

81 FLEET PLACE
BROOKLYN, NEW YORK

Remedial Action Work Plan

Site Number: 13CVCP094K

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REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C/D	Construction/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
BCA	Brownfield Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC BCP	New York City Brownfield Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design

RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SMMP	Soil and Materials Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, Richard D. Galli, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the redevelopment site located at 81 Fleet Place "The Giovani", Brooklyn, NY VCP Project #13CVCP094K.

I certify that this Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Richard D. Galli

Name

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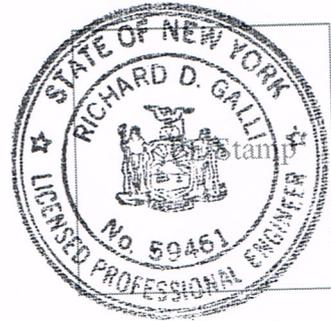
NYS PE License Number

Richard D. Galli

Signature

10/24/12

Date



EXECUTIVE SUMMARY

RA Real Estate, Inc. has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 31,500-square foot site located at 81 Fleet Place in Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located at 81 Fleet Place (aka 160 Myrtle Avenue) in the Downtown Brooklyn section of Brooklyn, New York and is identified as Block 2061, Lot 110 (formerly part of Lot 1) on the New York City Tax Map. Figure 1 shows the Site location. The Site is approximately 31,500 square feet and is bounded by Myrtle Avenue and low income housing to the north, a parking lot to the east, commercial buildings to the south, and a vacant lot to the west. Currently, the Site does not have any buildings and part of the site is covered with pavement and is being used as part of an active parking lot. The site is secured with fencing.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 15-story mixed use commercial and residential building with two levels of sub-grade parking. The building will cover approximately 78% of the lot. The remaining 22% of the lot (the eastern and southern edge of the property) will not be developed because of sewer and electrical easements and will be capped with asphalt. The site development includes no landscaping. All open area will be paved. There is a small planted area above the cellar at the entrance but this is on top of built area.

The building will contain 205 units (147,000 sqft of residential space), approximately 34,000 sqft of retail space on floor, and approximately 44,000 sqft of parking. The depth of the excavation for the two levels of subgrade parking varies as the site slopes. Generally, the excavation depth to the underside of the mat slab is a minimum of 25' and a maximum of 29',

except at the elevator pits where it is 2' deeper. Assuming the current site conditions and the depth of excavation will be as noted, approximately 28,000 cubic yards of material of soil/fill material will be excavated for construction of the redevelopment. The excavation is not expected to extend into the groundwater table, however dewatering may be required. The layout of the redevelopment is found in Figure 2 and the proposed redevelopment architectural plans are presented in Appendix B. The residential component occupies floors two through fifteen in an "L" shaped building facing both Fleet Place and Myrtle Avenue, accessed through a ground floor lobby facing Fleet Place. The retail component front on both Fleet Place and Myrtle Avenue and are accessed directly from the street with loading facilities interior to the site. The two sub-grade levels (cellar and sub-cellar) of parking are accessed through a pair of elevators which provide residential parking for the apartment buildings. The retail and parking components use the full available footprint, excluding easements. The two levels of sub-grade areas are mostly parking. There are service entrances for water, sewer, gas, electric, and some mechanical (ventilation) systems in the sub-grade spaces. Storage is provided for tenants and building operations in the sub-cellar. The current zoning designation is R7-1 Residential, with C2-4 Commercial overlay. The proposed used is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of the Remedy

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP citizen participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 1 Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. Appropriate segregation of excavated media onsite;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
7. Removal of USTs and closure of petroleum spills (if encountered) in compliance with applicable local, State, and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities;
9. Collection and analysis of end point samples to determine the performance of the remedy with respect to attainment of SCOs;
10. Demarcation of residual soil/fill;
11. Installation of a waterproofing/vapor barrier system beneath the building sub-grade foundations and along the side foundation walls to grade, as part of standard building construction;
12. Installation of parking ventilation system for two sub-grade levels, as part of standard building construction;
13. Construction and maintenance of an engineered composite cover consisting of a 3-foot thick mat slab poured on top of a 3-inch mud slab at the bottom of excavation to prevent human exposure to residual soil/fill remaining under the Site, and to provide a firm base for the vapor barrier system;

14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
15. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
16. Performance of all activities required for the remedial action, including permitting requirements, in compliance with applicable laws and regulations;
17. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP;
18. If Track 1 is not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
19. If Track 1 is not achieved, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies that show the location of contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities. This cleanup plan also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Remedial Investigation and Cleanup Plan. Under the NYC VCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses. Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment. An important part of the cleanup planning for the Site is the performance of a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan. This cleanup plan includes a Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in

compliance with safety requirements of the United States Occupational Safety and Health Administration. This plan includes many protective elements including those discussed below.

Site Safety Coordinator. This project has a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is Scott Davidow who can be reached at (631) 271-9292.

Worker Training. Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan. Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a ‘Contingency Plan’).

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager, Scott Davidow at (631) 271-9292, or the NYC Office of Environmental Remediation Project Manager, Michael Mandac, (212) 676-0754.

Quality Assurance. This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Storm-Water Management. To limit the potential for soil erosion and discharge, this cleanup plan has provisions for storm-water management. The main elements of the storm water

management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation. The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation are 7:00 AM to 5:00 PM, Monday through Saturday.

Signage. While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program, provides project contact names and numbers, and locations of project documents can be viewed.

Complaint Management. The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager, Kenneth L. Brooks, PE at (631) 271-9292, the NYC Office of Environmental Remediation Project Manager, Michael Mandac, (212) 676-0754, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs. To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal. All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations and required permits will be obtained.

Soil Chemical Testing and Screening. All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management. Soil stockpiles will be kept covered with tarps to prevent dust, odors and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed to protect storm water catch basins and other discharge points.

Trucks and Covers. Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with all laws and regulations.

Imported Material. All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on-Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination. All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping. Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing. Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report. The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review in the public document repository located at the NYC OER online document repository.

Long-Term Site Management. To provide long-term protection after the cleanup is complete, the property owner will be required to comply with an ongoing site management plan that calls for continued inspection of protective controls, such as site covers. The site management plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined in the property's deed. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Site Background

RA Real Estate, Inc. has enrolled in the New York City Brownfield Cleanup Program (NYC BCP) to investigate and remediate a property located at 81 Fleet Place in the Downtown Brooklyn section of Brooklyn, New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Current Usage

The Site is located at 81 Fleet Place (aka 160 Myrtle Avenue) in the Downtown Brooklyn section of Brooklyn, New York and is identified as Block 2061, Lot 110 (formerly part of Lot 1) on the New York City Tax Map. Figure 1 shows the Site location. The Site is approximately 31,500 square feet and is bounded by Myrtle Avenue and low income housing to the north, a parking lot to the east, commercial buildings to the south, and a vacant lot to the west. Currently, the Site does not have any buildings and part of the site is covered with pavement and is being used as part of an active parking lot. The site is secured with fencing.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 15-story mixed use commercial and residential building with two levels of sub-grade parking. The building will cover approximately 78% of the lot. The remaining 22% of the lot (the eastern and southern edge of the property) will not be developed because of sewer and electrical easements and will be capped with asphalt. The site development includes no landscaping. All open area will be paved. There is a small planted area above the cellar at the entrance but this is on top of built area.

The building will contain 205 units (147,000 sqft of residential space), approximately 34,000 sqft of retail space on floor, and approximately 44,000 sqft of parking. The depth of the excavation for the two levels of subgrade parking varies as the site slopes. Generally, the excavation depth to the underside of the mat slab is a minimum of 25' and a maximum of 29', except at the elevator pits where it is 2' deeper. Assuming the current site conditions and the depth of excavation will be as noted, approximately 28,000 cubic yards of material of soil/fill material will be excavated for construction of the redevelopment. The excavation is not expected to extend into the groundwater table, however dewatering may be required. The layout of the redevelopment is found in Figure 2 and the proposed redevelopment architectural plans are presented in Appendix B. The residential component occupies floors two through fifteen in an "L" shaped building facing both Fleet Place and Myrtle Avenue, accessed through a ground floor lobby facing Fleet Place. The retail component front on both Fleet Place and Myrtle Avenue and are accessed directly from the street with loading facilities interior to the site. The two sub-grade levels (cellar and sub-cellar) of parking are accessed through a pair of elevators which provide residential parking for the apartment buildings. The retail and parking components use the full available footprint, excluding easements. The two levels of sub-grade areas are mostly parking. There are service entrances for water, sewer, gas, electric, and some mechanical (ventilation) systems in the sub-grade spaces. Storage is provided for tenants and building operations in the sub-cellar. The current zoning designation is R7-1 Residential, with C2-4 Commercial overlay. The proposed used is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

A due diligence investigation into the potential impacts from off-site sources was conducted. The subject property is located in an area generally consisting of commercial and residential development.

The past and current uses of the adjoining properties are predominantly commercial and residential.

The area surrounding the site is both commercial and residential in character, with community facility uses.

Land uses in the area include:

- Open space/recreational (Fort Greene Park),
- Residential,
- Apartment buildings,
- Commercial office buildings,
- Mixed residential and commercial buildings,
- Vacant land,
- Public facilities/institutions,
- Parking facilities and
- Retail stores.

Surrounding zoning consists of residential (R6) and commercial (C6-1 and C6-4).

Sensitive receptors within 500 feet of the site include 2 day care centers:

- Duffield Childrens Center 101 Fleet Place
- Stanley S. Lamm Institute Early Childhood Center 147 Prince Street

Figure 3 shows the sensitive receptor locations, relative to the site.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, The Giovani*”, dated October, 2012 (RIR).

Summary of Past Uses of Site and Areas of Concern

Former occupancies in the vicinity included Duane Reade (166 Myrtle); Super Associated (176 Myrtle); Dalia Superstore (180 Myrtle); Andy’s Liquor Store (184 Myrtle); a vacant property; Clean Spin Laundromat (192 Myrtle); Park-n-Lock parking lot; New World Food Center (202 Myrtle); El Dorado Restaurant (204 Myrtle); Magic Nail (206 Myrtle); Golden Horse Kitchen (208 Myrtle); O&S Laundromat (214 Myrtle); The Life Center (216 Myrtle) and a former Kentucky Fried Chicken (208 Myrtle). Sanborn Maps indicate that the property was developed with three and four story residential buildings with storefronts from 1887 to at least

1950, single story commercial buildings from at least 1969 to 2007, and vacant/a parking lot after 2007. Former one-story retail buildings with single level basements were demolished in early-to-mid 2007.

Areas of Concern at the subject site, as identified in past Phase I and Phase II studies, include:

- Presence of historic fill material at the Site to a depth of 20 feet below grade

Summary of the Work Performed under the Remedial Investigation

1. Conducted several Site inspections to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed twelve soil borings (6 by Langan, December 2007; 6 by Galli, September 2010) across the subject Site, and collected eighteen soil samples for chemical analysis from the soil borings to evaluate soil quality (12 by Langan, December 2007; 6 by Galli, September 2010);
3. Installed four groundwater monitoring wells (2 by Langan, December 2007; 2 by Galli, September 2010) on the subject Site to establish groundwater flow and collected four groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed eight soil vapor probes (3 by Langan, December 2007; 5 by Galli, July, 2012) around the subject Site and collected eight samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 27 to 34 feet.
2. Depth to groundwater ranges from 31 to 33 feet at the Site.
3. Groundwater flow is generally from East-Southeast to West-Northwest beneath the Site.
4. Depth to bedrock is approximately 112 feet at the Site.
5. The stratigraphy of the site, from the surface down, consists of approximately 20 feet of urban fill; underlain by 70 - 90 feet of sand; underlain by sound bedrock.

6. Soil/fill samples collected during the RI showed minor detections of PCBs and VOCs which were below the Track 1 SCOs. Metals including lead, nickel, silver, mercury and zinc were detected slightly above Unrestricted Use SCOs and of these lead (584 ppm) and Barium (906 ppm) also exceeded Track 2 Residential SCOs at one soil sampling location each. Pesticides including DDD (maximum of 0.015 ppm), DDE (maximum of 0.0609 ppm) and DDT (maximum of 0.209 ppm) were detected in all soil samples and exceeded the Unrestricted Use SCOs but were all below the Restricted Residential SCOs, Numerous SVOCs were detected in one shallow sample (LEG-14 collected at 0-10' below grade) and one deep sample (SB-5 collected at 20' below grade). SVOCs in shallow soil (LEG-14) slightly exceeded the Track 2 Residential SCOs. SVOC concentrations in deeper soil (SB-5) greatly exceeded the Restricted Residential SCOs, including benzo(a)anthracene (at 79 ppm), benzo(a)pyrene (at 66 ppm), benzo(b)fluoranthene (78 ppm), benzo(k)fluoranthene (33 ppm), chrysene (77 ppm), indeno(1,2,3-CD)pyrene (42 ppm), phenanthrene (210 ppm), and pyrene (170 ppm). The SVOCs detected at the site are polycyclic aromatic hydrocarbons (PAHs) and their concentrations and distribution throughout the site are indicative of historic urban fill material.
7. Groundwater samples collected during the RI did not detect PCBs in the groundwater samples. There were detections of SVOCs in groundwater which were below the New York State Groundwater Quality Standards (GQS). Two pesticides were detected in one groundwater sample (MW-4) which slightly exceeded the GQS, including Endosulfan I at 0.02 ug/L and Endosulfan II at 0.015 ug/L. Both Endosulfans have a GQS of 0.009 ug/L. Several metals including antimony, arsenic, barium, chromium, iron, lead, magnesium, mercury and sodium greatly exceeded GQS in all of the groundwater samples. The majority of VOC detections throughout the site were below the GQS, except for chloroform (8.7 ug/L) and tetrachloroethene. (maximum of 33.2 ug/L). Two drycleaners were previously located along Myrtle Avenue on or near the subject property and may be the source of the tetrachloroethene in the groundwater samples collected.
8. The soil vapor samples collected during the RI indicated moderate levels of petroleum-related and chlorinated VOCs. Petroleum-related VOCs include toluene, which was found at concentrations ranging from 31.6 $\mu\text{g}/\text{m}^3$ to 169.1 $\mu\text{g}/\text{m}^3$ in all eight soil vapor

locations, benzene at concentrations ranging from 6.2 $\mu\text{g}/\text{m}^3$ to 100 $\mu\text{g}/\text{m}^3$ in four of the eight samples, ethylbenzene at concentrations of 56.8 $\mu\text{g}/\text{m}^3$ in SV-15 and 49.9 $\mu\text{g}/\text{m}^3$ in SV-18, and o-xylene at concentrations of 57.5 $\mu\text{g}/\text{m}^3$ in SV-15 and 45.7 $\mu\text{g}/\text{m}^3$ in SV-18. Tetrachloroethene (PCE) was detected in all of the eight soil vapor samples, with a concentration range of 40 mcg/m^3 to 476.7 mcg/m^3 . Trichloroethene (TCE) was detected in four of the eight soil vapor samples, with a concentration range of 9.8 mcg/m^3 to 34.4 mcg/m^3 . 1,1,1-trichloroethane (TCA) was detected in three of the eight soil vapor samples, with a concentration range of 37.5 mcg/m^3 to 628.8 mcg/m^3 . Carbon tetrachloride was not detected any of the eight soil vapor samples. The PCE and TCE concentration range falls within the no further action to monitor range of the NYSDOH *Guidance for Evaluation Soil Vapor Intrusion Decision Matrix*. Given the levels of tetrachloroethene in the groundwater and the site history of drycleaners on or near the site, the levels indicate a possible on-site source.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 REMEDIAL ACTION OBJECTIVES

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 REMEDIAL ALTERNATIVES ANALYSIS

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing remedial action objectives (RAOs) for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). A remedy is then developed based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance;
- Land use; and
- Sustainability

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

Alternative 1 involves:

- Removal of all soil/fill exceeding Unrestricted Use (Track 1) Soil Cleanup Objective (SCOs) throughout the Site. This alternative would require excavation to depths across the site ranging from approximately 25-29 feet below grade to remove all historic fill and 32 feet below grade for the elevator pits and confirmation that Track 1 SCOs have been achieved through post-excavation end point sampling.
 - No engineering or institutional controls are required on a Track 1 cleanup, but the installation of a vapor barrier beneath the basement foundation and behind the

foundation sidewalls of the new building would be installed as a part of standard construction and to prevent any exposure from off-site soil vapor.

- As part of construction, two sub-grade levels of ventilated parking garage per NYC codes will also act as engineering controls.
- Installation of a vapor barrier system under the building foundation slab and up the foundation walls to grade as part of construction; and
- Installation of parking ventilation system for two sub-grade levels, as part of standard building construction.

Alternative 2 involves:

- Establishment of Restricted Use (Track 2) Residential SCOs;
- Removal of all soil/ fill exceeding Track 2 Residential SCOs. This would require excavation to depths across the site ranging from approximately 25-29 feet below grade to remove all historic fill and 32 feet below grade for the elevator pits and confirmation that the Track 2 Residential SCOs have been achieved through post-excavation end point sampling;
- Installation of a vapor barrier system under the building foundation slab and up the foundation walls to grade as part of construction;
- Installation of two sub-grade levels of ventilated parking, as part of standard building construction;
- Placement of a final cover over the entire site to eliminate exposure to remaining soil/fill;
- Establishment of use restrictions including prohibitions on the use of groundwater from the site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;
- Establishment of an approved Site Management Plan to ensure long-term management of these engineering and institutional controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- Placement of a deed notice to memorialize the remedial action and the Engineering and Institutional Controls to ensure that future owners of the site continue to maintain these controls as required.

Both Alternatives will remove approximately 28,000 cubic yards of material of soil/fill. Site controls would be implemented to prevent exposure of site workers, the surrounding community, and nearby surface water; those controls would include a Construction Health and Safety Plan (CHASP), Community Air Monitoring Plan (CAMP), and Erosion and Sediment Control Plan (E&SC).

3.1 Threshold Criteria

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing the historic fill at the Site to a depth ranging from 25-29 feet (plus 2 more feet at the elevator pits), thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Implementing an approved Soil and Materials Management Plan and Community Air Monitoring Plan (CAMP) would minimize potential exposure to contaminated soils during construction. Since construction and remediation will occur in close proximity to groundwater, special attention will be given to selecting appropriate construction techniques during the Site development. As such, there is minimal risk of contact with groundwater. If dewatering should prove necessary due to actual groundwater elevation, it will be performed in accordance NYC Department of Buildings and NYC Department of Environmental Protection requirements for dewatering and discharge, respectively. The sub-grade portion of the building developed within the interim unsaturated zone will be insulated with a specialized waterproofing membrane. Additionally, a vapor barrier system (beneath the building foundation slab and up the foundation sidewalls to grade) and a parking ventilation system (for the two sub-grade levels parking) are being installed at the site as part of standard construction and would prevent any potential migration of soil vapor into the new building.

Alternative 2 would achieve comparable protections of human health and the environment since soil will be removed to a depth ranging from 25-29 feet below grade (plus 2 more feet at the elevator pits) across the site for development purposes. The remaining soil/fill on-Site will meet the Track 2 Residential SCOs and this alternative will include institutional and engineering controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing institutional controls including a deed notice and a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 2 Residential SCOs would minimize the risk of contamination leaching into groundwater. Implementing an approved Soil and Materials Management Plan and Community Air Monitoring Plan (CAMP) would minimize potential exposure to contaminated soils during construction. Potential contact with contaminated groundwater would be eliminated as the deed notice would prohibit it, and it is not anticipated to be encountered during construction. Additionally, a vapor barrier system (beneath the building foundation slab and up the foundation sidewalls to grade) and a parking ventilation system (for the two sub-grade levels parking) are being installed at the site as part of standard construction and would prevent any potential migration of soil vapor into the new building.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

Alternative 1 would achieve compliance with the remedial goals, SCGs and RAOs because all contaminated soil left in place would be at concentrations lower than the Unrestricted Use Track 1 SCOs. Focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs.

Alternative 2 would address the chemical-specific SCGs for soil and soil vapor by establishing Restricted Use Track 2 Residential SCOs and removing the soil exceeding these SCOs, and installation of engineering controls including a vapor barrier and two sub-grade levels of ventilated parking garage to mitigate potential soil vapor intrusion. Similar to the Track 1 alternative, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs.

Short-term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during remedial actions.

Both **Alternative 1 and 2** have similar-short term effectiveness during their respective implementations. Both **Alternative 1 and 2** are considered to be effective in protecting human health and the environment in the short term. **Alternative 1** would eliminate all exposures to the contaminant sources and **Alternative 2** would reduce exposure to the contaminant sources. Both **Alternative 1 and 2** would employ appropriate measures to prevent short term impacts, including a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-site soil disturbance activities and would effectively prevent the release of significant contaminants into the environment. Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-site contaminants. Construction workers operating under appropriate management procedures and a Health and Safety Plan (CHASP) will be protected from on-site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones).

Long-term Effectiveness and Permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of ECs/ICs that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of Engineering Controls.

Alternative 1 would achieve long-term effectiveness by providing a permanent cleanup of on-site contamination through removal of all impacted soil/fill material in excess of Track 1 SCOs and would eliminate any potential on-site sources of soil vapors and groundwater contamination consistent with remedial action objectives. New building will be constructed with a waterproofing/vapor barrier and two sub-grade levels of the ventilated parking. A waterproofing/vapor barrier system is required as part of new construction because the building foundation extends into the water table. The waterproofing/vapor barrier system and the ventilated parking garages are also considered a permanent control for off-site soil vapor management.

Alternative 2 would also be effective over the long-term attaining Track 2 Residential SCOs through the placement of a composite cover system across the entire site, establishing use restrictions, establishing a Site Management Plan to ensure long-term management of Institutional Controls (ICs) and Engineering Controls (ECs), and placing a deed restriction to memorialize these controls for the long term. Additionally, a vapor barrier system and a parking ventilation system (for the two sub-grade levels of parking) is being installed as a part of standard construction. Establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term. The SMP will ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce

the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 would provide maximum reduction of toxicity, mobility, and volume of contaminated material/soil on-site soil by excavation and removal of all soils that exceed Track 1 Unrestricted Use SCOs.

Alternative 2 would greatly reduce the toxicity, mobility, and volume of contaminants from on-site soil because it would include removal of contaminants that exceed Track 2 Restricted Residential SCOs. For Alternative 2, placement of a building slab and vapor barrier will eliminate potential exposures with remaining soil, groundwater, and soil vapor contamination. Groundwater use restrictions will eliminate potential exposures by ensuring that there is no use of on-site groundwater for potable purposes.

Alternative 1 would eliminate a greater total mass of contaminants on Site.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

Both **Alternative 1 and 2** are feasible and implementable. They use standard materials and services and well established technology that are readily available. The reliability of the remedy is also high. There are no special difficulties associated with any of the activities proposed, which utilize standard industry methods. Excavation of nearly all of the contaminated material would be required for construction of the foundations. Installation of the waterproofing/vapor barrier system will be conducted in accordance with standard methods utilized to install waterproofing membranes.

For implementation of both remedies, standard construction equipment utilized for the overall earthwork would be used. OSHA trained personnel will complete all activities that include excavation and handling of impacted soils. No special permits, other than earthwork

permits required for completion of the required site redevelopment scope, are required for implementation of the remedy. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost Effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Initial costs associated with the **Alternative 1 and 2** are very similar. However, the long-term costs are higher for **Alternative 2** than **Alternative 1** based on implementation of a Site Management Plan and placement of a deed restriction as part of **Alternative 2**. In both cases, appropriate public health and environmental protections are achieved.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

Based on the overall goals of the remedial program and initial permitting associated with the proposed site development, no adverse community opinions is anticipated for either alternative. Both of the alternatives for the Site would provide a remedial action that is protective of public health and the environment and would be safe to achieve. This RAWP will be subject to and undergo public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. This public comment will be considered by OER prior to approval of this plan. A Citizen Participation Plan is provided in Appendix C.

Land Use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS

Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

Both Alternatives are appropriate with respect to the proposed use and to land uses in the vicinity of the Site. The proposed redevelopment of the Site is compatible with its current existing zoning designation R7-1 zoning designation with C2-4 commercial overlay and is consistent with recent development patterns. The Site is surrounded by commercial and mixed-use commercial/residential properties and the proposed cleanup provides comprehensive protection of public health and the environment for these uses. Improvements in the current condition of the property achieved by both cleanup alternatives are also consistent with the City's goals for cleanup of contaminated land, bringing such properties to productive reuse, and making such properties protective of natural and cultural resources.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in *PlaNYC: A Greener, Greater New York*. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

Both **Alternative 1** and **Alternative 2** would potentially result in similar energy usage based on the potentially equal volume of material transported off-Site. Both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action.

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is **Alternative 1 (Track 1 SCOs)**. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternative is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP citizen participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 1 Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. Appropriate segregation of excavated media onsite;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
7. Removal of USTs and closure of petroleum spills (if encountered) in compliance with applicable local, State, and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities;

9. Collection and analysis of end point samples to determine the performance of the remedy with respect to attainment of SCOs;
10. Demarcation of residual soil/fill;
11. Installation of a waterproofing/vapor barrier system beneath the building sub-grade foundations and along the side foundation walls to grade, as part of standard building construction;
12. Installation of parking ventilation system for two sub-grade levels, as part of standard building construction;
13. Construction and maintenance of an engineered composite cover consisting of a 3-foot thick mat slab poured on top of a 3-inch mud slab at the bottom of excavation to prevent human exposure to residual soil/fill remaining under the Site, and to provide a firm base for the vapor barrier system;
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
15. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
16. Performance of all activities required for the remedial action, including permitting requirements, in compliance with applicable laws and regulations;
17. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP;
18. If Track 1 is not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
19. If Track 1 is not achieved, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and

farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives And Soil/Fill Management

Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs) proposed for this project are those specified in 6NYCRR Part 375-6.8(a) Unrestricted Residential SCOs. Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix E. The location of planned excavations is shown in Figure 5.

If Track 1 SCOs are not achieved, then Restricted Use (Track 2) Residential SCOs will be applied. Soil data collected beneath the total depth of building foundations indicated remaining soil at the Site soil meets Track 2 Residential SCOs.

Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is estimated to be 28,000 cubic yards.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

<u>Disposal Facility</u>	<u>Waste Type</u>	<u>Estimated Quantities</u>
TBD	Historic Fill	28,000 cubic yards
TBD	Petroleum Contaminated Soil	TBD
TBD	Contaminated Groundwater	TBD

End-Point Sampling

Removal actions under this plan are to be performed in conjunction with remedial end-point sampling. End point sampling frequency will consist of samples collected from the bottom of the excavation as expressed below. To evaluate attainment of Track 1 SCOs, end point samples will be analyzed for the full list of VOCs, SVOCs, PCBs, pesticides, and metals. In addition, if hotspots are identified, end point sampling frequency will consist of the following:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Proposed endpoint sampling locations are shown in Appendix I, “Endpoint Sampling Locations Plan”. Ten (10) post-remediation confirmatory samples will be collected and the locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and

map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed for trigger analytes (those for which SCO exceedance is identified) utilizing the following methodology:

Soil analytical methods will include:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, on a daily basis;
- Analysis of one (1) duplicate sample per twenty (20) samples collected;
- Analysis of one (1) field blank sample;
- Analysis of one (1) laboratory blank sample;
- Use of dedicated and/or disposable field sampling equipment;
- Proper sample handling and preservation;
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- One (1) duplicate end-point soil sample will be collected to evaluate field sampling precision or reproducibility of measurements of the same parameter under the given set of conditions;
- Disposable sampling equipment will be used to minimize cross-contamination between samples;
- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary;

- Because plasticizers and other organic compounds inherent in plastic containers may contaminate samples requiring organic analysis, samples will be collected in glass containers;
- Appropriate sample preservation techniques, including cold temperature storage at 4° C, will be utilized to ensure that the analytical parameters concentrations do not change between the time of sample collection and analysis; and
- Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Appendix E. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 2,000 cubic yards. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is zero tons.

4.3 Engineering Controls

Engineering Controls are not required on properties that achieve a Unrestricted Use Track 1 cleanup. However, as part of new construction, the following elements are being built to provide protections against soil vapor from surrounding properties. If Track 1 SCOs are not achieved, these three elements will constitute engineering controls that will be employed in the remedial action to address residual contamination remaining at the site

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. The entire property will be covered by an engineered permanent cover system comprised of:

- Structural 3-foot thick mat slab foundation resting on a 3-inch mud slab beneath the building footprint; and
- Installation of a waterproofing/vapor barrier system beneath the building sub-grade foundations and along the side foundation walls to grade, as part of standard building construction; and

- Installation of parking ventilation system for two sub-grade levels, as part of standard building construction.

The composite cover system is a permanent engineering control for the Site. If Track 1 is not achieved, the system will be inspected and reported at specified intervals as required by this RAWP and the Site Management Plan. A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the RAR.

Vapor Barrier

Migration of soil vapor will be mitigated with a combination of building structural slab and a vapor barrier system. In order to prevent subsurface vapors from impacting the interior air of the building at the Site, a vapor barrier system consisting of a 46-mil Preprufe 300R waterproofing membrane will be installed beneath the footing mat slab and the elevator pits. The vapor barrier will be extended up to grade level by attaching it to the exterior sides of foundation walls using 32-mil Preprufe 160R and Bituthene 4000 waterproofing membrane. The vapor barrier will be installed according to manufacturer specifications.

The Remedial Closure Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty. Appendix G provides a vapor barrier design and specifications.

Parking Ventilation System

The garage is ventilated to comply with the New York City mechanical code section mc 404 and is provided with a system to ventilate 1.5 cfm per square foot which totals 62000 cfm. This is accomplished by introducing outdoor air at louvers located along the south building facia at the first floor and transferring it to all areas of the garage so that it can be exhausted. Exhaust is accomplished by four 17000 cfm in line fans with two fans located in the subcellar and two fans located in the cellar levels. Discharge air from these fans is exhausted through louvers located

more than 10 feet above grade on the north and west facias of the building. These locations maintain code required distances from all residential windows as they are more than 10 feet from any operable residential window. Fans are controlled via a central carbon monoxide sensing system.

4.4 Institutional Controls

Institutional Controls are not required on properties that achieve a Track 1 cleanup. If Track 1 SCOs are not achieved, the following Institutional Controls will be employed.

Institutional Controls (IC) would manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be established in a Declaration of Covenant and Restrictions (DCR) assigned to the property by the title holder and will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls for this remedial action would be:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the Site Management Plan, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;
- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; 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. OER retains the right to enter

the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted on a periodic basis and will comply with RCNY §43-1407(1)(3).

- Vegetable gardens and farming on the Site are prohibited;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential use and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

If a Track 1 cleanup is not achieved, a Site Management Plan will be established for the property. Site Management is the last phase of remediation when ECs or ICs are required and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. If Track 1 SCOs are attained, no Site Management Plan (SMP) will be required. The SMP describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Brownfield Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of EC's; (4) inspection and certification of EC's; and (5) reporting.

Site management activities, reporting, and EC/IC certification will be scheduled on an periodic basis to be established in the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by March 31 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA). As a part of the VCP, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Sources

Based on the results of the RIR, the contaminants of concern found are:

Soil

- SVOCs – Polycyclic aromatic hydrocarbons (PAHs) were detected at concentrations above the Unrestricted Use (Track 1) SCOs, including acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluorine, indeno(1,2,3-CD)pyrene, naphthalene, phenanthrene, and pyrene.
- Metals – Barium, copper, lead, nickel, silver, zinc, and mercury were detected at concentrations above Unrestricted Use (Track 1) SCOs
- Pesticides – 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, and dieldrin were detected at concentrations above Unrestricted Use (Track 1) SCOs

Groundwater

- Metals – In the unfiltered sample, several metals were detected at concentrations exceeding the Part 703.5 Class GA groundwater standards, including antimony, arsenic, barium, beryllium, chromium, copper, iron, lead, magnesium, manganese, nickel, sodium, thallium, and mercury.
- VOCs – Chloroform and tetrachloroethene (PCE) were detected at concentrations exceeding the Part 703.5 Class GA groundwater standards
- Pesticides – Endosulfan I and II were detected at concentrations exceeding the Part 703.5 Class GA groundwater standards

Soil Vapor

- Chlorinated VOCs detected at low to moderate concentrations, including 1,1,1-trichloroethane, tetrachloroethene (PCE), and trichloroethene (TCE).

Nature, Extent, Fate and Transport of Contaminants

SVOCs and metals are present in the historic fill materials present throughout the Site at approximately 20 feet below grade. These contaminants are consistent with the presence of historic fill material.

The metal contaminants found in the unfiltered groundwater samples collected at the site are linked to the historic fill material. However, no filtered groundwater samples were collected during the RIR. While it is clear that there are metals in groundwater, it may be necessary to take additional groundwater samples as part of the site remediation. Chloroform and tetrachloroethene are present in the groundwater samples collected at the site. The chlorinated VOCs are most likely attributed to the former drycleaners that were at or near the site.

The chlorinated VOCs that were identified in soil gas (1,1,1-trichloroethane, tetrachloroethene, and trichloroethene) at low to moderate concentrations were not found in on-site soil at appreciable concentrations. Tetrachloroethene was detected in the groundwater samples collected at the site. The chlorinated VOCs are most likely attributed to the former drycleaners that were at or near the site. Petroleum-related compounds were detected in the soil gas measurements. These included Toluene in all eight soil vapor probes; Benzene (SV-3, -14, -15 and -18); Ethylbenzene (SV-15 and -18); and Xylenes (SV-5, -14, -15 and -18). These data suggest a historic problem with transport of petroleum products, possibly from a distant spill or discharge.

Potential Routes of Exposure

An exposure route is the mechanism by which a receptor comes into contact with a chemical.

Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill and soil.

Existence of Human Health Exposure

An exposure pathway begins with a source and a mechanism of contaminant release, resulting in the contamination of a received matrix (environmental medium). A complete exposure pathway also requires a point of potential contact with the contaminated matrix (i.e. exposure point), an exposure route (i.e. inhalation, ingestion, or dermal contact), and a receptor population. If an exposure pathway is not complete because it does not include a contaminated matrix, a point of potential contact, an exposure route, or a receptor, then no risk exists.

Existing

The Site is undeveloped, vacant and partially capped (for the existing sewer and electrical easements). Therefore, exposure to surficial soil/fill material is unlikely. Groundwater is marginally exposed at the Site, and because the Site is served by the public water supply, groundwater is not used at the Site. There are no structures on Site where soil vapor could accumulate.

Construction/ Remediation Activities

Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils and groundwater (if dewatering is required) as a result of on-Site construction/excavation activities. Similarly, off-Site receptors could be exposed to dust from onsite activities. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through dust controls, and through the implementation of the Community Air Monitoring Plan and a Construction Health and Safety Plan. Groundwater is not anticipated to be encountered at the lowest excavation elevation (elevator pits), and there will be no structures on site where soil vapor could accumulate.

Proposed Future Conditions

Once the remedial actions and redevelopment of the Site have been completed, there will be no potential onsite exposure pathways. Not only will historic fill be removed, but the Site will also be fully capped with the concrete building slab, which will prevent contact with any residual soils. Any exposures to vapors from off-site sources will be prevented by installation of a vapor barrier, the building foundation slab, and two sub-grade levels of parking with a ventilation system.

Receptor Populations

The immediate area surrounding the Site is mixed use residential and commercial, and is anticipated to remain as such. The new building at the site will be utilized as a mixed use commercial and residential facility. Potential receptor populations are as follows:

On-Site Receptors - The Site is currently vacant and undeveloped, and a fence restricts access to the Site. Therefore, the only potential on-Site receptors are Site Representatives and trespassers. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, workers, and visitors.

Off-Site Receptors - Potential offsite receptors within a 0.25-mile radius of the Site include: adult and child residents, commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

1. Duffield Children's Center (101 Fleet Place)
2. Stanlay S. Lamm Institute Early Childhood Center (147 Prince Street)

Overall Human Health Exposure Assessment

Based upon this analysis, complete on-site exposure pathways appear to be present only during the remedial action phase. Under current conditions, preventing access to the Site and the paved cap minimize on-Site exposure pathways. During the remedial action, on-site exposure pathways will be eliminated by preventing access to the Site, through implementation of soil/materials management, storm water pollution prevention, dust controls, employment of a community air monitoring plan, and implementation of a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways to on-Site soil/ fill, as all soil that exceeds Unrestricted Use Track 1 SCOs will have been removed, and the vapor barrier and concrete building slabs will interrupt potential for soil vapor intrusion.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include, Project Director; Kenneth L. Brooks, PE, Project Manager; Scott Davidow, On-Site Project Manager and Safety Coordinator; and Matthew Galli, Field Technician. The Professional Engineer (PE) for this project is Richard D. Galli, PE.

5.2 Site Security

The Applicant will control site access of the fenced property through gated entrances. Barriers will be installed around work areas as needed to delineate and restrict access to the work area.

5.3 Work Hours

The hours for operation of remedial construction will be from 7:00 AM to 5:00 PM, Monday through Saturday. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix F. The Site Safety Coordinator will be Scott Davidow. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, including 40-hour hazardous waste operator training and annual 8-hour refresher training. The Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the HASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 Agency Approvals

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. The location of proposed equipment and material staging areas, truck inspection station, stockpile areas, and other pertinent remedial management features will be arranged for the clearest and safest access for all personnel.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the NYC VCP Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

5.8 Traffic Control

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. Routes for truck traffic to and from the project site will be selected to meet project access requirements using the best available legal truck routes.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck

inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily Reports

Daily reports providing a general summary of activities for each day of *active remedial work* will be emailed to the OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo-Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas.

Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations from the Remedial Action Work Plan

All changes to the RAWP will be reported to the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 REMEDIAL ACTION REPORT

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan, if necessary;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Recorded Declaration of Covenants and Restrictions, and;
- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

I, Richard D. Galli, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the redevelopment site located at 81 Fleet Place “The Giovani”, Brooklyn, NY VCP Project #13CVCP094K.

I certify that the OER-approved Remedial Action Work Plan dated [month day year] and Stipulations in a letter dated [month day, year]; if any were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

7.0 SCHEDULE

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 4-6 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	--
Fact Sheet 2 announcing start of remedy	1	--
Mobilization	3	1
Remedial Excavation	4	12
Demobilization	16	1
Record Declaration of Covenants and Restrictions		
Submit Remedial Action Report		

FIGURES

**SITE LOCATION MAP
LAYOUT OF PROPOSED SITE DEVELOPMENT
SENSITIVE RECEPTOR LOCATIONS
EXCAVATION PLAN**



Galli Engineering, P.C.



734 Walt Whitman Road,
Suite 402A
Melville, New York 11747

JOB NO.
0837-01-002

DATE
9/8/11

SCALE N.T.S.	CHKD. BY KLB
DRAWN BY JJR	DESIGN BY KLB

RED APPLE REAL ESTATE, INC

FIGURE I - SITE LOCATION MAP

Myrtle Avenue Development

Brooklyn, New York 11201

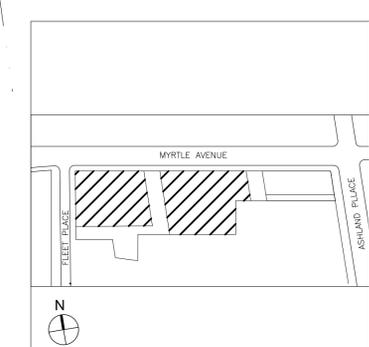
Red Apple Myrtle Avenue Development, LLC
823 11th Avenue
New York, New York 10019

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
Tel 212.247.2660
Fax 212.245.7132
www.dattner.com



01 Site Plan

Revisions



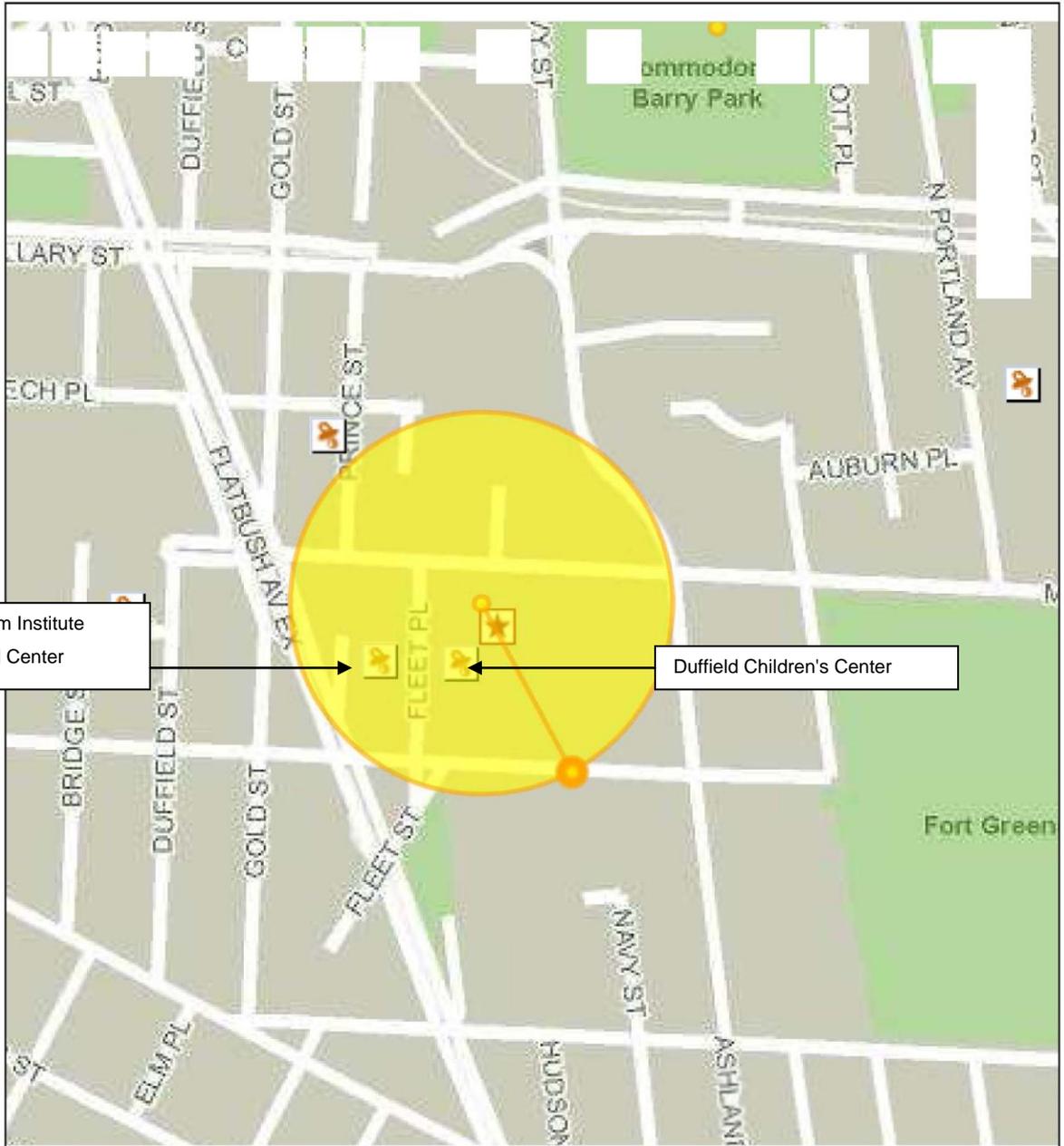
Key Plan
© 2011 Dattner Architects

SITE PLAN

Date	August 03, 2011
Scale	1/8" = 1'-0"
Drawn By	VA
Checked By	IM
Project No.	0510.0E
Seal	

Sheet No. **SP-01**

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Stanley S. Lamm Institute
Early Childhood Center

Duffield Children's Center

Galli Engineering, P.C.

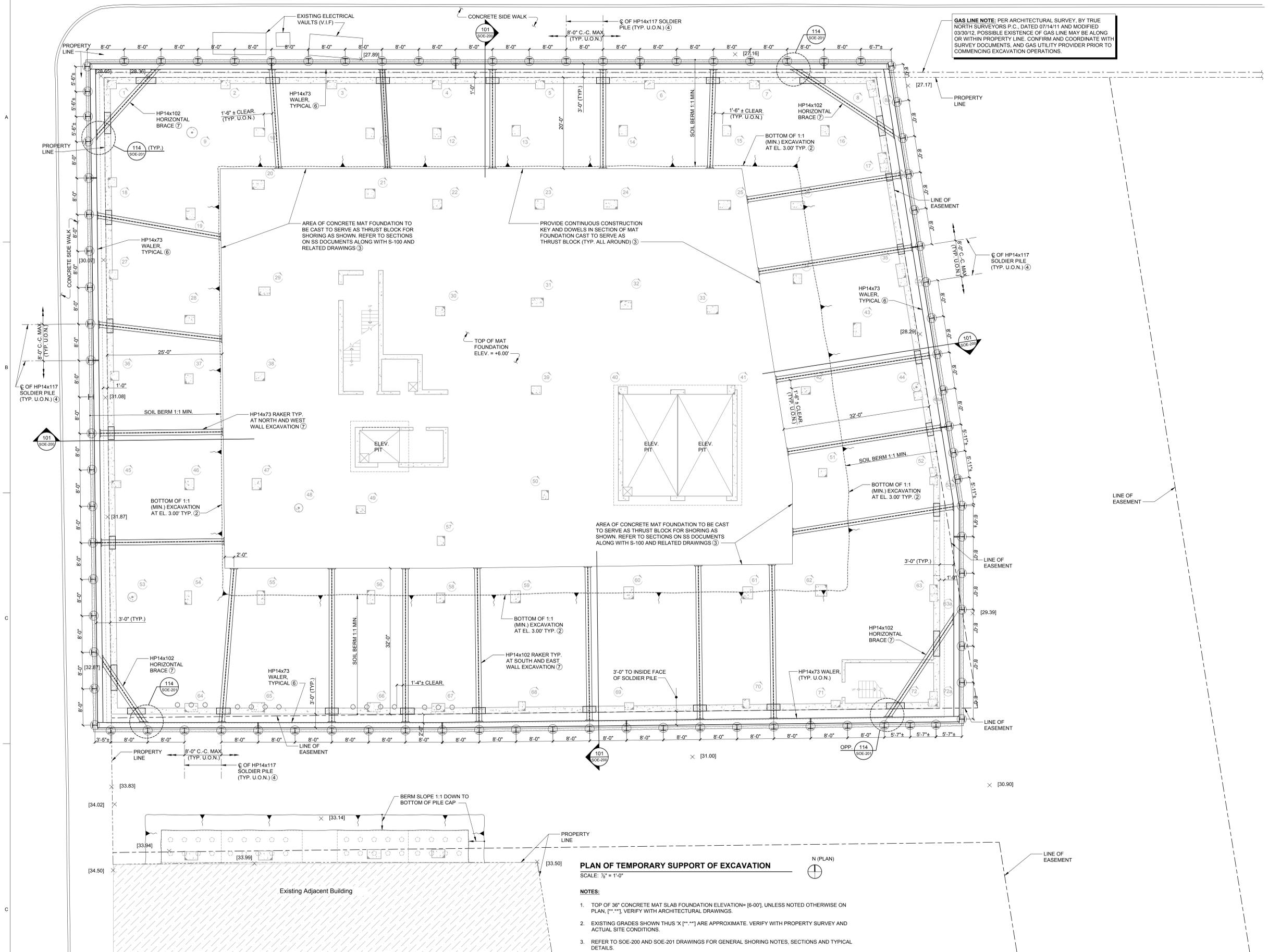


734 Walt Whitman Road,
Suite 402A
Melville, New York 11747

JOB NO.	0837-03-001
DATE	8/16/12
SCALE	N.T.S.
CHKD. BY	KLB
DRWN. BY	JJR
	KLB

RED APPLE REAL ESTATE, INC
81 FLEET PLACE, BROOKLYN, NY 11201

FIGURE 2 - SENSITIVE RECEPTORS LOCATIONS

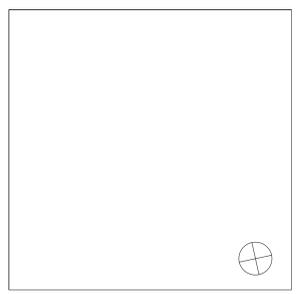


GAS LINE NOTE: PER ARCHITECTURAL SURVEY, BY TRUE NORTH SURVEYORS P.C., DATED 07/14/11 AND MODIFIED 03/30/12, POSSIBLE EXISTENCE OF GAS LINE MAY BE ALONG OR WITHIN PROPERTY LINE. CONFIRM AND COORDINATE WITH SURVEY DOCUMENTS, AND GAS UTILITY PROVIDER PRIOR TO COMMENCING EXCAVATION OPERATIONS.

PLAN OF TEMPORARY SUPPORT OF EXCAVATION
SCALE: 1/8" = 1'-0"

- NOTES:**
- TOP OF 36" CONCRETE MAT SLAB FOUNDATION ELEVATION= +6.00', UNLESS NOTED OTHERWISE ON PLAN. ("**") VERIFY WITH ARCHITECTURAL DRAWINGS.
 - EXISTING GRADES SHOWN THUS "X ("**") ARE APPROXIMATE. VERIFY WITH PROPERTY SURVEY AND ACTUAL SITE CONDITIONS.
 - REFER TO SOE-200 AND SOE-201 DRAWINGS FOR GENERAL SHORING NOTES, SECTIONS AND TYPICAL DETAILS.
 - (2) INDICATES PROPOSED SHORING SEQUENCE OF CONSTRUCTION NUMBER. SEE GENERAL NOTES ON DRAWING SOE-200.

Revisions



PLAN OF TEMPORARY SUPPORT OF EXCAVATION

Date July 13, 2012
Scale AS NOTED
Drawn By JD
Checked By ND



D.O.B. FILING SET
07/13/12

Project No. 12005.01 Seal
Sheet No. **SOE-100.00**
of _____
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GENERAL NOTES

SHORING SEQUENCE OF CONSTRUCTION - PLAN SOE-100 AND SECTION 101/SOE-200 (NOTE: SEQUENCE NUMBERS ARE NOTED THUS: ①) (ON PLAN AND SECTION)

- BEFORE INSTALLING SOLDIER PILES, CONTRACTOR SHALL VERIFY LOCATION OF, AND CLEAR, ALL UTILITY LINES UNDER SIDEWALK AND PROPERTY. REFER TO SPECIFICATIONS FOR ADDITIONAL FORMATION.
- EXCAVATE PHASE 1 BERM ON A MINIMUM SLOPE OF 1:1 TO ELEVATION 3.00' (BOTTOM OF MAT FOUNDATION) AS SHOWN ON PLAN AND SECTION.
- CAST PORTION OF MAT FOUNDATION WHICH IS TO BE UTILIZED AS THRUST BLOCK FOR RAKERS.
- INSTALL PERIMETER SOLDIER PILES AS SHOWN ON PLAN.
- EXCAVATE TO DEPTH OF TOP OF PHASE 2 BERM AS SHOWN IN SECTION. LAGGING SHALL BE CAREFULLY INSTALLED TO PREVENT DISTURBING SOIL BEHIND LAGGING. LAGGING SHALL BE PLACED FOR EACH FOOT OF EXCAVATION AS EXCAVATION PROCEEDS DOWNWARD. PROVIDE AMPLE SPACE BETWEEN LAGGING FOR BACK-PACKING WITH LEAN CONCRETE.
- INSTALL WALERS.
- INSTALL RAKERS AND HORIZONTAL BRACES. USE WEDGES TO ACCOMMODATE FOR SLACK IN SYSTEM. MONITOR SYSTEM FOR SLACK EACH DAY AND INSTALL ADDITIONAL WEDGES AS MAY BE REQUIRED.
- EXCAVATE REMAINDER OF EARTH BERM TO REQUIRED ELEVATION. HORIZONTAL TIMBER LAGGING SHALL BE CAREFULLY INSTALLED TO PREVENT DISTURBING SOIL BEHIND LAGGING. LAGGING SHALL BE PLACED FOR EACH FOOT OF EXCAVATION AS EXCAVATION PROCEEDS DOWNWARD. PROVIDE AMPLE SPACE BETWEEN LAGGING FOR BACK-PACKING WITH LEAN CONCRETE.
- ONCE EXCAVATION IS COMPLETED, THE SITE IS READY FOR BALANCE OF NEW BUILDING CONSTRUCTION.
- CONSTRUCT REMAINING PORTION OF MAT FOUNDATION.
- CAST CONCRETE FOUNDATION WALLS AND INTERIOR COLUMNS.
- CAST CELLAR SLAB AND FIRST FLOOR SLAB.
- BACKFILL BEHIND FOUNDATION WALLS TO FINISHED GRADE AFTER CONCRETE SLAB HAVE REACHED DESIGN STRENGTH.
- REMOVE RAKERS AND WALERS AFTER WALLS, CELLAR SLAB, AND FIRST FLOOR CONSTRUCTION IS COMPLETE AND REACHED FULL DESIGN STRENGTH.

