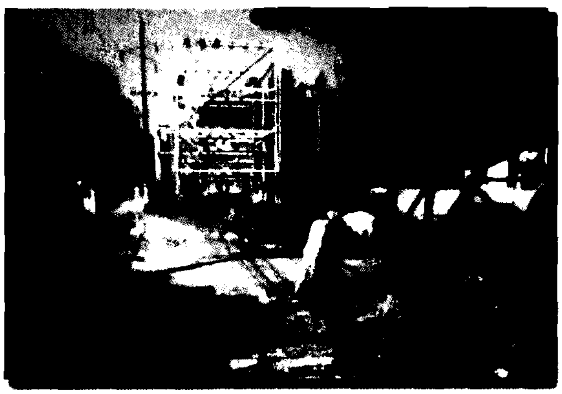
MTA

Long Island Rail Road
MTA CONTRACT NO. 5-01-00032-0-0
ENVIRONMENTAL CONSULTANT SERVICES

Investigation Work Plan



Substation Delineation Phase 2 Site Assessment

Manhasset: Site No. V00396-1, Index No. W1-0909-02-02

Massapequa: Site No. V00397-1, Index No. W1-0910-02-02

Island Park: Site No. V00392-1, Index No. W1-0908-02-02

September 2002

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Jamaica Station
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Kenneth J. Bauer
President

Jose R. Fernández
Vice President - System Safety

Tara

DUPLICATE

Long Island Rail Road

October 29, 2002

Ms. Champanine Saviengvong
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7015

RE: Addendum No. 2 to the Investigation Work Plan dated September 2002
Manhasset Substation, Site No. V00396-1, Index No. W1-0909-02-02
Massapequa Substation, Site No. V00397-1, Index No. W1-0910-02-02
Island Park Substation, Site No. V00392-1, Index No. W1-0908-02-02

Dear Ms. Saviengvong

The following is an addendum to the Investigation Work Plan dated September 2002:

- Soil borings IPSB-22, 23, 24, and 25 will be advanced to a depth of 4 feet below grade within the tile field located at the Island Park substation. Continuous two-foot soil samples will be collected from each boring to be analyzed for VOCs by Method 8260, SVOCs by Method 8270, RCRA metals by Methods 6010/7471 and TPHCs by Method 8015M; and

- Soil boring MSSB-35 will be advanced to a depth of 15 feet below grade within the Communications Pit located at the Massapequa substation. Continuous two-foot soil samples will be collected from 11 to 15 feet to be analyzed for VOCs by Method 8260, SVOCs by Method 8270, RCRA metals by Methods 6010/7471 and TPHCs by Method 8015M.

If you have any questions and/or comments, please do not hesitate to contact me at (718) 558-3252.

Sincerely,

Lewis D. Wunderlich

cc. D. D'Ambrosio (NYSDEC)
K. Carpenter (NYSDEC)
T. King (NYSDEC)
B. Mitchell (NYSDOH)
J. Kushwara (USEPA)
B. Mackay (NCDH)
L. Wunderlich (LIRR)
C. Channer (MTA)
A. Postyn (D&B)

Jamaica Station
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Kenneth J. Bauer
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Vice President - System Safety

DUPLICATE

Long Island Rail Road

October 1, 2002

Ms. Champanine Saviengvong
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7015

RE: Addendum to the Investigation Work Plan dated September 2002
Manhasset Substation, Site No. V00396-1, Index No. W1-0909-02-02
Massapequa Substation, Site No. V00397-1, Index No. W1-0910-02-02
Island Park Substation, Site No. V00392-1, Index No. W1-0908-02-02

Dear Ms. Saviengvong

The following is an addendum to the Investigation Work Plan dated September 2002:

- The technical merit of including semi-volatile organic compounds (SVOCs) and polychlorinated biphenyls (PCBs) groundwater analyses will be determined, in conjunction with the Department, based on the analytical results of soil samples collected and analyzed as part of the Construction Excavation Work Plan;

- Soil samples will be screened with a photoionization detector (PID) and a Jerome mercury analyzer. Based on the PID readings and field observations, soil samples may also be analyzed for volatile organic compounds (VOCs) by EPA Method 8260.

- The LIRR is committed to conduct an off-site investigation if it is determined to be technically warranted. For example, if elevated levels of chemical constituents are detected in close proximity to the site boundary or if a known release from the site has occurred, the LIRR will implement and complete an off-site investigation. It should be noted that the LIRR is committed to ensure that the final remediation remedy for each site will eliminate off-site impacts from on-site sources and will remediate significant off-site threats to human health and the environment attributed to site contamination.

- As provided in the September 2002 Investigation Work Plan, a test pit IPTP-03 will be excavated in an attempt to locate the "south" dry well at the Island Park substation. If a dry well is encountered and it is determined to be active, UIC closure activities may be warranted. However, if the dry well is encountered and determined to be inactive, a soil sample from the dry well will **only** be collected if it can be field determined that IPSB-07

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

INVESTIGATION WORK PLAN
DELINEATION PHASE 2 SITE ASSESSMENT
for
FOR MANHASSET, MASSAPEQUA AND ISLAND PARK SUBSTATIONS

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK 11797

SEPTEMBER 2002

INVESTIGATION WORK PLAN

DELINEATION PHASE 2 SITE ASSESSMENT
FOR MANHASSET, MASSAPEQUA AND ISLAND PARK SUBSTATIONS

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Section 1

1.0 INTRODUCTION

The purpose of this Investigation Work Plan is to describe the detailed screening, sample collection and analytical procedures that will ensure high quality, valid data for use in Site Assessments to be conducted for three electric substations (Manhasset, Massapequa, and Island Park) owned and operated by the Long Island Rail Road (LIRR). The LIRR is investigating the Manhasset, Massapequa and Island Park substations (Site Nos. V-00396-1, V-00397-1 and V-00392-1, respectively) as part of a Voluntary Cleanup Agreement (VCA) with the New York State Department of Environmental Conservation (NYSDEC). The index numbers for these substations are WI-0908-02-02, WI-0909-02-02 and W1-0910-02-02, respectively. The procedures in this Work Plan, where appropriate, will also be utilized to conduct groundwater investigations to determine if groundwater quality has been impacted from on-site operations. Sample matrices for the three substation site assessments are provided as part of the Site-Specific Work Plans summarized in Section 5.0.

This Work Plan has been prepared in conformance with the scope of work described in the Request for Proposal for Delineation Phase 2 Site Assessments for Manhasset, Massapequa, and Island Park substations dated February 1, 2002. In addition, this Work Plan has been prepared in accordance with the NYSDEC guidelines for preparation of Quality Assurance and Quality Control Plans including the 2000 Analytical Services Protocol (ASP).

The Work Plan provides the following information relative to conducting the Site Assessments:

- Project/Site Background;
- Data Use Objectives;
- Sampling Program;
- Quality Assurance/Quality Control Samples;
- Sampling and Handling Procedures;
- Decontamination Procedures;

- Laboratory Sample Custody Procedures;
- Sample Documentation;
- Equipment Calibration and Preventative Maintenance;
- Control and Disposal of Investigation-derived Material;
- Documentation, Data Reduction and Reporting;
- Data Validation;
- Performance and System Audits; and
- Corrective Action.

Investigation activities and media addressed in this Work Plan include:

- Sediment Soil Sampling;
- Surface Soil Sampling;
- Mercury Vapor Screening and Sampling;
- Groundwater Monitoring Well Installation;
- Groundwater Sampling; and
- Soil Boring Construction and Subsurface Soil Sampling.

Section 2

2.0 PROJECT SUMMARY

2.1 Project Background

The LIRR built and operated substations from the early 1930s through 1951 that utilized mercury rectifiers. These 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. The LIRR identified 20 substations located throughout Queens, Nassau, and Suffolk Counties that once utilized mercury containing rectifiers.

It is believed that during the early 1980s, the remaining 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 and maintenance 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.

The environmental assessments conducted at the electric substations, as documented by the report entitled, "Site Assessment of 20 Substations for Mercury Contamination," dated December 2000, which was prepared by Dvirka and Bartilucci Consulting Engineers, identified elevated levels of mercury in soil at all 20 substations.

Based on the findings of the Site Assessment activities, several substations were found to contain elevated levels of mercury in soil that had the potential to pose a human exposure pathway. As a result, an Interim Remedial Measures (IRM) program was conducted to eliminate the potential human exposure pathway by excavating mercury impacted soil for proper off-site transportation and disposal. IRM activities were performed at 11 substations including Valley Stream, Lindenhurst, Far Rockaway, Floral Park, Shea, Bayside, Port Washington, Massapequa, Hempstead, Kew Gardens, and Island Park. The IRM program is documented in the report entitled, "Site Assessment of 20 Substations for Mercury Contamination - Interim Remedial Measures Oversight Report," dated January 2001, which was prepared by Dvirka and Bartilucci Consulting Engineers. It should be noted that elevated levels of mercury still exist in subsurface soil at these 11 substations.

As indicated in the request for proposal (RFP) dated February 1, 2002, the LIRR has agreed to undertake and complete supplemental investigation/delineation site assessments and remedial activities at the 20 substations under the New York State Department of Environmental Conservation's (NYSDEC) Voluntary Cleanup Program (VCP). The NYSDEC, Division of Environmental Remediation, Bureau of Eastern Remedial Action, located in Albany, New York will provide oversight of site assessment and remedial activities conducted under the Voluntary Cleanup Program.

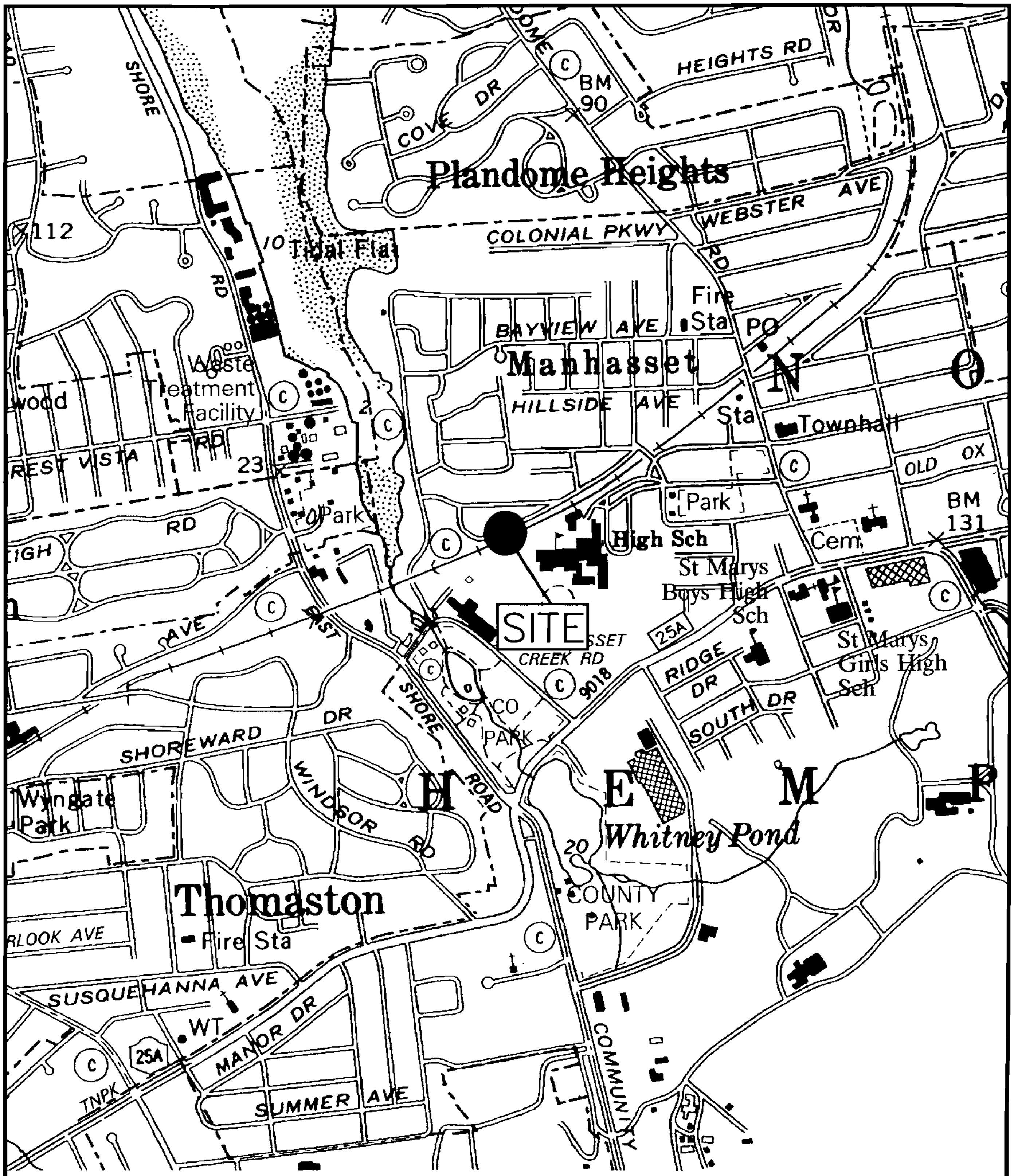
The Scope of Work for this project includes Delineation Phase 2 Site Assessment activities at three of substations located in Massapequa, Manhasset, and Island Park, New York. The Scope of Work provided in the RFP was adapted from the Site Assessment recommendations and incorporates comments from NYSDEC, Nassau County Department of Health (NCDH) and the United States Environmental Protection Agency (USEPA).

2.2 Site Description

Delineation Phase 2 Site Assessments will be completed at the Manhasset, Massapequa, and Island Park substations. Provided below is a brief description of each substation:

2.2.1 Manhasset

The Manhasset substation site is located in Manhasset, Nassau County, New York (see Figure 2-1). The site consists of a 25-foot by 30-foot one-story brick building located within the LIRR right-of-way, 12 feet north of the existing train tracks as shown on Figure 2-2. A 30-foot by 30-foot transformer yard is located immediately east of the substation building and is secured by a perimeter chain-linked fence. The remaining portion of the site is a rectangular-shaped,



LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT

SITE LOCATION MAP
MANHASSET SUBSTATION–N10

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 2–1

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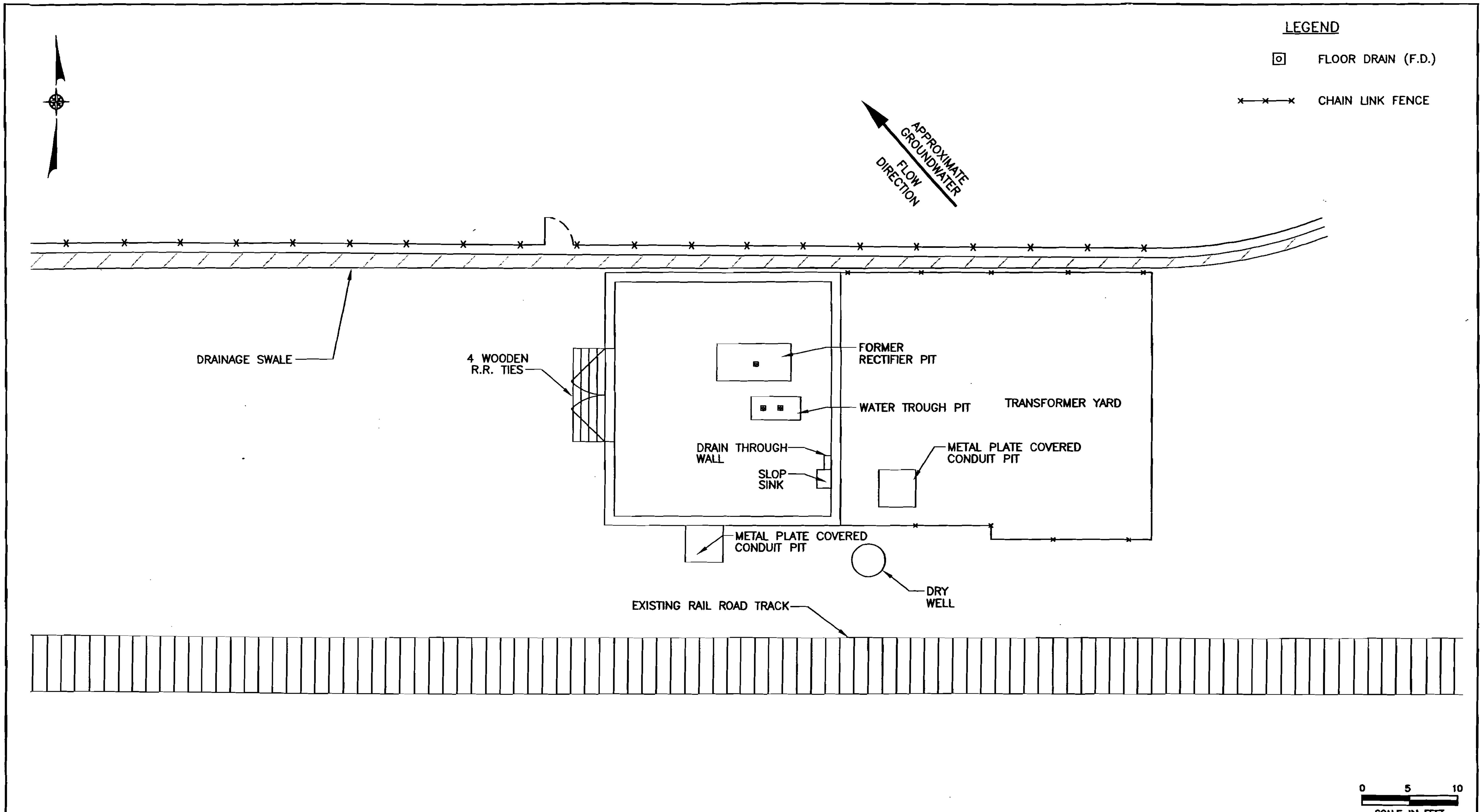

SOURCES: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS & D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SITE PLAN
MANHASSET SUBSTATION – N10

FIGURE 2-2

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partially developed, parcel of land. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Port Washington line. The areas surrounding the substation and the transformer yard are used for storage of equipment and supplies by the LIRR. Based on available information, the approximate groundwater flow direction is to the northwest and the approximate depth to groundwater is 75 feet below grade.

The Manhasset substation does not house any sanitary or office facilities but is served by public water. The interior of the substation consists of an active solid-state rectifier located over a pit that once supported a mercury-containing rectifier. However, during a site inspection conducted by Dvirka and Bartilucci Consulting Engineers (D&B) on February 13, 2002, the solid-state rectifier had been removed in support of the ongoing overall capital improvement project for the Manhasset substation. The substation is also equipped with a second pit, referred to as a water trough on LIRR construction drawings, which is covered by a metal utility plate. During the initial site investigation conducted in 1999, D&B observed that the rectifier pit contained one floor drain and the water trough contained two floor drains. In addition, the Manhasset substation was equipped with a slop sink along the eastern substation wall that discharged to the transformer yard located to the east of the substation. The Manhasset substation does not have a basement or a utility trench system. It should also be noted that the Manhasset substation contained a bank of active lead-acid batteries located in the northwest corner of the substation to provide back-up electricity for the substation switch equipment in the event of a power failure.

During the initial site investigation, D&B observed that storm water drainage from the substation property is conveyed to an existing storm water drainage system. The storm water drainage system originates from an elevated area to the south of the substation and the LIRR right-of-way and is conveyed via a concrete pipe which extends to the north running under the tracks. The concrete pipe discharges to a corrugated pipe, approximately 80 feet to the east of the substation. The corrugated pipe conveys flows in a westerly direction and discharges to a drainage swale located immediately to the west of the substation. Storm water continues to flow west along the northern boundary of the substation approximately 800 feet, down an embankment to the headwaters of Manhasset Bay.

2.2.2 Massapequa

The Massapequa substation site is located in Massapequa, Nassau County, New York (see Figure 2-3). The site consists of an approximately 625 square foot one-story brick building as shown in Figure 2-4. An approximately 2,500 square foot transformer yard is located adjacent to the substation to the west and is secured by a perimeter chain-linked fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Montauk line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking and pedestrian traffic areas. Based on available information, the approximate groundwater flow direction is to the south and the approximate depth to groundwater is 15 feet below grade.

The Massapequa substation is not equipped with a basement or any sanitary and office facilities. The interior of the substation consists of an active solid-state rectifier located over a pit that once supported a mercury-containing rectifier. The substation is also equipped with a second pit, referred to as a water trough on LIRR construction drawings. In addition, the substation contains a water pipe trench with a concrete bottom located in the southeast corner of the substation.

