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August 4, 2009

VIA FEDEX OVERNIGHT

Mr. William Ottaway, P.E.
Environmental Engineer
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 11th Floor
Albany, New York 12233-7017

Re: Site Management Plan - Final
535 West 19th Street, Tax Block 691, Lot 11, Manhattan, New York
W. 18th St. Former MGP (NYSDEC Site No. V00553)
Voluntary Clean-up Agreement – Index No. D2-0003-02-08

Dear Mr. Ottaway:

Enclosed for your approval are specific pages of the Site Management Plan (SMP) for the property at 535 West 19th Street, which have been revised to address comments from the New York State Department of Environmental Conservation (NYSDEC). Please remove the corresponding pages in the earlier version of the SMP and replace them with the revised pages enclosed herein. A compact disc containing the complete copy of the final plan is also enclosed. The referenced property is one of the parcels that comprise the West 18th Street former Gas Works Site. This document is submitted in accordance with the requirements and provisions of the August 15, 2002 Voluntary Cleanup Agreement between the NYSDEC and Consolidated Edison Company of New York, Inc. (Con Edison).

Please call me at (718) 204-4145 should you have any questions regarding this submittal.

Very truly yours,

Neil O'Halloran
Project Manager
MGP Program

encl:

cc: D. Hettrick, NYSDOH
G. Cross, NYSDEC (w/o encl.)
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J. O'Connell, NYSDEC – Region 2 (w/o encl.)
N. Epler, Roux Associates (w/o encl.)

August 4, 2009

SITE MANAGEMENT PLAN

535 West 19th Street (aka 100 11th Avenue)
New York, New York

Prepared for:

WEST CHELSEA DEVELOPMENT PARTNERS, LLC
485 Broadway
New York, New York 10013

CONSOLIDATED EDISON COMPANY
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TABLE OF CONTENTS

TABLE OF CONTENTS

(Continued)

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Description of Remedial Program

This document is required as an element of the remedial program at 535 West 19th Street Redevelopment Site located on the northeast corner of West 19th Street and 11th Avenue, New York, New York (hereinafter referred to as the "Site") under the New York State (NYS) Voluntary Cleanup Program (VCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with VCA # D2-0003-02-08 Site # V00530-2, which was executed on August 15, 2002 (the "VCA").

1.1.1 General

Consolidated Edison of New York, Inc. (Con Edison) entered into a VCA with the NYSDEC to remediate a 0.28 acre property located in New York, New York. This VCA requires Con Edison to investigate and remediate contaminated media at the Site. A map showing the location and boundaries of this 12,500 square foot Site is provided in Figure 1. The boundaries of the Site are more fully described in the metes and bounds Site description that accompanies the Declaration of Covenants and Restrictions ("Deed Restriction") recorded on title for the Site (Appendix A).

After completion of the remedial work described in the Remedial Action Work Plan (RAWP), 535 West 19th Street Redevelopment Site (Remedial Engineering P.C., August 23, 2006), as modified in the Site Operations Plan (SOP) and SOP Addendum #1 (collectively, the "Remedial Action"), some contamination was left in the subsurface at this Site, which is hereafter referred to as "residual contamination." This Site Management Plan (SMP) was prepared to manage residual contamination at the Site in perpetuity or until extinguishment of the Deed Restriction, in accordance with the VCA. Remedial action work on the Site began in September 2006, and was completed in February 2008. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by Roux Associates, Inc., on behalf of West Chelsea Development Partners (WCDP) and Con Edison, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated December 25, 2002 and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the

Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Deed Restriction for the Site.

1.1.2 Purpose

The Site contains residual contamination left after completion of the remedial action. Engineering Controls have been incorporated into the Site remedy to provide proper management of remaining contamination to ensure protection of public health and the environment. A Deed Restriction will be placed on title for the Site, and recorded with the New York City Register, Office of Land Records Office, that provides an enforceable legal instrument to ensure compliance with this SMP and all ECs and ICs placed on the Site. The ICs place restrictions on Site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Deed Restriction for contamination that remains at the Site. This plan has been approved by the NYSDEC, and the Deed Restriction obligates the Site owner and its successors and assigns to comply with and implement this plan. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the Site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of a basement ventilation system (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports. To address these needs, this SMP includes four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for a basement ventilation system; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Deed Restriction. Failure to properly implement the SMP is a violation of the Deed Restriction; and

- At the time the SMP was prepared, the SMP and all Site documents related to Remedial Investigation and Remedial Action were maintained at the NYSDEC office in Albany, New York. At this time, March 2009, Site documents can also be found in the repositories established for this project, including:

  Muhlenberg Branch
  The New York Public Library
  209 West 23rd Street, New York, New York 10011
  212-924-1585

  Hours of Operation: Monday 10:00 – 6:00, Tuesday 10:00 – 8:00
  Wednesday 10:00 – 6:00, Thursday 10:00 – 8:00
  Friday 10:00 – 5:00, Saturday 10:00 – 5:00
  (Closed Sunday)

  and

  Manhattan Borough President Scott Stringer's Office
  1 Centre Street, 19th Floor, New York, New York 10007
  212-669-8300

  Hours of Operation: Monday – Friday 9:00 AM – 5:00 PM

1.2 Site Background

1.2.1 Site Location and Description

The Site is located in the Manhattan Borough, City of New York, New York and is identified as Block 691 and Lot 11 on the New York County Tax Map.

The Site is bordered immediately to the north by a multi-story, brick building operating as a New York State Department of Corrections facility. The Site is bordered immediately to the east by a two-story commercial building. To the south, the Site is bordered by West 19th Street. Eleventh Avenue borders the west side of the Site.

Surrounding land uses include a mixture of garage, warehouse, residential, office, local retail, recreational and light industrial. The Hudson River Park and the Chelsea Piers entertainment center are located to the west of the project site across the West Side Highway, and the Hudson River is approximately 400 feet to the west. In addition, the High Line, an elevated former rail line that is proposed as a public park and is under consideration for inclusion on the National and State Register of Historic Places, is located on the same block, approximately 300 feet east of the project Site.

The boundaries of the Site are more fully described in Appendix A – Metes and Bounds.

1.2.2 Site History

The Site is a portion of a former 18th Street Manufactured Gas Plant (MGP) facility, which extended from West 16th Street north to West 20th Street and west from 10th Avenue to the Hudson River. The MGP facility was operated from the mid-1830s until the early 1900s by the former Manhattan Gas Company and was constructed entirely on landfill material of undocumented origin. Prior to development of this area of Manhattan, the natural shoreline of the Hudson River was located along 10th Avenue between West 16th and West 20th Streets and, therefore, Block 691, was entirely under water. Between 1836 and 1852, the Hudson River adjacent to most of the blocks where the gas plant was constructed (i.e., Blocks 688, 689, and 690) was filled and the shoreline was shifted west to about mid block, between 10th and 11th Avenues. Infilling of the river on these blocks continued between 1852 and 1865 and the shoreline was eventually shifted to 13th Avenue. The western end of Block 691, which included the Site and where Gas Holder #6 of the MGP would later be constructed, was backfilled sometime between 1852 and 1859.

In the late 1860s, the Manhattan Gas Light Company purchased the parcel containing the Site and gas holders were constructed. According to historic maps of this area, Gas Holder #6 occupied over half of the area of the Site. Gas Holder #5 was located immediately adjacent to the Site to the north, and Gas Holder #7, which was the largest holder in the area, was located immediately west of the Site beneath what is now 11th Avenue. Gas Holders #5 and #6 were demolished in 1909; however, the remnant subsurface ring-wall of Gas Holder #6 was found to be present beneath the Site.

Subsequent to the demolition of Gas Holder #6 and the sale of the Site by the Manhattan Gas Light Company, various operations were conducted on the Site. These included a New York City Department of Street Cleaning Wagon Yard, an American Red Cross building that was demolished around 1929, an automobile repair shop, a motor freight (trucking) station, and portions of the Seaman's House for the YMCA. The Site had been used as a public parking lot from 1979 until early 2006. The parking lot closed in January 2006.

1.2.3 Geologic Conditions

The current topography of the Site is completely covered by a 21-story residential building, asphalt, or concrete pavement. The only vegetation will be in landscaped areas that are not in contact with native soil. Based on the topography of adjacent and nearby properties, the Site will not receive rain/storm water runoff from other properties. The area in which the Site is located is identified by the United States Geological Survey (USGS) as Urban Land. Urban Land is characterized by the USGS as land that has more than 85 percent of its surface covered by pavement, roads, buildings, parking lots, etc.

The Site was excavated to an average depth of 17 feet below land surface (ft bls) for construction of the building foundation. Below the foundation, the Site is underlain by fill material, including silty clay, sand, gravel and brick, wood, coal, slag, and concrete fragments. The surface elevation of the Site is approximately 5 feet above mean sea level, as shown in the USGS 7.5 Minute Series Topographic Map (Central Park, New York quadrangle, 1979). The nearest surface water body to the Site is the Hudson River located approximately 400 feet to the west of the Site. The Site is located in a 100-year flood zone. Regional groundwater flow direction is westerly (toward the Hudson River). A dark gray low-permeability silty clay was observed at depth in all borings completed at the Site. The top of the silty clay was confirmed at depths ranging from 18 to 28 feet below land surface (ft bls). The silty clay extends to approximately 60 ft bls, followed by a sandy-silt, and then bedrock, which occurs at a depth ranging from approximately 73 to 87 feet below land surface. The bedrock is a slightly weathered gray mica schist.

A section of the foundation ring-wall for Gas Holder #6 associated with the former MGP Site was observed to a depth of at least 17 feet in test pits and during excavation for the foundation. The ring-wall was intact where observed, was constructed of brick and was approximately two-feet thick and originally extended from approximately 3 ft bls to at least 25 ft bls. The base of the holder (i.e., bottom of ring wall) sits on the upper few feet of the silty clay unit.

1.3 Summary of Remedial Investigation Findings

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination at the Site. The results of the RI are summarized in the following reports:

- Phase II Subsurface Investigation (Roux Associates, Inc., October 14, 2005);
- Site Characterization Report (TRC, January 2006);
- Supplemental Investigation Report (Roux Associates, Inc., May 9, 2006); and
- UST Removal and Post-Excavation Soil Sampling (Roux Associates, Inc., July 13, 2006).

Generally, the RI determined that the fill and soil beneath the Site may be characterized as historic urban fill, with impacts by metals and semi-volatile organic compounds (SVOCs) beneath most of the Site at levels typical for fill in this area. Soil in the vicinity of the water table may have been impacted by petroleum hydrocarbons based on observations noted in boring logs, although analytical data did not indicate significant shallow volatile organic compound (VOC) impacts in soil. Deeper soil also may have been sporadically impacted by petroleum hydrocarbon-related impacts, as evidenced by staining and odor in split-spoon samples from approximately 9 to 20 ft bls. A review of soil data from samples obtained at depth in the central and southwest portions of the Site indicated residual impacts from historic MGP operations and associated coal tar related contamination.

Below is a summary of Site conditions when the RI was performed:

<u>Soil</u>

- Subsurface soil at the Site consists of a layer of historic fill overlying a thick sequence of low permeability silty-clay, which extends to approximately 60 feet bls. The groundwater table occurs in the upper historic fill unit and is effectively isolated from the deeper bedrock aquifer by the intervening silty clay.
- Most of the soil is impacted by concentrations of SVOCs and metals indicative of historic urban fill.
- Shallow soil exhibited evidence of impacts by petroleum hydrocarbons, including staining, sheen and odor, although analytical data from shallow soil (i.e., at the water table) did not indicate significant impact by VOCs.

- Soil from deep borings located in the center of the Site (SB-5) [inside the holder base] and the southwest portion of the Site (SB-36) are significantly impacted by VOCs and / or SVOCs, which appear to be related to coal tar residues detected at these locations.

- Benzene was the only VOC detected more than an order of magnitude above RSCOs at depth in Soil Borings SB-1 (1,200 micrograms per kilogram [µg/kg]; 17.5-20 ft bls and 1,900 µg/kg; 27.5-30 ft bls), SB-5 (640 µg/kg; 25-27.5 ft bls), SB-33 (940 µg/kg; 35-37 ft bls) and SB-36 (2,000 µg/kg; 33-35 ft bls).

- VOCs were either not detected or detected at low concentrations in Soil Borings SB-2, SB-3, SB-4, SB 32, SB 38, and Test Pit TP 4.

- Samples from Soil Boring SB-36 (25-27 feet bls) contained relatively high detections of VOCs, including benzene (43,000 µg/kg), toluene (21,000 µg/kg), ethylbenzene (35,000 µg/kg), and xylenes (71,000 µg/kg) (i.e., BTEX compounds). The presence of high concentrations of BTEX compounds at depth may be due to coal tar-related impacts, although photoionization detector (PID) field screening and visual observations in Soil Boring SB-5 did not have strong indicators of such impacts (e.g., staining or odors). A tar-like viscous material was observed in Soil Boring SB-36 at 25 to 27 ft bls.

- With the exception of SB-5 (25-27 ft bls) and SB-36 (35-37 ft bls), the concentrations of total VOCs and total SVOCs did not exceed their respective RSCOs of 10 mg/kg and 500 mg/kg.

- Total Petroleum Hydrocarbons analyses of samples from Soil Borings SB-7 and SB-8 indicated impacts potentially related to the adjacent USTs.

- Elevated detections of lead were observed in soil borings completed by TRC, including 1,080 milligrams per kilogram (mg/kg) in SB-38 (3-4 ft bls) and 2,000 mg/kg in Test Pit TP-4 (5-6 ft bls). The elevated lead concentrations are consistent with the presence of historical fill beneath the Site.

<u>On-Site Groundwater</u>

- There were no detections of metals in filtered groundwater samples at concentrations above NYSDEC ambient water quality standards and guidance values (AWQSGV).

- There were no detections of SVOCs at concentrations significantly above NYSDEC AWQSGV.

- Cyanide was detected at a concentration approximately two times the NYSDEC AWQSGV of 200 µg/L in Monitoring Well MW-1.

- The only detection of VOCs in groundwater at concentrations significantly above NYSCEC AWQSGV was benzene in deep Monitoring Well MW-1 at 1,000 µg/L.

Underground Storage Tanks

On November 16, 2005, a spill was reported to the NYSDEC for the Site, regarding three USTs identified while performing a ground penetrating radar (GPR) survey of the Site. The USTs were located along the south-central border of the Site along West 19th Street. Prior to removal of the tanks, all residual liquids were pumped from the tanks using a vacuum truck and transported offsite for proper disposal. Three 550-gallon USTs were excavated and removed from the Site on February 2, 2006. Once the tanks were removed, approximately 11 tons of soil was excavated from directly beside and beneath the USTs and staged adjacent to the excavation and covered with plastic sheeting. No elevated PID readings or staining were observed while performing the excavation. Once removed from the excavation, the tanks were cut open, decontaminated and the petroleum residuals removed and containerized in a 55-gallon drum. The final extent of the excavation was approximately 25 feet long (east to west), 15 feet wide (north to south) and approximately six feet deep.

VOCs

Low concentrations of VOCs were detected in all of the post excavation soil samples collected. The VOCs detected included acetone, benzene, toluene, ethylbenzene, xylenes, and methylene chloride. None of the samples contained concentrations of VOCs exceeding the NYSDEC Recommended Soil Cleanup Objectives (RSCOs). The methylene chloride detected in the samples was also detected in the laboratory quality control samples and is attributable to blank contamination.

SVOCs

SVOCs were detected in all of the post excavation soil samples collected. The samples contained several polycyclic aromatic hydrocarbons (PAHs) at concentrations above their respective NYSDEC RSCOs. The PAHs detected at concentrations exceeding the NYSDEC RSCOs included benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,I]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, ideno[1,2,3-cd]pyrene, naphthalene and phenanthrene. These SVOCs were attributable to the historic fill used in urban areas and are not likely indicative of releases from the removed USTs or historic MGP operations.

Metals

Low concentrations of metals were detected in all of the post excavation samples collected. The samples contained several metals at concentrations marginally exceeding their respective NYSDEC RSCOs. The metals detected at concentrations exceeding the NYSDEC RSCOs included arsenic, chromium, mercury and selenium. These concentrations of metals were attributable to the historic fill used in the area.

1.4 Summary of Remedial Actions

The Site was remediated in accordance with the NYSDEC-approved Remedial Action Work Plan (RAWP) dated August 23, 2006, the Site Operations Plan (SOP) dated September 6, 2006, and the SOP Addendum #1 dated October 23, 2006.

The following is a summary of the Remedial Actions performed at the Site:

1. The soil and groundwater beneath the Site were encapsulated by a concrete perimeter secant pile barrier wall and capped by a concrete building foundation equipped with a waterproof vapor barrier. The perimeter barrier wall extends from beneath the building foundation into the silty-clay layer.

   The Site was excavated to an average depth of approximately 17 feet bls to accommodate the construction of the building foundation and cellar areas, with greater depths in certain areas as required for construction of pile caps, footings and for installation of utilities. The foundation was hydraulically isolated from underlying groundwater via waterproofing/vapor barrier material. The foundation concrete floor and walls provide a physical barrier protecting the vapor barrier liner materials. The active mechanical ventilation system in the basement is a further measure of protection from the potential for migration of vapors into the lowermost building level from residual VOCs in soil gas and/or groundwater.

2. An institutional control in the form of a Deed Restriction will be used to subject the property to use restrictions and engineering controls that run with the land in perpetuity. The institutional control will be an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring (OM&M) requirements and of ensuring the potential restriction of future uses of the Site. The institutional control is required since residual MGP waste will be left onsite, and engineering controls must be maintained or protected against damage to perform properly and be effective. In addition, the institutional control will prohibit the use of Site groundwater for potable use and will prohibit vegetable gardens from being placed in direct contact with residual soil at the Site.

3. Development and implementation of a Site Management Plan for long term management of residual contamination as required by the Deed Restriction, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

Remedial activities were completed at the Site in June 2008.

1.4.1 Removal of Contaminated Materials from the Site

The entire Site was excavated to a depth of approximately 17 feet bls. A total of approximately 23,500 tons of material was excavated and removed from the Site for offsite disposal. Additional excavation was required for seven pile caps and three utility pits. None of the additional excavation areas located within the former gasholder were excavated to depths in which heavily contaminated soil was encountered during the Supplemental Investigation (i.e., greater than 21 feet bls). A three-inch thick mud slab was installed on the finished excavation grade to provide a uniform surface on which the vapor barrier was installed.

All fill and other material excavated from the Site was disposed of in accordance with all applicable federal, state, and local regulations and guidance. Any water generated during remedial activities was transferred to onsite aboveground holding tanks and sampled for offsite disposal.

A map showing areas where excavation was performed is shown in Figure 2.

1.4.2 On-Site and Off-Site Treatment Systems

No long-term treatment systems were installed as part of the Site remedy.

1.4.3 Remaining Contamination

- Soil from deep intervals in soil borings located in the center of the Site (SB 5 25 to 27.5 ft bls) and the southwest portion of the Site (SB 36 25 to 27 ft bls) contained elevated concentrations of VOCs and/or SVOCs, which appear to be related to MGP residuals detected at these locations. Both of these borings were located within the existing holder foundation and above the low-permeability silty clay. Field evidence of MGP residue was detected in deep intervals in these soil borings.

- Samples from Soil Boring SB 36 (25-27 feet bls) contained relatively high concentrations of VOCs, including benzene (43,000 µg/kg), toluene (21,000 µg/kg), ethylbenzene (35,000 µg/kg), and xylenes (71,000 µg/kg) (i.e., BTEX compounds). The presence of

high concentrations of BTEX compounds at depth may be due to MGP-residue, such as the tar-like viscous material observed in Soil Boring SB 36 at 25 to 27 ft bls.

- Benzene was the only VOC detected at more than an order of magnitude above the Recommended Soil Cleanup Objective (RSCO) of 60 micrograms per kilogram [µg/kg] at depth in Soil Borings SB 1 (1,200 µg/kg at 17.5-20 feet below land surface [ft bls] and 1,900 µg/kg at 27.5-30 ft bls), SB 5 (640 µg/kg at 25-27.5 ft bls), SB 33 (940 µg/kg at 35-37 ft bls) and SB 36 (2,000 µg/kg at 33-35 ft bls).

- The ring-wall associated with the former onsite gas holder #6 was intact where observed, is constructed of brick and is approximately two-feet thick and extends from below the building foundation to approximately 25 ft bls.

The concrete mud slab upon which the vapor barrier was laid serves as the demarcation layer for underlying impacted residual soil.

Tables 1 through 3 and Figure 2 (boring locations) summarize results of all soil samples remaining at the Site after completion of Remedial Action that exceed the RSCOs and Track 4 SCOs for restricted residential use of the Site.

1.4.4 Engineering and Institutional Controls

Since residual contamination is present at this Site, Engineering Controls and Institutional Controls have been implemented to protect public health and the environment for the applicable future use. The Controlled Property has the following Engineering Controls:

1. A cover system consisting of an approximate 3-inch thick concrete mud slab beneath the vapor barrier and a two-foot thick structural concrete building foundation slab covering the entire Site.

2. A waterproofing/vapor barrier consisting of several products manufactured by W.R. Grace. The primary components of the barrier system consists of factory-made high density polyethylene (HDPE) composite membranes Preprufe 300R and 160R rolled directly on top of the mud slab and vertical prepared foundation surfaces, respectively. HDPE tape and Bithuthene liquid membranes were used to seal the seams between the segments of HDPE membranes.

3. The soil and groundwater beneath the Site are encapsulated by a concrete perimeter secant pile barrier wall and capped by the concrete building foundation equipped with a waterproof/vapor barrier. The perimeter barrier wall extends from beneath the building foundation into the silty-clay layer.

A series of Institutional Controls are required to implement, maintain, and monitor these Engineering Controls. The Deed Restriction requires compliance with these Institutional Controls, to ensure that:

- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Site must be inspected and certified at a frequency and in a manner defined in this SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP; and
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

In addition, the Deed Restriction places the following restrictions on the property:

- Use of groundwater underlying the property is prohibited;
- Vegetable gardens are prohibited in soils on or from the property;
- All future activities on the property that would disturb remaining contaminated material must be conducted in accordance with the Excavation Work Plan included in this SMP;
- The potential for vapor intrusion must be evaluated for any buildings developed on the Site, and any potential impacts that are identified must be mitigated; and
- The property may be used for residential use, provided that the long-term Engineering and Institutional Controls (EC/ICs) described in the SMP remain in use.

These EC/ICs are designed to:

- Prevent ingestion/direct contact with contaminated soil;
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil;
- Prevent ingestion of groundwater with contaminant levels that exceed drinking water standards;
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater;
- Prevent contaminated groundwater from migrating off-site; and
- Prevent migration of contaminants that would result in off-site groundwater or surface water contamination.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 Introduction

2.1.1 General

A summary of the remedial action and EC/ICs implemented at the Site are as follows:

- Hydraulic control measures consisting of a subsurface perimeter secant barrier wall;
- Construction of the building foundation to create a permanent physical barrier or cap to deep residual MGP contamination (i.e., soil and groundwater);
- Waterproofing/vapor barrier beneath and around the building foundation;
- An active mechanical ventilation system in the building basement level. The ventilation system provides a contingency level of protection from potential accumulation of vapors migrating from underlying soil into the basement area in the unlikely event of a breach in the vapor barrier; and
- Institutional control in the form of a Deed Restriction to restrict the use of Site groundwater.

Since residual contaminated soil and groundwater exists beneath the Site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

The purpose of this Plan is to provide:

- A description of all EC/ICs on the Site;
- The basic operation and intended role of each implemented EC/IC;
- A description of the key components of the ICs created as stated in the Deed Restriction;
- A description of the features that should be evaluated during each periodic inspection and compliance certification period;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Soil Management Plan for the safe handling of residual contamination that may be disturbed during maintenance or redevelopment work on the Site; and

- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

2.2 Engineering Controls

2.2.1 Building Foundation Cover

Exposure to residual contamination in soil/fill and groundwater at the Site is prevented by the building foundation elements placed over the entire Site. The foundation elements are comprised of a concrete secant pile foundation walls, a concrete building pressure slab and concrete sidewalks. The secant piles are approximately 3 feet in diameter and overlap to form a continuous wall around the foundation perimeter. The concrete pressure slab is a minimum of 24 inches thick. The horizontal portion of the vapor barrier is installed on top of a mud slab and is below, and protected by, the concrete pressure slab. The vertical portions of the vapor barrier were installed along the inside of the secant wall and are protected by approximately 8-inch thick interior (basement) concrete walls. The Excavation Work Plan that appears in Section 2.4 outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or removed, and any underlying residual contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Operation and Maintenance Plan included in Section 4.0 of this SMP. As-built drawings of the building foundation elements area provided in Appendix B.

2.2.2 Basement Ventilation System

Procedures for operating and maintaining the basement ventilation system are documented in the Operation and Maintenance Plan (Section 4.0 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3.0 of this SMP). The Monitoring Plan also addresses inspections in the event that a condition occurs that may affect the Engineering Controls at the Site (e.g., fire or natural disaster such as flood or earthquake).

2.3 Institutional Controls

Institutional Controls are required by the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to residual contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to restricted residential uses only. Adherence to these Institutional Controls on the

Site is required by the Deed Restriction and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Deed Restriction by the Site owner and its successors and assigns;
- Implementation of all elements of this SMP;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP; and
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

Institutional Controls may not be discontinued without an amendment to, or extinguishment of, the Deed Restriction.

The Site has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Deed Restriction. Site use restrictions that apply to the Controlled Property are:

- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for the intended purpose;
- Vegetable gardens are prohibited in soils on or from the Controlled Property;
- All future activities on the property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with this SMP;
- The potential for vapor intrusion must be evaluated for any buildings developed on the Site, and any potential impacts that are identified must be mitigated;
- The property may be used for restricted residential use provided that the long-term Engineering and Institutional Controls included in this SMP are employed;
- The property may not be used for a higher level of use, such as unrestricted residential use without additional remediation and amendment of the Deed Restriction, as approved by the NYSDEC; and
- The Site owner will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to

evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow, and will be made by an expert that the NYSDEC finds acceptable.

2.3.1 Soil Vapor Intrusion Evaluation

Prior to building occupancy, in accordance with the RAWP, an indoor air sample will be obtained from within the building lower level or basement area and will be analyzed for VOC content, in order to confirm that the vapor barrier and ventilation system are preventing potential exposure to volatile organic vapors in the building.

2.4 Site Excavation

The entire area of the Site has been excavated to a minimum of 17 ft bls and covered by the vapor barrier and foundation slab for the 21-story building. The foundation slab is below the water table, and therefore under hydrostatic pressure. The foundation slab and vapor barrier serve as engineering controls preventing contact with underlying soil impacted by MGP residuals. The foundation slab and vapor barrier may not be breached without prior notice and approval of the NYSDEC. In situations where it is not practical to provide prior notice and obtain approval of the NYSDEC (e.g., emergency repairs of subsurface structures and utilities), notice need not be provided prior to excavation, but notice must be given within 48 hours of the start of such excavation. If a penetration of the vapor barrier membrane is necessary, damaged portions of barrier layers will be removed and patched or replaced with identical or equivalent barrier materials as used in the initial construction of such components. As applicable, all overlying protective layers will be re-installed. In addition, all repairs will be documented for inclusion in the annual certification.