GENERAL

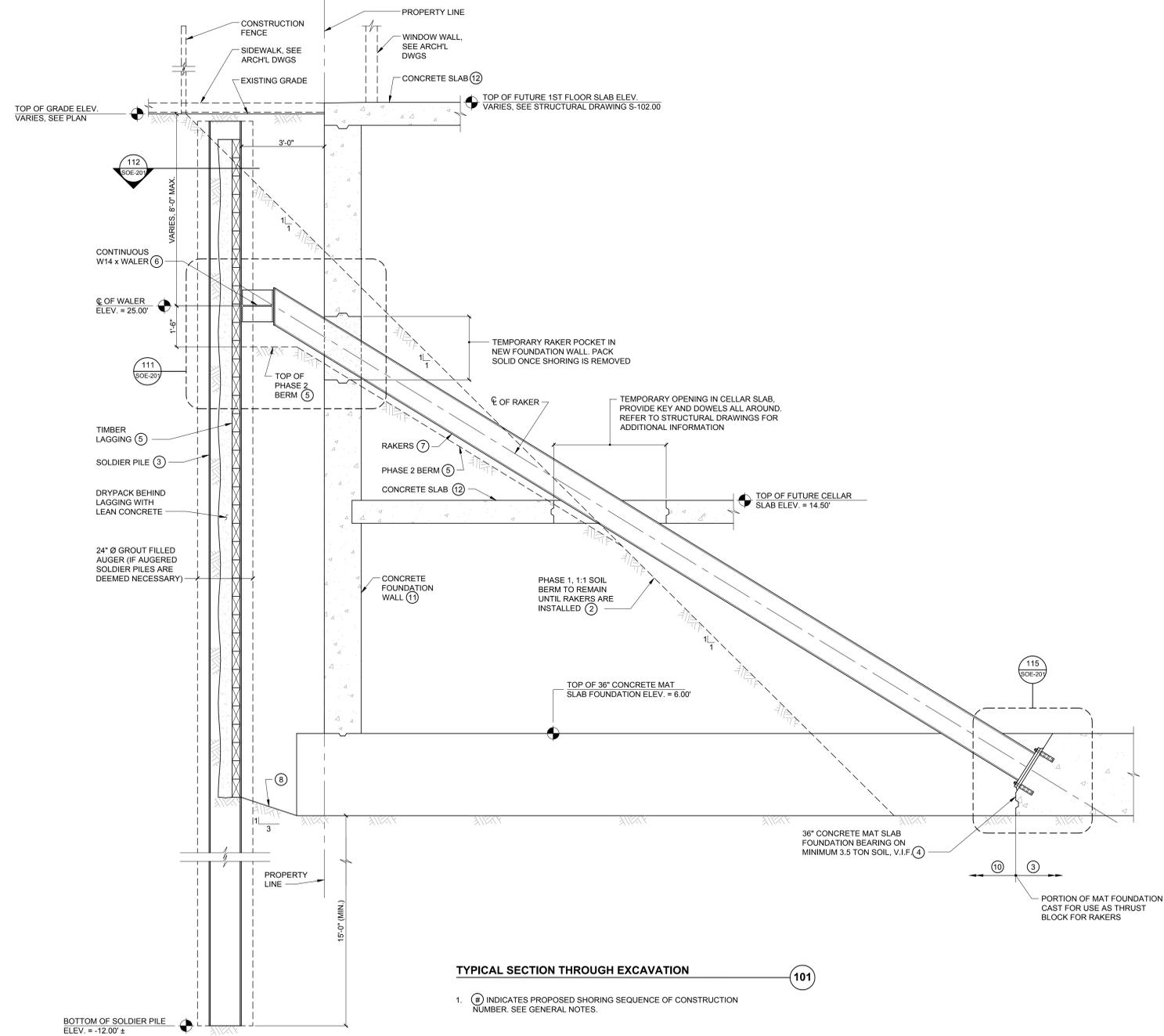
- LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. ALL LOCATIONS AND SIZES ARE BASED ON UTILITY MARK-OUTS. ABOVE GROUND STRUCTURES THAT WERE VISIBLE & ACCESSIBLE IN THE FIELD, AND THE MAPS AS LISTED IN THE REFERENCES AVAILABLE AT THE TIME OF THE SURVEY, AVAILABLE AS-BUILT PLANS AND UTILITY MARK OUT DOES NOT ENSURE MAPPING OF ALL UNDERGROUND UTILITIES AND STRUCTURES. BEFORE ANY EXCAVATION IS TO BEGIN, ALL UNDERGROUND UTILITIES SHOULD BE VERIFIED AS TO THEIR LOCATION, SIZE AND TYPE BY THE PROPER UTILITY COMPANIES.
- IF AN UNFORESEEN INTERFERENCE EXISTS BETWEEN AN EXISTING AND PROPOSED UTILITY OR STRUCTURE THE CONTRACTOR IS TO NOTIFY THE DESIGN ENGINEER SO THAT THE APPROPRIATE REVISIONS CAN BE MADE.
- THE CONTRACTOR IS TO ADHERE TO ALL APPLICABLE CONSTRUCTION SAFETY STANDARDS AS PUBLISHED IN THE CODE OF FEDERAL REGULATIONS 1926 AS AMENDED.
- NOTIFY LOCAL, STATE AND FEDERAL AGENCIES AS MAY BE REQUIRED FOR PROPOSED WORK.
- ALL EROSION CONTROLS (IF REQ'D) ARE TO BE SET IN PLACE PRIOR TO ANY LAND DISTURBANCES ON THE SITE.
- THE CONTRACTOR IS TO USE CAUTION WHEN WORKING NEAR OR UNDER OVERHEAD UTILITIES. THE CONTRACTOR IS TO NOTIFY THE UTILITY COMPANIES OF HIS INTENT PRIOR TO COMMENCEMENT OF ANY WORK.
- ANY DRAINAGE STRUCTURES, UTILITIES, DITCHES, GRASSED AREAS, PAVEMENT, CONCRETE OR CURBS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.
- THE CONTRACTOR SHALL BE SOLELY AND DIRECTLY RESPONSIBLE TO THE OWNER AND OPERATORS OF SUCH PROPERTIES FOR ANY DAMAGE, INJURY, EXPENSE, LOSS, INCONVENIENCE, DELAY, SUITS, ACTIONS OR CLAIMS OF ANY CHARACTER RESULTING FROM THE CONSTRUCTION OPERATIONS UNDER THIS CONTRACT.
- NEITHER THE OWNER, OFFICERS OR AGENTS OF THE BUSINESS SHALL BE RESPONSIBLE TO THE CONTRACTOR FOR DAMAGES AS A RESULT OF THE CONTRACTOR'S FAILURE TO PROTECT UTILITIES ENCOUNTERED IN THE COURSE OF PERFORMING WORK WHERE THE CONTRACTOR'S OPERATIONS COULD CAUSE DAMAGE OR INCONVENIENCE TO WATER, FIRE PROTECTION SYSTEMS, TELEPHONE, ELECTRIC SERVICES, SANITARY AND STORM WATER SYSTEM. THE OPERATIONS SHALL BE SUSPENDED UNTIL ALL ARRANGEMENTS NECESSARY FOR THE PROTECTION OF THESE UTILITIES AND SERVICES HAVE BEEN MADE BY THE CONTRACTOR.
- ALL WORK NOT SPECIFICALLY ASSOCIATED WITH SHORING AT 350 SNEDIKER AVENUE, BROOKLYN, NY TO BE FILED UNDER SEPARATE APPLICATION.
- THIS PLAN AND APPLICATION ARE FILED FOR APPROVAL ONLY OF THE STATED WORK APPEARING ON THE APPLICATION FORM AND DETAILED ON THE ACCOMPANYING PLANS. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON AND ARE NOT TO BE CONSTRUED AS BEING APPROVED OR IN COMPLIANCE WITH APPLICABLE CODES, RULES OR REGULATIONS. THESE MATTERS ARE SHOWN FOR INFORMATION PURPOSES ONLY.

SHORING NOTES

- THIS SHORING DESIGN IS RESTRICTED TO MAXIMUM EXCAVATIONS AS SHOWN & SOIL TYPES WITH AN ACTIVE LATERAL PRESSURE NOT EXCEEDING 40 PSF PER FOOT DEPTH.
- SURCHARGE OF 100 PSF MAX. SHALL EXIST WITHIN 25' OF THE EXCAVATION & EDGED OF EXCAVATION SHALL BE CUT BACK AS INDICATED.
- STRUCTURAL STEEL FOR ROLLED WIDE FLANGE HP SHAPES TO CONFORM TO ASTM A-572, 50 ksi. STRUCTURAL STEEL FOR ALL OTHER SHAPES, PLATES RODS AND BARS TO CONFORM TO ASTM-A36, 36 ksi.
- ALL FASTENERS TO BE FULLY TORQUED A325-X BOLTS IN ACCORDANCE WITH A.I.S.C. REQUIREMENTS.
- SHORING SYSTEM TO BE FULLY ASSEMBLED INCLUDING DIAGONAL BRACES, (IF REQ'D) BEFORE BEING SUBJECT TO GROUND PRESSURE.
- INSTALLATION OF SOLDIER BEAMS & TIMBER TO BE IN ACCORDANCE WITH ALL O.S.H.A. REGULATIONS.
- ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW YORK CITY BUILDING CODE.
- TIMBER LAGGING TO BE 4"x10" UNDRRESSED, NEW OR USED, WITH MIN. Fy=1950 psi IN GOOD SERVICEABLE CONDITION (ALL TIMBER LAGGING TO BE LEFT IN PLACE AFTER COMPLETION OF PROJECT TO BE PRESSURE TREATED)

N.Y.C.D.O.B. NOTES

- CONTRACTOR SHALL TAKE NOTICE OF THE REQUIREMENTS CONTAINED IN IRCNY SECTION 52-01 FOR EXCAVATIONS AND EARTHWORK AND SHALL FULLY COMPLY WITH EACH AND EVERY ONE OF SAID REQUIREMENTS THROUGHOUT THE PROJECT. CONTRACTOR SHALL REFER TO BIS WEBSITE AT WWW.NYC.GOV/BUILDINGS FOR ADDITIONAL INFORMATION.
- UNLESS SPECIFICALLY NOTED OTHERWISE, DENARDIS ENGINEERING LLC IS RETAINED SOLELY TO PROVIDE PLANS FOR THE SUBJECT PROJECT AND RESPONSIBILITY IS THEREBY LIMITED TO THE ACCURACY OF THESE DRAWINGS.
- THE INSPECTING ENGINEER IS NOT RESPONSIBLE FOR ANY WORK PERFORMED WITHOUT PRIOR WRITTEN NOTICE TO THE ENGINEER NOR FOR ANY UNINSPECTED OR UNACCEPTABLE WORK.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED WORK PERMITS FOR ALL WORK SHOWN ON PLANS PRIOR TO START OF WORK.



TYPICAL SECTION THROUGH EXCAVATION 101

- ① INDICATES PROPOSED SHORING SEQUENCE OF CONSTRUCTION NUMBER. SEE GENERAL NOTES.

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Brooklyn, NY 11201

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Revisions

Key Plan

GENERAL NOTES AND SECTION

Date July 13, 2012
Scale 1/2" = 1'-0"
Drawn By JD
Checked By ND

Project No. 12005.01 Seal

Sheet No. **SOE-200.00**
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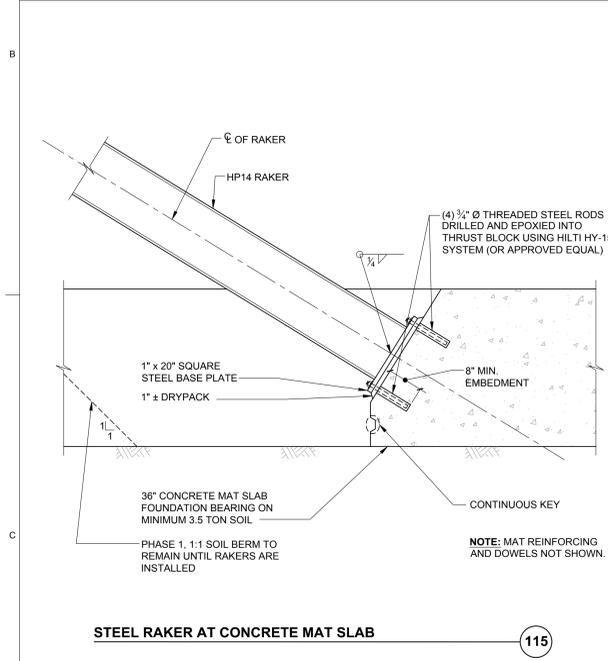
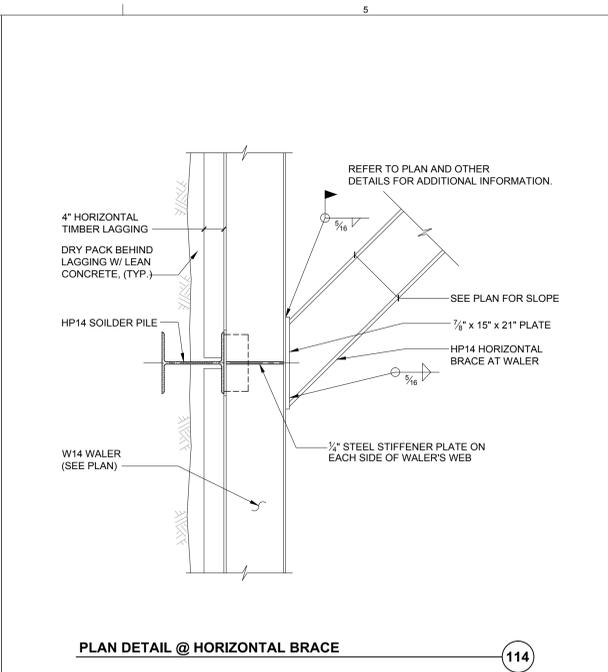
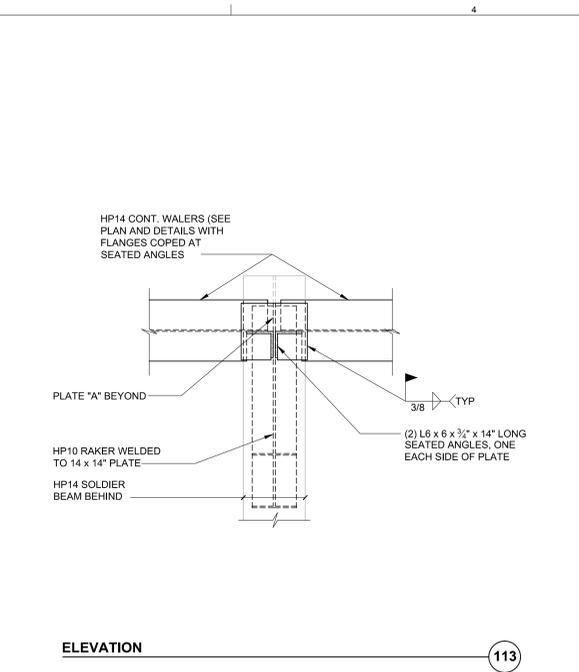
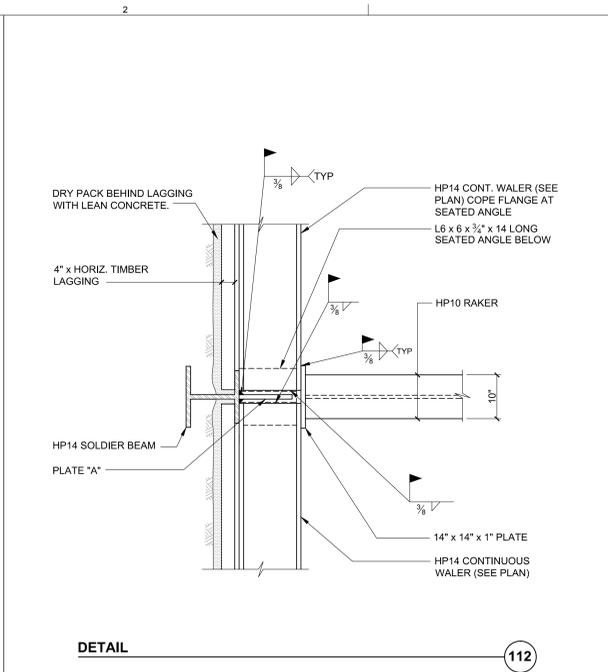
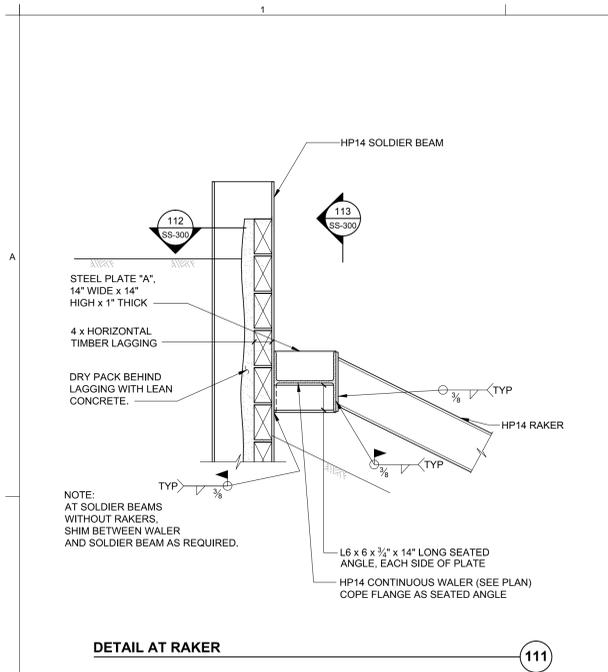
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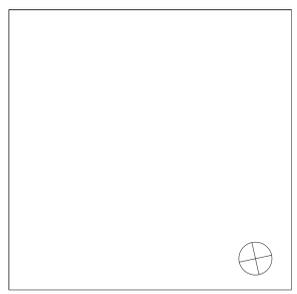
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Revisions



SHORING DETAILS

Date July 13, 2012
Scale 3/4" = 1'-0"
Drawn By JD
Checked By ND



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TABLES

**ANALYTICAL RESULTS FOR SOIL
ANALYTICAL RESULTS FOR GOUNDWATER
ANALYTICAL RESULTS FOR SOIL VAPOR**

Consultant	Unrestricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8a)	Restricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8b) - Residential	Langan												Galli					
			LEG 13	LEG 13	LEG 14	LEG 14	LEG 15	LEG 15	LEG 16	LEG 16	LEG 17	LEG 17	LEG 18	LEG 18	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10
Sample Identification			0-6	22-24	0-10	20-22	0-4	20-22	0-4	18-20	0-10	22-24	0-4	20-23	0-20	0-20	0-20	0-20	0-20	0-20
Sample Depth			4/3/2007	4/3/2007	4/2/2007	4/3/2007	3/30/2007	3/30/2007	4/13/2007	4/13/2007	3/26/2007	3/26/2007	4/23/2007	4/23/2007	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Date			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Matrix			Volatile Organic Compounds (ug/kg)																	
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	270	19,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	19 J	NA	NA	NA	NA
1,2-Dichloroethane	20	230	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2400	17,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1800	9,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-Hexanone			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Acetone	50	100,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17 J	20 J	19 J	15 J	17 J	14 J
Benzene	60	2,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Bromodichloromethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Bromomethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	760	1,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1,100	100,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	370	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Dichlorobenzene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1,000	30,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m&p-Xylene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Methylbenzene	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	120	100,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl t-butyl ether (MTBE)	930	62,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylacetate			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	50	51,000	5.2 J	ND	7.8 J	9.1 J	5.7 J	6.2 J	4.9 J	8.2 J	4.6 J	5.4 J	5.1 J	5.9 J	7.1 J	7 J	6.9 J	5.6 J	5.9 J	7 J
o-Xylene	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Styrene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	5,500	ND	ND	ND	ND	ND	ND	11.5	ND										
Toluene	700	100,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28 J	0.35 J	0.32 J	0.45 J	0.41 J	0.29 J
Total Xylenes	260	100,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND
Trichloroethene	470	10,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorotrifluoroethane			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	20	210	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES/Legend:

ND (non detect) = (flag U) Analyte included in the analysis, but not detected;

J = Detected but below the ReportingLimit; therefore, result is an estimated concentration

NA = Not Analyzed

Yellow highlight = Result is above Restricted Use Residential SCO; Red highlight = Result is above Unrestricted SCO

Consultant	Unrestricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8a)	Restricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8b) - Residential	Langan												Galli					
			LEG 13	LEG 13	LEG 14	LEG 14	LEG 15	LEG 15	LEG 16	LEG 16	LEG 17	LEG 17	LEG 18	LEG 18	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10
Sample Identification	0-6	22-24	0-10	20-22	0-4	20-22	0-4	18-20	0-10	22-24	0-4	20-23	0-20	0-20	0-20	0-20	0-20	0-20		
Sample Depth	4/3/2007	4/3/2007	4/2/2007	4/3/2007	3/30/2007	3/30/2007	4/13/2007	4/13/2007	3/26/2007	3/26/2007	4/23/2007	4/23/2007	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010		
Sample Date	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix	Semivolatile Organic Compounds (ug/kg)																			
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
2,3,4,6-tetrachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
2-Methylphenol (o-cresol)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
2-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
3&4-Methylphenol (m&p-cresol)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
3,3'-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4-Chloroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
4-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,2-Benzphenanthrene	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
1-Methylnaphthalene	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
2-Methylnaphthalene	-	-	ND	ND	97.2 J	ND														
2,4-Dinitrophenol	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
3,5,5-Trimethyl-2-Cyclohexene-1-One	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
4-Methylphenol	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Acenaphthene	20,000	100,000	ND	ND	326 J	ND	28.5 J	ND	ND	ND	ND	ND	ND	45,000	ND	ND	ND	17 J		
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aniline	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
Acetophenone	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Anthracene	100,000	100,000	92 J	ND	920	ND	83.8	ND	ND	ND	184 J	ND	153 J	ND	67,000	ND	ND	46 J		
Benzaldehyde	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Benzo(a)Anthracene	1,000	1,000	347 J	ND	1,710	ND	222 J	ND	35.5 J	ND	241 J	ND	497 J	ND	79,000	ND	ND	180 J		
Benzo(a)Pyrene	1,000	1,000	316 J	ND	1,370	ND	201 J	ND	28.1 J	ND	211 J	ND	410 J	ND	66,000	ND	ND	150 J		
Benzo(b)Fluoranthene	1,000	1,000	272 J	ND	1,230	ND	168 J	ND	ND	ND	228 J	ND	342 J	ND	78,000	20 J	ND	210 J		
Benzo(g,h,i)Perylene	100,000	100,000	196 J	ND	687	ND	103 J	ND	ND	ND	132 J	ND	208 J	ND	36,000	ND	ND	100 J		
Benzo(k)Fluoranthene	800	1,000	260 J	ND	1,180	ND	182 J	ND	ND	ND	199 J	ND	382 J	ND	33	ND	ND	79 J		
Benzyl Butyl Phthalate	-	-	ND	ND	219 J	ND														
Bis(2-Ethylhexyl)Phthalate	-	-	ND	ND	147 J	ND														
Bis(2-chloroethoxy)methane	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Bis(2-chloroethyl)ether	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Bis(2-chloroisopropyl)ether	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Caprolactam	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Carbazole	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30,000	ND	ND	ND	25 J		
Chrysene	1,000	1,000	337 J	ND	1,650	ND	226 J	ND	35 J	ND	306	ND	518 J	ND	77,000	ND	ND	190 J		
Dibenz(a,h)Anthracene	330	330	ND	ND	72.9 J	ND	7,200	ND	ND	ND	ND									
Diethyl Phthalate	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Di-N-Butylphthalate	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Di-n-octylphthalate	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA		
Dibenzofuran	-	-	ND	ND	225 J	ND	29,000	ND	ND	ND	ND									
Dimethylphthalate	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Fluoranthene	100,000	100,000	764	ND	3,720	ND	497	ND	59.7 J	ND	620	ND	1,050	ND	190,000	33 J	ND	410		
Fluorene	30,000	100,000	ND	ND	391 J	ND	27.9	ND	ND	ND	ND	ND	ND	39,000	ND	ND	ND	18 J		
Hexachlorobenzene	330	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Hexachlorobutadiene	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Hexachlorocyclopentadiene	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Hexachloroethane	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Indeno(1,2,3-cd)Pyrene	500	500	214 J	ND	798	ND	103 J	ND	ND	ND	123 J	ND	199 J	ND	42,000	ND	ND	93 J		
Isophorone	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Naphthalene	12,000	100,000	ND	ND	149 J	ND	35,000	ND	ND	ND	ND									
Nitrobenzene	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
N-Nitrosodimethylamine	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
N-Nitrosodi-n-propylamine	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
N-Nitrosodiphenylamine	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
p-Chloroaniline	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND		
Pentachlorophenol	800	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Phenanthrene	100,000	100,000	472 J	ND	3,530	ND	328	ND	ND	ND	328	ND	772	ND	210,000	22 J	ND	260 J		
Phenol	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Pyrene	100,000	100,000	735	ND	3,760	ND	504	ND	58.7 J	ND	656	ND	1,150	ND	170,000	29 J	ND	350		