The site investigation conducted by D&B in 1999 revealed the presence of a water service pit with an earthen bottom located off the southeast corner of the substation. A dry well with a solid cover was also observed off the northwest corner of the substation located within the transformer yard. Based on flush tests, it was determined that the drain in the rectifier pit discharges to the dry well located in the transformer yard. In addition, a steel plate covered control communications pit, containing a floor drain, was located within the transformer yard. It should be noted that there was a cable within the communications pit that was coated with a material that resembled asbestos. A steel plate covered positive cable pit containing a floor drain was also observed along the north side of the substation. Available LIRR construction drawings indicate that a dry well is located approximately 10 feet north of the substation. However, this dry well, if present, would currently be located beneath the existing railroad tracks.

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT

SITE LOCATION MAP
MASSAPEQUA SUBSTATION–S15

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 2–3

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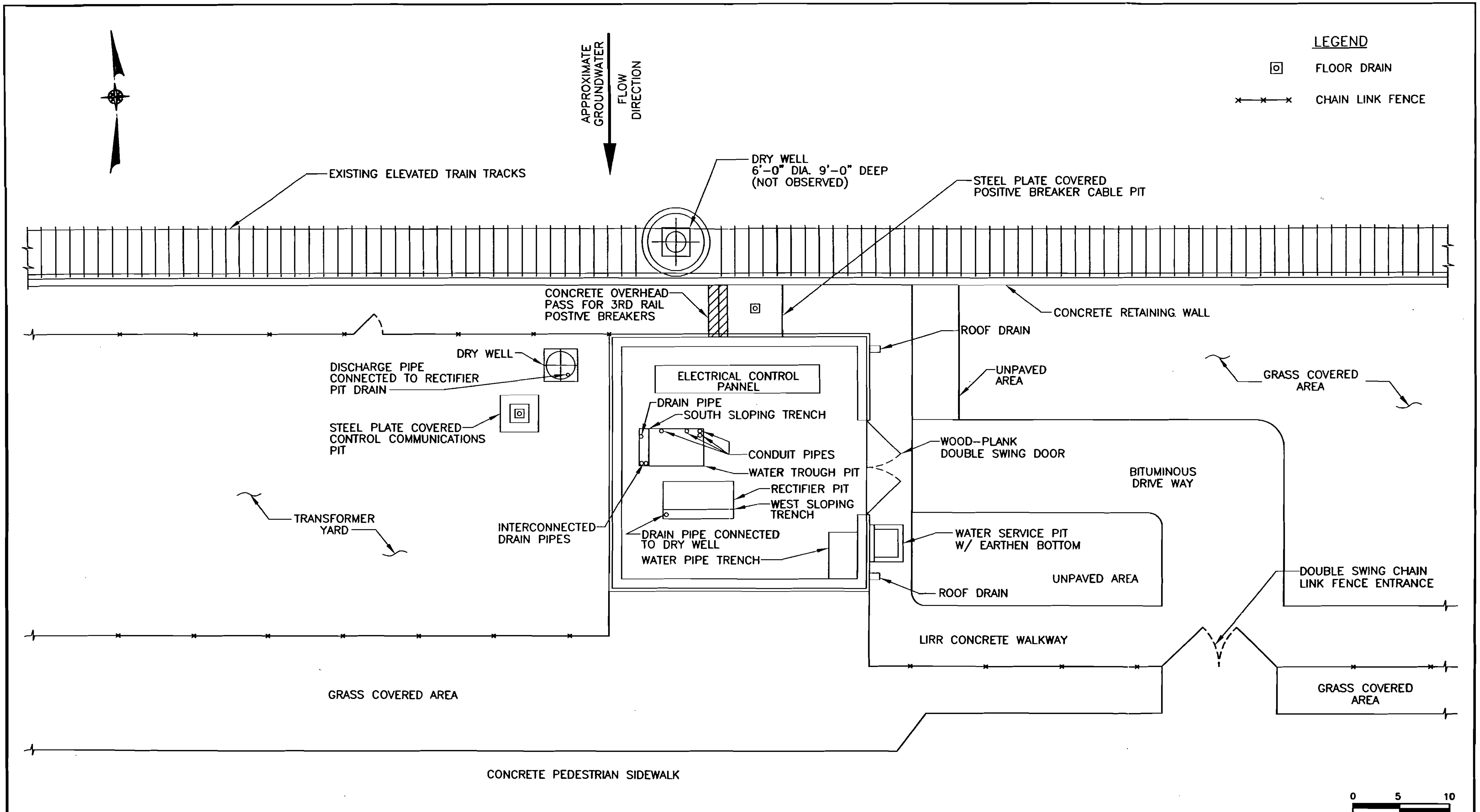

SOURCES: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS & D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SITE PLAN
MASSAPEQUA SUBSTATION – S15

FIGURE 2-4

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2.2.3 Island Park

The Island Park substation site is located in Island Park, Nassau County, New York (see Figure 2-5). The site consists of an approximately 1,800 square foot one-story brick building as shown on Figure 2-6. An approximately 3,000 square foot transformer yard is located adjacent to the substation to the northeast and is secured by a perimeter chain-linked fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Long Beach line. The areas surrounding the substation and the transformer yard are currently utilized for vehicular parking. Based on available information, the approximate groundwater flow direction is to the southwest and the approximate depth to groundwater is 10 feet below grade.

It is important to note that during the initial site inspection conducted by D&B in 1999, the septic tank located to the southwest of the substation was full of sanitary waste. In addition, the on-site LIRR representatives indicated to D&B that there have been problems with the sanitary system overflowing onto the parking lot in the past.

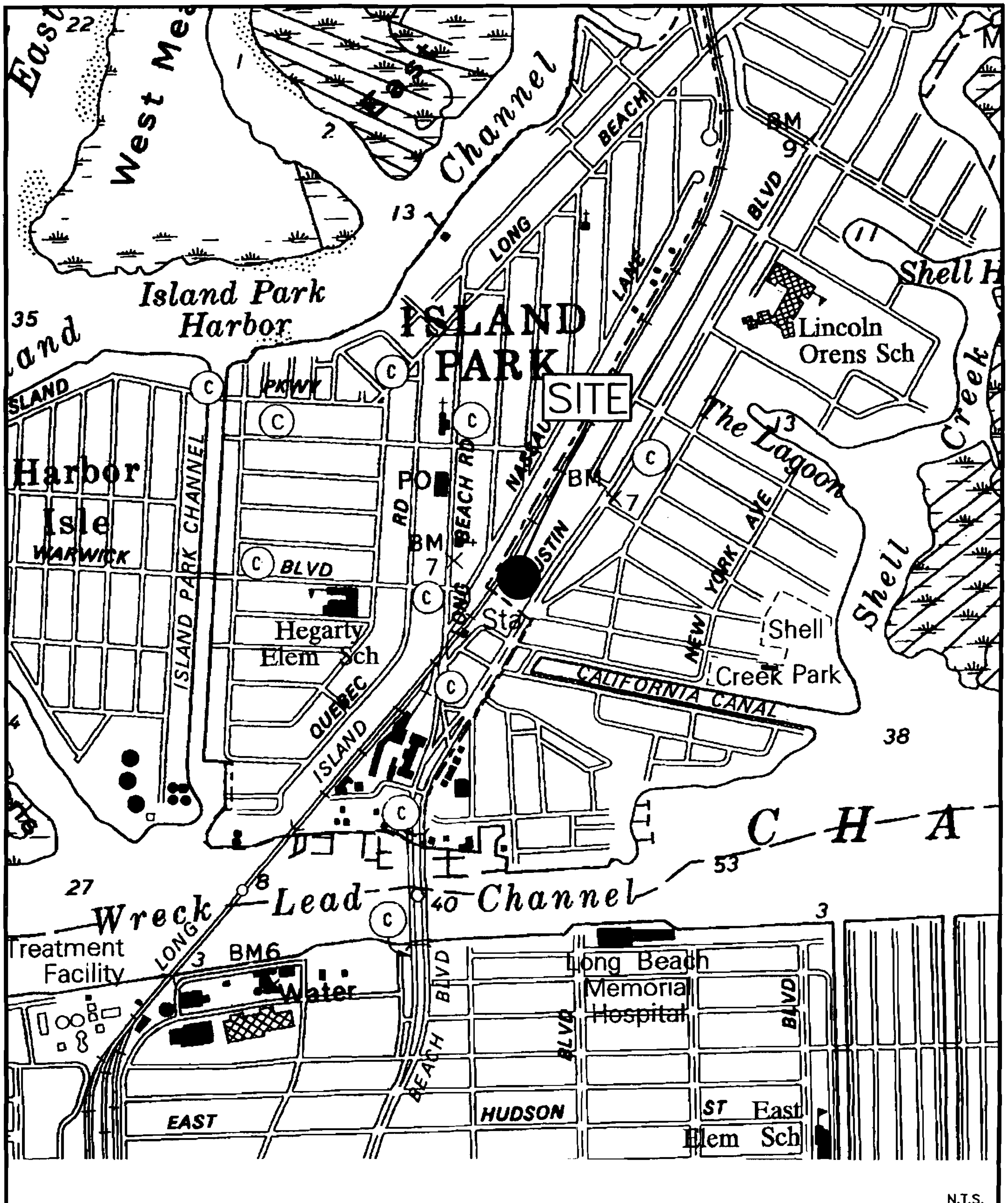
The Island Park substation contains a basement, sanitary facilities, water service and a utility trench system. The interior of the substation consists of two active solid-state rectifiers located over two separate pits leading to the basement. These pits once supported the mercury-containing rectifiers. In addition, there is a water meter pit with an earthen bottom that is covered with a steel plate located off the northwest corner of the substation as shown in Figure 2-6.

2.3 Technical Approach

Based on the Technical Scope of Work presented in the RFP dated February 1, 2002 and site inspections conducted with representatives of the LIRR, we offer the following summary of our technical approach.

The overall program is organized into the following six tasks:

Task 1 - Work Plan;



LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT

SITE LOCATION MAP
ISLAND PARK SUBSTATION–L03

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 2–5

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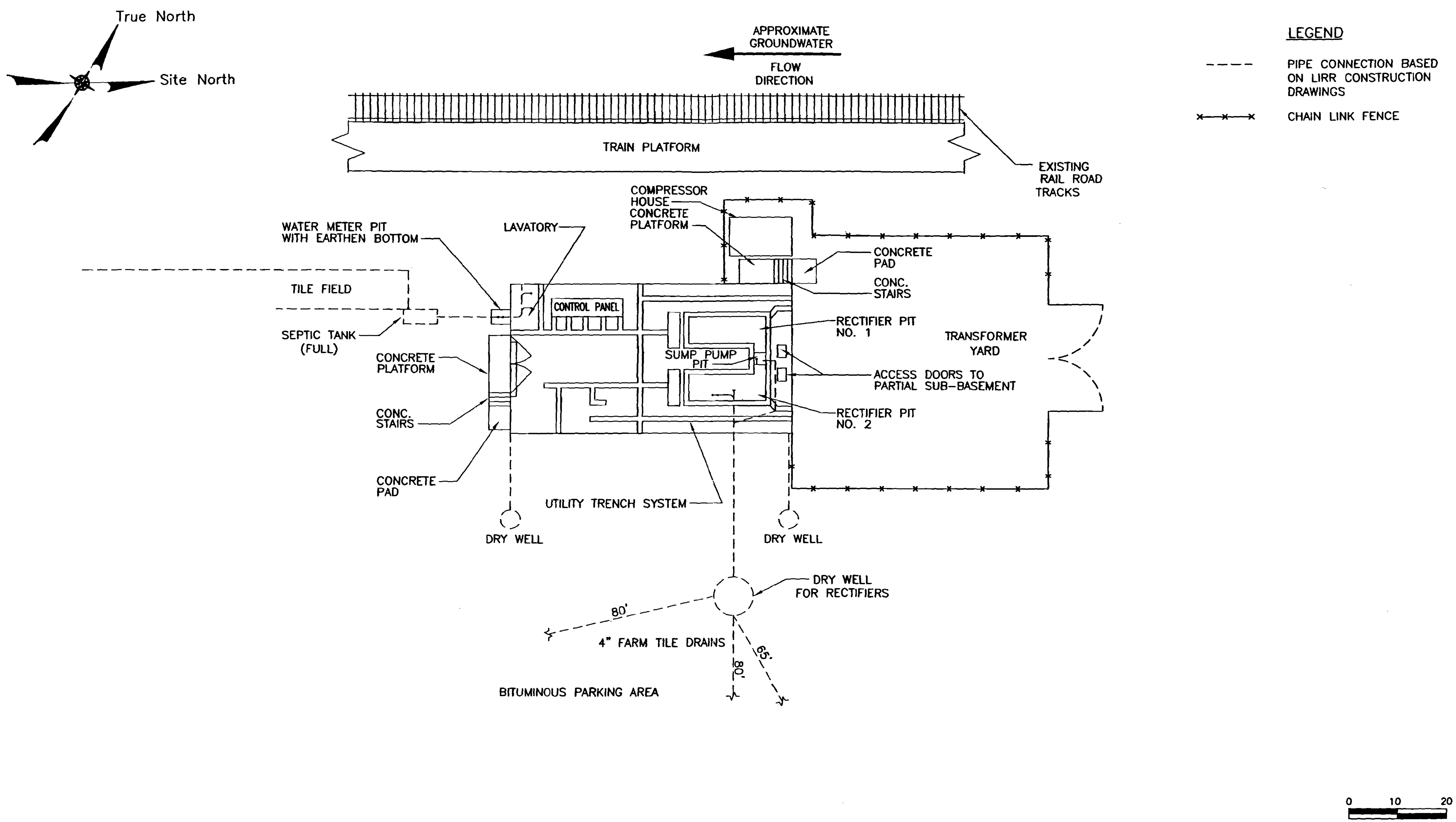

SOURCES: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS & D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SITE PLAN

ISLAND PARK SUBSTATION -L03

FIGURE 2-6

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Task 2 - Health and Safety Plan;

Task 3 - Delineation Phase 2 Site Assessment;

Task 4 - Fish and Wildlife Resources Impact Analysis;

Task 5 - Public Health Exposure Assessments; and

Task 6 - Draft/Final Report.

2.3.1 Task 1 - Work Plan

This document was prepared to satisfy the requirements of presenting a Draft/Final Work Plan. As stated in Section 1.0, this document presents the generic and site-specific work plans to address the LIRR requirements presented in the February 1, 2002 RFP.

2.3.2 Task 2 - Draft/Final Health and Safety Plan

As part of this task, D&B will prepare a draft and final health and safety plan to address worker safety at the sites. The HASP (provided under a separate cover) will outline our Project Team's health and safety program for this assignment. Site-specific information shall be provided in individual sections marked with tabs and/or contrasting color pages to allow quick access in emergencies. The HASP shall contain at a minimum:

- Project Team Key Personnel (including names, titles, telephone numbers and pager numbers);
- Responsibilities of Key Personnel;
- Emergency Telephone Numbers (Fire, Police, EMS, LIRR Movement Bureau, LIRR System Safety and any site-specific information such as phone numbers at each substation if available);
- Map with route to nearest hospital indicated from each substation;
- Text description of route to nearest hospital from each substation;
- Description of site and work to be performed;

- Delineation of site, including access points, security, sign-in log, location of HASP, decontamination area, equipment storage area, and waste staging area for each substation;

- Material Safety Data Sheets or other approved information sources representing materials reasonably expected to be encountered on site (i.e. transformer oil, PCB, lead, asbestos, etc.);

- Physical hazards which may be encountered; trenching/excavation hazards, confined space entry, hot work (welding), fall protection, lock-out/tag-out, heavy equipment, noise, etc.;

- Personal Protective Equipment (PPE) to be used on-site, and exposure monitoring levels or conditions where PPE upgrades are required;

- Instruction on proper use of PPE including donning/doffing, testing, decontaminating, and signs of PPE failure;

- Decontamination procedures for exposed workers;

- List of personnel decontamination materials and equipment, and their location on site for each substation;

- Methods for protecting equipment from contamination or decontaminating any equipment;

- List of equipment decontamination materials and equipment, and their location on site;

- Procedures to be followed in case of emergencies (i.e. fire, worker injury, etc.) for each substation;

- Methods and procedures to be used to comply with OSHA exposure monitoring requirements; and

- Accident/Incident Reporting Forms and other forms used on site for health and safety.

2.3.3 Task 3 – Delineation Phase 2 Site Assessment

The field investigation program will consist of the following elements:

- Surface Soil and Subsurface Soil Sampling;

- Groundwater Monitoring Well Installation;

- Test Pit Excavation; and
- Air Sampling/Monitoring.

Site-specific work plans summarizing all proposed field work in support of the Delineation Phase 2 Site Assessment are presented in Section 5.0.

As detailed in Section 5.0, soil samples will also be collected as part of the USEPA Underground Injection Control (UIC) program. Soil borings will be advanced for the collection and analysis of soil samples to determine the vertical extent of impacted soil within various drainage structures (i.e., dry wells, floor drains, and pits) previously determined to be regulated by the USEPA UIC program. Additional tracing of discharge lines not previously investigate may be required based on USEPA and/or NCDH field observations.

The site-specific work plans described in Section 5.0 include the installation of one additional upgradient groundwater monitoring well at the Manhasset substation. In addition, three groundwater probe samples will be collected from the Massapequa and Island Park substations utilizing the Geoprobe direct push technique.

Test pit excavation activities will also be conducted at the Island Park substation to locate a possible drainage line to the west of the substation, a "rectifier dry well" and a "south" storm water dry well within the parking lot. Test pit excavation activities are described in detail in Section 5.0.

2.3.4 Task 4 – Fish and Wildlife Resources Impact Analysis

A wildlife habitat survey will be conducted in order to prepare a Fish and Wildlife Resources Impact Analysis for the Manhasset substation. The survey will be performed in accordance with Step I and IIa of the NYSDEC Division of Fish and Wildlife document entitled, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites," dated October 1994. This assessment will include data on fish and wildlife resources at the LIRR Manhasset substation and the surrounding area including the Whitney Pond Drainage area and Manhasset Bay.

The goals of the Fish and Wildlife Resources Impact Analysis are to:

- Identify the potential impacts to flora and fauna posed by existing contamination at the site; and
- Provide a basis for determining required remediation and contaminant levels that can remain on-site and off-site, while providing adequate protection of ecological resources.

The Step I analysis will include the following:

- Preparation of a location map with the site perimeter clearly defined;
- Documentation of fish and wildlife resources capable of utilizing the site including species and/or their habitats considered endangered, threatened, rare or of special concern;
- Preparation of a cover-type map presenting major vegetative communities in the vicinity of the site;
- Correlation table of the value of the covertypes to the fish and wildlife resources of the vicinity;
- Qualitative assessment of contaminant-induced stress on local flora/fauna; and
- A qualitative evaluation of the fish and wildlife resources present and their value to humans.

A Step IIa analysis will include observed and expected fish and wildlife receptors of any potential contamination, as well as identifiable vectors of contamination, and a qualitative assessment of impacts from site-related contaminants.

The information and findings associated with the Fish and Wildlife Resources Impact Analysis will be utilized to determine if further investigation and/or quantification of fish and wildlife impacts are warranted.

The information and findings associated with the Fish and Wildlife Resources Impact Analysis for the Manhasset substation will be presented in the final report for this project.

2.3.5 Task 5 – Public Health Exposure Assessments

A qualitative public health exposure assessment will be prepared based upon the results of the Delineation Phase 2 Site Assessment, as well as the results of the previous investigations conducted at the Manhasset, Massapequa, and Island Park substations.

The goals of the public health exposure assessment are to:

- Determine the potential human health risk under current/baseline site conditions, including identification of the contaminants of concern, contaminant migration pathways, routes of exposure and potential receptors;
- Identify areas, on-site and off-site, that may require remediation where significant impacts or potential impacts have been identified; and
- Provide a basis for determining contaminants that can remain on-site and off-site, while providing adequate protection of human health for both current and anticipated site use.

The approach that will be used to perform the public health exposure assessment is based on the approach that we have used to prepare numerous exposure assessments for Superfund sites which have been approved by NYSDEC and NYSDOH.