All soil to be excavated from the Site from below the building foundation or beneath the sidewalk adjacent to the building will be characterized for the constituents required by the potential soil disposal facilities. These analyses will include, but may not be limited to, total petroleum hydrocarbons (TPH), the full Target Compound List (TCL)+15 of VOCs, the TCL+30 list of SVOCs and the Target Analyte List (TAL) of metals including mercury, cyanide and hexavalent chromium. All excavated soils will be managed in accordance with applicable NYSDEC regulations and guidance and the requirements of the soil disposal facilities where the soil is to be transported. Reuse of soil onsite will be contingent upon satisfaction of 6 NYCRR

375-6.7(d)(1)(ii)(b), unless otherwise approved by NYSDEC. If offsite disposal is required, it will be at a permitted facility.

In the event that impacted soil is excavated, it will be staged, characterized, and disposed of in accordance with applicable NYSDEC regulations and guidance.

All obviously impacted soil and soil determined by sampling to exceed the lower of the protection of groundwater or protection of public health restricted-residential soil cleanup objectives as set forth in 6 NYCRR Table 375-6.8 (b) will be placed in roll-off containers or stockpiled on flat terrain on double layers of polyethylene sheeting, each with a minimum 8-mil thickness between the excavated soils and ground or pavement surface. The excavated soils to be managed in stockpiles will not exceed a quantity of approximately 100 cubic yards per stockpile. The stockpiles will be constructed with a perimeter berm to contain any leachate or runoff from the soil. Polyethylene sheeting will also be placed over the stockpiled soil and anchored to prevent precipitation from entering the soil pile and prevent wind transport of stockpiled soil. Stockpiled soil (including petroleum contaminated soil) will be removed from Site as quickly as practicable. Any soil that is spilled onsite will be cleaned up as soon as practicable. Any spillage of soil offsite will be removed immediately.

2.4.1 Notification

Excluding emergency repair situations as discussed above in this section, at least 10 days prior to the start of any activity that is anticipated to encounter residual contamination, the Site owner or their representative will notify the Department. Currently, this notification will be made to:

William Ottaway, P.E.
Project Manager
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for Site re-grading, intrusive elements or utilities to be installed below the soil cover, or any work that may impact an engineering control;

- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A statement that the work will be performed in compliance with this SMP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan, in electronic format;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

2.5 Inspections and Notifications

2.5.1 Inspections

Inspections of all remedial components installed at the Site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive Site-wide inspection will be conducted annually and summarized in an annual report. Each inspection will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Deed Restriction;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3.0). The reporting requirements are outlined in the Site Management Reporting Plan (Section 5.0).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

2.5.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are required under the terms of the VCA and/or Environmental Conservation Law, as applicable.
- 10-day advance notice of any proposed ground-intrusive activities.
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action to be taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing response action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

3.0 MONITORING PLAN

3.1 Introduction

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the implemented ECs to reduce or mitigate contamination at the Site. ECs at the Site include:

- A subsurface perimeter secant barrier wall;
- The building foundation;
- The basement ventilation system; and
- Waterproofing/vapor barrier beneath and around the building foundation.

This Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Sampling and analysis of indoor air;
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements; and
- Annual inspection and periodic certification.

3.2 Engineering Control System Monitoring

The completed building foundation and associated water proofing/vapor barrier will serve as a barrier to prevent the migration of contaminants (e.g., soil vapor) into the building. The building foundation is keyed into the perimeter barrier wall. An active ventilation system will be

maintained and inspected in the building basement in accordance with New York City Department of Buildings (NYCDOB) requirements. The active ventilation system was designed to meet NYCDOB requirements and to provide further protection from accumulation of VOCs in the basement area in the unlikely event of a breach in the vapor barrier.

3.2.1 Operation and Maintenance of Engineering Controls

The engineering controls include the waterproofing/vapor barrier, structural slab/foundation walls, perimeter barrier wall and an active ventilation system in the basement as part of the building mechanical system. The operation and maintenance of the engineering controls will be limited to inspection of the foundation floor and sidewalls in the basement level of the building and verification that the ventilation system is operating in conformance with NYCDOB code requirements. Any cracks in the foundation floor or sidewalls will be repaired as necessary. In the event that a breach of the building foundation engineering control is observed, a round of indoor air quality testing will be performed as specified in Section 3.2.1.1.

3.2.1.1 Indoor Air Quality Testing

The initial indoor air sampling required by the RAWP to confirm the effectiveness of the vapor barrier installed beneath the building shall be performed after approval of the Remedial Action Report (RAR) as part of Site Management Plan activities. This sampling will be performed after the exterior of the building has been completed or the exterior has been sufficiently enclosed such that air in the basement has been effectively isolated and the air quality inside the building is deemed representative of ambient conditions without undue influence from completion of finished interior surfaces and or ambient air. The following is provided as guidance to effectively characterize the air quality in the building:

- Indoor air samples will be collected in two locations within the basement of the building. In addition, one ambient air sample will be collected near the sidewalk Along West 19th Street. The air samples will be collected from a height of 3 to 5 ft above the ground surface.

- The air sampling will be conducted in general accordance with the "Final Guidance for Evaluating Soil Vapor Intrusion in New York," NYSDOH, October 2006. The air samples will be analyzed for VOCs using modified United States Environmental Protection (USEPA) Method TO-15 for all compounds. Samples will be collected in laboratory-supplied, certified-clean 2.7-liter capacity Summa canisters. The flow regulators will be calibrated by the analytical laboratory to collect the sample over a 24-hour period. After sample collection, the air samples will be shipped under proper

chain-of-custody procedures via courier to a NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratory.

- Prior to the testing, the sample location and adjacent spaces will be inspected to determine if any materials are present with the potential to affect the indoor air quality (e.g. equipment, cleaning supplies, etc.). Any identified materials will be documented by completing a NYSDOH Indoor Air Quality Questionnaire and Building Inventory. The sampling area will then be ventilated by opening windows and interior doors. After ventilation is performed for a period of at least three hours, the doors and windows will be closed. The Site will then remain sealed for approximately 24 hours prior to the collection of the samples.

- Sampling will be performed at a time when the room is unoccupied. All windows and exterior doors will remain closed. Sampling personnel will avoid lingering in the immediate area of the Summa canisters. Flow rates for the indoor and outdoor samples will be identical, and samples will be collected concurrently.

- The field samplers will maintain a sample log sheet summarizing the following:

    1. Sample identification;

    2. Date and time of sample collection;

    3. Sample height;

    4. Identity of samplers;

    5. Sampling methods and devices;

    6. Volume of air sampled;

    7. Pressure of canisters before and after samples collected; and

    8. Chain of custody protocols from sampling point to lab analysis.

Within two weeks after receiving the final air data, a report will be prepared. The report will include a description of the sampling scope of work; a figure showing sample locations; summaries of field measurements and observations; product inventory findings; and, analytical data compared to applicable guidance values; and conclusions and recommendations.

3.3 Site-Wide Inspection

Inspections of the engineering controls will be performed annually, with the exception of the ventilation system. Ventilation system inspection will be performed in accordance with NYCDOB code and permit requirements. Inspection frequency is subject to change with the approval of the NYSDEC. Unscheduled inspections and/or sampling may take place when a suspected failure of the active ventilation system has been reported or an emergency occurs that is deemed likely to affect the operation of the system or the protectiveness of the engineering controls. During these inspections, an inspection form will be completed (Appendix C). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted;
- Compliance with the Operation and Maintenance Plan; and
- Confirm that Site records are up to date.

3.4 Reporting Requirements

Forms and any other information generated during regular inspections will be kept on file on-Site. All forms, and other relevant reporting formats used during the inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of the SMP.

3.5 Certifications

Site inspections and sampling activities will take place as outlined above.

The frequency of inspections may only be revised with the prior approval of NYSDEC. Inspection certifications for all ICs and ECs will be submitted to NYSDEC based on the date of issuance of the Certificate of Completion. The first certification will be made within one year of this date, and the remainder will be made annually. A qualified environmental professional, as

determined by NYSDEC, will perform the inspection and certification, unless an engineering evaluation of engineering controls is required. In this case, a licensed professional engineer with current registration will provide the certification. Further information on the certification requirements are outlined in the Reporting Plan of the SMP.

4.0 OPERATION AND MAINTENANCE PLAN

4.1 Introduction

The active ventilation system will be operated and maintained as part of normal building maintenance and in accordance with applicable NYCDOB code requirements. Therefore, this Operation and Maintenance Plan describes only the measures necessary to inspect and maintain the building foundation engineering control. A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP.

4.2 Engineering Control System Operation and Maintenance

4.2.1 Scope

Maintenance of the building foundation includes annual visual inspection by a qualified environmental professional as approved by the NYSDEC. The inspection will include a visual examination of all visible building foundation floor surfaces and exposed wall surfaces for significant crack or leaks. Since the building foundation is under hydrostatic pressure, the presence of a leak indicates failure of the foundation waterproofing/vapor barrier membrane.

If a leak is observed in the foundation of the structure, a qualified water proofing contractor will be contacted. All groundwater will be collected and containerized or removed with absorbent pads and disposed of properly. If leakage persists beyond an extreme high tidal storm event, a plan to correct the leakage shall be prepared by the water proofing contractor. The most likely method of repair will be pressure grouting using a series of drilled points through the foundation wall in suspect areas of leakage. Grout will be approved by a designated environmental professional for compatibility with contaminants known to be present in groundwater.

4.3 Maintenance Reporting Requirements

Maintenance reports and any other information generated during regular inspections at the Site will be kept on-file on-site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Periodic Review Report, as specified in the Section 5.0 of this SMP.

4.3.1 Routine Maintenance Reports

A checklist (Appendix C) will be completed during each routine maintenance event. The checklist will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist); and
- A review of the contact list provided below in Section 4.4, with updates made as necessary.

4.3.2 Non-Routine Maintenance Reports

During each non-routine maintenance event, a form will be completed that will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Presence of leaks;
- Date of leak repair;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

4.4 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

4.4.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence that could affect the engineering controls and require assistance, the Owner, or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies as described immediately above, appropriate emergency response personnel should be contacted. Prompt contact should also be made to a qualified environmental professional. These emergency contact lists must be maintained in an easily accessible location at the Site.

Emergency Contact Numbers	
Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Contact Numbers	
Roux Associates, Inc.	(631) 232-2600
[Add mechanical contractor]	

* Note: Contact numbers subject to change and should be updated as necessary

4.4.2 Map and Directions to Nearest Health Facility

- Site Location: 525 West 19th Street, New York, New York
- Nearest Hospital Name: Saint Vincent's Hospital

- Hospital Location: 170 West 12th Street, New York, New York 10011
- Hospital Telephone: (212) 604-7000
- Directions to the Hospital:
  1. Travel east on West 19th Street to Tenth Avenue
  2. Turn left onto Tenth Avenue
  3. Turn right onto West 20th Street
  4. Turn right onto Seventh Avenue
  5. Turn left onto West 12th Street

  Total Distance: 1.2 miles

  Total Estimated Time: 10 minutes

Map Showing Route from the Site to the Hospital: (on following page)

4.4.3 Response Procedures

As appropriate, the fire department and other emergency response groups will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan. The list will also be posted prominently at the Site and made readily available to all personnel at all times.

5.0 SITE MANAGEMENT REPORTING PLAN

5.1 Introduction

A Site inspection and certification report will be completed as presented below.

5.2 Certification of Engineering and Institutional Controls

Information on the EC/ICs can be found in the Engineering and Institutional Control Plan portion of the SMP. Inspection of the EC/ICs will occur annually. After the inspection, a qualified environmental professional, as determined by NYSDEC, will perform the certification, unless an engineering evaluation of engineering controls is required. In this case, a licensed professional engineer with current registration will provide the certification. The site inspection and certification report will certify that:

- On-site ECs/ICs are unchanged from the previous certification;
- They remain in place and are effective;
- The systems are performing as designed;
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls;
- Access is available to the Site by NYSDEC and NYSDOH to evaluate continued maintenance of such controls; and
- Site use is compliant with the Deed Restriction.

5.3 Site Inspections

5.3.1 Inspection Frequency

Site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted in the event of any environmentally-related situation or unplanned occurrence that could affect the engineering controls.

5.3.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective systems, which are contained in Appendix C. Additionally, a general Site-wide

inspection form will be completed during the Site-wide inspection (Appendix C). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the Site during the reporting period will be included in the site inspection and certification report.

5.3.3 Evaluation of Records and Reporting

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Maintenance activities are being conducted properly; and
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

6.0 REFERENCES

NYSDEC, 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation. December 25, 2002.

Roux Associates, Inc., 2005. Phase II Subsurface Investigation, 535 West 19th Street, New York, New York. October 14, 2005.

Remedial Engineering, P.C., 2006. Remedial Action Work Plan, 535 West 19th Street Redevelopment Site, New York, New York. August 23, 2006.

Roux Associates, Inc., 2006. UST Removal and Post-Excavation Soil Sampling, 535 West 19th Street, New York, New York. Spill No.0509807. July 13, 2006.

Roux Associates, Inc., 2006b. Supplemental Investigation Report. 535 West 19th Street Redevelopment Site. May 9, 2006.

Roux Associates, Inc., 2006c. Site Operations Plan, 535 West 19th Street Development Site, New York, New York. September 2, 2006.

Roux Associates and Con Edison, 2006. Site Operations Plan Addendum No. 1, 535 West 19th Street Development Site, New York, New York. October 23, 2006.

Table 1. Summary of Volatile Organic Compounds Detected Above Unrestricted Use Criteria in Remaining Soil Samples Collected During Remediation Investigation

Parameter (Units in µg/kg)	NYSDEC RSCOs (µg/kg)	NYSDEC Unrestricted Use Criteria (µg/kg)	**Sample Designation:** / **Sample Date:** / **Sampth Depth (ft bls):**	B33-3537 05/16/04 35-37	B33-3537DL 05/16/04 35-37	B36-2527 5/8/04 25-27	B36-2527DL 5/8/04 25-27	B36-3335 5/8/04 33-35	B36-3335DL 5/8/04 33-35
1,1,1-Trichloroethane	800	680		0.48 U	4.8 UD	67 U	340 UD	0.43 U	4.3 UD
1,1,2,2-Tetrachloroethane	600	--		0.94 U	9.4 UD	81 U	410 UD	0.84 U	8.4 UD
1,1,2-Trichloroethane	--	--		0.9 U	9 UD	85 U	430 UD	0.8 U	8 UD
1,1,2-Trichlorotrifluoroethane	--	--		0.82 U	8.2 UD	110 U	570 UD	0.73 U	7.3 UD
1,1-Dichloroethane	200	270		0.63 U	6.3 UD	35 U	180 UD	0.56 U	5.6 UD
1,1-Dichloroethene	400	330		0.38 U	3.8 UD	53 U	260 UD	0.34 U	3.4 UD
1,2,4-Trichlorobenzene	3400	--		0.45 U	4.5 UD	47 U	240 UD	0.4 U	4 UD
1,2-Dibromo-3-Chloropropane	--	--		1.2 U	12 UD	150 U	770 UD	1.1 U	11 UD
1,2-Dibromoethane	--	--		0.74 U	7.4 UD	100 U	520 UD	0.66 U	6.6 UD
1,2-Dichlorobenzene	7900	1100		0.73 U	7.3 UD	60 U	300 UD	0.65 U	6.5 UD
1,2-Dichloroethane	100	20		5.5 U	**55 UD**	**53 U**	**260 UD**	4.9 U	**49 UD**
1,2-Dichloropropane	--	--		0.6 U	6 UD	52 U	260 UD	0.53 U	5.3 UD
1,3-Dichlorobenzene	1600	2400		0.38 U	3.8 UD	61 U	310 UD	0.33 U	3.3 UD
1,4-Dichlorobenzene	8500	1800		0.63 U	6.3 UD	64 U	320 UD	0.56 U	5.6 UD
2-Butanone	300	120		22 J	41 UD	**470 U**	**2300 UD**	3.6 U	36 UD
2-Hexanone	--	--		5.7 U	57 UD	110 U	540 UD	5.1 U	51 UD
4-Methyl-2-Pentanone	1,000	--		4.3 U	43 UD	220 U	1100 UD	3.8 U	38 UD
Acetone	200	50		**230**	**450 D**	**540 U**	**2700 UD**	12 U	**120 UD**
Benzene	60	60		**870 E**	**940 D**	**37000 E**	**43000 D**	**1600 E**	**2000 D**
Bromodichloromethane	--	--		0.59 U	5.9 UD	57 U	290 UD	0.53 U	5.3 UD
Bromoform	--	--		0.53 U	5.3 UD	41 U	210 UD	0.47 U	4.7 UD
Bromomethane	--	--		1.3 U	13 UD	130 U	640 UD	1.1 U	11 UD
Carbon Disulfide	2,700	--		39	85 JD	64 U	320 UD	0.16 U	1.6 UD
Carbon Tetrachloride	600	760		0.53 U	5.3 UD	77 U	390 UD	0.47 U	4.7 UD
Chlorobenzene	1,700	1,100		0.63 U	6.3 UD	61 U	300 UD	0.56 U	5.6 UD
Chloroethane	1,900	--		0.94 U	9.4 UD	150 U	730 UD	0.83 U	8.3 UD
Chloroform	300	370		0.42 U	4.2 UD	95 U	**470 UD**	0.38 U	3.8 UD
Chloromethane	--	--		0.59 U	5.9 UD	110 U	560 UD	0.53 U	5.3 UD
cis-1,2-Dichloroethene	--	250		0.63 U	6.3 UD	130 U	**630 UD**	0.56 U	5.6 UD
cis-1,3-Dichloropropene	--	--		0.35 U	3.5 UD	25 U	120 UD	0.31 U	3.1 UD
Cyclohexane	--	--		0.54 U	5.4 UD	60 U	300 UD	0.48 U	4.8 UD
Dibromochloromethane	--	--		0.52 U	5.2 UD	62 U	310 UD	0.46 U	4.6 UD
Dichlorodifluoromethane	--	--		2.2 U	22 UD	55 U	270 UD	2 U	20 UD
Ethyl Benzene	5,500	1,000		100	110 D	**31000**	**35000 D**	3.7 J	4 UD
Isopropylbenzene	2,300	--		17	24 JD	1200	1300 JD	0.59 U	5.9 UD

Table 1. Summary of Volatile Organic Compounds Detected Above Unrestricted Use Criteria in Remaining Soil Samples Collected During Remediation Investigation

Parameter (Units in µg/kg)	NYSDEC RSCOs (µg/kg)	NYSDEC Unrestricted Use Criteria (µg/kg)	**Sample Designation:**	B33-3537	B33-3537DL	B36-2527	B36-2527DL	B36-3335	B36-3335DL
			Sample Date:	05/16/04	05/16/04	5/8/04	5/8/04	5/8/04	5/8/04
			Sampth Depth (ft bls):	35-37	35-37	25-27	25-27	33-35	33-35
m/p-Xylenes	--	--		90	100 D	45000	53000 D	4.3 J	8.2 UD
Methyl Acetate	--	--		2.3 U	23 UD	140 U	680 UD	2 U	20 UD
Methyl tert-butyl Ether	120	930		0.41 U	4.1 UD	59 U	300 UD	0.36 U	3.6 UD
Methylcyclohexane	--	--		0.63 U	6.3 UD	1000	470 UD	0.56 U	5.6 UD
Methylene Chloride	100	50		4.1 J	12 UD	**100 U**	**510 UD**	1.1 U	11 UD
o-Xylene	600	--		50	60 JD	16000	18000 D	0.69 U	6.9 UD
Styrene	--	--		0.56 U	5.6 UD	3300	3200 JD	0.5 U	5 UD
t-1,3-Dichloropropene	--	--		0.46 U	4.6 UD	70 U	350 UD	0.41 U	4.1 UD
Tetrachloroethene	1,400	1,300		1.1 U	11 UD	54 U	270 UD	1 U	10 UD
Toluene	1,500	700		13	16 JD	**17000**	**21000 D**	11	4.1 UD
trans-1,2-Dichloroethene	300	300		0.66 U	6.6 UD	85 U	**420 UD**	0.59 U	5.9 UD
Trichloroethene	700	470		0.57 U	5.7 UD	110 U	**550 UD**	0.51 U	5.1 UD
Trichlorofluoromethane	--	--		4.4 U	44 UD	95 U	470 UD	3.9 U	39 UD
Vinyl Chloride	200	20		0.42 U	4.2 UD	**44 U**	**220 UD**	0.37 U	3.7 UD
Total Confident Conc. VOC				1435.1	1785	151500	174500	1619	2000
Total TICs				3156	0	342000	0	0	0

Notes:

ft bls - feet below land surface
µg/kg - micrograms per kilogram
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
E - Exceeds calibration limits.
D; DL - Analysis at secondary dilution.
NYSDEC - New York State Department of Environmental Conservation
Unrestricted Use -
-- No NYSDEC RSCO available

Table 2. Summary of Semivolatile Organic Compounds Detected Above Unrestricted Use Criteria in Remaining Soil Samples Collected During Remediation Investigation

Parameter (Units in µg/kg)	NYSDEC RSCOs (µg/kg)	NYSDEC Unrestricted Use Criteria (µg/kg)	**Sample Designation:** / **Sample Date:** / **Sample Depth (ft bls):**	B32-2123 05/22/04 21-23	B33-3537 5/16/04 35-37	B36-1719 5/8/04 17-19	B36-2527 5/8/04 25-27	B36-2527DL 5/8/04 25-27	B36-2527DL2 5/8/04 25-27	B38-2123 5/16/04 21-23	B38-2123DL 5/16/04 21-23
1,1-Biphenyl	--	--		12 U	17 U	12 U	3000	2900 JD	1300 UD	15 U	150 UD
2,2-oxybis(1-Chloropropane)	--	--		21 U	31 U	23 U	93 U	470 UD	2300 UD	28 U	280 UD
2,4,5-Trichlorophenol	100	--		26 U	38 U	28 U	110 U	570 UD	2800 UD	34 U	340 UD
2,4,6-Trichlorophenol	--	--		14 U	21 U	15 U	62 U	310 UD	1600 UD	19 U	190 UD
2,4-Dichlorophenol	400	--		14 U	20 U	15 U	60 U	300 UD	1500 UD	18 U	180 UD
2,4-Dimethylphenol	--	--		21 U	31 U	23 U	320 J	470 UD	2300 UD	28 U	280 UD
2,4-Dinitrophenol	200	--		17 U	26 U	19 U	76 U	380 UD	1900 UD	23 U	230 UD
2,4-Dinitrotoluene	--	--		7.9 U	12 U	8.4 U	34 U	170 UD	860 UD	10 U	100 UD
2,6-Dinitrotoluene	100	--		17 U	25 U	18 U	73 U	370 UD	1800 UD	22 U	220 UD
2-Chloronaphthalene	--	--		8.2 U	12 U	8.8 U	36 U	180 UD	900 UD	11 U	110 UD
2-Chlorophenol	800	--		17 U	25 U	18 U	74 U	370 UD	1900 UD	22 U	220 UD
2-Methylnaphthalene	36,400	--		6.8 U	64 J	7.3 U	16000 E	16000 D	15000 JD	9 U	90 UD
2-Methylphenol	100	330		25 U	37 U	27 U	110 U	540 UD	2700 UD	33 U	330 UD
2-Nitroaniline	430	--		14 U	21 U	15 U	62 U	310 UD	1600 UD	19 U	190 UD
2-Nitrophenol	330	--		16 U	23 U	17 U	69 U	350 UD	1700 UD	21 U	210 UD
3,3-Dichlorobenzidine	--	--		63 U	93 U	68 U	280 U	1400 UD	6900 UD	83 U	830 UD
3+4-Methylphenols	--	330		18 U	27 U	19 U	79 U	400 UD	2000 UD	24 U	240 UD
3-Nitroaniline	500	--		64 U	94 U	68 U	280 U	1400 UD	6900 UD	84 U	840 UD
4,6-Dinitro-2-methylphenol	--	--		23 U	34 U	24 U	100 U	500 UD	2500 UD	30 U	300 UD
4-Bromophenyl-phenylether	--	--		10 U	15 U	11 U	45 U	230 UD	1100 UD	14 U	140 UD
4-Chloro-3-methylphenol	240	--		12 U	17 U	12 U	51 U	260 UD	1300 UD	15 U	150 UD
4-Chloroaniline	220	--		150 U	210 U	160 U	640 U	3200 UD	16000 UD	190 U	1900 UD
4-Chlorophenyl-phenylether	--	--		9.8 U	14 U	10 U	43 U	210 UD	1100 UD	13 U	130 UD
4-Nitroaniline	--	--		31 U	45 U	33 U	130 U	670 UD	3400 UD	41 U	410 UD
4-Nitrophenol	100	--		39 U	57 U	41 U	170 U	840 UD	4200 UD	51 U	510 UD
Acenaphthene	50,000	20000		8.7 U	100 J	9.3 U	14000 E	15000 D	15000 JD	63 J	110 UD
Acenaphthylene	50,000	100000		12 U	17 U	13 U	3200	3400 JD	1300 UD	16 U	160 UD
Acetophenone	--	--		21 U	30 U	22 U	90 U	450 UD	2300 UD	27 U	270 UD
Anthracene	50,000	100000		9.4 U	140 J	49 J	20000 E	25000 D	25000 JD	92 J	120 UD
Atrazine	--	--		12 U	18 U	13 U	53 U	260 UD	1300 UD	16 U	160 UD
Benzaldehyde	--	--		39 U	57 U	41 U	170 U	840 UD	4200 UD	51 U	510 UD
Benzo(a)anthracene	224	1000		74 J	120 J	170 J	**19000 E**	**19000 D**	**19000 JD**	290 J	79 UD
Benzo(a)pyrene	61	1000		110 J	97 J	170 J	**15000 E**	**14000 D**	**15000 JD**	480 J	520 JD
Benzo(b)fluoranthene	220	1000		77 J	80 J	160 J	**17000 E**	**15000 D**	**11000 JD**	270 J	280 UD
Benzo(g,h,i)perylene	50,000	100000		57 J	25 U	120 J	2700	3800 JD	1900 UD	300 J	230 UD
Benzo(k)fluoranthene	220	800		55 J	68 J	120 J	**9000**	**7900 JD**	**13000 JD**	340 J	180 UD
bis(2-Chloroethoxy)methane	--	--		18 U	27 U	19 U	79 U	390 UD	2000 UD	24 U	240 UD
bis(2-Chloroethyl)ether	--	--		19 U	29 U	21 U	85 U	420 UD	2100 UD	26 U	260 UD
bis(2-Ethylhexyl)phthalate	50,000	--		9.1 U	300 J	9.7 U	200 J	200 UD	990 UD	260 J	120 UD
Butylbenzylphthalate	50,000	--		13 U	76 J	14 U	58 U	290 UD	1400 UD	57 J	170 UD