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Consultant	Unrestricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8a)	Restricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8b) - Residential	Langan												Galli					
			LEG 13	LEG 13	LEG 14	LEG 14	LEG 15	LEG 15	LEG 16	LEG 16	LEG 17	LEG 17	LEG 18	LEG 18	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10
Sample Identification			0-6	22-24	0-10	20-22	0-4	20-22	0-4	18-20	0-10	22-24	0-4	20-23	0-20	0-20	0-20	0-20	0-20	0-20
Sample Depth			4/3/2007	4/3/2007	4/2/2007	4/3/2007	3/30/2007	3/30/2007	4/13/2007	4/13/2007	3/26/2007	3/26/2007	4/23/2007	4/23/2007	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Date			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Matrix			Metals (mg/kg)																	
Cyanide	27	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Aluminum	-	-	3,590	2,890	7,880	7,830	10,600	4,840	7,390	3,150	4,580	3,220	5,840	5,260	4,970	5,200	4,880	2,640	3,560	3,340
Antimony	-	-	0.527 J	0.434 J	1.04 J	1.27 J	1.48 J	0.415 J	ND	0.423 J	0.801 J	0.449 J	0.764 J	0.689 J	ND	19.9	ND	ND	ND	ND
Arsenic	13	16	0.861 J	1.15 J	2.31	2.82	3.51 J	1.62 J	0.523 J	0.288 J	2.34 J	1.36 J	3.76	2.4	5.1J	1.9 J	5.5 J	ND	ND	9.2
Barium	350	350	32.2	28.6	74.5	53.3	94.5	24.3	43.1	23.5	141	27	156	42.4	906	33.6	34.7	21.7	27.2	35.2
Beryllium	7.2	14	0.279 J	0.24 J	0.37 J	0.641	0.438	0.15 J	0.29 J	0.152 J	0.284 J	0.263	0.281 J	0.27 J	0.33 J	0.32 J	0.25 J	0.17 J	0.26 J	0.26 J
Cadmium	2.5	2.5	0.027 J	0.0324 J	0.113 J	0.0861 J	0.159 J	0.0881 J	0.356 J	0.228 J	0.189 J	ND	0.382 J	0.0408 J	0.85 J	ND	ND	ND	ND	ND
Calcium	-	-	1,680	4,460	4,520	7,120	3,890	2,030	2,360	6,160	6,890	5,530	3,690	11,900	12,200	1,320	3,160	949	1,050	3,820
Chromium (Total)	-	-	11.1	6.62	15.8	20.7	20.8	7.16	12.4	17.5	13.5	5.92	11.8	28.7	26.1	9	11.2	4.3	8.4	13.5
Cobalt	-	-	4.05	2.83	5.56	7.31	6.74	2.96	5.35	8.32	4.32	2.59	3.76	7.27	5.6	4	4.3	2.6	4.8	11.6
Copper	50	270	19.4	4.88	17.9	15.8	22.4	10.4	15.8	6.82	17.8	6.33	23.3	14.2	34.1	10.9	15.8	6.9	11.6	73.7
Iron	-	-	9,310	5,840	13,100	14,400	22,500	7,700	13,300	7,540	8,830	6,250	10,100	12,400	10,700	8,810	8,840	5,640	7,350	17,100
Lead	63	400	3.52	2.29	87.3	6.9	166	3.71	30.7	4.19	181	3.01	132	5.04	584	19.9	5	2.4	13.7	33.3
Magnesium	-	-	2,770	2,490	2,530	10,700	2,860	1,860	2,350	9,880	4,250	2,830	1,360	12,600	5,980	2,590	4,950	1,710	4,800	5,890
Manganese	1,600	2,000	207	159	250	397	324	209	222	230	265	161	204	255	325	188	105	181	227	234
Nickel	30	140	25.5	10.3	19.9	49.8	24.6	14.2	19.2	119	30.9	6.92	10.5	101	51.7	18	30	8.6	44.3	61.1
Potassium	-	-	730	606	1,740	3,660	1,270	646	841	684	966	614	616	1,230	855	580	1,210	350	601	560
Selenium	3.9	36	ND	ND	ND	ND	ND	ND	ND	0.575 J	ND	ND	ND	ND	ND	3.3 J	ND	ND	ND	ND
Silver	2	36	ND	ND	ND	1.05	ND	ND	21.3	11.5	ND									
Sodium	-	-	189	97.2	106	282	98.5	327	196	130	178	124	69.4	238	209	107	403	70.3	89.2 J	104 J
Thallium	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	-	-	15.4	7.39	22	25.1	26.1	14.8	17	9.28	13.6	9.89	16.3	18.3	17.4	12.5	15.2	5.9	8.9	10.9
Zinc	109	2,200	18.3	17.2	76.9	62.1	82.1	17.9	34.3	18.9	83.5	15.4	142	24	371	27.7	25.8	12.6	29.6	42.7
Mercury	0.18	0.81	ND	ND	0.0925	ND	0.304	ND	0.0503	ND	0.269	ND	0.228	ND	0.54	0.023 J	ND	ND	0.068	0.14

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Consultant	Unrestricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8a)	Restricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8b) - Residential	Langan												Galli					
			LEG 13	LEG 13	LEG 14	LEG 14	LEG 15	LEG 15	LEG 16	LEG 16	LEG 17	LEG 17	LEG 18	LEG 18	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10
Sample Identification			0-6	22-24	0-10	20-22	0-4	20-22	0-4	18-20	0-10	22-24	0-4	20-23	0-20	0-20	0-20	0-20	0-20	0-20
Sample Depth			4/3/2007	4/3/2007	4/2/2007	4/3/2007	3/30/2007	3/30/2007	4/13/2007	4/13/2007	3/26/2007	3/26/2007	4/23/2007	4/23/2007	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Date			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Matrix			PCBs (ug/kg)																	
PCB-1016			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.4 J	ND	ND	ND	ND	ND
PCB-1260	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.3 J	ND	ND	ND	ND	ND
Total PCBs	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Consultant	Unrestricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8a)	Restricted Use Soil Cleanup Objectives (6 NYC RR Pt. 375-6.8b) - Residential	Langan												Galli					
			LEG 13	LEG 13	LEG 14	LEG 14	LEG 15	LEG 15	LEG 16	LEG 16	LEG 17	LEG 17	LEG 18	LEG 18	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10
Sample Identification			0-6	22-24	0-10	20-22	0-4	20-22	0-4	18-20	0-10	22-24	0-4	20-23	0-20	0-20	0-20	0-20	0-20	0-20
Sample Depth			4/3/2007	4/3/2007	4/2/2007	4/3/2007	3/30/2007	3/30/2007	4/13/2007	4/13/2007	3/26/2007	3/26/2007	4/23/2007	4/23/2007	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
Sample Date			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Matrix			Pesticides (ug/kg)																	
4,4'-DDD	3.3	2600	ND	ND	3.75 J	ND	5.71 J	ND	ND	ND	ND	ND	13.2 J	ND	15	ND	ND	ND	ND	ND
4,4'-DDE	3.3	1,800	ND	ND	6.15 J	ND	3.58 J	ND	ND	ND	ND	ND	60.9	ND	17	ND	ND	ND	ND	ND
4,4'-DDT	3.3	1,700	ND	ND	53.2	ND	72.1	ND	ND	ND	ND	ND	209	ND	45	ND	ND	ND	ND	ND
Aldrin	5	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	94	910	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	418	ND						
alpha-BHC	20	97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	36	72	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	40	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	5	0.039	ND	ND	ND	ND	1.62 J	ND	ND	ND	ND	ND	23.9	ND						
Endosulfan I	2,400	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2,400	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8 J	ND	ND	ND	ND	ND
Endosulfan Sulfate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	14	2,200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.4	ND	ND	ND	ND	ND
Endrin Aldehyde	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1	ND	ND	ND	ND	ND
Endrin Ketone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	100	280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha-Chlordane	94	91	ND	ND	8.73 J	ND	ND	ND	13.4 J	NA	NA	NA	132	ND	ND	0.76 J	ND	ND	ND	ND
gamma-Chlordane	-	-	ND	ND	6.92 J	ND	ND	ND	15.5 J	ND	ND	ND	63.8	ND	1.7 J	ND	ND	ND	ND	ND
Heptachlor	42	42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.84 J	ND	ND	ND	ND	ND
Methoxychlor	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12 J	ND	ND	ND	ND	ND
Toxaphene			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND

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Consultant		Langan		Galli	
		MW 15	MW 17	MW 3	MW 4
Sample Identification	NYS Ambient Water Quality Standards	-	-	-	-
Sample Depth		4/26/2007	4/7/2007	4/23/2010	4/23/2010
Sample Date		Water	Water	Water	Water
Sample Matrix		Volatile Organic Compounds (ug/L)			
1,1,1-Trichloroethane		ND	ND	ND	ND
1,1,2,2-Tetrachloroethane		ND	ND	ND	ND
1,1,2-Trichloroethane		NA	NA	ND	ND
1,1-Dichloroethane		ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND
1,2,3-Trichlorobenzene		NA	NA	NA	NA
1,2,4-Trichlorobenzene		ND	ND	ND	ND
1,2-Dichlorobenzene		ND	ND	NA	NA
1,2-Dichloroethane		ND	ND	ND	ND
1,2-Dichloropropane		NA	NA	ND	ND
1,3-Dichlorobenzene		ND	ND	NA	NA
1,3-Dichloropropane		ND	ND	NA	NA
1,4-Dichlorobenzene		ND	ND	NA	NA
2-Hexanone		NA	NA	ND	ND
4-Methyl-2-pentanone (MIBK)		ND	ND	ND	ND
Acetone	50	ND	ND	ND	1.0 J
Benzene	1	ND	ND	ND	ND
Bromochloromethane		ND	ND	NA	NA
Bromodichloromethane		NA	NA	ND	ND
Bromoform		NA	NA	ND	ND
Bromomethane		NA	NA	ND	ND
Carbon Disulfide		ND	ND	ND	ND
Carbon tetrachloride		ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND
Chlorodibromomethane	50	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND
Chloroform	7	3.8	ND	4.5 J	8.7
Chloromethane		NA	NA	ND	ND
cis-1,2-Dichloroethene		NA	NA	ND	ND
cis-1,3-Dichloropropene		NA	NA	ND	ND
trans-1,3-Dichloropropene		NA	NA	ND	ND
Dibromochloromethane		ND	ND	ND	ND
m-Dichlorobenzene	3	ND	ND	NA	NA
Dichloromethane	5	ND	ND	NA	NA
Ethylbenzene	5	ND	ND	ND	ND
Freon (Chloriated Fluorocarbon)	5	ND	ND	NA	NA
Methylbenzene (Toluene)	5	ND	ND	ND	ND
Methyl ethyl ketone (2-Butanone)		ND	ND	ND	ND
Methyl t-butyl ether (MTBE)		NA	NA	NA	NA
Methylene chloride	5	ND	ND	ND	ND
Styrene		NA	NA	ND	ND
Tetrachloroethene	5	33.2	2.8	5.1	24
trans-1,2-Dichloroethene		ND	ND	ND	ND
trans-1,3-Dichloropropene		NA	NA	ND	ND
Trichloroethene	5	0.5 J	ND	ND	ND
Vinyl chloride	2	ND	ND	ND	ND
Xylenes Total	5			ND	ND
o-Xylene		ND	ND	ND	ND
m,p-Xylene		ND	ND		

NOTES/Legend:

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Blank or NA = Not Analyzed

Red highlight = Result is above Ambient Groundwater Standards Class GA

Consultant		Langan		Galli	
		MW 15	MW 17	MW 3	MW 4
Sample Identification	NYS Ambient Water Quality Standards	-	-	-	-
Sample Depth					
Sample Date		4/26/2007	4/7/2007	4/23/2010	4/23/2010
Sample Matrix		Water	Water	Water	Water
Semi-Volatile Organic Compounds (ug/L)					
1,2,4-Trichlorobenzene		ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND
2,4,5-Trichlorophenol		ND	ND	ND	ND
2,4,6-Trichlorophenol		NA	NA	ND	ND
2,4-Dichlorophenol		ND	ND	ND	ND
2,4-Dimethylphenol		NA	NA	ND	ND
2,4-Dinitrophenol	10	ND	ND	ND	ND
2,4-Dinitrotoluene	5	NA	NA	ND	ND
2,6-Dinitrotoluene	5	ND	ND	ND	ND
2-Chloronaphthalene	10	NA	NA	ND	ND
2-Chlorophenol		ND	ND	ND	ND
2-Methylnaphthalene	-	ND	ND	ND	ND
2-Methylphenol (o-cresol)		ND	ND	ND	ND
2-Nitroaniline	5	ND	ND	ND	ND
2-Nitrophenol		ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)		ND	ND	ND	ND
3-Nitroaniline	5	ND	ND	ND	ND
3,5,5-Trimethyl-2-Cyclohexene-1-One	50	ND	ND	NA	NA
4-Bromophenyl phenyl ether		NA	NA	ND	ND
4-Chloro-3-methylphenol		ND	ND	ND	ND
4-Chloroaniline		ND	ND	ND	ND
4-Chlorophenyl phenyl ether		NA	NA	ND	ND
4-Methylphenol	1	ND	ND	ND	ND
4-Nitroaniline	5	NA	NA	ND	ND
4-Nitrophenol		ND	ND	ND	ND
Acenaphthene	20	ND	ND	ND	ND
Acenaphthylene		ND	ND	ND	ND
Anthracene	50	ND	ND	ND	ND
Atrazine	7.5	NA	NA	NA	NA
Benz(a)anthracene	0.002	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	0.002	ND	ND	ND	ND
Benzo(ghi)perylene	-	ND	ND	ND	ND
Benzo(k)fluoranthene	0.002	ND	ND	ND	ND
Benzyl butyl phthalate	50	ND	ND	ND	ND
Bis(2-chloroethoxy)methane		NA	NA	ND	ND
Bis(2-chloroethyl)ether	1	NA	NA	ND	ND
Bis(2-ethylhexyl)phthalate	5	ND	ND	ND	ND
Carbazole		NA	ND	ND	ND
P-Chloroaniline		ND	ND	ND	ND
Chrysene	0.002	ND	ND	ND	ND
Dibenz(a,h)anthracene		ND	ND	ND	ND
Dibenzofuran		ND	ND	ND	ND
Diethyl phthalate	50	ND	ND	ND	ND
Dimethylphthalate	50	ND	ND	ND	ND
Di-n-butylphthalate	50	ND	ND	ND	ND
Di-n-octylphthalate		ND	ND	ND	ND
Fluoranthene	50	ND	ND	ND	ND
Fluorene	50	ND	ND	ND	ND
Hexachlorobenzene	0.04	ND	ND	ND	ND
Hexachlorobutadiene		NA	NA	ND	ND
Hexachlorocyclopentadiene	5	NA	NA	ND	ND
Hexachloroethane	0.5	NA	NA	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	ND	ND	ND	ND
Isophorone	50	ND	ND	ND	ND
Naphthalene	10	ND	ND	ND	ND
Nitrobenzene	0.4	ND	ND	ND	ND
N-Nitrosodi-n-propylamine		NA	NA	ND	ND
N-Nitrosodiphenylamine		NA	NA	ND	ND
Pentachlorophenol	1	ND	ND	ND	ND
Phenanthrene	50	ND	ND	ND	ND
Phenol	1	ND	ND	ND	ND
Pyrene	50	ND	ND	ND	ND

NOTES/Legend:

ND (non detect) = (flag U) Analyte included in the analysis, but not detected;

J = Detected but below the ReportingLimit; therefore, result is an estimated concentration

Blank or NA = Not Analyzed

Red highlight = Result is above Ambient Groundwater Standards Class GA

Consultant		Langan		Galli	
Sample Identification	NYS Ambient Water Quality Standards	MW 15	MW 17	MW 3	MW 4
Sample Depth		-	-	-	-
Sample Date		4/26/2007	4/7/2007	4/23/2010	4/23/2010
Sample Matrix		Water	Water	Water	Water
Metals (mg/L)					
Cyanide	200	NA	NA	NA	NA
Aluminum	-	1,400	887	181,000	104,000
Antimony	3	4.6 J	11.6	75.0 U	75.0 U
Arsenic	25	2.5 U	2.2	35 J	75.0 U
Barium	1,000	189	74.6	2,510	1,530
Beryllium	3	1 U	0.6	14.7	8.1
Cadmium	5	0.2 U	0.2	25.0 U	25.0 U
Calcium	-	130,000	61,000	173,000	267,000
Chromium (Total)	50	5.4	10.4	475	318
Cobalt	-	1.5 U	0.2	256	168
Copper	200	4.8 J	8.6	711	396
Iron	300	1,490	1,370	333,000	199,000
Lead	25	15.2	7.5	741	285
Magnesium	35,000	28,400	14,100	175,000	209,000
Manganese	300	169	187	32,200	7,950
Nickel	100	5.8	7.4	745	1,270
Potassium	-	9,430	10,100	56,400	40,700
Selenium	10	5 U	8	190 U	190 U
Silver	50	2 U	3.2	5.6 J	1.8 J
Sodium	20,000	35,400	40,700	56,300	119,000
Thallium	0.5	5.9 J	2.6	75.0 U	75.0 U
Vanadium	-	4.6 J	3.8	387	254
Zinc	2,000	21.4	31.9	1,390	986
Mercury	0.7	0.08 U	0.04	0.76	0.3

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Sample Identification	NYS Ambient Water Quality Standards	MW 15	MW 17	MW 3	MW 4
Sample Depth		-	-	-	-
Sample Date		4/26/2007	4/7/2007	4/23/2010	4/23/2010
Sample Matrix		Water	Water	Water	Water
Pesticides (ug/L)					
4,4'-DDD	0.3	NA	NA	ND	ND
4,4'-DDE	0.2	NA	NA	ND	ND
4,4'-DDT	0.2	NA	NA	ND	0.039 J
Aldrin		NA	NA	ND	ND
alpha-Chlordane	0.05	NA	NA	ND	0.013 J
gamma-Chlordane		NA	NA	ND	ND
Chlordane	0.05	NA	NA		
alpha-BHC		NA	NA	ND	0.012 J
beta-BHC		NA	NA	ND	ND
delta-BHC	-	NA	NA	ND	0.0066 J
Dieldrin	0.004	NA	NA	ND	ND
Endosulfan I	0.009	NA	NA	ND	0.02 J
Endosulfan II	0.009	NA	NA	ND	0.015 J
Endosulfan sulfate		NA	NA	ND	ND
Endrin	0.2	NA	NA	ND	0.048 J
Endrin aldehyde	5	NA	NA	ND	ND
Endrin ketone		NA	NA	ND	ND
gamma-BHC (Lindane)	-	NA	NA	ND	0.012 J
Heptachlor	0.04	NA	NA	ND	0.035 J
Heptachlor Epoxide	0.03	NA	NA	ND	ND
Methoxychlor	35	NA	NA	ND	ND
Toxaphene		NA	NA	ND	ND

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Consultant		Langan		Galli	
Sample Identification	NYS Ambient Water Quality Standards	MW 15	MW 17	MW 3	MW 4
Sample Depth		-	-	-	-
Sample Date		4/26/2007	4/7/2007	4/23/2010	4/23/2010
Sample Matrix		Water	Water	Water	Water
PCBs (ug/L)					
PCB-1016		ND	ND	ND	ND
PCB-1221		ND	ND	ND	ND
PCB-1232		ND	ND	ND	ND
PCB-1242		ND	ND	NA	NA
PCB-1248		ND	ND	ND	ND
PCB-1254		ND	ND	ND	ND
PCB-1260		ND	ND	ND	ND
PCB-1262		ND	NA	NA	NA
PCB-1268		ND	NA	NA	NA
Total PCBs	0.09	-	-	-	-

NOTES/Legend:

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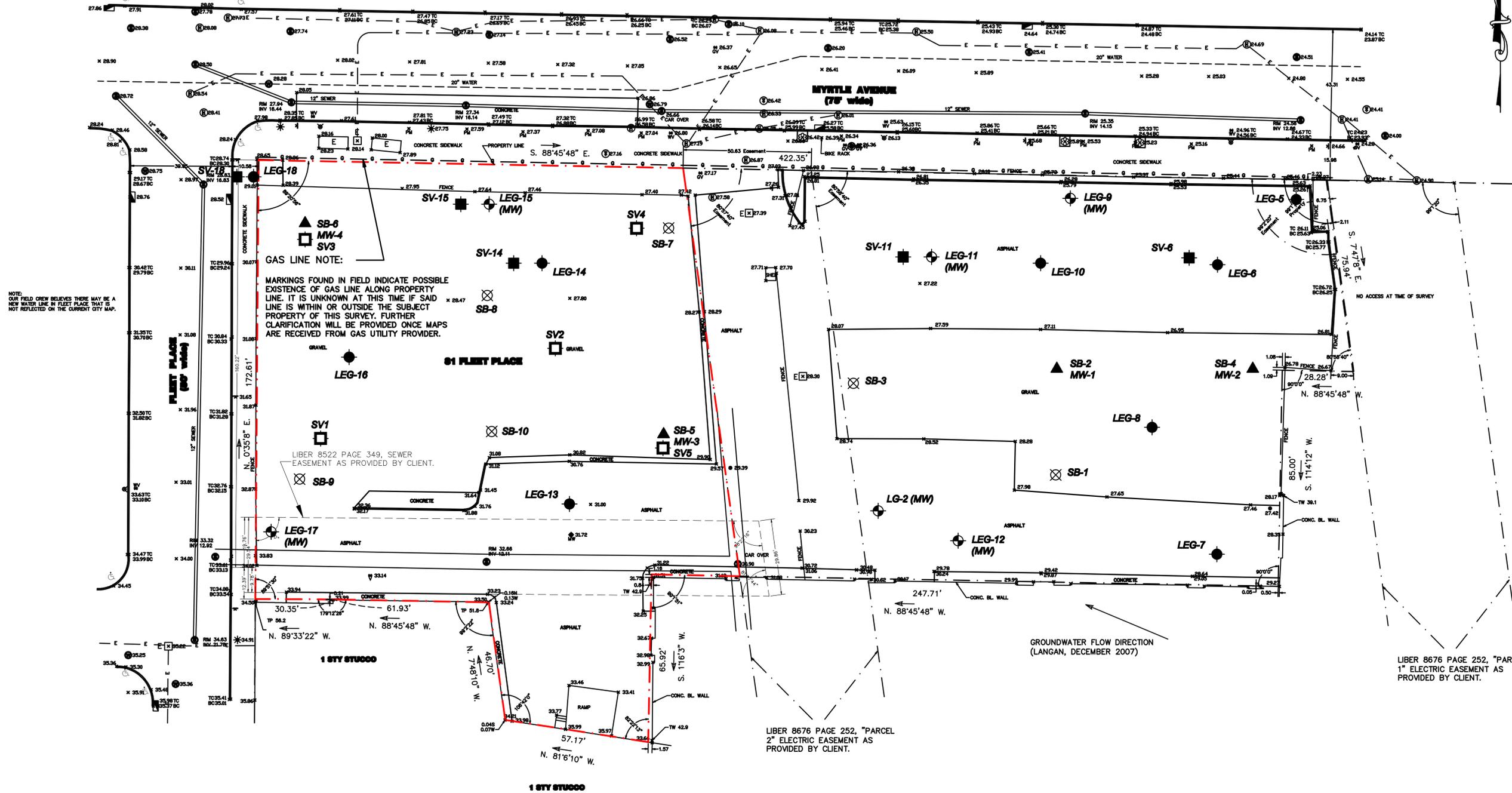
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Sample Designation	Galli					Langan		
	SV-1	SV-2	SV-3	SV-4	SV-5	SV-14	SV-15	SV-18
	Soil Vapor							
Sample Matrix	Aug. 20120	Dec. 2007	Dec. 2007	Dec. 2007				
Sample Date	Aug. 20120	Dec. 2007	Dec. 2007	Dec. 2007				
Units	ug/m ³							
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	37.50	628.80
Benzene	ND	ND	100.00	ND	ND	23.6 J	6.20	8.50
Chloromethane	ND							
Vinyl Chloride	ND							
Bromomethane	ND							
Chloroethane	ND	214.10						
Acetone	1700.00	2800.00	1500.00	1300.00	1200.00	457.70	359.40	ND
Trichlorofluoromethane	560.00	580.00	ND	1100.00	350.00	352.90	19.10	9.8 J
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	34.90	905.20
Methylene Chloride	ND	3.5 J						
1,1,2-Trichloro-1,2,2-trifluoroethane	ND							
Carbon Tetrachloride	ND							
Carbon Disulfide	ND	ND	90.00	ND	ND	74.70	2.0 J	5.9 J
trans-1,2-Dichloroethene	ND							
Methyl tert-Butyl Ether	ND	ND	ND	ND	ND	ND	1.5 J	ND
Vinyl Acetate	ND							
2-Butanone	ND	ND	91.00	ND	ND	198.80	65.10	20.90
cis-1,2-Dichloroethene	ND							
Chloroform	ND	ND	ND	ND	46.00	ND	ND	ND
1,2-Dichloroethane	ND							
Bromodichloromethane	ND							
Trichloroethene	ND	ND	ND	9.80	ND	34.40	14.40	16.10
cis-1,3-Dichloropropene	ND							
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	5.40	ND
trans-1,3-Dichloropropene	ND							
1,1,2-Trichloroethane	ND							
Toluene	79.00	92.00	120.00	86.00	99.00	31.60	128.80	169.10
2-Hexanone	ND	ND	ND	ND	ND	42.60	6.10	ND
Dibromochloromethane	ND							
1,2-Dibromoethane	ND							
Tetrachloroethene	40.00	140.00	130.00	300.00	110.00	352.60	476.70	124.80
Chlorobenzene	ND	63.10						
Ethylbenzene	ND	ND	ND	ND	ND	ND	56.80	49.90
m,p-Xylenes	ND	ND	ND	ND	140.00	31.2 J	159.50	141.60
Bromoform	ND							
Styrene	ND	ND	ND	ND	ND	ND	6.40	4.3 J
o-Xylene	ND	ND	ND	ND	ND	ND	57.50	45.70
1,1,2,2-Tetrachloroethane	ND							
1,3-Dichlorobenzene	ND							
1,4-Dichlorobenzene	ND	78.50						
1,2-Dichlorobenzene	ND							
Propene	NA	NA	NA	NA	NA	1420.00	ND	ND
Dichlorodifluoromethane (Freon 12)	NA	NA	NA	NA	NA	388.00	103.00	74.70
1,2-Dichlorotetrafluoromethane (Freon 114)	NA	NA	NA	NA	NA	ND	ND	ND
1,3-Butadiene	NA	NA	NA	NA	NA	ND	ND	ND
Ethanol	NA	NA	NA	NA	NA	81.80	53.20	ND
1,1-Dichloroethene	ND							
Isopropyl alcohol	NA	NA	NA	NA	NA	ND	ND	ND
Hexane	NA	NA	NA	NA	NA	130.00	14.70	54.60
Ethyl acetate	NA	NA	NA	NA	NA	ND	ND	ND
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	ND	ND	ND
Tetrahydrofuran	NA	NA	NA	NA	NA	18.90	42.20	29.30
Cyclohexane	NA	NA	NA	NA	NA	15.80	3.10	8.60
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	3.10	8.60
n-Heptane	NA	NA	NA	NA	NA	120.00	24.80	16.80
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	ND	24.50	20.20
4-Ethyltoluene	NA	NA	NA	NA	NA	ND	18.50	15.70
Benzyl chloride	NA	NA	NA	NA	NA	ND	ND	ND
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	22.60	76.20	63.90
Hexachlorobutadiene	NA	NA	NA	NA	NA	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	ND	ND	ND

APPENDIX A
SITE SAMPLING LOCATIONS PLAN



GAS LINE NOTE:
 MARKINGS FOUND IN FIELD INDICATE POSSIBLE EXISTENCE OF GAS LINE ALONG PROPERTY LINE. IT IS UNKNOWN AT THIS TIME IF SAID LINE IS WITHIN OR OUTSIDE THE SUBJECT PROPERTY OF THIS SURVEY. FURTHER CLARIFICATION WILL BE PROVIDED ONCE MAPS ARE RECEIVED FROM GAS UTILITY PROVIDER.

