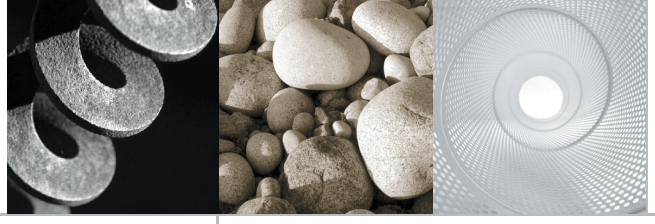

GEI Consultants

Geotechnical
Environmental and
Water Resources
Engineering

Remedial Action Work Plan

East 173rd Street Works (Starlight Park) Operable Unit No. 1 (OU-1)

Bronx, New York

Site ID: V00552-2

Submitted to:
Consolidated Edison Company of New York, Inc.

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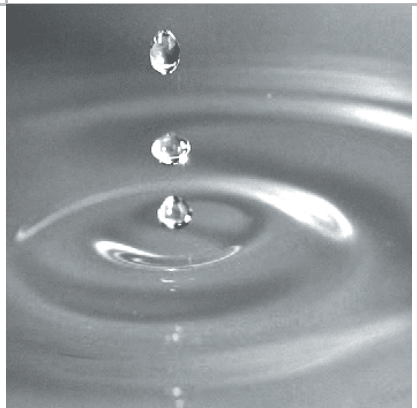

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Abbreviations and Acronyms

ASTM	American Society for Testing and Materials
AWQS	Ambient Water Quality Standard
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAMP	Community Air Monitoring Program
CHASP	Construction Health and Safety Plan
CCMP	Comprehensive Conservation Management Plan
cgs	Current Ground Surface
CQAPP	Construction Quality Assurance Project Plan
CSI	Construction Specification Institute
DNAPL	Dense Nonaqueous Phase Liquid
FRI	Focused Remedial Investigation
MGP	Manufactured Gas Plant
NAPL	Non-aqueous Phase Liquids
NRCS	Natural Resources Conservation Service
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDEP	New York State Department of Environmental Protection
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OMM	Operation, Maintenance, and Monitoring Plan
OSHA	Occupational Health & Safety Administration
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detector
ppm	Parts per Million
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCSCOs	Recommended Soil Cleanup Objectives
RI	Remedial Investigation
SCG	Standards, Criteria and Guidance
SRI	Supplemental Remedial Investigation
SRIWP	Supplemental Remedial Investigation Work Plan
SVOC	Semivolatile Organic Compound
TAGM	Technical Administrative Guidance Memorandum
UFPO	Underground Facilities Protective Organization
USEPA	United States Environmental Protection Agency
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

1. Introduction

This Remedial Action Work Plan (RAWP) was prepared by GEI Consultants, Inc. (GEI), on behalf of Consolidated Edison Company of New York, Inc. (Con Edison), to address subsurface contamination associated with the historic operations of the former East 173rd Street Works manufactured gas plant (MGP) site located in the Bronx, New York. This RAWP was developed in accordance with the terms of the Voluntary Cleanup Agreement (VCA), dated August 15, 2002, Index #02-0003-02-08, between Con Edison and the New York State Department of Environmental Conservation (NYSDEC), and the criteria contained in Section 7 of NYSDEC's Draft Voluntary Cleanup Program Guide, dated May 2002.

The former MGP site is located in a portion of Starlight Park, which is located adjacent to the Bronx River. The remedial activities described in this RAWP address Operable Unit 1 (OU1), which consists of the former MGP site. The potential impact of the former MGP on adjacent areas of the Bronx River is currently the subject of additional investigation as Operable Unit 2 (OU2). Remedial activities for OU2, if required, will be addressed by a separate RAWP.

The major elements of this RAWP were previously presented to the NYSDEC, New York State Department of Health (NYSDOH), the New York City Department of Parks and Recreation (Parks Department), and community stakeholders in a document titled "Proposed Remedial Approach, East 173rd Street Works (Starlight Park), Bronx Former MGP Site," dated April 30, 2003. This RAWP provides expanded descriptions of the remedial activities described in the Proposed Remedial Approach, and incorporates modifications to the Proposed Remedial Approach based on comments received from NYSDEC, NYSDOH, Parks Department, and community stakeholders. Additional coordination with the Parks Department to incorporate their detailed requirements into the remedial design are ongoing, and will be reflected in the next submittal, to include draft construction drawings and engineering specifications.

1.1 Site Description

The East 173rd Street former MGP site (the Site) is located between the Sheridan Expressway and the Bronx River in the neighborhood of West Farms, in the Borough of the Bronx, New York (Figure 1). The Site is defined as all land occupied by former MGP operations. The term "on site" refers to land within the boundary of the former MGP. The Site is approximately 3 acres in size and is located within the central portion of Starlight Park (approximately 8 acres), a part of the Bronx River Park. The Site is currently covered with approximately 40 inches to 80 inches of fill soil (urban fill) placed during park construction after the MGP was decommissioned. The former MGP property boundary and the locations of MGP structures are

shown on Figure 2. Starlight Park is currently owned by the City of New York and is operated by the Parks Department.

1.2 Site History

The Site was owned by several Con Edison predecessor companies from 1859 to 1936. From 1936 to 1945, the Site was owned by Con Edison. Since 1945, the Site has been owned by the City of New York. Historic records confirm that an MGP operated at the Site between 1893 and 1912. However, based on gas franchise ownership records, MGP operation may have begun earlier. Subsequent records suggest that between 1912 and 1923, the facilities at the Site were used primarily for gas storage and as a standby plant. Sometime prior to 1943, the gas holders were taken down and the associated buildings were partially removed. The Site was used by Con Edison as a storage facility and garage until it was sold to the City of New York in December 1945. During the MGP operations, the Bronx River channel was located in its native channel adjacent to the southern side of the Site, as shown in Figure 2.

The last plant building was taken down in the 1950s by the City of New York. Starlight Park was reportedly constructed in the 1960s. During the 1960s, the Bronx River channel was moved its current location south of the site and the Sheridan Expressway was constructed.

1.3 Summary of Previous Investigations

GEI conducted a focused remedial investigation (FRI) at the Site from June 2002 through August 2002. The FRI was performed to:

- Locate the subsurface remnants of any MGP structures or other structures that may exist in Starlight Park and that might be associated with waste source areas or might serve as preferential pathways for the migration of MGP waste or other contamination

- Characterize potential MGP impacts in Starlight Park's soil and groundwater, and in Bronx River sediment

- Characterize site-specific geology and hydrology

- Delineate the lateral and vertical extent of potential MGP waste impacts in the soil, groundwater, and sediment

The investigation included test pits, soil borings, rock coring, well installation, piezometer installation, filed testing, and sediment sampling. Media tested included surface soil, subsurface soil, groundwater, and sediment. The locations of the media testing are shown on Figure 3. Detailed descriptions of the investigations and individual test results are contained in the report

titled *Focused Remedial Investigation, East 173rd Street Works, Bronx, New York* (FRI) by GEI, dated April 2003.

1.4 Summary of Environmental Conditions on the Site

Potential contaminants associated with the production, purification and storage of manufactured gas include liquid residues and solid by-products. Liquid residues include tars and oils that are complex mixtures of hydrocarbons. Organic compounds associated with these tars and oils include volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Solid by-products commonly found at MGP sites include ash, purifier material and solidified tar. Inorganic compounds associated with ash and purifier material include metals and complex cyanide compounds. The mixture of organic and inorganic compounds found at any particular MGP site is dependent on the nature and source of the raw materials and gas making processes historically used at the MGP.

Compounds detected in soil, sediment, and groundwater at the Site include individual VOCs, SVOCs, and inorganic compounds. Many of the inorganic and organic compounds detected in on-site media can be associated with MGP residues; however, some of these detected compounds may also occur in background concentrations associated with urban fill soil and groundwater.

The conclusions from the FRI report regarding OU-1 are summarized below according to each media.

- ***Urban Fill*** – The uppermost soils [from the ground surface to between 40 and 80 inches below the current ground surface (cgs)] are not impacted by former MGP operations. The uppermost soils at Starlight Park have been mapped as transported urban fill by the Natural Resources Conservation Service (NRCS). The urban fill soil was placed over the former MGP surface after the MGP ceased operating for construction of Starlight Park and filling of the former Bronx river channel.

- ***Subsurface Soil*** – Subsurface soils (i.e., below the urban fill) consist predominately of glacial till deposits overlain by organic rich alluvial marsh deposits. MGP-era fill and a historic MGP soil horizon overlie the alluvial marsh deposits. The urban fill deposits overlie these subsurface soils. Physical evidence of MGP residue and analytical results indicate that on-site subsurface soils (i.e., MGP-era fill, alluvial marsh deposits, and glacial deposits) are impacted by the former MGP operations. VOCs, SVOCs, and metals were detected in subsurface-soil samples at concentrations that exceed the Recommended Soil Cleanup Objectives (RSCOs) [NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046, 1994]. The samples exhibiting the highest SVOC concentrations and the greatest number of individual SVOCs that exceed RSCO

criteria were collected from on-site subsurface soils containing dense nonaqueous phase liquid (DNAPL) tar. The DNAPL tar is limited to discrete areas within the former MGP boundary, at depths between 8 and 20.5 feet below the cgs.

- ***Groundwater*** – Groundwater samples collected from on-site wells located in areas of MGP-impacted subsurface soils and along the hydraulically downgradient Site boundary contained concentrations of VOCs and SVOCs above the New York State Ambient Water Quality Standards (AWQS) for a GA Water Class. The DNAPL tar may represent a continuing source for VOC and SVOC groundwater contamination. Cyanide was detected at a concentration above AWQS in one on-site well located in an area of impacted subsurface soil. Cyanide was not detected in groundwater samples collected from monitoring wells located along the hydraulically downgradient Site boundary.

- ***MGP Structures*** – Remnants of several MGP structures are present beneath the surface of the Site. The rims of the two subsurface water-seal holders were encountered at a depth starting approximately 6 feet below the cgs, and the holder bottoms were encountered at depths of 18 feet and 22 feet below the cgs. The slab of the former above-grade holder was uncovered at a depth of approximately 4.5 feet below the cgs. The floors of several of the former MGP buildings were encountered at depths ranging between 3 and 5 feet below the cgs.

The FRI report presented the conclusion that subsurface soils and groundwater within the park are impacted by former MGP operations, and remediation is necessary. This RAWP is focused on the MGP-impacted areas that have been identified within OU-1.

1.5 Contemplated Future Site Use

The Site and other portions of Starlight Park are currently being used as staging areas for contractors working on the New York State Department of Transportation (NYSDOT) Sheridan Expressway reconstruction project, which is expected to be completed in the summer of 2004. After the Remedial Action project is completed, the park will be reconstructed by the NYSDOT and Parks Department. The reconstructed park includes a vehicle parking area, boathouse, ball fields, basketball court, playground, picnic area, sanitation facilities, and walking paths. The Site corresponds to the location of the planned ball fields, as shown on Figure 4. The redevelopment features shown on Figure 4 are based on NYSDOT Plans and Drawings for the Mainline Improvement I-895, Arthur Sheridan Expressway (which includes the renovations to Starlight Park), dated May 1, 2001, and subsequent conversations with NYSDOT representatives. Figure 5 illustrates the proposed surface grade reductions (in feet below the current ground surface) for specific areas of the Site. The final surface grade over most of the Site will be 1 to 4 feet lower than the current ground surface to accommodate the requirements of the ball fields. For purposes of clarity the future grade of the park will be referred to as the "redevelopment grade."

The plan for renovation of Starlight Park also includes the installation of a subsurface stormwater drainage system for the Sheridan Expressway and separate drain systems for the park. The expressway drains were originally proposed to be routed through the center of the former MGP Site. To facilitate ongoing construction activities for the expressway and to prevent interference with the remedial plans for the Site, NYSDOT has indicated that they will reroute the drain south of the Site prior to the start of remedial activities.

1.6 Remedial Action Objectives (RAOs)

In the May 2002 Draft Voluntary Cleanup Program Guide (Section 7) and December 2002 Draft DER 10 Technical Guidance for Site Characterization and Remediation (Section 4), NYSDEC identifies two general goals for remedy selection under the Voluntary Cleanup Program:

1. "To remediate the Site to a level that is protective of public health and the environment under the conditions of the Site's Contemplated Use," and

2. "Sources of contamination should be removed or eliminated, to the extent feasible, regardless of presumed risk."

The Site's contemplated use is anticipated to be a public park. The proposed park development includes the construction of an enclosed Comfort Station and a Boat House Complex outside the footprint of the former MGP site. At the Site, MGP-related contamination is located below the urban fill at depths greater than 4 feet below the current ground surface (cgs), with higher contaminant levels located between depths of 8 and 20.5 feet below the cgs. Thus, under current conditions, there is no direct contact exposure pathway to the MGP-contaminated soils, except in the case of Site excavation. Similarly, there will be no volatile inhalation pathway at the Site because, while new structures are planned on the Park property, they will not be within the impacted area and will not be receptors for subsurface vapors. In addition, groundwater at the Site is not used as a drinking water source. However, the DNAPL tar and areas that exhibit high concentrations of MGP-related SVOC and VOC soil contamination within the Site do represent an ongoing source of contamination to groundwater. Groundwater at the Site discharges to the Bronx River. However, it is unlikely that MGP-related dissolved-phase analyte concentration above AWQS will be present in the river. The surface water quality of the river will be characterized as part of a supplemental investigation of OU-2. The DNAPL tar and areas that exhibit high concentrations of MGP-related SVOC and VOC soil contamination within the Site also represent a potential direct contact/vapor inhalation risk to unprotected Site workers during excavation activities.

Based on the general goals for remedy selection and the specific Site information, the proposed Site-specific remedial action objectives (RAOs) are:

- Eliminate, to the extent practical, the potential human health exposure of Starlight Park visitors and maintenance/construction workers to MGP-related contaminants
- Eliminate, to the extent practicable, potential impacts to the environment from MGP-related contaminates
- To the extent practicable, excavate and remove identified DNAPL and MGP-related contaminants

Based on the RAOs, the proposed Site-specific remedial actions are:

- Removal and off-site disposal of soils within the former MGP footprint and any areas identified outside the MGP footprint boundary that contain DNAPL tar and/or concentrations of total SVOCs greater than 500 parts per million (ppm), or have concentrations of total VOCs greater than 10 ppm. These 500/10 criteria were established by the NYSDEC and are consistent with TAGM 4046.

- Within the former MGP footprint and any areas outside the MGP footprint where excavation of MGP-related contaminants is required, installation and maintenance of a minimum 3-foot-thick soil cover of clean fill (complying with NYSDEC individual TAGM 4046 cleanup objectives) below the final redevelopment grade in the area within the footprint of the planned ball field, and a minimum 6-foot-thick layer of clean fill below the redevelopment grade in areas outside the planned ball field boundary. In some areas, this clean fill soil cover may be thicker to accommodate deeper park infrastructure, such as utilities and foundations.

- Implementation of post-remediation groundwater monitoring and institutional controls

The proposed Site-specific remedial actions will address the RAOs as follows:

Park Users: The soil cover will eliminate direct contact exposure pathways for Site users to MGP-impacted soils left in place with concentrations below the 500/10 cleanup criteria. There will be no potential volatile inhalation pathway at the Site because, while new structures are planned on the Park property, they will not be within the impacted area and will not be receptors for subsurface vapors. Institutional controls will continue to prevent groundwater use.

Park Workers: Potential direct contact and/or inhalation exposure to soils containing SVOC and VOC levels below the 500/10 cleanup criteria may occur during future excavation activities below the soil cover. These potential exposures will be appropriately managed using institutional controls.

Groundwater/Surface Water Migration: It is anticipated that groundwater quality will improve through natural processes as a result of the removal of soils containing DNAPL tar and MGP-related constituents greater than the 500/10 cleanup criteria. Therefore, active groundwater remediation is not proposed. Periodic post-remediation groundwater monitoring will be performed to allow evaluation of groundwater quality.

Detailed elements of the selected remedy for the Site are summarized in Section 1.7 of this RAWP. A comparative analysis of the selected remedy and other potential remedies is contained in Section 2.0 of this RAWP.

The proposed remedial actions also include the implementation of institutional controls, which include some Site use restrictions to prevent or mitigate potential exposures during future excavation activities. The proposed institutional controls and use restrictions are described in Section 4.6 of this RAWP.

1.7 Summary of Selected Remedy

The selected remedy includes the following activities:

- Stockpiling of urban fill for reuse as backfill
- To the extent practicable, excavation and off-site disposal of MGP-impacted soil that exceeds the 500/10 cleanup criteria and/or contains visible DNAPL tar
- Removal of former MGP structures and piping encountered within the area of the remedial excavation
- Stockpiling subsurface soils with concentrations of total SVOCs and total VOCs in compliance with the 500/10 cleanup criteria for possible reuse as backfill.
- Excavation dewatering, effluent treatment and discharge
- Backfilling the bottom of the excavations with stockpiled subsurface soils that do not exceed the 500/10 cleanup criteria and placement of stockpiled urban fill over the reused subsurface soils
- Installation and maintenance of a demarcation barrier within the entire MGP footprint and any excavated areas outside the MGP footprint boundary

- Placement of a minimum 3-foot-thick soil cover of clean fill (complying with NYSDEC individual TAGM 4046 cleanup objectives) below the final redevelopment grade in the area within the footprint of the planned ball field

- Placement of a minimum 6-foot-thick soil cover of clean fill below the redevelopment grade in the areas outside the planned ball field boundary and within the former MGP footprint, and in any areas outside the MGP footprint where excavation of MGP-related contaminants is required.

- Regrading of the MGP-area footprint and any excavated remedial areas outside the MGP footprint boundary to support planned park improvements

- Implementation of post-remediation groundwater monitoring and institutional controls

Execution of the deeper portions of the excavation will require installation of an excavation support system, such as sheet piling, and dewatering to maintain the excavation in a stable, dry condition below the water table. Site controls during excavation include security fencing, erosion and sediment barriers, vapor/odor/dust suppression, and continuous air monitoring.

The approximate extent of the excavation for the selected remedy is shown on Figure 6. Subsurface profiles through the excavation are shown on Figures 7 and 8. A project summary drawing that illustrates the Site, extent of excavation, and Parks Department redevelopment plan is shown on Plate 1. Implementation of the selected remedy is described in detail in Section 4 of this RAWP. Prior to the implementation of the selected remedy, pre-remediation borings will be used to collect engineering data to support the design of deep excavation and excavation support systems. The pre-remediation boring data will also be used to determine the exact excavation limits of the deep excavation. These details will be presented in the remedial design. The pre-construction boring program will be conducted in accordance with the NYSDEC-approved "Supplemental Remedial Investigation Work Plan, East 173rd Street Works, Former Manufactured Gas Plant Site," dated August 28, 2003. Additional information on the pre-remediation boring program is discussed in the Supplemental Remedial Investigation Work Plan (SRIWP) Comment Response Letter (addressed to the NYSDEC) dated October 3, 2003 and SRIWP comment response presented in a letter to the Parks Department dated August 1, 2003. The NYSCEC-approved pre-remediation borings and well locations are illustrated on Figure 9.

2. Engineering Evaluation of the Remedy

This section contains an engineering evaluation that supports Con Edison's choice of the selected remedy, as required by Subsection 7.4 of the Draft Voluntary Cleanup Program Guide. The goal of the evaluation is to explain how the selected remedy will be protective of human health and the environment, when compared to other potential remedies. For the Site, three remedial options were considered:

1. No Action.

2. Excavation of visible tar and soils containing total SVOCs greater than 500 ppm and VOCs greater than 10 ppm, in accordance with the provisions of TAGM 4046.

3. Excavation of all soils that exhibit contaminant concentrations greater than individual RSCOs listed in TAGM 4046.

The options were compared according to the six evaluation criteria specified in the Voluntary Cleanup Program Guide:

- ***Protection of Human Health and the Environment***. To what degree does each remedy achieve the remedial action objectives?

- ***Standards, Criteria and Guidance*** (SCG). Identify major SCGs applicable to the Site and the degree to which the proposed remedies comply with the SCGs.

- ***Short-Term Effectiveness and Impacts***. Identify risks to the community, workers and environment that would result from implementing the remedy. Discuss how the risks will be controlled and the reliability of the controls. Evaluate whether the proposed remedy achieves RAOs within two years.

- ***Long-Term Effectiveness and Permanence***. Is the remedy permanent, or does it rely on containment or other factors that may reduce the ability to achieve RAOs over time? Discuss any uncertainty. After completion, will there be any significant remaining threats, exposure pathways, or risks to the public or environment from the remaining wastes or treated residuals?
- ***Reduction of Toxicity, Mobility, or Volume***. How much contamination will be removed from each media? If treatment is used, will the process be complete or partial, and is the process reversible? Will the mobility of contaminants be reduced?

- ***Implementability***. Are there potential construction difficulties? Are the required materials and services readily available? Are there potential problems obtaining permits or other approvals?

Based on these considerations, excavation to the 500/10 cleanup criteria was selected as the preferred remedy because it provides a similar level of protection to the larger RSCO excavation, but has fewer short-term impacts and is more implementable. A detailed discussion supporting this conclusion is contained in the following sections.