Table 2. Summary of Semivolatile Organic Compounds Detected Above Unrestricted Use Criteria in Remaining Soil Samples Collected During Remediation Investigation

Parameter (Units in µg/kg)	NYSDEC RSCOs (µg/kg)	NYSDEC Unrestricted Use Criteria (µg/kg)	**Sample Designation:**	B32-2123	B33-3537	B36-1719	B36-2527	B36-2527DL	B36-2527DL2	B38-2123	B38-2123DL
			Sample Date:	05/22/04	5/16/04	5/8/04	5/8/04	5/8/04	5/8/04	5/16/04	5/16/04
			Sample Depth (ft bls):	21-23	35-37	17-19	25-27	25-27	25-27	21-23	21-23
Caprolactam	--	--		15 U	21 U	16 U	63 U	320 UD	1600 UD	19 U	190 UD
Carbazole	--	--		8.7 U	78 J	9.3 U	9800	9800 D	10000 JD	11 U	110 UD
Chrysene	400	1000		73 J	110 J	180 J	**15000 E**	**16000 D**	**18000 JD**	290 J	170 UD
Dibenz(a,h)anthracene	14	330		12 U	17 U	12 U	**1200 J**	250 UD	1300 UD	94 J	150 UD
Dibenzofuran	6,200	7000		13 U	65 J	14 U	**14000**	**14000 D**	**14000 JD**	17 U	170 UD
Diethylphthalate	7,100	--		12 U	300 J	13 U	54 U	270 UD	1400 UD	240 J	160 UD
Dimethylphthalate	2,000	--		9.4 U	14 U	10 U	41 U	210 UD	1000 UD	12 U	120 UD
Di-n-butylphthalate	8,100	--		89 J	3100	5.6 U	23 U	110 UD	570 UD	12000 E	15000 D
Di-n-octyl phthalate	50,000	--		9.4 U	14 U	10 U	41 U	210 UD	1000 UD	12 U	120 UD
Fluoranthene	50,000	100000		81 J	320 J	340 J	44000 E	51000 D	53000 D	280 J	72 UD
Fluorene	50,000	30000		11 U	93 J	48 J	18000 E	18000 D	18000 JD	15 U	150 UD
Hexachlorobenzene	41	330		7.4 U	11 U	7.9 U	32 U	160 UD	810 UD	9.7 U	97 UD
Hexachlorobutadiene	--	--		14 U	20 U	15 U	60 U	300 UD	1500 UD	18 U	180 UD
Hexachlorocyclopentadiene	--	--		9.9 U	15 U	11 U	43 U	220 UD	1100 UD	13 U	130 UD
Hexachloroethane	--	--		19 U	28 U	20 U	82 U	410 UD	2100 UD	25 U	250 UD
Indeno(1,2,3-cd)pyrene	3,200	500		56 J	14 U	95 J	**2100**	**4100 JD**	1000 UD	270 J	130 UD
Isophorone	4,400	--		15 U	22 U	16 U	64 U	320 UD	1600 UD	19 U	190 UD
Naphthalene	13,000	12000		8.6 U	530 J	120 J	**57000 E**	**70000 ED**	**72000 D**	86 J	110 UD
Nitrobenzene	200	--		20 U	30 U	21 U	87 U	440 UD	2200 UD	26 U	260 UD
N-Nitroso-di-n-propylamine	--	--		17 U	26 U	19 U	76 U	380 UD	1900 UD	23 U	230 UD
N-Nitrosodiphenylamine	--	--		10 U	15 U	11 U	44 U	220 UD	1100 UD	13 U	130 UD
Pentachlorophenol	1,000	800		12 U	18 U	13 U	54 U	270 UD	1300 UD	16 U	160 UD
Phenanthrene	50,000	100000		110 J	450 J	230 J	62000 E	75000 ED	77000 D	420 J	120 UD
Phenol	30	330		16 U	24 U	18 U	72 U	360 UD	1800 UD	22 U	220 UD
Pyrene	50,000	100000		96 J	280 J	340 J	35000 E	37000 D	38000 JD	330 J	93 UD
Total Confident Conc. SVOC				878	6371	2142	377520	416900	413000	16162	15520
Total TICs				1550	14130	1720	58250	0	0	11560	0

Notes:

ft bls - feet below land surface
µg/kg - micrograms per kilogram
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
E - Exceeds calibration limits.
D; DL - Analysis at secondary dilution.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
-- No NYSDEC RSCO available

Table 3. Summary of Metals Detected Above Unrestricted Use Criteria in Remaining Soil Samples Collected During Remediation Investigation

Parameter (Units in mg/kg)	NYSDEC RSCOs (mg/kg)	NYSDEC Unrestricted Use Criteria (mg/kg)	**Sample Designation:** / **Sample Date:** / **Sample Depth (ft bls):**	B32-2123 05/22/04 21-23	B33-3537 05/16/04 35-37	B33-3941 05/16/04 39-41	B36-1719 05/08/04 17-19	B36-2527 05/08/04 25-27	B36-3335 05/08/04 33-35	B38-2123 05/16/04 21-23
Antimony	--	--		0.69 J	1 U	0.85 U	0.72 U	3.5 J	0.9 U	1.7 J
Arsenic	7.5	13		4.9	7.8	6.6	2.4	6.2	7.8	9.1
Beryllium	0.16	7.2		0.38 J	0.57 J	0.57 J	0.36 J	0.57 J	0.59 J	0.78
Cadmium	1	2.5		0.47 J	0.08 U	0.07 U	0.28 J	0.48 J	0.49 J	0.22 J
Chromium	10	--		13.5	21.2	20.9	11.6	25.3	21	25.7
Copper	25	50		29.5	14.5	11.7	22.4	36.7	12.6	42.8
Lead	500	63		**174**	23.4	10.4	**127**	**473**	11	**133**
Mercury	0.1	0.18		**0.27**	0.02	0.02	**1.1 D**	0.7 D	0.03	**0.33**
Nickel	13	30		15.1	22.5	20.5	16	29	20.5	29.5
Selenium	2	3.9		0.38 U	0.56 U	0.47 U	0.4 U	0.41 U	0.5 U	0.49 U
Silver	--	2		0.13 U	0.19 U	0.16 U	0.13 U	0.14 U	0.17 U	0.16 U
Thallium	--	--		0.4 U	0.59 U	0.72 J	0.42 U	0.43 U	0.53 U	0.51 U
Zinc	20	109		44.7	60.3	60.1	74.3	107	53.2	95.4

Notes:
mg/kg - milligrams per kilogram
ft bls - feet below land surface
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
-- No NYSDEC RSCO available

Title:

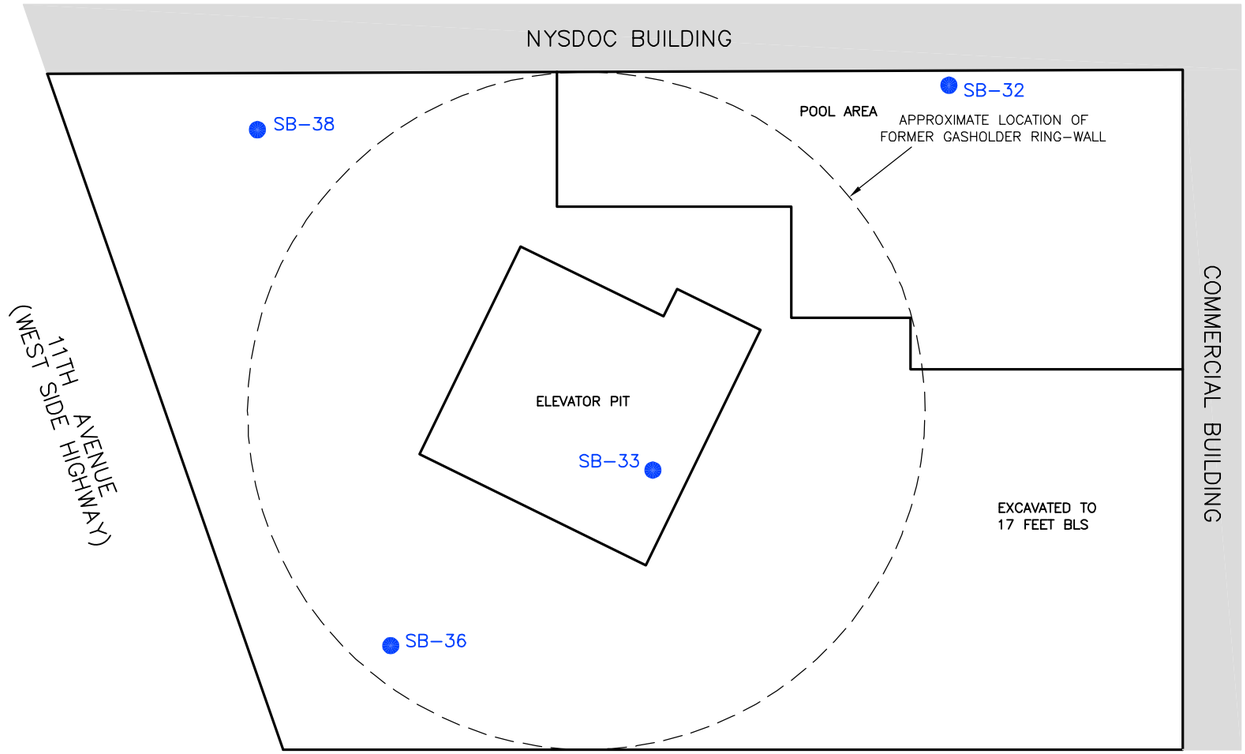
SITE PLAN

535 WEST 19TH STREET, NEW YORK, NEW YORK

Prepared For :
WEST CHELSEA DEVELOPMENT PARTNERS LLC

ROUX ASSOCIATES, INC
Environmental Consulting & Management

Compiled By : NE	Date : 2/27/09	FIGURE
Prepared By : NE.	Scale : NTS	1
Project Manager : NE	Office: NY	
File No: ALF0215001.PPT	Project : 1262.0002Y	



LEGEND

SB-33 ●	LOCATION AND DESIGNATION OF SOIL BORING COMPLETED DURING REMEDIAL INVESTIGATION WHERE CONSTITUENTS REMAINING IN SOIL WERE ABOVE NYSDEC UNRESTRICTED USED CRITERIA
17 FEET BLS	BELOW LAND SURFACE
NYSDOC	NEW YORK STATE DEPARTMENT OF CORRECTIONS

NOTES

– SITE EXCAVATED TO APPROXIMATELY 17 FT BLS.

20' 0 20'

Title:
LOCATIONS OF REMEDIAL INVESTIGATION SOIL BORINGS WITH REMAINING SOIL ABOVE NYSDEC UNRESTRICTED USE CRITERIA

535 WEST 19TH ST. DEVELOPMENT SITE
NEW YORK, NEW YORK

Prepared For:
WEST CHELSEA DEVELOPMENT PARTNERS, LLC

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: C.B.	Date: 27FEB09	FIGURE
Prepared by: B.H.C.	Scale: AS SHOWN	2
Project Mgr: N.E.	Office: NY	
File No: ALF02.150.03	Project: 1262.0002Y	

N:\PROJECTS\ALF1262Y\ALF02Y\149\ALF02.149.03.DWG

APPENDIX A

Metes and Bounds

First American Title Insurance Company of New York

Title No. 3008-231730

SCHEDULE "A"

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF MANHATTAN, CITY, COUNTY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTHERLY LINE OF WEST 19TH STREET, DISTANT 450 FEET 2 INCHES WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE SAID NORTHERLY SIDE OF WEST 19TH STREET AND THE WESTERLY SIDE OF 10TH AVENUE;

RUNNING THENCE NORTHERLY WITH 10TH AVENUE, 92 FEET TO THE CENTRE LINE OF THE BLOCK;

THENCE WESTERLY ALONG SAID CENTRE LINE OF THE BLOCK, 153 FEET 9 1/2 INCHES MORE OR LESS TO A POINT IN THE EASTERLY LINE OF 11TH AVENUE, AS LEGALLY OPENED;

THENCE SOUTHEASTERLY ALONG SAID EASTERLY LINE OF 11TH AVENUE, 98 FEET 7 1/2 INCHES TO ITS INTERSECTION WITH THE SAID NORTHERLY LINE OF WEST 19TH STREET;

THENCE EASTERLY ALONG SAID NORTHERLY LINE OF WEST 19TH STREET, 118 FEET 3 INCHES MORE OR LESS TO THE POINT OR PLACE OF BEGINNING.

TOGETHER WITH THE BENEFITS AND SUBJECT TO THE BURDENS OF AN EASEMENT OF LIGHT AND AIR SET FORTH IN A ZONING LOT DEVELOPMENT AND EASEMENT AGREEMENT RECORDED 1/13/2006 AS CRFN 2006000022490.

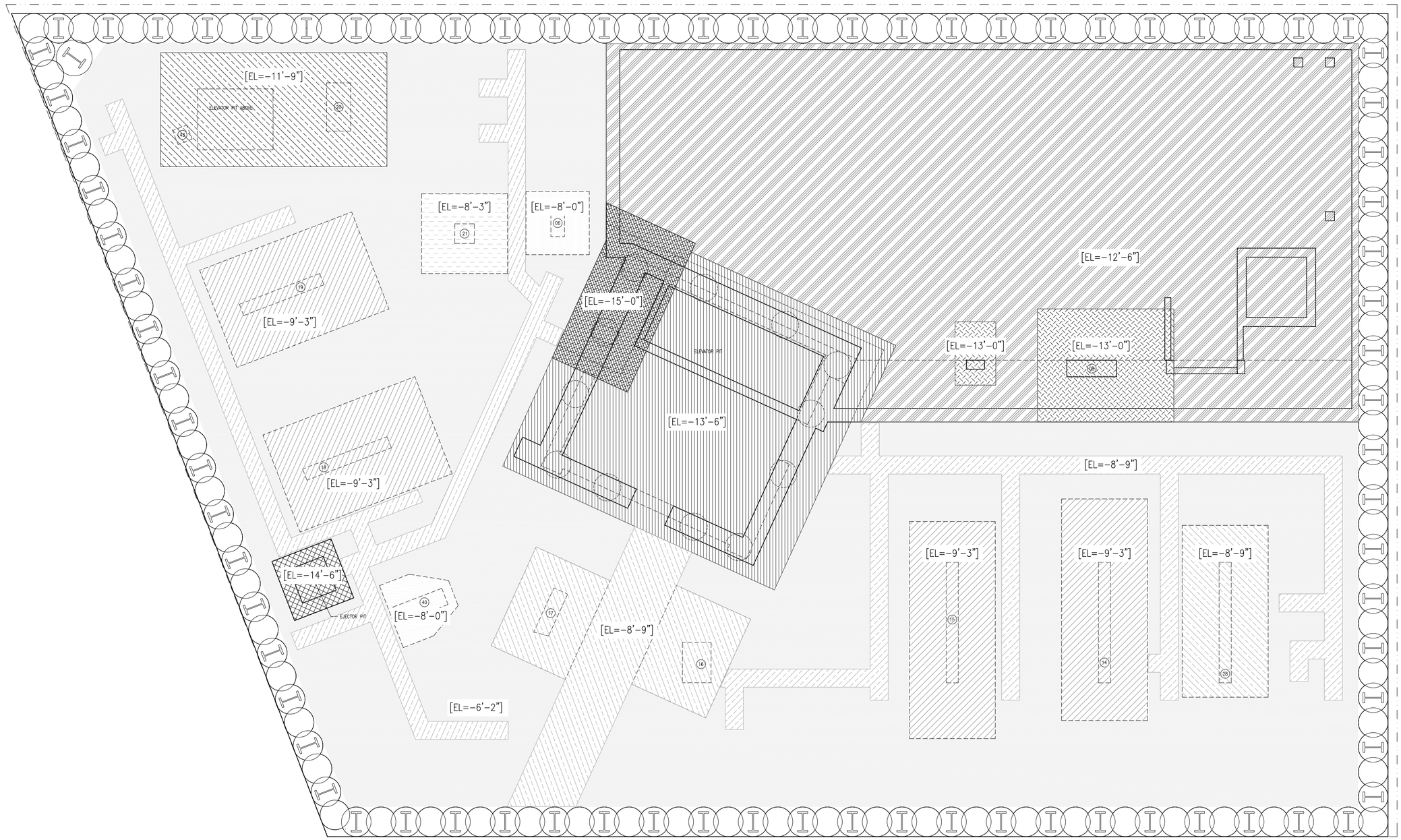
THE policy to be issued under this report will insure the title to such buildings and improvements erected on the premises, which by law constitute real property.

FOR CONVEYANCING ONLY: TOGETHER with all the right, title and interest of the party of the first part, of in and to the land lying in the street in front of and adjoining said premises.

APPENDIX B

As-Builts of Engineering Controls

(On Disk Inside Back Cover)



100 ELEVENTH AVENUE NEW YORK

Client
West Chelsea Development Partners, LLC
485 Broadway, 5th Floor
New York,New York,10013
212.343.1700

Design Architects
Ateliers Jean Nouvel
10 Cité d'Angoulême
75011 Paris, France
011.33.1.4.803.3383

Executive Architects
Beyer Blinder Belle Architects & Planners LLP
41 East 11th Street
New York,New York,10003
212.777.7800

Structural Engineer
DeSimone Consulting Engineers
12 West 18th Street
New York,New York,10011
212.532.2211

Mechanical / Plumbing / Electrical
AKF Engineers
One Atlantic Street, 8th Floor
Stamford,Connecticut,06901
203.323.4333

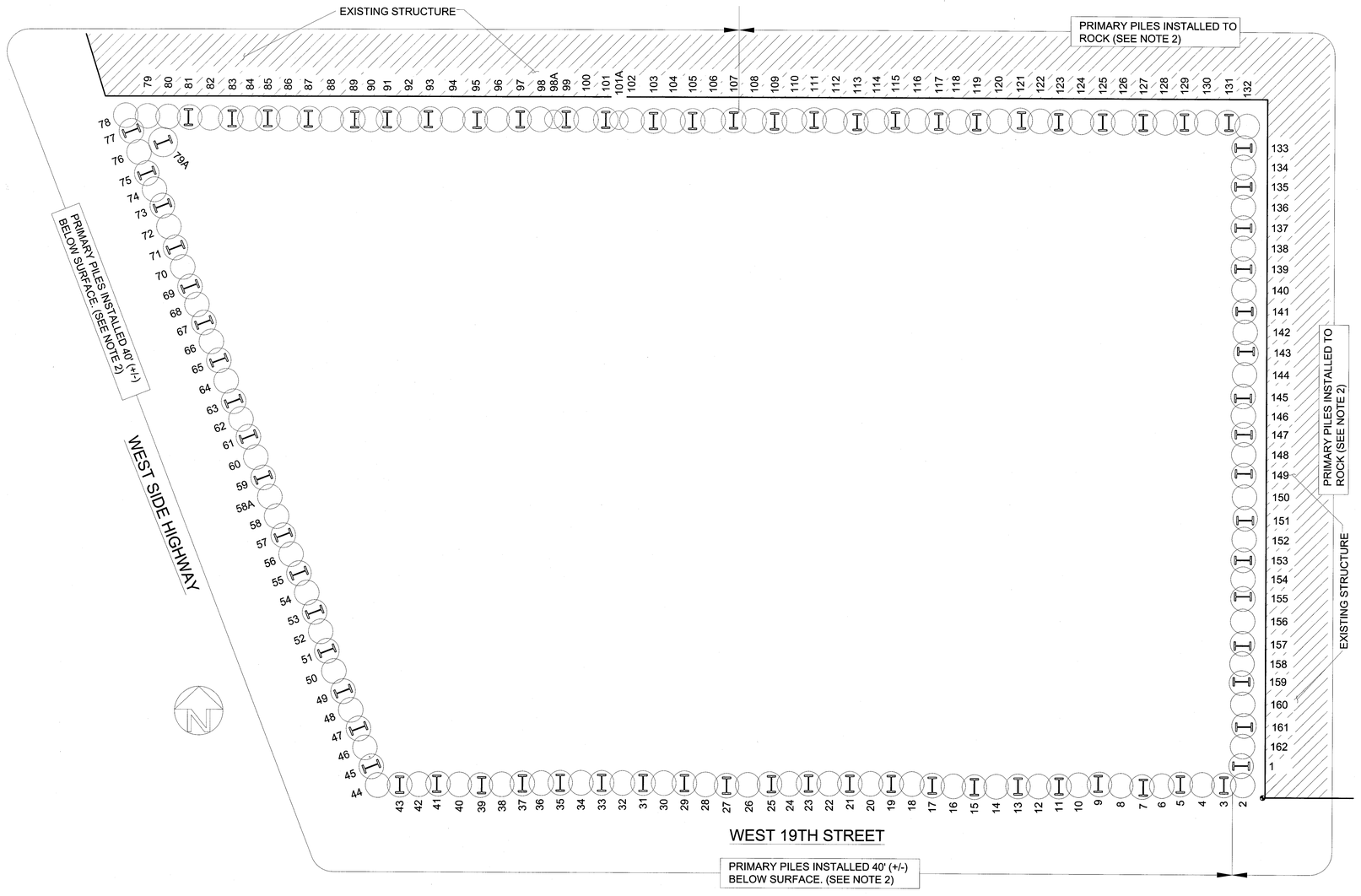
No.	Date	Description
Revisions		

Drawing Title

General Depth of Excavation Plan

Scale	1/8" = 1'- 0"
Issue Date	27 February 2009
Project No.	
Drawing No.	

N



1 SECANT PILE WALL - PLAN VIEW
SCALE: 1/8"=1'-0"

Pile no.	Shaft Top Elev.	Shaft Bottom Elevation	Remarks
1	4.00	-69.66	
2	4.00	-71.30	
3	4.00	-72.80	
4	4.00	-40.00	
5	4.00	-72.80	
6	4.00	-40.00	
7	4.00	-74.44	
8	4.00	-43.28	
9	4.00	-74.08	
10	4.00	-40.00	
11	4.00	-72.80	
12	4.00	-40.00	
13	4.00	-72.80	
14	4.00	-40.00	
15	4.00	-72.80	
16	4.00	-40.00	
17	4.00	-72.80	
18	4.00	-40.00	
19	4.00	-72.80	
20	4.00	-43.28	
21	4.00	-76.08	
22	4.00	-40.00	
23	4.00	-79.36	
24	4.00	-40.00	
25	4.00	-79.36	
26	4.00	-40.00	
27	4.00	-79.36	
28	4.00	-40.00	
29	4.00	-79.36	
30	4.00	-49.84	
31	4.00	-82.64	
32	4.00	-40.00	
33	4.00	-79.36	
34	4.00	-40.00	
35	4.00	-82.64	
36	4.00	-40.00	
37	4.00	-82.64	
38	4.00	-35.72	
39	4.00	-76.08	
40	4.00	-40.00	
41	4.00	-75.72	
42	4.00	-35.72	
43	4.00	-76.08	
44	4.00	-40.00	
45	4.00	-74.08	
46	4.00	-40.00	
47	4.00	-72.80	
48	4.00	-35.72	
49	4.00	-72.80	
50	4.00	-40.00	
51	4.00	-76.08	
52	4.00	-40.00	
53	4.00	-72.80	
54	4.00	-40.00	
55	4.00	-72.80	
56	4.00	-35.72	
57	4.00	-76.08	
58	4.00	-40.00	
58A	4.00	-72.80	Additional primary pile
59	4.00	-74.08	
60	4.00	-35.72	
61	4.00	-72.80	
62	4.00	-35.72	
63	4.00	-72.80	
64	5.50	-34.22	
65	5.50	-74.58	
66	5.50	-38.50	
67	5.50	-75.40	
68	5.50	-34.22	
69	5.50	-74.58	
70	5.50	-34.22	
71	5.50	-71.30	
72	5.50	-34.22	
73	5.50	-71.30	
74	5.50	-38.50	
75	5.50	-71.30	
76	5.50	-34.22	
77	5.50	-71.30	
78	5.50	-34.22	
79	5.50	-20.82	Pile abandoned due to obstruction
79A	5.50	-71.30	Remedial pile
80	5.50	-41.78	
81	5.50	-72.02	
82	5.50	-34.22	
83	5.50	-75.30	
84	5.50	-34.22	
85	5.50	-75.30	
86	5.50	-34.22	
87	5.50	-78.58	
88	5.50	-34.22	
89	5.50	-81.86	
90	5.50	-34.22	
91	5.50	-77.86	
92	5.50	-35.22	
93	5.50	-81.86	
94	5.50	-34.22	
95	5.50	-81.86	
96	5.50	-34.22	
97	5.50	-86.78	
98	5.50	-77.86	
98A	5.50	-34.22	Additional primary pile
99	5.50	-77.86	
100	5.50	-75.86	
101	5.50	-85.14	
101A	5.50	-34.22	Additional primary pile
102	5.50	-34.22	
103	4.50	-75.58	
104	4.50	-35.22	
105	4.50	-78.86	
106	4.50	-36.22	
107	4.50	-75.58	
108	4.50	-72.30	
109	4.50	-75.58	
110	4.50	-72.30	
111	4.50	-72.30	
112	4.50	-72.30	
113	4.50	-72.30	
114	4.50	-72.30	
115	4.50	-72.30	
116	4.50	-72.30	
117	4.50	-72.30	
118	4.50	-72.30	
119	4.50	-62.46	
120	4.50	-72.30	
121	4.50	-72.30	
122	4.50	-75.58	
123	4.50	-62.46	
124	4.50	-72.30	
125	4.50	-78.86	
126	4.00	-82.64	
127	4.00	-76.08	
128	4.00	-76.08	
129	4.00	-77.72	
130	4.00	-79.36	
131	4.00	-77.72	
132	4.00	-81.00	
133	4.00	-82.64	
134	4.00	-82.64	
135	4.00	-82.64	
136	4.00	-76.08	
137	4.00	-82.64	
138	4.00	-82.64	
139	4.00	-82.64	
140	4.00	-79.36	
141	4.00	-84.92	
142	4.00	-83.30	
143	4.00	-86.64	
144	4.00	-82.64	
145	4.00	-89.43	
146	4.00	-84.28	
147	4.00	-89.92	
148	4.00	-83.46	
149	4.00	-89.43	
150	4.00	-79.36	
151	4.00	-85.89	
152	4.00	-76.08	
153	4.00	-79.36	
154	4.00	-76.08	
155	4.00	-83.36	
156	4.00	-76.08	
157	4.00	-80.08	
158	4.00	-76.08	
159	4.00	-76.80	
160	4.00	-76.08	
161	4.00	-80.90	
162	4.00	-74.44	

NOTES:

1. ALL ELEVATIONS ARE RELATIVE TO THE BOROUGH PRESIDENT OF MANHATTAN TOPOGRAPHICAL BUREAU DATUM (BPMD), WHICH IS 2.75 FT ABOVE MEAN SEALEVEL AT SANDY HOOK, NJ, AS ESTABLISHED BY THE US COAST AND GEODETIC SURVEY OF 1929.