LIBER 8522 PAGE 349, SEWER EASEMENT AS PROVIDED BY CLIENT.

LIBER 8676 PAGE 252, "PARCEL 2" ELECTRIC EASEMENT AS PROVIDED BY CLIENT.

LIBER 8676 PAGE 252, "PARCEL 1" ELECTRIC EASEMENT AS PROVIDED BY CLIENT.

GROUNDWATER FLOW DIRECTION (LANGAN, DECEMBER 2007)

LEGEND

- BORING LOCATION (LANGAN 12/07)
- ⊕ MONITORING WELL LOCATION (LANGAN 12/07)
- SOIL GAS PROBE LOCATION (LANGAN 12/07)
- ⊗ SOIL BORING LOCATION (GALLI 9/10)
- ▲ SOIL BORING & MONITORING WELL LOCATION (GALLI 9/10)
- SOIL GAS PROBE (GALLI, JULY 2012)
- SUBJECT SITE

- SURVEYORS LEGEND:**
- TC—TOP OF CURB
 - BC—BOTTOM OF CURB
 - LG—LEGAL GRADE
 - TB—TOP OF WALL
 - BW—BOTTOM OF WALL
 - CU—CUP-DRINK LINK FENCE
 - ASPH—ASPHALT PAVEMENT
 - CONC—CONCRETE PAVEMENT
 - PH—FIRE HYDRANT
 - S—SEWER
 - E—ELECTRIC
 - W—WATER
 - OV—OVENS VALVE
 - WV—WATER VALVE
 - OVV—OVENS VALVE
 - T—TELEPHONE
 - TP—TOP PARAPET
 - LP—LIGHT POLE
 - UP—UTILITY POLE
 - MW—MONITORING WELL
 - [0.00]—LEGAL GRADE

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SEAL			
DATE			
SCALE		Galli engineering, p.c. 734 Walt Whitman Road, Suite 402A Melville, New York 11747	
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APPENDIX B
PROPOSED REDEVELOPMENT ARCHITECTURAL PLANS

81 FLEET PLACE

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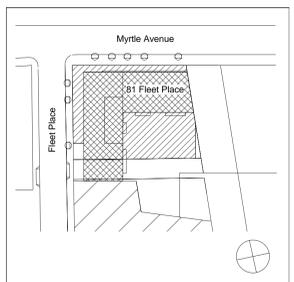
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DRAWING LIST

	Architectural
A-100	Floor Plan - Sub-Cellar
A-101	Floor Plan - Cellar
A-102	Floor Plan - 1st Floor
A-103	Floor Plan - 2nd Floor
A-104	Floor Plan - 3rd Floor
A-105	Floor Plan - 4th Floor
A-106	Floor Plan - 5th to 9th Floors
A-107	Floor Plan - 10th to 11th Floors
A-108	Floor Plan - 12th Floor
A-109	Floor Plan - 13th Floor
A-110	Floor Plan - 14th Floor
A-111	Floor Plan - 15th Floor
A-112	Floor Plan - Roof
A-113	Floor Plan - Bulkhead
A-200	West Elevation at Fleet Place
A-201	North Elevation at Myrtle Avenue
A-202	East Elevation
A-203	South Elevation
A-204	Building Elevations
A-205	Building Elevations



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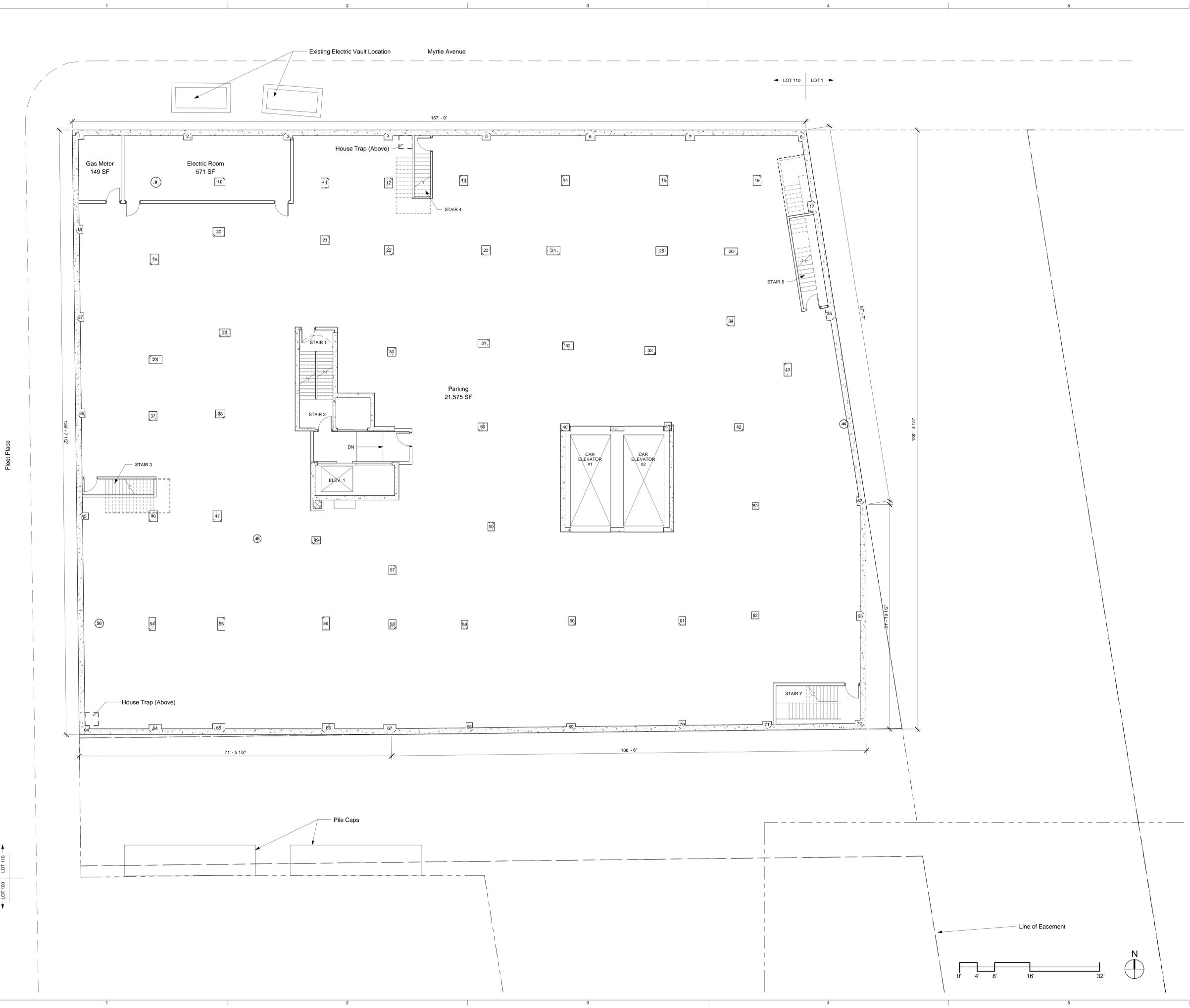
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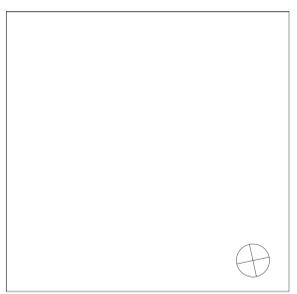
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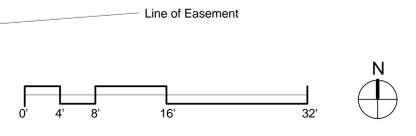
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Floor Plan - Cellar

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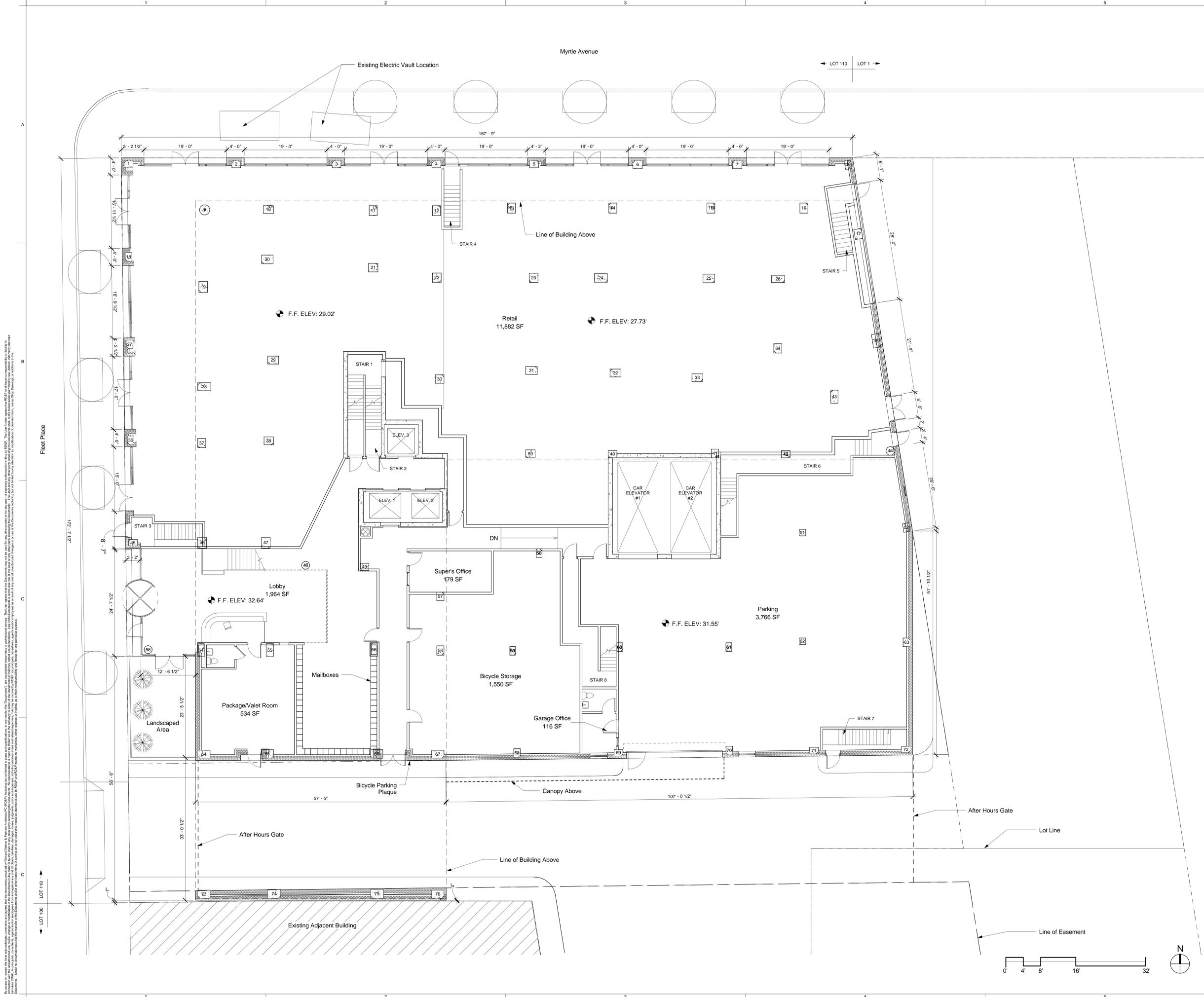
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Floor Plan - 1st Floor

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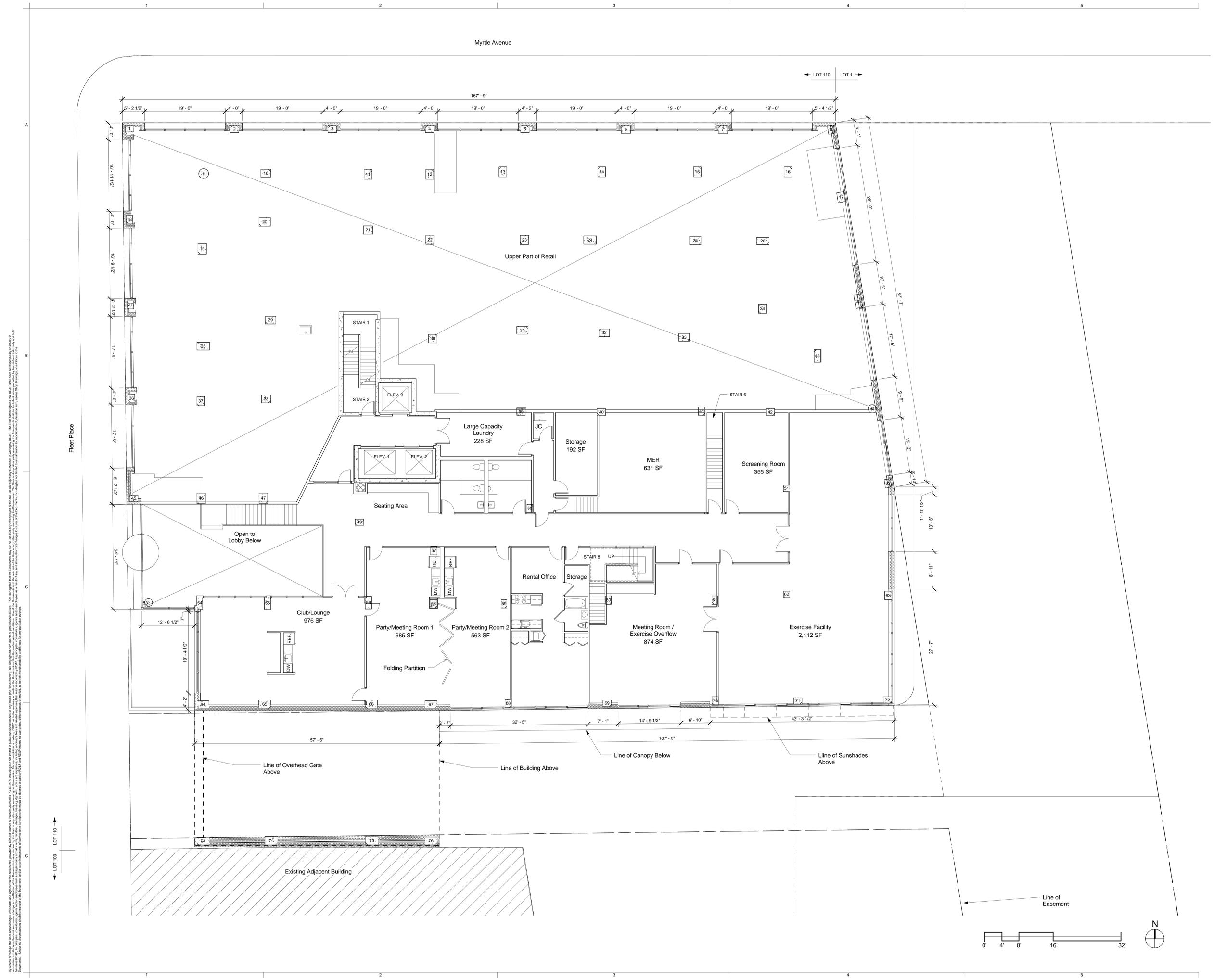


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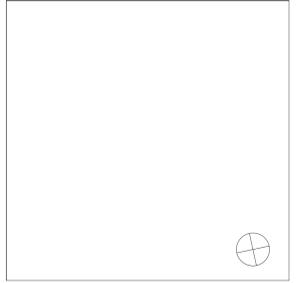
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Floor Plan -2nd Floor

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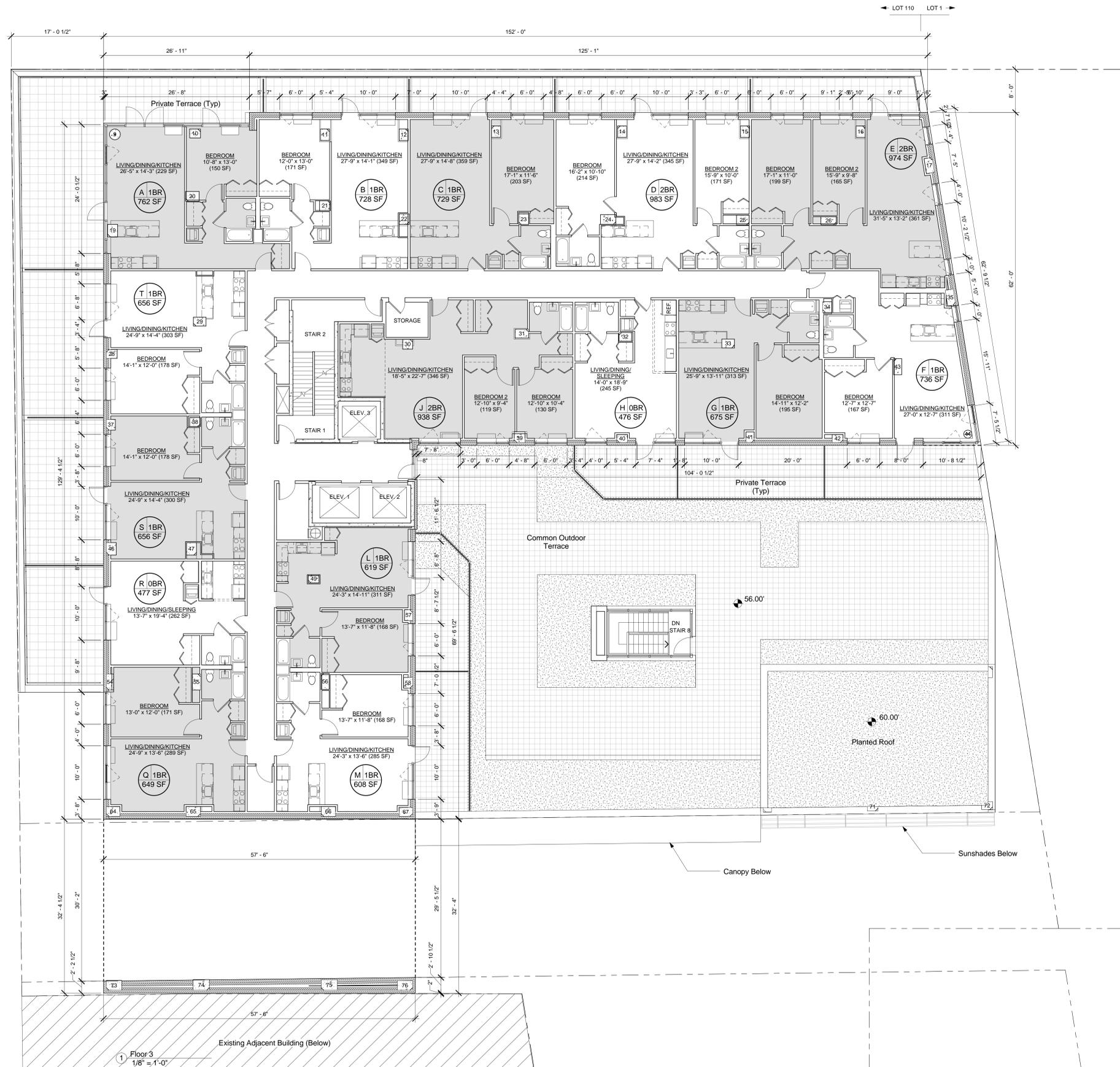
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Floor Plan - 3rd Floor

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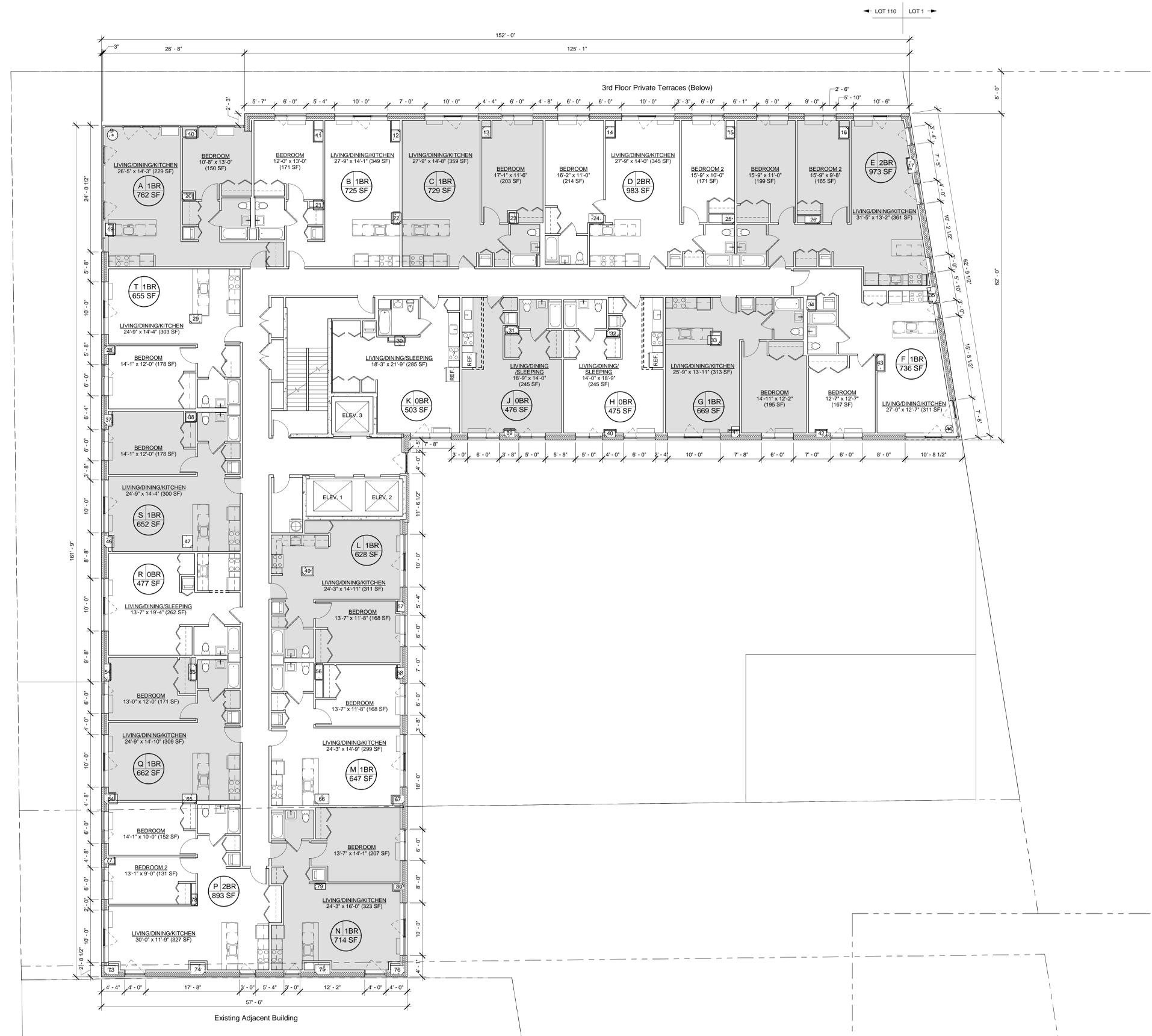
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Floor Plan - 5th to 9th Floors

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Floor Plan - 10th to 11th Floors

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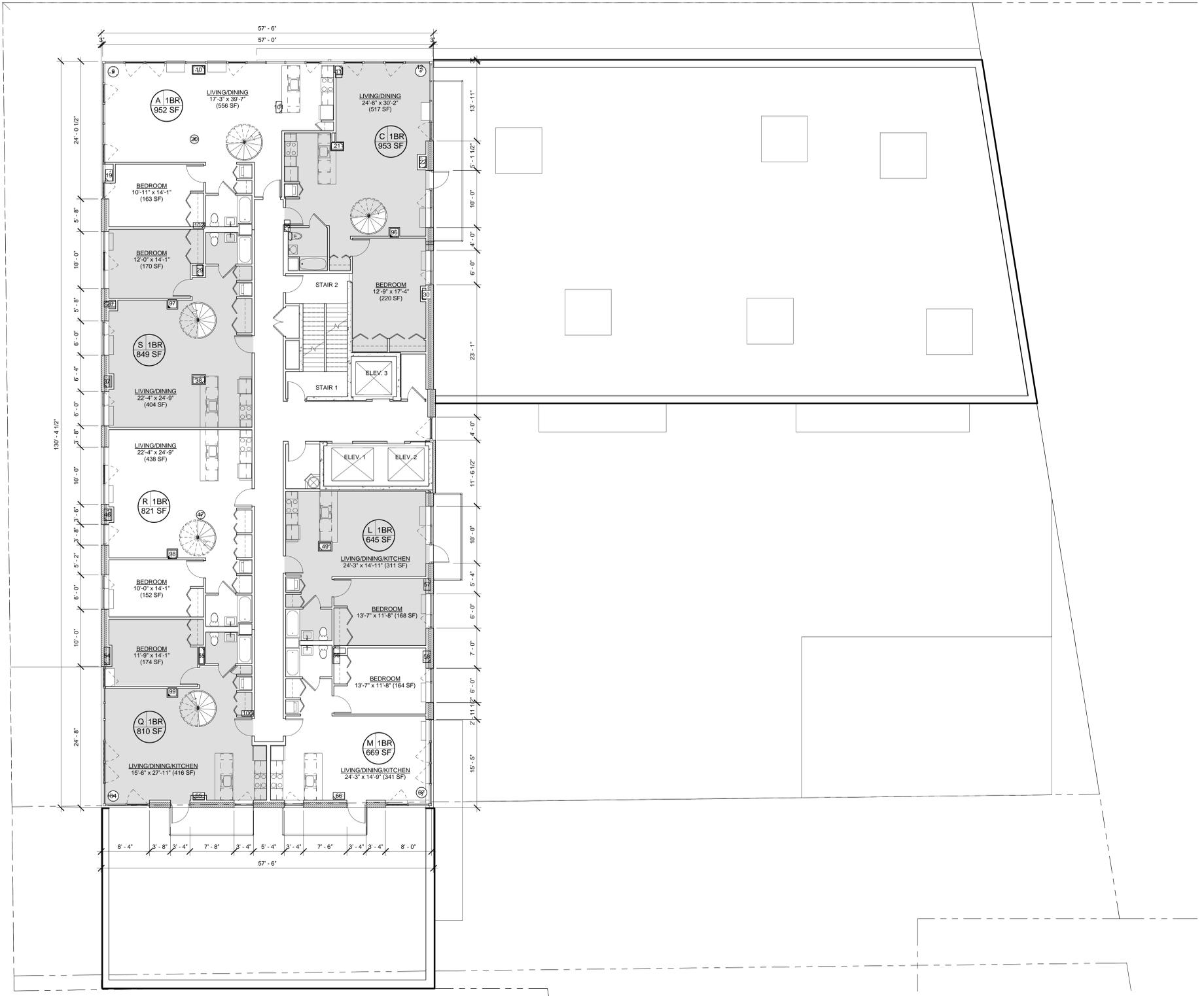
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← LOT 110 →
← LOT 100 →



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15th Floor

Date June 28, 2012
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Project No. 1126 Seal

Sheet No.