The contaminants of concern (COCs) will be developed for the substation sites from validated investigation data and based on the exceedances of standards, criteria and guidelines (SCGs) selected for the sites. The COCs will represent the most toxic, mobile and persistent contaminants at the sites, as well as those contaminants which are detected most frequently and at the highest concentrations. Identification of the COCs will focus the exposure assessment on those contaminants which pose the greatest threat to human health.

Utilizing information from the Delineation Phase 2 Site Assessments, site reconnaissance and previous site investigations, the contaminant sources, migration pathways and human exposure points will be identified and evaluated. Potential human exposures to contaminants and contaminated media include ingestion, inhalation and dermal contact with waste, groundwater, surface soil, subsurface soil, surface water and surface water sediment. Potential receptors on-site will be adult workers and occasional adult visitors, while off-site potential receptors will include neighboring residents. The information and findings associated with the qualitative public health exposure assessment will be presented in the final report for this project.

With regard to the selection of SCG, the following will be used to screen the data to identify, ***on a preliminary basis***, the COCs.

- Surface and Subsurface Soil - NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Levels for initial screening, and USEPA Risk-Based Concentrations for Industrial Land Use for secondary screening;
- Surface Water Sediment - TAGM 4046 for human exposure and NYSDEC Technical Guidance for Screening Contaminated Sediment for ecological exposure; and
- Groundwater - NYSDEC Technical and Operational Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values.

Exceedances of SCGs will identify the contaminants, media and areas of concern for the substation sites to determine if the potential of an unacceptable risk to human health exists based on current and anticipated use of the site, potential on-site and off-site receptors and potential contaminant migration pathways.

2.3.6 Task 6 – Draft/Final Report

As part of this task, the D&B Project Team will prepare a report for all three substation sites that will thoroughly document the findings of the project and present clear and concise recommendations regarding any impacted media identified. The draft and final report will include site drawings, analytical results, a site location map, groundwater flow direction map and the results of all environmental analysis. In addition, a detailed discussion of the results of the field sampling and analytical data will be presented along with any appropriate recommendations for remediation or supplemental Phase II investigation programs. All supporting information such as boring logs and groundwater monitoring well logs will be provided in appendices.

2.4 Project Management

The schedule for implementation of this project is provided in Figure 2-7. Specific deadlines for completion of tasks and subtasks are established throughout the project schedule to ensure timely completion of the work.

Dvirka and Bartilucci Consulting Engineers (D&B) will be the prime consultant responsible for all substation site assessments. Firms that will be used as subconsultants and subcontractors for this project are summarized below:

PROJECT TEAM SUMMARY

Firm	Category	Project Responsibility	Work Statement Participation
Dvirka and Bartilucci Consulting Engineers	Professional Consultant	Prime Consultant/ Engineering Services/ Overall Project Management	Tasks 1 through 6
Emilcott Associates, Inc.	Subconsultant	Health and Safety/ Industrial Hygiene	Tasks 2 and 3
Land, Air, Water Environmental Services, Inc.	Subcontractor	Drilling Services	Task 3
MITKEM Corporation	Subcontractor	Analytical (Laboratory) Services	Task 3

The project organization for this project, illustrating both management and project responsibility functions for the project team and key personnel, is provided in Figure 2-8.

LIRR

Delineation Phase 2 Site Assessment for Manhasset, Massapequa and Island Park Substations

ID	Task Name	Duration	Start	Finish
1	**Task 1 - Work Plan**	**85 days**	**Mon 5/20/02**	**Fri 9/13/02**
2	Prepare Draft Work Plan	20 days	Mon 5/20/02	Fri 6/14/02
3	LIRR Review	5 days	Mon 6/17/02	Fri 6/21/02
4	Revise Work Plan	5 days	Mon 6/24/02	Fri 6/28/02
5	NYSDEC Review	18 days	Mon 7/1/02	Wed 7/24/02
6	Revise Work Plan	7 days	Wed 9/4/02	Thu 9/12/02
7	Issue Final Work Plan	0 days	Fri 9/13/02	Fri 9/13/02
8	**Task 2 - Health and Safety Plan**	**42 days**	**Mon 6/3/02**	**Tue 7/30/02**
9	Prepare Draft HASP	15 days	Mon 6/3/02	Fri 6/21/02
10	LIRR Review	5 days	Mon 6/24/02	Fri 6/28/02
11	Revise HASP	2 days	Mon 7/1/02	Tue 7/2/02
12	NYSDEC Review	12 days	Wed 7/3/02	Thu 7/18/02
13	Revise HASP	7 days	Fri 7/19/02	Mon 7/29/02
14	Issue Final HASP	0 days	Tue 7/30/02	Tue 7/30/02
15	**Task 3 - Delineation Phase 2 Site Assessment**	**28 days**	**Wed 9/25/02**	**Fri 11/1/02**
16	**Manhasset - N10**	**14 days**	**Wed 9/25/02**	**Mon 10/14/02**
17	Field Work	8 days	Wed 9/25/02	Fri 10/4/02
18	Laboratory Analysis	10 days	Tue 10/1/02	Mon 10/14/02
19	**Massapequa - S15**	**13 days**	**Wed 10/9/02**	**Fri 10/25/02**
20	Field Work	4 days	Wed 10/9/02	Mon 10/14/02
21	Laboratory Analysis	10 days	Mon 10/14/02	Fri 10/25/02
22	**Island Park - L03**	**12 days**	**Thu 10/17/02**	**Fri 11/1/02**
23	Field Work	5 days	Thu 10/17/02	Wed 10/23/02
24	Laboratory Analysis	10 days	Mon 10/21/02	Fri 11/1/02
25	**Task 4 - Fish & Wildlife Resources Impact Analysis**	**10 days**	**Tue 10/22/02**	**Mon 11/4/02**
26	**Task 5 - Public Health Exposure Assessments**	**21 days**	**Mon 11/4/02**	**Mon 12/2/02**
27	**Task 6 - Draft/Final Report**	**36 days**	**Fri 1/24/03**	**Fri 3/14/03**
28	Submit Draft Report to LIRR	0 days	Fri 1/24/03	Fri 1/24/03
29	LIRR Review	5 days	Fri 1/24/03	Thu 1/30/03
30	Revise Report	5 days	Fri 1/31/03	Thu 2/6/03
31	NYSDEC Review	20 days	Fri 2/7/03	Thu 3/6/03
32	Revise Report	5 days	Fri 3/7/03	Thu 3/13/03
33	Issue Final Report	0 days	Fri 3/14/03	Fri 3/14/03

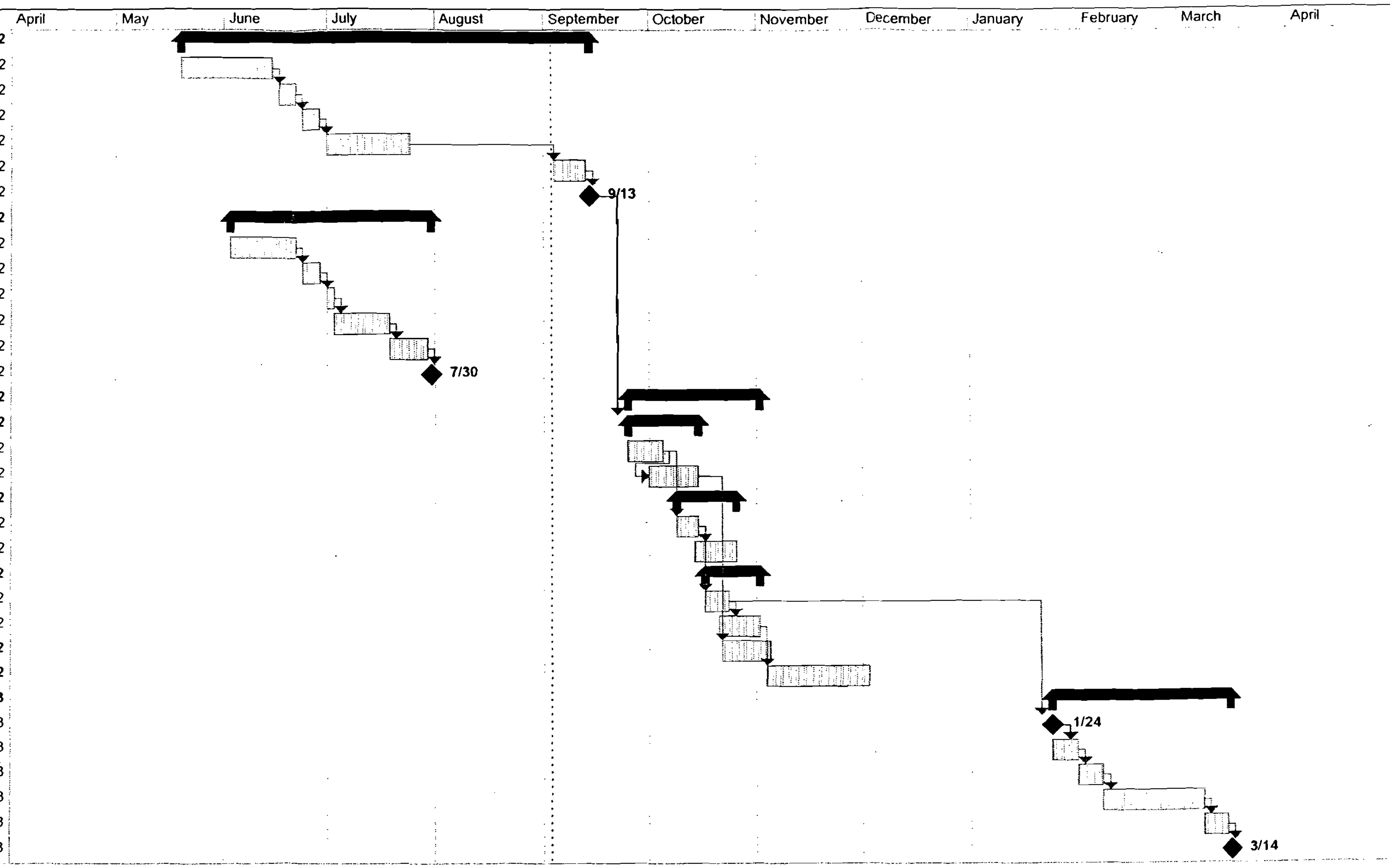


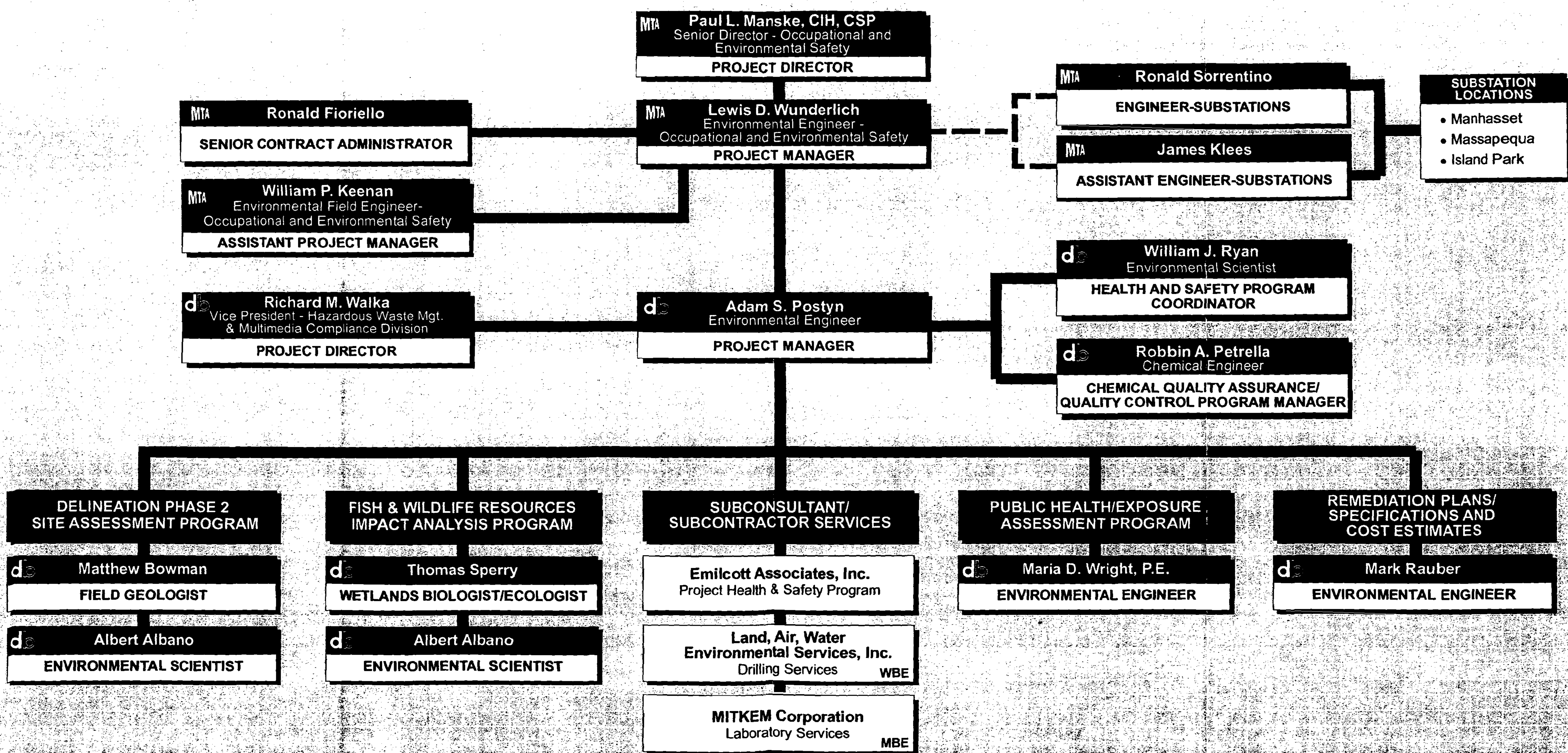
Figure 2-7

Task | Progress | Summary | External Tasks | Deadline

Split | Milestone | Project Summary | External Milestone

Long Island Rail Road

PROJECT ORGANIZATION AND KEY STAFF
LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
FOR MANHASSET, MASSAPEQUA AND ISLAND PARK SUBSTATIONS



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

FIGURE 2-8

Section 3

3.0 SAMPLING AND ANALYSIS PLAN

The purpose of this Generic Work Plan is to provide general information on the elements of the field investigations that will be performed at typical electric substation sites. Information relating to the number and locations of samples to be collected for site-specific field investigations will be provided in the Site-Specific Work Plans (see Section 5.0).

Electric substation sites typically share several characteristics related to on-site operations, waste disposal activities and constituents of concern. For the purposes of this Generic Work Plan, certain assumptions have been made with regard to a "typical" electric substation site.

Possible mercury impacts to soil and groundwater at a typical substation site are due to the operation, maintenance and deactivation of mercury containing rectifiers. In addition, polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and Resource Conservation and Recovery Act (RCRA) metals, are other contaminants of concern due to the proximity of electric substation sites to adjacent transformer yards.

Specific electric substation sites will possess unique characteristics unlike the typical sites described above. The techniques described below may not be applicable at all sites, and other techniques not described in this Work Plan may be desirable under certain circumstances. In any event, Site-Specific Work Plans have been prepared which address the specific conditions and investigation requirements for a specific electric substation site.

The following is a description of the various field activities that may be conducted to support a Delineation Phase 2 Site Assessment at an electric substation site. For a detailed description of sampling and analytical procedures, refer to Section 4.0.

3.1 Surface Soil Sampling

Surface soil samples may be collected on-site at locations of known or suspected spill or disposal areas and areas of visually stained soil or stressed vegetation to determine the nature and extent of surficial soil contamination on-site. The number of samples to be collected will be based upon the size of the area being investigated and surface observation. Samples will be collected at a depth of 0 to 2 inches below ground surface using either a disposable polyethylene scoop, decontaminated stainless steel trowel or a sterile wooden tongue depressor. If the area is paved, samples will be collected 0 to 2 inches below the pavement. Detailed sampling procedures are described in Section 4.5 of this Work Plan. Site-specific sampling methods, if different from this Generic Work Plan, will be provided in the Site-Specific Work Plans. Specific sampling locations and analytical methods will be described in the Site-Specific Work Plans.

3.2 Sediment Sampling

Sediment samples may be collected to determine if waste disposal and on-site contamination has impacted surface water bodies (creek, stream, lake, pond, etc.). Sediment samples will be collected at the same locations as the surface water samples. Samples will be collected at the point of discharge to the surface water body and/or in down stream depositional areas.

The sediment samples will be collected 0 to 2 inches below the surface of the sediment utilizing a decontaminated long handle polyethylene scoop, if possible. Sampling locations and analytical methods will be provided in the Site-Specific Work Plans.

3.3 Test Pit Excavation and Sampling

Test pits may be required to expose underground utilities or on-site sanitary systems that may be acting as a source of contamination or a conduit for contaminant migration. The test pits will be excavated with a backhoe with an appropriate bucket reach.

The selection of samples from the test pits will be based on visual observation, such as staining, odor and PID/FID or Jerome Mercury Analyzer measurements. Samples will be obtained from the backhoe bucket immediately after retrieval utilizing a disposable polyethylene or polystyrene scoop or sterile wooden tongue depressor. Personnel will not enter the pit to collect samples.

The protocol for test pit excavation, sampling and backfill will be the following:

- Uncontaminated soil from the test pit, approximately 2 to 3 feet in depth, will be removed and placed separately;
- Deeper excavated visibly clean soil will be staged separately
- Deeper excavated soil which indicates contamination will be segregated and placed on plastic liners and covered
- If the water table or buried drums are encountered during test pit construction, excavation will be terminated
- A record of excavation and sample collection will be maintained (see Section 4.8)
- The excavation will be filled in the reverse order of soil removal; and
- Final cover will use the soil initially removed and placed separately. If this is not sufficient, clean soil from the surrounding area will be placed on top of the pit.

In general, only the backhoe bucket, which will come into direct contact with impacted soil, will require decontamination. Test pit locations and analytical methods will be provided in the Site-Specific Work Plans. If necessary, an odor suppressing foam or other appropriate material will be utilized in order to minimize the migration of hazardous vapors from the excavation or stockpiled soil.

3.4 Direct Push Soil Sampling

Direct push sampling techniques can allow for the relatively rapid collection of soil samples with minimal disturbance of the ground surface and generation of soil cuttings. Soil samples can be collected with a probe from various depths in the vicinity of the suspected contaminant source to determine the depth of the source and degree of contamination in the vadose zone. The geology of the site must be evaluated to determine if direct push (soil probe) sampling techniques are feasible. If probe sampling is not feasible at a site due to the subsurface geology, sampling will then be completed utilizing standard drilling techniques such as hollow stem augers with split spoon sampling. The probes will be installed utilizing a decontaminated screen point and sampler fitted with a disposable acetate liner. Detailed sampling procedures are provided in Section 4.0. Probe locations and analytical methods will be provided in the Site-Specific Work Plans. Probe holes will be abandoned according to procedures described in Section 3.7.

3.5 Direct Push Groundwater Screening and Sampling

Collection of groundwater samples utilizing direct push sampling techniques include utilization of a groundwater probe sampler. Direct push sampling techniques will be utilized to collect groundwater samples to define the horizontal and vertical extent of groundwater contamination on- and off-site.

The direct push sampling techniques are useful for preliminary contaminant plume delineation based on actual groundwater sampling. Drawbacks to this method include the fact that this is a one-time sample only. The geology and hydrogeology of the site must be evaluated to determine if it is amenable to direct push sampling techniques. Probe sampling is typically only applicable in unconsolidated deposits.

Groundwater probes will be installed utilizing a decontaminated screened sampler. The decontaminated probe and rods will be driven until the sampler tip is approximately 1-foot below the target sampling depth. Once that depth has been reached, the expandable drive point will be disengaged and the rods pulled back a distance of about 2 feet to expose the screened sampler. Disposable polyethylene tubing, equipped with a bottom check valve, will be used to convey groundwater to the surface for collection. Each sample, upon retrieval, will be analyzed in the field for pH, conductivity, turbidity and temperature.

If necessary, samples may be collected for iron and manganese to provide additional information for potential treatment of groundwater. Prior to the collection of metals samples, groundwater turbidity will be measured. If the turbidity is less than 50 NTUs, one sample will be collected for total metals analyses. If turbidity is greater than 50 NTUs, a filtered sample will also be collected and analyses performed for both filtered and unfiltered. Refer to Section 4.0 for more detailed sampling procedures. Site-specific sampling locations and analytical methods will be provided in the Site-Specific Work Plans. Probe holes will be sealed and abandoned according to Section 3.7.