2.1 Description of Potential Remedial Options

The remedial options evaluated are based on experience at other MGP sites and the requirements of future site use. Only excavation and off-site disposal options are considered. Various in-situ treatment technologies requiring longer timeframes and offering less certain degrees of effectiveness were not considered applicable for the Site due to the proximity of the Bronx River and the incompatibility of the treatment infrastructure with park use. None of the options include separate remedial actions for groundwater impacts. Based on the FRI findings (e.g., groundwater quality, fate and transport, exposure assessment), groundwater remediation is not required to meet the RAOs. However, both excavation options will eliminate a significant quantity of the existing source of current groundwater impacts thereby creating conditions that will allow for reduced groundwater contaminant concentrations over time due to natural attenuation. Post-remediation groundwater monitoring is required for both excavation options to evaluate future groundwater quality.

2.1.1 No Action

This option is included as a baseline for comparison. It does not include any remedial activity other than continued groundwater monitoring.

2.1.2 Excavation Of Visible Tar and Soils Containing Total SVOCs Greater Than 500 ppm And VOCs Greater Than 10 ppm

This excavation includes the removal of soils with visible tar impacts, SVOC concentrations greater than 500 ppm, and soils with VOC concentrations greater than 10 ppm; institutional controls; and post-remediation groundwater monitoring to confirm the effects of the excavation on groundwater conditions. This option also includes the installation and maintenance of a clean fill soil cover that complies with NYSDEC individual TAGM 4046 cleanup objectives over the entire MGP footprint and in any areas outside the MGP footprint where excavation of MGP-related contaminants is required.

The only exception to the 500/10 cleanup criteria is a sample at MW-2D from a depth of approximately 30 feet with a total VOC concentration of 31 ppm, which consisted predominately of total xylene (20 ppm). Benzene was not detected in this sample. The soil associated with this sample is excluded from this analysis because it does not represent a significant source of MGP-related waste, but would require a significantly more complicated excavation support system to remove. Analytical data from other boring locations near MW-2D (SB-3, SB-19, and SB-20) and from other locations at a similar stratigraphic horizon do not exhibit total VOC concentrations above the proposed 10-ppm cleanup standard. These data suggest that the VOCs detected at MW-2D are limited to an isolated zone.

The excavation would be backfilled with subsurface soils excavated from the Site and any areas outside the MGP footprint boundary that do not exceed the 500/10 cleanup criteria, urban fill from the Site and any excavated areas outside the MGP footprint boundary (available as a result of excavation and regrading activities) and imported clean fill as necessary. Institutional controls would also be required to control potential exposure to residual contamination in groundwater and soil below the soil cover. The proposed institutional controls include:

- A prohibition of land development for any use other than a park without prior written approval of the NYSDEC, provided that Site conditions and any excavated remedial areas outside the MGP footprint boundary are protective of the new use or made protective for such use by additional remediation. Without such approval, only appropriate commercial, industrial, or recreational use will be allowed.

- Worker notification if utility or other excavation work below the soil cover is planned on the Site or any excavated remedial areas outside the MGP footprint boundary

- Notification to the NYSDEC prior to any action that could jeopardize the integrity of the remedy

- Development and approval of a soil management plan (including a health and safety plan) for any soil or waste removed from below the soil cover at the Site and any excavated remedial areas outside the MGP footprint boundary

- A prohibition on the development of water supply or irrigation wells on the Site

- Annual inspection and certification to confirm appropriate use of the Site and any excavated remedial areas outside the MGP footprint boundary, and to ensure that engineering and institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

The institutional controls will be memorialized to remain in place via an agreement between the Parks Department and Con Edison, with the approval of the NYSDEC and NYSDOH. The institutional controls will only apply to the area within the boundary of the former MGP footprint and any excavated remedial areas outside the MGP footprint boundary.

A plan showing the approximate extent of this excavation is included in Appendix A. The actual extent of the excavation will be determined based on data from the OU-1 supplemental investigation and post-excavation confirmation samples. The actual extent of the excavation will be presented in the remedial design submittal. The area of the proposed preliminary remedial excavation is about 1.1 acres and the depth ranges from 10 to 22 feet below cgs. The area of the clean fill soil cover is approximately 2.5 acres at minimum thicknesses of 3 feet and 6 feet (includes 1.1 acre remedial excavation and all areas within the boundary of the former MGP). To install the 6-foot-thick clean fill soil cover in certain park areas proposed by the Parks Department and Con Edison, some over excavation is required beyond that which would have been necessary to install a minimum 3 foot clean fill soil cover. Because of this over excavation to provide thicker soil cover than is normally required, subsurface soil removed during remedial excavation activities that is in compliance with clean up criteria may be reused as deeper excavation backfill below the clean fill soil cover. Estimated remedial excavation and soil cover excavation volumes are as follows.

- Total excavation volume: 48,000 cubic yards
- Excavated Urban Fill: 20,000 cubic yards
- Excavated Subsurface Soil: 28,000 cubic yards

The excavated urban fill volume (20,000 cubic yards) includes 1,000 cubic yards of over excavated urban fill required to achieve the minimum 6-foot-thick soil cover. The excavated subsurface soil volume (28,000 cubic yards) includes 2,500 cubic yards of over excavated subsurface soils required to achieve the soil cover.

The estimated backfill volumes are as follows.

- Total backfill volume: 42,500 cubic yards
- Clean fill soil cover (3 foot to 6 foot depth): 20,000 cubic yards
- Reused urban fill: 20,000 cubic yards (includes over excavation volume)
- Reused subsurface soil that comply with the 500/10 cleanup criteria: 2,500 cubic yards

The 5,500-cubic-yard difference between the total excavated volume and backfill volume is due to the lower redevelopment grade. The assumed average excavation rate is 360 cubic yards per day (18 truckloads per day). The average backfill placement rate is assumed to be about 50 percent faster, or 480 cubic yards per day (27 truckloads per day). The excavation will require sheet piling to support the sidewalls and dewatering.

The total estimated time for remediation is nine months, including mobilization, sheet pile installation, excavation, backfilling, sheet pile removal, final grading, and demobilization.

Additional details regarding the implementation of this remedy are discussed in Section 4.0.

2.1.3 Excavation of All Soils Containing Concentrations Greater Than Individual Recommended Soil Cleanup Objectives (RSCOs) Listed in TAGM 4046

This option includes the excavation of all soils that exceed the individual RSCOs for VOCs and SVOCs listed in TAGM 4046, and post-remediation groundwater monitoring to confirm the effects of the excavation on groundwater conditions. Because the urban fill typically exceeds individual RSCOs for one or more chemicals, the urban fill could not be reused as backfill. A deed restriction prohibiting development of water supply or irrigation wells on the Site would be required for this option until groundwater constituent concentrations are equal to or below the New York State AWQS for a GA Water Class.

A plan showing the proposed extent of this excavation is included in Appendix A. The area of the excavation would correspond to the entire Site boundary, or about 2.5 acres, and the depth ranges from 12 to 36 feet below cgs. Estimated remedial excavation and soil cover excavation volumes are as follows.

- Total excavation volume: 70,000 cubic yards
- Excavated urban fill: 20,000 cubic yards
- Excavated Subsurface Soil: 50,000 cubic yards

The estimated backfill volumes are as follows.

- Total backfill volume: 60,000 cubic yards
- Clean fill volume: 60,000 cubic yards
- Reused subsurface soil/urban fill: 0 cubic yards

The 10,000 cubic yard difference between the total excavated volume and the backfill volume is due to the lower redevelopment grade. The assumed average excavation rate is 360 cubic yards per day (18 truckloads per day). The average backfill placement rate is assumed to be about 50 percent faster, or 480 cubic yards per day (27 truckloads per day). The excavation will require sheet piling to support the sidewalls and dewatering below the water table.
The total estimated time for remediation is 18 months, including mobilization, sheet pile installation, excavation, backfilling, sheet pile removal, final grading, and demobilization.

2.2 Comparative Evaluation of Remedy Options

2.2.1 Protection of Human Health and the Environment

As previously indicated in Subsection 1.6 of this RAWP, the general goals for remedy selection under the Voluntary Cleanup Program are:

1. "To remediate the Site to a level that is protective of public health and the environment under the conditions of the Site's Contemplated Use," and

2. "Sources of contamination should be removed or eliminated, to the extent feasible, regardless of presumed risk."

Both excavation options remove the sources of contamination at the Site. Both excavation options are also similarly protective of public health and the environment assuming final use as a park: the 500/10 option by eliminating exposure pathways to residual contaminants with the soil cover and institutional controls; and the individual RSCO option by removing residual contaminants.

The No Action option is not protective of human health and the environment because it does not address the source, and does not provide for control of exposure pathways.

2.2.2 Standards Criteria and Guidance

The following is a list of major SCGs that apply to the Site:

Remedy Selection:

- TAGM 4030 – Selection of Remedial Actions at Inactive Hazardous Waste Sites (May 1990)
- TAGM 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- Draft Voluntary Cleanup Program Guide, May 22, 2002.

Remedy Implementation:

- 6 NYCRR Part 376 – Land Disposal Restrictions
- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 750 through 758 – Implementation of NPDES Program in NYS ("SPDES Regulations)

- TAGM 4031 – Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites
- Draft Voluntary Program Cleanup Guide, May 22, 2002

Both of the excavation options comply with the remedy selection SCGs and would comply with the remedy implementation SCGs if selected. In particular, TAGM 4046 specifies the two alternative cleanup criteria considered in this evaluation: individual RSCOs and the 500/10 total criteria.

The No Action option does not comply with any applicable TAGM.

2.2.3 Short-term Effectiveness and Impacts

The primary risks to the community during implementation of the excavation options include inhalation of fugitive dust and vapors from the Site and additional truck traffic (including potential spills). Primary risks to Site workers include inhalation and direct contact with fugitive dust and vapors and equipment accidents. The primary risk to the environment is a release of excavated material containing MGP-related contaminants to the Bronx River either through direct discharge or via the existing stormwater system in the park.

These risks will be mitigated with a variety of Site controls implemented during construction, including security fencing, erosion control barriers, continuous air monitoring, vapor and dust suppression, personal protective equipment, decontamination, and training.

While the general reliability of the Site controls is similar for both excavation options, the significantly longer duration of the Individual RSCO option (18 months vs. 9 months) increases the probability that one of more of the controls will fail during some portion of the remedial work. The Individual RSCO option also includes approximately two and a half times the excavated soil volume, substantially increasing truck traffic, the associated nuisance, accident potential, and risk of a release to the environment.

The excavations and institutional controls associated with both options will likely achieve all the RAOs presented in Section 1.6.

The No Action option would maintain the current no risk conditions in the short term but would not remove the sources of contamination.

2.2.4 Long-term Effectiveness and Permanence

- Both excavation remedies are permanent, irreversible, and do not rely on containment of sources. However, the 500/10 excavation relies on the maintenance of institutional controls to control potential exposures to residual contamination below the soil cover.

There is a minimal degree of uncertainty related to future enforcement of the institutional controls. However, the controls apply to subsurface work greater than 3 feet in depth and 6 feet in depth in some areas, which are likely to occur as infrequent, discrete, planned events, and not as the result of regular maintenance activities. These are circumstances that favor enforcement of the institutional controls with a reasonable amount of diligence by Parks Department staff.

The No Action option does not reduce Site risks in the long term.

2.2.5 Reduction of Toxicity, Mobility, or Volume

Both excavations will remove the source areas from the Site, which is estimated to include approximately 85 percent or more of the total mass of MGP-related contamination identified in soils at the Site. The individual RSCO excavation would remove most of the remaining 15 percent.

In both instances, removal of the source areas is expected to reduce contaminant dissolution into groundwater to the point where natural attenuation processes will steadily reduce hydraulically downgradient contaminant concentrations over time.

The No Action option does not reduce the toxicity, mobility, or volume of the MGP-related contamination at the Site.

2.2.6 Implementability

Both excavation options could be implemented using conventional excavation equipment and procedures. However, the substantially greater size and depth of the Individual RSCO excavation will require a more complicated and sophisticated excavation support system and will generate approximately 5 times as much dewatering effluent, as summarized in the following table:

Excavation Option	System Size (Gallons per minute)	Days of Operation	Total Volume (millions of gallons)
500/10 Excavation	80	100	4.5
RSCO Excavation	165	230	22

2.3 Remedy Option Evaluation

- Both excavation options provide a similar level of protectiveness for human health and the environment, and meet applicable SCGs

- The 500/10 excavation involves fewer short-term risks to the community, Site workers and the environment due to its substantially shorter duration

- The Individual RSCO excavation has less uncertainty regarding long-term effectiveness due to its lack of institutional controls, and results in a greater reduction in the mass of contamination on Site

- The 500/10 excavation is more implementable due to its significantly smaller size and depth

Given that both excavation options meet the two threshold criteria (protection of human health and the environment and compliance with SCGs), the final remedy selection is based on an evaluation of the tradeoffs associated with the remaining balancing criteria. The benefits associated with the 500/10 excavation option (i.e., fewer short-term risks to the community and significantly greater implementability) outweigh the potential risks associated with enforcement of institutional controls and the marginal increase in contaminant mass removed. Therefore, the selected remedy is the excavation and off-site disposal of MGP-impacted material that exceeds the 500/10 cleanup criteria.

3. Remedial Design Process

The remedial design process for this project includes three stages of design document preparation: conceptual design document (30 percent completion), pre-final design document (75 percent completion) and final design document (100 percent completion and suitable for obtaining contractor bids). This RAWP represents the 30 percent conceptual design document. The pre-final design documents will include:

- Detailed design drawings
- Technical specifications
- A construction quality assurance project plan (CQAPP)
- A construction health and safety plan (CHASP)
- A construction schedule
- A post-construction operation, maintenance and monitoring (OMM) plan
- Project data report

Collectively, these documents will represent the complete, detailed plan for site remediation.

The pre-final design documents will be submitted to the NYSDEC for review and comment. The documents will also be provided to the Parks Department for review because of the need for the remedial design to be coordinated with the Starlight Park redevelopment project. NYSDEC and Parks Department comments will be addressed via correspondence. The pre-final design document and associated comment correspondence will be released to the public. The final remedial design document will incorporate NYSDEC and Parks Department comments and will present complete drawings and specifications.

Each part of the pre-final design document is further described in the following sections.

3.1 Detailed Design Drawings

The preliminary list includes the following plans and details:

- Historical Conditions
- Existing Conditions
- Summary of Work
- Site Management Plan
- Security Plan
- Stormwater and Erosion Control Plan
- Traffic Plan

- Soil Management Plan
- Air Monitoring, Vapor and Dust Control Plan
- Geotechnical Instrumentation Plan
- Excavation Plan
- Excavation Sections
- Sheet Pile Wall Profile
- Design Criteria for Excavation
- Support and Dewatering
- Subsurface Profiles
- Remedial Grading Plan
- Cover Plan
- Restoration Plan

Drawings submitted as part of the final design document will be sealed by a professional engineer licensed in New York State. Specifications submitted as part of the final design document will be presented in Construction Specification Institute (CSI) format.

3.2 Specifications

The preliminary list of specification sections includes the following:

- Summary of Work
- Work Restrictions
- Contractor Submittal Procedures
- Temporary Facilities and Controls
- Erosion and Sedimentation Control
- Vehicle Access and Parking
- Site Preparation
- Excavation
- Demolition
- Dewatering and Water Treatment
- Excavation Support
- Excavated Materials Management
- Off-Site Transportation and Disposal
- Sampling and Analysis
- Imported Backfill
- Site Restoration
- Geotechnical Instrumentation

3.3 CQAPP

The construction quality assurance project plan (CQAPP) will establish the analytical testing criteria for all remedial activities. The CQAPP will include sampling frequency for disposal and documentation, sampling protocols, glassware requirements, test parameters, test methods, quality assurance/quality control requirements, and reporting requirements. All samples collected for chemical characterization during remediation activities will be submitted to a laboratory approved by the Environmental Laboratory Accreditation Program. The CQAPP will be based on NYSDEC requirements and guidance.

3.4 CHASP

The construction health and safety plan (CHASP) will establish the minimum health and safety requirements for site workers, including training and health monitoring requirements; site physical and chemical hazards; monitoring requirements; action levels; personal protective equipment requirements; and personnel decontamination requirements.

3.5 Schedule

The estimated construction schedule in critical-path format, broken down by major activities, will be provided.

3.6 OMM Plan

The operation, maintenance and monitoring (OMM) plan will establish the schedule and procedures for post-remediation activities such as park construction coordination, management of materials removed from below the imported clean fill soil cover, and groundwater monitoring.

4. Execution of the Remedy

This section describes the fundamental criteria and procedures that will be used to perform the various elements of the selected remedy. As described in Section 3 of this RAWP, these elements will be further expanded upon in the design documents, which include plans and specifications.

4.1 Pre-Construction Activities

4.1.1 Supplemental Investigation

Prior to preparation of the 75 percent pre-final design document, GEI performed a supplemental remedial investigation to refine the limits of the excavation and to collect geotechnical data for the design of the earth support and dewatering systems. The proposed field activities are described in the NYSDEC-approved "Supplemental Remedial Investigation Work Plan, East 173rd Street Works, Former Manufactured Gas Plant Site" by GEI, dated, August 28, 2003. Additional field activities are described in the SRIWP Comment Response Letter (addressed to the NYSDEC) dated October 3, 2003 and SRIWP comment responses presented in a letter to the Parks Department dated August 1, 2003. The investigation includes borings, in-situ hydraulic conductivity tests, and laboratory soil strength testing and sieve analysis. The NYSDEC-approved pre-construction boring and well locations are illustrated in Figure 9.

4.1.2 Sheridan Expressway Storm Sewer Relocation

The Sheridan Expressway reconstruction includes an upgraded storm sewer system that will run across Starlight Park and discharge to the Bronx River. To accommodate the construction schedule, the main branch of the new storm sewer system must be operational in the first half of 2004. However, the original proposed alignment of the main branch of the system was planned to be installed through the area of the proposed preliminary remedial excavation. This alignment would not allow the sewer to be operational in the required timeframe. In response to this problem, NYSDOT relocated the main branch of the sewer, and its associated grit separator, south of the Site. NYSDOT, NYSDEC, and Con Edison are currently coordinating the degree of environmental oversight required to perform this work.

4.1.3 In-Situ Waste Characterization Sampling

Immediately prior to or during general mobilization, the remediation contractor (the Contractor) selected by Con Edison will perform a boring program to collect soil samples for testing for off-site disposal requirements. The location, number, and laboratory tests required will be determined based on the disposal facilities selected.

4.2 Mobilization/Site Preparation

Prior to mobilization, the Contractor will prepare and submit all required documents for review and approval by Con Edison and the NYSDEC, as appropriate. Contractor submittals typically include a CHASP, a detailed site management plan, construction schedule, and permits that the contractor is responsible for obtaining. Submittals may also include some detailed designs for specialty items, such as the dewatering system and excavation support system.

The Contractor will apply for and obtain all necessary federal, state, and local permits associated with the remediation that are not the responsibility of Con Edison. These permits may include, but are not limited to, traffic routing, stormwater discharge, wastewater discharge, construction/ zoning, air emissions, and noise. Con Edison will obtain the appropriate access agreements for conducting the remedial work from the Parks Department and/or NYSDOT as required.

In accordance with Con Edison's *Utility Clearance Process for Intrusive Activities* (dated March 11, 2003), the Contractor will be responsible for contacting the Underground Facilities Protective Organization (UFPO) to request that all utilities on the park property are located and marked as appropriate. In addition, a commercial utility-locating company will be contracted to locate on-site features.

Prior to mobilization, Con Edison will also conduct a pre-construction Site meeting with the Contractor, consulting engineer, NYSDEC, NYSDOT, and the Parks Department to review the construction sequence, confirm the responsibilities of each of the parties, and establish formal lines of communication for the project.

After the pre-construction Site meeting the Contractor will mobilize all necessary labor, equipment, supplies and materials to perform the remedial work in accordance with the plans and specifications. Initial activities will consist of establishing temporary site facilities, project controls, equipment laydown areas, and material stockpiling areas. These activities are discussed in more detail in the following sections.

4.3 Project Controls

4.3.1 Temporary Site Facilities

Temporary Site facilities will include office trailers, storage trailers, portable toilets, material storage, and equipment lay down areas. Based on the excavation location it is likely that the temporary Site facilities will be located at the southern end of the park property just inside the existing main gate from the Sheridan Expressway on ramp. After installation, the Contractor will establish temporary electric, water, telephone, and other services as required. The office space will be sized to accommodate, at a minimum, the Contractor's staff and one representative from Con Edison, the consulting engineer, and NYSDEC, respectively. The NYSDEC will be provided a private office with a lockable door and one telephone line and one fax line.

4.3.2 Security

NYSDOT, or NYSDOT's contractor, will continue to provide security at the Site until work on the Sheridan Expressway is completed. Prior to the NYSDOT leaving the Site, Con Edison and the Parks Department will determine security requirements in the interim between NYSDOT's departure and the start of remedial work.

Prior to the start of remedial work, a temporary fence will be erected around the perimeter of the work and storage areas. At a minimum, it will be a 6-foot-high chain-link fence topped with barbed wire. All vehicles and/or equipment left in the work area will be secured at the end of each working day. Essential equipment that must run overnight and/or on non-working days, such as dewatering systems, will be designed and managed with appropriate automatic shutoffs and/or alarms to prevent unsafe operation. All personnel working at the Site will be required to sign in and out on a daily basis. The gates to the Site will be closed during working hours except to allow vehicle traffic to pass in and out of the Site. Warning signs, in English and Spanish, will be placed on the gates and perimeter fence to alert passersby and discourage trespassing.

Full-time on-site security will also be present during non-working periods of the week (nights, weekends, holidays) until the remedial work is completed.