A-111.00

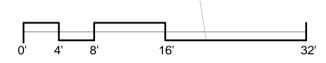
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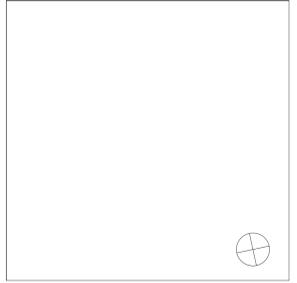
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1 Roof Plan
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Floor Plan - Roof

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Sheet No.

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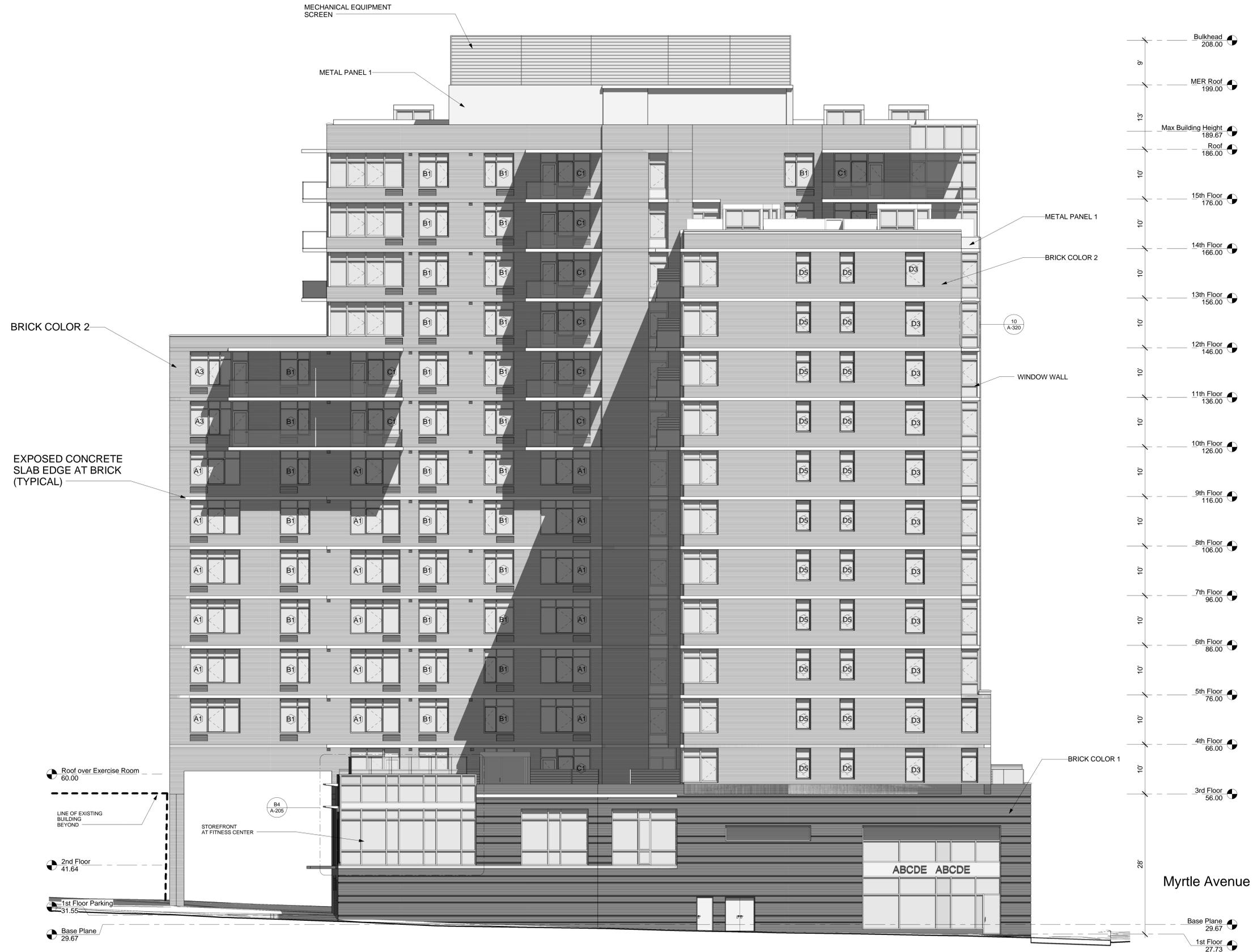
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East Elevation

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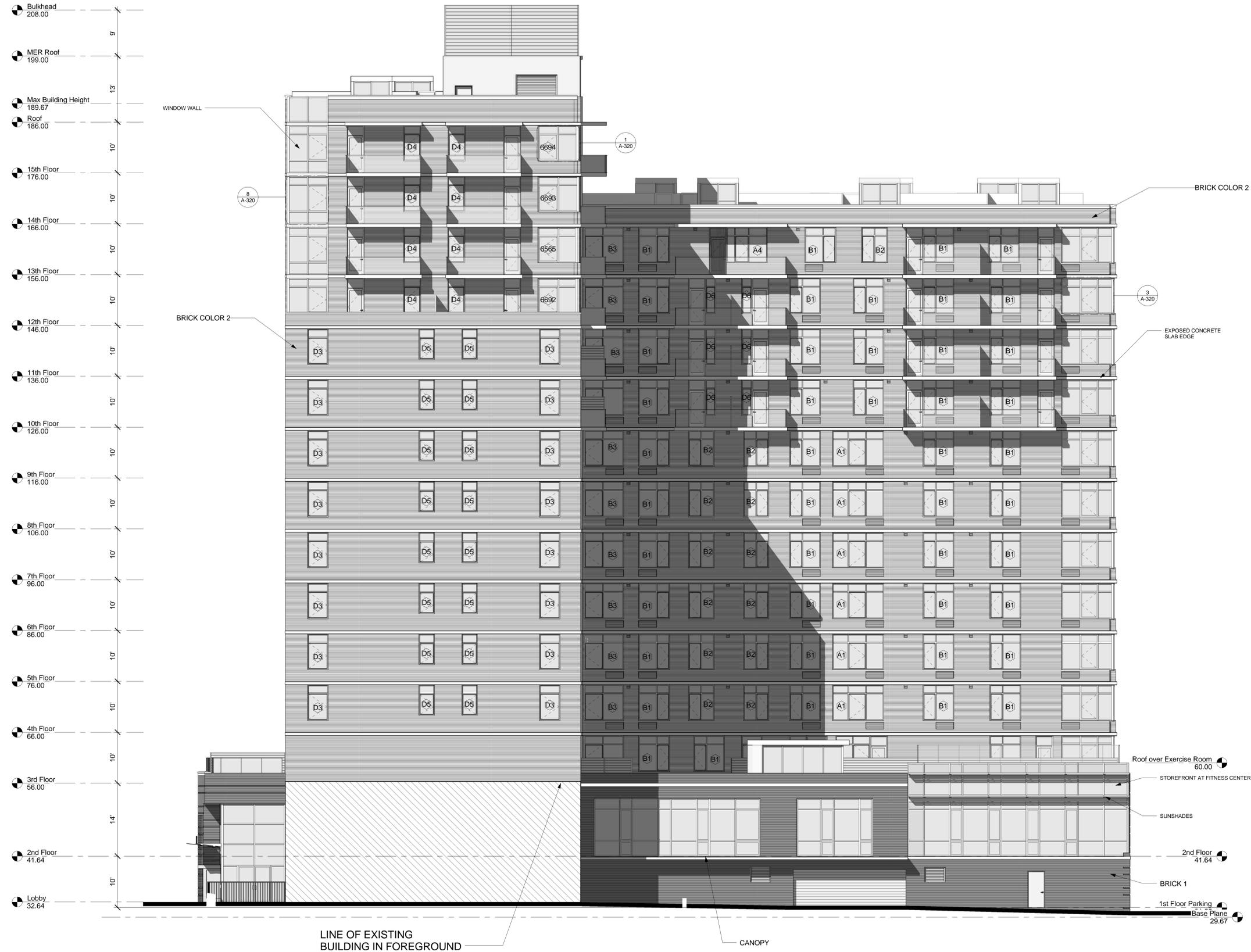


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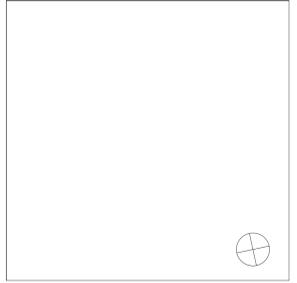
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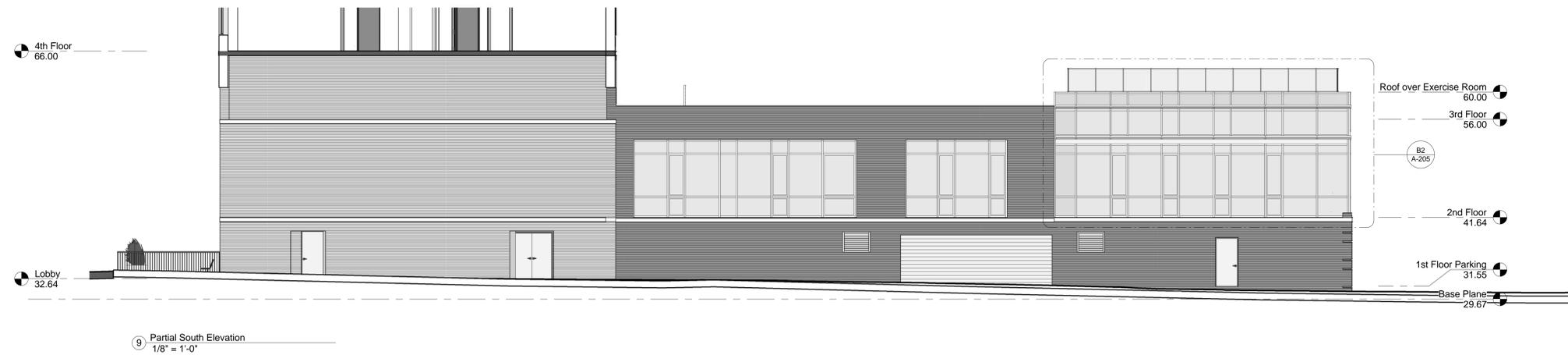
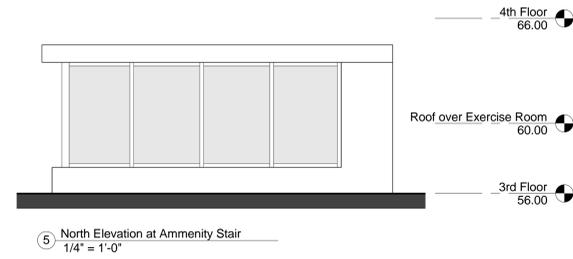
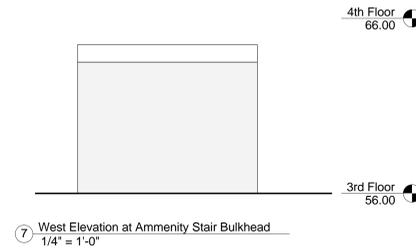
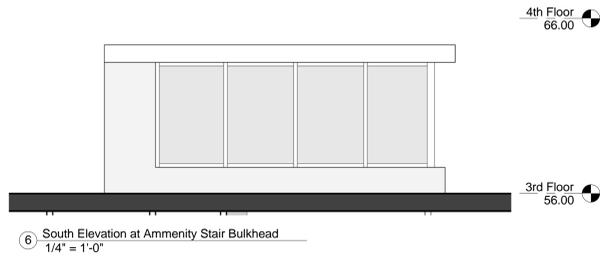
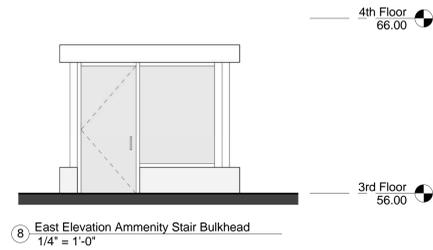
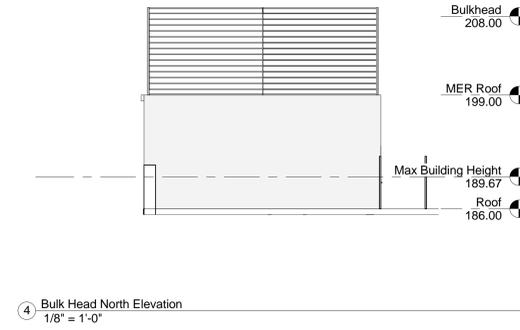
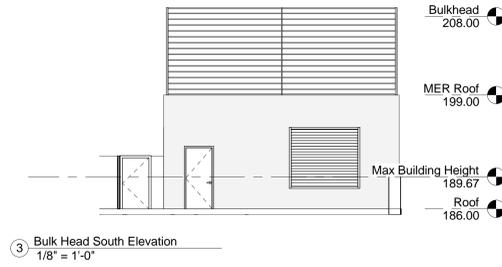
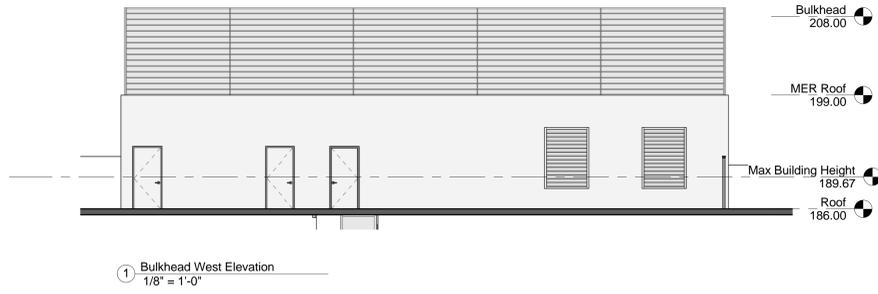
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South Elevation

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Building Elevations

Date June 28, 2012

Scale As indicated

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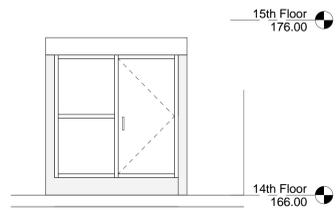
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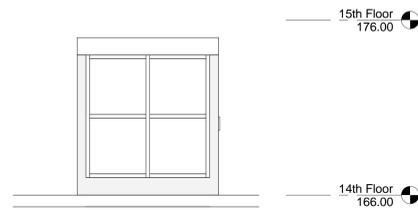
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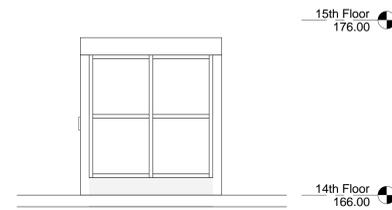
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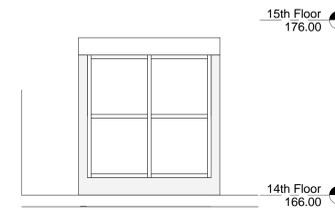
A1 Elevation 1 at Circular Stair Bulkhead
1/4" = 1'-0"



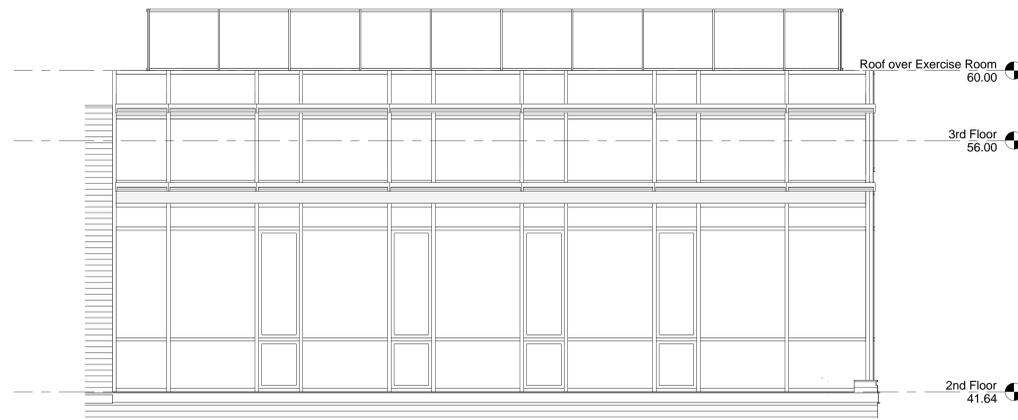
A2 Elevation 2 at Circular Stair Bulkhead
1/4" = 1'-0"



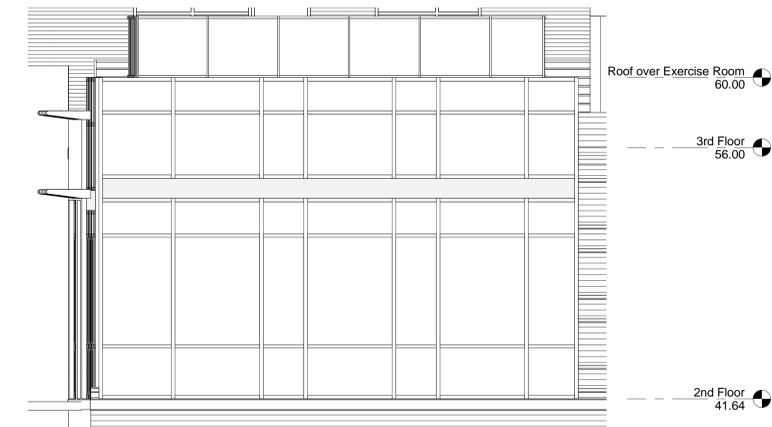
A3 Elevation 3 at Circular Stair Bulkhead
1/4" = 1'-0"



A4 Elevation 4 at Circular Stair Bulkhead
1/4" = 1'-0"



B2 Partial South Elevation at Fitness Center
1/4" = 1'-0"



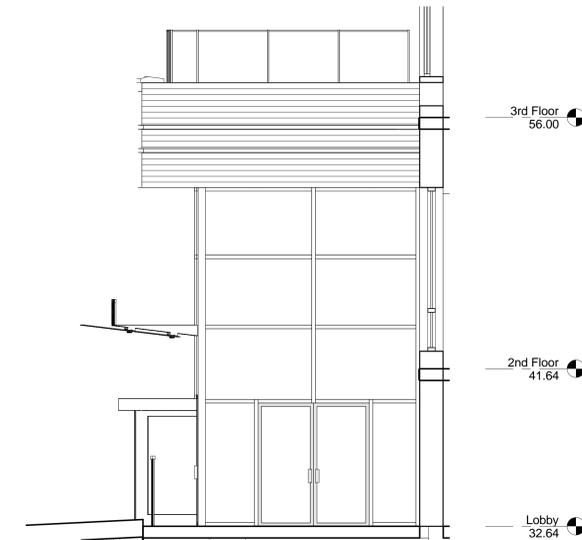
B4 Partial East Elevation at Fitness Center
1/4" = 1'-0"



7 Partial Elevation at Typical Storefront
1/4" = 1'-0"



10 Partial Elevation at Lobby
1/4" = 1'-0"



9 Elevation Entrance Lobby South
1/4" = 1'-0"

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Building Elevations

Date June 28, 2012

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APPENDIX C
CITIZEN PARTICIPATION PLAN

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and RA Real Estate, Inc. have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, RA Real Estate, Inc. will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Michael Mandac, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 676-0754

Project Contact List. OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Voluntary Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories. A document repository is maintained in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. RA Real Estate, Inc. will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

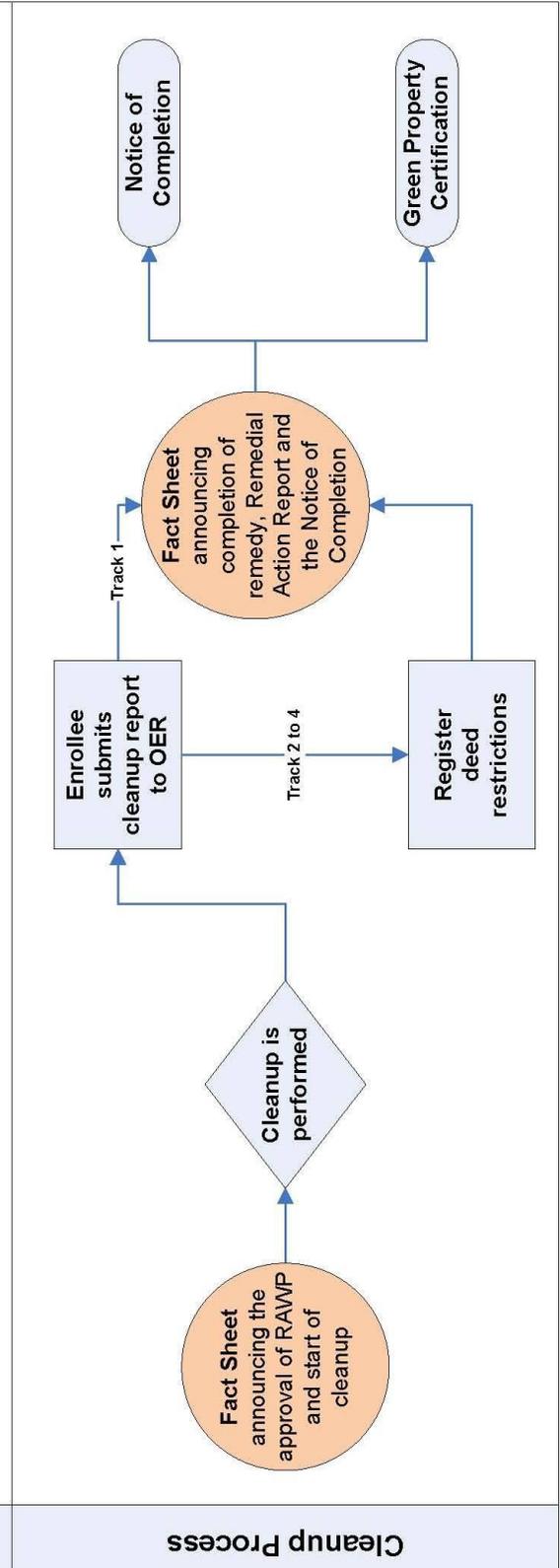
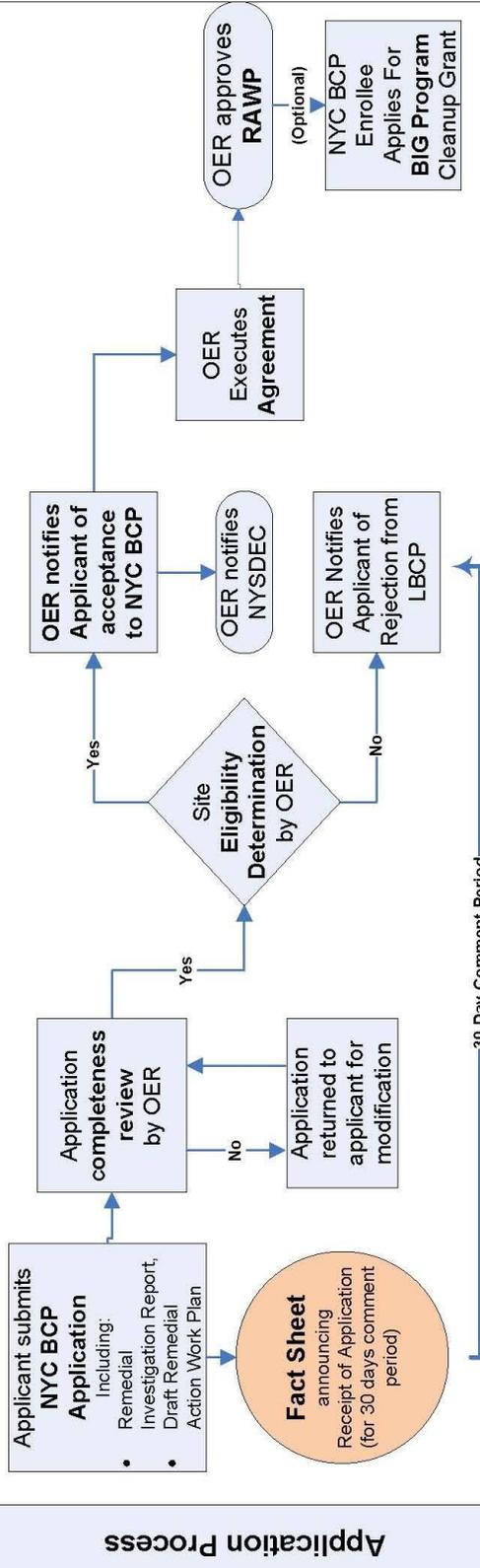
Brooklyn Public Library
Walt Whitman Branch
93 Saint Edwards Street
Brooklyn, NY 11205

Digital Documentation. NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

Public Notice and Public Comment. Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be prepared by RA Real Estate, Inc., reviewed and approved by OER prior to distribution and mailed by RA Real Estate, Inc. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones. Public notice and public comment activities occur at several steps during a typical NYC VCP project. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: These steps include:

Flow Chart For NYC Brownfield Cleanup Program (NYC BCP)



Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan.

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.

Public Notice announcing the approval of the RAWP and the start of remediation

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.

Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX D
SUSTAINABILITY STATEMENT

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials. Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduce Consumption of Virgin and Non-Renewable Resources. Reduced consumption of virgin and non-renewable resources lowers the overall environmental impact of the project on the region by conserving these resources.

An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided under this plan, will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency. Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels. Use of clean fuel improves NYC's air quality by reducing harmful emissions.

An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control. Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Storm-water Retention. Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced storm-water retention capability of the redevelopment project will be included in the RAR.