3.6 Monitoring Well Drilling and Groundwater Monitoring

Groundwater monitoring involves periodic sampling and analysis of groundwater from monitoring wells. The effective design of monitoring wells requires careful consideration of the hydrogeology and subsurface geochemistry at the site. Information obtained from site reconnaissance, geophysical investigations or nearby existing wells can be useful in deciding appropriate monitoring well drilling, construction and development methods for the site. The design of a monitoring well should be based upon site-specific conditions and cannot be completed using a "one size fits all" method or material. The goal of monitoring well design is to construct wells that will produce depth and location-specific hydrogeologic and chemical data. Precautions must be made to ensure that well completion and development procedures minimize disturbance to the natural geologic environment and groundwater samples. Additionally, monitoring well installation techniques must minimize the potential for cross-contamination through the subsurface.

3.6.1 Drilling Methods

The selection of drilling and well completion methods for monitoring well construction will be based on site-specific conditions, including geologic materials to be penetrated, anticipated depth of drilling, potential for cross-contamination and accessibility to boring locations on the site. The selection of an appropriate drilling method for the construction of monitoring wells will be based on minimizing both the disturbance of geologic materials penetrated and the introduction of air, fluids and mud. The use of drilling mud and additives will be avoided, where possible, because the introduction of any foreign material has the potential for interfering with the chemical quality of water obtained from the monitoring wells and determination of aquifer characteristics through the use of slug tests. The following evaluations of various drilling techniques are based on these factors and the physical limits of each method.

3.6.1.1 - Hollow Stem Augers

The hollow stem auger method is among the most desirable drilling methods for the construction of monitoring wells. Hollow stem auger drill rigs are generally mobile, relatively fast and inexpensive to operate in unconsolidated materials. No drilling fluids are used and disturbance to the geologic materials penetrated is minimal. Depths of borings constructed using augers vary based upon soil types, however, borings up to 100 feet and greater are possible (maximum depth limit is about 200 feet). Clayey soils restrict the depth to which auger drilling can be accomplished. Augers typically cannot be used in bedrock, unless it is highly weathered, and the use of hollow stem auger drilling in heaving sand environments may also present difficulty.

3.6.1.2 - Cable Tool

The cable tool drilling method is relatively slow, but still offers advantages such as low cost per foot, the ability to create large diameter borings and the ability to increase permeability of bedrock. These considerations make it a useful choice for monitoring well construction in unconsolidated formations and relatively shallow consolidated formations. This method allows for the collection of formation samples and the detection of permeable zones. The installation of a steel casing as drilling progresses also provides a stable annulus for the construction of a monitoring well.

3.6.1.3 - Air Rotary

Rotary drilling methods operate on the principle of circulating either a fluid or air to remove the drill cuttings and maintain an open hole as drilling progresses. The different types of rotary drilling are named according to the type of fluid and the direction of fluid flow. Air rotary drilling forces air down the drill rods and back up the borehole to remove the drill cuttings. The use of air rotary drilling is best suited for use in hard rock formations. In soft, unconsolidated formations, a casing is driven to keep the formations from caving. In highly fractured formations, it is often difficult to maintain air circulation and casing may be required. The air from the compressor on the rig must be filtered to ensure that the oil from the compressor is not introduced into the geologic system to be monitored. The use of air rotary drilling techniques must be used with care in highly polluted or hazardous environments. Contaminated solids, water and vapors can be blown out of the hole and are difficult to contain. Protection of the drill crew and observers is correspondingly difficult.

3.6.1.4 - Air Rotary with Casing Hammer

Air rotary drilling with casing driving capability increases the utility of this type of drilling method. Typical air rotary problems associated with drilling in soft, unconsolidated and highly fractured formations are minimized. The utility of constructing monitoring wells in the casing prior to its removal also makes this type of drilling technique more appealing. Concerns about oil in the circulating air and containment of contaminant cuttings, water and vapor, must also be considered.

3.6.1.5 - Reverse Circulation Rotary

Reverse circulation rotary drilling has limited application for the construction of monitoring wells. Large quantities of fluid are circulated down the hole and pumped back to the surface through the drill stem. Mud rotary offers better control of contaminated cuttings and water removed from the borings, and does not cause exposure to vapors as in air rotary techniques. The hydrostatic pressure of the water in the borehole is used to maintain an open borehole. If permeable formations are encountered, large quantities of water will infiltrate into these formations, altering in-situ water quality. Similarly, water bearing units with differing hydrostatic heads will have the opportunity for free interchange of waters, altering the quality of water in the unit of lower hydrostatic head. Because of the large quantities of water normally required for this type of drilling, and the high potential for water to enter the formations to be sampled, this type of drilling is not typically utilized.

3.6.1.6 - Mud Rotary

Mud rotary drilling operates in the same fashion as the air rotary drilling technique, except that water and drilling mud are circulated down the drill pipe and back up the borehole to remove drill cuttings. Mud rotary drilling offers better control of contaminated cuttings and water removed from the boring and does not cause exposure to vapors as in air rotary techniques. The borehole is held open by the hydrostatic pressure of the circulating mud and the mud cake that develops on the borehole wall during the drilling process. Viscosity of the drilling mud is controlled to minimize the infiltration of the drilling fluid into porous formations penetrated by the drilling equipment. The use of drilling mud can cause groundwater chemistry or in-situ permeability to be altered by introduction of mud into the borehole. Monitoring wells installed in mud-rotary borings often require extra well development and may detect solutes attributable to the mud that cause an inaccurate assessment of groundwater chemistry. Under certain conditions, mud rotary techniques can be effective by using a continuous supply of potable water without additives. Alternatively, mud can be used to advance a boring to a depth several feet above the zone of interest, at which time mud can be replaced with potable water and the borehole continued to final depth.

Based upon the advantages and disadvantages of the various drilling methods described above, the preferred drilling methods are typically hollow stem augers for drilling in the overburden and mud rotary using potable water without additives in the bedrock. However, the final selection of the drilling method will be based on site-specific geologic and hydrostatic conditions. Alternate methods of drilling must be specified in the Site-Specific Work Plans together with the rationale for selection.

3.6.2 Subsurface Soil Sampling

Subsurface soil samples will be collected during construction of monitoring wells and soil borings. Soil borings will be advanced to delineate the extent of subsurface soil contamination on-site. The depth of the boring and sampling intervals will be determined in the Site-Specific Work Plans. Samples typically will be obtained continuously from the ground surface to provide detailed stratigraphic and soil quality information.

Soil samples obtained from decontaminated split spoons will be observed and logged for geologic characteristics, odors and staining, and screened with an FID or PID and a Jerome Mercury Analyzer. The data obtained from this screening will be used to select soil samples from each borehole for chemical analysis. All subsurface soil samples selected for chemical analysis will be collected from within the unsaturated zone unless contamination at the water table interface is evident, in which case, samples of soil in the saturated zone may be collected.

The number and locations of the samples to be collected, and the analytical methods to be utilized, will be provided in the Site-Specific Work Plans.

3.6.3 Overburden Monitoring Wells and Microwells/Piezometers

Monitoring well and microwell/piezometer boreholes constructed in the overburden will typically be installed using decontaminated 4 1/4-inch ID hollow stem augers. If difficulties with "running sands" are encountered which hinder soil sampling, potable water will be added to the hollow stem augers to maintain a positive hydrostatic head. Additionally, if difficulties with elevated levels of explosive or toxic gases, such as methane and hydrogen sulfide are encountered, potable water or mud may be introduced into the hollow stem augers to suppress the gas. If the depth of boring or nature of unconsolidated deposits prevent the efficient use of 4 1/4-inch ID hollow stem augers, then other methods such as those described in Section 3.6.1 may be considered. The use of alternative drilling methods, if any, will be described and justified in the Site-Specific Work Plans.

The final depth of each borehole will be below the water table at a depth that will allow 6 inches of sand pack to be placed between the screen bottom and bottom of the boring, as well as allow the screen to intersect the water table. For mid-depth or deep overburden wells, the borings must be deep enough to allow 6 inches of sand pack between well screen bottom and boring bottom, and allow the screen to intersect the zone of concern. If the boring is drilled too deep, for any reason, the borehole must be filled to a depth of 6 inches below the planned screen location with a bentonite slurry or other suitable impermeable material. At a minimum, overburden borings will be constructed for the installation of monitoring wells and piezometers that screen the water table. The actual number and depth of borings, as well as analytical sampling methods, will be determined on a site-specific basis and contained in the Site-Specific Work Plans.

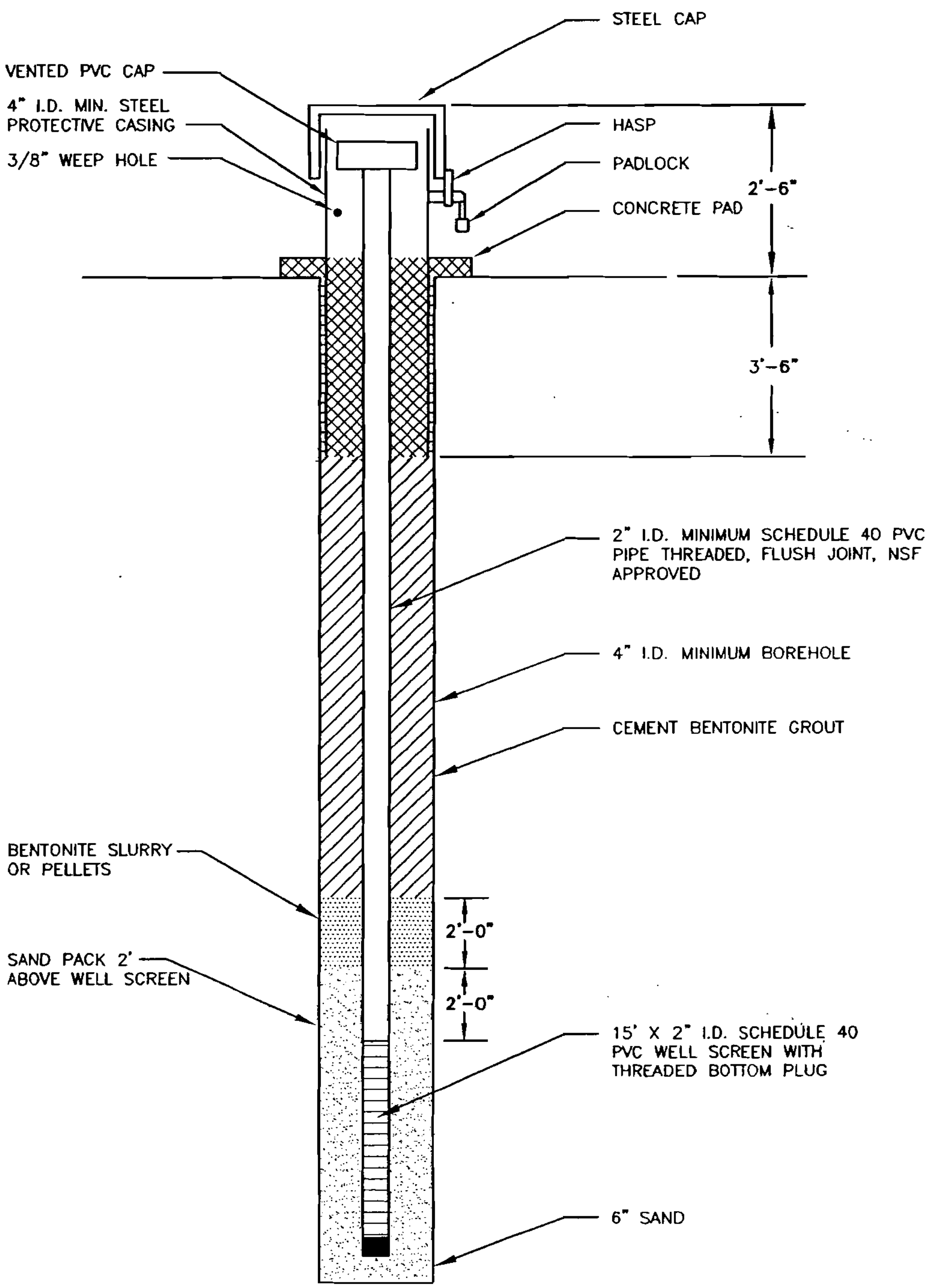
Cuttings generated from the construction of the boreholes will be handled in accordance with NYSDEC TAGM No. 4032 "Disposal of Drill Cuttings" dated November 1989 (see Appendix C). In general, this TAGM allows for on-site disposal of cuttings as long as certain criteria are met.

Monitoring wells will typically be installed for the purpose of groundwater sampling. Piezometers will typically be installed when sampling is not required, but water level data is necessary. The following discussion regarding monitoring wells also pertains to piezometers. The depth of overburden monitoring wells will be determined on the basis of the geology and hydrogeology of the site and the goals of the monitoring program. In the case of overburden wells, the goal in general is to monitor the potential effects of near surface contaminants on groundwater.

In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water levels from several of these wells, if they are completed in the same hydrogeologic unit, will also provide information on the horizontal direction of shallow groundwater flow. If the overburden area of concern is relatively thick, then a series of mid-depth or deep monitoring wells will be required to properly assess groundwater conditions. The need for and depth of mid-depth or deep overburden wells will be provided in the Site-Specific Work Plans.

The diameter of monitoring wells should be the minimum practical size that will be compatible with the strength requirements of the well materials and allow for groundwater sampling. Small diameter monitoring wells will decrease the amount of water to be removed for well development and purging, and minimize the potential need for containment of contaminated water. Additionally, small diameter wells will minimize the potential impact on groundwater chemistry caused by disturbance during well drilling. Overburden monitoring wells will typically be constructed of decontaminated 2-inch ID, Schedule 40, 0.010-inch slot PVC well screen and threaded, flush joint PVC casing. No solvents will be utilized to construct the wells. These site-specific cases where non-aqueous phase liquids (NAPLs) are present or suspected, the use of stainless steel wire-wrap screens may be considered if the chemical is incompatible with PVC materials. In addition, when site-specific conditions dictate, different size screen openings may be utilized. Justification for the use of alternate screen material and size will be provided in the Site-Specific Work Plans.

The well screen in a monitoring well will be long enough to permit entry of water from the vertical zone to be monitored. The length of the screen will be kept to a minimum for water level data to be obtained from the well to represent information that is depth-discreet. In wells where the length of the screen is long, the resulting water level represents an average water level for the materials opposite the screen, and is sometimes insufficient to determine accurate groundwater flow characteristics. The overburden water table monitoring well screens will generally be 10 to 15 feet long. The screen will typically be installed with 5 feet above the water table in order to intercept the water table under varying seasonal groundwater elevations. The selection of screen lengths will be provided in the Site-Specific Work Plans. A generalized construction diagram for a well with a steel protective casing is shown on Figure 3-1. A generalized flush-mounted well construction diagram is shown on Figure 3-2. The type of well utilized will be based on site-specific considerations.



LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT

PLAN FOR CONSTRUCTION OF OVERBURDEN MONITORING WELLS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 3-1

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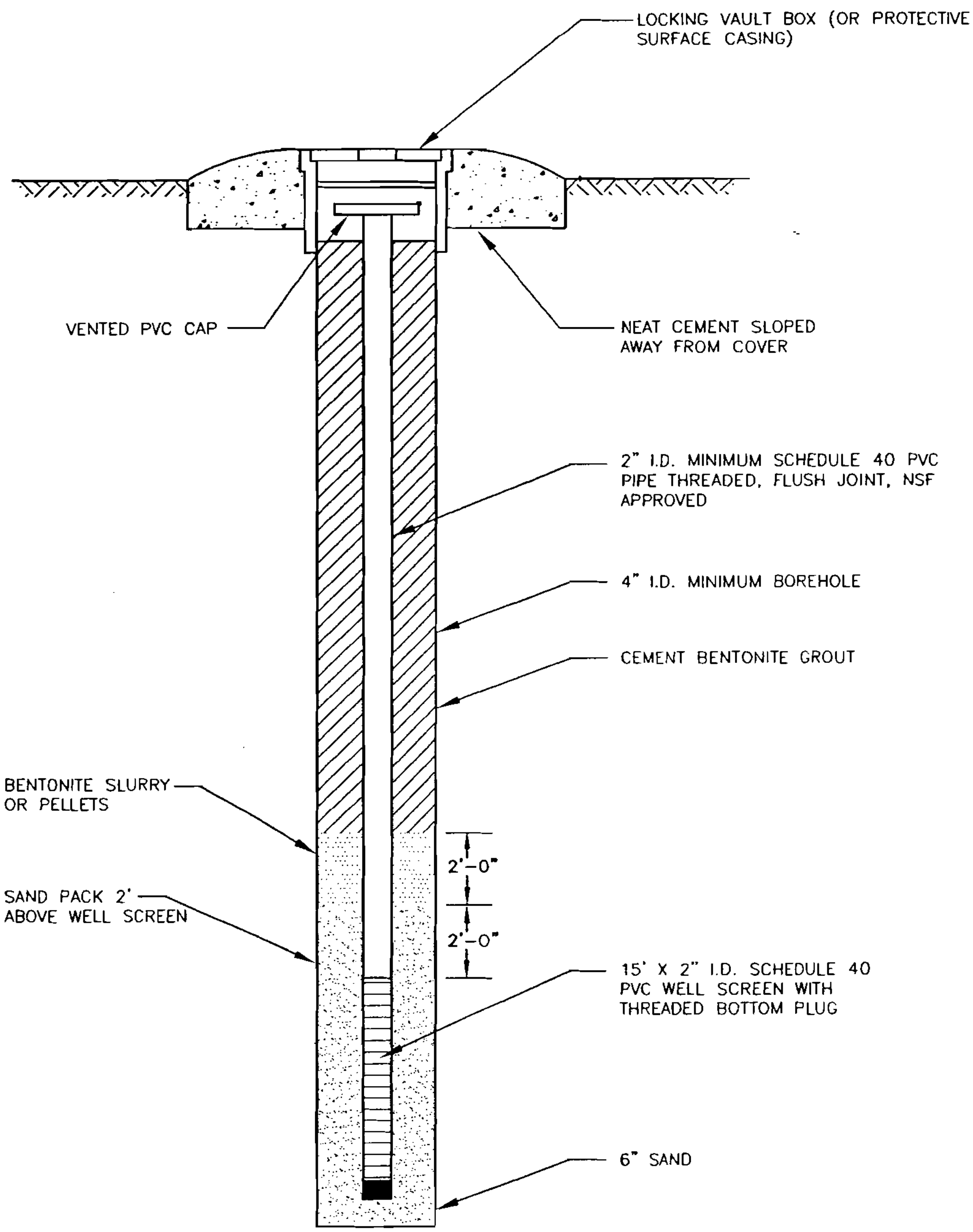

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT

PLAN FOR CONSTRUCTION OF MONITORING WELLS WITH LOCKING VAULT

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 3-2

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At the completion of borehole construction and soil sampling, the well screen and riser pipe will be lowered into the hollow stem auger and set at the desired depth. Sand pack of a grain size appropriate for the selected screen opening size and geologic conditions will be placed into the annular space to a minimum height of 2 feet above the top of the well screen using a tremie pipe or other suitable method. Generally, number 2 morie sand will be used. During this time, the auger will be slowly removed. The well pipe will also be pulled up no more than 1/2 foot to allow sand material to fill the borehole beneath the well screen. Upon completing the placement of the sand pack, a minimum 2-foot thick bentonite pellet, chip or slurry seal will be tremied in the annular space. Bentonite pellets or bentonite chips, if used, will be hydrated with potable water and allowed to swell for a minimum of 1/2 hour before introducing the cement bentonite grout in the remaining annular space. The cement-bentonite grout will be pressure pumped into the annular space by the tremie method.

The monitoring wells will be completed with either a flush mount curb box or riser pipes. Wells completed with riser pipes will be constructed with approximately 2 1/2 feet of riser above ground surface and protected with a locking steel casing with minimum diameter of 4 inches. The protective casing will be at least 5 feet in length and secured into the borehole using concrete sand or gravel mix. The surface seal will be completed with a 3-foot diameter formed concrete pad and will be constructed to drain surface water away from the well. The protective casing will have a locking cap and weep hole, and be marked with the monitoring well identification. In cases where monitoring wells will be installed in roadways, parking lots or through floors, flush mount protective casings will be used. In such cases, a locking water tight PVC well cap will be installed inside of a curb box with bolted, water tight cover. Protective casing types will be specified in the Site-Specific Work Plans.