4.3.3 Traffic Plan

All traffic is expected to enter and leave the Site via the existing gate to the Sheridan Expressway at the southern end of the park. NYSDOT's Sheridan Expressway contractor is currently using this gate for the same purpose. The Contractor's personnel will direct the arrival or departure of construction vehicles, and provide flag services as needed to maintain safe travel on the ramp and Edgewater Road. All truck traffic, except trucks of local origin, will be required to arrive at and leave the Site via the Sheridan Expressway. The complete haul route(s) will be identified following the selection of an off-site disposal facility. The haul routes will be designed to

minimize or eliminate the time trucks will be on local streets. Clean, empty dump trucks waiting to be loaded with excavated material for off-site disposal will be staged on the Site. Trucks will not be allowed to stage in neighborhood streets. Site personnel will be required to park on Site or in legal all-day on-street parking spaces, if available.

4.3.4 Exclusion Zone

The exclusion zone is the area within the park where all worker activity is subject to the monitoring, work procedures, and protective equipment required in the CHASP. For this project, the exclusion zone will include the excavation areas and any areas used to temporarily store, handle, or treat any of the MGP-impacted soil and groundwater removed from the excavation. The exclusion zone will be separately and clearly delineated from the rest of the park and the perimeter security fencing. All personnel and equipment leaving the exclusion zone will be subject to the decontamination requirements described in Subsection 4.3.8 of this RAWP.

4.3.5 Health and Safety Plan

All site personnel will be required to read, sign, and comply with the requirements of the project CHASP and the contractor CHASP at all times. The project CHASP will be included in the 75 percent pre-final design document, as discussed in Section 3 of this report.

4.3.6 Perimeter Air Monitoring and Vapor Control Plan

Excavation activities at remediation sites typically generate airborne dust and vapors (volatile organic compounds [VOCs]) that have the potential to migrate off site. In recognition of this potential hazard, the NYSDOH has promulgated a Community Air Monitoring Plan (CAMP) that establishes action levels of dust and VOCs that are protective of the surrounding community. The requirements of the CAMP are contained in Appendix D of the Voluntary Cleanup Guide. Specific measures that will be taken during Site remediation work to comply with the CAMP are described in the following paragraphs.

- ***Fixed Monitoring Stations***.

    - Up to six fixed monitoring stations, capable of providing real-time and 15-minute average monitoring for dust and VOCs will be established around the perimeter of the exclusion zone. The monitoring stations will operate continuously, 24 hours per day, 7 days per week for the duration of soil disturbing activities. All monitoring data will be transmitted directly to a central computer where it will be analyzed by a technician. The system will automatically alert site management via alarm and pager if any measured dust or VOCs exceed an action level. All equipment will be calibrated at least once daily. To establish background conditions, real-time monitoring will begin at least one week before the start of

soil disturbing activities. One 8-hour time-weighed sample will be collected prior to the start of soil disturbance activities. This sample will be collected during the week that the real time background sampling is performed. Once per week, during soil disturbing activities, 8-hour time-weighted samples will be collected at two of the fixed monitoring stations and analyzed for VOCs and naphthalene by modified USEPA method TO-15. The time-weighted samples will be used to confirm the results of continuous monitoring.

- If total VOC concentrations are detected at a concentration that exceed action levels on the real-time monitoring system, the gas chromatograph of the real-time system will automatically switch from Total VOC Mode to Compound Specific Mode. If odors become a nuisance, the real-time monitoring system can be manually switched to Compound Specific Mode. Once the real-time monitoring system switches to the Compound Specific Mode, the gas chromatograph will determine the real-time concentration of benzene, toluene, ethylbenzene and xylene (BTEX). The compound specific concentrations will be documented.

- ***Roving Monitoring***. In addition to the fixed monitoring stations, on-site personnel will also perform roving monitoring with a photoionization detector (PID) for VOCs and a Miniram™ for dust within the exclusion zone. All equipment will be calibrated at least once daily. The roving monitoring will be performed near activities that are likely to generate dust and/or vapor to establish the types of controls required to prevent dust or VOC concentrations above CAMP requirements at the perimeter of the exclusion zone.

- ***VOC Response Levels***

  - If total VOCs at the downwind perimeter of the exclusion zone exceed 5 ppm above background for a 15-minute time-weighted average, work activities must be temporarily halted and monitoring continued. If the total VOC level readily decreases below 5 ppm over background, work activities could resume with continued monitoring.

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

- If total VOCs at the perimeter of the exclusion zone exceed 25 ppm, activities must be shut down.

- ***Dust Response Levels***

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

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

- ***Weather***. Meteorological parameters, such as wind speed, wind direction, temperature, and barometric pressure will be monitored throughout the air-sampling program using an on-site weather station. This weather station will, at a minimum, continuously record wind speed, wind direction, and temperature. The continuous meteorological data will be summarized for each 24-hour period during the remedial action. A log of local weather observations (wind direction, temperature, and precipitation data) will be kept with observations taken coincidental with real-time air-quality measurements.

- ***Reporting.*** All air monitoring data will be recorded and available for review by NYSDEC and NYSDOH personnel.

- ***Vapor and Dust Control.*** If the real-time perimeter action levels are exceeded, Con Edison, the consulting engineer and the Contractor will consult to determine what type of emission control action is appropriate. Actions that may be taken to reduce emissions include the following:

  - Spraying water on exposed soil surfaces and/or roadways to suppress windblown dust

- Covering working areas of exposed impacted soils or stockpiles of impacted soils with tarpaulins, vapor suppressing foam or other vapor control agent

- Temporarily relocating work to an area with potentially lower emission levels.

- Reduce the production rate or change the sequence of work activities

- Change the work methods or equipment to alternatives that minimize air emissions

In practice, these actions will typically be employed proactively to prevent action levels from being reached at the exclusion zone perimeter in the first instance.

The use of temporary structures with air emissions treatment systems to cover the excavations was evaluated. Emission modeling by GEI based on conservative estimates of excavation conditions indicates that the temporary structures will not be required to comply with the requirements of the CAMP. A summary of the modeling analysis is contained in Appendix B.

In addition to the specific measures that will be taken during Site remediation work to comply with the CAMP, GEI personnel trained in making odor observations and evaluation will monitor odors downwind of the exclusion zone. The intensity of any perceived odor will be measured on the 8-point n-butanol intensity scale as described in ASTM Method E-544 "Standard Practice for Referencing Superthreshold Odor Intensity." Research conducted by Odor Science and Engineering, Inc. (OS&E) in Bloomfield, Connecticut and by Dr. William Cain at Yale University in New Haven, Connecticut, has shown that complaints of nuisance odors typically occur when the intensity of any odor is perceived to be at a level of 3.5 or higher on the n-butanol scale. Accordingly, if the odor intensity downwind of the Site exclusion zone reaches an intensity of 3.5 or greater on the n-butanol scale, appropriate control actions will be initiated such as modifying the excavation/soil handling rate, applying an odor neutralizer, or covering the excavated material.

4.3.7 Survey Control

During mobilization, a licensed surveyor will be contracted to establish a temporary baseline grid and benchmarks for the remedial work. The grid and benchmarks will be established in both Metric (meters) and English Units (feet) with the reference horizontal grid and vertical datum used by NYSDOT for the park reconstruction documents. The surveyors will return as needed to establish other reference points, layout work, and survey record information. This includes the locations of subsurface structures encountered at the limits of excavation but left in place, such as historic foundations and/or piping (with the approval of NYSDEC). Other Site personnel will perform additional intermediate surveys as needed.

4.3.8 Decontamination Plan

The Contractor will establish decontamination areas for the following activities.

- Personnel decontamination
- Equipment decontamination

A personnel decontamination station where workers can drop equipment and remove PPE will be set up at a designated exit from the exclusion zone. It will be equipped with basins for water and detergent, and trash bags or cans for containing disposable PPE and discarded materials. Once personnel have decontaminated at this station and taken off their PPE, they will, if necessary, proceed to an adjacent wash facility as a secondary means of personal hygiene (e.g., hands, face, etc.). The specific personnel decontamination procedures and requirements will be provided in the final CHASP.

All materials and equipment (except disposable items) will be decontaminated on specially constructed "pads" located at exit points from the exclusion zone. At a minimum, the pads will consist of a layer of crushed stone underlain by an impervious plastic liner that has been graded to drain to a collection sump. The pad will be sized to accommodate the largest piece of equipment used on the project. Where effective, the equipment will be "dry" decontaminated using a broom and/or brushes. If significant amounts of soil or other contaminants remain after the dry decontamination, the equipment will also be pressure washed before leaving the Site.

Wastewater from equipment decontamination will be collected in a sump and treated with the dewatering effluent from the excavation.
Soil collected from the decontamination pads will be combined with the excavated MGP-impacted material for off-site disposal.

Disposable items will be containerized within the exclusion zone and transported for appropriate off-site disposal.

4.3.9 Stormwater and Erosion Control Plan

During mobilization, a continuous line of silt fence and hay bales will be established around the perimeter of the work area to minimize off-site sediment transport during storm events. Silt fences and hay bales will also be used to protect any storm drains outside the excavation areas. The silt fences will be inspected by the Contractor at the start and end of each workday and repaired immediately as needed.

Within areas disturbed by remedial excavations, the ground surface surrounding the excavation will be sloped to drain toward the excavation. In this way, any precipitation that comes into contact with potentially MGP-impacted soil will be directed into the excavation where it will be collected by the dewatering system and pumped to the dewatering effluent treatment plant.

4.4 Excavation

4.4.1 Excavation Sequence

As presently configured, the excavation consists of two main components: the "shallow" excavation areas that are 10 to 14 feet deep and the "deep" excavation areas that are 20 to 22 feet deep. General soil conditions in the excavation area consist of 5 feet of urban fill, overlying 8 feet of MGP-era fill, overlying 10 feet of organic soils, overlying 6 feet of glacial deposits, overlying bedrock. The depth to bedrock ranges from approximately 28 to 38 feet. The depth to groundwater is approximately 10 feet.

The general proposed sequence of excavation is as follows:

1. Excavate all urban fill across the entire shallow and deep excavation zones. Remove obstructions as encountered. Stockpile the urban fill on park property for reuse as backfill.

2. Excavate the subsurface soil across the entire excavation to a depth of about 8 feet (approximate depth of water table). Stockpile the subsurface soil on park property and characterize stockpile for possible reuse as backfill. Transport and off-site disposal of all MGP-impacted subsurface soil that exceeds the 500/10 cleanup criteria and/or contains visible DNAPL tar. Transport and offsite disposal of all subsurface soil not reused as backfill.

3. Install excavation dewatering sumps and wells.

4. Install the excavation support system. The excavation support system will be installed to bedrock or refusal to function as a groundwater cutoff. Remove

obstructions as encountered. Excavation support is proposed for the perimeter of the deep excavation, along the west side of the 14-foot-deep excavation, and along the east side of the 12-foot-deep excavation adjacent to the river.

5. Complete the remediation excavation, stockpile subsurface soils on park property and characterize stockpile for possible reuse as backfill. Transport and off-site disposal of all soils that exceeds the 500/10 cleanup criteria and/or contains visible DNAPL tar. Transport and offsite disposal of all subsurface soils not reused as backfill.

6. Backfill the remediation excavation with urban fill, subsurface soil meeting cleanup criteria and imported clean fill as necessary.

7. Install a demarcation barrier within the entire former MGP footprint and any excavated areas outside the MGP footprint boundary below the clean fill soil cover.

8. Within the former MGP footprint and any areas outside the MGP footprint requiring excavation of MGP-related contaminants, place a minimum 3-foot-thick soil cover of clean fill below the final redevelopment grade within the footprint of the planned ball field.

9. Within the former MGP footprint and any areas outside the MGP footprint requiring excavation of MGP-related contaminants, place a minimum 6-foot-thick soil cover of clean fill below the redevelopment grade in areas outside the planned ball field boundary.

Completion of the deep excavation first, from a depth of 8 feet, will allow the Contractor to work from a "dirty" platform in the shallow excavation areas. If the shallow excavations were completed first, it would be difficult to prevent recontamination as material was removed from the deep excavation. Initially leaving the shallow excavations at 8 feet and completing them at the end will also reduce dewatering requirements. The exact limits of the deep excavation will be determined prior to the excavation work based on information collected during the focused remedial investigation and supplemental remedial investigation. In areas where sheet piling is installed, the results of samples collected from the pre-construction borings will be used to document the sidewall soil conditions. In other areas, and on the excavation bottoms, samples will be collected when the excavation limits have been achieved.

The removal of urban fill and subsurface soil in areas on the Site outside the excavation areas will also allow investigation in the area of two underground storage tanks (USTs) that may have

been located (based on a historical plan) on the northeast portion of the Site (near the former at grade holder).

4.4.2 Excavation Support

Excavation support is required to maintain vertical sidewalls in the deep excavation, particularly below the water table, and to protect the storm drain adjacent to the west side of the excavation and the riverbank adjacent to the east side of the excavation. The type of excavation support that will likely be used is interlocking steel sheet piling. Steel sheet piling is appropriate for the Site because it can be directly driven from the surface to form a continuous wall to the top of bedrock. The piling thus stabilizes the side wall soils, which would likely collapse into the excavation in an open excavation scenario, and cuts off much of the groundwater that would otherwise enter the excavation and require treatment.

Cantilevered sheet piling will be used for most of the excavation support. Braced sheet piling, consisting of internal/external bracing or tiebacks will be used for the deep excavation. Tie bands will likely be anchored into bedrock.

Upon completion of backfilling the excavation, the bracing and sheet piling will be removed, if feasible, after backfilling. Any tiebacks will be de-tensioned, cut, and left in place along with any sheet pile that cannot be practically removed.

4.4.3 Excavation Dewatering and Effluent Treatment

Excavation dewatering will consist of a combination of shallow sumps and dewatering wells. The sumps will be located within the excavations. The wells will be located inside the excavations. Both the sumps and wells will be fitted with submersible pumps. The network of sumps and wells will be pumped such that the groundwater level in the excavation is maintained at least 1 foot below the excavation bottom during soil removal and backfilling. This will provide for observation of the excavation bottom and facilitate compaction of the backfill.

All water pumped from the sumps and wells will be directed to a dewatering effluent treatment plant (located within the park) where it will be treated to appropriate standards and discharged to either the sanitary sewer or the Bronx River. At a minimum, the treatment plant will consist of the following components, listed in the order of flow from the excavation:

- Primary settling tanks/oil water separators
- Sand filter
- Bag filter
- Carbon treatment for organic contaminants

The system will be designed with redundant components and back-flushing capabilities to ensure continuous operation. The determination of the discharge point for the treated dewatering effluent will be determined based on the permits that can be obtained from the regulating authorities. Con Edison anticipates that the volume of dewatering effluent will be on the order of millions of gallons due to the depths and extent of the proposed preliminary remedial excavation. The off-site transport and disposal of such an enormous volume of material is not practical. The options for discharge of appropriately treated dewatering effluent to the sanitary sewer or surface water of the Bronx River will be considered. The pre-final design documents will provide the most viable discharge alternative, and will also indicate the criteria used for its selection. For example, for the sanitary sewer option, such criteria could include the availability and capacity of nearby sanitary sewerage piping; available capacity of the municipal sewage treatment plant; and pretreatment requirements. Discharge to the sanitary sewer would require submittal of an application to discharge to the New York City Department of Environmental Protection (NYCDEP) and subsequent approval of the application by NYCDEP. Discharge to the Bronx River would require the application and subsequent approval by NYSDEC of the discharge, the implementation of an on-site treatment system, and compliance with stringent water quality requirements.

4.4.4 Pipe Management

Piping encountered within the soil remedial excavation limits will be removed for off-site disposal. Each pipe that extends beyond the soil remedial excavation limit will be evaluated to determine if the pipe should be cut and capped or plugged at the excavation limit, traced outside the excavation limit or traced and removed. The evaluation will be made in the field in consultation with the NYSDEC field staff. The criteria used to evaluate piping that extends beyond the limits of the excavation (if present) will include the following:

- Pipe size
- Pipe depth below the proposed ground surface grade
- Contents (e.g., tar) inside the pipe or pipe bedding
- Possible location of the beginning and terminus of the pipe
- Possible relation of the pipe to historic MGP structures

Pipe evaluations and the location of all cut and capped pipes, traced pipe and pipe removed from areas beyond the soil excavation limit will be documented and presented in a post-remediation report.

4.4.5 Documentation Sampling

Documentation samples will be collected on a 40-foot grid from the sides and bottoms of the excavations and tested for VOCs and SVOCs to confirm that the cleanup criteria have been met.

In areas where sheet piling is installed, the results of samples collected from the pre-construction borings will be used to document the sidewall soil conditions. In other areas, and on the excavation bottoms, samples will be collected when the excavation limits have been achieved. The excavation support for the deep excavation will be designed to allow the bottom to be 2 feet deeper than the target depth based on visual observations.

4.4.6 Backfilling

The excavation will be backfilled with a combination of on-site excavated subsurface soils, on-site urban fill and imported clean fill for the soil cover. Stockpiled subsurface soils will be sampled and analyzed to determine total SVOC and total VOC concentrations. The frequency, number, and placement of samples collected from the subsurface soil stockpiles will be determined during remedial design. The bottom of the remedial excavations will be backfilled with stockpiled subsurface soils that do not exceed the 500/10 cleanup criteria. Stockpiled urban fill will be reused and placed on top of reused subsurface soils. Clean fill will be used for the soil cover. Prior to transport to the Site, the source of the clean fill will be tested to ensure that chemical concentrations are below the individual RSCOs listed in TAGM 4046 for VOCs, SVOCs, pesticides/PCBs, and metals. Additional samples of clean fill will be tested for every 2,000 cubic yards of fill brought to the Site.

4.4.7 Demarcation Barrier

A demarcation barrier will be placed in all areas within the MGP footprint and any excavated remedial areas outside the MGP footprint boundary. The demarcation barrier will be placed below the 3-foot and 6-foot clean soil cover. In areas where remnant MGP structure slabs are present and the thickness of backfill is reduced, the demarcation barrier will be placed on top of the slab. The demarcation barrier will likely consist of a permeable, brightly colored netting or mesh type material. Details of the demarcation barrier will be provided in the remedial design document.

4.4.8 Final Grading/Soil Cover

Backfill will be placed to redevelopment grade, minus the thickness of topsoil or other surface features, during final landscaping and park construction by NYSDOT. Throughout the MGP footprint, and any excavated remedial areas outside the MGP footprint boundary, a minimum 3-foot or 6-foot of clean fill soil cover will be established. The thickness of the clean backfill required for the soil cover will be referenced from the redevelopment grade. Within the former MGP footprint and any areas outside the MGP footprint where excavation of MGP-related contaminants is required, a minimum 3-foot thick clean fill soil cover will be installed within the footprint of the planned ball field, and a minimum 6-foot thick of clean fill soil cover will be placed in areas outside the planned ball field boundary. The slab of the former above-grade holder and former purifying building are present at depths of approximately 4.5 feet below the

current ground surface (cgs). The slab of the former retort house is present at a depth of approximately 3 feet cgs. These concrete slabs and any other foundations encountered outside the excavation and within the former MGP boundary will be evaluated during the remedial design to determine if they will be removed or left in place as part of the soil cover. The evaluation criteria that will be developed will include evidence of environmental impairment, thickness, area, structural integrity, and depth below redevelopment grade. It should be noted that the "upper most" portion of all areas of the Site will consist of clean topsoil, grass, or pavement placed by NYSDOT (during park redevelopment construction activities) above the grade to be left after remedial actions. Con Edison will provide oversight during final landscaping to ensure that the proper buffer zones are established. It is Con Edison's intent to provide the details of the soil cover construction as part of the remedial design document.

4.5 Materials Management

4.5.1 Stockpiling Plan

Soils that contain visible DNAPL tar will be directly loaded to transport containers for off-site disposal. This will minimize on-site stockpiling requirements for contaminated soils and the associated potential for the stockpiles to generate unacceptable levels of vapors and dust. Some on-site stockpiling space will be required for on-site urban fill that will be reused as backfill, stockpiled subsurface soils that will be tested to determine if the soil can be reused as backfill and as a contingency for contaminated soil that appears to be inconsistent with the characteristics of MGP waste, short-term disruptions in truck transport, capacity of the disposal facility, treatment of soil too wet to transport, and for potentially contaminated debris removed from the excavation. The maximum time that stockpiled soils will remain on the park property waiting for disposal or reuse is unknown. However, it is not likely that stockpiled subsurface soils would remain on the park property for more than three weeks.

A stockpiling pad(s) will be constructed in the area south of the excavation within the exclusion zone. This location will facilitate hauling from the excavation, as well as ultimate removal from the Site via the main gate. At a minimum, the pad will consist of a crushed stone underlain by an impervious plastic liner. The edges of the pad will be bermed, and the pad will be graded such that any liquid draining from the stockpiles can be collected in a sump and directed to the dewatering effluent treatment plant.

Prior to placement on the pad, debris will be cleaned with hoses and/or brushes within the excavation. Additional cleaning, if required for off-site disposal, will be performed on the pad. All excavation soil that will remain on the park property after the end of the working day in which the soil was removed will be covered with plastic tarps. Debris that is cleaned off and stockpiled will not be covered.

At the end of construction, the components of the pad will be disposed of as MGP-impacted waste. After the pad is removed, confirmatory surface-soil samples will be collected from the pad location and tested for VOCs and SVOCs. The exact number of confirmatory samples and the locations of the samples will be determined with NYSDEC approval after the construction of the stockpile pad.

Urban fill stockpiles will be located north of the excavation. The urban fill will not be placed on a pad, but will be covered with plastic tarps to minimize sediment runoff and dust generation.