2. FOR AS-BUILT SECANT PILE TIP ELEVATIONS REFER TO SECTION 3 OF THIS DRAWING.

3. GRAPHICAL REPRESENTATION OF THE AS-BUILT ELEVATIONS OF THE SECANT WALL STRUCTURE IS PROVIDED ON DRAWING 300871-ADB-002.

2 SECANT PILE WALL - NOTES
SCALE: N/A

3 SECANT PILE WALL - AS-BUILT ELEVATIONS
SCALE: N/A

DESIGNED A.D.
DRAWN A.D.
CHECKED
PROJ.ENGR. A.D.

SCALE
AS NOTED

STATE OF NEW YORK ALFREDAS DAUGIRDAS 085456 LICENSED PROFESSIONAL ENGINEER

SKANSKA

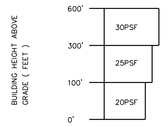
UNDERPINNING & FOUNDATION SKANSKA

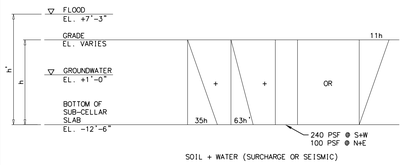
46-36 54TH ROAD MASPETH, NY 11378 PHONE: (718) 786-6557 FAX: (718) 786-6981

100 ELEVENTH AVENUE (535 WEST 19TH STREET)
WEST SIDE HIGHWAY & WEST 19TH STREET
NEW YORK, NY
SECANT PILE WALL ELEVATION AS-BUILT

DATE: 03/04/09
DWG. NO.: 300871-SWAB-001
SHEET NO.: 1 OF 2
FILE NAME: 300871-4.2

NO.	DATE	ISSUED FOR	BY





GENERAL NOTES:

I - CODES

1. BUILDING CODE OF THE CITY OF NEW YORK, INCLUDING LATEST AMENDMENTS ("N.Y.C. CODE")
2. AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS – ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN", JUNE 1, 1989 ("AISC SPECIFICATION"). AS MODIFIED BY SUBCHAPTER 10 ARTICLE 6 OF THE NYC BUILDING CODE.
3. AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" ACI 318–99 ("ACI") AS MODIFIED BY SUBCHAPTER 10 ARTICLE 5 OF THE N.Y.C. BUILDING CODE.

II - MATERIALS

UNLESS OTHERWISE SHOWN OR NOTED ON DRAWINGS:

1. STRUCTURAL STEEL:

ALL ROLLED SHAPES:	ASTM A572 OR A992, GRADE 50
ALL PLATES AND CONNECTION MATERIAL:	ASTM A36
ALL TUBULAR SECTIONS:	ASTM A500, GRADE B
ALL PIPE SECTIONS:	ASTM A53, GRADE B
ANCHOR BOLTS, U.O.N.:	ASTM F1554

2. METAL DECK:
FABRICATE FROM ASTM A611 OR ASTM A653 STEEL WITH ASTM A653 G60 GALVANIZING. SIZE AND GAGE AS NOTED ON DRAWINGS.
U.O.N., FLOOR DECKING SHALL BE COMPOSITE DECK WITH CONFIGURATION THAT PERMITS FULL AISC SHEAR CONNECTOR VALUE.

3. SHEAR CONNECTORS:
3/4" DIAMETER x 3" HEADED STUDS, U.O.N.

4. CAST–IN–PLACE CONCRETE:

FOUNDATION WALLS & BUTTRESSES:	5 KSI NORMAL WT.
PILECAPS:	5 KSI NORMAL WT.
SLABS ON GROUND:	4 KSI NORMAL WT. U.O.N.
FORMED SLABS:	AS NOTED ON DRAWINGS.
SLABS ON METAL DECK:	3 KSI LT. WT. 115 PCF
COLUMNS AND WALLS:	AS NOTED ON DRAWINGS.

5. REINFORCEMENT:

DEFORMED BARS:	ASTM A615, GRADE 60., U.O.N.
DEFORMED BARS:	ASTM A615, GRADE 75, SEE COLUMN AND SHEAR WALL PLANS

NOTE: ALL #11 REINFORCING BARS TO BE GRADE 75

WELDED WIRE FABRIC:	ASTM A185.
WELDED DEFORMED WIRE FABRIC:	ASTM A467, GRADE 60.

6. WELDING ELECTRODES:	E70XX LOW HYDROGEN.
7. BOLTING MATERIALS:	ASTM A325 OR A490, U.O.N.

III - GENERAL

1. NOTES, TYPICAL DETAILS AND SCHEDULES APPLY TO ALL STRUCTURAL WORK UNLESS OTHERWISE NOTED. FOR CONDITIONS NOT SPECIFICALLY SHOWN, PROVIDE DETAILS OF A SIMILAR NATURE. VERIFY APPLICABILITY BY SUBMITTING SHOP DRAWINGS FOR REVIEW.
2. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL AND MECHANICAL DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER PRIOR TO PERFORMING WORK.
3. DO NOT SCALE DRAWINGS TO OBTAIN DIMENSIONAL INFORMATION.
4. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR WATER/DAMPROOFING AND FIREPROOFING DETAILS AND REQUIREMENTS.
5. TOP OF CONCRETE SLABS ARE AT FLOOR REFERENCE ELEVATIONS EXCEPT AS NOTED. FOR FLOOR REFERENCE ELEVATIONS SEE COLUMN SCHEDULE.
6. THESE DRAWINGS DO NOT DEFINE SCOPE OF CONTRACTS. SEE CONSTRUCTION MANAGER'S DOCUMENTS.
7. AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONDITIONS OF THE JOBSITE INCLUDING SAFETY OF PERSONS AND PROPERTY. THE ARCHITECT'S OR ENGINEER'S PRESENCE OR REVIEW OF WORK DOES NOT INCLUDE THE ADEQUACY OF THE CONTRACTOR'S MEANS OR METHODS OF CONSTRUCTION.
8. SHORING, BRACING AND PROTECTION OF EXISTING AND ADJACENT STRUCTURES DURING CONSTRUCTION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. PROTECT AND MAINTAIN THE INTEGRITY OF ADJACENT STREETS, BUILDINGS AND STRUCTURES.
9. ALL EXISTING DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES SHOWN ON THE DRAWINGS SHALL BE VERIFIED BY FIELD MEASUREMENTS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER.
10. DRAWINGS HAVE BEEN PREPARED BASED ON AVAILABLE KNOWLEDGE OF EXISTING CONDITIONS. IF, DURING DEMOLITION, EXCAVATION OR CONSTRUCTION, ACTUAL CONDITIONS ARE DISCOVERED TO DIFFER FROM THOSE INDICATED ON DRAWINGS, ENGINEER SHALL BE NOTIFIED.

IV - FOUNDATION NOTES

1. PILES ARE TO HAVE A MIN. 150 TON NET CAPACITY AS DEFINED IN THE GEOTECHNICAL REPORT.
2. NO BACKFILL SHALL BE PLACED AGAINST FOUNDATION WALLS UNLESS SUPPORTING SLABS ARE IN PLACE AND SET OR THE WALLS ARE ADEQUATELY BRACED.
3. UNDERPINNING OF THE EXISTING ADJACENT FOUNDATION MAY BE REQUIRED (SEE TYPICAL UNDERPINNING DETAILS AND INFORMATION GIVEN ON DRAWINGS). EXTENT OF UNDERPINNING WORK SHOWN ON DRAWINGS IS BASED UPON INTERPRETATION OF AVAILABLE INFORMATION. HOWEVER, ACTUAL CONDITIONS WILL VARY AND DETERMINE REQUIRED SCOPE OF WORK.
4. DEWATERING OF THE SITE DURING CONSTRUCTION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. PRECAUTIONS SHALL BE TAKEN BY THE CONTRACTOR NOT TO UNDERMINE EXISTING FOUNDATIONS. METHOD OF DEWATERING AND CALCULATIONS FOR THE APPROPRIATE SYSTEM ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. DEWATERING SHALL NOT BE STOPED UNTIL 4TH FLOOR IS CAST.
5. ALL PILE CAPS ARE TO BE CENTERED ON COLUMNS ABOVE, U.O.N.
6. PROVIDE DOWELS IN FOUNDATIONS FOR ALL WALLS, COLUMNS, AND SHEAR WALLS OF SAME NUMBER AND SIZE AS THE VERTICAL REINFORCEMENT ABOVE, U.O.N.
7. PROVIDE WATERSTOPS IN ALL VERTICAL CONSTRUCTION JOINTS IN BASEMENT WALLS.
8. SLABS ON GROUND SHALL BE PLACED ON SELECT FILL COMPACTED TO 95 PERCENT MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D1557).
9. PILE CAP ELEVATIONS SHOWN ON THE DRAWINGS HAVE BEEN ESTIMATED USING THE GEOTECHINICAL REPORT. ACTUAL ELEVATIONS OF PILE CAPS BOTTOMS WILL BE DETERMINED BY FIELD CONDITIONS.
10. THE FOLLOWING SHALL BE GIVEN TO THE ENGINEER BEFORE PILE CAPS ARE POURED.
    - a) PILE IDENTIFICATION PLAN (NUMBERING SEQUENCE SHALL BE SAME AS INDICATED ON DCE PLANS).
    - b) PILE DRIVING LOGS SIGNED BY A PROFESSIONAL ENGINEER.
    - C) PILE DEVIATION PLAN (PILES SHALL NOT BE SURVEYED UNTIL THEY HAVE BEEN CUT–OFF).
11. ADDITION FOR AS INSTALLED ECCENTRICITIES SHALL BE MADE THOUGH INSTALLATION OF ADD'L PILES AND/OR STRAPS AS DESIGNED BY THE ENGINEER.

V - UNDERPINNING NOTES

1. CONTRACTOR SHALL RETAIN THE SERVICE OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NEW YORK TO PREPARE SIGNED AND SEALED DESIGN DRAWINGS AND CALCULATIONS FOR ALL REQUIRED UNDERPINNING OF ADJACENT STRUCTURES. THE CONTRACTOR SHALL FILE THE DRAWINGS WITH THE BUILDING DEPARTMENT.
2. SUBMIT COPY OF FILED DRAWINGS TO DCE FOR INFORMATION ONLY. ALL UNDERPINNING WORK SHALL BE SUBJECT TO CONTROLLED INSPECTION IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.
3. THE FULL SCOPE OF THIS WORK IS TO BE DETERMINED BY THE CONTRACTOR BY THE REVIEW OF ALL AVAILABLE DOCUMENTATION SUCH AS SURVEYS, GEOTECHNICAL REPORTS AND THE LIKE AND BY SITE REVIEW PRIOR TO BIDDING.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SAFETY OF ALL EXISTING ADJACENT BUILDINGS, STRUCTURES, SIDEWALKS, VAULTS AND THE LIKE DURING AND AS A RESULT OF UNDERPINNING OPERATIONS.
5. UNDERPINNING OF EXISTING ADJACENT FOUNDATIONS MAY BE REQUIRED. ALL ENGINEERING, DESIGNS, AND MEANS AND METHODS OF CONSTRUCTION RELATED TO UNDERPINNING ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

VI - CONCRETE NOTES

1. REINFORCING STEEL SHALL HAVE A MINIMUM CLEAR COVER AS FOLLOWS, U.O.N. IN DRAWINGS:

   CONCRETE POURED AGAINST EARTH.................................3"

   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #5 OR SMALLER...1½"
   #6 OR LARGER..2"

   CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
   COLUMNS (TIES AND MAIN REINFORCING)...........................1½"
   SLABS, WALLS, JOISTS
   #14 OR #18 BARS...1½"
   #11 OR SMALLER..¾"
   BEAMS (STIRRUPS AND MAIN REINF)...............................1½"

   CLEAR COVER SHALL BE CLEARLY SHOWN ON ALL REBAR DETAIL DRAWINGS.

2. ALL REINFORCEMENT SHALL BE SECURELY HELD IN POSITION WHILE PLACING CONCRETE. IF NECESSARY, ADDITIONAL BARS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT.
3. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS AND LOCATIONS OF ALL OPENINGS, PIPE SLEEVES, ETC. AS REQUIRED BY ALL TRADES, BEFORE THE CONCRETE IS POURED. THE CONTRACTOR SHALL CONSULT THE ARCHITECTURAL, MECHANICAL,AND ELECTRICAL DRAWINGS, AS WELL AS THE STRUCTURAL DRAWINGS FOR THE LOCATION, NUMBER, AND SIZE OF ALL OPENINGS, SLEEVES, ETC. HOWEVER, OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE INSTALLED ONLY AFTER APPROVAL OF THE STRUCTURAL ENGINEER IS OBTAINED.
4. LOCATION OF ALL CONSTRUCTION JOINTS NOT SHOWN IN DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO DETAILING OF REINFORCING. ALL CONSTRUCTION JOINTS TO BE CLEARLY SHOWN IN REBAR DETAIL DRAWINGS. ENGINEER MAY REQUIRE ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS.
5. DIMENSIONS "Ld" AS NOTED ON DRAWINGS SHALL BE AS FOLLOWS:

BEAMS

BAR SIZE	BOTTOM BARS	OTHER BARS
#3	13	17
#4	17	23
#5	22	28
#6	26	34
#7	38	49
#8	43	56
#9	48	63
#10	54	71
#11	60	78

COLUMNS

BAR SIZE	Ld
#3	13
#4	17
#5	22
#6	26
#7	38
#8	43
#9	48
#10	54
#11	60

TABLE ASSUMPTIONS:

1. f'c = 5 ksi
2. A MINIMUM CLEAR COVER AS SHOWN IN NOTE 1 ABOVE
3. A MINIMUM CLEAR SPACING OF 3" BETWEEN ANY BARS
4. fy = 60 ksi
5. NORMAL WEIGHT CONCRETE
6. FOR WALLS:
   CASE 1 = CLEAR SPACING ≥ 2db
   AND CLEAR COVER ≥ db
   CASE 2 = OTHER THAN CASE 1

WALLS

BAR SIZE	VERTICAL BARS		HORIZONTAL BARS	
	CASE 1	CASE 2	CASE 1	CASE 2
#3	13	20	17	25
#4	17	26	23	34
#5	22	32	28	42
#6	26	39	34	50
#7	38	56	49	73
#8	43	64	56	83
#9	48	72	63	94
#10	54	81	70	106
#11	60	90	78	117

SLABS / MATS

BAR SIZE	THICKNESS 12" OR LESS	THICKNESS GREATER THAN 12"	
	ALL BARS	BOTTOM BARS	OTHER BARS
#3	13	13	17
#4	17	17	23
#5	22	22	28
#6	26	26	34
#7	56	56	73
#8	64	64	83
#9	72	72	94
#10	81	81	106
#11	90	90	117

FOR: f'c = 3 ksi Ld = 1.29 x TABLE VALUE
f'c = 4 ksi Ld = 1.12 x TABLE VALUE
f'c = 6 ksi Ld = 0.92 x TABLE VALUE
f'c = 7 ksi Ld = 0.85 x TABLE VALUE
f'c = 8 ksi Ld = 0.79 x TABLE VALUE
f'c = 10 ksi Ld = 0.71 x TABLE VALUE
f'c = 12 ksi Ld = 0.71 x TABLE VALUE

FOR: fy = 75 ksi Ld = 75/60 x TABLE VALUE

6. ALL LAP SPLICES SHALL BE 1.3 Ld UNLESS NOTED OTHERWISE ON DRAWINGS.
7. FOR LIGHTWEIGHT AGGREGATE CONCRETE, MULTIPLY THE TABULATED VALUES BY 1.3.
8. FOR EPOXY–COATED BARS, MULTIPLY THE TABULATED VALUES BY 1.5.
9. COMBINATIONS OF EFFECTS DUE TO CONCRETE STRENGTH, CONCRETE WEIGHT, AND EPOXY BARS ARE CUMULATIVE. Ld SHALL BE MULTIPLIED BY EACH FACTOR TO FIND THE CORRECT VALUE.
10. ACI DOES NOT PERMIT LAP SPLICES OF #14 OR #18 BARS. BARS OF THIS SIZE SHALL BE COUPLED BY ACCEPTABLE MECHANICAL MEANS.
11. DOWEL BAR SUBSTITUTIONS SHALL BE PERMITTED PROVIDED THAT MANUFACTURER'S DATA SUPPORTS FULL TENSION SPLICES.
12. ALL SLEEVES AND PENETRATIONS SHALL BE PROVIDED BY THE SUB–CONTRACTOR REQUIRING THE OPENING.
13. CONCRETE COLUMN LENGTH ADJUSTMENT FOR ELASTIC SHORTENING, SHRINKAGE AND CREEP EFFECTS SHALL BE DISCUSSED WITH THE CONCRETE CONTRACTOR.
14. CONDUIT PLACED IN CONCRETE SLABS MUST BE PLACED IN ACCORDANCE WITH THE FOLLOWING GUIDELINES:
    - a. CONTRACTOR SHALL NOT INSTALL CONDUIT THAT IS NOT SHOWN ON MECHANICAL DRAWINGS.
    - b. DO NOT CROSS MORE THAN ONE LAYER OF CONDUIT OVER ANOTHER IN ANY GIVEN AREA.
    - c. PLACE CENTROID OF CONDUIT OR CONDUIT GROUP AT THE MID–HEIGHT OF THE SLAB.
    - d. CONDUIT OR CONDUIT GROUP CAN NOT EXTEND OUTSIDE THE MIDDLE ⅓ OF THE SLAB.
    - e. MAINTAIN A MINIMUM CLEAR SPACING BETWEEN THE CONDUIT OF 3 DIAMETERS. THIS REQUIREMENT APPLIES EXCEPT WHERE CONDUITS ACCUMULATE AT "TURN DOWNS". THE CONDITIONS AT "TURN DOWN" LOCATIONS MUST BE EVALUATED AT EACH LOCATION BY THE STRUCTURAL ENGINEER. "TURN DOWNS" CAN NOT OCCUR AT COLUMN OR BUTTRESS LOCATIONS.
    - f. DO NOT PLACE ANY CONDUIT IN THE SLAB WITHIN 36" FROM THE EDGE OF ANY COLUMN OR WALL ABOVE OR BELOW THE SLAB.
    - g. SLAB REINFORCEMENT MUST NOT BE MOVED, CUT, OR BENT TO ACCOMMODATE CONDUIT PLACEMENT.
    - h. CONDUIT IS NOT TO RUN THROUGH OR WITHIN A COLUMN OR WALL.
    - i. ALUMINUM CONDUIT SHALL NOT BE EMBEDDED IN A SLAB UNLESS IT IS EFFECTIVELY COATED.

    IF THE ABOVE REQUIREMENTS ARE ALL MET, CONDUIT LOCATIONS NEED NOT BE REVIEWED BY THE STRUCTURAL ENGINEER. ANY DEVIATIONS MUST BE SUBMITTED ON A SHOP DRAWING FOR APPROVAL BY THE STRUCTURAL ENGINEER PRIOR TO CONDUIT PLACEMENT.

    THE FOLLOWING CASES MUST BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER:

    - a. LOCATIONS OF ANY CONDUIT LARGER THAN 2" IN OUTSIDE DIAMETER.
    - b. LOCATIONS OF ANY BUNDLED CONDUITS.

VII - STEEL NOTES

1. BOLTED CONNECTIONS: BOLTS ARE TO BE A325 OR A490 SLIP CRITICAL, CLASS A. FLOOR BEAM CONNECTIONS TO OTHER BEAMS OR GIRDERS CAN BE MADE WITH A307 BOLTS. MINIMUM DIAMETER OF ALL BOLTS SHALL BE ¾", MAX. DIA. 1⅛". PROVIDE AT LEAST 2 BOLTS PER CONNECTION.

   UNLESS OTHERWISE NOTED IN PLAN, DETAIL FLOOR MEMBER CONNECTIONS FOR THE FOLLOWING VERTICAL REACTIONS:

SHAPE	MINIMUM REACTIONS (KIPS)		MINIMUM NUMBER OF ROWS
	TO GIRDERS	TO COLUMNS	
W8,C8	12	17	2
W10,C10	15	20	2
W12,C12	20	25	2
W14	25	30	3
W16	30	38	3
W18	36	46	3
W21	46	58	4
W24	57	72	4
W27	70	85	5
W30	85	100	6
W33	100	120	7
W36	115	135	8

2. END CONNECTIONS OF FLOOR MEMBERS SHALL ACCOMMODATE END ROTATIONS OF SIMPLE, UNRESTRAINED BEAMS. FOR THIS PURPOSE, INELASTIC ACTION IN THE CONNECTION IS PERMITTED.
3. COPED OR CUT ENDS OF MEMBERS SHALL BE REINFORCED WHERE REQUIRED TO SUSTAIN THE SPECIFIED REACTIONS.
4. FABRICATE AND ERECT FLOOR MEMBERS WITH NATURAL CAMBER UP.
5. SHORING OF FLOOR MEMBERS TO CONTROL SLAB THICKNESS, FLOOR LEVEL AND OTHER TOLERENCES, AND CONCRETE PONDING IS THE CONTRACTOR'S OPTION. FLOORS TO BE POURED SO AS TO MAINTAIN UNIFORM SLAB THICKNESS ACROSS TOP OF STEEL MEMBERS.
6. STRUCTURAL STEEL CONTRACTOR TO PROVIDE DECK SUPPORT ANGLES AS REQUIRED.
7. UNLESS OTHERWISE SHOWN ON DRAWINGS, SIZE OF WELDS SHALL NOT BE SMALLER THAN ¼".
8. FABRICATION AND ERECTION CONSIDERATIONS – THE FOLLOWING ITEMS WILL BE DEFINED AT A PRE–DETAILING CONFERENCE WITH THE STEEL CONTRACTOR:
   - i) STEEL COLUMN LENGTH ADJUSTMENT FOR ELASTIC SHORTENING EFFECTS.
   - ii) STEEL TRUSS CAMBERING.
   - iii) ELEMENTS AFFECTED BY STEEL ERECTION PROCEDURE, SUCH AS MEMBER SIZES, CONNECTIONS, SPLICES, BASE PLATES, ANCHOR BOLTS, ROCK ANCHORS, ETC.
   - iv) ERECTION PROCEDURES AND SEQUENCES WITH REGARD TO TEMPERATURE EFFECTS.
9. THE CONTRACTOR SHALL PROVIDE, AT NO ADDITIONAL COST, ALL ADDITIONAL STEEL, CONNECTIONS, GUYING, ETC. REQUIRED FOR ERECTION.
10. UNLESS SPECIFICALLY NOTED, STEEL DETAILS SHOWN ON THE DRAWINGS ARE FOR CONCEPT ONLY AND DO NOT INDICATE REQUIRED NUMBER OF BOLTS, SIZE OF WELDS, ETC.
11. MEMBERS MAY ONLY BE SPLICED WHERE SPECIFICALLY DETAILED ON ACCEPTED SHOP DRAWINGS.
12. FIELD CUTTING OF STRUCTURAL STEEL IS NOT PERMITTED EXCEPT WITH THE PRIOR APPROVAL OF THE ENGINEER.
13. BOLTS, NUTS AND WASHERS FOR STEEL PERMANENTLY EXPOSED TO WEATHER SHALL BE GALVANIZED. SEE SPECIFICATIONS.

VIII - METAL DECK NOTES

1. U.O.N., ALL METAL DECKING HAS BEEN DESIGNED FOR UNSHORED CONSTRUCTION. WHERE POSSIBLE, DECK SHALL EXTEND OVER TWO OR MORE SPANS.
2. DECK SUPPLIER SHALL FURNISH ANY AND ALL SCREEDS, CLOSURES, POUR STOPS, COLUMN CLOSURES, CANT STRIPS, RIDGE AND VALLEY PLATES, SUMPS, ETC. AS REQUIRED FOR COMPLETE INSTALLATION OF DECK.
3. COMPOSITE FLOOR DECK SHALL BE WELDED TO ALL SUPPORTING MEMBERS WITH ¾" DIA. PUDDLE WELDS OR #12 TEKS SELF–DRILLING FASTENERS AT 12" O.C. SHEAR STUDS SHALL BE CONSIDERED TO REPLACE WELDS. FASTEN SIDE LAPS AS REQUIRED IN SPECIFICATIONS.
4. ROOF DECK SHALL BE WELDED TO ALL SUPPORTING MEMBERS WITH 5/8" DIA. PUDDLE WELDS AT 18" O.C. OR #12 TEKS SELF–DRILLING FASTENERS @ 12" O.C. FASTEN SIDE LAPS AS REQUIRED IN SPECIFICATIONS FOR SPANS OVER 5'–0".
5. FORM DECK SHALL BE WELDED TO ALL SUPPORTING MEMBERS USING 16 GAGE WELD WASHERS WITH 3/8" DIA. HOLES IN PATTERN AS RECOMMENDED BY DECK MANUFACTURER. FASTEN SIDE LAPS WITH SCREWS AT 36" MAX FOR SPANS OVER 5'–0".
6. PROVIDE 2" MIN LAPS AND END BEARING FOR ALL DECKING.
7. UNFRAMED OPENINGS, IN FLOOR OR ROOF DECKS, LARGER THAN 6" PERPENDICULAR TO SPAN OF DECK SHALL BE REINFORCED.

IX - MASONRY NOTES

1. STRUCTURAL CONCRETE MASONRY, AS SHOWN ON THESE DRAWINGS, SHALL HAVE A COMPRESSIVE STRENGTH (F'M) OF 2500 PSI.
2. MASONRY UNITS SHALL CONFORM TO ASTM C90, TYPE II, NORMAL WEIGHT, UNLESS SPECIFICALLY NOTED OTHERWISE ON THESE DRAWINGS, WITH A UNIT STRENGTH AS REQUIRED TO ACHIEVE COMPRESSIVE STRENGTH SPECIFIED ABOVE.
3. MORTAR SHALL CONFORM TO ASTM C270, TYPE M OR S FOR ABOVE GRADE, TYPE M FOR BELOW GRADE.
4. GROUT FOR FILLED CELLS SHALL CONFORM TO ASTM C476 WITH 3000 PSI STRENGTH AT 28 DAYS. CELLS SHALL BE GROUTED IN INCREMENTS NOT EXCEEDING 5 FEET VERTICALLY. FILL ALL CELLS BELOW GRADE.
5. VERTICAL REINFORCING SHALL BE ASTM A615, GRADE 60 DEFORMED BARS. MINIMUM LAP SPLICES SHALL BE AS FOLLOWS:

   # 3 BARS – 1'–6"
   # 4 BARS – 2'–0"
   # 5 BARS – 2'–6"
   # 6 BARS – 3'–0"

6. HORIZONTAL REINFORCING SHALL BE NO. 9 GAGE "DUROWALL" OR EQUIVALENT AND SHALL BE PLACED EVERY OTHER COURSE U.O.N.
7. ALL BLOCK SHALL BE PLACED IN RUNNING BOND.

