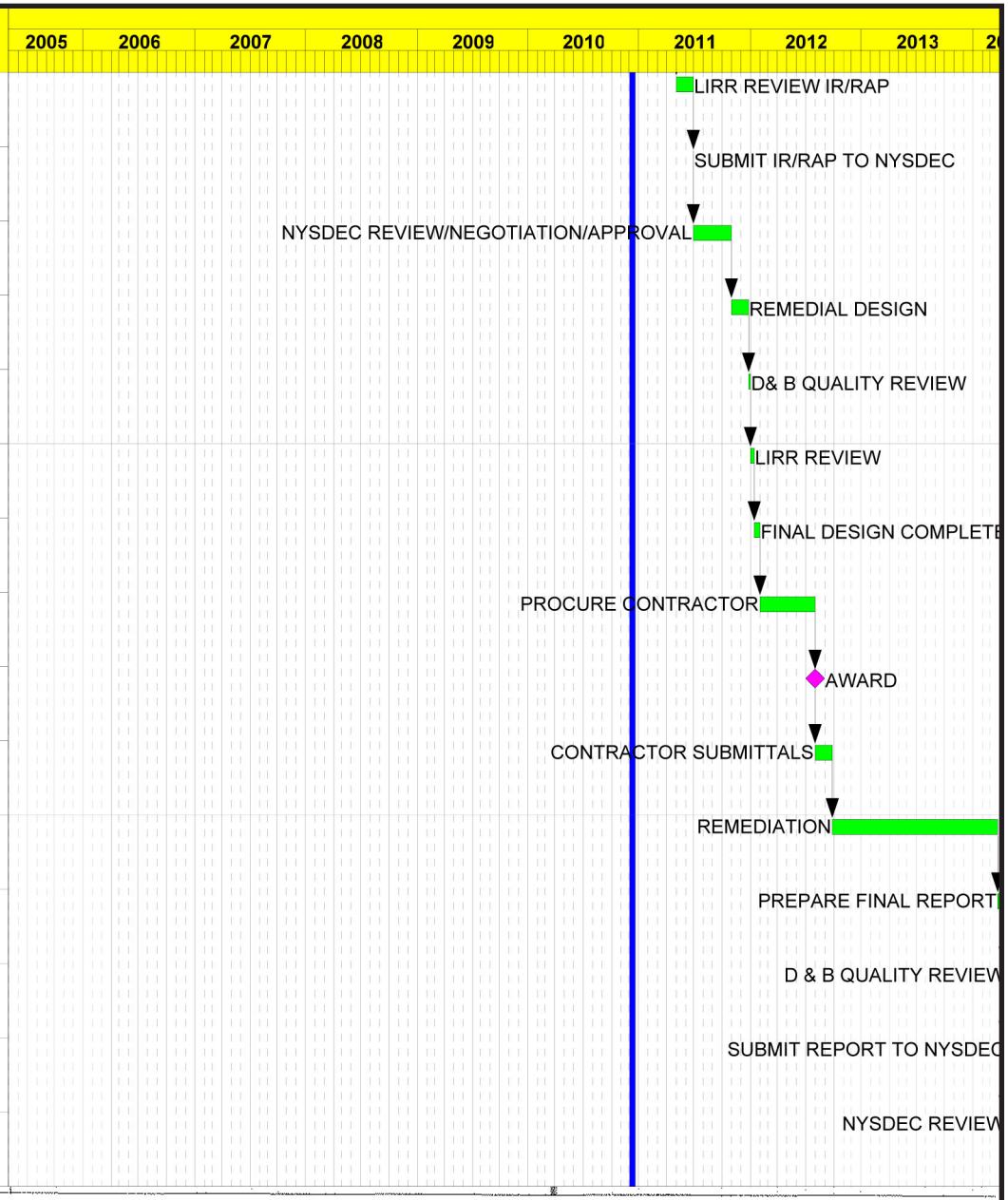
Dvirka and Bartilucci CONSULTING ENGINEERS
a Division of D&B Engineers and Architects, P.C.

LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SUBSTATION REMEDIATION SCHEDULE
CEDAR MANOR SUBSTATION (V00388-2)

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
a Division of D&B Engineers and Architects, P.C.

LONG ISLAND RAIL ROAD
REMEDIAL ACTION WORK PLAN

SUBSTATION REMEDIATION SCHEDULE
CEDAR MANOR SUBSTATION (V00388-2)

Start Date	01JAN05
Finish Date	16JUN14
Data Date	13DEC10
Run Date	16DEC10 11:09

Early Bar
Progress Bar
Critical Activity

Figure 8-1

APPENDIX A

MERCURY VAPOR MEASUREMENT RESULTS

TABLE 1

LONG ISLAND RAIL ROAD SUBSTATION INVESTIGATION
MERCURY VAPOR MEASUREMENT RESULTS - CEDAR MANOR

(December 13, 1999)

Measurement I.D.	MVA (mg/m^3 Hg)
CMMV-01	0.000
CMMV-02	0.000
CMMV-03	0.000
CMMV-04	0.000
CMMV-05	0.000
CMMV-06	0.000
CMMV-07	0.000
CMMV-08	0.000
CMMV-09	0.000
CMMV-10	0.000
CMMV-11	0.000
CMMV-12	0.000
CMMV-13	0.000
CMMV-14	0.000
CMMV-15	0.000
CMMV-16	0.000
CMMV-17	0.000
CMMV-18	0.000
CMMV-19	0.000
CMMV-20	0.000
CMMV-21	0.000
CMMV-22	0.000
CMMV-23	0.000
CMMV-24	0.000
CMMV-25	0.000
CMMV-26	0.000
CMMV-27	0.000
CMMV-28	0.000
CMMV-29	0.000
CMMV-30	0.000
CMMV-31	0.000
CMMV-32	0.000
CMMV-33	0.000
CMMV-34	0.000
CMMV-35	0.000
CMMV-36	0.000
CMMV-37	0.000
CMMV-38	0.000
CMMV-39	0.000
CMMV-40	0.000
CMMV-41	0.000
CMMV-42	0.000
CMMV-43	0.000
CMMV-44	0.000
CMMV-45	0.000
CMMV-46	0.000
CMMV-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/m3