4.5.2 Off-Site Transport and Disposal

Hauling companies with appropriate permits and/or licenses will perform all off-site waste transport. At a minimum, trucks hauling MGP-contaminated soils will be required to have a current permit that meets the requirements presented in New York Codes, Rules and Regulations (NYCRR) Part 364: Waste Transporter Permits. Other types of waste may require additional permits. The Contractor will be required to document truck permits prior to transporting waste from the Site.

Dump trucks used to haul MGP waste must have watertight tailgates. Prior to filling, the beds of the dump trucks will be lined with plastic sheeting. After filling, similar plastic sheeting will be used to cover the soil in the bed. The plastic sheeting will be secured using the truck's standard roll tarp.

After the load is covered and secured, the trucks will be decontaminated in accordance with Subsection 4.3.8 of this RAWP.

4.5.3 Liquid Waste

Liquid wastes that cannot be managed using the dewatering effluent treatment plant will be collected in fractionalization (frac) tanks, characterized, and transported to an appropriate off-site treatment/disposal facility.

4.6 Institutional Controls

The selected remedy relies on a set of restrictions and procedures, collectively referred to as institutional controls, to manage potential future human exposure to MGP-impacted soil and groundwater left in place below the soil cover. The proposed institutional controls include:

- A prohibition of land development for any use other than a park without prior written approval of the NYSDEC, provided that Site conditions and any excavated remedial areas outside the MGP footprint boundary are protective of the new use or made

protective for such use by additional remediation. Without such approval, only appropriate commercial, industrial, or recreational use will be allowed.

- Worker notification if utility or other excavation work below the soil cover is planned on the Site or any excavated remedial areas outside the MGP footprint boundary

- Notification to the NYSDEC prior to any action that could jeopardize the integrity of the remedy

- Development and approval of a soil management plan (including a health and safety plan) for any soil or waste removed from below the soil cover at the Site and any excavated remedial areas outside the MGP footprint boundary

- A prohibition on the development of water supply or irrigation wells on the Site

- Annual inspection and certification to confirm appropriate use of the Site and any excavated remedial areas outside the MGP footprint boundary, and to ensure that engineering and institutional controls included in this remedy are in place and remain effective to control the identified potential exposures.

The institutional controls will be memorialized to remain in place via an agreement between the Parks Department and Con Edison, with the approval of the NYSDEC and NYSDOH. The institutional controls will only apply to the area within the boundary of the former MGP footprint and any excavated remedial areas outside the MGP footprint boundary.

4.7 Post-Remedial Monitoring

After the remedial excavation is completed, Con Edison will perform periodic monitoring well sampling to confirm the improvement of groundwater quality. The monitoring wells that will be sampled include MW-1S/1D, MW-3S/3D, MW-4S/4D, and proposed monitoring wells MW-5S/5D and MW-6S/6D. Any of these wells that are damaged or destroyed by remedial activities will be replaced prior to the start of post-remedial monitoring.

During each sampling round, samples from each well will be tested for VOCs and SVOCs. Groundwater samples will be collected semi-annually for a minimum of two years. The first sampling round will be performed six months after remediation is completed. Monitoring will be discontinued at a particular well after MGP-related contaminants do not exceed New York State AWQS for a GA Water Class for three consecutive sampling rounds. Subsequent to the first two years of monitoring, the groundwater data will be evaluated by the NYSDEC to determine future groundwater monitoring requirements (if any).

5. Reporting/Record Keeping

5.1 Monthly Progress Report

During the preparation and execution of the selected remedy, Con Edison will provide monthly progress reports to NYSDEC summarizing the status of ongoing activities and the anticipated schedule of future activities.

5.2 On-Site Record Keeping

Records that will be kept during execution of the remedy include, but are not limited to:

- Daily field reports prepared by the resident engineer
- Construction photographs
- Air monitoring measurements
- Backfill sampling records
- Contractor submittals
- Documentation sample results
- As-built locations of excavation limits and documentation samples
- Dewatering effluent discharge testing results
- Transporter permit verification
- Waste transport manifests
- Weight tickets for bulk materials transported to or from the Site
- Quantities related to pay items

The records will be kept in the field office and periodically transferred to Con Edison and/or NYSDEC as required.

5.3 Remedial Action Final Report

Within 90 days of the conclusion of remedial activities, a final report will be prepared and submitted to NYSDEC documenting the implementation of the remediation. The report will include: a summary of the work conducted, noting any deviations from the RAWP; as-built drawings; disposal records; air monitoring records; documentation sampling results; water treatment testing results; other testing results; evidence that the institutional controls are in place; and a final OMM plan for post-remediation activities.

6. Schedule

A preliminary schedule of major pre-construction submittals, remedial implementation and post-construction report is contained in Table 1. The schedule is referenced in months from stakeholder review of the RAWP to the NYSDEC review of the remedial post-construction report. Based on the schedule the total estimated projected duration from RAWP acceptance to NYSDEC review of the post-construction report is 20 months.

7. Project Organization

7.1 Project Roles and Responsibilities

The primary participants in the former MGP remediation are:

Volunteer:	Consolidated Edison Company of New York
Property Owner:	The New York City Parks Department
Park Reconstruction:	New York State Department of Transportation
Regulatory Oversight:	New York State Department of Environmental Conservation New York State Department of Health
Consulting Engineer:	To be determined
Con Edison's Contractor:	To be determined

7.2 Project Communication

Successful project implementation will include regular internal communication between the project participants and external communication with the community and public officials at important milestones.

The main mechanism for internal communication will be weekly on-site progress meetings. At a minimum, participants in these meetings will include Con Edison's project manager; the Contractor's project manager; the resident engineer; and a NYSDEC representative. Others that can participate in the weekly meetings when appropriate include representatives of the Parks Department, NYSDOT, and NYSDOH.

Important external communication milestones (beyond regular public participation activities) include:

- Contract award
- Pre-construction meeting with local public safety officials
- Pre-construction meeting with the community
- Start of on-site work

- Significant work shutdowns (more than one day) due to air monitoring criteria above standards
- Start of sheet pile driving and associated vibration and noise
- Start of excavation and backfilling
- Completion of excavation and backfilling
- Departure from Site

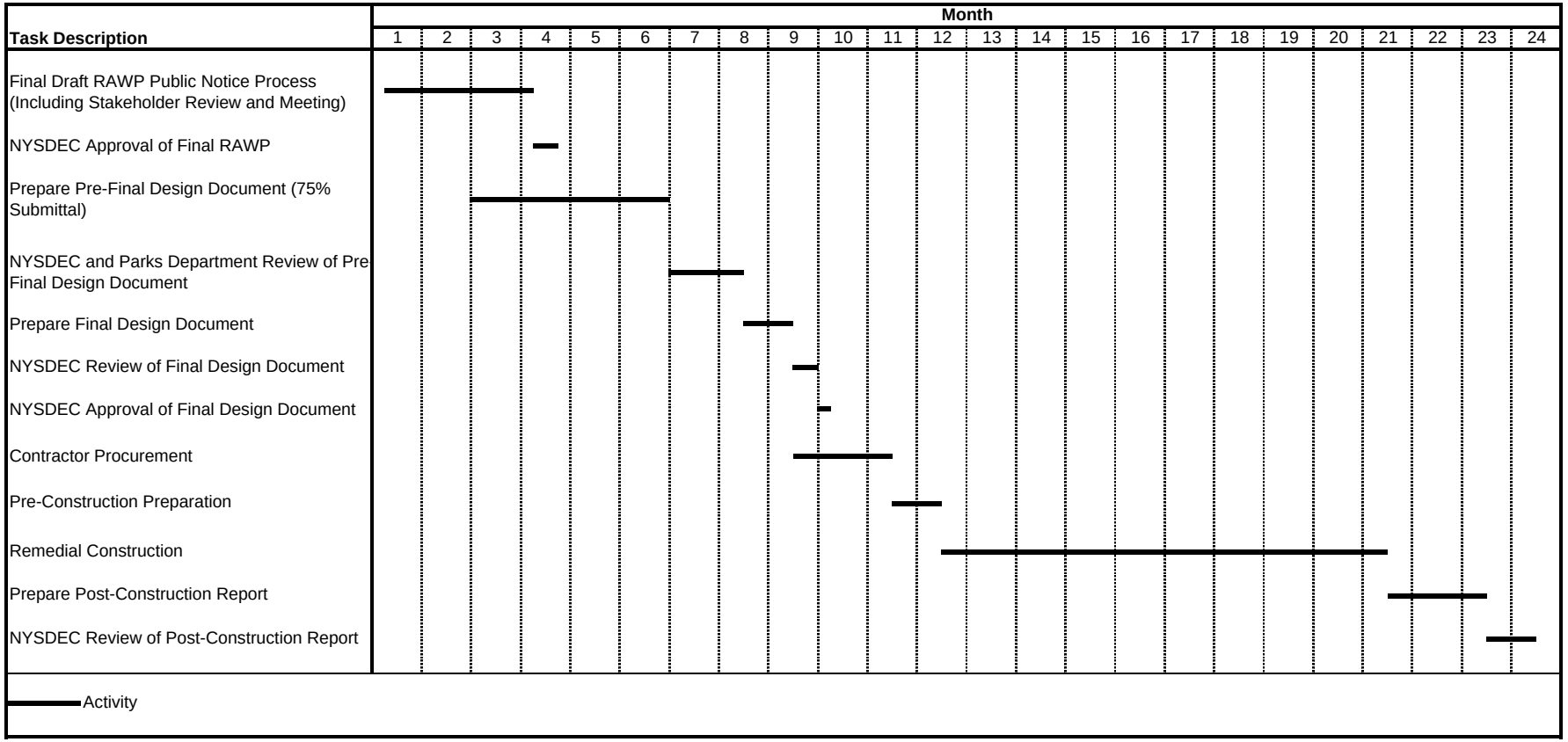
The milestones will be communicated using letters and/or public notices as appropriate.

7.3 Project Management

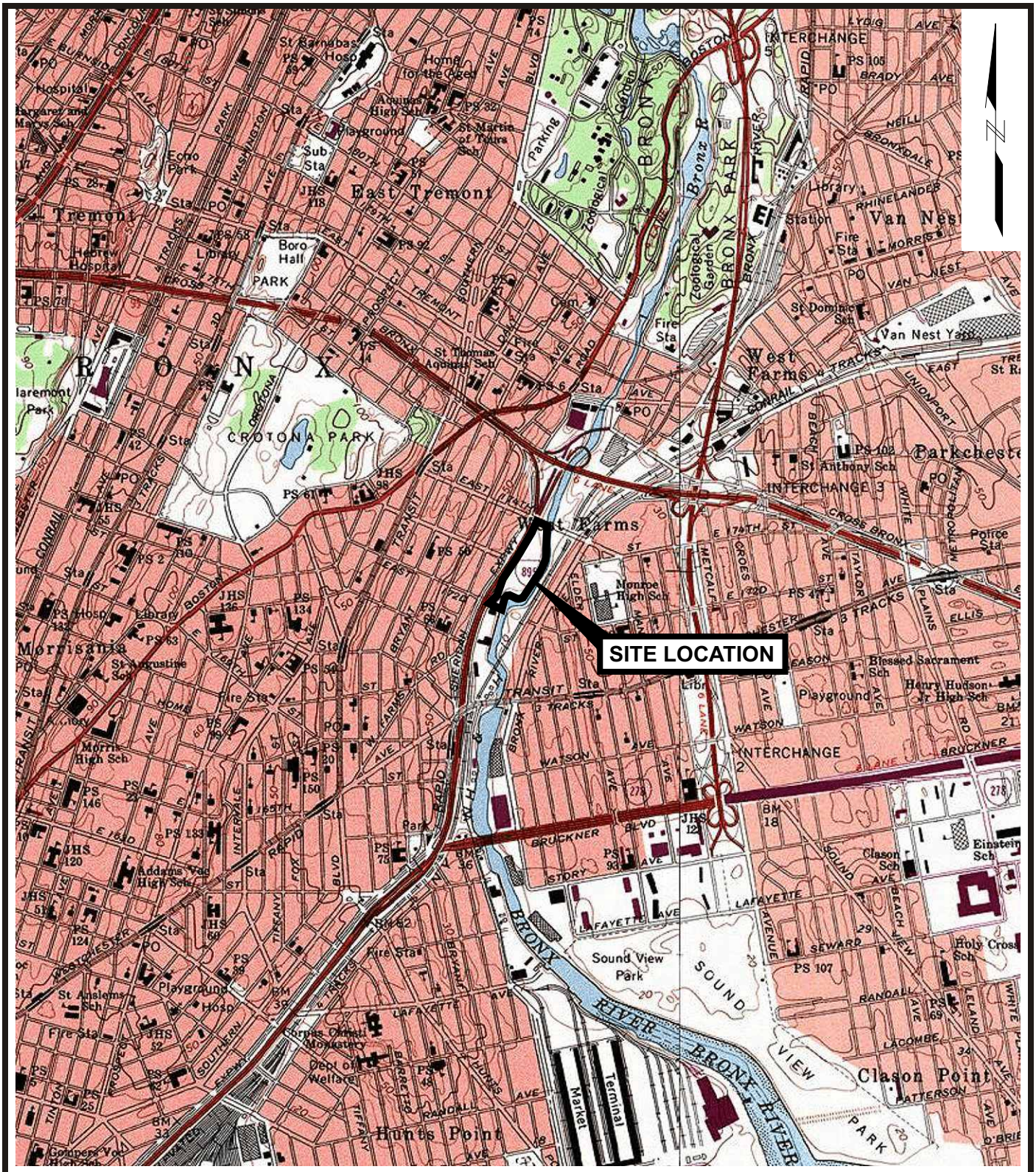
Overall management of the project will be the responsibility of Con Edison's project manager. He/she will be supported by a design engineer and resident engineer from GEI Consultants, Inc., and other environmental and engineering professionals as required. Con Edison's project manager will be the primary point of contact for the state agencies and local public officials.

Table

Table 1
Preliminary Schedule - Starlight Park Remediation



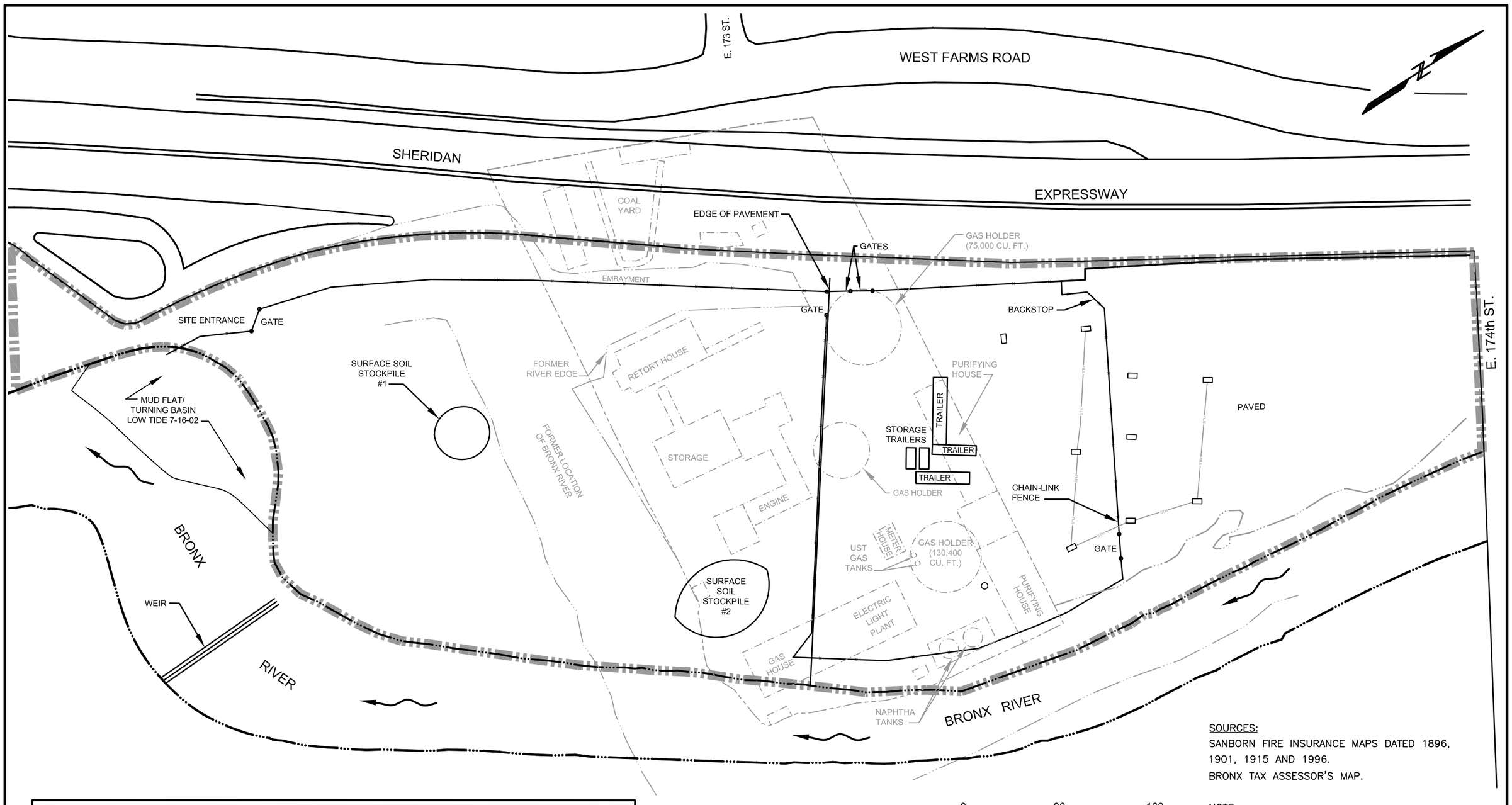
Figures



SOURCE: Map created with TOPO! ® ©2001 National Geographic (www.nationalgeographic.com/topo)

REMEDIAL ACTION WORK PLAN EAST 173RD STREET WORKS BRONX, NEW YORK	GEI Consultants	**SITE LOCATION MAP**
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.	Project 042310-1-1101	August 2004 Figure 1

CON_ED\013942\E173\RAWP\NL\E173-LOC.CDR



LEGEND

- CURRENT PROPERTY BOUNDARY
- APPROXIMATE FORMER MGP SITE BOUNDARY
- EXISTING STORM SEWER (STM)
- EXISTING CATCH BASIN
- EXISTING MANHOLE
- CURRENT BRONX RIVER
- FORMER EDGE OF BRONX RIVER
- FORMER BUILDING OR STRUCTURE

0 80 160

SCALE, FEET

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

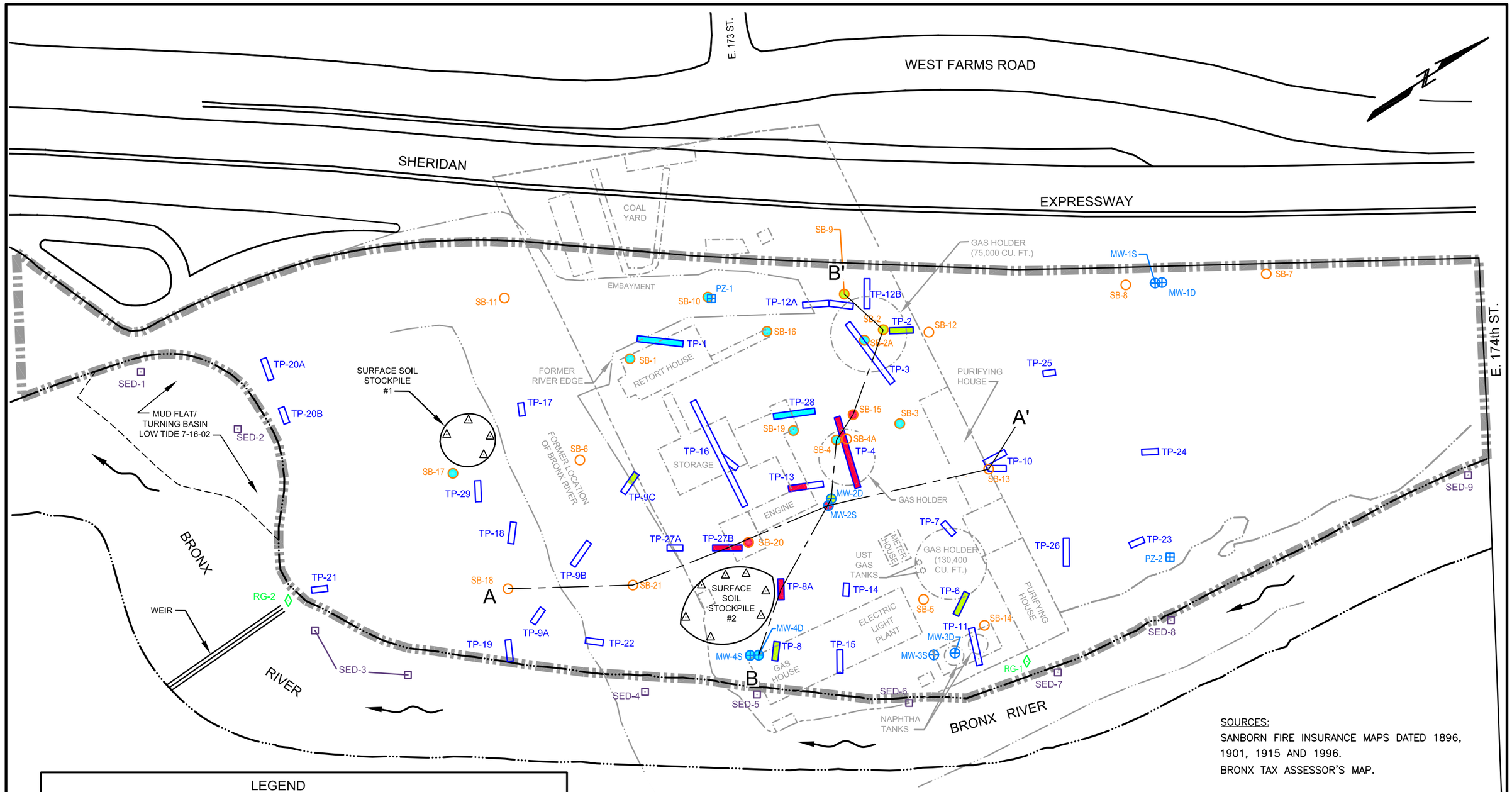
GEI Consultants

Project: 013942-2

HISTORICAL STRUCTURES AND CURRENT SITE LAYOUT

August 2004 Figure 2

CON_ED\013942\E173\RAWP\NL\01394-2-09 8/19/04



LEGEND

MW-1S	MONITORING WELL LOCATION		DNAPL TAR
SB-17	TEST BORING LOCATION		DNAPL TAR STAINING AND/OR SHEEN
PZ-1	PIEZOMETER LOCATION		NAPHTHALENE AND/OR MGP TAR ODOR
△	SURFACE SOIL SAMPLE LOCATION		CURRENT PROPERTY BOUNDARY
SED-1	SEDIMENT SAMPLE LOCATION		APPROXIMATE FORMER MGP SITE BOUNDARY
RG-1	RIVER GAUGE LOCATION	A — A'	CROSS SECTION LOCATIONS
TP-17	TEST PIT LOCATION		CURRENT BRONX RIVER
			FORMER EDGE OF BRONX RIVER
			FORMER BUILDING OR STRUCTURE