Linkage with Green Building. Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Paperless Brownfield Cleanup Program. RA Real Estate, Inc. is participating in OER's Paperless Brownfield Cleanup Program. Under this program, submission of electronic

documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program. RA Real Estate, Inc. is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings. Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX E
SOIL/MATERIALS MANAGEMENT PLAN

SOIL/MATERIALS MANAGEMENT PLAN

1.1 SOIL SCREENING METHODS

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

1.2 STOCKPILE METHODS

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and BE maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 CHARACTERIZATION OF EXCAVATED MATERIALS

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

1.5 OFF-SITE MATERIALS TRANSPORT

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are describe here or show in Figure. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 MATERIALS DISPOSAL OFF-SITE

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in Brooklyn, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or RA Real Estate, Inc. The letter will include as an attachment, (1) a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the RAR.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization

sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by OER with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 MATERIALS REUSE ON-SITE

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in Table number. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC BCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed. The expected location for placement of reused material is shown in Figure number.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 DEMARCATION

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement

of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures; or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 IMPORT OF BACKFILL SOIL FROM OFF-SITE SOURCES

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Table number.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;

- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

Source Screening and Testing

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 STORM-WATER POLLUTION PREVENTION

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 CONTINGENCY PLAN

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 ODOR, DUST AND NUISANCE CONTROL

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying the Remedial Action Report.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray for roads, excavation areas and stockpiles.

- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

APPENDIX F
CONSTRUCTION HEALTH AND SAFETY PLAN

CONSTRUCTION HEALTH AND SAFETY PLAN FOR SITE INVESTIGATION AND DRILLING ACTIVITIES

PREPARED FOR:

RA Real Estate, Inc.
823 Eleventh Avenue
New York, NY 10019-3535
(212) 373-8490

FOR WORK AT:

NYC BCP Number: 12EH-N539K

81 Fleet Place
Brooklyn, NY 11201

Tax Map Designation:

Block 2061, Lot 1

PREPARED BY:

Galli Engineering, P.C.
734 Walt Whitman Road, Suite 402A
Melville, NY 11747

September, 2012

Richard D. Galli, P.E.

Date

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APPENDICES:

Appendix A: Forms

SITE EMERGENCY FORM

Contaminants of Concern: Volatile Organic Compounds, Semi Volatile Organic Compounds and Heavy Metals

Minimum Level of Protection: Modified Level D

Do not endanger your life. Survey the situation before taking any action

Site Location Address: 81 Fleet Place, Brooklyn, NY 11201

EMERGENCY PHONE NUMBERS

IN THE EVENT OF ANY EMERGENCY,
CONTACT PROJECT MANAGER OR HEALTH
AND SAFETY REPRESENTATIVE.

Ambulance: 911

Project Manager: (631) 271-9292 Richard Galli, P.E.

Fire: 911

Health/Safety Rep: (631) 271-9292

Police (84th Prct): 911 or (718) 875-6811

Poison Control: 1-800-222-1222

Hospital Name: The Brooklyn Hospital Center - 121 Dekalb Avenue, Brooklyn, 11205

Hospital Phone: General Information: (718) 250-8000

FIRST AID FOR PETROLEUM HYDROCARBON EMERGENCIES

Ingestion: DO NOT INDUCE VOMITING. Call Poison Control, follow instructions. Administer CPR, if necessary. Seek Medical attention.

Inhalation: Remove person from contaminated environment. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT. Administer CPR if necessary. Seek medical attention.

Skin Contact: Brush off dry material, remove wet or contaminated clothing. Flush skin thoroughly with water. Seek medical attention if irritation persists.

Eye Contact: Flush eyes with water for 15 minutes. Seek medical attention.

Exposure Symptoms: Headache, dizziness, nausea, drowsiness, irritation of eyes, nose, throat breathing difficulties.

Contingency Plan: Report incident to Project Manager after emergency procedures have been implemented.

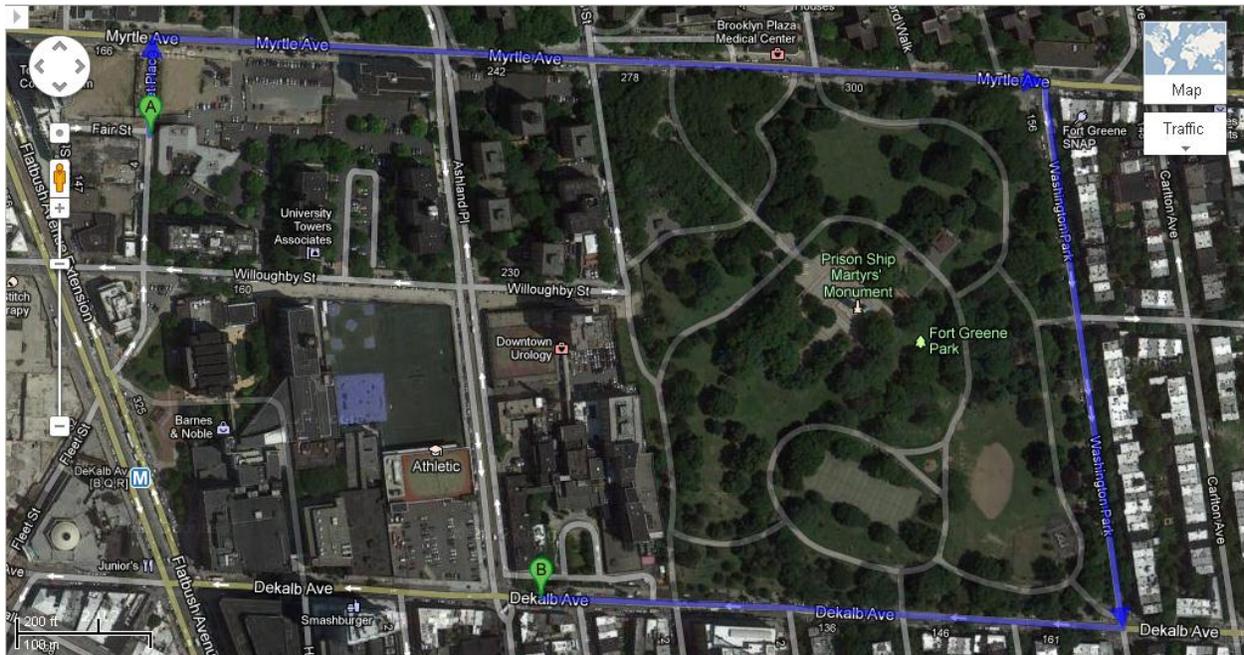
HOSPITAL DIRECTIONS

1. Head **north** on **Fleet Pl** toward **Fair St**
 2. Turn right onto **Myrtle Ave**
 3. Turn right onto **Washington Park**
 4. Turn right onto **Dekalb Ave**
- Destination will be on the right

HOSPITAL INFORMATION

The Brooklyn Hospital Center
121 Dekalb Avenue
Brooklyn, NY 11205

General Information: (718) 250-8000



EMERGENCY FIRST AID

1. Survey the situation. Do not endanger your own life. **DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.**
2. Call 911 or the fire department **IMMEDIATELY.** Explain the physical injury, chemical exposure, fire or release.
3. Decontaminate the victim without delaying life-saving procedures.
4. If the victim's condition appears to be noncritical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel. Let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.
5. Notify the Project Manager.

EMERGENCY FIRST AID PROCEDURES	
To Stop Bleeding	Cardiopulmonary Resuscitation (CPR) Only to be used by trained persons
<ol style="list-style-type: none"> 1. Give medical statement. 2. Assure airway, breathing and circulation. 3. Use DIRECT PRESSURE over the wound with clean dressing or your hand (use nonpermeable gloves). Direct pressure will control most bleeding. 4. Bleeding from an artery or several injury sites may require DIRECT PRESSURE on a PRESSURE POINT. Use pressure points for 30-60 seconds to help control severe bleeding. 5. Continue primary care and seek medical aid as needed. 	<ol style="list-style-type: none"> 1. Give medical statement 2. Arousal: Check for consciousness. 3. Open airway with chin-lift. 4. Look, listen and feel for breathing. 5. If breathing is absent, give 2 full rescue breaths. 6. Check the pulse for 5 to 10 seconds. 7. If pulse if present, continue rescue breathing: 1 breath every 5 seconds.

MSDS DEFINITIONS

TLV-TWA	<u>Threshold Limit Value - Time Weighted Average</u> - The time-weighted average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.
PEL	<u>Permissible Exposure Limit</u> - Time-weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.
REL	<u>Recommended Exposure Limit</u> - as defined by NIOSH similar to the Threshold Limit Values.
IDLH	<u>Immediately Dangerous to Life or Health</u> - Any atmospheric condition that poses an immediate threat to life, or which is likely to result in acute or immediate severe health effects. Oxygen deficiency is IDLH.
LEL	<u>Lower Explosive Limit</u> - The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
UEL	<u>Upper Explosive Limit</u> - The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.
FP	<u>Flash Point</u> - The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.
VP	<u>Vapor Pressure</u> - The pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form, often expressed in millimeters of mercury (mm Hg).
Odor Threshold	A property displayed by a particular compound. Low detection indicates a physiological sensation due to molecular contact with the olfactory nervous system (based on 50% of the population).
IP	<u>Ionization Potential</u> - The energy required to form an ion by removal of a given electron from an atom.

CONTAMINANTS PROFILE			
Chemical	Exposure Route	Symptoms of Overexposure	Incompatibilities
Volatile Organic Compounds	Inhalation and/or ingestion, skin contact	Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system.	
Semi Volatile Organic Compounds	Inhalation and/or ingestion, skin contact	Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system.	
Heavy Metals	Inhalation and/or ingestion, skin contact	Abdominal discomfort, nausea and/or constipation, diarrhea, metallic taste, weakness, muscle pains, irritability, headache, dizziness.	
Lead	Inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Strong oxidizers, hydrogen peroxide, acids
Mercury	Inhalation, skin absorption, ingestion, skin and/or eye contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects	Strong oxidizers such as chlorine

1.0 PURPOSE

81 Fleet Place, Brooklyn, NY 11201; Block: 2061, Lot: 1 will be excavated in order to remove contaminated soils for site redevelopment. This Health and Safety Plan has been prepared to describe procedures to be employed to protect workers and to minimize nuisance impacts to adjacent properties during the period when soil borings and sampling are under way (the Work Period).

All persons working on the site during the Work Period will be given a copy of this Site Health and Safety Plan (HASP) for review prior to beginning excavation work at the site. The Contractor and his subs shall implement, maintain and enforce these procedures during the Work Period.

The Contractor shall designate a responsible person to act as the Health and Safety Manager (HSM) for implementation of this HASP. The HSM will conduct initial site specific training and provide support for all health and safety activities as necessary, including upgrading or downgrading the level of personnel protection.

The HSM shall be assigned to the Site on a full time basis and be either the Contractor's employee or a subcontractor who reports to the Contractor in matters pertaining to site safety and health.

The following definitions shall be used throughout this specification:

1. Health and Safety Manager (HSM): The Contractor's employee or agent assigned to the Site on a full time basis for the duration of the Work Period with functional responsibility for implementation of the HASP.
2. Initial Remedial Action: An action taken to mitigate a health or safety problem so that subsequent work may have a lesser impact on worker safety or the environment.
3. Site: For the purpose of this HASP, "the Site" shall be the entire construction site at Block: 2061, Lot: 1 located at 81 Fleet Place, Brooklyn, New York.
4. Monitoring: Indicates the use of field instrumentation to provide information regarding the levels of organic vapors or dust being released during remedial action. Monitoring required by this HASP shall be conducted to evaluate employee exposures to toxic materials and potential for impacts to adjacent properties.
5. Physician: A licensed physician with experience in the practice of occupational medicine and provided by the Contractor.

2.0 REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS

The site specific HASP shall be consistent with the requirements of:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), specifically including 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response".
2. United State Environmental Protection Agency (USEPA) Standard Operating Guidelines Revised November, 1984.
3. Corps of Engineers Accident Prevention and Safety and Health Requirements Manual, EM 385-1-1. Revised October 1984.
4. NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, DHHS (NIOSH) Publ. No. 85-115.
5. United States Environmental Protection Agency (USEPA) Standard Operating Procedures and Quality Assurance Manual, Region IV. April 1986.

The HASP shall address, but not necessarily be limited to, the following components:

1. Names of key personnel and alternates responsible for site safety and health (responsibilities and chain of command)
2. Site Description and Evaluation
3. Site Control Measures (work zones, communication, and security)
4. Safety Training
5. Emergency Equipment and First Aid Requirements
6. Personnel Protective Equipment
7. Personnel Hygiene and Decontamination
8. Air and Noise Monitoring (Environmental and Personnel)
9. Confined Space Entry Procedures
10. Equipment Decontamination

Determination of the appropriate level of worker safety equipment and procedures shall be made by the Contractor as a result of an initial site survey, review of existing data and a continuing safety

and health monitoring program performed by the Contractor's HSM in accordance with the requirements specified herein.

Should any unforeseen or site specific safety related factor, hazard, or condition become evident during the performance of work at this Site, the Contractor will bring such to the attention of the Owner both verbally and in writing as quickly as possible, for resolution. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

3.0 SITE CONTROL

The current site will be locked during the Work Period to prevent unauthorized access during non-working hours. During the Work Period, all construction vehicles will be logged on and off the site by the HSM or his delegate.

Communications

Telephone communications will be available via cell phones. Emergency numbers, including police, fire, ambulance, hospital and DEP shall be prominently posted or available on site.

Security

Site security shall be provided and maintained 24 hours per day for the duration of the work in order to restrict unauthorized access to the site. The Security Office shall be maintained in the Contractor's facilities. Specific components of this security operation are as follows:

1. Vehicular access to the work area shall be restricted to authorized vehicles only.
2. A log of security incidents will be maintained.
3. No visitors shall be allowed on-site without the expressed approval of the Owner.

Environmental Controls

Dust raised by activities will be minimized by spraying water freely on all access ways to and from the site; on all exposed faces of any working pile; on areas traversed by construction equipment; and, at any other area where dust is seen to be created.

4.0 TRAINING

The Contractor shall be required to verify that all of his personnel assigned to or regularly entering the work area have been presented a copy of the HASP and have reviewed appropriate safety training in accordance with 29 CFR 1910.120. All workers will have received the 40 hour HAZWOPER initial training. They will also have an up-to-date 8 hour refresher course.

A site-specific health and safety briefing will be given to all personnel who will be working in the Work Area during the Work Period to familiarize them with the site safety procedures.

5.0 EMERGENCY EQUIPMENT AND FIRST AID

The Contractor shall be required to develop contingency plans including evacuation procedures and routes to places of refuge or safe distances from the danger area, for the following potential emergencies: chemical exposure, personal injury, potential or actual fire or explosion, and environmental accident (spill or release). In the event of any such emergency, the Contractor shall without delay take diligent action to remove or otherwise minimize the cause of the emergency; alert the Owner and institute whatever measures might be necessary to prevent any repetition of the conditions or actions resulting in the emergency.

Emergency medical care services shall be available at a nearby medical facility with established emergency routes. The staff at the facility shall be advised of any potential unusual medical emergencies that might result.

The Contractor shall establish emergency communications with a health care facility and emergency services if warranted by anticipated site conditions. The name of this facility, name of contact, emergency routes and emergency communications arrangements are provided on the first page of this safety plan. In addition the Contractor shall provide certain equipment:

A fully stocked first aid kit shall be provided and maintained in close proximity to the work, but not inside a hazardous work area. The first aid kit shall be specially marked and provided with adequate supplies necessary to cleanse and decontaminate burns, wounds, or lesions. It shall comply with OSHA 29 CFR 1910.151 Appendix A or ANSI Z308.1-1998 "Minimum Requirements for Workplace First-aid Kits".

6.0 PERSONNEL PROTECTIVE EQUIPMENT

During the Work Period, either the Contractor or his subs shall be required to provide all on-site personnel with appropriate personnel safety equipment and protective clothing and will ensure that all safety equipment and protective clothing is kept clean and well maintained. "Action levels" for determining the specified minimum levels of protection shall be based upon air monitoring results and direct contact potential. Specific action levels are listed in Table 8.1. The level of personnel protection required at the Site is not expected to exceed Modified Level D. Any changes to the minimum level of protection shall be approved by the HSM and the Owner. At a minimum the following items shall be provided:

Protective clothing shall be furnished for on-site personnel consisting of:

Modified Level D Equipment:

(* refers to optional equipment, if applicable)

- Work clothing as dictated by weather
- Coveralls
- Gloves*
- Hardhat
- Safety glasses*
- Safety shoes or boots; chemical-resistant, steel toe and shank
- Outer, disposable, chemical resistant boots*
- Face shield*

Upgrade as necessary to Level C when air monitoring Action Levels are exceeded.

Level C Equipment:

(* refers to optional equipment, if applicable)

- Full-face or half-mask air purifying, canister-equipped respirator (NIOSH approved)
- Hooded chemical-resistant clothing
- Coveralls*
- Gloves, inner, chemical-resistant
- Gloves, outer, chemical-resistant
- Safety boots; chemical-resistant, steel toe and shank
- Disposable outer, chemical-resistant boot covers*
- Hardhat
- Escape air mask*
- Face shield*
- 2 way radios (worn under outside protective clothing)*

All prescription eyeglasses in use on the Site shall be safety glasses. Prescription lens inserts shall be provided for full face respirators.

Footwear used on-site shall be steel-toed, steel shank safety shoes or boots, with chemical resistant soles and shall meet ASTM F2412 and F2413.

All on-site personnel shall wear a hardhat when engaging in construction or excavation activities.

All personnel protective equipment worn on-site shall be decontaminated or properly disposed of at the end of the work day. The HSM is responsible for ensuring all reusable personnel protective equipment is decontaminated and sanitized before being reissued.

Respirators shall be individually assigned and not interchanged between workers for the duration of the project. Respirators shall not be reissued without proper decontamination and disinfection.

Cartridges, canisters and filters shall be changed at least daily. A procedure for assuring periodic cleaning and maintenance of facemasks and change-out of filters shall be provided by the Contractor.

Modified Level D shall be the minimum level of protection set for all primary operations performed at the Site, unless an upgrade is required in accordance with the provisions set forth in the Air Monitoring program.

7.0 PERSONAL HYGIENE AND DECONTAMINATION

During the Work Period, all on-site personnel performing or supervising remedial work at this site or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall observe and adhere to the personnel hygiene-related provisions of this paragraph. The following conditions and procedures shall be followed:

1. The Contractor or his subs shall be required to provide and require use by personnel of all protective clothing including disposable work clothing and safety boots, storage and disposal containers for used disposable outerwear, washing facilities, a facility for changing into and out of and storing work clothing separate from street clothing, a lunch and/or break room, and portable toilets.
2. Disposable outerwear shall not be reused and when removed, shall be placed inside disposal containers provided for this purpose.
3. Smoking is prohibited at the worksite.
4. Employees must wash up before eating in the designated areas.

8.0 AIR AND NOISE MONITORING

Due to the relatively low potential for worker exposure to dangerous conditions and adverse impacts to surrounding occupants, air monitoring will only be performed during the Work Period if odors are noticed or visual observations show apparent chemical or petroleum staining. Baseline readings will be taken prior to the start of drilling each day of work.

In the event of chemical contamination, the Contractor will advise the Owner, who will call the Engineering Consultant. The Consultant will come in and monitor the work area with a photoionization detector (PID). All readings will be taken in the workers' breathing zone to determine whether an action level has been met and/or exceeded. Air monitoring results will be documented on the Air Monitoring Log (Appendix A).

Air monitoring action levels (Table 8.1) have been established to indicate the chemical concentrations in the breathing zone that require an upgrade in level of personnel protective equipment (PPE). The action levels apply to all tasks performed on this site. Guidelines for frequency of air monitoring are presented below.

If noise complaints are registered, noise measurements will be taken and readings compared against limits set forth in the NYC Zoning Resolution.

TABLE 8.1 AIR MONITORING ACTION LEVELS			
Instrument*	Function	Measurement	Action
Photoionization Detector (PID), Flame Ionization Detector (FID)	Measured total organic vapors	0-5 ppm	• Level D required
		5-500 ppm	• Upgrade to Level C
		> 500 ppm	• Stop work. Contact PM and HSR for guidance
Oxygen/Combustible Gas Meter (O ₂ /LEL) NOTE: Combustible gas meter readings obtained in an oxygen deficient atmosphere will not be accurate	Measures oxygen level (O ₂) and lower explosive limit (% LEL)	O ₂ 19.5-22%	• Acceptable conditions - Continue normal activity
		O ₂ <19.5	• Ventilate the space • Notify PM and SSHO if unable to achieve acceptable conditions
		O ₂ >22%	• Leave area immediately: this atmosphere is extremely flammable • Notify PM and SSHO
		LEL <10%	• Acceptable conditions - Continue normal activity
		LEL >10%	• Leave area immediately • Contact PM and SSHO for guidance on venting and other safety measures
* NOTE: Instruments must be calibrated according to manufacturer's recommendations			

Air Monitoring Frequency Guidelines

Periodic monitoring will be conducted during the Work Period when: (1) it is possible that an IDLH condition or a flammable atmosphere has developed or (2) there is an indication that exposures may have risen over permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:

- Change in Site Area - work begins on a different section of the site
- Change in Contaminants - handling contaminants other than those first identified
- Change in On-Site Activity - one operation ends and another begins
- Handling Leaking Drums or Containers
- Working with Obvious Liquid Contamination (e.g., a spill or lagoon)

9.0 CONFINED SPACE ENTRY PROCEDURES AND PERMIT

NO CONFINED SPACE ENTRY IS ANTICIPATED FOR THIS WORK.

Site work may require personnel to enter confined spaces. **No personnel shall enter an area identified as a confined space without using the confined space entry procedures.** The purpose of the confined space entry procedure is to protect employees from potentially hazardous environments and to facilitate immediate rescue in an emergency situation. A Confined Space Entry Permit must be posted at the entrance to each confined space.

DEFINITION: A Permit Required Confined Space means an enclosed space which is large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit (some examples are tanks, vessels, silos, storage bins, hoppers, vaults, pits and diked areas); is not designed for continuous employee occupancy; and has one or more of the following characteristics: (A) contains or has a known potential to contain a hazardous atmosphere (including oxygen deficient); (B) contains a material with the potential for engulfment of an entrant; (C) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or (D) contains any other recognized serious safety or health hazard.

Protocol For Confined Space Entry

- Perform the appropriate air monitoring activity at various depths in the space prior to entry. Monitor for: (1) oxygen level, (2) flammable vapors, and (3) toxic vapors.
- Ventilate the atmosphere in the space so that entry may be made safely without respiratory protection. If this is not feasible, appropriate respiratory protection must be worn by authorized entrants and attendants.
- Wear appropriate respiratory protection when ventilation alone can not achieve acceptable atmospheric levels of oxygen or flammable or toxic vapors. Note: Respirators alone are not sufficient in oxygen deficient atmospheres.
- Provide emergency means of evacuation - lifelines, mechanical hoist, etc.
- Provide at least one attendant to remain outside the confined space entering the confined space who is required to stay at the entrance of the confined space.

10.0 EQUIPMENT DECONTAMINATION

All equipment used in the work area during the Work Period shall be decontaminated prior to leaving the Site. The procedures for decontamination of equipment shall be approved by the Engineer. The Contractor shall be responsible for monitoring all vehicle decontamination prior to exiting the Site, where required.

1. Personnel engaged in vehicle decontamination shall wear protective equipment including disposable clothing and respiratory protection (as necessary) consistent with the requirements of this HASP.
2. Decontamination will consist only of rinsing with water unless there is an obvious additional need.

APPENDIX A

FORMS

VISITOR/TRAINEE GUIDELINES

Galli Engineering is committed to providing a safe environment on all work sites for visitors, trainees, employees and/or passersby. In order to accomplish this, the following guidelines must be followed.

1. VISITORS

Any person not actively participating in the work at the site is regarded as a "visitor" and must follow these visitor/trainee guidelines. Visitors must be accompanied by an authorized representative while on site.

Sites must be marked with signs, placards, and/or barricades to designate hazardous boundaries. Visitors will not be allowed on any site that is not adequately marked.

2. TRAINEES

Trainees are employees of Galli Engineering or their representatives who have not yet completed the required safety training program. New hires and in-house company transfers will be considered trainees until safety training requirements are met.

Trainees will be informed of restrictions by their supervisor and must abide by them before visiting active sites.

Trainees will be permitted to visit Galli Engineering sites as observers as long as the following conditions are met:

- Trainees are supervised at all times while observing on site.
- Trainees do not perform work functions of any type while on site.
- Trainees do not handle any equipment, tools and/or supplies while on site.
- Trainees do not enter any hazardous or hot zone or confined space areas while on site.

Supervisors will be responsible for informing trainees of the above conditions and for ensuring that the conditions are met. Supervisors will also ensure that trainees will not be asked to violate the conditions listed above.

A Trainee/Visitor Agreement Form must be signed by both the trainee and the supervisor.

Infractions of the above agreement will be viewed as extremely serious and will be subject to discipline up to and including termination for either the trainee and/or supervisor.

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

Health and Safety Plan Agreement

Galli personnel have the authority to stop activities performed by our subcontractors or visitors at this site if any field activity is not performed in accordance with the requirements of this Health and Safety Plan, and as per directive of the Site Supervisor (SS).

All Galli Engineering, P.C. Project personnel, subcontractor personnel, and visitors are required to sign the following agreement.

1. I have read and fully understand the Health and Safety Plan (HASP) and my individual responsibilities.

2. I agree to abide by the provisions of the Health and Safety Plan (HASP).

Name:

Date:

APPENDIX G

DESIGN AND SPECIFICATIONS FOR VAPOR BARRIER/WATERPROOFING MEMBRANE

P R O D U C T I N F O R M A T I O N

Preprufe® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites.