TABLE 1 (continued)

LONG ISLAND RAIL ROAD SUBSTATION INVESTIGATION
MERCURY VAPOR MEASUREMENT RESULTS - CEDAR MANOR

(December 13, 1999)

Measurement I.D.	MVA (mg/m^3 Hg)
CMMV-48	0.000
CMMV-49	0.000
CMMV-50	0.000
CMMV-51	0.000
CMMV-52	0.000
CMMV-53	0.000
CMMV-54	0.000
CMMV-55	0.000
CMMV-56	0.000
CMMV-57	0.000
CMMV-58	0.000
CMMV-59	0.000
CMMV-60	0.000
CMMV-61	0.000
CMMV-62	0.000

Notes:
MVA: Mercury vapor analyzer
Mg/m^3 Hg: Milligrams per meter cubed mercury vapor
Instrument detection limit is 0.003 mg/m3

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 20
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
CEDAR MANOR SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

PERIOD: From 05/01/2008 thru 05/01/2008 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Industrial Use SCOs	CMWC-01 CMWC-01(3) 05/01/2008	CMWC-01 CMWC-01(2-4) 05/01/2008
1,1-Dichloroethylene ()	(ug/l)		3.4UJ	3.4U
1,2-Dichloroethane ()	(ug/l)		2.0U	2.0U
2,4,5-Trichlorophenol ()	(ug/l)		0.380U	0.380U
2,4,6-Trichlorophenol ()	(ug/l)		0.350U	0.350U
2,4-D ()	(ug/l)		0.246U	0.246U
2,4-Dinitrotoluene ()	(ug/l)		0.340UJ	0.340UJ
Arsenic ()	(ug/l)		54.0U	54.0U
Barium ()	(ug/l)		939	768
Benzene ()	(ug/l)		1.8U	1.8U
Cadmium ()	(ug/l)		9.000U	9.000U
Carbon tetrachloride ()	(ug/l)		1.4U	1.4UJ
Chlordane ()	(ug/l)		0.1914U	0.1914U
Chlorobenzene ()	(ug/l)		1.4U	1.4U
Chloroform ()	(ug/l)		2.2U	2.2U
Chromium ()	(ug/l)		14.0U	14.0U
Endrin ()	(ug/l)		0.0069U	0.0069U
Heptachlor ()	(ug/l)		0.0227U	0.0227U

ug/l: micrograms per liter

TABLE 20
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CEDAR MANOR SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

PERIOD: From 05/01/2008 thru 05/01/2008 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Industrial Use SCOs	CMWC-01 CMWC-01(3) 05/01/2008	CMWC-01 CMWC-01(2-4) 05/01/2008
Heptachlor epoxide ()	(ug/l)		0.0121U	0.0121U
Hexachlorobenzene ()	(ug/l)		0.270U	0.270U
Hexachlorobutadiene ()	(ug/l)		0.390UJ	0.390UJ
Hexachloroethane ()	(ug/l)		0.230UJ	0.230UJ
Lead ()	(ug/l)		31.0U	205
Lindane ()	(ug/l)		0.0071U	0.0071U
Mercury ()	(ug/l)		0.63U	3.2
Methoxychlor ()	(ug/l)		0.0072U	0.0072U
Methyl ethyl ketone ()	(ug/l)		9.7U	9.7U
Nitrobenzene ()	(ug/l)		0.330U	0.330U
o-Cresol ()	(ug/l)		0.360U	0.360U
PCP ()	(ug/l)		0.520UJ	0.520UJ
p-Cresol ()	(ug/l)		0.390U	0.390U
p-Dichlorobenzene ()	(ug/l)		0.300UJ	0.300UJ
Pyridine ()	(ug/l)		1.5U	1.5U
Selenium ()	(ug/l)		45.0U	45.0U
Silver ()	(ug/l)		17.0U	17.0U

ug/l: micrograms per liter

TABLE 20
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
CEDAR MANOR SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
TOXICITY CHARACTERISTIC LEACHING PROCEDURE

PERIOD: From 05/01/2008 thru 05/01/2008 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Industrial Use SCOs	CMWC-01 CMWC-01(3) 05/01/2008	CMWC-01 CMWC-01(2-4) 05/01/2008
Silvex ()	(ug/l)		0.159U	0.159U
Tetrachloroethylene ()	(ug/l)		4.8U	4.8U
Toxaphene ()	(ug/l)		0.0900U	0.0900U
Trichloroethylene ()	(ug/l)		1.7U	1.7U
Vinyl chloride ()	(ug/l)		1.5UJ	1.5U

ug/l: micrograms per liter

TABLE 21
LONG ISLAND RAIL ROAD - 17 SUBSTATIONS
CEDAR MANOR SUBSTATION
WASTE CHARACTERIZATION SAMPLE RESULTS
RCRA CHARACTERISTICS

PERIOD: From 05/01/2008 thru 05/01/2008 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE	Industrial Use SCOs	CMWC-01 CMWC-01(3) 05/01/2008	CMWC-01 CMWC-01(2-4) 05/01/2008
Corrosivity	(ppm)		6.40	7.20
Cyanide(reactive)	(mg/kg)		10.00U	10.00U
Ignitability	(ppm)		140	140
Sulfide	(mg/kg)		40.00U	40.00U

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