0 80 160

SCALE, FEET

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

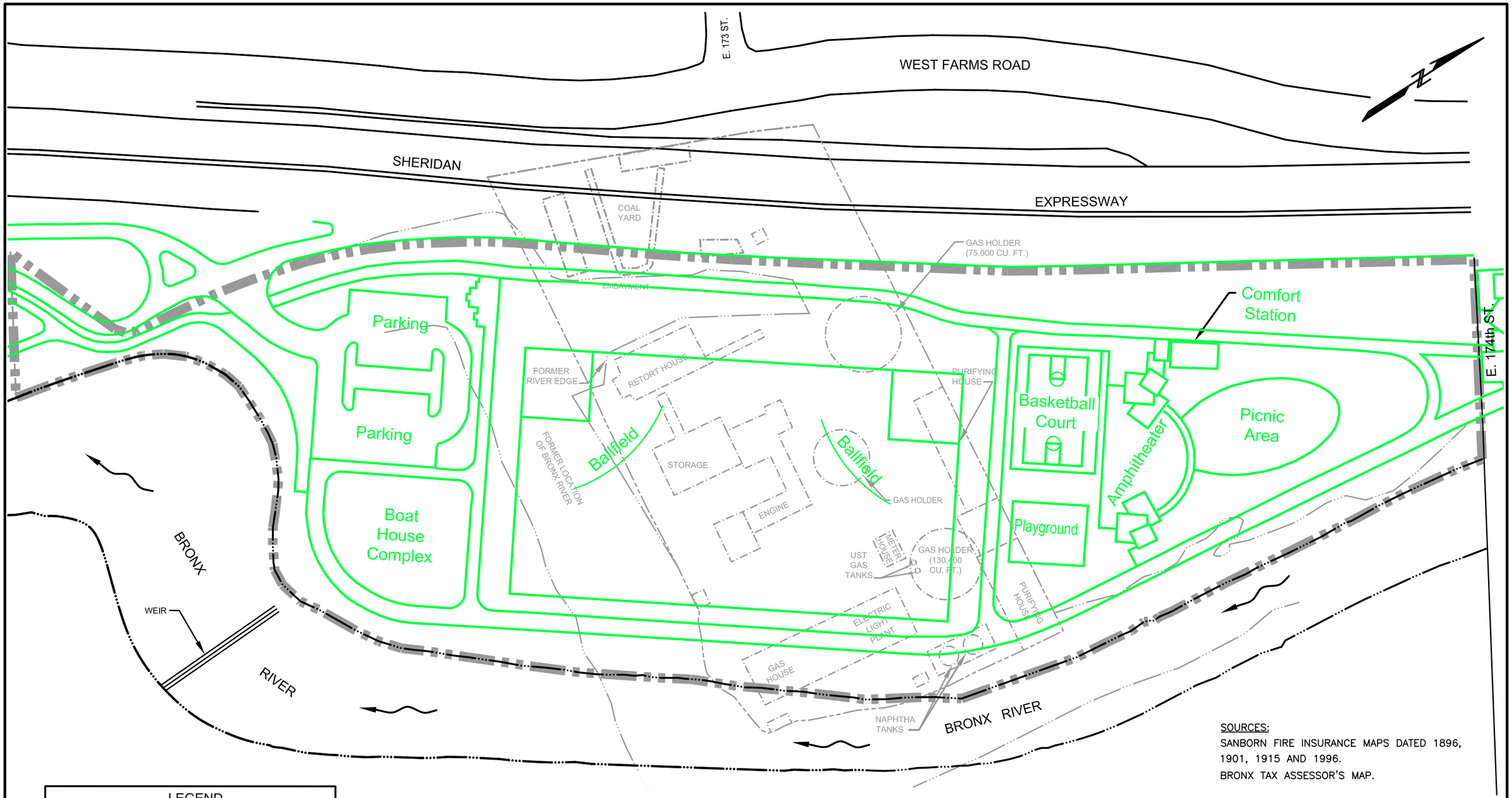
GEI Consultants

Project: 013942-2

SAMPLE AND CROSS SECTION LOCATIONS

August 2004 Figure 3

CON_ED\013942\E173\RAWP\NL\01394-2-13 8/19/04



SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

LEGEND

- CURRENT PROPERTY BOUNDARY
- APPROXIMATE FORMER MGP SITE BOUNDARY
- CURRENT BRONX RIVER
- FORMER EDGE OF BRONX RIVER
- FORMER BUILDING OR STRUCTURE
- PROPOSED PARK DEVELOPMENT LAYOUT

0 80 160
SCALE, FEET

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

Project: 013942-2

PROPOSED PARK DEVELOPMENT

August 2004 Figure 4

CON_ED\013942\E173\RAWP\NL\01394-2-10 8/19/04

E. 173 ST.

WEST FARMS ROAD

SHERIDAN

EXPRESSWAY

COAL YARD

GAS HOLDER (75,000 CU. FT.)

EMBANKMENT

0

3

FORMER RIVER EDGE

RETORT HOUSE

3

PURIFYING HOUSE

1-4

FORMER LOCATION OF BRONX RIVER

STORAGE

1

ENGINE

GAS HOLDER

3

MUD FLAT/TURNING BASIN LOW TIDE 7-16-02

BRONX

UST GAS TANKS

METER HOUSE

GAS HOLDER (130,000 CU. FT.)

2

0

PURIFYING HOUSE

WEIR

ELECTRIC LIGHT PLANT

0

0

GAS HOUSE

RIVER

NAPHTHA TANKS

BRONX RIVER

E. 174th ST.

LEGEND:

THIS IS .08 ARIAL TEXT.

LEGEND

- CURRENT PROPERTY BOUNDARY
- APPROXIMATE FORMER MGP SITE BOUNDARY
- CURRENT BRONX RIVER
- FORMER EDGE OF BRONX RIVER
- FORMER BUILDING OR STRUCTURE
- (2) GRADE REDUCTION FOR PARK RECONSTRUCTION (Feet)
- POST REMEDIATION: INSTALLATION AND MAINTENANCE OF A MINIMUM 3-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE FINAL REDEVELOPMENT GRADE IN THE AREA WITHIN THE FOOTPRINT OF THE PLANNED BALL FIELD, AND A MINIMUM 6-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE REDEVELOPMENT GRADE IN AREAS OUTSIDE THE PLANNED BALL FIELD BOUNDARY.
- PROPOSED PARK DEVELOPMENT LAYOUT

0 80 160

SCALE, FEET

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

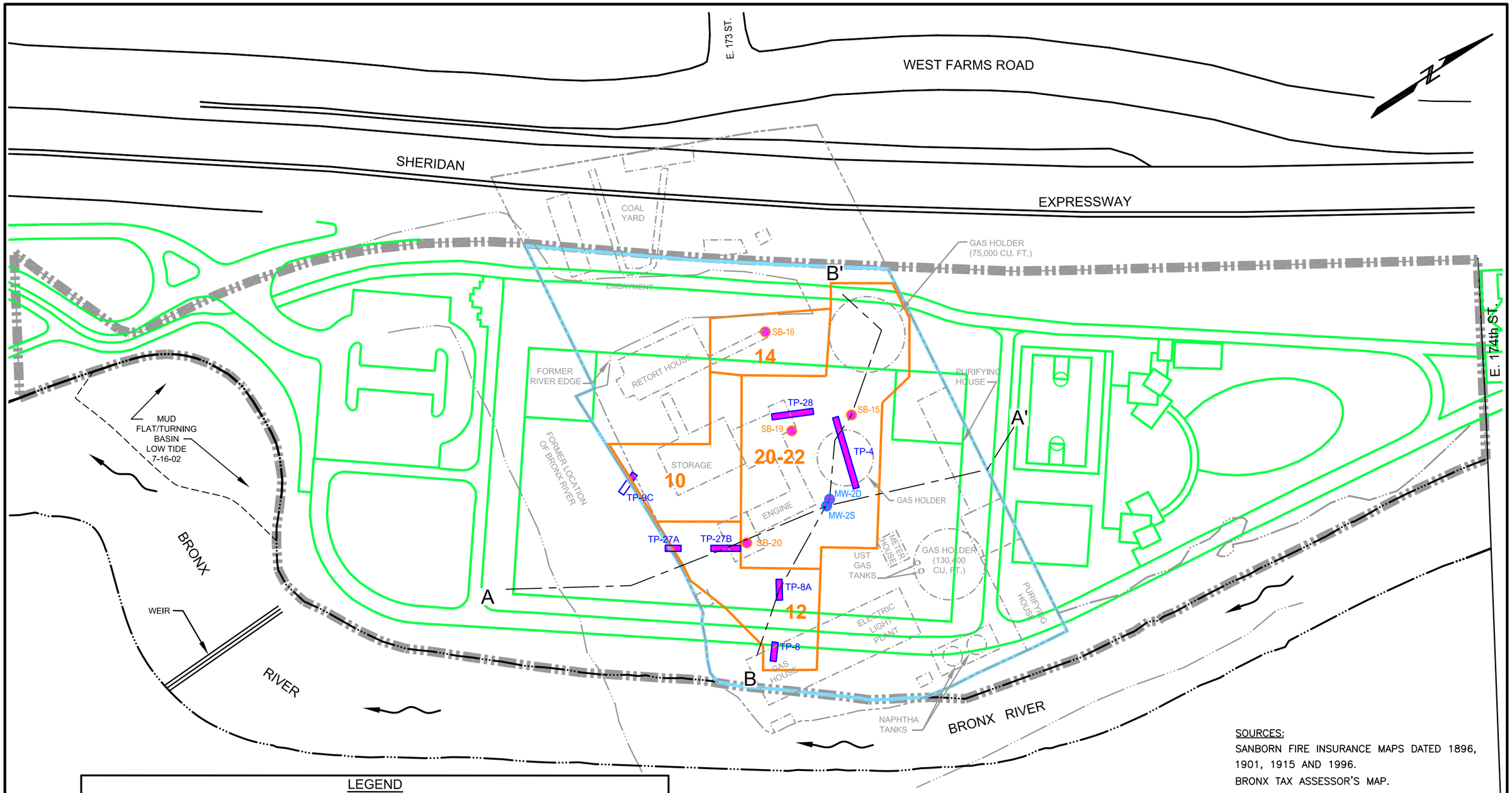
GEI Consultants

Project: 013942-2

PROPOSED GRADE CHANGE FOR PARK DEVELOPMENT

August 2004 Figure 5

CON_ED\013942\E173\RAWP\NL\01394-2-14 8/19/04



LEGEND

- CURRENT PROPERTY BOUNDARY
- APPROXIMATE FORMER MGP SITE BOUNDARY
- CURRENT BRONX RIVER
- FORMER EDGE OF BRONX RIVER
- FORMER BUILDING OR STRUCTURE
- PROPOSED PARK DEVELOPMENT LAYOUT
- A — A' CROSS SECTION LOCATIONS
- PROPOSED EXCAVATION LIMITS BASED ON TSVOCs > 500 ppm AND/OR TVOCs > 10 ppm

- 12 TARGET EXCAVATION DEPTHS FROM CURRENT GROUND SURFACE (Feet)
- TEST PIT OR BORING WITH DNAPL TAR AND/OR TSVOCs> 500 ppm, OR TVOCs> 10 ppm
- TSVOCs TOTAL SEMIVOLATILE ORGANIC COMPOUNDS
- TVOCs TOTAL VOLATILE ORGANIC COMPOUNDS
- ppm PARTS PER MILLION
- POST REMEDIATION: INSTALLATION AND MAINTENANCE OF A MINIMUM 3-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE FINAL REDEVELOPMENT GRADE IN THE AREA WITHIN THE FOOTPRINT OF THE PLANNED BALL FIELD, AND A MINIMUM 6-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE REDEVELOPMENT GRADE IN AREAS OUTSIDE THE PLANNED BALL FIELD BOUNDARY.

0 80 160

SCALE, FEET

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

Project: 013942-2

PROPOSED PRELIMINARY EXCAVATION LIMITS

August 2004 Figure 6

CON_ED\013942\E173\RAWP\NL\01394-2-11 8/19/04

A
ELEV.

A'
ELEV.

15
10
5
0
-5
-10
-15
-20
-25

FORMER MGP BOUNDRY

FORMER RIVER CHANNEL

SB-18
SB-21
TP-27B
SB-20
EXISTING GRADE
MW-2S
MW-2D
PROPOSED FINAL GRADE
SB-13/ TP-10

POST REMEDIATION: PLACE, OR MAINTAIN, THREE FEET OF URBAN FILL (OR CLEAN, IMPORTED SOIL) BELOW PROPOSED FINAL GRADE

PROPOSED CLEANUP LIMIT
500ppm TSVOCs/10ppm TVOCs AND/OR VISUAL DNAPL TAR

TVOCs ONLY
TDX

LEGEND

MW-2S — SOIL BORING OR MONITORING WELL IDENTIFICATION

WATER LEVEL MEASURED ON AUGUST 23, 2002

SCREENED INTERVAL

CONTACT

PROPOSED EXCAVATION LIMITS

POST MGP FILL (URBAN FILL)

MGP-ERA FILL

ORGANIC-RICH CLAY TO SAND (TIDAL MARSH)

FINE SAND TO GRAVEL (GLACIAL)

SCHIST BEDROCK

DNAPL TAR

EXCEEDS 500ppm SVOCs/10ppm TVOCs

URBAN FILL FOR REUSE

TSVOCs	TOTAL SEMIVOLATILE ORGANIC COMPOUNDS
TVOCs	TOTAL VOLATILE ORGANIC COMPOUNDS
ppm	PARTS PER MILLION

DATUM: BRONX BOROUGH DATUM

0 5 10
VERTICAL SCALE, FEET

0 50 100
HORIZONTAL SCALE, FEET

NOTE: VERTICAL EXAGGERATION = 10X

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

Project: 013942-2

GEOLOLGIC CROSS SECTION A-A'

August 2004 Figure 7

CON_ED\013942\E173\RAWP\NL\01394-2-04 8/19/04

B

ELEV.

15

10

5

0

-5

-10

-15

-20

-25

B'

ELEV.

15

10

5

0

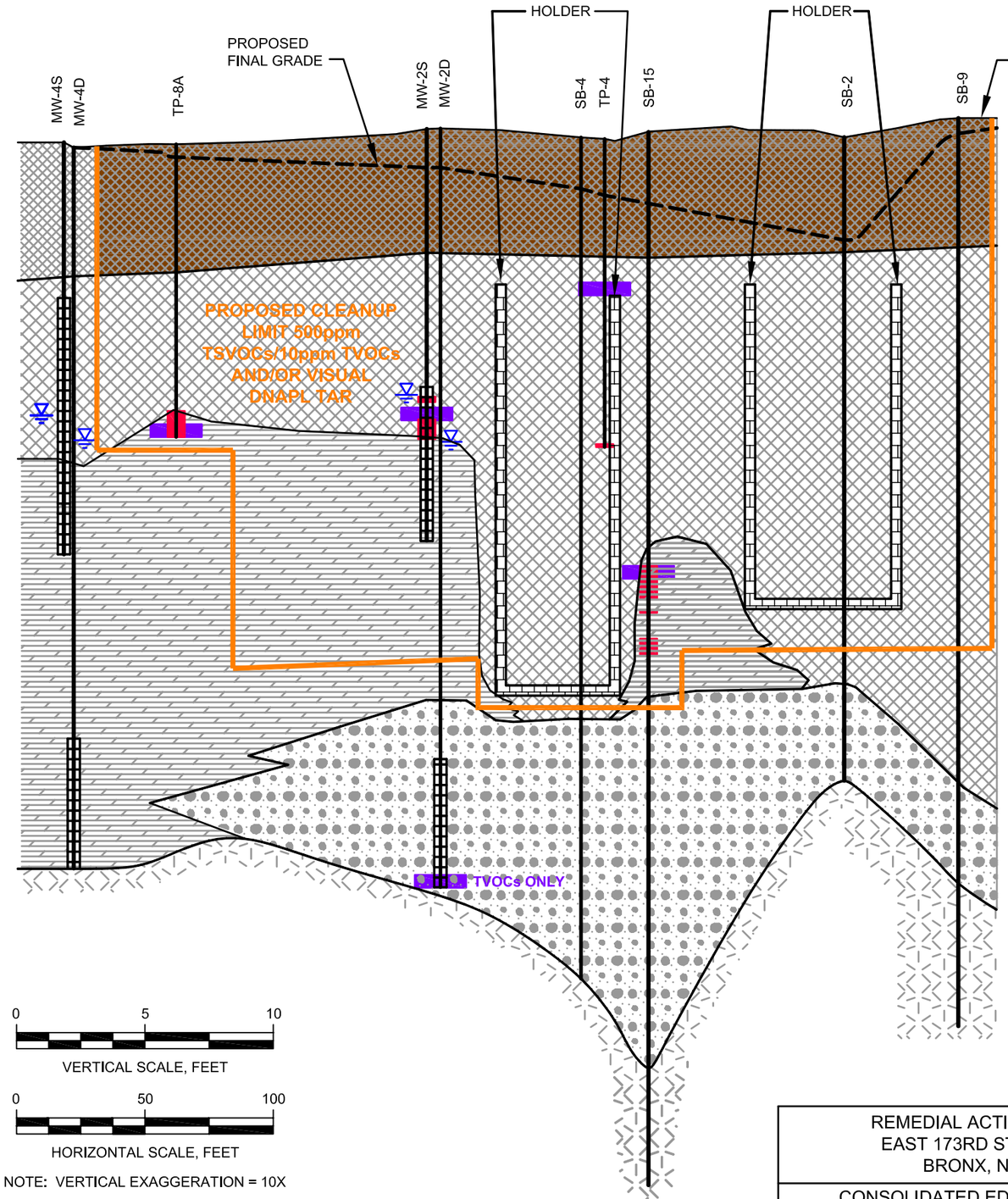
-5

-10

-15

-20

-25



LEGEND

MW-2S — SOIL BORING OR MONITORING WELL IDENTIFICATION

WATER LEVEL MEASURED ON AUGUST 23, 2002

SCREENED INTERVAL

CONTACT

PROPOSED EXCAVATION LIMITS

POST MGP FILL (URBAN FILL)

MGP-ERA FILL

ORGANIC-RICH CLAY TO SAND (TIDAL MARSH)

FINE SAND TO GRAVEL (GLACIAL)