X - CONTROLLED INSPECTION

OWNER WILL ENGAGE AND PAY FOR AN INDEPENDENT TESTING AGENCY TO PERFORM THE FOLLOWING INSPECTION AND TESTING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE PRIOR NOTICE FOR COMPLETION OF SUCH.

1. CONCRETE: ALL CONCRETE WORK SHALL BE SUBJECT TO CONTROLLED INSPECTION BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER AS REQUIRED BY SUBCHAPTER 1 OF THE N.Y.C. BUILDING CODE, PARAGRAPH 27–132. TECHINCIAL REPORT TR–1 SHALL BE FILED WITH THE BUILDING DEPARTMENT FOR APPROVAL OF SAID ENGINEER.
   - A. THE OWNER SHALL ENGAGE A LICENSED PROFESSIONAL ENGINEEER, APPROVED BY THE ENGINEER OF RECORD, TO SUPERVISE THE TESTING OF THE MATERIALS AND THE INSPECTION OF CONCRETE CONSTRUCTION.
   - B. THE PRELIMINARY TEST FOR CONTROLLED CONCRETE SHALL BE MADE IN ACCORDANCE WITH SUBCHAPTER 10 PARAGRAPH 27–605 OF THE N.Y.C. BUILDING CODE AND THE RESULTS FILED ON TECHNICAL REPORT TR–3. NO CONCRETE SHALL BE PLACED BEFORE ACCEPTANCE BY ENGINEER.
   - C. QUALITY CONTROL AND INSPECTION OF MATERIALS AND OF BATCHING SHALL BE MADE IN ACCORDANCE WITH SUBCHAPTER 10 PARAGRAPH 27–605 OF THE N.Y.C. BUILDING CODE.
   - D. ALL FIELD TESTS AND INSPECTIONS SHALL BE PERFORMED AS REQUIRED BY SUBCHAPTER 10 PARAGRAPH 27–607 OF THE N.Y.C. BUILDING CODE.
2. SOILS:
   INSPECT SUBGRADE FOR FOUNDATIONS, PIERS AND WALLS PER SUBCHAPTER 11 PARAGRAPH 27–723 OF THE N.Y.C. BUILDING CODE.
3. STEEL:
   INSPECT WELDING OPERATIONS AND TENSIONING OF HIGH STRENGTH BOLTS PER SUBCHAPTER 10 PARAGRAPH 27–616 AND TABLE 10–2 OF THE N.Y.C. BUILDING CODE.
4. PILING:
   INSPECT PILE DRIVING AND TESTING OPERATIONS PER SUBCHAPTER 11 PARAGRAPH 27–616 AND TABLE 10–2 OF THE N.Y.C. BUILDING CODE.
5. STRUCTURAL MASONRY:
   INSPECT MASONRY CONSTRUCTION PER SUBCHAPTER 10 PARAGRAPH 27–602 AND TABLE 10–2 OF THE N.Y.C. BUILDING CODE. TESTING SHALL COMPLY WITH REQUIREMENTS OF ACI 530.1/ASCE 6 AS CITED BY REFERENCE STANDARD RS 10.

XI - SYMBOLS USED ON DRAWINGS

1.	U.O.N.	DENOTES "UNLESS OTHERWISE NOTED".
2.	F → | ← F	DENOTES FINISHED (MILLED) SURFACES.
3.	(C =)	DENOTES CAMBER OF FLOOR MEMBERS.
4.	T	DENOTES TENSION.
	C	DENOTES COMPRESSION.
	T/C	DENOTES TENSION OR COMPRESSION.
5.	(......)	DENOTES MEMBER ELEVATION IF OTHER THAN BASELINE ESTABLISHED ON DRAWING OR TOP OF PILE CAP ELEVATION.
6.	[..]	DENOTES NUMBER OF SHEAR STUDS, EQUALLY SPACED.
7.	V	DENOTES SHEAR FORCE (KIPS).
	F	DENOTES AXIAL FORCE (KIPS).
	M	DENOTES MOMENT (KIP–FT).
8.	LD	DENOTES LENGTH AS PREVIOUSLY DEFINED IN CONCRETE NOTES.
9.	BP	DENOTES BEAM PENETRATION. SEE DWG. S–____FOR TYPICAL DETAIL AND SCHEDULE.
10.	↔	DENOTES SPAN DIRECTION OF METAL DECK.
11.	CP ⟩——↘	DENOTES COMPLETE PENETRATION WELD.
12.	PP ⟩——↘	DENOTES PARTIAL PENETRATION WELD. PROPORTIONED TO RESIST THE SPECIFIED FORCE.
13.	—◀|▶— OR —◀H	DENOTES MOMENT CONNECTION U.O.N. DETAIL CONNECTION FOR FULL MOMENT CAPACITY OF BEAM.
14.	FB	DENOTES W8x10 FILLER BEAM.
15.	LB	DENOTES LATERAL BRACE.
16.	EG	DENOTES TS6x4x¼ ELEVATOR GUIDE RAIL DIVIDER BEAM. TOP OF STEEL IS 2" BELOW TOP OF SUPPORTING STEEL MEMBERS, SEE TYPICAL DETAIL WHEN SUPPORTED BY CONCRETE ELEMENTS. PAINT PER SPECIFICATIONS. 4" DIMENSION IS PLAN DIMENSION.
17.	T.O.STL.	DENOTES 'TOP OF STEEL'.
18.	T.O.SL.	DENOTES 'TOP OF SLAB'.
19.	CLB01	DENOTES CELLAR LINK BEAM #1
20.	1B05	DENOTES FIRST FLOOR BEAM #5
21.	**T**	DENOTES COLUMN TRANSFER

WIND LOAD DIAGRAM

WIND LOAD DIAGRAM DEVELOPED IN ACCORDANCE WITH SUBCHAPTER 9 – ARTICLE 5 AND REFERENCE STANDARDS RS 9–5 OF THE NEW YORK CITY BUILDING CODE

SEISMIC DESIGN CRITERIA

REF: LOCAL 17/95; SECTION 27–569, RS9–6 AMD RS 10–5C.

SEISMIC ZONE FACTOR, Z = .15
SOIL PROFILE TYPE AND SIZE COEFFICIENT, S = 1.5
IMPORTANCE FACTOR, I = 1.0
Rw = 8 (SHEAR WALLS)
BUILDING HEIGHT, hn = 264 FT.
COEFFICIENT, C = 2.75
BASE SHEAR, V = (ZIC/Rw)W W = BUILDING WEIGHT

SOIL PRESSURE DIAGRAM

REF: LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, P–C: GEOTECHNICAL ENGINEERING STUDY. 9 DEC. 2005

DRAWING INDEX

S–000 – GENERAL NOTES	
S–001	GENERAL NOTES, DRAWING INDEX
S–100 – FOUNDATION PLANS, SECTIONS AND DETAILS	
S–101	SUB–CELLAR FLOOR PLAN
S–101A	CELLAR FLOOR PLAN
S–102	FOUNDATION SECTIONS AND DETAILS
S–103	FOUNDATION SECTIONS AND DETAILS
S–104	FOUNDATION SECTIONS AND DETAILS
S–105	FOUNDATION SECTIONS AND DETAILS
S–106	FOUNDATION SECTIONS AND DETAILS
S–200 – SHEAR WALLS COLUMNS AND BRACING SCHEDULES	
S–201	COLUMN SCHEDULE AND DETAILS
S–202	COLUMN DETAILS
S–211	SHEAR WALL PLANS
S–212	SHEAR WALL PLANS
S–213	SHEAR WALL PLANS
S–221	COLUMN ELEVATIONS
S–222	COLUMN ELEVATIONS
S–223	CORE SHEAR WALL ELEVATIONS
S–300 – SUPERSTRUCTURE PLANS	
S–301	GROUND FLOOR PLAN
S–302	2ND FLOOR PLAN
S–303	3RD FLOOR PLAN
S–304	4TH FLOOR PLAN
S–305	5TH FLOOR PLAN
S–306	6TH FLOOR PLAN
S–307	7TH–16TH FLOOR PLAN
S–308	17TH FLOOR PLAN
S–308A	18TH FLOOR PLAN
S–309	19TH FLOOR PLAN
S–310	20TH FLOOR PLAN
S–311	21ST FLOOR PLAN
S–312	ROOF AND EMR ROOF PLAN
S–400 – SUPERSTRUCTURE SECTIONS AND DETAILS	
S–401	TYPICAL CONCRETE SECTIONS AND DETAILS
S–402	TYPICAL CONCRETE SECTIONS AND DETAILS
S–403	TYPICAL CONCRETE SECTIONS AND DETAILS
S–404	CONCRETE SECTIONS AND DETAILS
S–405	CONCRETE SECTIONS AND DETAILS
S–406	CONCRETE SECTIONS AND DETAILS
S–411	SUPERSTRUCTURE SECTIONS AND DETAILS
S–412	SUPERSTRUCTURE SECTIONS AND DETAILS
S–421	MISCELANEOUS STEEL DETAILS
S–500 – SUPERSTRUCTURE SECTIONS AND DETAILS – MASONRY	
S–501	TYPICAL MASONRY SECTIONS AND DETAILS

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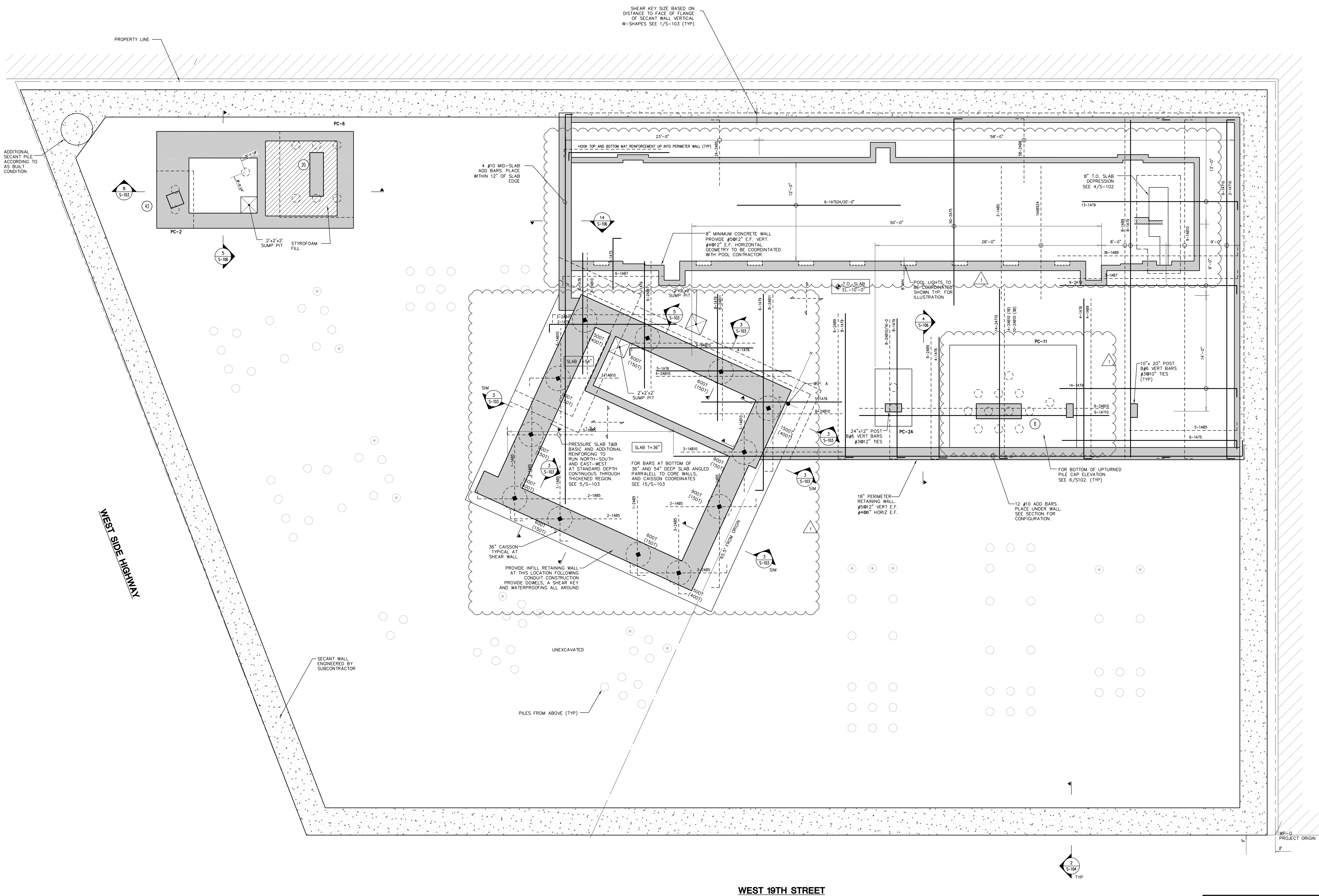
FOR CONSTRUCTION

No.	Date	Description
1	12/12/07	BULLETIN #1

Revisions

Drawing Title
GENERAL NOTES, DRAWING INDEX

Scale 1/4" = 1'–0"
Issue Date 11/16/07
Project No. 4667
Drawing No. S-001



TOP OF SLAB ELEVATION U.O.N.:
SEE PLAN
SLAB THICKNESS U.O.N.:
t = 24"
SLAB CONCRETE STRENGTH:
f'c = 5950 psi
SLAB BASIC BOT. BARS & MIDSTRIP TOP BARS U.O.N.:
#8@12" T&B, E.W.

DRAWING NOTES:

1. SEE DRAWING S-001 FOR GENERAL NOTES.
2. SEE PLAN FOR SLAB THICKNESS "t"
3. PC-xx: INDICATES PILE GROUP WITH 150 TON PILE (3 KIP LATERAL).
   LARGE DIAMETER CAISSONS AT SHEAR WALLS HAVE COMPRESSION AND TENSION CAPACITY AS NOTED ON PLAN (TENSION VALUE IN BRACKETS.) LATERAL CAPACITY MUST BE 50 KIP OR GREATER.
4. ✳ INDICATES PILES WITH TENSION CAPACITY
   PROVIDE 50 KIP TENSION CAPACITY FOR EACH 150 TON PILE
5. LOCATION AND SIZE OF ALL CURBS, PADS AND MASONARY DOWELS IS TO BE COORDINATED WITH ARCH. SEE DRAWING S-402 FOR TYP. DETAILS.
6. LOCATION AND SIZE OF ALL FLOOR DRAINS 12"x12" AND GREATER IN SIZE IS TO BE COORDINATED W/ARCH. DWGS.
7. OUTERMOST TOP & BOTTOM REBAR LAYERS SPAN N-S
8. SEE ARCHITECTURAL DRAWINGS FOR PIT DIMENSIONS
9. WATERPROOFING TO BE INSTALLED AS SPECIFIED BY GEOTECHNICAL ENGINEER'S AND ARCHITECT'S FLOOD CONTROL PROGRAM
10. ✛ INDICATES ORIENTATION OF SLAB BASIC BOTTOM BARS.
11. SEE ARCH DRAWINGS FOR SLAB COORDINATES AND HOLD POINTS

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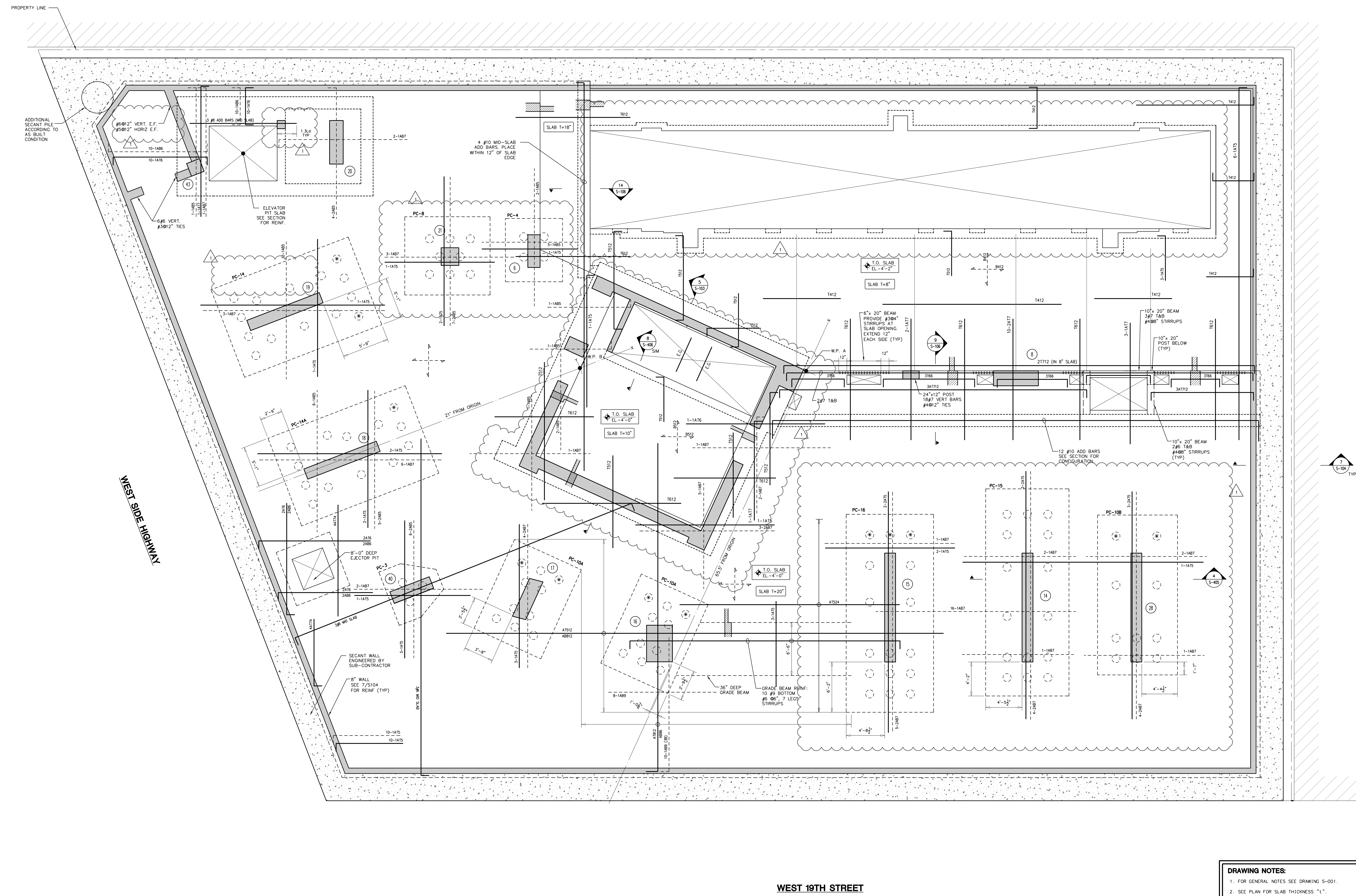
Drawing Title
SUB-CELLAR FLOOR PLAN

Scale: 1/4" = 1'-0"
Issue Date: 11/16/07
Project No.: 4667
Drawing No.: S-101



TOP OF SLAB ELEVATION U.O.N.: SEE PLAN
SLAB THICKNESS U.O.N.: t = 20"
SLAB CONCRETE STRENGTH: f'c = 5950 psi
SLAB BASIC BOT. BARS & MIDSTRIP TOP BARS U.O.N.: #6@12" T&B, E.W.

DRAWING NOTES:

1. FOR GENERAL NOTES SEE DRAWING S-001.
2. SEE PLAN FOR SLAB THICKNESS "t".
3. FOR BEAM SCHEDULES SEE DRAWING S-404.
4. FOR TYPICAL CONCRETE DETAILS SEE DRAWING S-401 – S-403.
5. AB INDICATES ADDITIONAL BOTTOM BARS.
6. FOR COLUMN SCHEDULE SEE DRAWING S-201.
7. FOR SHEAR WALL SCHEDULE SEE DRAWING S-211 – S-213.
8. ALL OPENING DIMENSIONS GIVEN AS EAST-WEST x NORTH-SOUTH.
9. WATERPROOFING TO BE INSTALLED AS SPECIFOED BY GEOTECHNICAL ENGINEER'S AND ARCHITECT'S FLOOD CONTROL PROGRAM
10. SH-XX NOTATION INDICATES COLUMN SHEAR HEADS ARE REQUIRED. FOR SHEAR HEAD SHEDULE SEE DRAWING S-405.
11. (symbol) INDICATES ORIENTATION OF SLAB BASIC BOTTOM BARS.
12. SEE ARCH DRAWINGS FOR SLAB COORDINATES AND HOLD POINTS

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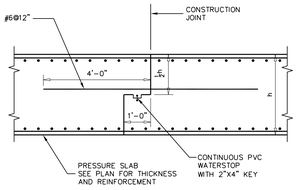
1	12/12/07	BULLETIN #1

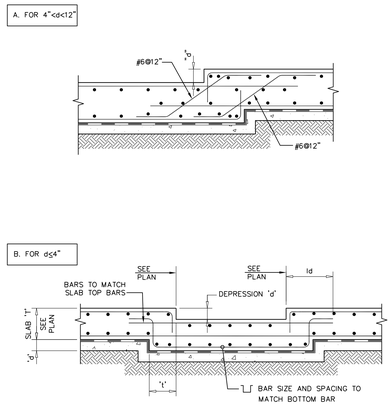
Revisions

Drawing Title
CELLAR FLOOR PLAN

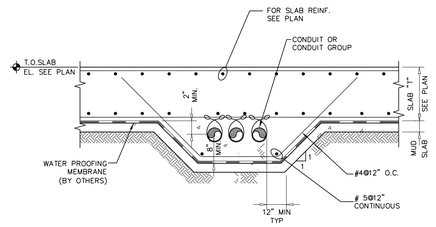
Scale 1/4" = 1'-0"
Issue Date 11/16/07
Project No. 4667
Drawing No. S-101A



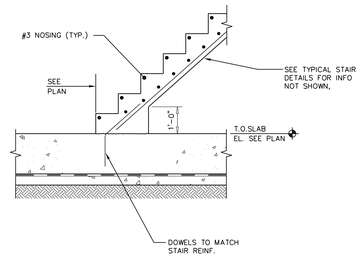
5 PRESSURE SLAB CONSTRUCTION JOINT DETAIL
SCALE: 1/2"=1'-0"



4 PRESSURE SLAB DEPRESSION DETAIL
SCALE: 1/2"=1'-0"

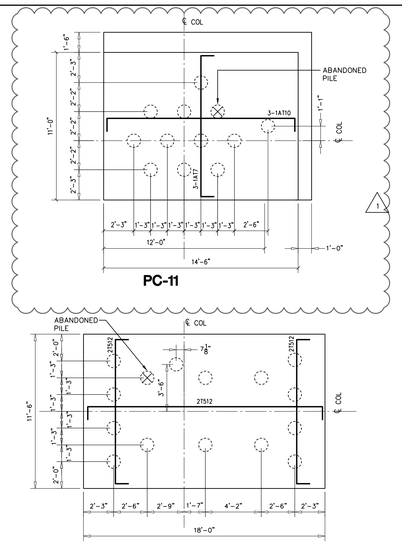


3 TYPICAL PRESSURE SLAB HAUNCH DETAIL
SCALE: 1/2"=1'-0"

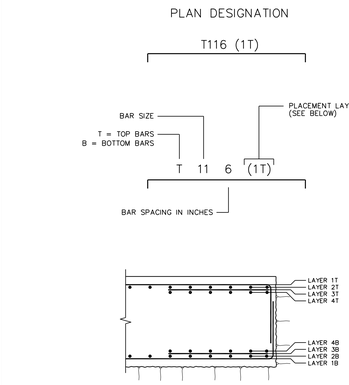


2 DETAIL AT STAIRS ON PRESSURE SLAB
SCALE: 1/2"=1'-0"

1 NO DETAIL
SCALE: XX"=1'-0"



10 REVISED PILE CAPS
SCALE: 1/4"=1'-0"



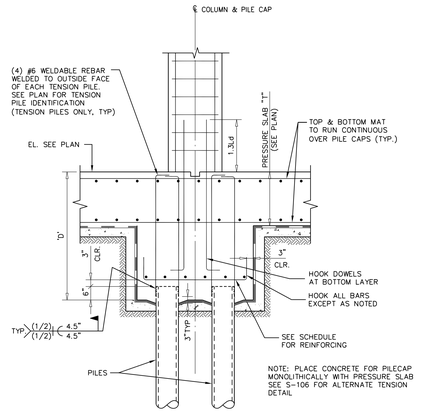
9 PRESSURE SLAB REBAR PLACEMENT LEGEND
SCALE: N.T.S.

PILE CAP SCHEDULE (150 TON)

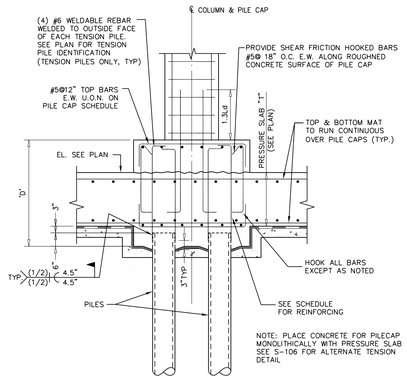
MARK (NOTE)	'D'	'L'	'W'	LONG BARS	SHORT BARS	NOTES
~~PC-1~~	~~5'-6"~~	~~4'-6"~~	~~4'-6"~~	~~6#10 HOOKED~~	~~6#10 HOOKED~~	
PC-2	3'-6"	7'-0"	4'-6"	10#11 HOOKED	14#11 HOOKED	
PC-3	3'-6"	7'-0"	6'-8"	6#10 HOOKED		
PC-4	3'-6"	7'-0"	7'-0"	8#11 HOOKED	8#11 HOOKED	1
PC-6	3'-6"	10'-6"	9'-0"	18#11 HOOKED	22#11 HOOKED	
PC-8	3'-9"	9'-6"	8'-10"	12#11 HOOKED 2AB #8 ON COLUMN CL	13#11 HOOKED 1AB #9 ON COLUMN CL	1 & 5
PC-10	4'-3"	12'-0"	9'-10"	18#10	13#10 HOOKED	
PC-10A	4'-3"	12'-0"	9'-0"	18#10	13#10 HOOKED	1
PC-10B	4'-3"	19'-0"	9'-6"	10#10	20#10 HOOKED	1 & 5
PC-14	4'-9"	18'-0"	11'-6"	26#11	16#11 HOOKED	1
PC-15	4'-9"	24'-6"	9'-6"	23#11	25#10 HOOKED	1 & 5
PC-16	4'-9"	24'-0"	9'-6"	24#11	24#10 HOOKED	1 & 5
PC-2A	3'-6"	7'-0"	4'-6"	6#11 HOOKED	8#11 HOOKED	2
PC-11	4'-3"	14'-6"	11'-0"	25#10 SAB #11 ON COLUMN CL	18#10 HOOKED SAB #9 ON COLUMN CL	3, 4 & 5
PC-14A	4'-9"	18'-0"	11'-6"	26#11	16#11 HOOKED	4

NOTE:
1. TOP BARS SEE DETAIL 15/S-102.
2. PROVIDE TOP REINFORCEMENT, LONG BARS: 5T912, SHORT BARS: 8T612. HOOK BARS AT FACE OF PILE CAP.
3. PROVIDE TOP REINFORCEMENT, LONG BARS: 14S12, SHORT BARS: 16T512. HOOK BARS AT FACE OF PILE CAP.
4. FOR UPDATED PILE CAP GEOMETRY, SEE 10/S-102.
5. SEE 15/S-102 AND PLAN FOR REVISED PILE CAP GEOMETRY.