3.6.4 Borehole and Monitoring Well Logging

All borehole construction and monitoring well installation will be logged and documented by a geologist. Notes will be kept in both bound field books and on Boring Logs and Monitoring Well Construction Logs (see Section 4.8). The Boring Logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses and measurements made with PIDs, FIDs or Jerome Mercury Analyzer. In addition, soil will be visually inspected for staining and checked for odors. Well construction specifications will be provided in the Monitoring Well Construction Logs. The Modified Burmeister Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report (see Section 4.8) will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

3.6.5 Monitoring Well Development

Monitoring wells will be developed by pumping and surging for 2 hours, or until the turbidity of the groundwater achieves a reading of 50 NTUs (nephelometric turbidity units) or less. Well development will be supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development will continue until the field parameters stabilize for a minimum of three consecutive readings of 10 percent variability or less. When possible, well development water will be recharged on-site. All equipment used for the development of monitoring wells will be decontaminated prior to use and between wells (see Section 4.6).

3.6.6 Groundwater Level Measurement

Groundwater level measurements, where applicable, will be obtained from each of the wells installed as part of the Delineation Phase II Site Assessment. Existing wells may also be utilized for groundwater level measurements. If feasible, all groundwater level measurements will be made within an eight hour period of uniform weather conditions. Additionally, a study of the influence of the local tidal cycles may be conducted at sites adjacent to major water bodies in order to quantify potential variations in local groundwater flow. In addition, water levels may be obtained from surface water bodies that are suspected of influencing groundwater flow on or near the site by installing a fixed measuring point such as a staff gauge or permanent mark, on a fixed surface and measuring the depth to the surface of the water body. The measuring points will be surveyed for location and elevation.

All water and LNAPL level measurements, where appropriate, will be made using a fixed reference point at each measurement location. Down hole instruments will be decontaminated between each measurement location (see Section 4.6). The static water level will be measured to the nearest 0.01 foot. Groundwater level data will be used to construct groundwater potentiometric surface maps and used to determine local horizontal flow direction, as well as vertical gradients. Where LNAPL is present, a corrected groundwater potentiometric surface elevation will be calculated in order to supplement the groundwater elevation data and provide a corrected groundwater elevation contour map, if necessary.

3.6.7 Groundwater Sampling

The depth to the water level in each well to be sampled will be measured in order to calculate the liquid bore volume necessary for purging. Depth to water will be measured with respect to a reference point established at the top of the well casing. Water level measurements will be obtained using a decontaminated electronic water level indicator.

The wells will be purged until a minimum of three to five bore volumes have been removed or until the well is dry, whichever occurs first. The number of bore volumes purged will be a function of the pH, temperature and conductivity, and will continue until stabilization of these parameters is achieved. Purge water will be recharged on-site, if possible. Refer to Section 4.11 for further discussion on containment and disposal of purge water.

Disposable polyethylene bailers with disposable nylon or polypropylene rope will be used for purging and sampling of the wells. Deep wells or wells that require large volumes of water to be removed may be purged and sampled using decontaminated, downhole pumps and decontaminated or disposable tubing. Once the well has been sufficiently purged, sampling will begin. If groundwater recovery is very slow, it may be necessary to wait several hours, or overnight, for sufficient volume to become available for the necessary sample analyses. Locations of the monitoring wells, and analytical sampling methods, will be provided in the Site-Specific Work Plans. Specific monitoring well sampling procedures are included in Section 4.0.

3.7 Probe Hole, Borehole and Well Abandonment

Direct push probe holes and soil borings which are not completed as monitoring wells will be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole. Sealing of the well or borehole will include the following methods: overboring or removal of the casing to the greatest extent possible followed by perforation of any casing left in place; removal of all casing and other well construction material within the upper 5 feet of the boring or within 5 feet of the proposed excavation level; sealing by pressure injection with cement bentonite grout using a tremie pipe to a depth extending the entire length of the boring to within 5 feet below the ground surface or the proposed excavation level; sealing the remaining 5 feet to ground surface with neat cement grout; and restoration of the sealed site to a safe condition. Well abandonment will follow the methods described in "Groundwater Monitoring Well Decommissioning Procedures," NYSDEC Division of Hazardous Waste Remediation, dated May 1995.

3.8 Air Screening

Ambient air monitoring will be performed throughout the field program undertaken in support of the remedial investigation. Either a flame ionization detector (i.e., Century Foxboro OVA) or a photoionization detector (i.e., Photovac MicroTip) will be utilized to detect total organic vapors. In addition, a Jerome Mercury Vapor Analyzer will be utilized to detect mercury vapors. Detailed monitoring procedures are summarized in the Health and Safety Plan (provided under separate cover).

The ambient air screening instruments will be used to determine the necessary levels of personal protective equipment (see the Health and Safety Plan), as well as to provide data on contaminant concentrations in the background ambient air and during investigative activities.

In addition, to protect the downwind community from potential airborne contaminant release, a Community Air Monitoring Plan (CAMP) requiring real-time monitoring at the downwind perimeter of each designated work zone during certain activities will be established. Air monitoring will occur for particulates (i.e., dust) and not volatile organic compounds (VOCs) because, historically, VOCs have not been utilized at the three substation sites. Continuous monitoring will occur during soil/waste excavation and handling, test pitting or trenching, and during the demolition of contaminated or potentially contaminated structures.

Specifically, particulate concentrations will be monitored in real-time at both the upwind and downwind perimeters of the Construction Work Zone (CWZ) or the Construction Exclusion Zone (CEZ). Monitoring equipment will be capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level, and will be equipped with an audible alarm to indicate exceedance of that level. Real-time monitoring will be conducted under the following conditions:

- If the downwind PM10 particulate level exceeds the upwind perimeter (background) level by 100 ug/m^3 for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed;
- Work will continue using dust suppression techniques as long as the downwind PM10 particulate level remains less than 150 ug/m^3 greater than the upwind level. If the level exceeds this value; however, work will be stopped and site work will be re-evaluated; and
- All readings will be recorded and available for State (DEC and DOH) personnel to review.

3.9 Surveying and Mapping

Sampling locations may be surveyed by a New York State licensed surveyor for horizontal and vertical control. Vertical and horizontal control of the monitoring well/piezometer casing will allow for calculation of groundwater elevations for the development of groundwater contour maps. The ground surface, protective casing and measuring point in the inner casing will be surveyed.

Vertical and horizontal control of the soil borings and monitoring wells allow for the preparation of geologic and hydrogeologic cross sections. Additional on- and off-site sampling points, such as surface soil and soil vapor survey locations, will be surveyed, if necessary.

Control points for use in the preparation of a topographic map of the study area will also be surveyed, if necessary. Coordination between the aerial photographer and the surveyor will be required in order to select the necessary control points for preparation of the topographic map.

Section 4

For a detailed discussion of the sampling program and selection of sample matrices and locations, see the Site-Specific Work Plans provided in Section 5.0.

4.3 Analytical Parameters

Surface soil and subsurface soil samples collected from the three substation sites will typically be analyzed for mercury. Soil samples collected as part of the United States Environmental Protection Agency (USEPA) Underground Injection Control Program (UIC) will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) metals, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPHs). Similarly, soil samples which will be collected in the vicinity of transformers or in areas of "potential releases" may also be analyzed for RCRA metals, PCBs and SVOCs. In addition, sediment soil samples that may be collected will be analyzed for mercury and total organic carbon (TOC).

Groundwater samples will typically be analyzed for both filtered and unfiltered Target Analyte (TAL) Metals and VOCs.

Table 4-1 presents a summary of the parameters/sample fraction together with the typical sample location, type of sample, sample matrix, type of sample container, method of sample preservation, holding time and analytical method.

4.4 Data Quality Requirements

Data quality requirements and assessments are provided in the 6/00 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol estimate precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 6/00 NYSDEC ASP, where applicable. Table 4-2 presents a summary of the data quality requirements.

Table 4-1

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site	Grab	Surface Soil	SVOCs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8270
	Grab	Surface Soil	PCBs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8082
	Grab	Surface Soil	RCRA Metals, Hg	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for Hg analysis, 6 months for all other metals	6/00 NYSDEC ASP, Method 6010/7471

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site/Study Area	Trip Blank	Water	VOCs	Glass, clear/40 ml/1 ICHEM 300 series or equivalent	Cool to 4°C	7 days after VTSR for analysis	6/00 NYSDEC ASP, Method OLM 04.2

VTSR - Verified time of sample receipt at the laboratory.

The methods of analysis will be in accordance with SW-846 and 6/00 NYSDEC ASP. Specific analytical procedures and laboratory QA/QC descriptions are not included in this QA/QC Plan, but will be available upon request from the laboratory selected to perform the analyses. The laboratory will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified for organic and inorganic analyses and also be NYSDOH Contract Laboratory Protocol (CLP) certified.

4.4.1 Data Representativeness

Representative samples will be collected as follows:

- Sediment (Surface Water) - Samples will be collected in the area of the surface water samples 0 to 2 inches below the sediment surface after the surface water sample is obtained in order not to introduce sediment into the water column. Samples will be collected with a decontaminated long handle polyethylene scoop.
- Surface Soil - Samples will be collected at a depth of 0 to 2 inches using a dedicated polystyrene scoop or sterile wooden tongue depressor.
- Subsurface Soil (Hollow Stem Auger) - Samples will be collected using a decontaminated steel split spoon sampler during soil boring construction.
- Subsurface Soil (Probe) - Samples will be collected using a decontaminated screen point sampler and dedicated acetate tube liner.
- Groundwater (Probe) - Samples will be collected upon installation of the probe using dedicated polyethylene tubing equipped with a bottom check valve in order to purge the standing water and collect a representative groundwater sample.
- Groundwater (Monitoring Well) - Samples will be collected with a dedicated polyethylene bailer after the monitoring well has been purged of three to five well casing volumes until field measurements for pH, conductivity, temperature and turbidity have stabilized, or until the well is purged dry (whichever comes first) and the well has been allowed to recharge.
- Equipment Calibration - Field equipment used for air monitoring will be calibrated daily before use according to the manufacturer's procedures.
- Equipment Decontamination - Nondedicated sampling equipment will be decontaminated prior to use at each location according to the procedures described in Section 4.

Table 4-2 (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Soils		
VOCs[(a)]	See Table 2-2a	See Table 2-2a
Extractables[(a)]	See Table 2-2b	See Table 2-2b
Pesticides/PCBs	See Table 2-2c	See Table 2-2c
Metals[(b)]	± 25	75-125
Groundwater		
VOCs[(a)]	See Table 2-2a	See Table 2-2a
Extractables[(a)]	See Table 2-2b	See Table 2-2b
Pesticides/PCBs	See Table 2-2c	See Table 2-2c
Metals[(b)]	± 25%	75-125

NOTES:

(a) Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs, extractables, and pesticides/PCBs are listed in Tables 3-2a, 3-2b and 3-2c, respectively. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

(b) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

(c) Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: NYSDEC ASP

Table 4-2a

DATA QUALITY REQUIREMENTS
ACCURACY REQUIREMENTS FOR VOCs

	Spike Recovery Limits (%)	
	Water	Low/Medium Soil
Surrogate Compound		
Toluene-d8	88-110	84-138
4-Bromofluorobenzene	86-115	59-113
1,2-Dichloroethane-d4	76-114	70-121
Matrix Spike Compound		
1,1-Dichloroethene	61-145	59-172
Trichloroethane	71-120	62-137
Chlorobenzene	75-130	60-133
Toluene	76-125	59-139
Benzene	76-127	66-142

Source: NYSDEC ASP

Table 4-2b

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

Surrogate Compounds	Matrix	Precision	Accuracy %
d5-Nitrobenzene	Water	≤ 20	35-114
	Solid	≤ 25	23-120
2-Fluorobiphenyl	Water	≤ 20	43-116
	Solid	≤ 25	30-115
d14-Terphenyl	Water	≤ 20	33-141
	Solid	≤ 25	18-137
d5-Phenol	Water	≤ 20	10-110
	Solid	≤ 25	24-113
2-Fluorophenol	Water	≤ 20	21-110
	Solid	≤ 25	25-121
2,4,6-Tribromophenol	Water	≤ 20	10-123
	Solid	≤ 25	19-122
2-Chlorophenol-d4 (Advisory)	Water	≤ 20	33-110
	Solid	≤ 25	20-130
1,2-Dichlorobenzene-d4 (Advisory)	Water	≤ 20	16-110
	Solid	≤ 25	20-130

Table 4-2b (continued)

DATA QUALITY REQUIREMENTS OBJECTIVES FOR PRECISION AND ACCURACY OF EXTRACTABLE COMPOUNDS BASED UPON RECOVERY OF SURROGATE AND MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds			
1,2,4-Trichlorobenzene	Water	≤ 20	39-98
	Solid	≤ 25	38-107
Acenaphthene	Water	≤ 20	46-118
	Solid	≤ 25	31-137
2,4-Dinitrotoluene	Water	≤ 20	24-96
	Solid	≤ 25	28-89
Pyrene	Water	≤ 20	26-127
	Solid	≤ 25	35-142
N-Nitroso-Di-n-Propylamine	Water	≤ 20	41-116
	Solid	≤ 25	41-126
1,4-Dichlorobenzene	Water	≤ 20	36-97
	Solid	≤ 25	28-104
Pentachlorophenol	Water	≤ 20	9-103
	Solid	≤ 25	17-109
Phenol	Water	≤ 20	12-110
	Solid	≤ 25	26-90

Table 4-2b (continued)

DATA QUALITY REQUIREMENTS OBJECTIVES FOR PRECISION AND ACCURACY OF EXTRACTABLE COMPOUNDS BASED UPON RECOVERY OF SURROGATE AND MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds (continued)			
2-Chlorophenol	Water	≤ 20	27-123
	Solid	≤ 25	25-102
4-Chloro-3-methylphenol	Water	≤ 20	23-97
	Solid	≤ 25	26-103
4-Nitrophenol	Water	≤ 20	10-80
	Solid	≤ 25	11-114

*Accuracy will be determined as percent recovery of these compounds. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: NYSDEC ASP

Table 4-2c

DATA QUALITY REQUIREMENTS

ADVISORY RECOVERY LIMITS
SURROGATE AND MATRIX SPIKE COMPOUNDS
FOR PESTICIDES/PCBs*

	Advisory Recovery Limits (%) Water	Soil/Sediment
Surrogate Compound		
Decachlorobiphenyl	60-150	60-150
Tetrachloro-m-xylene	60-150	60-150
Matrix Spike Compound		
Lindane	56-123	46-127
Heptachlor	40-131	35-130
Aldrin	40-120	34-132
Dieldrin	52-126	31-134
Endrin	56-121	42-139
4,4'-DDT	38-127	23-134

*Samples do not have to be reanalyzed if these recovery limits are not met.

Source: NYSDEC ASP

4.4.2 Data Comparability

All data will be presented in the units designated by the methods specified by a NYSDOH ELAP and CLP certified laboratory, and the 6/00 NYSDEC ASP. In addition, sample locations, collection procedures and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

4.4.3 Data Completeness

The acceptability of 100% of the data is desired as a goal for this project. The acceptability of less than 100% complete data, meeting all laboratory QA/QC protocols/standards, will be evaluated on a case-by-case basis.

4.5 Detailed Sampling Procedures

Environmental samples will be collected as part of the Delineation Phase 2 Site Assessment of the three substations. These may include groundwater, sediment, subsurface soil, and surface soil. Sample locations may consist of monitoring wells, dry wells, sanitary systems, soil probe locations, groundwater probe locations, soil borings, and surface soils. Actual locations will be described in the Site-Specific Work Plans provided in Section 5.0.

General sampling approaches and equipment are described in this section. A summary of the Delineation Phase 2 Site Assessment sampling program, including sample media, depths, equipment, rationale and analytical parameters is provided in Section 5.0.

When taking soil samples, an attempt will be made to maintain sample integrity by preserving its physical form and chemical composition to as great an extent as possible. An appropriate sampling device (i.e., decontaminated or dedicated equipment) will be utilized to transfer the sample into the sample container. Every effort will be made to ensure that the sample is a proper representation of the matrix from which it was collected. The sample will be transferred into the sample bottle as quickly as possible, with no mixing, to ensure that the volatile fraction is not lost.

The materials involved in groundwater sampling are critical to the collection of high quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. The materials for bailers and pump parts will be PTFE (e.g., Teflon[R]) stainless steel and/or polyethylene.

There will be several steps taken after the transfer of the soil or water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field log book. Associated paper work (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

4.5.1 Sample Identification

All samples collected will be labeled with a sample identification code. The code will identify the site, sample location, sample matrix and series numbers for sample locations with more than one sample. Samples will be labeled according to the following system:

- Site: – Site name (i.e., Manhasset "MH")
- Sample Type:
  - – Surface Water Sediment "SD"
  - – Surface Soil "SS"
  - – Soil Boring or Probe "SB"
  - – Monitoring Well "MW"
  - – Groundwater Probe "GP"
- Sample Number: – For circumstances where more than one sample of the same type and/or from the same location will be collected, a consecutive sample number will be assigned. When more than one sample is collected from a borehole in a sampling round at different depths, the depth will be indicated on the sample container and in the field log book.
- Quality Assurance/ Quality Control (QA/QC):
  - – Matrix Spike "MS"
  - – Matrix Spike Duplicate "MSD"
  - – Field Blank "FB"
  - – Trip Blank "TB"

Based upon the above sample identification procedures, an example of a sample label may be:

Site → MH-SB-1 - MS ← QA/QC

Sample Location ↓ (MH-SB-1)

Sample Number ↑ (1)

MH-SB-1 - MS

4.5.2 Sample Handling, Packaging and Shipping

All samples will be placed in the appropriate containers as specified in the 6/00 NYSDEC ASP. The holding time criteria identified in the ASP will be followed as specified in Table 4-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or "blue ice" packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) or clear packing tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

4.5.3 Surface Water Sediment (Pond, Lake, River, Stream)

1. Be certain that the sample location is noted on Location Sketch.
2. Unless using disposable equipment, be certain that the sampling equipment (long handle polyethylene scoop) has been decontaminated utilizing the procedures outlined in Section 4.6.
3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.
4. Wear disposable gloves and boots if it is necessary to enter the water.
5. Insert scoop slowly at 0 to 2 inches into the sediment and remove sample.
6. With a disposable polystyrene scoop or sterile wooden tongue depressor, transfer the sample into the open sample container taking care not to spill sample on the outside of the container or overfill container and replace cover on the sample container.
7. Return sample container to cooler.
8. If reusable, decontaminate the sampling equipment according to the procedures outlined in Section 4.6.
9. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.5.4 Soil (Surface)

1. Be certain that the sample location is noted on Location Sketch.

2. If a dedicated sampling device is not used, be certain that the sampling equipment has been decontaminated utilizing the procedures outlined in Section 4.6.

3. Remove laboratory precleaned sample container from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

4. At the sample location, clear surface debris (e.g., vegetation, rocks, twigs, etc.). Collect an adequate amount of soil from a depth of 0 to 2 inches using a decontaminated or disposable scoop and/or sterile wooden tongue depressor. Transfer the sample directly into the sample container.

5. Return the sample container to the cooler.

6. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.

7. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.5.5 Soil (Probe)

1. Be certain that the sample location is noted on Location Sketch.

2. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.

3. Drive the probe to the desired sampling depth.

4. Retrieve the soil probe and immediately after opening it, obtain an organic vapor measurement with a FID or PID and a mercury vapor measurement with a Jerome Mercury Analyzer.

5. Remove a sample aliquot from the soil probe using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.

6. Return the sample container to the cooler.

7. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.

8. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.5.6 Soil (Borehole, Split Spoon)

1. Be certain that the sample location is noted on Location Sketch.

2. Be certain that the sampling equipment (split spoon) has been decontaminated utilizing the procedures outlined in Section 4.6.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

4. Drill into the soil to the desired depth and drive the split spoon sampler.

5. Retrieve the split spoon and immediately after opening the split spoon, obtain an organic vapor measurement with a PID or FID, a mercury vapor measurement with a Jerome Mercury Analyzer and fill out Boring Log Form (see Section 4.8).

6. Remove a sample aliquot from the split spoon using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.

7. Return the sample container to the cooler.

8. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.

9. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.5.7 Groundwater (Probe)

1. Be certain sample location is noted on Location Sketch.

2. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

3. Obtain a sample by using a dedicated polyethylene tubing equipped with a bottom check valve.

4. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

5. After sample collection, obtain field measurements including pH, conductivity, temperature and turbidity.

6. If a sample is to be collected for metals analysis, the turbidity must be less than 50 NTUs. If the turbidity cannot be reduced to less than 50 NTUs, the sample will be filtered in the field or by the laboratory. Both the filtered and unfiltered portion of the sample will be analyzed.

7. Return sample containers to sample cooler.

8. Place all disposable personal protective equipment and disposal sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.5.8 Groundwater (Monitoring Well)

1. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.

2. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature and turbidity) stabilize, or until the well is dry, whichever occurs first. Turbidity should be less than 50 NTUs prior to collection of a sample for metals analysis.

3. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

4. Obtain a sample by using a disposable polyethylene bailer.

5. If the turbidity of the sample is greater than 50 NTUs, the metals portion of the sample will be filtered in the field or by the laboratory. Both the filtered and unfiltered portion of the sample will be analyzed.

6. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace the cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

7. Return sample container to sample cooler.

8. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum and store in a secure area (fenced, if possible).

4.6 Decontamination Procedures

Whenever possible, all field sampling equipment should be sterile/disposable and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning/ decontamination procedure will be used in order to mitigate cross contamination between sample locations. A decontamination station/pad will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling locations to keep equipment transport handling to a minimum after decontamination.

4.6.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that are used to collect samples. When using field decontamination, sampling should commence in the area of the site with the lowest contamination, if known or probable, and proceed through to the areas of highest contamination.

4.6.2 Decontamination Procedure for Drilling/Probing Equipment

All equipment such as drill rigs and other mobile equipment will receive an initial cleaning prior to use at the site. The frequency of subsequent cleanings while on site will depend on how the equipment is actually used in relation to collecting environmental samples. All wash/rinse solutions will be collected and recharged on site after testing, if possible. If an appropriate location for on-site recharge is not available, the next preferable option is to discharge to a municipal sewer system. Until an appropriate discharge alternative is determined, all wash/rinse solutions will be collected and contained on site in 55-gallon drums.

After the initial decontamination, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig/probe items such as augers, drill/probe rods and drill bits will be cleaned in between sample locations.

Drilling/probing equipment will be decontaminated in the following manner:

- Wash thoroughly with nonresidual detergent (alconox) and tap water using a brush to remove particulate matter or surface film. Pressure washing will be utilized, if necessary, to remove any oil and/or tar accumulations on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed;
- Steam clean (212°F); and
- Once decontaminated, remove all items from the decontamination area.

Also, following the general cleaning procedures described above, all downhole/drilling items, such as split spoon samplers, Shelby tubes, rock corers, or any other item of equipment which will come in direct contact with a sample during drilling, will be decontaminated by pressure washing and/or steam cleaning.

4.6.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual detergent (alconox) and clean potable tap water using a brush to remove particulate matter or surface film;
- Steam clean (if necessary);
- Rinse thoroughly with tap water;
- Rinse thoroughly with distilled water;
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry;
- Rinse thoroughly with distilled water and air dry;
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a drum specifically used for this purpose;

The first step, a soap and water wash, will be performed to remove all visible particulate matter and residual oil, grease and tar. Pressure washing will be utilized followed by steam cleaning, if necessary. This step will be followed by a tap water rinse and a distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse will be used for trace organics removal. Methanol has been chosen because it is not an analyte of concern on the Target Compound List. The solvent will be allowed to evaporate and then a final distilled/deionized water rinse will be performed. This rinse removes any residual traces of the solvent. The aluminum wrap will protect the equipment and keep it clean until it is used at another sampling location.

4.6.4 Decontamination Procedure for Well Casing and Development Equipment

Field cleaning of well casings will consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil, grease and tar are removed.

This material will then be stored in such a manner so as to preserve it in this condition. Special attention to threaded joints will be necessary to remove cutting oil or weld burn residues, if necessary.

Materials and equipment that will be used for the purposes of well development will also be decontaminated by steam cleaning. An additional step will involve flushing the interior of any hose, pump, etc. with a nonphosphate detergent solution and potable water rinse prior to the development of the next well. This liquid waste will be disposed of on site, if possible after testing.

4.7 Laboratory Sample Custody Procedures

A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment, will be used to analyze samples collected during the Delineation Phase 2 Site Assessment. The selected laboratory's Standard Operating Procedures will be made available upon request.

4.8 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QA/QC Plan in an efficient and high quality manner. Field management procedures will include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required); preparing a Location Sketch; completing Sample Information Records, Chain of Custody Forms, and Test Pit, Boring, Drilling and Well Construction Logs; maintaining a daily Field Log Book; completing Daily Equipment Calibration Logs; preparing Daily Field Activity Reports; completing Field Change Forms; and filling out a Daily Air Monitoring Form. Copies of each of these forms are provided in Appendix A. Proper completion of these forms and the field log book are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly.

4.8.1 Location Sketch

For each sampling point, a Location Sketch will be completed using permanent references and distances to the sampling point noted, if possible.

4.8.2 Sample Information Record

At each sampling location, a Sample Information Record Form is filled out including, but not limited to, the following information:

- Site name;
- Sample crew;
- Sample location;
- Field sample identification number;
- Date;
- Time of sample collection;
- Weather conditions;
- Temperature;
- Sample matrix;
- Method of sample collection and any factor that may affect its quality adversely;
- Well information (groundwater only);
- Field test results;
- Analysis to be performed; and
- Remarks.

4.8.3 Chain of Custody

The Chain of Custody Form will be completed and is initiated at the laboratory with container preparation and shipment to the site. The form remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the containers and samples. When the form is complete, it will indicate that there was no lapse in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession; or
- It is in the individual's view after being in his or her physical possession; or
- It is secured by the individual so that no one can tamper with it; or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody Forms are provided by the laboratory selected to perform the analytical services. At a minimum, the following information will be provided on these forms:

- Project name and address;
- Project number;
- Sample identification number;
- Date;
- Time;
- Sample location;
- Sample type;

4.8.5 Field Log Book

Field log books will be bound and have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented. Notations will be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook will include, but not be limited to, the following:

The first page of the log will contain the following information:

- Project name and address;
- Name, address and phone number of field contact;
- Waste generator and address, if different from above;
- Type of process (if known), generating waste;
- Type of waste; and
- Suspected waste composition, including concentrations.

Daily entries will be made for the following information:

- Purpose of sampling;
- Location of sampling point;
- Number(s) and volume(s) of sample(s) taken;
- Description of sampling point and sampling methodology;
- Date and time of collection, arrival and departure;
- Collector's sample identification number(s);
- Sample distribution and method of storage and transportation;
- References, such as sketches of the sampling site or photographs of sample collection;

- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance), water levels, drilling logs, and organic vapor and dust readings; and
- Signature of personnel responsible for completing log entries.

4.8.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, will complete this form noting personnel on site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This form will be signed and subject to review.

4.8.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form will be completed by the Field Operations Manager, and approved by a LIRR representative and the NYSDEC Project Manager, if required.

4.9 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be performed daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.
2. A schedule of preventive maintenance tasks, consistent with the instrument manufacturer's specific operation manuals, that will be carried out to minimize down time of the equipment.
3. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 6/00 ASP, for laboratory equipment, will be contained in the laboratory's standard operating procedures (SOP) which will be available upon request.

4.10 Performance of Field Audits

During field activities, the QA/QC officer will accompany sampling personnel into the field, in particular in the initial phase of the field program, to verify that the site sampling program is being properly conducted, and to detect and define problems so that corrective action can be taken early in the field program. All findings will be documented and provided to the Field Operations Manager.

4.11 Control and Disposal of Contaminated Material

During construction and sampling of the monitoring wells and soil borings, contaminated waste, soil and water may be generated from drill cuttings, drilling fluids, decontamination water, development water and purge water. All soil cuttings generated during the Delineation Phase 2 Site Assessment will be handled in a manner consistent with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4032, Disposal of Drill Cuttings.

All water generated during the investigation, including decontamination water, drill water and purge water, will be recharged on site, if possible, following testing. The Site-Specific Work Plans will provide detailed information on the disposal of water generated during the investigation. If it is not possible to recharge water on site, the next preferred option is discharge of the water to a municipal sewer system. This will be evaluated in preparation of the Site-Specific Work Plans.

Department of Transportation approved 55-gallon drums will be used for the containment of soil cuttings and water, and for disposal of personal protective clothing and disposable sampling equipment (i.e., bailers, scoops, tongue depressors, etc.). The drums will be marked, labeled with a description of the contents and from what location they were collected. All drums will be sealed and stored on site in a secure area.

4.12 Documentation, Data Reduction and Reporting

Mitkem Corporation, a NYSDOH ELAP and CLP certified laboratory meeting the New York State requirements for documentation, data reduction and reporting will be used for all laboratory analysis. All data will be cataloged according to sampling locations and sample identification nomenclature that is described in Section 4.5.1 of this Work Plan. The laboratory analysis will be reported in the NYSDEC ASP Category B deliverables format.

4.13 Data Validation

As described in Section 4.12 above, summary documentation regarding data validation will be completed by the laboratory using NYSDEC forms contained in the 6/00 NYSDEC ASP and submitted with the data package.

A Data Validation Summary Report (DUSR) will be prepared in lieu of a full data validation. The analytical and usability processes will be conducted in conformance with the NYSDEC ASP dated June 2000 and NYSDEC Guidance for the Development of Data Usability Summary Reports.

The DUSR will be prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with analytical method protocols include all chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, field sampling notes will also be reviewed and any quality control problems will be evaluated as to their effect on the usability of the sample data.

The DUSR will describe the samples and analysis parameters reviewed. Data deficiencies, analytical protocol deviations and quality control problems will be described and their effect on the data discussed. Re-sampling and re-analysis recommendations will be made, if necessary.

The DUSR shall be prepared by our company QA/QC officer, Ms. Robbin Petrella. Ms. Petrella meets the personnel requirements listed in the DUSR Guidance Document. A copy of her résumé is included in Appendix B.

4.14 Performance and System Audits

Mitkem Corporation, a NYSDOH ELAP and CLP certified laboratory which has satisfactorily completed performance audits and performance evaluation samples will be used to perform sample analyses for the Delineation Phase 2 Site Assessment.

4.15 Corrective Action

A NYSDOH ELAP and CLP certified laboratory will meet the requirements for corrective action protocols, including sample "clean up" to attempt to eliminate/mitigate matrix interference.

The 6/00 NYSDEC ASP protocol includes both mandatory and optional sample cleanup and extraction methods. Cleanup is required by the 6/00 NYSDEC ASP in order to meet contract required detection limits. There are several optional cleanup and extraction methods noted in the 6/00 NYSDEC ASP protocol. These include florisil column cleanup, silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

High levels of matrix interference may be present in waste, soil and sediment samples. This interference may prevent the achievement of ASP detection limits if no target compounds are found. In order to avoid unnecessary dilutions, the optional cleanup methods noted in the 6/00 NYSDEC ASP will be required to be performed by the laboratory as necessary.

4.16 Trip Blanks

The primary purpose of a trip blank is to detect other sources of contamination that might potentially influence contaminant values reported in actual samples, both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water;
- Sample containers;
- Cross contamination in shipment;
- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory; and
- Laboratory reagents used in analytical procedures.

A trip blank will consist of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks will be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, these sample containers only travel with the sample cooler. The temperature of the trip blanks will be maintained at 4°C while on site and during shipment. Trip blanks will return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank will travel to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks will be implemented only when collecting water samples, including field blanks, and analyzed for volatile organic compounds only.

4.17 Method Blanks/Holding Blanks

A method blank is an aliquot of laboratory water or soil which is spiked with the same internal and surrogate compounds as the samples. The purpose of the method blank is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 6/00 NYSDEC ASP. A holding blank is an aliquot of analyte-free water that is stored with the environmental samples in order to demonstrate that the samples have not been contaminated during laboratory storage. This blank will be analyzed using the same analytical procedure as the samples.

4.18 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike samples are quality control procedures, consistent with 6/00 NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix spikes (MS) and matrix spike duplicates (MSD) will be aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds. These QA/QC samples will be used to evaluate the matrix effect of the sample upon the analytical methodology, as well as to determine the precision of the analytical method used. A matrix spike blank will be an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The matrix spike blank (MSB) will be subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB samples are defined in the 6/00 NYSDEC ASP.

4.19 Field Blank (Field Rinsate Blank)/Equipment Blank

The field blank will consist of an aliquot of analyte-free water, supplied by the laboratory, which is opened in the field and is generally poured over or through a sample collection device after it is decontaminated, collected in a sample container and returned to the laboratory as a sample for analysis. It is a check on sampling procedures and cleanliness (decontamination) of sampling devices. Generally, a field blank will be collected daily or for a "batch" of sample matrices collected in the same manner (such as water and soil/sediment) up to a maximum of 20 samples. Field blanks will be analyzed for the suite of chemicals analyzed for in the environmental samples collected in that "batch." Field blanks will not be analyzed when using dedicated or disposable (one use only) sampling equipment unless directed otherwise.

Section 5

5.0 SITE SPECIFIC WORK PLANS

The purpose of the Site Specific Work Plans is to describe the detailed sampling and analysis to be conducted as part of the Delineation Phase 2 Site Assessment of the Manhasset, Massapequa, and Island Park electric substations. The proposed sample locations are provided on Figures 5-1 through 5-3 for the Manhasset, Massapequa, and Island Park electric substations, respectively. However, it should be noted that the exact locations of the samples will be determined in the field based on field conditions, equipment access and utility clearance. Descriptions of the sampling and analysis to be conducted for each of the three substation sites are provided below:

5.1 Surface and Subsurface Soil Sampling

The location, number and type of soil samples to be collected is summarized on Tables 5-1 through 5-3 for the Manhasset, Massapequa and Island Park substations, respectively. A brief summary of the soil sampling to be conducted is provided below:

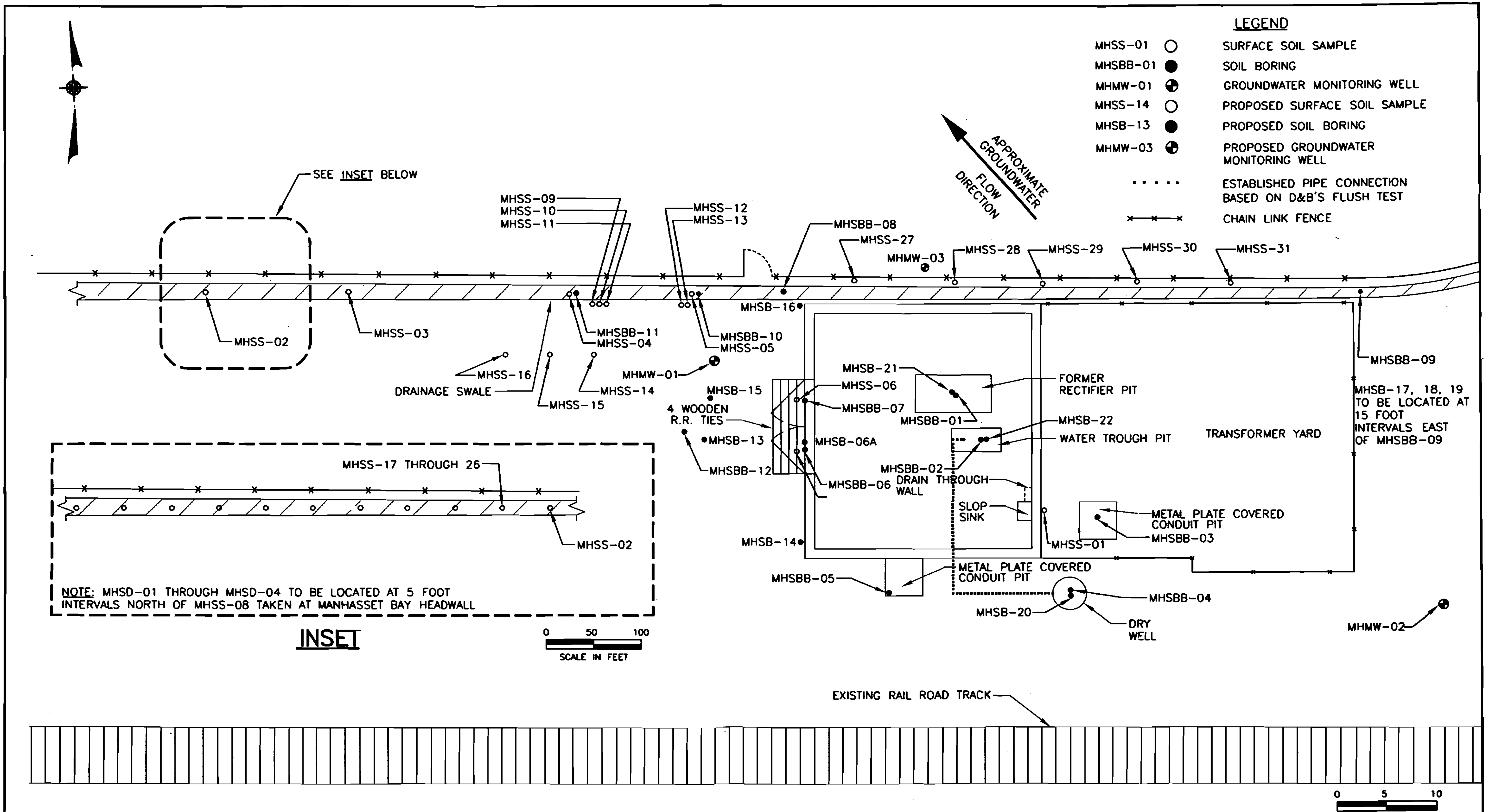
5.1.1 Manhasset Substation - N10

1. Soil probes will be advanced for the collection and analysis of soil samples to delineate the horizontal and vertical extent of mercury impacted soil in the vicinity of railroad ties (previous soil samples MHSBB-06 and MHSBB-07) located directly west of the substation. Samples will be analyzed for mercury by EPA Method 7471.

2. Soil probes will be advanced for the collection and analysis of surface soil samples to delineate the horizontal extent of mercury contamination in the drainage swale located immediately north of the substation. Samples will be analyzed for mercury by EPA Method 7471.

3. Soil probes will be advanced for the collection and analysis of soil samples to delineate the horizontal and vertical extent of mercury contamination associated with previous soil sample MHSBB-09 located in the eastern "upgradient" portion of the drainage swale. Samples will be analyzed for mercury by EPA Method 7471.

4. Subsurface soil samples will be collected and analyzed to characterize mercury-impacted soil in the vicinity of the fence line north of the substation and transformer yard. Samples will be analyzed for mercury by EPA Method 7471.