SCHIST BEDROCK

DNAPL TAR

EXCEEDS 500ppm SVOCs/10ppm TVOCs

URBAN FILL FOR REUSE

TSVOCs — TOTAL SEMIVOLATILE ORGANIC COMPOUNDS

TVOCs — TOTAL VOLATILE ORGANIC COMPOUNDS

ppm — PARTS PER MILLION

DATUM: BRONX BOROUGH DATUM

0 5 10

VERTICAL SCALE, FEET

0 50 100

HORIZONTAL SCALE, FEET

NOTE: VERTICAL EXAGGERATION = 10X

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

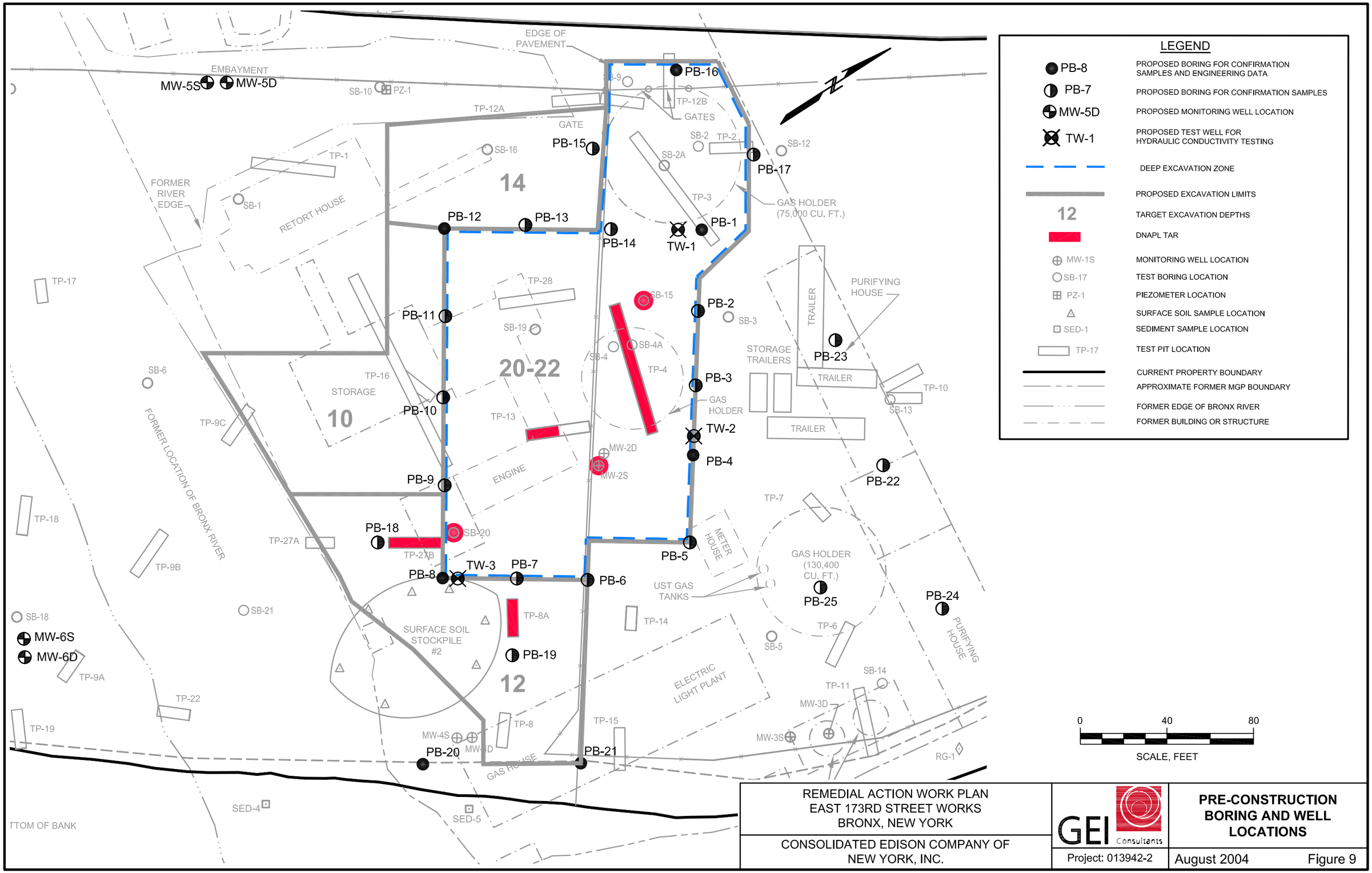
GEI Consultants

Project: 013942-2

GEOLOLGIC CROSS SECTION B-B'

August 2004 Figure 8

CON_ED\013942\E173\RAWP\NL\01394-2-04 8/19/04



REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

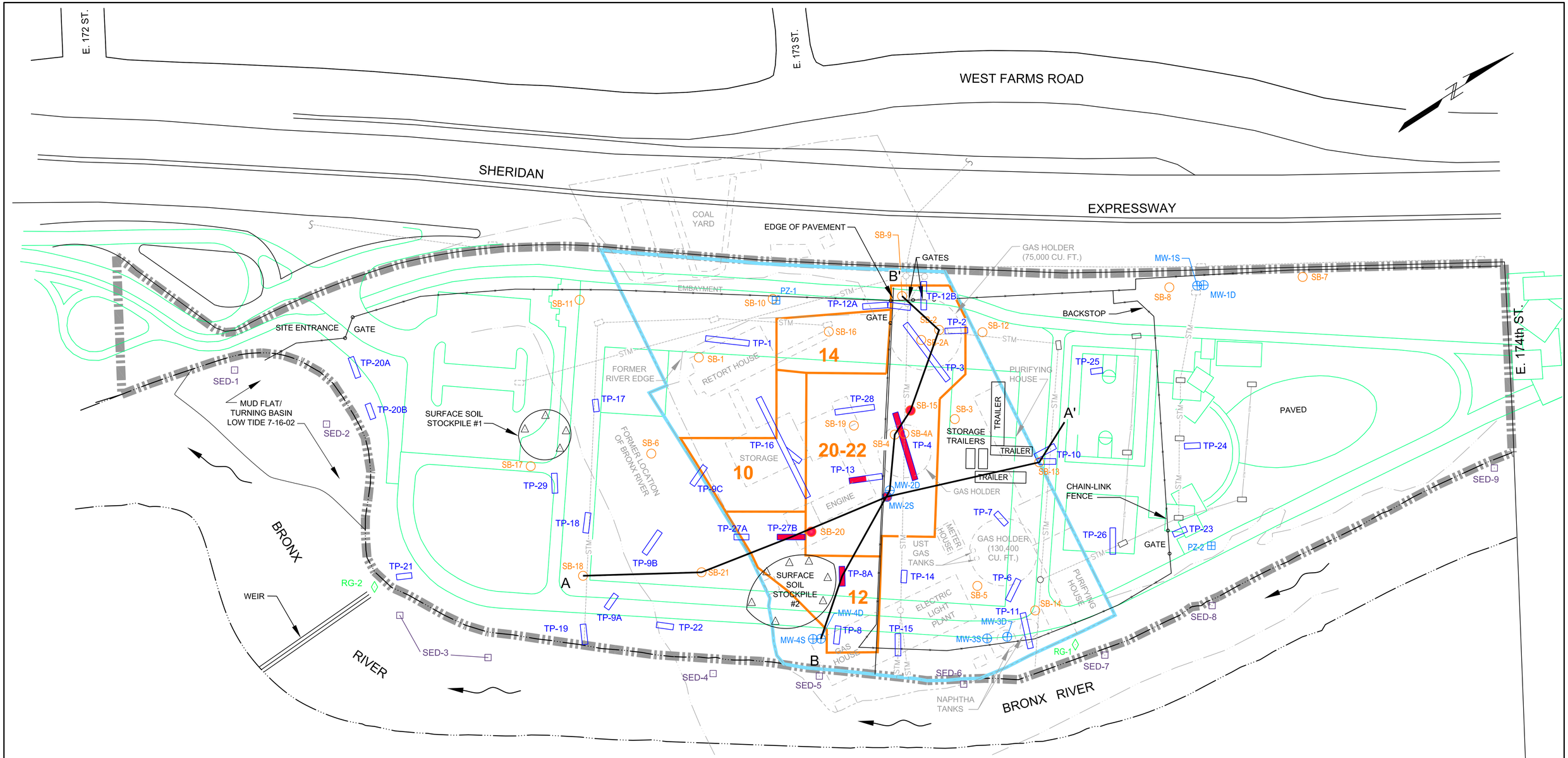
Project: 013942-2

PRE-CONSTRUCTION BORING AND WELL LOCATIONS

August 2004 Figure 9

CON_ED\013942\E173\RAWP\NL\E173RD-PBOR-REV 8/19/04

Plate



LEGEND

MW-1S	MONITORING WELL LOCATION
SB-17	TEST BORING LOCATION
PZ-1	PIEZOMETER LOCATION
△	SURFACE SOIL SAMPLE LOCATION
SED-1	SEDIMENT SAMPLE LOCATION
RG-1	RIVER GAUGE LOCATION
TP-17	TEST PIT LOCATION
STM	EXISTING STORM SEWER
▭	EXISTING CATCH BASIN
○	EXISTING MANHOLE
STM	PROPOSED STORM DRAIN
▭	PROPOSED CATCH BASIN
○	PROPOSED MANHOLE
	CURRENT PROPERTY BOUNDARY
	APPROXIMATE FORMER MGP BOUNDARY
A — A'	CROSS SECTION LOCATIONS
	CURRENT BRONX RIVER
	FORMER EDGE OF BRONX RIVER
	FORMER BUILDING OR STRUCTURE
	PROPOSED EXCAVATION LIMITS BASED ON TSVOCs > 500 ppm and/or TVOCs > 10 ppm
12	TARGET REMEDIAL EXCAVATION DEPTHS (Feet)
	DNAPL TAR
TSVOCs	TOTAL SEMIVOLATILE ORGANIC COMPOUNDS
TVOCs	TOTAL VOLATILE ORGANIC COMPOUNDS
ppm	PARTS PER MILLION
	POST REMEDIATION: INSTALLATION AND MAINTENANCE OF A MINIMUM 3-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE FINAL REDEVELOPMENT GRADE IN THE AREA WITHIN THE FOOTPRINT OF THE PLANNED BALL FIELD, AND A MINIMUM 6-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE REDEVELOPMENT GRADE IN AREAS OUTSIDE THE PLANNED BALL FIELD BOUNDARY.
	PROPOSED PARK DEVELOPMENT LAYOUT

0 40 80
SCALE, FEET

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTES:
1. SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

2. THE LOCATIONS OF PROPOSED SHERIDAN EXPRESSWAY STORM DRAINAGE SYSTEM (DRAINS, CATCH BASINS, MANHOLES) ARE CURRENTLY BEING REDESIGNED TO BE ROUTED AWAY FROM THE AREA OF THE PROPOSED MGP REMEDIATION.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

PROJECT NO.: 013942-2

GEI Consultants
P.O. BOX 297
188 NORWICH AVENUE
COLCHESTER, CONNECTICUT 06415

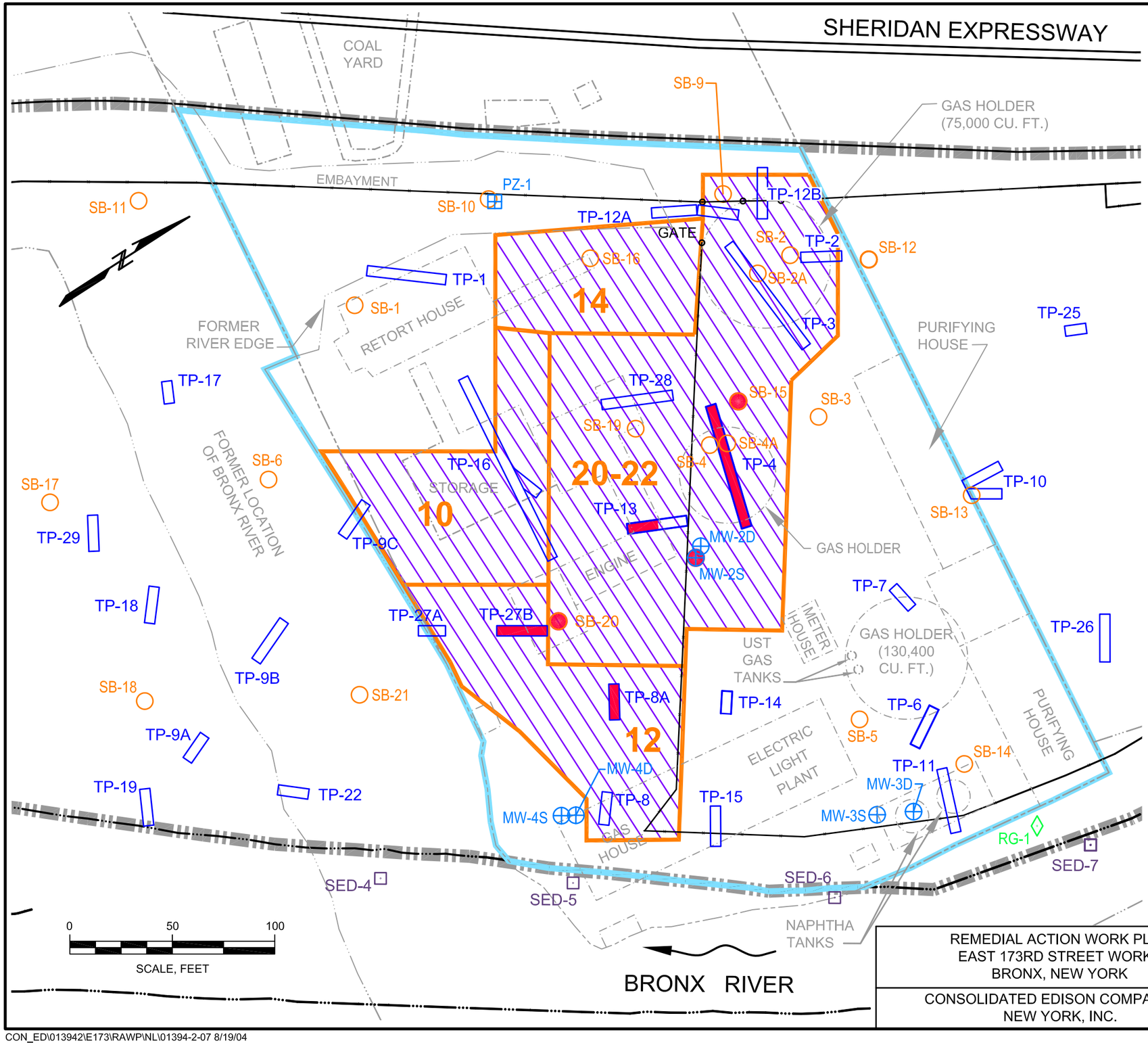
PROJECT SUMMARY

AUGUST 2004 PLATE 1

Appendix A

Proposed Preliminary Excavation Limits

Figure A1



LEGEND

MW-1S	MONITORING WELL LOCATION
SB-17	TEST BORING LOCATION
PZ-1	PIEZOMETER LOCATION
SED-1	SEDIMENT SAMPLE LOCATION
RG-1	RIVER GAUGE LOCATION
TP-17	TEST PIT LOCATION
	CURRENT PROPERTY BOUNDARY
	APPROXIMATE FORMER MGP SITE BOUNDARY
	CURRENT BRONX RIVER
	FORMER EDGE OF BRONX RIVER
	FORMER BUILDING OR STRUCTURE
	PROPOSED EXCAVATION LIMITS
12	TARGET EXCAVATION DEPTHS
	DNAPL TAR
TSVOCs	TOTAL SEMIVOLATILE ORGANIC COMPOUNDS
TVOCs	TOTAL VOLATILE ORGANIC COMPOUNDS
ppm	PARTS PER MILLION
	>500ppm TSVOCs >10ppm TVOCs

POST REMEDIATION: INSTALLATION AND MAINTENANCE OF A MINIMUM 3-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE FINAL REDEVELOPMENT GRADE IN THE AREA WITHIN THE FOOTPRINT OF THE PLANNED BALL FIELD, AND A MINIMUM 6-FOOT-THICK SOIL COVER OF CLEAN FILL BELOW THE REDEVELOPMENT GRADE IN AREAS OUTSIDE THE PLANNED BALL FIELD BOUNDARY.

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

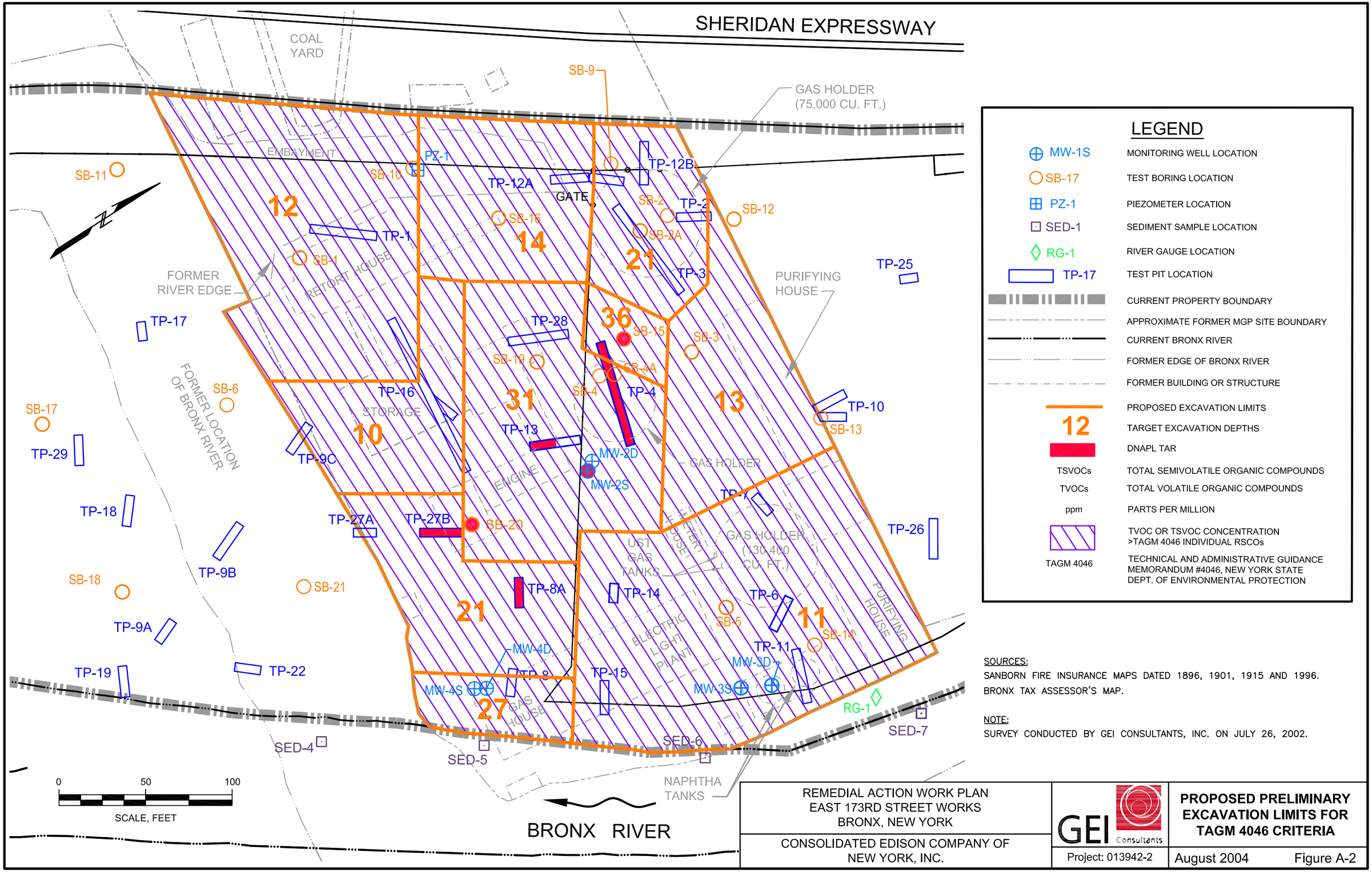
Project: 013942-2

PROPOSED PRELIMINARY EXCAVATION LIMITS FOR 500/10 CRITERIA

August 2004 Figure A-1

CON_ED\013942\E173\RAWP\NL\01394-2-07 8/19/04

Figure A2



LEGEND

MW-1S	MONITORING WELL LOCATION
SB-17	TEST BORING LOCATION
PZ-1	PIEZOMETER LOCATION
SED-1	SEDIMENT SAMPLE LOCATION
RG-1	RIVER GAUGE LOCATION
TP-17	TEST PIT LOCATION
	CURRENT PROPERTY BOUNDARY
	APPROXIMATE FORMER MGP SITE BOUNDARY
	CURRENT BRONX RIVER
	FORMER EDGE OF BRONX RIVER
	FORMER BUILDING OR STRUCTURE
	PROPOSED EXCAVATION LIMITS
12	TARGET EXCAVATION DEPTHS
	DNAPL TAR
TSVOCs	TOTAL SEMIVOLATILE ORGANIC COMPOUNDS
TVOCs	TOTAL VOLATILE ORGANIC COMPOUNDS
ppm	PARTS PER MILLION
	TVOC OR TSVOC CONCENTRATION >TAGM 4046 INDIVIDUAL RSCOs
TAGM 4046	TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4046, NEW YORK STATE DEPT. OF ENVIRONMENTAL PROTECTION

SOURCES:
SANBORN FIRE INSURANCE MAPS DATED 1896, 1901, 1915 AND 1996.
BRONX TAX ASSESSOR'S MAP.

NOTE:
SURVEY CONDUCTED BY GEI CONSULTANTS, INC. ON JULY 26, 2002.

REMEDIAL ACTION WORK PLAN
EAST 173RD STREET WORKS
BRONX, NEW YORK

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

GEI Consultants

Project: 013942-2

PROPOSED PRELIMINARY EXCAVATION LIMITS FOR TAGM 4046 CRITERIA

August 2004 Figure A-2

CON_ED\013942\E173\RAWP\NL\01394-2-08 8/19/04

Appendix B

Air Dispersion Model

AIR DISPERSION MODEL FOR
173 RD STREET WORKS FORMER MGP SITE
BRONX, NEW YORK

INTRODUCTION

This report contains the results of the air dispersion modeling of particulates and volatile organic compounds (VOCs) from proposed excavation activities during the remediation of the site. The latest version of the United States (US) Environmental Protection Agency (EPA) SCREEN3 Model, Version 95250 in conjunction with the *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources* (EPA-450/4-80-010, 1988), was used to estimate the maximum 1-hour concentrations at various distances from the excavation of source areas. According to EPA, the SCREEN3 model is a very conservative screening tool to estimate 1-hour concentrations.