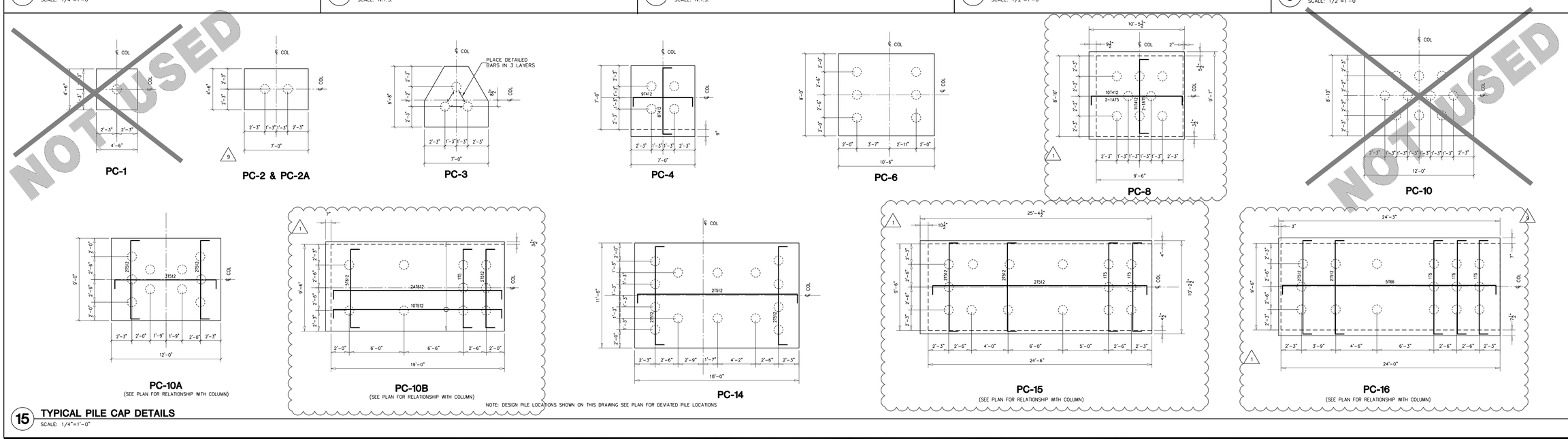
8 PILE CAP SCHEDULE
SCALE: N.T.S.



7 TYPICAL DOWNTURNED PILECAP DETAIL
SCALE: 1/2"=1'-0"



6 TYPICAL UPTURNED PILECAP DETAIL
SCALE: 1/2"=1'-0"



15 TYPICAL PILE CAP DETAILS
SCALE: 1/4"=1'-0"

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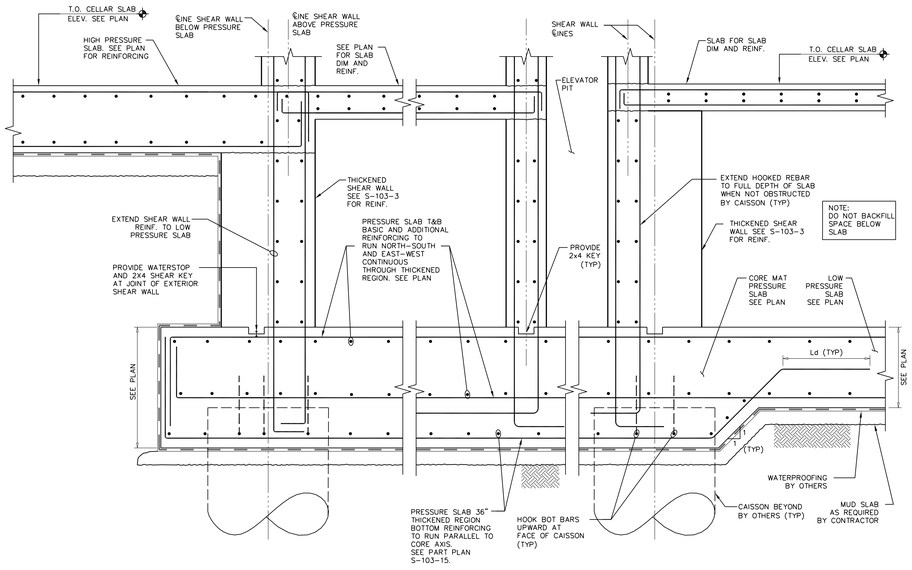
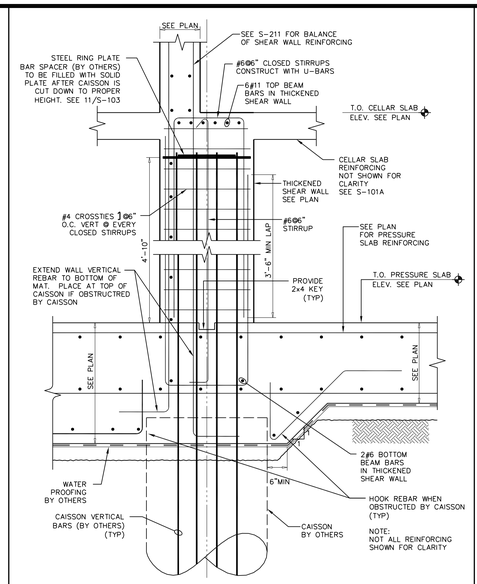
12/12/07 BULLETIN #1

Drawing Title
FOUNDATION SECTIONS AND DETAILS

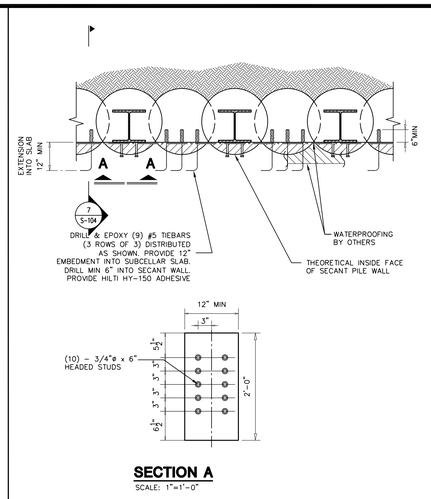
Scale: AS SHOWN
Issue Date: 11/16/07
Project No: 4667
Drawing No: S-102



5 SECTION AT THICKENED PRESSURE SLAB UNDER CORE
SCALE: 3/4"=1'-0"

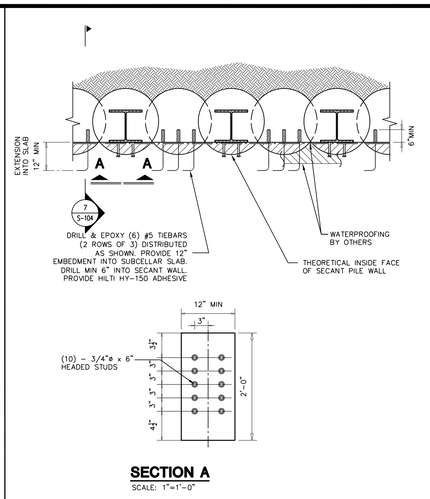


3 SECTION AT THICKENED SHEAR WALL
SCALE: 3/4" = 1'-0"



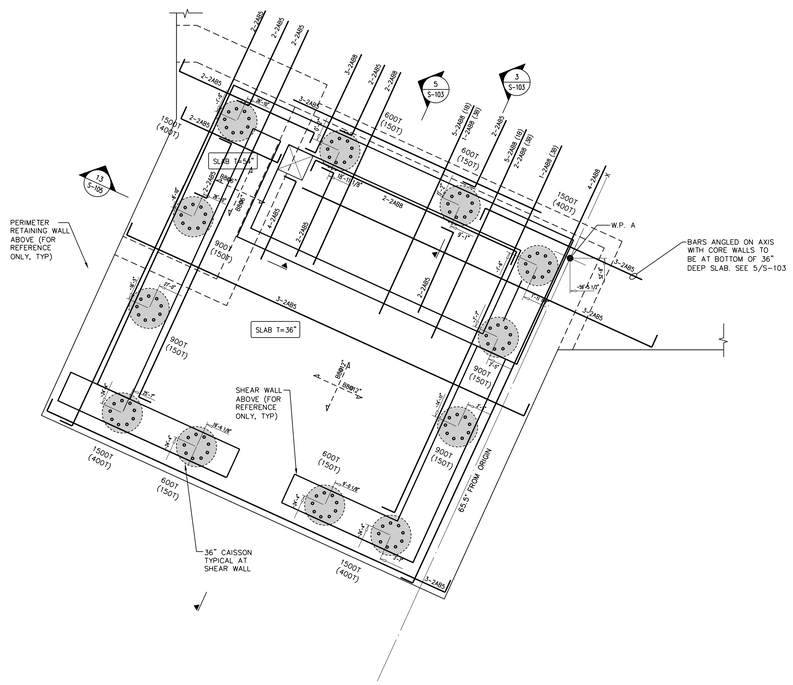
SECTION A
SCALE: 1"=1'-0"

2 TYPICAL SUB-CELLAR SLAB CONNECTION TO SECANT PILE WALL
SCALE: 1/2"=1'-0"

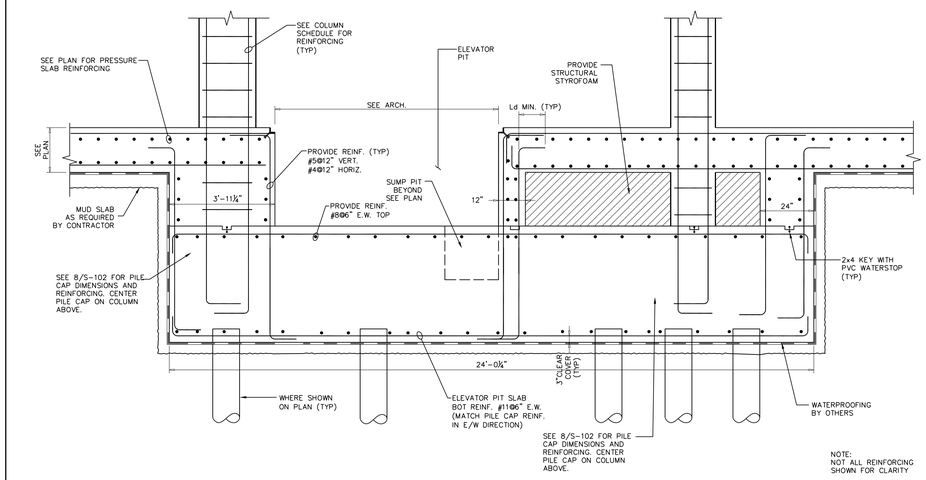


SECTION A
SCALE: 1"=1'-0"

1 TYPICAL CELLAR SLAB CONNECTION TO SECANT PILE WALL
SCALE: 1/2"=1'-0"

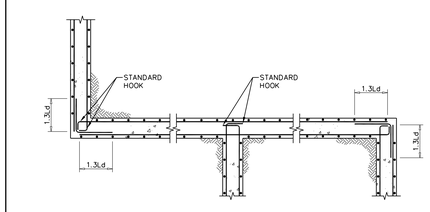


15 PRESSURE SLAB PARTIAL PLAN -- BOTTOM REINFORCEMENT AT 36" AND 54" THICK CORE MAT



8 SECTION THROUGH PILE CAPS AND ELEVATOR PIT
SCALE: 1/2"=1'-0"

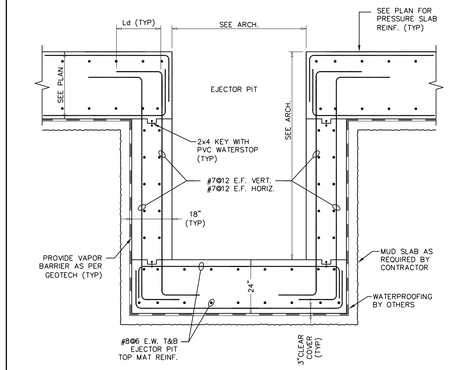
6 NO DETAIL
SCALE: xx"=1'-0"



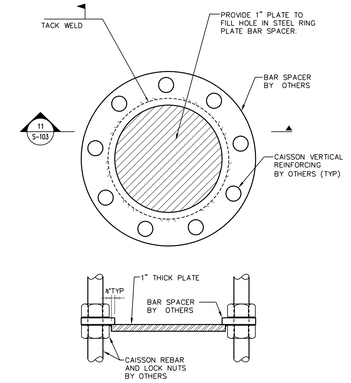
CORNER WALLS **INTERSECTING WALLS** **CORNER WALLS**

NOTE:
CORNER BARS TO MATCH SIZE AND SPACING OF HORIZONTAL BARS IN WALLS.

13 TYPICAL FOUNDATION WALL REINFORCING DETAIL
SCALE: 1/2"=1'-0"



12 TYPICAL EJECTOR PIT DETAIL
SCALE: 1/2"=1'-0"



11 CAISSON END-PLATE DETAIL
SCALE: 1 1/2"=1'-0"

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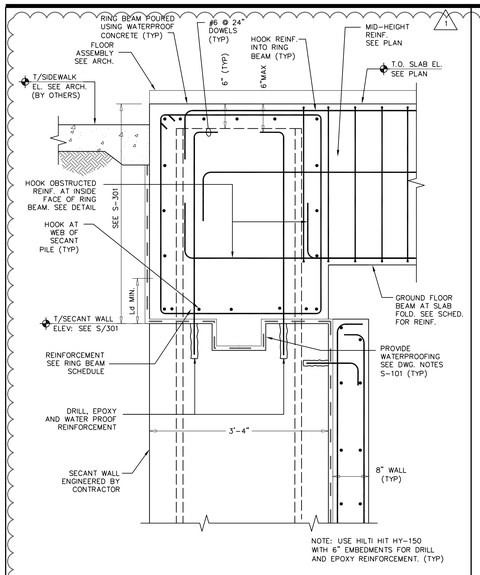
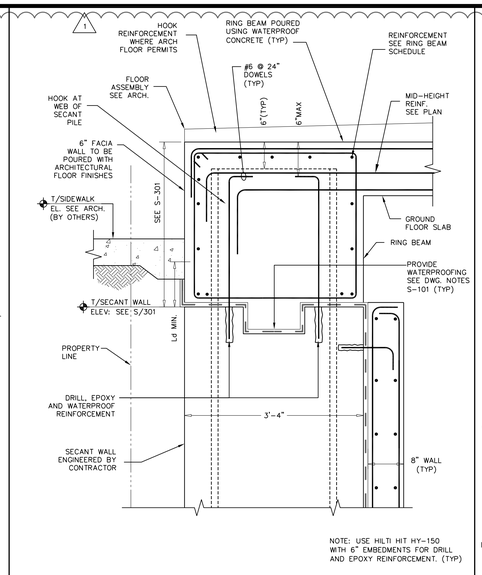
12/12/07 BULLETIN #1

Drawing Title
FOUNDATION SECTIONS AND DETAILS

Scale: AS SHOWN
Issue Date: 11/16/07
Project No: 4667
Drawing No: S-103



5 SECTION THROUGH SECANT WALL RING BEAM
SCALE: 1"=1'-0"



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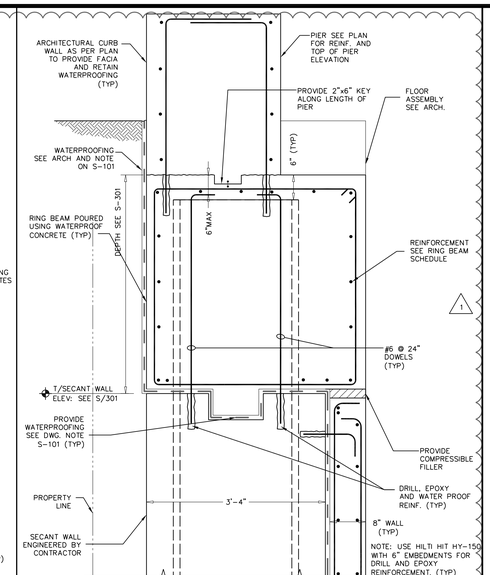

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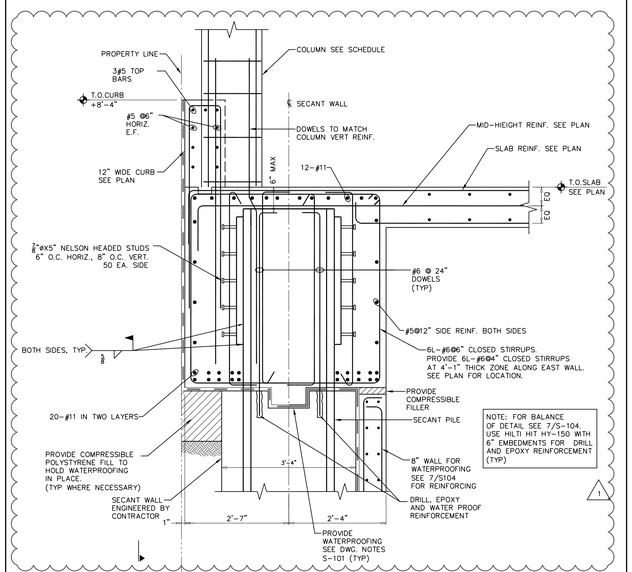
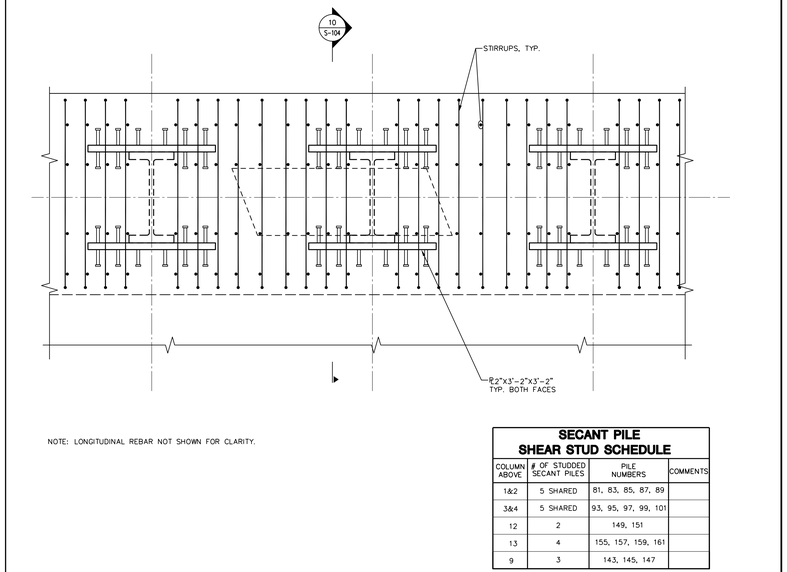
SCALE: 1"=1'-0"



10 COLUMN-SECANT WALL CONNECTION DETAIL-SECTION AT RING BEAM RMB10
SCALE: 3/4"=1'-0"

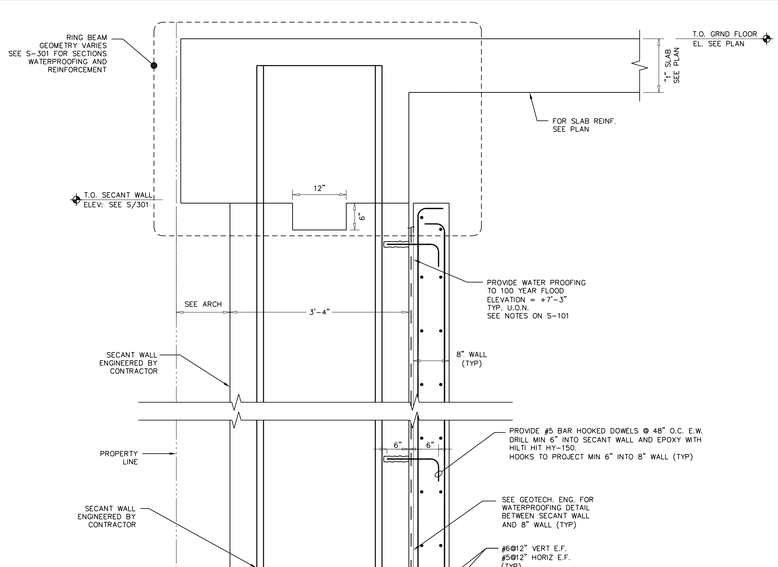


NOTE: LONGITUDINAL REBAR NOT SHOWN FOR CLARITY.

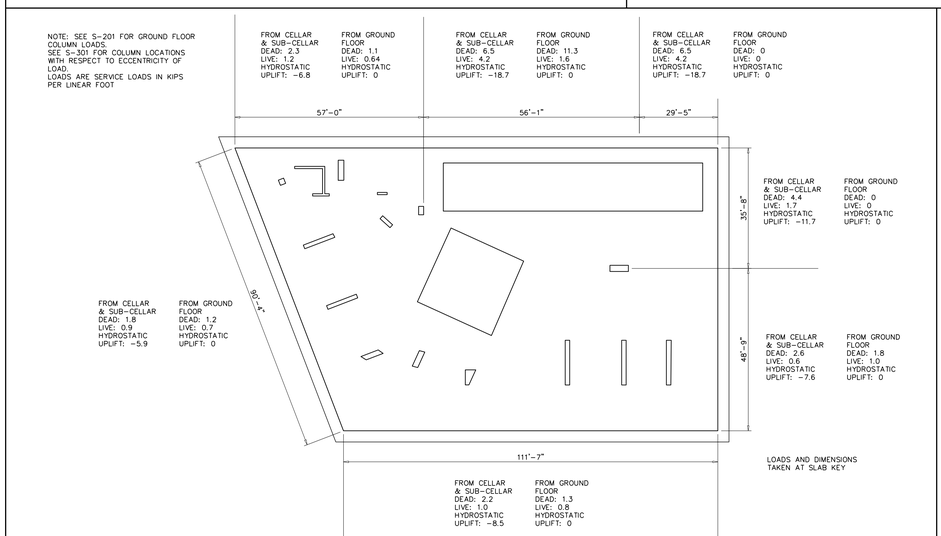
9 COLUMN-SECANT WALL CONNECTION DETAIL-PLAN AND SECANT PILE SHEAR STUD SCHEDULE
SCALE: 3/4"=1'-0"

SECANT PILE SHEAR STUD SCHEDULE

COLUMN ABOVE	# OF STUDDED SECANT PILES	PILE NUMBERS	COMMENTS
1&2	5 SHARED	81, 83, 85, 87, 89	
3&4	5 SHARED	93, 95, 97, 99, 101	
12	2	149, 151	
13	4	155, 157, 159, 161	
9	3	143, 145, 147	



7 TYPICAL SECTION THROUGH SECANT WALL
SCALE: 1"=1'-0"

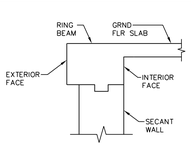


15 SECANT WALL LOAD MAP (SERVICE LOADS) - AS OF 8/29/2006
SCALE: 1/2"=1'-0"

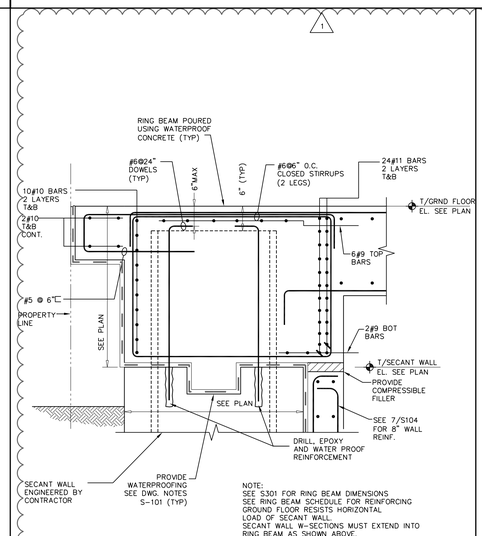
RING BEAM SCHEDULE

RING BEAM	DEPTH	EXTERIOR BEAM REINF.	INTERIOR BEAM REINF.	TOP BEAM REINF.	BOT. BEAM REINF.	BEAM STIRRUPS	COMMENTS
RBM1	4'-0"	6#11	6#11	4#5	4#5	#6@12"	–
RBM2	4'-0"	10#10	24#11	6#9	2#9	#6@6"	–
RBM3	3'-3"	7#9	7#9	3#5	3#5	#5@12	–
RBM4	6'-4"	12#6	12#6	5#6	5#6	#5@12"	–
RBM5	2'-0"	6#6	6#6	3#6	3#6	#5@12"	–
RBM6	2'-3"	5#6	5#6	3#5	3#5	#5@12"	–
RBM7	3'-0"	7#6	7#6	3#5	3#5	#5@12"	–
RBM8	3'-0"	7#9	7#9	3#5	3#5	#5@12"	–
RBM9	4'-0"	9#7	9#7	3#5	3#5	#5@12"	–
RBM10	5'-0"	–	–	–	–	–	SEE 10/ S-104

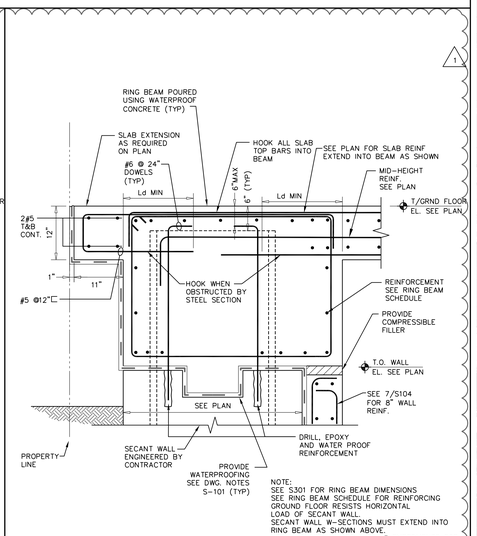
NOTE: SEE PLAN S-301 FOR RING BEAM WIDTH