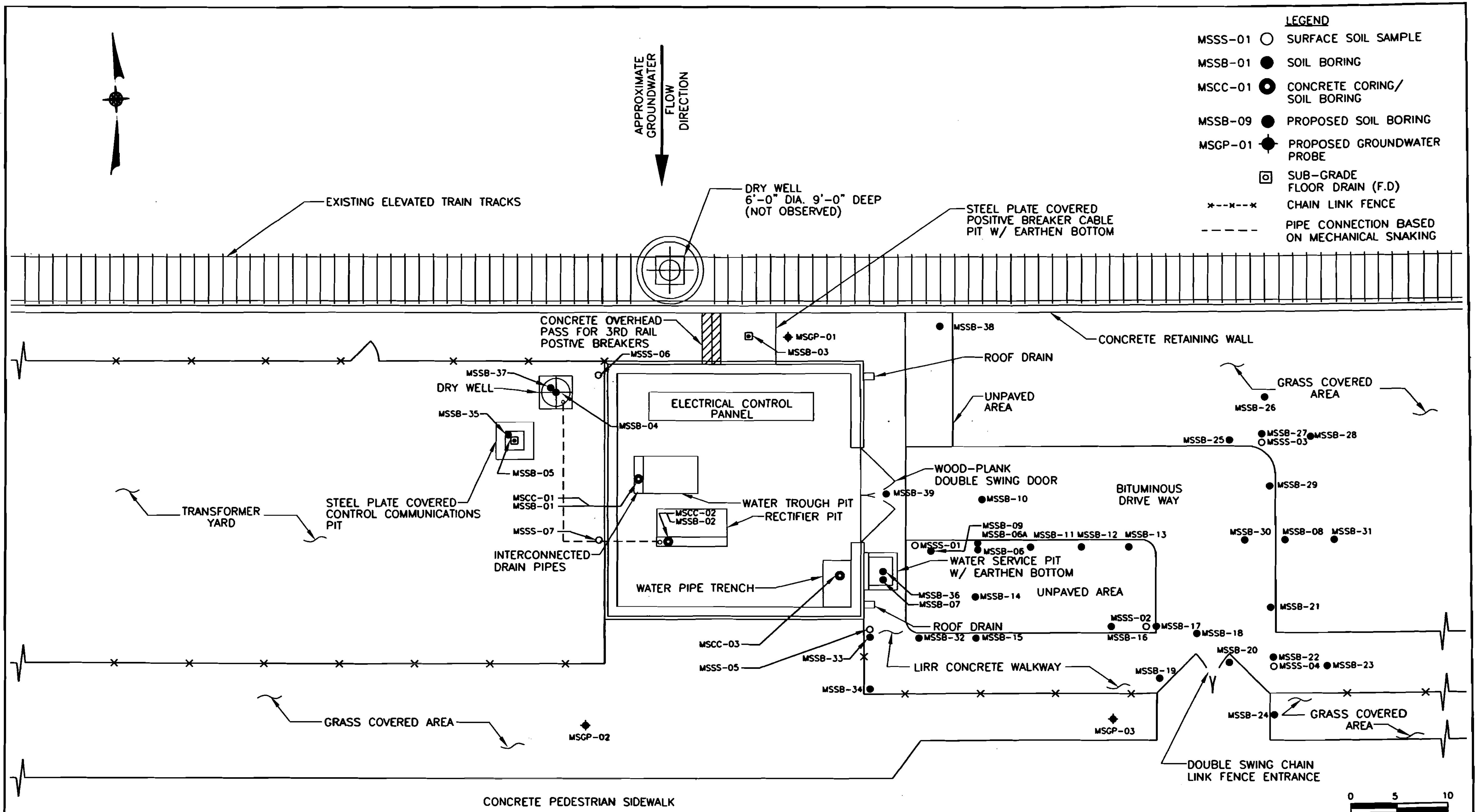
SOURCES: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS & D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SAMPLE LOCATION MAP

MANHASSET SUBSTATION – N10

FIGURE 5-1



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

LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SAMPLE LOCATION MAP

MASSAPEQUA SUBSTATION – S15

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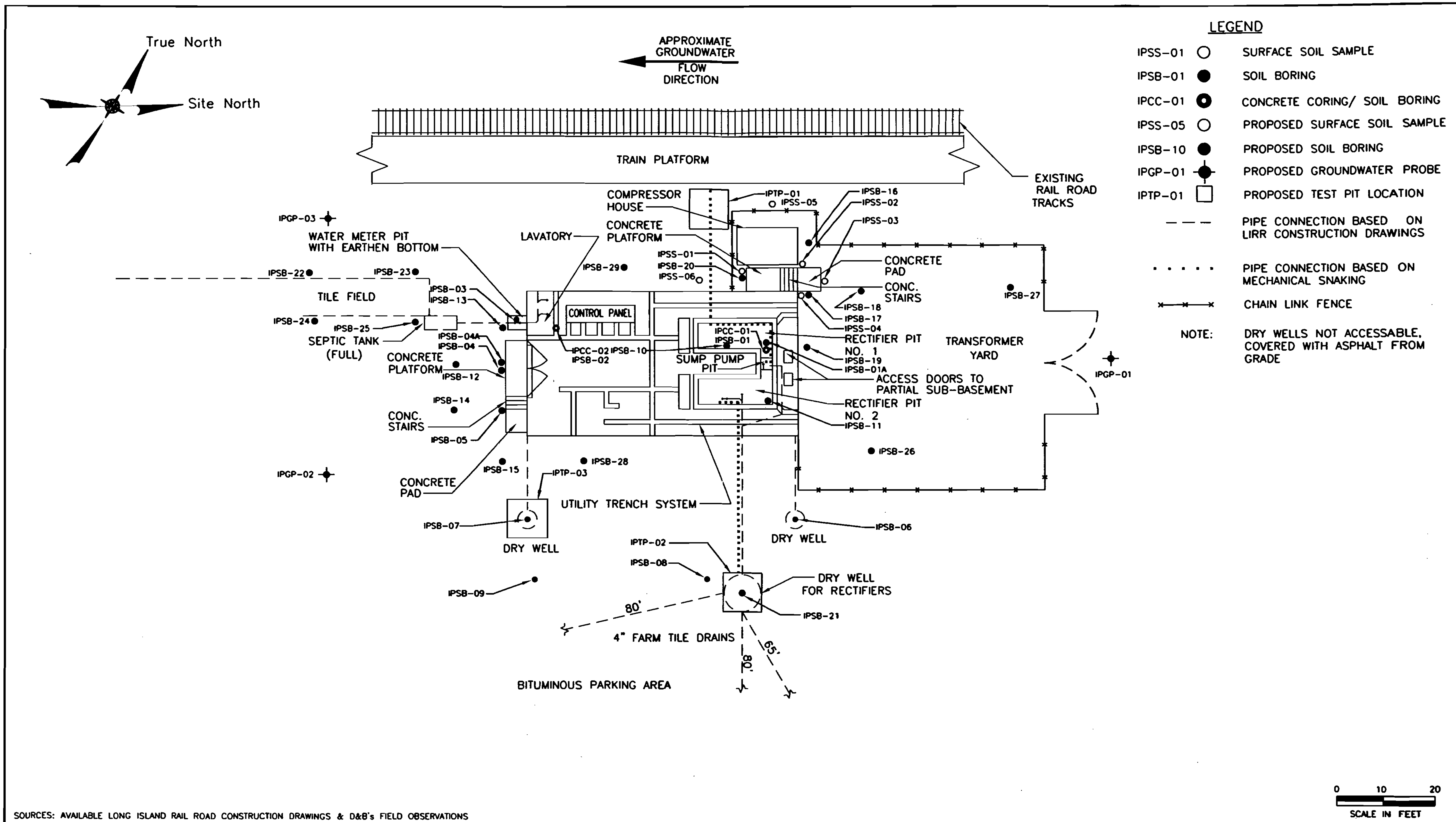
FIGURE 5-2



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LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT
SAMPLE LOCATION MAP

ISLAND PARK SUBSTATION -L03

FIGURE 5-3

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TABLE 5-1
Long Island Rail Road
DELINEATION PHASE 2 SITE ASSESSMENT
Sampling and Analysis Summary
Manhasset Substation - N10

Location	Sample Point ID	SOIL BORINGS			SOIL PROBES		Soil Sampling	SURFACE WATER SEDIMENT	MONITORING WELLS		GROUNDWATER PROBES		Recommended Analyses								Comments
		No. of Borings	No. of Split Spoon Samples	Linear Ft. Drilling	No. of Probes	No. of Geoprobe Samples	Interval	No. of Samples	No. of Wells	Approx. Depth	No. of Probes	Depth of Groundwater Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TOC	USEPA UIC Constituents *	
Exterior Railroad Ties	MHSB-06A				1	2	6'-10' bgs Cont.						2								Delineate extent of Hg contamination associated with MHSBB-06. Soil probe to be located adjacent to MHSBB-06.
	MHSB-13 & 14				2	10	0-10' bgs Cont.***						10								Delineate extent of Hg contamination associated with MHSBB-06. Probes to be located 10' west and 10' south of MHSBB-06.
	MHSB-15 & 16				2	8	0-8' bgs Cont.***						8								Delineate extent of Hg contamination associated with MHSBB-07. Probes to be located 10' west and 10' north of MHSBB-07.
Drainage Swale	MHSS-14 Through 16						0-2" bgs						3								Surface soil samples to delineate MHSS-09, 10, and 11 to the south and southwest.
	MHSS-17 Through 26				10	10	0-2" bsb						10								Delineate horizontal extent of Hg contamination. Probes to be located at 50' intervals extending west from MHSS-02.
	MHSB-17, 18 & 19				3	15	0-8' bgs Cont. ***						15								Determine extent of Hg contamination associated with MHSBB-09. Probes to be located at 15' intervals extending east of MHSBB-09.
Fenceline	MHSS-27 Through 31						0-2" bgs						5								Surface soil samples to characterize soil north of the substation and transformer yard.
Outfall to Manhasset Bay	MHSD-01, 02, 03, & 04						0-2" bgs	4					4						4		4 sediment samples to be located at 5' intervals extending to the north from soil sample MHSS-08.
Underground Injection Control	MHSB-20	1	7	14			16.5'-26.5' bgs Cont.													5	Determine vertical extent of impacted soil in dry well.
	MHSB-21				1	4	2'-10' bpb Cont.													4	Determine vertical extent of impacted soil in rectifier pit.
	MHSB-22				1	2	6'-10' bpb Cont.													2	Determine vertical extent of impacted soil in water trough pit.
Groundwater	MHMW-03								1	90					6**		3				Install one additional monitoring well. Collect and analyze samples from three wells.

NOTES:

bgs: below ground surface.

bpb: below pit bottom.

bsb: below swale bottom

Cont.: Continuous 2-foot soil sampling

* USEPA UIC Constituents include VOCs by Method 8260, RCRA Metals by Methods 6010/7471, SVOCs by Method 8270 and TPHs by Method 8015M.

** Filtered and Unfiltered Samples.

*** Surface sample to be collected at 0-2" interval. Remaining samples to be collected at two foot intervals (e.g., 2-4', 4-6', etc.).

TABLE 5-2
Long Island Rail Road
DELINEATION PHASE 2 SITE ASSESSMENT
Sampling and Analysis Summary
Massapequa Substation - S15

Location	Sample Point ID	SOIL BORINGS			SOIL PROBES		Soil Sampling Interval	GROUNDWATER PROBES		Recommended Analyses								
		No. of Borings	No. of Split Spoon Samples	Linear Ft. Drilling	No. of Probes	No. of Geoprobe Samples		No. of Probes	Depth of Groundwater Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	Asbestos PLM	USEPA UIC Constituents *	
East Side of Substation	MSSB-06A, 09, 10, 11, 12, 13, 14, & 15				8	24	0-6' bgs. Cont.***			24								Delir MSS 5' no west
	MSSB-16 Through 29				14	28	0-4' bgs Cont.***			28								Delir MSS adjac east, 5' sou
	MSSB-30 & MSSB-31				2	4	0-4' bgs Cont.***			4								Delir MSS MSS
	MSSB-32, 33, & 34				3	15	0-10' bgs Cont.***			15								Delin MSS 5' sou
Miscellaneous Pits	MSSB-35				1	2	11'-15' bgs. Cont.			2								Borir vertic
	MSSB-36				1	2	7.5'-11.5' bgs. Cont.			2								Deter MSSI
Underground Injection Control	MSSB-37	1	5	22			12-22' bgs Cont.										5	Deter
Groundwater	MSGP-01, 02, & 03							3	15			6**		3				Deter
Potential Releases	MSSB-38 & 39				2	4	0-4' bgs Cont.***			4	4		4		4			Addr Probe of the

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260, RCRA Metals by Methods 6010/7471, SVOCs by Method 8270 and TPHs by Method 8015M.
** Unfiltered and Filtered Samples
*** Surface sample to be collected at 0-2" interval. Remaining samples to be collected at two foot intervals (e.g., 2-4', 4-6', etc.).

TABLE 5-3
Long Island Rail Road
DELINEATION PHASE 2 SITE ASSESSMENT
Sampling and Analysis Summary
Island Park Substation - L03

Location	Sample Point ID	SOIL BORINGS No. of Borings	SOIL BORINGS No. of Split Spoon Samples	SOIL BORINGS Linear Ft. Drilling	SOIL PROBES No. of Probes	SOIL PROBES No. of Geoprobe Samples	Soil Sampling Interval	GROUNDWATER PROBES No. of Probes	GROUNDWATER PROBES Depth of Groundwater Probes	Recommended Analyses Mercury	Recommended Analyses RCRA Metals	Recommended Analyses TAL Metals	Recommended Analyses PCBs	Recommended Analyses VOCs	Recommended Analyses SVOCs	Recommended Analyses USEPA UIC Constituents *	Comments
Substation Interior	IPSB-01A				1	2	4'-8' bpb Cont.			2							Delineate extent of Hg contamination associated with IPSB-01. Probe to be located adjacent to IPSB-01. Soil Samples will be collected after building demolition.
	IPSB-10 & 11				2	8	0-8' bpb Cont.***			8							Delineate extent of Hg contamination associated with IPSB-01. Probes to be located 10' east and south of IPSB-01. Soil samples will be collected after building demolition.
West Side of Substation	IPSS-05 & 06						0-2" bgs			2							Surface soil samples to delineate extent of Hg contamination in the vicinity of the IRM work.
South Side of Substation	IPSB-04A				1	2	6'-10' bgs. Cont.			2							Delineate extent of Hg contamination associated with IPSB-04. Probe to be located adjacent to IPSB-04.
	IPSB-12 & 13				2	10	0-10' bgs. Cont.***			10							Delineate extent of Hg contamination associated with IPSB-04. Probes to be located 10' south and west of IPSB-04.
	IPSB-14 & 15				2	10	0-10' bgs. Cont.***			10							Delineate extent of Hg contamination associated with IPSB-05. Probes to be located 10' south and east of IPSB-05.
Northwest Corner of Substation	IPSB-16 & 17				2	4	0-4' bgs. Cont.			4							Delineate extent of Hg contamination associated with IPSS-04. Probes to be located adjacent to IPSS-04 and 10' north, east and west of IPSS-04.
	IPSB-18 & 19				2	4	0-4' bgs. Cont.***			4							Delineate extent of Hg contamination associated with IPSS-04. Probes to be located adjacent to IPSS-04 and 10' north, east and west of IPSS-04.
	IPSB-20				1	2	0-4' bgs. Cont.			2							Delineate extent of Hg contamination associated with IPSS-01. Probes to be located adjacent to IPSS-01
Rectifier Dry Well	IPSB-21	1	5	10			10' below bottom of dry well									5	Boring through drywell, subsequent to test pit excavation.
Groundwater	IPGP-01, 02 & 03							3	10			6**		3			Determine if groundwater has been impacted at the site.
Tile Field	IPSB-22, 23, 24, & 25				4	8	0-4' bgs. Cont.***			8							Investigate tile field.
Transformers	IPSB-26 & 27				2	6	0-2" and 0-4' Cont.			6	6		6		6		Investigate stained areas in the vicinity of transformers.
Potential Releases	IPSB-28 & 29				2	4	0-4' bgs. Cont.***			4	4		4		4		Address potential releases not previously investigated. Probes to be located on the east and west sides of the substation.
Test Pit Excavations	IPTP-01, 02, & 03																Areas west and east of substation will be excavated to identify potential subsurface features.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260, RCRA Metals by Methods 6010/7471, SVOCs by Method 8270 and TPHs by Method 8015M.
** Unfiltered and Filtered Samples
*** Surface sample to be collected at 0-2" interval. Remaining samples to be collected at two foot intervals (e.g., 2-4', 4-6', etc.).

5. Four sediment soil samples will be collected for analysis at the outfall to Manhasset Bay. Samples will be collected at 5-foot intervals extending north from previous surface soil sample MHSS-08 and will be analyzed for mercury by EPA Method 7471 and total organic carbon (TOC) by EPA Method 1986.

5.1.2 Massapequa Substation - S15

1. Soil probes will be advanced for the collection and analysis of soil samples to delineate the horizontal and vertical extent of mercury impacted soil at former sample locations along the east side of the substation (MSSB-06, MSSS-02, MSSS-03, MSSS-04, MSSS-05 and MSSB-08). Samples will be analyzed for mercury by EPA Method 7471.

2. Soil probes will be advanced for the collection and analysis of soil samples to delineate the vertical extent of mercury impacted soil beneath the communications pit and water service pit (former sample locations MSSB-05 and MSSB-07). Samples will be analyzed for mercury by EPA Method 7471.

3. Soil probes will be advanced for the collection and analysis of soil samples to detect inadvertent, non-specific releases. Probes will be located on the east side and northeastern corner of the substation. Samples will be analyzed for mercury (EPA Method 7471), PCBs (EPA Method 8082), RCRA Metals (EPA Method 6010/7471) and SVOCs (EPA Method 8270).

5.1.3 Island Park Substation - L03

1. Soil probes will be advanced, after building demolition, for the collection and analysis of soil samples to determine the horizontal and vertical extent of mercury contamination inside the sump pump pit at former soil sample location IPSB-01. Samples will be analyzed for mercury by EPA Method 7471.

2. Soil probes will be advanced for the collection and analysis of soil samples to determine the horizontal and vertical extent of mercury contamination along the south side of the substation at former soil sample locations IPSB-04 and IPSB-05. Samples will be analyzed for mercury by EPA Method 7471.

3. Soil probes will be advanced for the collection and analysis of soil samples to determine the horizontal and vertical extent of mercury contamination along the northwest corner of the substation at former soil sample locations IPSS-04 and IPSS-01. Samples will be analyzed for mercury by EPA Method 7471.

4. Soil probes will be advanced for the collection and analysis of soil samples to determine the potential impact from the septic tank tile field located southwest of the substation. Samples will be analyzed for mercury by EPA Method 7471.

5. Soil probes will be advanced for the collection and analysis of soil samples to determine the potential impact from stained areas in the vicinity of transformers. Samples are to be analyzed for PCBs (EPA Method 8082), RCRA Metals (EPA Method 6010/7471) and SVOCs (EPA Method 8270). Six soil samples will be collected for analysis from two locations within the vicinity of transformers.

6. Soil probes will be advanced for the collection and analysis of soil samples to detect inadvertent, non-specific releases. Probes will be located on the eastern and western sides of the substation. Samples will be analyzed for mercury (EPA Method 7471), PCBs (EPA Method 8082), RCRA Metals (EPA Method 6010/7471) and SVOCs (EPA Method 8270).

5.2 Groundwater Sampling

The groundwater samples to be collected are summarized on Tables 5-1 through 5-3 for the Manhasset, Massapequa and Island Park substations, respectively. A brief summary of the groundwater sampling to be conducted is provided below:

5.2.1 <u>Manhasset Substation - N10</u>

One additional groundwater monitoring well will be installed to evaluate groundwater quality downgradient of the substation. This monitoring well will be installed in the street north of the substation. Consequently, the necessary permits will be obtained and traffic control will be established as part of the installation of this well.

The monitoring well will be installed using a hollow stem auger rig to a depth of approximately 90 feet below grade and will be constructed of two-inch inner diameter PVC casing. A 15-foot PVC screen (slot size 0.010) will be installed approximately 10 feet below and 5 feet above the water table. A filter pack of sand will be placed in the annular space around the screen and will be extended two feet above the screen. Two-foot split spoon samples at five foot intervals will be collected during the installation of the monitoring well.

Following well installation, the well will be developed by pumping to obtain a reading of 50 Nephelometric Turbidity Units (NTUs). All drill cuttings and purge water will be contained in DOT approved 55-gallon drums.

Following well installation, groundwater samples will be collected from all three site monitoring wells. Monitoring wells will be purged and sampled using low flow sampling procedures (USEPA Ground Water Currents, April 1996). All samples will be analyzed for filtered and unfiltered TAL Metals by EPA Method 200.7/245.1 and Target Compound List (TCL) VOCs by EPA Method 8260.

5.2.2 Massapequa Substation - S15

Three groundwater probe samples (one upgradient and two downgradient) will be collected from this site utilizing the Geoprobe® direct push technique. It has been assumed that the depth to groundwater at the Massapequa substation is approximately 15 feet below grade. All groundwater samples will be analyzed for filtered and unfiltered TAL Metals by EPA Method 200.7/245.1 and TCL VOCs by EPA Method 8260.

5.2.3 Island Park Substation - L03

Three groundwater probe samples (one upgradient and two downgradient) will be collected from this site utilizing the Geoprobe® direct push technique. It has been assumed that the depth to groundwater at the Island Park substation is approximately 10 feet below grade. All groundwater samples will be analyzed for filtered and unfiltered TAL Metals by EPA Method 200.7/245.1 and TCL VOCs by EPA Method 8260.

5.3 Underground Injection Control

Soil samples to be collected as part of the USEPA Underground Injection Control (UIC) program are summarized on Tables 5-1 through 5-3 for the Manhasset, Massapequa and Island work. Prior to the start of field activities at the substations, all project personnel who will be working on LIRR property will be required to complete a track safety course administered by LIRR.