SCREEN3 MODEL INPUTS AND ASSUMPTIONS

Emissions Source Data

The following emissions source data were used as input to the model. Calculations of the emissions source data for particulate and VOCs are included as Attachments 1 and 2 respectively.

- The maximum particulate emissions rate for the excavation were calculated using known excavated volumes and emission factors obtained from the *EPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, dated 1989. When calculating the particulate emissions the following conservative assumptions were used:

    - A 4,451.6 square meters (1.1 acre) excavation
    - The excavation will not be implemented in phases
    - No emissions controls are implemented
    - Backfilling of the excavation is not implemented in phases
    - Emissions occur at ground level

- The VOC emission rates were calculated using Ziegler's modification of *Arnold's Open Landfill Model*, which was published by the EPA in 1989. The following conservative assumptions were used in calculating the VOC emissions rates:

    - A 4,451.6 square meters (1.1 acre) excavation
    - The excavation will not be implemented in phases
    - No emissions controls are implemented
    - 10 percent of the maximum compound concentration was estimated for all excavated soils.
    - Emissions occur at ground level

These calculated emission rates are tabulated below.

Compound	Emission Rates g/sec-m2
Benzene	0.000126
Toluene	0.000341
Ethyl benzene	0.000080
Xylenes	0.000433
Particulates	0.000059

Receptor Data

Receptor height was assumed to be 1.5 meters (5 feet). Four receptor locations were used in the model in order to determine potential concentrations of particulates and VOCs at the proposed perimeter security fence. The receptor locations are defined as the minimum distance from the center of the excavation to the edge of the perimeter security fence in the northeast, northwest, southeast and southwest directions. The four-receptor locations are as follow:

- Receptor Location 1- 54.864 meters (180 feet) southeast
- Receptor Location 2- 56.388 meters (185 feet) northwest
- Receptor Location 3- 85.344 meters (280 feet) northeast, and
- Receptor Location 4- 94.488 meters (310 feet) southwest

Meteorological Data

The full meteorology option, which contains all stability classes and wind speeds, was selected for the worst-case meteorological condition. The worst-case meteorological condition is the combination of wind speed and stability that results in the maximum ground level concentrations. In this situation, the worst-case meteorological condition is a calm day.

Program Options

The urban option mode was used based on the procedures found in the EPA's *Guideline on Air Quality Models (Revised)* (EPA-450/2-78-027R, June 1986).

RESULTS AND CONCLUSIONS

The results of the air dispersion model analysis for uncontrolled emissions are summarized on the following table. The model computer output for particulates and VOCs are included as Attachment 3 and 4 respectively.

Compound	Concentration at 54.864 meters (ug/m3)	Concentration at 54.864 meters (PPM)	Concentration at 56.388 meters (ug/m3)	Concentration at 56.388 meters (PPM)	Concentration at 85.344 meters (ug/m3)	Concentration at 85.344 meters (PPM)	Concentration at 94.488 meters (ug/m3	Concentration at 94.488 meters (PPM)
Benzene	2143.0	0.7	2133.0	0.7	1357.0	0.4	1192.0	0.4
Toluene	5800.0	1.5	5772.0	1.5	3672.0	1.0	3225.0	0.9
Ethyl benzene	1378.0	0.3	1371.0	0.3	872.1	0.2	766.0	0.2
Xylenes	7382.0	1.7	7346.0	1.7	4673.0	1.1	4104.0	0.9
Total VOCs	16703.0	4.2	16622.0	4.2	10574.1	2.7	9287.0	2.4
Particulate	1004	--	998.7	--	635.3	--	558	--

The results presented in the table above indicate that the estimated VOC concentrations are below the CAMP response levels and estimated particulate concentrations are in excess of the response levels. As previously mentioned, the model input parameters and assumptions are conservative. It is likely that actual VOC and particulate concentrations measured during the remediation will be less than the concentrations estimated by the model. However, in accordance with the CAMP, the results of the air monitoring during construction will dictate whether emission controls have to be implemented.

A Perimeter Air Monitoring Program and a Vapor Control Plan will be implemented in accordance with the NYSDOH CAMP for monitoring dust and VOCs. If real-time response levels are exceeded; action would be implemented to reduce the emissions. These actions may include spraying of water, covering the work area, and sequencing the work.

Attachment 1

Estimated Particulate Emissions Excavation
Con-Edison Bronx MGP Site

Conversion Factors:		
Pounds per kilogram		2.2
Pounds per metric ton		2204
Grams per pound		434
Ft^3 per yd^3		27
Feet per meter		3.28
Tons per metric-ton	(convs)	1.1
kilograms per metric ton	(convs1)	0.001
Density of soil, ton/yd^3	(density)	1.7
Excavation Rate:		
Loads per day excavated from site		28
Tons per load		25
Yd^3 per load		17
Yd^3 per day		480
Yd^3 per hour	(EXR)	60
Total yd^3 to be excavated	(EXT)	20,000
Total tons to be excavated		34,000
Total metric tons to be excavated	(TME)	30,909
Total depth (TD) of excavation (ft)		17
Depth of (DS) topsoil (ft)		3
Depth of (DO) overburden (ft)		14
Moisture Content (%)	(Mc)	20
Percent Silt (%)	(s)	20

Emission Factor of Excavation for Material
Particulate emissions per unit mass of material excavated is estimated (USEPA 1989b, Tables 10 and 18, pages 53 and 74, respectively), based on excavating 3 feet of topsoil and 14 feet of overburden.

Typical range of emission factor (EFts)for topsoil during an excavation	0.015-0.2 kg/metric-ton
Typical range of emission factor (Efo) for overburden during an excavation	0.002-0.0 kg/metric-ton

$EF_{excavation}$= (DS/TD) [(0.015 kg/metric-ton+0.22 kg/metric-ton)/2] +
(DO/TD) [(0.002 kg/metric-ton+0.086 kg/metric-ton)/2]

$EF_{excavation}$= 0.057 kg/metric-ton

$ER_{excavation}$= ($EF_{excavation}$) * (Excavation Rate)
=(Efexcavation*EXR*density)/convs

$ER_{excavation}$ = 5.283 kg/hour

Time to complete excavation (Tce) =EXT/EXR

Tce 333.33 hours

Particulate Matter (PM) Emitted from excavation (kg)= ERexcavation * Tce*(1-Mc/100)*(s/100)
(1-Mc/100) accounts for 20 percent of moisture in the soil, which will not be airborne
s/100 accounts for 20 percent silt that will be airborne (80 percent heavier which will not be airborne.
PM = 281.74545 kg

Particulate Matter (PM) Emitted from excavation (kg/hour)= 0.85 kg/hour

Average Process Weight Rate (APWR) = TME/Tce

APWR= 92.727 metric tons/hour

Estimated Particulate Emissions
Soil Transport
Con-Edison Bronx MGP Site

Materials from the excavation will be put directly into trucks for transport to an off-site disposal or treatment facility. The emission factor per truck traveled is estimated by the following equation (USEPA 1989b, Tables 21 and 22, pages 97 and 98):

$EF_{transport} = k\ (1.7)\ (s/12)\ (s/48)\ (W/2.7)^{0.7}\ (w/4)^{0.5}$

$EF_{transport}$ = Emission factor, kg/VKT	**0.008391**
k= particle size multiplier	0.8
s= site specific silt conten , %	20
S= Average truck speed, km/hr	7.5
W= Average truck weight, metric-tons	25
w= Number of wheels on truck	14
m= moisture content (%)	20
Transportation Rate	
Trucks per day being loaded	28
Trucks per hour being loaded	3.5

The maximum roundtrip distance a truck will travel in the excavation is 200 feet (0.061 0.061 km

VKT/hr= 0.061 km/truck * 3.5 truck/hr = 0.2135 VKT/hour

Emission Rate= (Emission Factor) * (VKT/hr)*(moisture content)

Emission Rate = 0.0014 kg/hour

Number hours of truck transport = 333.3 hours

Total emission for Transportation = 0.47768

Estimated Particulate Emissions
Dumping and Overburden Replacement
Con-Edison Bronx MGP Site

Clean native backfill will be used to replace excavated soil. Approximately 20,000 yd3 of clean native backfill will be transported by truck to the excavation and placed on a pile with a surface area of 65.7 m2. The clean fill will be placed into the excavation and graded and compacted with a backhoe. After filling the excavation, the backhoe will grade the fill to blend with the existing surface levels. Trucks will transport the clean backfill into excavation area. One four wheel diesel front end loader with a 2.5 yd3 bucket will be used to transport approximately 20,000 yd3 of clean native soil to the excavation. The maximum roundtrip distance is approximately 100 feet (0.0305 km). The surface area of the exposed soil when the bucket is full is 31 ft2 (2.9 m2). Average front loader speed is 7.5 km/hr.

Transport

$$EF = k\,(1.7)\,(s/12)\,(s/48)\,(W/2.7)^{0.7}\,(w/4)^{0.5}$$

	Truck	Front End Loader
EF = Emission factor, kg/VKT	**0.0020978**	**0.000824**
k= particle size multiplier	0.8	0.8
s= site specific silt content, %	10	10
S= Average truck speed, km/hr	7.5	7.5
W= Average truck weight, metric-tons	25	16.1
w= Number of wheels on truck	14	4
m=moisture content (%)	15	15
Transportation Rate		
Trucks per day being loaded	28	
Trucks per hour being loaded (TRL/hr)	3.5	

A truck and front end loader travels a maximum of 100 feet (0.0305 km) per trip (LT), so 0.0305 km

VKT/hr= TRL/hr*LT

VKT/hr = 0.10675

ERtruck = EFT * VKT/hour* moisture content

ER_{truck} = 0.000190345 kg/hour

The front end loader holds 2.5 yd3 (3.8 metric-tons) per trip. Its maximum roundtrip distance is 200 ft. (0.0305 km) per trip. If a truck unloads 25 tons (22.7 metric tons) of backfill, the front loader will make 5.97 trips per truckload of backfill. At the rate the trucks are scheduled, this yields:

Trip/hour= 5.97 trips/hour

$VKT/hr_{front\ end\ loader}$ = 0.182085 VKT/hr

$ER_{front\ end\ loader}$= EFT*VKT/hr front end loader*moisture content

$ER_{front\ end\ loader}$ = 0.0001275 kg/hour

Therefore, the emission rate due to the transport is:

$ER_{transport} = ER_{truck} + ER_{front\ end\ loader}$

$ER_{transport}$ = 0.0003179 kg/hour

Bucket of Front End Loader

Particulate matter from the front end loader's uncovered bucket during the transport of clean fill are estimated by the equation found in USEPA 1989b, Tables 21 and 22, pages 97 and 98. The surface area of the front end loader bucket when filled is 2.9 m2.

$EF_{bucket} = 0.0018 * U$

	Bucket of front end loader
EF_{bucket} = Emission factor, kg/m^2-hr	**0.00421**
U= Sum of front end loader speed and air velocity over land surface, m/s	2.34
SA= Surface area of bucket, m^2	2.9

Therefore, the emission rate of particulate matter from the bucket of the front end loader is:

Erbucket= $EF_{bucket} * SA_{bucket}$

Erbucket= 0.0122148 kg/hour

Dumping

The excavator will place 20,000 yd3 (30,909 metric-tons) of backfill material into the excavated area. This will be done at a rate of 800 yd3 (1,360 metric-tons) per day, 170.0 metric-tons/hr. The emissions for the dumping activities are estimated by the equation (USEPA 1989b, Tables 21 and 22, pages 97 and 98).

$EF_{dumping} = k (0.0016) (u/2.2)^{1.3} (M/2)^{-1.4}$

	Dumping
$EF_{dumping}$ = Emission factor for dumping, kg/metric-ton	**1.37E-06**
k = 0.8 (USEPA 1989b, Table 23, page 99)	0.8
u = air velocity over land surface, m/s	0.1
M = Moisture content of backfill material, %	15
Dumping Rate (DR) = metric-ton/hr	170

Therefore, the emission rate of the dumping activities is expressed as:

$ER_{dumping} = EF_{dumping} *$ dumping rate

$ER_{dumping}$ = 2.33E-04 kg/hour

Grading

The excavator grades native soil with its backhoe while in a stationary position. Particulate emissions during this operation are estimated by the equation (USPEA 1989b, Table 10, page 53):

$EF_{grading}$ = 0.006 kg/metric-ton

$ER_{grading} = EF_{grading} *$ DR* moisture content *percent silt

$ER_{grading}$ = 0.0867 kg/hour

Storage Piles

There are two storage piles planned for this project. The first storage pile is 20 foot in diameter covering 29.18 m2 of land surface and the second storage pile is approximately 40 feet in diameter covering approximately 116.73 m2. Particulate emissions from the piles are estimated using a factor of 1.2 g/m2/day (PF) using the equation (USEPA 1989b, Table 10, page 53):

	Pile 1	Pile 2
Pile Diameter (ft)	20	40
Pile Surface Area (square meter) (PSA)	29.18	116.73
Pile Factor (PF) g/m2/day	1.2	1.2
s=silt content	10	10
mc= moisture content	15	15

$ER_{storage\ pile\ 1} = PF*PSA$

$ER_{storage\ pile\ 1}$ = 2.97636 g/day

$ER_{storage\ pile\ 1}$ = 0.000124015 kg/hour

$ER_{storage\ pile\ 2}$ = 11.90646 g/day

$ER_{storage\ pile\ 2}$ = 0.000496103 kg/hour

Overburden Replacement Rates

Based on current plans, it is estimated that the excavator will be able to place 36 truckloads of backfill material per day.

Excavator Rate		28	loads/day	742 metric tons/day
Total weight to be replaced	(metric-tons)			30,909
Total time (Time) for overburden replacement (hours)		333.3		
Total days for overburden replacement (days)		41.7		

Therefore, the dumping overburden emission rate is:

$ER_{overburden\ replacement} = ER_{transport} + ER_{bucket\ loading} + ER_{dumping} + ER_{grading} + ER_{storage\ piles}$

$ER_{transport}$ = 0.000317881 kg/hour
$ER_{bucket\ loading}$ = 0.0122148 kg/hour
$ER_{dumping}$ = 2.33E-04 kg/hour
$ER_{grading}$ = 0.0867 kg/hour
$ER_{storage\ piles}$ = 0.000620118 kg/hour

$ER_{overburden\ replacement}$ = 0.1000858 kg/hour

Total particulate emissions for overburden replacement:

$Part = Time*ER_{overburden\ replacement}$

Part= 33.35860865 kg

Summary of Particulate Emissions During Excavation
Con-Edison Bronx MGP Site

Type of Operation	Emission Factor	Operation Rate	Emission Rate	Operation Time	Particulate Emitted
Excavation	0.056971 kg/metric-ton	92.727 metric tons/hour	0.85 kg/hour	333.33 hours	281.7455 kg
Transport	0.008391 kg/VKT	0.2135 VKT/hour	0.0014 kg/hour	333.33 hours	0.477723 kg
Dumping and Overburden Replacement					
Transport of truck	0.002098 kg/VKT	0.10675 VKT/hour	0.0003 kg/hour	333.30 hours	0.10595 kg
Transport of front end loader	0.000824 kg/VKT	0.182085 VKT/hour	0.0122 kg/hour	333.30 hours	4.071193 kg
Surface area of bucket	0.004212 kg/m2-hour	2.9 m2	0.0002 kg/hour	333.30 hours	0.077671 kg
Dumping	1.37E-06 kg/metric-ton	170 metric-ton/hour	0.0867 kg/hour	333.30 hours	28.89711 kg
Grading	0.006 kg/metric-ton	170 metric-ton/hour	0.0006 kg/hour	333.30 hours	0.206685 kg
Storage pile 1	1.2 g/m2/day	N/A	0.0001 kg/hour	333.30 hours	0.041334 kg
Storage pile 2	1.2 g/m2/day	N/A	0.0005 kg/hour	333.30 hours	0.165351 kg
Total			0.95 kg/hour		315.7885 kg
Total			2.08 lb/hour		694.7346 lbs
			0.26316 g/sec		

Attachment 2

Mass emission rate of VOCs during excavation and transport based on 10% of maximum compound concentration in soil

Volatile organic emissions are estimated using Ziegler's modification of Arnold's open landfill model (USEPA 1989a, page 123; Dragun, page 275): Explanations of variables are given below.

$$(dV/dt)_i = 2\ P_{vi}\ W\ (D_i\ L\ U / Pi\ fv)^{0.5}\ (wi/w)$$

where $(dV/dt)_i$ is the volumetric emission rate for compound I

At low pressures the volumetric emission rate is converted to a mass emission rate using the ideal gas law:

$$E_i = \frac{Mi\ (dV/dt)_i\ Pt}{RT}$$

Therefore,

$$E_i = 2\ (Pt/RT)\ Mi\ Pvi\ (wi/w)\ W\ (Di\ LU / Pi\ fv)^{\wedge}0.5$$

Where

E_i =	mass emission rate of compound *i*; g/sec		
Pt =	ambient pressure; atm		1
R =	ideal gas constant =		82.057
T =	temperature (Average = 49°F); °K		282
Mi =	molecular weight of compound *i*; g/g.mole		
Pvi =	equivalent vapor pressure,		0.985
wi/w =	mass fraction of compound in Soil		
W =	Width of excavation area, cm	220 ft	6705.6
Di =	Diffusion coefficient in air, cm^2/sec		
L =	length of excavation area, cm	320 ft	9753.6
U =	wind speed, cm/sec	12 mph	536.50
pi =			3.141592
fv =	correction factor		0.97725
A=	Area of excavation,m2		4451.6

This equation [Dragun's equation (Dragun, page 275)] has been converted from a volumetric to a mass emission rate in a manner similar to the Research Triangle Institute modification of Shen's Open Landfill Model (USEPA 1989a, page 124).

Wind speed 536.50 cm/sec

The equation estimates baseline emissions of volatile organics. To account for excavation, and transport operations, an agitation factor of 15 (backhoe) is used (USEPA 1989b, Table 27, page 106):

$$E_{exci} = 15 * 2\ (Pt/RT)\ Mi\ Pvi\ (wi/w)\ W\ (Di\ LU / Pi\ fv)^{0.5}$$

E_{exci} = mass emission rate of compound I; during excavation and transport within the excavation, g/sec

Summaries of estimated volatile organic emissions occurring during the excavation process, based on the previous equations, are shown in the following table. Since clean backfill is used during the overburden replacement process, organic emissions are not estimated for this process.

The summary of Estimated Volatile Organic Compounds emitted for excavation and transport occurring during the excavation process follows:

Compound	Emission Rates	
	g/sec	lb/hr
Benzene	0.56	4.64
Toluene	1.52	12.60
Ethylbenzene	0.36	2.97
xylenes	1.93	15.98

Compound	Emission Rates
	g/sec-m2
Benzene	0.000126
Toluene	0.000341
Ethylbenzene	0.000080
xylenes	0.000433

			Values	Benzene	Toluene	Ethylbenzene	Xylenes
E_{exci} =	mass emission rate of compound *i*; g/sec		0.0000	0.5599	1.5191	0.3575	1.9260
		lb/hr		4.6443	12.6012	2.9656	15.9764
15 =	Agitation Factor for backhoe		15				
Pt =	ambient pressure; atm		1				
R =	ideal gas constant =		82.057				
T =	temperature (Average = 49°F); °K		282				
Mi =	molecular weight of compound *i*; g/g.mole			78.12	92.14	106.16	106.2
Pvi =	equivalent vapor pressure,		0.985				
wi/w =	mass fraction of compound in Soil			0.0000021	0.000005	0.0000011	0.0000055
W =	Width of excavation area, cm		6705.6				
Di =	Diffusion coefficient in air, cm^2/sec			0.0932	0.087	0.075	0.087
L =	length of excavation area, cm		9753.6				
U =	wind speed, cm/sec	12 mph	536.50				
pi =			3.141592				
fv =	correction factor	Pvi~ 0.985	0.97725				
	Concentration of Compound, mg/kg			21	50	11	55

Blue= dependent on excavation area

Pink = dependent on compound

Attachment 3

08/25/03
17:11:16

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

EAST 173 STREET WORKS FORMER MGP SITE PARTICULATE EMMISIONS

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	.590000E-04
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	66.7203
LENGTH OF SMALLER SIDE (M)	=	66.7203
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	URBAN

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1004.	55.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	1004.	6	1.0	1.0	10000.0	.00	45.
100.	519.1	6	1.0	1.0	10000.0	.00	45.
200.	207.9	6	1.0	1.0	10000.0	.00	44.
300.	114.5	6	1.0	1.0	10000.0	.00	45.
400.	73.20	6	1.0	1.0	10000.0	.00	45.
500.	51.43	6	1.0	1.0	10000.0	.00	42.
600.	38.54	6	1.0	1.0	10000.0	.00	44.
700.	30.22	6	1.0	1.0	10000.0	.00	38.
800.	24.53	6	1.0	1.0	10000.0	.00	32.
900.	20.45	6	1.0	1.0	10000.0	.00	1.