13 RING BEAM SCHEDULE
N.T.S.



12 SECTION THROUGH SECANT WALL RING BEAM
SCALE: 1"=1'-0"



11 SECTION THROUGH SECANT WALL RING BEAM
SCALE: 1"=1'-0"

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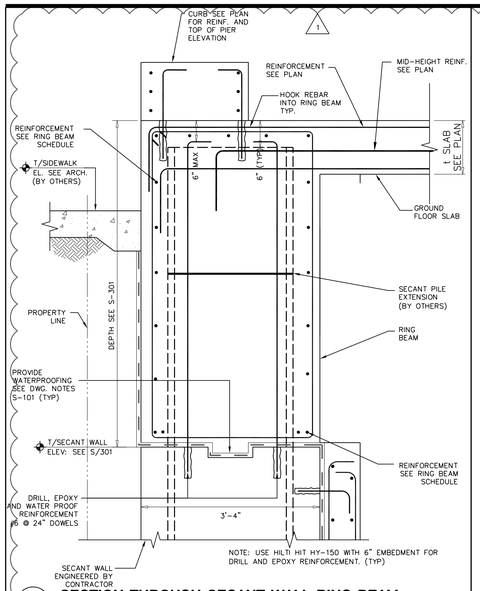
FOR CONSTRUCTION

1 12/12/07 BULLETIN #1

No.	Issue	Description

Drawing Title
FOUNDATION SECTIONS AND DETAILS

Scale: AS SHOWN
Issue Date: 11/16/07
Project No: 4667
Drawing No: S-104



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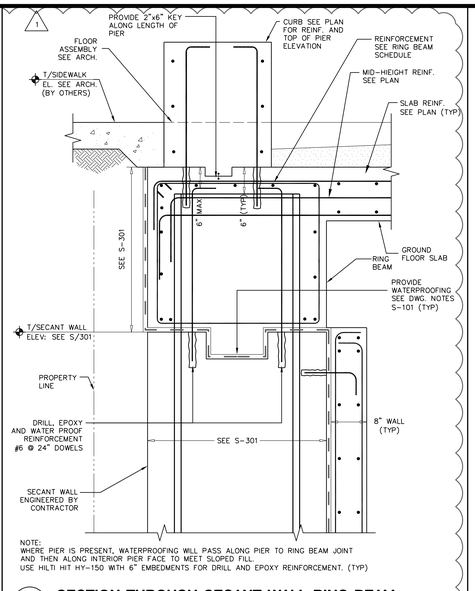
SCALE: 1"=1'-0"



4 SECTION THROUGH SECANT WALL RING BEAM

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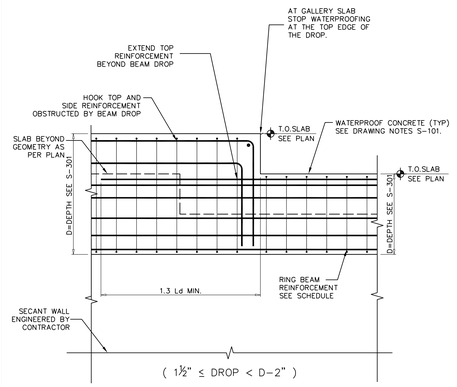
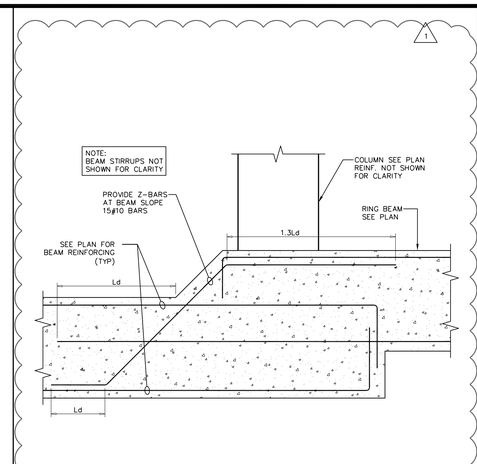


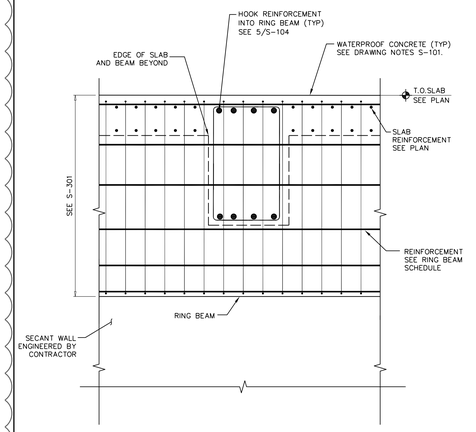
3 TYPICAL TOP OF RING BEAM DROP PROFILE

SCALE: 3/4"=1'-0"



2 DETAIL AT SLOPED RING BEAM

SCALE: 3/8"=1'-0"



1 BEAM FRAMING INTO RING BEAM

SCALE: 3/4"=1'-0"

10 RING BEAM NW CORNER REINFORCEMENT PART PLAN

SCALE: 1/2"=1'-0"

9 RING BEAM NE CORNER REINFORCEMENT PART PLAN

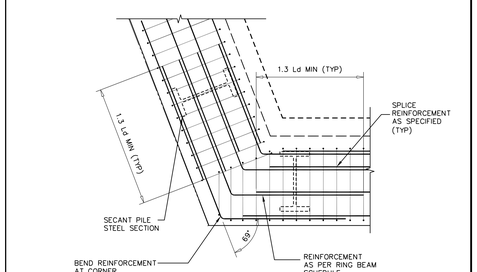
SCALE: 1/2"=1'-0"

8 TYICAL BOTTOM OF RING BEAM DROP PROFILE

SCALE: 3/4"=1'-0"

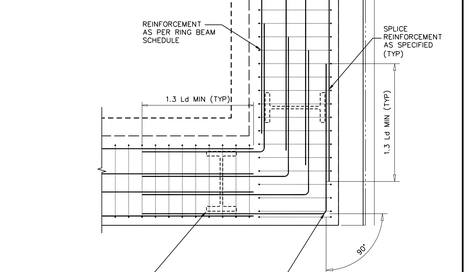
7 RING BEAM DROP TO SLAB FOLD PROFILE

SCALE: 3/4"=1'-0"



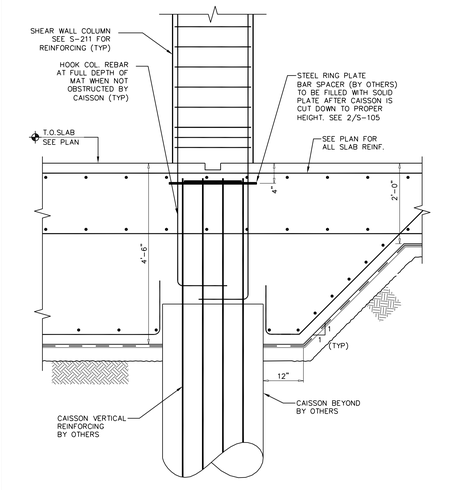
15 RING BEAM SW CORNER REINFORCEMENT PART PLAN

SCALE: 1/2"=1'-0"



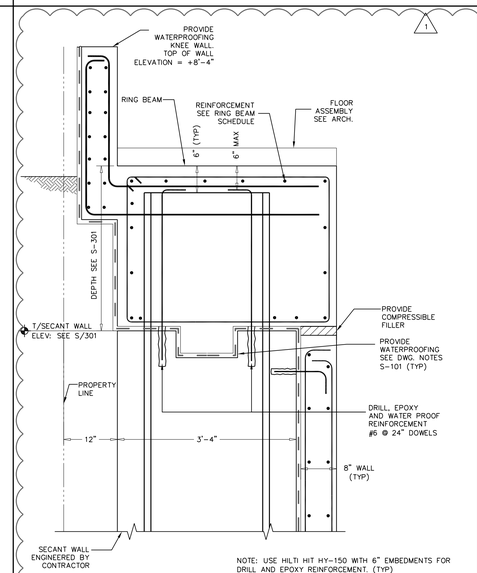
14 RING BEAM SE CORNER REINFORCEMENT PART PLAN

SCALE: 1/2"=1'-0"



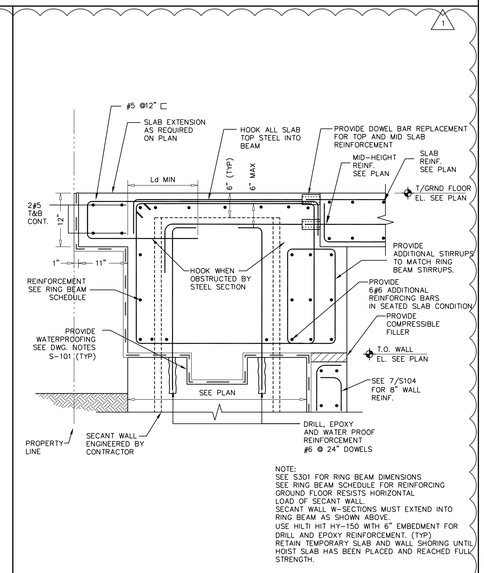
13 TYPICAL CAISSON ANCHORAGE DETAIL AT SHEAR WALL COLUMN

SCALE: 3/4"=1'-0"



12 SECTION THROUGH SECANT WALL RING BEAM

SCALE: 1"=1'-0"



11 SECTION THROUGH SECANT WALL RING BEAM

SCALE: 1"=1'-0"

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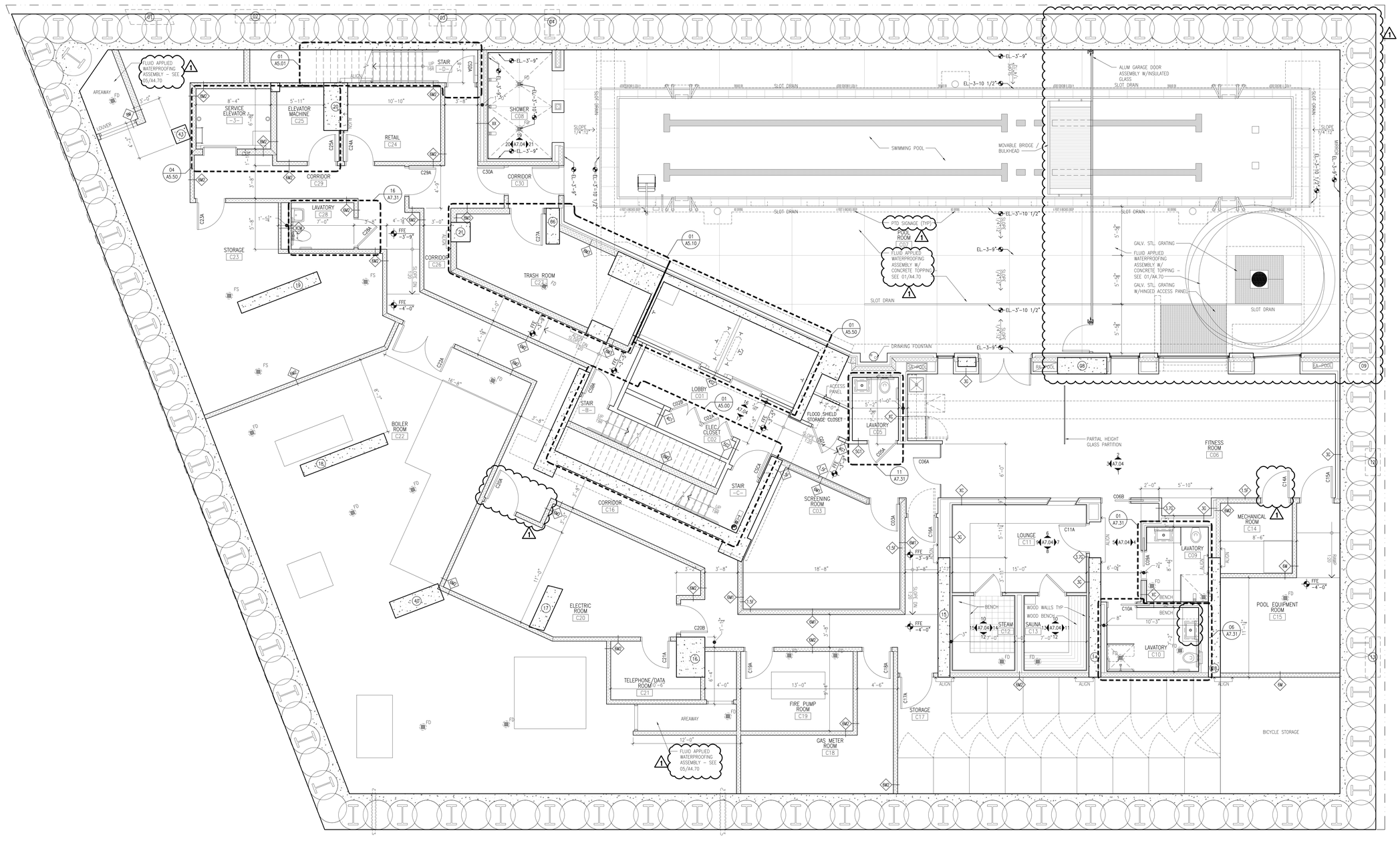
12/12/07 BULLETIN #1

No.	Date	Description
No. Issue		

Drawing Title
FOUNDATION SECTIONS AND DETAILS

Scale: AS SHOWN
Issue Date: 11/16/07
Project No: 4667
Drawing No: S-105



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FOR CONSTRUCTION

No.	Date	Description
1	09.19.08	BULLETIN #2

Revisions:

Drawing Title:

Cellar Floor Plan

Scale:	1/4" = 1'- 0"
Issue Date:	16 November 2007
Project No.:	1976.00
Drawing No.:	

A1.00

To	Fabio Liscidini – Underpinning and Foundation Skanska, Inc. Alfredas Daugiala – Underpinning and Foundation Skanska, Inc.	Reference number SY-DS01
cc		File reference 131264
From	Stephen Young, PE	Date February 9th, 2009
Subject	535 West 19th Street, New York Secant Pile Wall Design Statement	

1 INTRODUCTION

This memorandum provides the design methodology of the secant pile wall for the above captioned project. Arup was retained by Underpinning and Foundation Skanska to design the secant pile wall as excavation support for the two-level 18 feet deep basement located at 100 11th Avenue and West 19th Street. The secant pile wall also acts as the permanent basement retaining wall for the new building, and is supported laterally by the base slab and the ground floor slab. An internal cast-in-place reinforced concrete wall is constructed around the inside face of the secant pile wall and is designed to take the groundwater load.

The site is bounded to the north by 5 to 8-story structure supported on concrete-filled, tapered corrugated steel casing (ie, Raymond "Step-Taper" piles) and to the east by a two-story building supported on shallow footings. The western boundary of the site (11th Avenue / West Side Highway) is skewed, resulting in a trapezoidal-shaped site as shown in Figure 1.

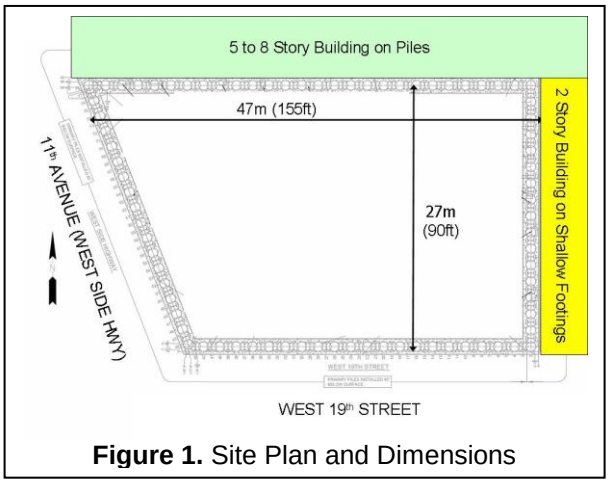


Figure 1. Site Plan and Dimensions

2 SECANT PILE WALL ARRANGMENT

The secant pile wall consists of overlapping drilled caissons, as shown in Figure 2. Each caisson in the secant pile wall is 3.3 feet in diameter and is constructed using concrete with a minimum 28-day compressive strength (f'_c) of 4,000 psi. The primary secant piles of the wall are cast first and founded to a depth of 40 feet. The primary piles are not used as structural element to support vertical loading and moment.

The secondary secant piles are subsequently installed to overlap the primary piles as shown in Figure 2. Each secondary pile is reinforced with a W24x306 core beam (f_y = 50 ksi) and the center-to-center spacing of the secondary piles is 5.5 feet. The secondary piles are founded on the Medium Hard Rock and are designed to support vertical loading and moment.

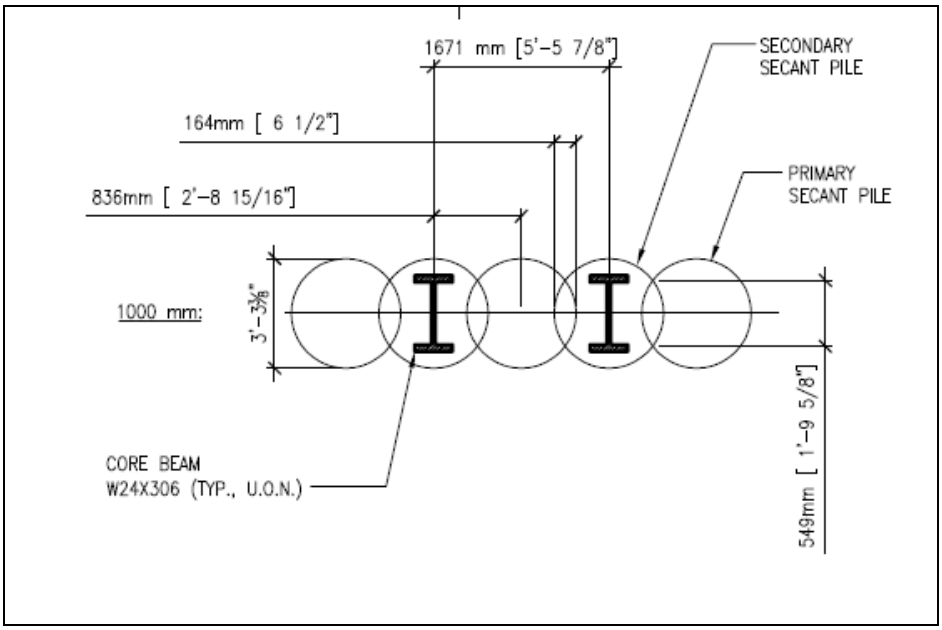


Figure 2. Secant Pile Wall Arrangement

3 COLUMN LOADING

The secant pile wall is designed to support the vertical axial load of discrete superstructure columns (numbers 1, 2, 3, 4, 9, 12, and 13), and the moment generated from the eccentricity of these columns relative to the neutral axis of the secant wall core beams. These working vertical loads and moments applied at the pile head are reported in Table 1 below.

Table 1. Secant Pile Wall – Service Vertical Load and Moment Applied at Secant Pile Head

Column No.	Secondary Secant Pile No.	Column Service Load (kips)	Column Load Eccentricity (ft)	Moment Applied at Head of Secant Pile (kip-ft)	Vertical Slab Load (kips)	Total Vertical Load (kips)
1 & 2	81	670	1.33	891	89	759
	83	721	1.33	959	89	810
	85	651	1.33	866	89	740
	87	452	1.42	640	89	541
	89	227	1.42	322	89	316
3 & 4	93	362	1.25	452	89	451
	95	461	1.25	575	89	550
	97	470	0.75	352	89	559
	99	388	0.75	290	189	577
	101	241	0.75	180	189	430
9	143	154	NR*	0*	94	248
	145	498	NR*	0*	94	592
	147	583	NR*	0*	94	677
12	149	565	0.67	377	94	659
	151	565	0.67	377	94	659
13	155	397	1.33	528	94	491
	157	649	1.33	863	94	743
	159	467	1.33	621	94	561
	161	216	1.33	287	94	310

* The eccentricity generated by Column 9 is not be taken by the secant wall. Only the axial load derived by this column is taken by the secant wall.

4 WALL DESIGN

The software program *Oasys* FREW (*Flexible Retaining Wall Analysis*) was used to perform the analysis of the secant pile wall. FREW is a two-dimensional soil-structure interaction plane strain analysis that permits the user to consider variations in soil strength and stiffness, wall bending stiffness (EI), strut stiffness and preload, multiple excavation stages, and vertical surcharges. At each construction stage, the program calculates and displays strut loads and profiles of wall bending moment, shear force, and lateral displacement.

SOIL STRATUM AND PARAMETERS

Based on the information provided in the Geotechnical Engineering Study for project site performed by Langan Engineering and Environmental Services, Inc., prepared for Cape Advisors, Inc. dated December

9th 2005, the subsurface soil stratum and the soil parameters adopted for the analyses are derived. The general subsurface profile and parameters are summarized in the table 2 below. The groundwater table is taken as 5 ft. below ground surface (elevation +1) across the project site.

Table 2 – Soil Stratum and Design Parameters

Strata	Top of Stratum	Bulk Density (pcf)	SPT N-value (blows/ft)	S_u (psf)	ϕ' (°)	E' (psi)
Fill	+6*	120	3 – 25	-	30	1,500
Organic Clays/Silts	-15	95	0 – 6	350	20	500
Sand	-55	130	6 – 26	-	33	3,600
Bedrock	-80	170	-	-	44	20,000

* Corresponds to approximate ground surface elevation across project site

EXCAVATION SEQUENCE

The excavation sequences adopted in the FREW analyses are provided in Attachment A.

5 WALL CAPACITY

STRUCTURAL CAPACITY

The structural design of the secant pile wall utilizes allowable stress design approach. The vertical compressive loads imposed by building columns are designed to be taken by the concrete of the secondary secant piles using an allowable concrete compressive stress equal to 0.25 f'_c, where f'_c is 4,000 psi at 28 days.

The steel sections installed in the secondary secant pile wall are designed to take the moment and the allowable compressive stress of the steel section is 0.5 f_y, where f_y is taken to be 36 ksi.

GEOTECHNICAL CAPACITY

All secondary secant piles are founded in the Medium Hard Rock (2-65, NY City Building Code Class of Material). The secondary piles are designed with two different founding criteria. The first criterion is to socket the pile 0.5 feet into Medium Hard Rock. The vertical load is designed to be taken by the end bearing of the pile and the allowable end bearing pressure is 40 tsf.

The second criterion is to socket the pile 3.5 feet into Medium Hard Rock. The vertical capacity of the pile is the summation of the allowable bond along the sides of the rock socket and the allowable

end bearing pressure. The allowable rock socket bond stress is 200 psi and the allowable end bearing pressure is 40 tsf.

6 PERMANENT SLAB LOADS

Based on the results of the FREW analyses, the working loads acting on the permanent slab loads are summarized in the Table 3 below. Types 1, 2, and 3 refer to final constructed conditions, as identified in Figure 3.

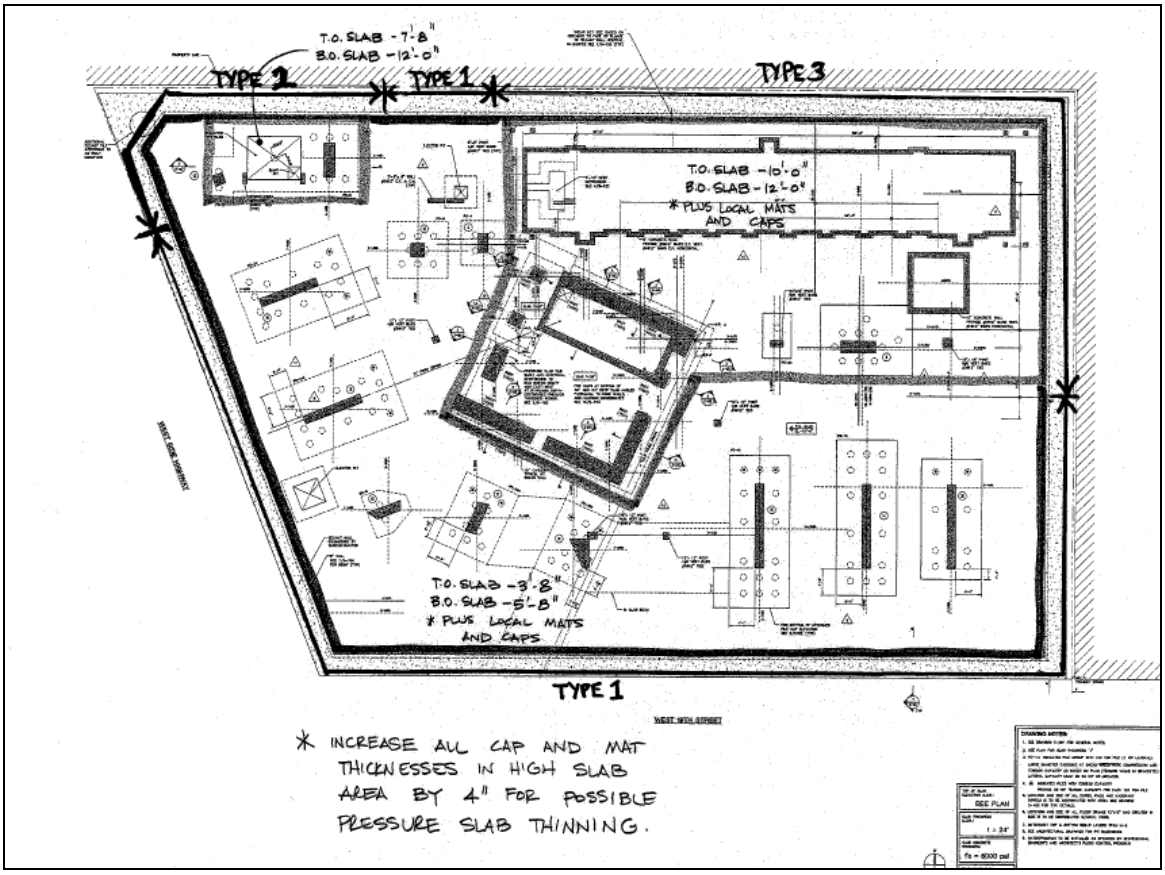


Figure 3. Permanent Slab Loads Plan

Table 3: Permanent Slab Loads - temporary bracing removed after both the base slab and the ground floor slab are completed

Slab Level	Working Horizontal Load Perpendicular to Wall (kips/ft of wall)				
	Type 1		Type 2		Type 3
	General	At Column Locations	General	At Column Locations	
Ground Floor Slab at El. +8'-6"	3	-15 (tension)	3	-12 (tension)	12
Invert Slab at El. -3'-6"	24	38	24	24	NA
Invert Slab at Escalator Pit	NA	NA	30	42	NA
Invert Slab at Pool (El. -10'-0")	NA	NA	NA	NA	22

The permanent slabs are designed to resist these loads.