D&B will also have our Health and Safety consultant (Emilcott Associates) provide a Site Safety Officer during "intrusive" field work located within active (but de-energized) substations. As such, D&B has made provision for Emilcott Associates to be on-site during the sampling activities to be conducted within the Island Park substation. In addition, a Certified Industrial Hygienist (CIH) will also available for both office and "in-field" consultation (if necessary) throughout the field program.

5.7 Waste Disposal

D&B has made provision to contain all investigation derived waste in DOT approved 55-gallon drums. D&B has also included the cost to collect and analyze two waste characterization samples from each site. It has been assumed that one composite waste characterization sample will be collected from the soil and wastewater investigation derived material from each site. The LIRR will be responsible for the proper off-site transportation and disposal of the investigation derived waste.

Appendix A

APPENDIX A

FIELD FORMS

EXHIBIT 1

LOCATION SKETCH

DVIRKA
AND
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LOCATION SKETCH

Project ______________________ Sample Crew ______________________

Sample(s) Location(s) ______________________

Sample(s) and/or Well Number(s) ______________________

____

Location of sample points, wells, borings, etc., with reference to three permanent reference points. Measure all distances, clearly label roads, wells and permanent features.

EXHIBIT 2

SAMPLE INFORMATION RECORDS

DVIRKA AND BARTILUCCI

SAMPLE INFORMATION RECORD

SITE ________________________ SAMPLE CREW ________________

SAMPLE LOCATION/WELL NO. ________________________

FIELD SAMPLE I.D. NUMBER ________________ DATE ________________

TIME __________ WEATHER ________________ TEMPERATURE ________

SAMPLE TYPE:

GROUNDWATER ________________ SEDIMENT ________________

SURFACE WATER ________________ AIR ________________

SOIL ________________ OTHER (Describe, e.g., septage leachate) ________________

WELL INFORMATION (fill out for groundwater samples):

DEPTH TO WATER ________________ MEASUREMENT METHOD ________________

DEPTH OF WELL ________________ MEASUREMENT METHOD ________________

VOLUME REMOVED ________________ REMOVAL METHOD ________________

FIELD TEST RESULTS:

COLOR ________________ pH ________________ ODOR ________________

TEMPERATURE (°F) ________________ SPECIFIC CONDUCTANCE (umhos/cm) ________________

TURBIDITY ________________

PID/FID READING ________________ VISUAL DESCRIPTION ________________

CONSTITUENTS TO BE ANALYZED:

REMARKS: ________________

WELL CASING VOLUMES

GAL/FT	1-1/4" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.10	2-1/2" = 0.24	3-1/2" = 0.50	6" = 1.46

9-0734.PM4

Sketch of Lot, Building, and Well and Septic System Location

Sketch of Water Treatment System and Sampling Locations

Photograph of Water Treatment System

EXHIBIT 3

CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY RECORD

PAGE OF | NO

JOB #:

CLIENT:

PROJECT ID:

PROJECT MGR:

RUSH [ ] YES [ ] NO DUE DATE

TESTS

BOTTLE TYPE AND PRESERVATION

GENERAL REMARKS

FIELD FILTERED - CIRCLE Y or N

BOTTLE SET #	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX	LAB ID	QC Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	SAMPLE REMARKS

MATRIX CODES

A - AIR
AQ - AQUEOUS
C - COMPLEX
D - DRUM WASTE
OI - OIL
S - SOIL
SL - SLUDGE
W - WIPE
O - OTHER
FB - FIELD BLANK
TB - TRIP BLANK

BOTTLES PREPARED BY DATE / TIME

SIGNATURE

SAMPLES COLLECTED BY DATE / TIME

SIGNATURE

BOTTLES REC'D BY DATE / TIME

SIGNATURE

RECEIVED IN LAB BY DATE / TIME

SIGNATURE

REMARKS ON SAMPLE RECEIPT

[ ] BOTTLES INTACT
[ ] CUSTODY SEALS
[ ] PRESERVED
[ ] SEALS INTACT
[ ] CHILLED
[ ] SEE REMARKS

LABORATORY COPY

EXHIBIT 4

RECEIPT OF SAMPLES FORM

DVIRKA AND BARTILUCCI

Receipt for Samples

Project Name: ______________________ Field Log Book Reference Number: ______________

Project Address: ______________________ Sampled By: ______________

Project Number: ______________________ Split With: ______________

SAMPLE NUMBERS	DATE	TIME	COMP	GRAB	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CONTAINERS	REMARKS

Transferred by (Signature)		Received by (Signature)		Telephone
Date	Time	Title	Date	Time

EXHIBIT 5

TEST PIT LOG FORM

DVIRKA AND BARTILUCCI

TEST PIT LOG

TEST PIT LOCATION SKETCH MAP

N

TEST PIT NO.

PROJECT NO./NAME	LOCATION
EXCAVATOR/EQUIPMENT/OPERATOR	
INSPECTOR/OFFICE	START/FINISH DATE
ELEVATION OF: GROUND SURFACE/BOTTOM OF PIT (FT. ABOVE MSL)	CONDITION OF PIT
REMARKS:	

DEPTH	SAMPLE INTERVAL	OVA SCREEN	DESCRIPTION OF MATERIALS	REMARKS
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

EXHIBIT 6

BORING LOG FORM

BORING LOG

Dvirka and Bartilucci CONSULTING ENGINEERS	Project No.: Project Name:	Boring No.: Sheet __ of __ By:
Drilling Contractor: Driller: Drill Rig: Date Started:	Geologist: Drilling Method: Drive Hammer Weight: Date Completed:	Boring Completion Depth: Ground Surface Elevation: Boring Diameter:

Depth (ft.)	Soil Sample				PID Per 6" (ppm)	Sample Description	USCS
	No.	Type	Blows Per 6"	Rec. (feet)			
-0-							
-1-							
-2-							
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-							

Sample Types:	NOTES:
SS = Split Spoon HA = Hand Auger GP = Geoprobe Sampler CC = Concrete Core	

EXHIBIT 7

DRILLING LOG FORM

DVIRKA AND BARTILUCCI

DRILLING CONTRACTOR	DRILLING LOG	BORING NUMBER ______
Driller ______	PROJECT NAME ______	Sheet ____ of ____
Inspector ______		Boring Location ______
Rig Type ______	PROJECT # ______	
Drilling Method ______	Location/Address ______	
Drive Hammer Weight ______		

GROUNDWATER OBSERVATIONS				Weather ______	Plot Plan
Water Level					
Time				Date/Time Start ______	
Date				Date/Time Finish ______	
Casing Depth					

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary ______

EXHIBIT 8

WELL CONSTRUCTION LOG FORM

Dvirka and Bartilucci

WELL CONSTRUCTION LOG

SITE ________ JOB NO. ________ WELL NO. ________

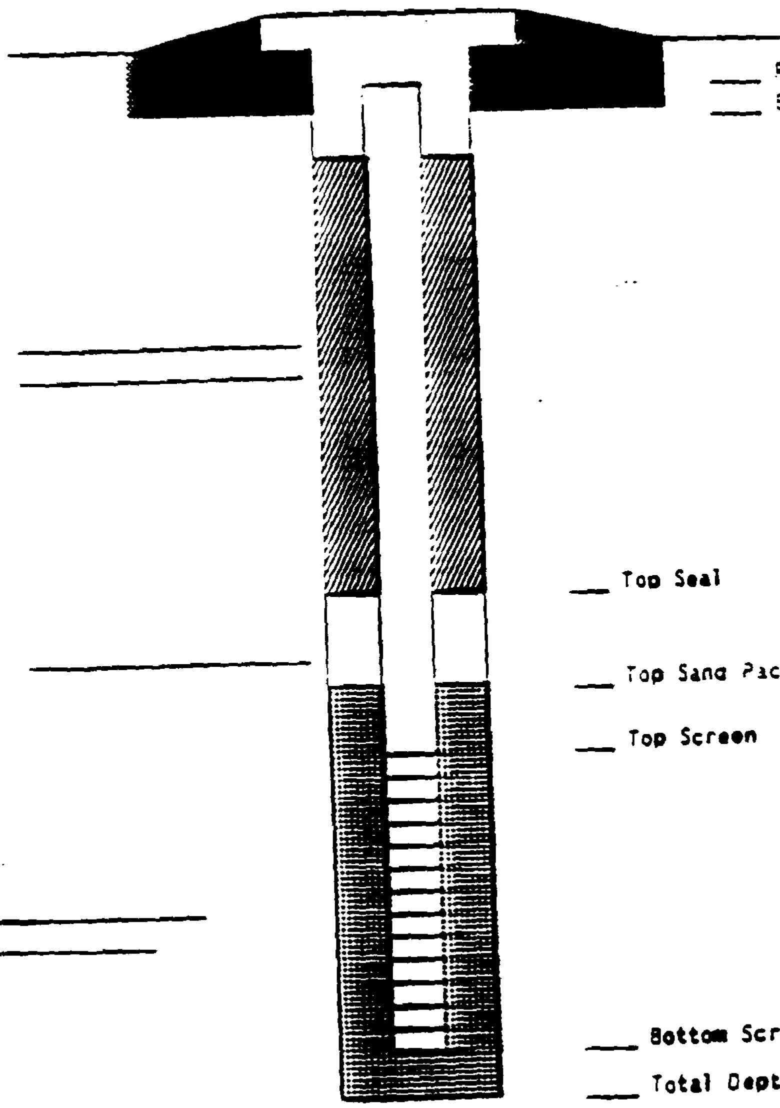
TOTAL DEPTH ________ SURFACE ELEV. ________ TOP RISER ELEV. ________

WATER LEVELS (DEPTH, DATE, TIME) ________ DATE INSTALLED ________

RISER DIA ___ MATERIAL ________ LENGTH ____

SCREEN DIA ___ MATERIAL ________ LENGTH ____ SLOT SIZE ________

SCHEMATIC



Ground Surface

___ Riser Elevation

___ Bottom Surface Seal

Surface Seal Type ________ ________

Grout Type ________ ________

___ Top Seal

Seal Type ________

___ Top Sand Pack

___ Top Screen

Sand Pack Type ________

Size ________

___ Bottom Screen

___ Total Depth of Boring

Dvirka and Bartilucci
Consulting Engineers

WELL CONSTRUCTION LOG

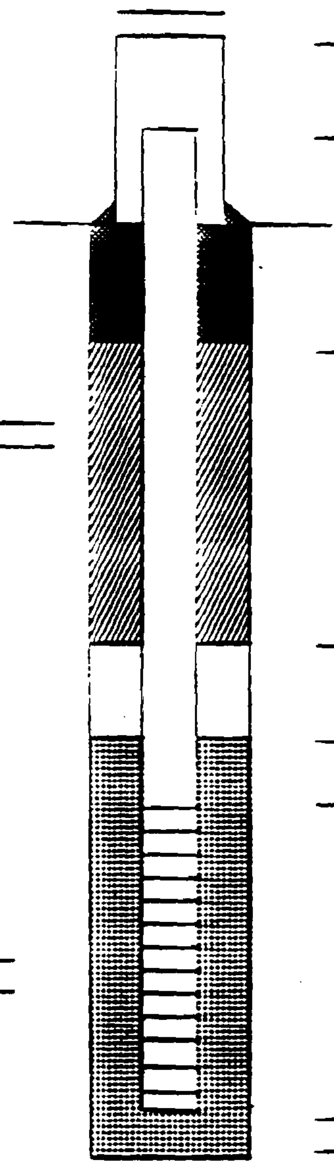
SITE ______________________ JOB NO. ____ WELL NO. ____

TOTAL DEPTH ____ SURFACE ELEV. __________ TOP RISER ELEV. __________

WATER LEVELS (DEPTH, DATE, TIME) __________ DATE INSTALLED ______

RISER	DIA	___	MATERIAL	________	LENGTH	____		
SCREEN	DIA	___	MATERIAL	________	LENGTH	____	SLOT SIZE	______
PROT CSG	DIA	___	MATERIAL	________	LENGTH	____		

SCHEMATIC



___ Prot. Csg Stickup

___ Riser Stickup

Ground Surface

Surface Seal Type ______________
____

___ Bottom Surface Seal

Grout Type ______________
____

___ Top Seal

Seal Type ______________

___ Top Sand Pack

___ Top Screen

Sand Pack Type ______________
Size ______________

___ Bottom Screen

___ Total Depth of Boring

EXHIBIT 9

DAILY EQUIPMENT CALIBRATION LOG FORM

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AND
BARTILUCCI

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________________

Project Number: ______________ Calibrated By: ______________

Date	Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

EXHIBIT 11

FIELD CHANGE FORM

DVIRKA
AND
BARTILUCCI

FIELD CHANGE FORM

Project Name: ______________________________

Project Number: ____________________ Field Change Number: __________

Location: ____________________________ Date: __________

Field Activity Description: ______________________________

____

____

____

Reason for Change: ______________________________

____

____

____

Recommended Disposition: ______________________________

____

____

____

______________________________ __________

Field Operations Officer (D&B Consulting Engineers) (Signature) Date

Disposition: ______________________________

____

____

____

______________________________ __________

On-site Supervisor (NYSDEC) (Signature) Date

____

Distribution: Project Manager (D&B)
Project Manager (NYSDEC)
Field Operations Officer
On-site Supervisor (NYSDEC)

Others as Required: __________
____
____
____

DB-FCF

EXHIBIT 12

FIELD AUDIT FORM

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM

Site: ______________________ Date: ______________________

Persons On-site: ______________________ QA/QC Officer Conducting Audit:

______________________ ______________________

______________________ Project:

______________________ ______________________

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

Methanol	YES	NO
Alconox	YES	NO
D.I. Water	YES	NO
Scrub Brushes	YES	NO
Steam Cleaner	YES	NO

Comments: ______________________

____

____

3. Is the decontamination pad set up so water is contained: YES NO

Comments: ______________________

____

____

4. Is the site/investigation areas secured (fence, markers, etc.) or otherwise in accordance with project requirements: YES NO

Comments: ______________________

____

____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

5. Is contaminated material properly stored and in a secure area or otherwise in accordance with project requirements: YES NO
   Are the drums of waste (water, soil, ppe) labeled properly: YES NO

   Comments: ______________________________

   ____

   ____

6. Are field forms filled out properly, legibly and timely:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO
Boring Logs	YES	NO

   Comments: ______________________________

   ____

   ____

7. Is the proper sampling and field measurement equipment, including calibration supplies on site: YES NO

   Comments: ______________________________

   ____

   ____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

8. Are there adequate sample containers, including deionized water for QA/QC:

	Field Blanks	YES	NO
	Trip Blanks	YES	NO

Comments: ______________________________

____

____

9. Is the equipment decontaminated in accordance with project requirements:

	Sampling equipment	YES	NO
	Construction equipment	YES	NO

Comments: ______________________________

____

____

10. Is field measurement equipment calibrated:

	Daily	YES	NO
	Properly	YES	NO

Comments: ______________________________

____

____

11. Are samples collected and labeled properly: YES NO

Comments: ______________________________

____

____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

12. Are samples stored at 4°C: YES NO

Comments: ______________________

____

____

13. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: ______________________

____

____

14. Is a copy of the Field Investigation Work Plan available on site: YES NO

Comments: ______________________

____

____

15. Is a copy of each equipment manual on-site: YES NO

Comments: ______________________

____

____

16. Is a copy of the QA/QC Plan available on site: YES NO

Comments: ______________________

____

____

DVIRKA
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FIELD AUDIT FORM
(continued)

17. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: ______________________

____

____

18. Are quality control samples taken:

Trip Blanks	YES	NO
Field Blanks	YES	NO

Comments: ______________________

____

____

19. Are samples shipped in a timely and appropriate manner: YES NO

Comments: ______________________

____

____

20. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: ______________________

____

____

21. Certification - Based upon my audit at the above project. I hereby certify/do not certify compliance with QA/QC requirements for the project:

______________________ ______________________

Dated Signed

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FIELD AUDIT FORM
(continued)

General Comments: ____________________

____

____

____

FLDAUDIT

EXHIBIT 13

NYSDEC SAMPLE IDENTIFICATION, PREPARATION AND ANALYSIS SUMMARY FORMS

To be included with all lab data and with each workplan

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*Pest PCBs Method #	*Metals	*Other

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Analyzed

ROBBIN A. PETRELLA

QUALITY ASSURANCE OFFICER

EDUCATION

SUNY at Buffalo, B.S. (Chemical Engineering) - 1986

PROFESSIONAL EXPERIENCE

Ms. Petrella's professional quality assurance/quality control (QA/QC) experience spans 15 years. During this time, she served as a Sample and Data Analyst for two large environmental laboratories. Ms. Petrella was responsible, as Data Review Group Leader, for supervision of data validation and QA/QC coordination between the laboratory and its clients. Her technical experience includes both the analysis and review of environmental samples using numerous protocols, including those developed by the United States Environmental Protection Agency (USEPA), New York State Department of Environmental Conservation (NYSDEC), and New Jersey Department of Environmental Protection (NJDEP).

Since joining the firm, Ms. Petrella has been responsible for preparing Quality Assurance/Quality Control Plans and Waste Analysis Plans for a number of large private sector clients. These include Chemical Waste Disposal Corporation, the International Business Machines Corporation and Northrop Grumman Corporation. She also has prepared overall QA/QC programs for Northrop Grumman's on-site laboratories.

Ms. Petrella has prepared QA/QC Plans and data validation/usability reports for remedial investigation and feasibility studies conducted at numerous New York State Registry Sites, including those in the Towns of Cheektowaga, Schodack, and North Tonawanda, as well as the Villages of Croton-on-Hudson and Brentwood, New York. These tasks involved evaluation of the laboratory data to determine compliance with NYSDEC Analytical Services Protocols (ASP), as well as to determine the usability of the data particularly if it was not consistent with ASP requirements.

Ms. Petrella has assisted in the preparation and performance of air sampling programs for remedial investigation/feasibility studies (RI/FS) conducted at landfill/Superfund sites in Wallkill, New York and East Northport, New York. She has also performed water supply sampling for an RI/FS in Rensselaer County, New York, and a surface and subsurface water and soil sampling program as part of an RI/FS in Elmira, New York.

Ms. Petrella has acted as the QA/QC officer, and prepared and performed field audits for Superfund site investigations in Tonawanda, New York; Owego, New York; Brookhaven, New York; and Hornell, New York, and for a major railroad facility in New York City. She also has assisted in the preparation of laboratory contracts for analytical services for hazardous waste studies in Schodack, New York; Jamaica, New York; and the New York State Superfund Standby contract.

Ms. Petrella is responsible for performing laboratory audits on all laboratories having contracts with the firm as part of the New York State Superfund Program. She has been certified by the USEPA in both organic and inorganic data validation by successfully completing courses authorized by the USEPA. These certifications have also been accepted by the NYSDEC.

Ms. Petrella is responsible for the data validation of all data packages from ongoing hydrogeologic investigation and landfill closure investigations in Brookhaven and Hauppauge, New York. She also is responsible for validation of all data collected during field investigations for a large aerospace corporation, a major utility on Long Island, and manufactured gas plants across Long Island.

Ms. Petrella has acted as Project Manager for a standby project with the NYSDEC and a groundwater treatment project located in New Jersey.

Ms. Petrella has been instrumental in the design and implementation of the firm's GIS\Key Database system. In that role, she is responsible for the maintenance of the system and training of personnel in its use. She also is responsible for all updates to the GIS\Key program and communicates on a regular basis with the GIS\Key venders with regard to system improvements and network administration. Currently, there are seven ongoing projects that use GIS\Key, five of which are MGP sites. Ms. Petrella is responsible for entering and reporting of all chemistry data from GIS\Key.

Ms. Petrella also has conducted indoor and outdoor air sampling programs as part of MGP site field investigations. She has conducted interviews with homeowners as part of the air sampling program. She also is responsible for data validation of all the data from the air sampling programs.

Ms. Petrella is presently the Quality Assurance/Quality Control officer for the firm and responsible for reviewing all work relating to Quality Assurance/Quality Control for hazardous waste, hazardous substance, manufactured gas plant and solid waste projects undertaken by the firm. She also is responsible for preparation and maintenance of the Corporate Quality Assurance Manual, and for inventory and maintenance of the firm's field/sampling and monitoring equipment. As the QA/QC Officer, she reports directly to the Principal-in-Charge of the Environmental Remediation Division.