1000.	17.40	6	1.0	1.0	10000.0	.00	27.
1100.	15.06	6	1.0	1.0	10000.0	.00	41.
1200.	13.22	6	1.0	1.0	10000.0	.00	1.
1300.	11.74	6	1.0	1.0	10000.0	.00	1.
1400.	10.53	6	1.0	1.0	10000.0	.00	31.
1500.	9.520	6	1.0	1.0	10000.0	.00	15.
1600.	8.673	6	1.0	1.0	10000.0	.00	38.
1700.	7.953	6	1.0	1.0	10000.0	.00	10.
1800.	7.334	6	1.0	1.0	10000.0	.00	8.
1900.	6.799	6	1.0	1.0	10000.0	.00	3.
2000.	6.331	6	1.0	1.0	10000.0	.00	1.
2100.	5.917	6	1.0	1.0	10000.0	.00	1.
2200.	5.548	6	1.0	1.0	10000.0	.00	3.
2300.	5.219	6	1.0	1.0	10000.0	.00	5.
2400.	4.925	6	1.0	1.0	10000.0	.00	9.
2500.	4.660	6	1.0	1.0	10000.0	.00	15.
2600.	4.420	6	1.0	1.0	10000.0	.00	21.
2700.	4.203	6	1.0	1.0	10000.0	.00	24.
2800.	4.004	6	1.0	1.0	10000.0	.00	24.
2900.	3.822	6	1.0	1.0	10000.0	.00	24.
3000.	3.655	6	1.0	1.0	10000.0	.00	26.
3500.	2.991	6	1.0	1.0	10000.0	.00	30.
4000.	2.524	6	1.0	1.0	10000.0	.00	12.
4500.	2.178	6	1.0	1.0	10000.0	.00	7.
5000.	1.914	6	1.0	1.0	10000.0	.00	3.
5500.	1.705	6	1.0	1.0	10000.0	.00	1.
6000.	1.535	6	1.0	1.0	10000.0	.00	5.
6500.	1.395	6	1.0	1.0	10000.0	.00	7.
7000.	1.279	6	1.0	1.0	10000.0	.00	7.
7500.	1.179	6	1.0	1.0	10000.0	.00	7.
8000.	1.094	6	1.0	1.0	10000.0	.00	17.
8500.	1.020	6	1.0	1.0	10000.0	.00	17.
9000.	.9556	6	1.0	1.0	10000.0	.00	17.
9500.	.8985	6	1.0	1.0	10000.0	.00	17.
10000.	.8477	6	1.0	1.0	10000.0	.00	17.
15000.	.5403	6	1.0	1.0	10000.0	.00	17.
20000.	.3958	6	1.0	1.0	10000.0	.00	39.
25000.	.3121	6	1.0	1.0	10000.0	.00	39.
30000.	.2575	6	1.0	1.0	10000.0	.00	39.
40000.	.1908	6	1.0	1.0	10000.0	.00	19.
50000.	.1515	6	1.0	1.0	10000.0	.00	19.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 55. M:

55.	1004.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

```
**********************************
 *** SCREEN DISCRETE DISTANCES ***
 **********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

   DIST      CONC                U10M   USTK  MIX HT   PLUME  MAX DIR
    (M)    (UG/M**3)    STAB   (M/S)  (M/S)    (M)    HT (M)   (DEG)
 -------  ----------   ----   -----  -----  -------  ------  -------
     55.    1004.         6     1.0    1.0 10000.0      .00     45.
     56.    998.7         6     1.0    1.0 10000.0      .00     45.
     85.    635.3         6     1.0    1.0 10000.0      .00     45.
     94.    558.0         6     1.0    1.0 10000.0      .00     45.

  DIST     = DISTANCE FROM CENTER OF THE AREA SOURCE
  CONC     = MAXIMUM GROUND LEVEL CONCENTRATION
  STAB     = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
  U10M     = WIND SPEED AT THE 10-M LEVEL
  USTK     = WIND SPEED AT STACK HEIGHT
  MIX HT   = MIXING HEIGHT
  PLUME HT= PLUME CENTERLINE HEIGHT
  MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
            MAXIMUM CONCENTRATION

**********************************
*** END OF SCREEN MODEL OUTPUT ***
**********************************
```

Attachment 4

08/25/03
16:40:56

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 95250 ***

EAST 173 STREET MGP SITE BENZENE

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =          AREA
   EMISSION RATE (G/(S-M**2)) =      .126000E-03
   SOURCE HEIGHT (M)          =        .0000
   LENGTH OF LARGER SIDE (M)  =       66.7203
   LENGTH OF SMALLER SIDE (M) =       66.7203
   RECEPTOR HEIGHT (M)        =        1.5000
   URBAN/RURAL OPTION         =         URBAN
   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


     ****************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ****************************************

 CALCULATION         MAX CONC        MAX CONC      DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)         (PPM)        MAX (M)     HT (M)
--------------    -----------    -----------    -------    -------
SIMPLE TERRAIN    2143.            0.672088     55.        0.

**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************


BUOY. FLUX =      .000 M**4/S**3;  MOM. FLUX =      .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                 U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)    (UG/M**3)    STAB    (M/S)  (M/S)    (M)    HT (M)   (DEG)
-------  ----------   ----   -----  -----  ------   ------  -------
    55.    2143.         6      1.0    1.0 10000.0      .00     45.
   100.    1109.         6      1.0    1.0 10000.0      .00     45.
   200.    443.9         6      1.0    1.0 10000.0      .00     44.
   300.    244.5         6      1.0    1.0 10000.0      .00     45.
   400.    156.3         6      1.0    1.0 10000.0      .00     45.
   500.    109.8         6      1.0    1.0 10000.0      .00     42.
   600.    82.30         6      1.0    1.0 10000.0      .00     44.
   700.    64.54         6      1.0    1.0 10000.0      .00     38.
   800.    52.38         6      1.0    1.0 10000.0      .00     32.
   900.    43.68         6      1.0    1.0 10000.0      .00      1.
  1000.    37.15         6      1.0    1.0 10000.0      .00     27.
```

1100.	32.16	6	1.0	1.0	10000.0	.00	41.
1200.	28.23	6	1.0	1.0	10000.0	.00	1.
1300.	25.07	6	1.0	1.0	10000.0	.00	1.
1400.	22.48	6	1.0	1.0	10000.0	.00	31.
1500.	20.33	6	1.0	1.0	10000.0	.00	15.
1600.	18.52	6	1.0	1.0	10000.0	.00	38.
1700.	16.98	6	1.0	1.0	10000.0	.00	10.
1800.	15.66	6	1.0	1.0	10000.0	.00	8.
1900.	14.52	6	1.0	1.0	10000.0	.00	3.
2000.	13.52	6	1.0	1.0	10000.0	.00	1.
2100.	12.64	6	1.0	1.0	10000.0	.00	1.
2200.	11.85	6	1.0	1.0	10000.0	.00	3.
2300.	11.15	6	1.0	1.0	10000.0	.00	5.
2400.	10.52	6	1.0	1.0	10000.0	.00	9.
2500.	9.951	6	1.0	1.0	10000.0	.00	15.
2600.	9.440	6	1.0	1.0	10000.0	.00	21.
2700.	8.975	6	1.0	1.0	10000.0	.00	24.
2800.	8.551	6	1.0	1.0	10000.0	.00	24.
2900.	8.163	6	1.0	1.0	10000.0	.00	24.
3000.	7.806	6	1.0	1.0	10000.0	.00	26.
3500.	6.389	6	1.0	1.0	10000.0	.00	30.
4000.	5.390	6	1.0	1.0	10000.0	.00	12.
4500.	4.652	6	1.0	1.0	10000.0	.00	7.
5000.	4.087	6	1.0	1.0	10000.0	.00	3.
5500.	3.640	6	1.0	1.0	10000.0	.00	1.
6000.	3.278	6	1.0	1.0	10000.0	.00	5.
6500.	2.980	6	1.0	1.0	10000.0	.00	7.
7000.	2.731	6	1.0	1.0	10000.0	.00	7.
7500.	2.519	6	1.0	1.0	10000.0	.00	7.
8000.	2.337	6	1.0	1.0	10000.0	.00	17.
8500.	2.179	6	1.0	1.0	10000.0	.00	17.
9000.	2.041	6	1.0	1.0	10000.0	.00	17.
9500.	1.919	6	1.0	1.0	10000.0	.00	17.
10000.	1.810	6	1.0	1.0	10000.0	.00	17.
15000.	1.154	6	1.0	1.0	10000.0	.00	17.
20000.	.8453	6	1.0	1.0	10000.0	.00	39.
25000.	.6665	6	1.0	1.0	10000.0	.00	39.
30000.	.5500	6	1.0	1.0	10000.0	.00	39.
40000.	.4074	6	1.0	1.0	10000.0	.00	19.
50000.	.3235	6	1.0	1.0	10000.0	.00	19.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 55. M:

55.	2143.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	2143.	6	1.0	1.0	10000.0	.00	45.
56.	2133.	6	1.0	1.0	10000.0	.00	45.
85.	1357.	6	1.0	1.0	10000.0	.00	45.
94.	1192.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** END OF SCREEN MODEL OUTPUT ***
****

08/25/03
16:45:03

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

EAST 173 STREET MGP SITE ETHYLBENZENE

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	.810000E-04
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	66.7203
LENGTH OF SMALLER SIDE (M)	=	66.7203
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	URBAN

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	MAX CONC (PPM)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1378.	0.31802	55.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	1378.	6	1.0	1.0	10000.0	.00	45.
100.	712.6	6	1.0	1.0	10000.0	.00	45.
200.	285.4	6	1.0	1.0	10000.0	.00	44.
300.	157.2	6	1.0	1.0	10000.0	.00	45.
400.	100.5	6	1.0	1.0	10000.0	.00	45.
500.	70.61	6	1.0	1.0	10000.0	.00	42.
600.	52.91	6	1.0	1.0	10000.0	.00	44.
700.	41.49	6	1.0	1.0	10000.0	.00	38.
800.	33.67	6	1.0	1.0	10000.0	.00	32.
900.	28.08	6	1.0	1.0	10000.0	.00	1.
1000.	23.88	6	1.0	1.0	10000.0	.00	27.

1100.	20.68	6	1.0	1.0	10000.0	.00	41.
1200.	18.15	6	1.0	1.0	10000.0	.00	1.
1300.	16.11	6	1.0	1.0	10000.0	.00	1.
1400.	14.45	6	1.0	1.0	10000.0	.00	31.
1500.	13.07	6	1.0	1.0	10000.0	.00	15.
1600.	11.91	6	1.0	1.0	10000.0	.00	38.
1700.	10.92	6	1.0	1.0	10000.0	.00	10.
1800.	10.07	6	1.0	1.0	10000.0	.00	8.
1900.	9.334	6	1.0	1.0	10000.0	.00	3.
2000.	8.692	6	1.0	1.0	10000.0	.00	1.
2100.	8.123	6	1.0	1.0	10000.0	.00	1.
2200.	7.617	6	1.0	1.0	10000.0	.00	3.
2300.	7.165	6	1.0	1.0	10000.0	.00	5.
2400.	6.761	6	1.0	1.0	10000.0	.00	9.
2500.	6.397	6	1.0	1.0	10000.0	.00	15.
2600.	6.068	6	1.0	1.0	10000.0	.00	21.
2700.	5.770	6	1.0	1.0	10000.0	.00	24.
2800.	5.497	6	1.0	1.0	10000.0	.00	24.
2900.	5.247	6	1.0	1.0	10000.0	.00	24.
3000.	5.018	6	1.0	1.0	10000.0	.00	26.
3500.	4.107	6	1.0	1.0	10000.0	.00	30.
4000.	3.465	6	1.0	1.0	10000.0	.00	12.
4500.	2.991	6	1.0	1.0	10000.0	.00	7.
5000.	2.627	6	1.0	1.0	10000.0	.00	3.
5500.	2.340	6	1.0	1.0	10000.0	.00	1.
6000.	2.107	6	1.0	1.0	10000.0	.00	5.
6500.	1.916	6	1.0	1.0	10000.0	.00	7.
7000.	1.755	6	1.0	1.0	10000.0	.00	7.
7500.	1.619	6	1.0	1.0	10000.0	.00	7.
8000.	1.502	6	1.0	1.0	10000.0	.00	17.
8500.	1.401	6	1.0	1.0	10000.0	.00	17.
9000.	1.312	6	1.0	1.0	10000.0	.00	17.
9500.	1.234	6	1.0	1.0	10000.0	.00	17.
10000.	1.164	6	1.0	1.0	10000.0	.00	17.
15000.	.7417	6	1.0	1.0	10000.0	.00	17.
20000.	.5434	6	1.0	1.0	10000.0	.00	39.
25000.	.4285	6	1.0	1.0	10000.0	.00	39.
30000.	.3536	6	1.0	1.0	10000.0	.00	39.
40000.	.2619	6	1.0	1.0	10000.0	.00	19.
50000.	.2080	6	1.0	1.0	10000.0	.00	19.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 55. M:

55.	1378.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	1378.	6	1.0	1.0	10000.0	.00	45.
56.	1371.	6	1.0	1.0	10000.0	.00	45.
85.	872.1	6	1.0	1.0	10000.0	.00	45.
94.	766.0	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** END OF SCREEN MODEL OUTPUT ***
****

08/25/03
16:43:01

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

EAST 173 STREET MGP SITE TOLUENE

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	.341000E-03
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	66.7203
LENGTH OF SMALLER SIDE (M)	=	66.7203
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	URBAN

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	MAX CONC (PPM)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	5800.	1.542218	55.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	5800.	6	1.0	1.0	10000.0	.00	45.
100.	3000.	6	1.0	1.0	10000.0	.00	45.
200.	1201.	6	1.0	1.0	10000.0	.00	44.
300.	661.7	6	1.0	1.0	10000.0	.00	45.
400.	423.1	6	1.0	1.0	10000.0	.00	45.
500.	297.2	6	1.0	1.0	10000.0	.00	42.
600.	222.7	6	1.0	1.0	10000.0	.00	44.
700.	174.7	6	1.0	1.0	10000.0	.00	38.
800.	141.8	6	1.0	1.0	10000.0	.00	32.
900.	118.2	6	1.0	1.0	10000.0	.00	1.
1000.	100.6	6	1.0	1.0	10000.0	.00	27.

1100.	87.05	6	1.0	1.0	10000.0	.00	41.
1200.	76.40	6	1.0	1.0	10000.0	.00	1.
1300.	67.84	6	1.0	1.0	10000.0	.00	1.
1400.	60.83	6	1.0	1.0	10000.0	.00	31.
1500.	55.02	6	1.0	1.0	10000.0	.00	15.
1600.	50.13	6	1.0	1.0	10000.0	.00	38.
1700.	45.96	6	1.0	1.0	10000.0	.00	10.
1800.	42.39	6	1.0	1.0	10000.0	.00	8.
1900.	39.29	6	1.0	1.0	10000.0	.00	3.
2000.	36.59	6	1.0	1.0	10000.0	.00	1.
2100.	34.20	6	1.0	1.0	10000.0	.00	1.
2200.	32.06	6	1.0	1.0	10000.0	.00	3.
2300.	30.16	6	1.0	1.0	10000.0	.00	5.
2400.	28.46	6	1.0	1.0	10000.0	.00	9.
2500.	26.93	6	1.0	1.0	10000.0	.00	15.
2600.	25.55	6	1.0	1.0	10000.0	.00	21.
2700.	24.29	6	1.0	1.0	10000.0	.00	24.
2800.	23.14	6	1.0	1.0	10000.0	.00	24.
2900.	22.09	6	1.0	1.0	10000.0	.00	24.
3000.	21.13	6	1.0	1.0	10000.0	.00	26.
3500.	17.29	6	1.0	1.0	10000.0	.00	30.
4000.	14.59	6	1.0	1.0	10000.0	.00	12.
4500.	12.59	6	1.0	1.0	10000.0	.00	7.
5000.	11.06	6	1.0	1.0	10000.0	.00	3.
5500.	9.852	6	1.0	1.0	10000.0	.00	1.
6000.	8.872	6	1.0	1.0	10000.0	.00	5.
6500.	8.065	6	1.0	1.0	10000.0	.00	7.
7000.	7.390	6	1.0	1.0	10000.0	.00	7.
7500.	6.817	6	1.0	1.0	10000.0	.00	7.
8000.	6.324	6	1.0	1.0	10000.0	.00	17.
8500.	5.897	6	1.0	1.0	10000.0	.00	17.
9000.	5.523	6	1.0	1.0	10000.0	.00	17.
9500.	5.193	6	1.0	1.0	10000.0	.00	17.
10000.	4.900	6	1.0	1.0	10000.0	.00	17.
15000.	3.123	6	1.0	1.0	10000.0	.00	17.
20000.	2.288	6	1.0	1.0	10000.0	.00	39.
25000.	1.804	6	1.0	1.0	10000.0	.00	39.
30000.	1.489	6	1.0	1.0	10000.0	.00	39.
40000.	1.103	6	1.0	1.0	10000.0	.00	19.
50000.	.8755	6	1.0	1.0	10000.0	.00	19.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 55. M:

55.	5800.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR MAXIMUM CONCENTRATION

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	5800.	6	1.0	1.0	10000.0	.00	45.
56.	5772.	6	1.0	1.0	10000.0	.00	45.
85.	3672.	6	1.0	1.0	10000.0	.00	45.
94.	3225.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** END OF SCREEN MODEL OUTPUT ***
****

08/25/03
16:49:51

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

EAST 173 STREET MGP SITE XYLENES

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	.434000E-03
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	66.7203
LENGTH OF SMALLER SIDE (M)	=	66.7203
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	URBAN

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	MAX CONC (PPM)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	7382.	1.703004	55.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	7382.	6	1.0	1.0	10000.0	.00	45.
100.	3818.	6	1.0	1.0	10000.0	.00	45.
200.	1529.	6	1.0	1.0	10000.0	.00	44.
300.	842.2	6	1.0	1.0	10000.0	.00	45.
400.	538.5	6	1.0	1.0	10000.0	.00	45.
500.	378.3	6	1.0	1.0	10000.0	.00	42.
600.	283.5	6	1.0	1.0	10000.0	.00	44.
700.	222.3	6	1.0	1.0	10000.0	.00	38.
800.	180.4	6	1.0	1.0	10000.0	.00	32.
900.	150.4	6	1.0	1.0	10000.0	.00	1.
1000.	128.0	6	1.0	1.0	10000.0	.00	27.

1100.	110.8	6	1.0	1.0	10000.0	.00	41.
1200.	97.23	6	1.0	1.0	10000.0	.00	1.
1300.	86.34	6	1.0	1.0	10000.0	.00	1.
1400.	77.42	6	1.0	1.0	10000.0	.00	31.
1500.	70.03	6	1.0	1.0	10000.0	.00	15.
1600.	63.80	6	1.0	1.0	10000.0	.00	38.
1700.	58.50	6	1.0	1.0	10000.0	.00	10.
1800.	53.95	6	1.0	1.0	10000.0	.00	8.
1900.	50.01	6	1.0	1.0	10000.0	.00	3.
2000.	46.57	6	1.0	1.0	10000.0	.00	1.
2100.	43.52	6	1.0	1.0	10000.0	.00	1.
2200.	40.81	6	1.0	1.0	10000.0	.00	3.
2300.	38.39	6	1.0	1.0	10000.0	.00	5.
2400.	36.22	6	1.0	1.0	10000.0	.00	9.
2500.	34.28	6	1.0	1.0	10000.0	.00	15.
2600.	32.51	6	1.0	1.0	10000.0	.00	21.
2700.	30.91	6	1.0	1.0	10000.0	.00	24.
2800.	29.45	6	1.0	1.0	10000.0	.00	24.
2900.	28.12	6	1.0	1.0	10000.0	.00	24.
3000.	26.89	6	1.0	1.0	10000.0	.00	26.
3500.	22.00	6	1.0	1.0	10000.0	.00	30.
4000.	18.57	6	1.0	1.0	10000.0	.00	12.
4500.	16.02	6	1.0	1.0	10000.0	.00	7.
5000.	14.08	6	1.0	1.0	10000.0	.00	3.
5500.	12.54	6	1.0	1.0	10000.0	.00	1.
6000.	11.29	6	1.0	1.0	10000.0	.00	5.
6500.	10.27	6	1.0	1.0	10000.0	.00	7.
7000.	9.405	6	1.0	1.0	10000.0	.00	7.
7500.	8.676	6	1.0	1.0	10000.0	.00	7.
8000.	8.049	6	1.0	1.0	10000.0	.00	17.
8500.	7.506	6	1.0	1.0	10000.0	.00	17.
9000.	7.030	6	1.0	1.0	10000.0	.00	17.
9500.	6.609	6	1.0	1.0	10000.0	.00	17.
10000.	6.236	6	1.0	1.0	10000.0	.00	17.
15000.	3.974	6	1.0	1.0	10000.0	.00	17.
20000.	2.912	6	1.0	1.0	10000.0	.00	39.
25000.	2.296	6	1.0	1.0	10000.0	.00	39.
30000.	1.894	6	1.0	1.0	10000.0	.00	39.
40000.	1.403	6	1.0	1.0	10000.0	.00	19.
50000.	1.114	6	1.0	1.0	10000.0	.00	19.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 55. M:

55.	7382.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
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PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
55.	7382.	6	1.0	1.0	10000.0	.00	45.
56.	7346.	6	1.0	1.0	10000.0	.00	45.
85.	4673.	6	1.0	1.0	10000.0	.00	45.
94.	4104.	6	1.0	1.0	10000.0	.00	45.

DIST = DISTANCE FROM CENTER OF THE AREA SOURCE
CONC = MAXIMUM GROUND LEVEL CONCENTRATION
STAB = ATMOSPHERIC STABILITY CLASS (1=A, 2=B, 3=C, 4=D, 5=E, 6=F)
U10M = WIND SPEED AT THE 10-M LEVEL
USTK = WIND SPEED AT STACK HEIGHT
MIX HT = MIXING HEIGHT
PLUME HT= PLUME CENTERLINE HEIGHT
MAX DIR = WIND DIRECTION RELATIVE TO LONG AXIS FOR
MAXIMUM CONCENTRATION

****
*** END OF SCREEN MODEL OUTPUT ***
****