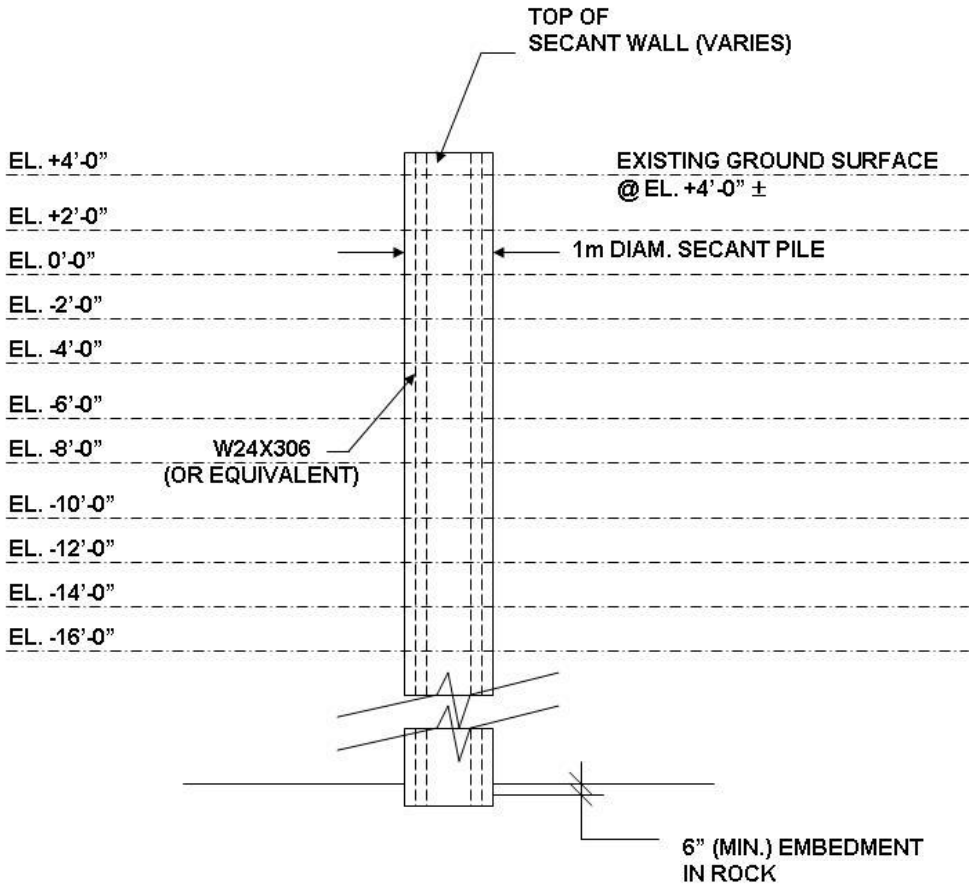
Attachment A

EXCAVATION SEQUENCES

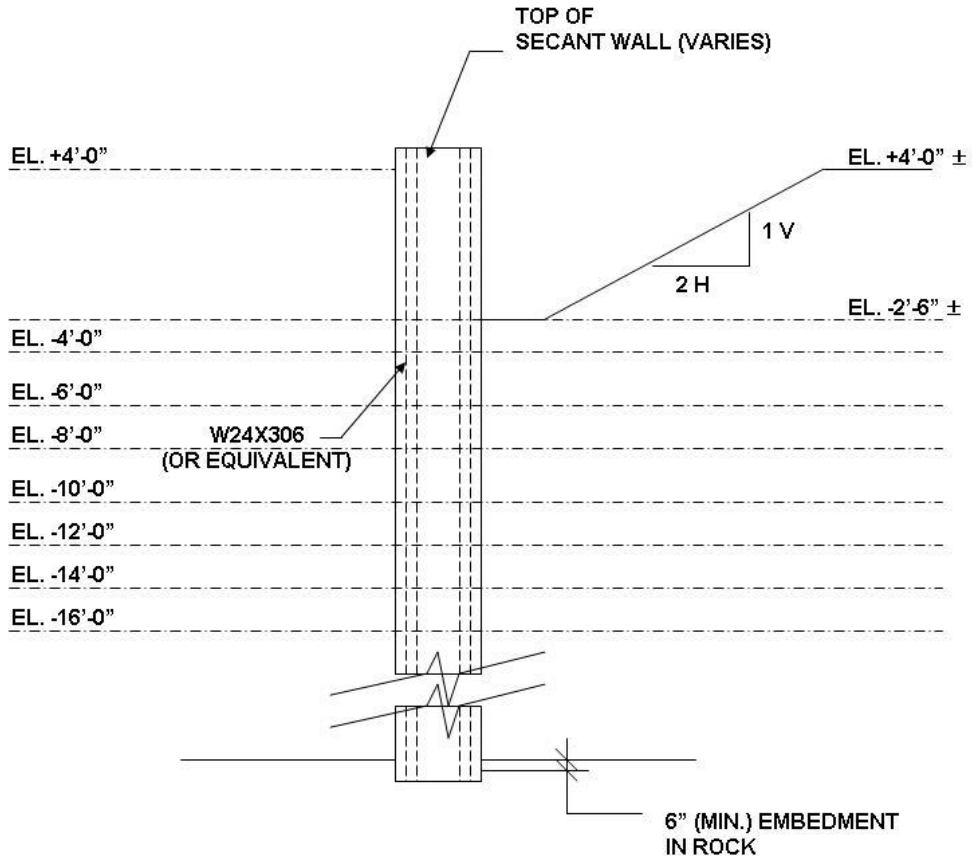
535 WEST 19TH STREET

EXCAVATION SEQUENCE

EAST WALL

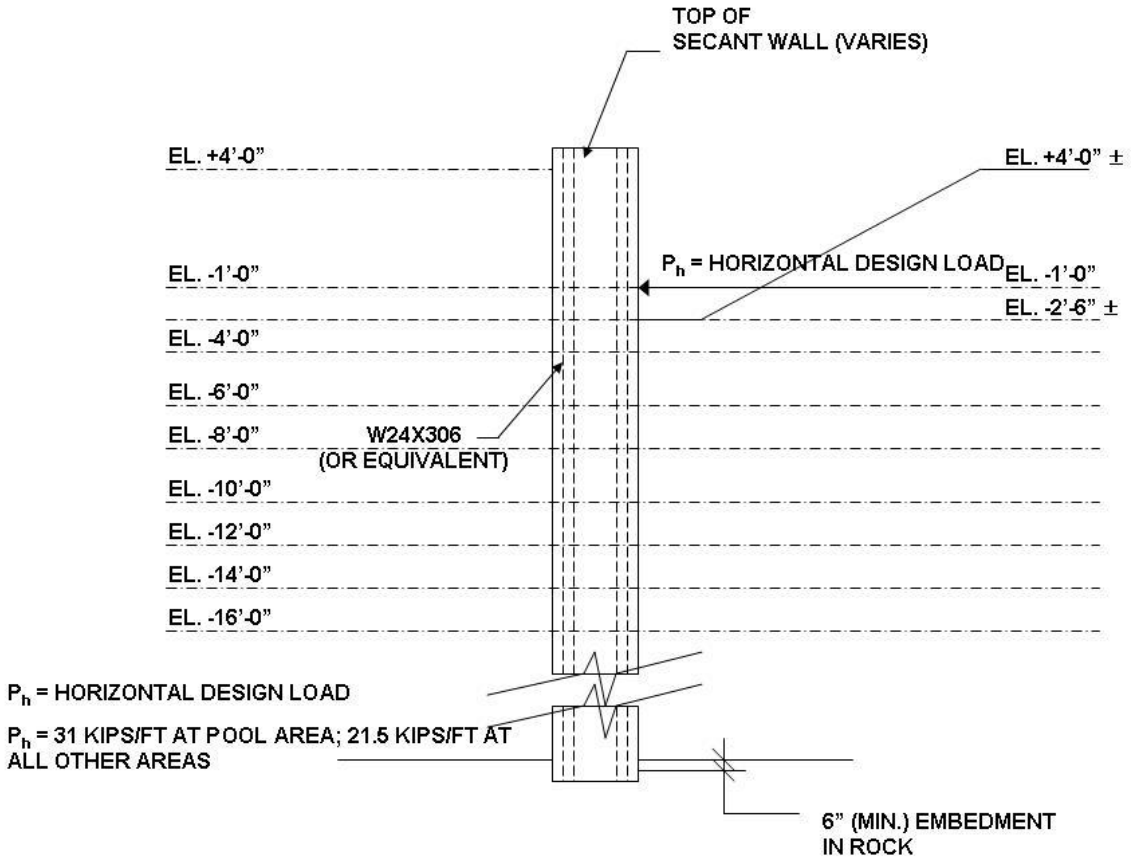


STAGE 1: INSTALL SECANT PILES



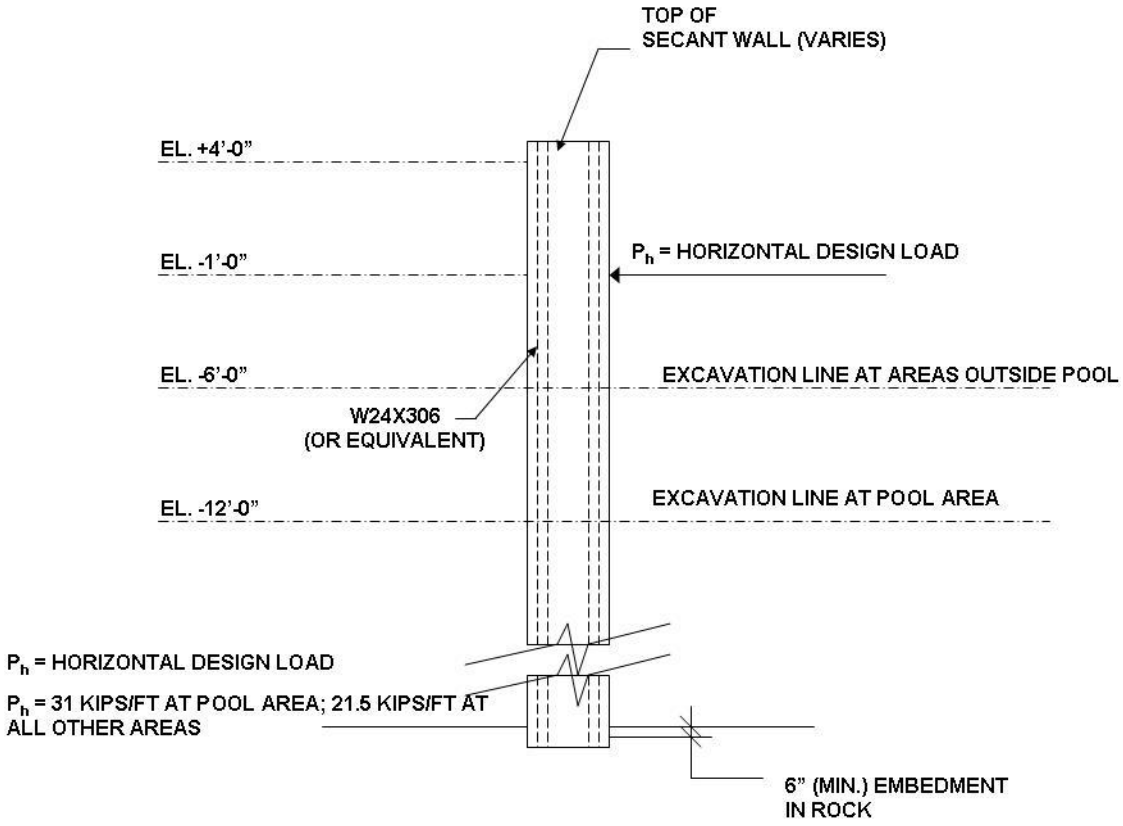
STAGE 2: DEWATER TO EL. - 3'- 6" & TRENCH EXCAVATION WITH 2-ON-1 BERM

- **DEWATER TO EL. -3' – 6"**
- **EXCAVATE TRENCH ADJACENT TO SECANT WALL TO BASE EL. - 2'- 6" WITH 2-ON-1 BERM TO EXISTING GROUND SURFACE (CIRCA EL. +4' – 0") AS SHOWN**



STAGE 3: INSTALL STRUT (WITH 10 KIP/FT PRELOAD) AT EL. - 1'- 0"

- **INSTALL STRUT AT CENTERLINE EL. -1'- 0" (ONE-BY-ONE WITH LOCALIZED TRENCH EXCAVATION. MAINTAIN GROUND SURFACE AT EL. +4'- 0" ACROSS THE SITE EXCEPT AT THE LOCALIZED TRENCH EXCAVATION FOR EACH STRUT INSTALLATION**
- **PRELOAD STRUTS TO 10 KIPS/FT.**



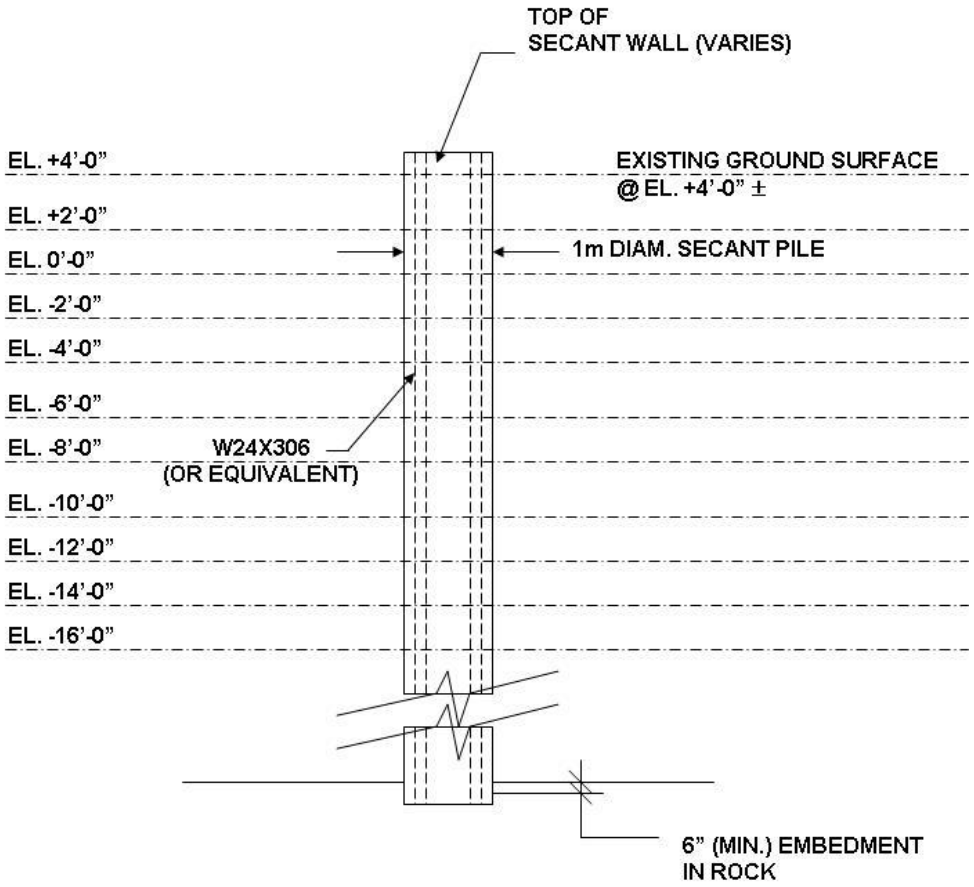
STAGE 4: DEWATER & EXCAVATE (TO EL. - 12' IN POOL AREA, EL. - 6' ELSEWHERE)

- **DEWATER TO EL. -13'- 0" IN POOL AREA, AND TO EL. -7'- 0" ELSEWHERE**
- **EXCAVATE TO EL. -12'- 0" IN POOL AREA, AND TO EL. -6'- 0" ELSEWHERE**

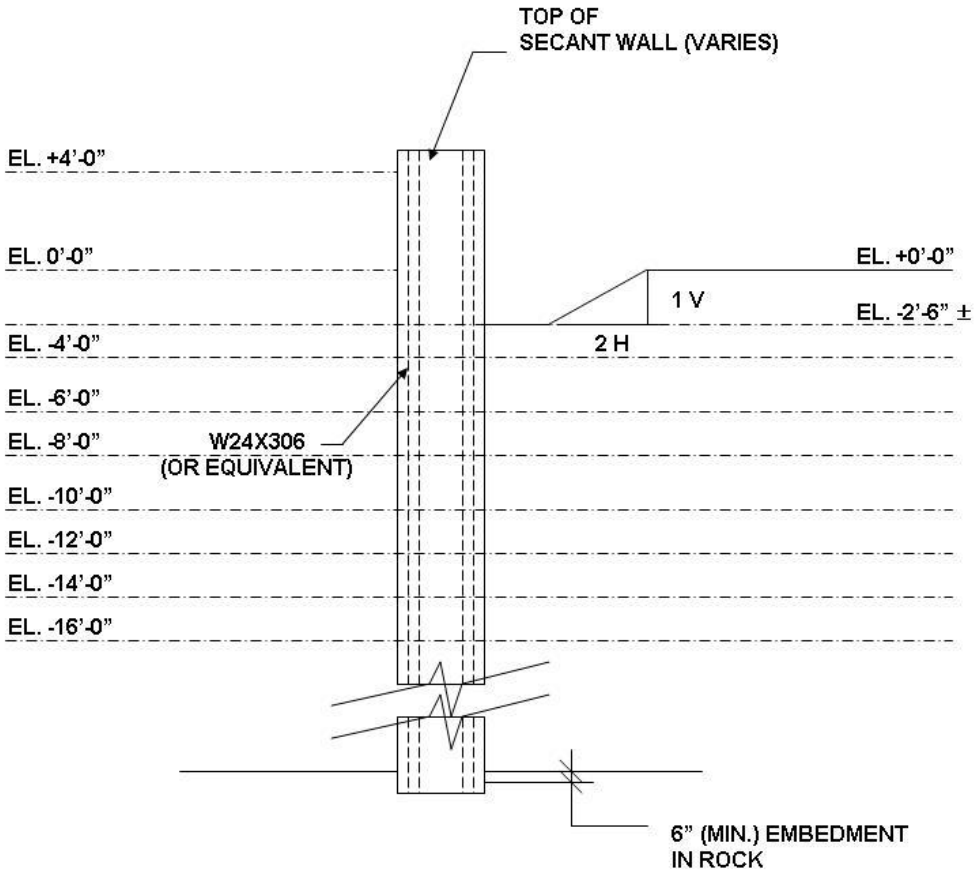
535 WEST 19TH STREET

EXCAVATION SEQUENCE

WEST WALL

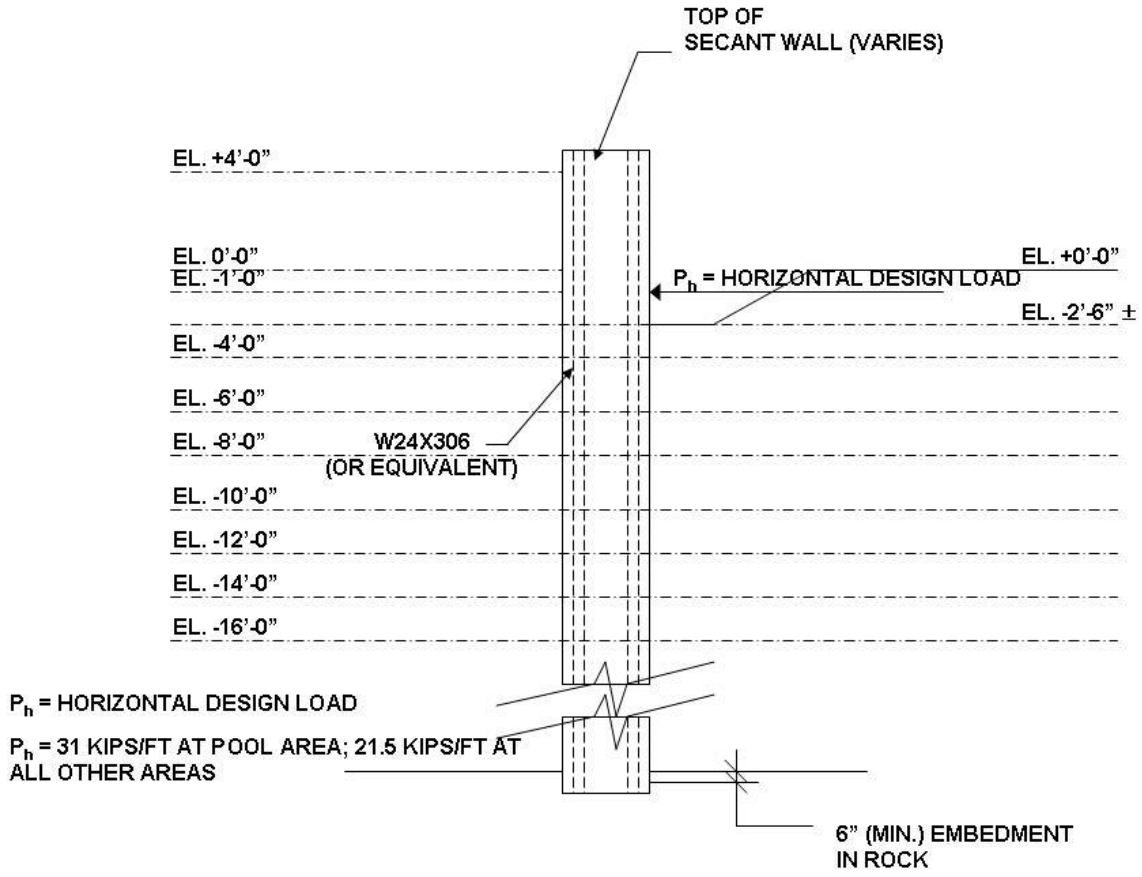


STAGE 1: INSTALL SECANT PILES



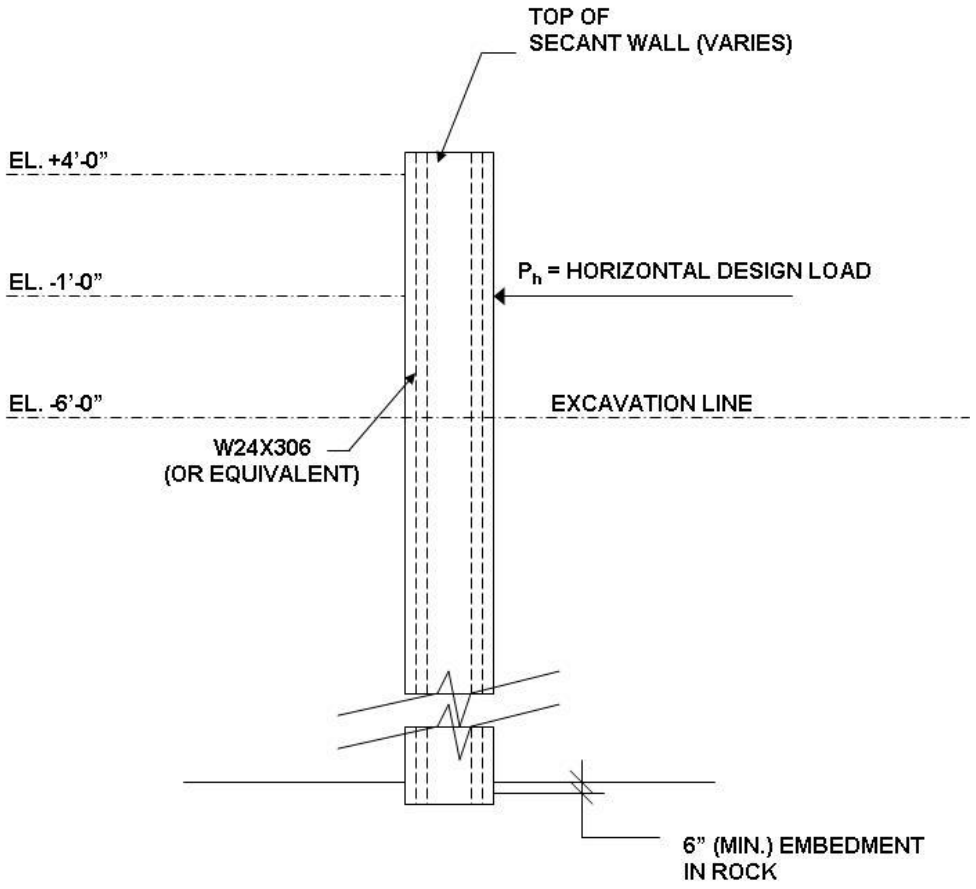
STAGE 2: DEWATER TO EL. - 3'- 6" & TRENCH EXCAVATION WITH 2-ON-1 BERM

- **DEWATER TO EL. -3'- 6"**
- **EXCAVATE TRENCH ADJACENT TO SECANT WALL TO BASE EL. - 2'- 6" WITH 2-ON-1 BERM TO EL. 0' – 0" AS SHOWN**



STAGE 3: INSTALL STRUT (WITH 10 KIP/FT PRELOAD) AT EL. - 1'- 0"

- **INSTALL STRUT AT CENTERLINE EL. -1'- 0" (ONE-BY-ONE WITH LOCALIZED TRENCH EXCAVATION. MAINTAIN GROUND SURFACE AT EL. 0'- 0" ACROSS THE SITE EXCEPT AT THE LOCALIZED TRENCH EXCAVATION FOR EACH STRUT INSTALLATION**
- **PRELOAD STRUTS TO 10 KIPS/FT.**



STAGE 4: DEWATER & EXCAVATE TO EL. - 6'- 0"

- **DEWATER TO EL. -7'- 0"**
- **EXCAVATE TO EL. -6'- 0"**

Project Desc.: Path: C:\TMCUSTOM\underpinning\west119\west119.pro Plot Date/Time: Fri Dec 14,2007 / 8:06:28

REVISION | DATE

1
2
3
4
5

PROJECT MANAGER:
ENGR. of RECORD: REG. NO:
GNYPA of RECORD: REG. NO:

Contractor's Layout

829-A Lincoln Ave. Bohemia New York 11716 631-218-0334

SCALE - 10
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DECEMBER 14, 2007

UNDERPINNING & FOUNDATION
46-36 54TH ROAD
MASPETH, NY 11378

535 WEST 19TH STREET
WESTSIDE HIGHWAY & WEST 19TH STREET
NEW YORK, NY

DRAWING

SHEET 1
OF 1

APPENDIX C

Site-wide Inspection Form and Checklist

535 West 19th Street Redevelopment Site
New York, New York
Voluntary Cleanup Agreement No. D2-0003-02-08
Site No. V00530-2

Site Management Plan

Date: _______________

Engineering Control Checklist - Building Foundation

Crack Identification	Location	Size (L X W)	Movement Monitored	Repair Performed	Moisture Infiltration	PID Readings	Notes

535 West 19th Street Redevelopment Site
New York, New York
Voluntary Cleanup Agreement No. D2-0003-02-08
Site No. V00530-2

Site Management Plan

Date: _______________

Engineering Control Checklist - Basement Level Venting System

Fan/Blower Identification	Location	Area Servicing	Design Output (CFM)	Measured Output (CFM)	Output/Intake Observed At All Vent Locations	Recommended Action	Notes