Advantages

- Forms a unique continuous adhesive bond to concrete poured against it – prevents water migration and makes it unaffected by ground settlement beneath slabs
- Fully-adhered watertight laps and detailing
- Provides a barrier to water, moisture and gas – physically isolates the structure from the surrounding ground
- BBA Certified for basement Grades 2, 3, & 4 to BS 8102:1990
- Zero permeance to moisture
- Solar reflective – reduced temperature gain
- Simple and quick to install – requiring no priming or fillets
- Can be applied to permanent formwork – allows maximum use of confined sites
- Self protecting – can be trafficked immediately after application and ready for immediate placing of reinforcement
- Unaffected by wet conditions – cannot activate prematurely
- Inherently waterproof, non-reactive system:
 - not reliant on confining pressures or hydration
 - unaffected by freeze/thaw, wet/dry cycling
- Chemical resistant – effective in most types of soils and waters, protects structure from salt or sulphate attack

Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

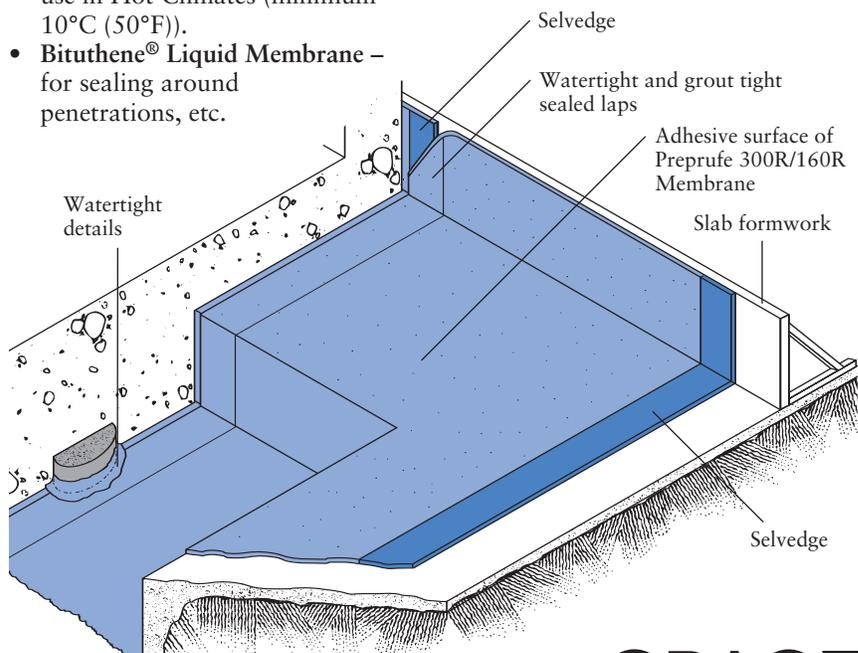
Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

- **Preprufe 300R** – heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R** – thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT** – for covering cut edges, roll ends, penetrations and detailing (temperatures between -4°C (25°F) and +30°C (86°F)).
- **Preprufe Tape HC** – as above for use in Hot Climates (minimum 10°C (50°F)).
- **Bituthene® Liquid Membrane** – for sealing around penetrations, etc.

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted sand or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor® fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.



Installation

The most current application instructions, detail drawings and technical letters can be viewed at www.graceconstruction.com. Technical letters are provided for the following subjects to assist in the installation of Preprufe:

- Chemical Resistance
- Minimizing Concrete Shrinkage and Curling
- Rebar Chairs on Preprufe 300R Membrane
- Removal of Formwork Placed Against Preprufe Membranes
- Winter Lap Sealing and the use of Preprufe Tape LT

For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 1.2 m (4 ft) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

All surfaces – It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 12 mm (0.5 in.). Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal – The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. The surface does not need to be dry, but standing water must be removed.

Vertical – Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 12 mm (0.5 in.) out of alignment.

Membrane Installation

Preprufe can be applied at temperatures of -4°C (25°F) or above. When installing Preprufe in cold or marginal weather conditions <13°C (55°F) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application.

Horizontal substrates –

Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed.

Accurately position succeeding sheets to overlap the previous sheet 75 mm (3 in.) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to Grace Tech Letters for information on suitable rebar chairs for Preprufe.

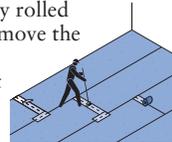
Vertical substrates –

Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour.

The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or similar 50 mm (2 in.) below the top edge. Fastening can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional fasteners must be covered with a patch of Preprufe Tape.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

Roll ends and cut edges – Overlap all roll ends and cut edges by a minimum 75 mm (3 in.) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap and roll firmly. Immediately remove printed plastic release liner from the tape.



Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit www.graceconstruction.com. This Manual gives comprehensive guidance and standard details for:

- internal and external corners
- penetrations
- tiebacks
- columns
- grade beam pilecaps
- tie-ins
- terminations

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by jet washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (12 mm (0.5 in.) or less) and slices by applying Preprufe Tape centered over the damaged area and roll firmly. Remove the release liner from the tape. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 150 mm (6 in.) beyond the damaged area. Seal all edges of the patch with Preprufe Tape, remove the release liner from the tape and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe R Membrane and Tape.

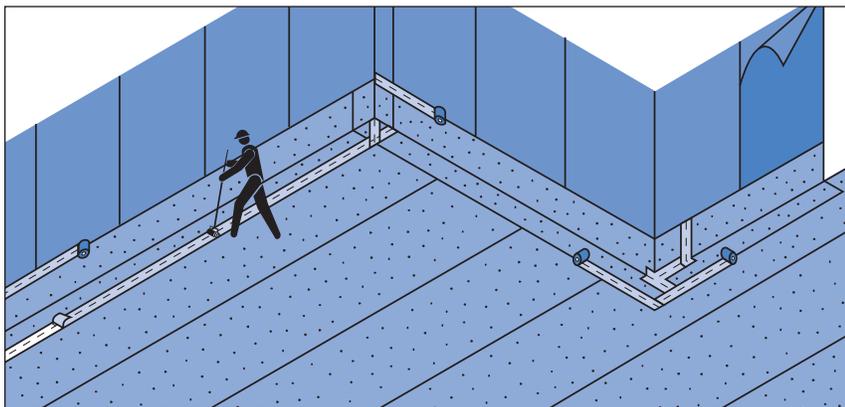
It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 10 N/mm² (1500 psi) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

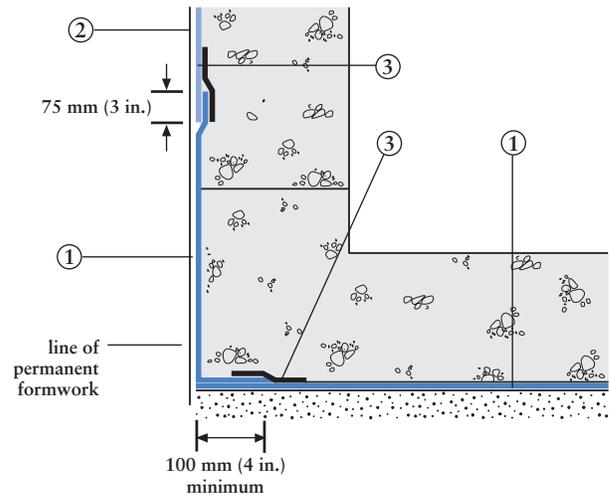
As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 40 N/mm² (6000 psi) will typically require a cure time of approximately 6 days at an average ambient temperature of -4°C (25°F), or 2 days at 21°C (70°F).



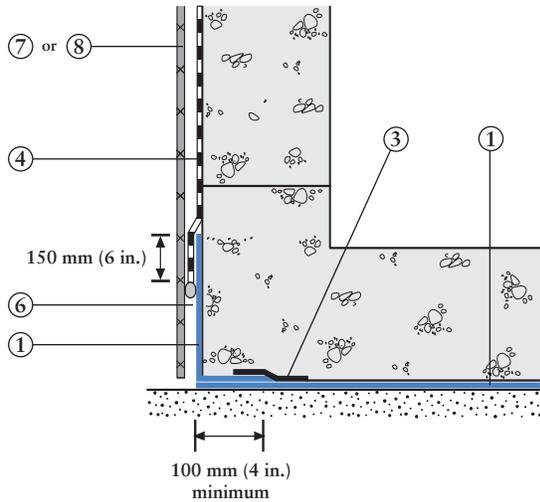
Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at www.graceconstruction.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

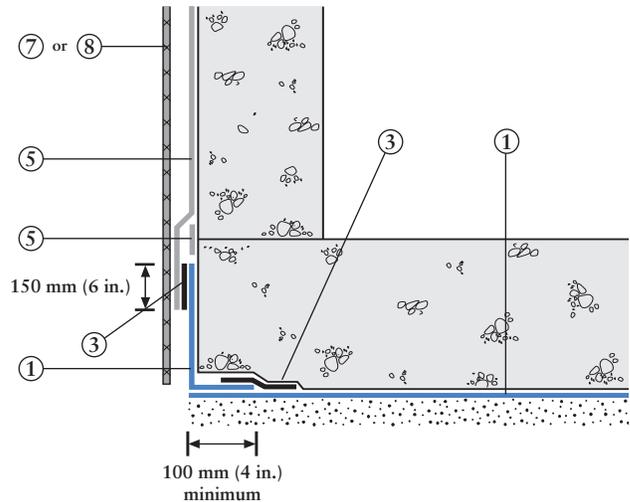
Wall base detail against permanent shutter



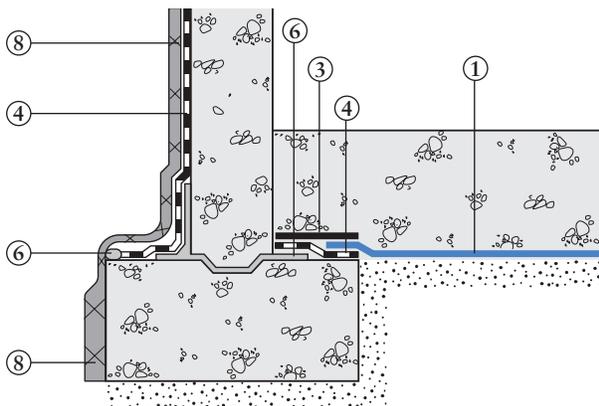
Bituthene wall base detail (Option 1)



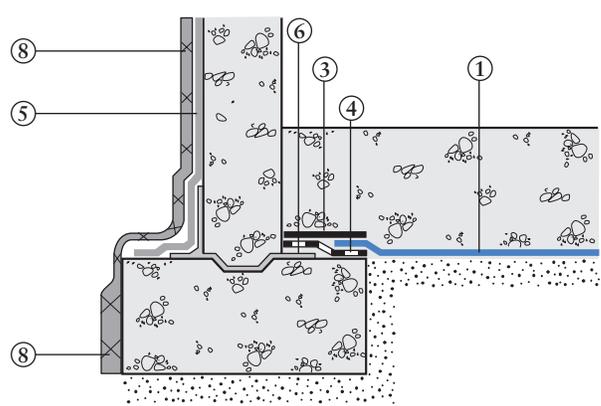
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



1 Preprufe 300R
2 Preprufe 160R

3 Preprufe Tape
4 Bituthene

5 Procor
6 Bituthene Liquid Membrane

7 Protection
8 Hydroduct®

Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	1.2 mm (0.046 in.)	0.8 mm (0.032 in.)	
Roll size	1.2 m x 30 m (4 ft x 98 ft)	1.2 m x 35 m (4 ft x 115 ft)	100 mm x 15 m (4 in. x 49 ft)
Roll area	36 m ² (392 ft ²)	42 m ² (460 ft ²)	
Roll weight	50 kg (108 lbs)	42 kg (92 lbs)	2 kg (4.3 lbs)
Minimum side/end laps	75 mm (3 in.)	75 mm (3 in.)	75 mm (3 in.)

*LT denotes Low Temperature (between -4°C (25°F) and +30°C (86°F))
 HC denotes Hot Climate (>+10°C (50°F))

Ancillary Products

Bituthene Liquid Membrane – 5.7 liter (1.5 US gal) or 15.1 liter (4 US gal)

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	1.2 mm (0.046 in.) nominal	0.8 mm (0.032 in.) nominal	ASTM D3767
Low temperature flexibility	Unaffected at -23°C (-10°F)	Unaffected at -23°C (-10°F)	ASTM D1970
Resistance to hydrostatic head, minimum	70 m (231 ft)	70 m (231 ft)	ASTM D5385, modified ¹
Elongation, minimum	300%	300%	ASTM D412, modified ²
Tensile strength, film, minimum	27.6 MPa (4000 psi)	27.6 MPa (4000 psi)	ASTM D412
Crack cycling at -23°C (-10°F), 100 cycles	Unaffected	Unaffected	ASTM C836
Puncture resistance, minimum	990 N (221 lbs)	445 N (100 lbs)	ASTM E154
Peel adhesion to concrete, minimum	880 N/m (5.0 lbs/in.) width	880 N/m (5.0 lbs/in.) width	ASTM D903, modified ³
Lap peel adhesion	440 N/m (2.5 lbs/in.) width	440 N/m (2.5 lbs/in.) width	ASTM D1876, modified ⁴
Permeance to water vapor Transmission, maximum	0.01 perms (0.6 ng/(Pa × s × m ²))	0.01 perms (0.6 ng/(Pa × s × m ²))	ASTM E96, method B
Water absorption, maximum	0.5%	0.5%	ASTM D570
Methane permeability	9.1 mls/m ² /day	N/A	University of London, QMW College ³
Permeability ⁵ (hydraulic conductivity)	K=<1.4 × 10 ⁻¹¹ cm.s ⁻¹	K=<1.4 × 10 ⁻¹¹ cm.s ⁻¹	ASTM D5084-90

Footnotes:

- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 3 mm (0.125 in.) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 50 mm (2 in.) per minute at -4°C (25°F).
- Result is lower limit of apparatus. Membrane therefore considered impermeable.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to

Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

For Technical Assistance call toll free at 866-333-3SBM (3726).

 Visit our web site at www.graceconstruction.com

W. R. Grace & Co.-Conn. 62 Whittemore Avenue Cambridge, MA 02140

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We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.-Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

These products may be covered by patents or patents pending.

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GRACE
Construction Products

Bituthene® System 4000

Self-adhesive HDPE waterproofing membrane with super tacky compound for use with patented, water-based System 4000 Surface Conditioner

Advantages

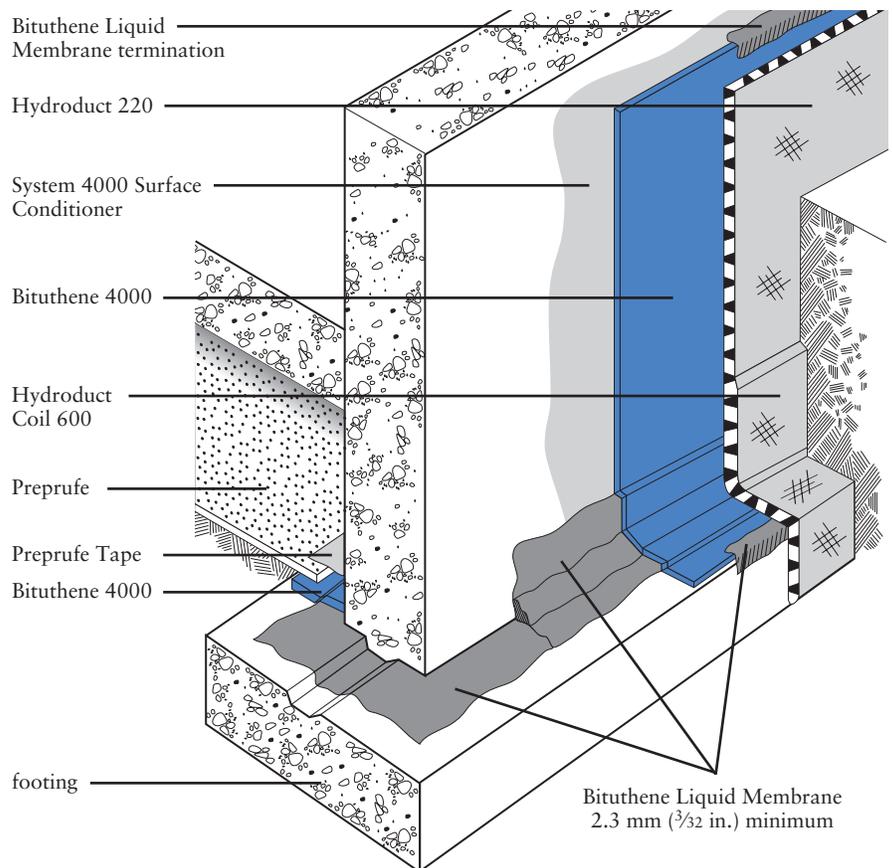
- **Excellent adhesion** – special adhesive compound engineered to work with high tack System 4000 Surface Conditioner
- **Cold applied** – simple application to substrates, especially at low temperatures
- **Reduced inventory and handling costs** – System 4000 Surface Conditioner is included with each roll of membrane
- **Wide application temperature range** – excellent bond to self and substrate from -4°C (25°F) and above
- **Overlap security** – minimizes margin for error under site conditions
- **Cross laminated, high density polyethylene carrier film** – provides high tear strength, puncture and impact resistance
- **Flexible** – accommodates minor structural movements and will bridge shrinkage cracks

Description

Bituthene® System 4000 is a 1.5 mm (1/16 in.) flexible, pre-formed waterproof membrane which combines a high performance, cross laminated, HDPE carrier film with a unique, super tacky, rubberized asphalt compound.

System 4000 Surface Conditioner is a unique, water-based, latex surface treatment which imparts an aggressive, high tack finish to the treated substrate. It is specifically formulated to bind site dust and concrete efflorescence, thereby providing a suitable surface for the Bituthene System 4000 Waterproofing Membrane.

Conveniently packaged in each roll of membrane, System 4000 Surface Conditioner promotes good initial adhesion and, more importantly, excellent permanent adhesion of the Bituthene System 4000 Waterproofing Membrane. The VOC (Volatile Organic Compound) content is 125 g/L.



Use

Bituthene is ideal for waterproofing concrete, masonry and wood surfaces where in-service temperatures will not exceed 57°C (135°F). It can be applied to foundation walls, tunnels, earth sheltered structures and split slab construction, both above and below grade. (For above grade applications, see “Above Grade Waterproofing Bituthene System 4000.”)

Bituthene is 1.5 mm (1/16 in.) thick, 0.9 m (3 ft) wide and 20 m (66.7 ft) long and is supplied in rolls. It is unrolled sticky side down onto concrete slabs or applied onto vertical concrete faces primed with System 4000 Surface Conditioner. Continuity is achieved by overlapping a minimum 50 mm (2 in.) and firmly rolling the joint.

Bituthene is extremely flexible. It is capable of bridging shrinkage cracks in the concrete and will accommodate minor differential movement throughout the service life of the structure.

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. Grace Protection Board Adhesive is extremely flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

Surfaces should be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Concrete must be properly dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete).

If time is critical, Bituthene Primer B2 may be used to allow priming and installation of membrane on damp surfaces or “green” concrete. Priming may begin in this case as soon as the concrete will maintain structural integrity. Use form release agents which will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane. Cure concrete with clear, resin-based curing compounds which do not contain oil, wax or pigment. Except with Primer B2, allow concrete to thoroughly dry following rain. Do not apply any products to frozen concrete.

Repair defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel cut mortar joints flush to the face of the concrete blocks.

Temperature

- Apply Bituthene System 4000 Membrane and Conditioner only in dry weather and when air and surface temperatures are -4°C (25°F) or above.
- Apply Bituthene Primer B2 in dry weather above -4°C (25°F). (See separate product information sheet.)

Conditioning

Bituthene System 4000 Surface Conditioner is ready to use and can be applied by spray or roller. For best results, use a pump-type air sprayer with fan tip nozzle, like the Bituthene System 4000 Surface Conditioner Sprayer, to apply the surface conditioner.

Apply Bituthene System 4000 Surface Conditioner to clean, dry, frost-free surfaces at a coverage rate of 7.4 m²/L (300 ft²/gal). Coverage should be uniform. Surface conditioner should not be applied so heavily that it puddles or runs. **Do not apply conditioner to Bituthene membrane.**

Allow Bituthene System 4000 Surface Conditioner to dry one hour or until substrate returns to its original color. At low temperatures or in high humidity conditions, dry time may be longer.

Bituthene System 4000 Surface Conditioner is clear when dry and may be slightly tacky. In general, conditioning should be limited to what can be covered within 24 hours. In situations where long dry times may prevail, substrates may be conditioned in advance. Substrates should be reconditioned if significant dirt or dust accumulates.

Before surface conditioner dries, tools should be cleaned with water. After surface conditioner dries, tools should be cleaned with mineral spirits. Mineral spirits is a combustible liquid which should be used only in accordance with manufacturer's recommendations. **Do not use solvents to clean hands or skin.**

Corner Details

The treatment of corners varies depending on the location of the corner. For detailed information on Bituthene Liquid Membrane, see separate product information sheet.

- At wall to footing inside corners – **Option 1:**

Apply membrane to within 25 mm (1 in.) of base of wall. Treat the inside corner by installing a 20 mm ($\frac{3}{4}$ in.) fillet of Bituthene Liquid Membrane. Extend Bituthene Liquid Membrane at least 65 mm ($2\frac{1}{2}$ in.) onto footing, and 65 mm ($2\frac{1}{2}$ in.) onto wall membrane.

Option 2:

Treat the inside corner by installing a 20 mm ($\frac{3}{4}$ in.) fillet of Bituthene Liquid Membrane. Apply 300 mm (12 in.) wide strip of sheet membrane centered over fillet. Apply wall membrane over inside corner and extend 150 mm (6 in.) onto footing. Apply 25 mm (1 in.) wide troweling of Bituthene Liquid Membrane over all terminations and seams within 300 mm (12 in.) of corner.

- At footings where the elevation of the floor slab is 150 mm (6 in.) or more above the footing, treat the inside corner either by the above two methods or terminate the membrane at the base of the wall. Seal the termination with Bituthene Liquid Membrane.

Joints

Properly seal all joints with waterstop, joint filler and sealant as required. Bituthene membranes are not intended to function as the primary joint seal. Allow sealants to fully cure. Pre-strip all slab and wall cracks over 1.5 mm ($\frac{1}{16}$ in.) wide and all construction and control joints with 230 mm (9 in.) wide sheet membrane strip.

Application on Horizontal Surfaces

(Note: Preprufe® pre-applied membranes are strongly recommended for below slab or for any application where the membrane is applied before concreting. See Preprufe product information sheets.)

Apply membrane from the low point to the high point so that laps shed water. Overlap all seams at least 50 mm (2 in.). Stagger all end laps. Roll the entire membrane firmly and completely as soon as possible. Use a linoleum roller or standard water-filled garden roller less than 760 mm (30 in.) wide, weighing a minimum of 34 kg (75 lbs) when filled. Cover the face of the roller with a resilient material such as a 13 mm ($\frac{1}{2}$ in.) plastic foam or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Seal all T-joints and membrane terminations with Bituthene Liquid Membrane at the end of the day.

Protrusions and Drains

Apply membrane to within 25 mm (1 in.) of the base of the protrusion. Apply Bituthene Liquid Membrane 2.5 mm (0.1 in.) thick around protrusion. Bituthene Liquid Membrane should extend over the membrane a minimum of 65 mm ($2\frac{1}{2}$ in.) and up the penetration to just below the finished height of the wearing course.

Vertical Surfaces

Apply membrane in lengths up to 2.5 m (8 ft). Overlap all seams at least 50 mm (2 in.). On higher walls apply membrane in two or more sections with the upper overlapping the lower by at least 50 mm (2 in.). Roll all membrane with a hand roller.

Terminate the membrane at grade level. Press the membrane firmly to the wall with the butt end of a

hardwood tool such as a hammer handle or secure into a reglet. Failure to use heavy pressure at terminations can result in a poor seal. A termination bar may be used to ensure a tight seal. Terminate the membrane at the base of the wall if the bottom of the interior floor slab is at least 150 mm (6 in.) above the footing. Otherwise, use appropriate inside corner detail where the wall and footing meet.

Membrane Repairs

Patch tears and inadequately lapped seams with membrane. Clean membrane with a damp cloth and dry. Slit fishmouths and repair with a patch extending 150 mm (6 in.) in all directions from the slit and seal edges of the patch with Bituthene Liquid Membrane. Inspect the membrane thoroughly before covering and make any repairs.

Drainage

Hydroduct® drainage composites are recommended for both active drainage and protection of the membrane. See Hydroduct product information sheets.

Protection of Membrane

Protect Bituthene membranes to avoid damage from other trades, construction materials or backfill. Place protection immediately in temperatures above 25°C (77°F) to avoid potential for blisters.

- On vertical applications, use Hydroduct 220 Drainage Composite. Adhere Hydroduct 220 Drainage Composite to membrane with Hydroduct Tape. Alternative methods of protection are to use 25 mm (1 in.) expanded polystyrene or 6 mm ($\frac{1}{4}$ in.) extruded polystyrene that has a minimum compressive strength of 55 kN/m² (8 lbs/in.²). Such alternatives do not provide positive drainage to the system.

If 6 mm (1/4 in.) extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 50 mm (2 in.) in diameter. Adhere polystyrene protection board with Bituthene® Protection Board Adhesive or Hydroduct Tape.

- In mud slab waterproofing, or other applications where positive drainage is not desired and where reinforced concrete slabs are placed over the membrane, the use of 6 mm (1/4 in.) hardboard or 2 layers of 3 mm (1/8 in.) hardboard is recommended.

Insulation

Always apply Bituthene membrane directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membrane. Do not apply Bituthene membranes over lightweight insulating concrete.

Backfill

Place backfill as soon as possible. Use care during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 150 mm (6 in.) to 300 mm (12 in.) lifts.

For areas which cannot be fully compacted, a termination bar is recommended across the top termination of the membrane.

Placing Steel

When placing steel over properly protected membrane, use concrete bar supports (dobies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Use special care when using wire mesh, especially if the mesh is curled.

Approvals

- City of Los Angeles Research Report RR 24386
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E

Warranty

Five year material warranties covering Bituthene and Hydroduct products are available upon request. Contact your Grace sales representative for details.

Technical Services

Support is provided by full time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

System 4000 Surface Conditioner Sprayer

The Bituthene System 4000 Surface Conditioner Sprayer is a professional grade, polyethylene, pump-type, compressed air sprayer with a brass fan tip nozzle. It has a 7.6 L (2 gal) capacity. The nozzle orifice and spray pattern have been specifically engineered for the optimum application of Bituthene System 4000 Surface Conditioner.

Hold nozzle 450 mm (18 in.) from substrate and squeeze handle to spray. Spray in a sweeping motion until substrate is uniformly covered.

Sprayer should be repressurized by pumping as needed. For best results, sprayer should be maintained at high pressure during spraying.

To release pressure, invert the sprayer and spray until all compressed air is released.

Maintenance

The Bituthene System 4000 Surface Conditioner Sprayer should perform without trouble for an extended period if maintained properly.



Sprayer should not be used to store Bituthene System 4000 Surface Conditioner. The sprayer should be flushed with clean water immediately after spraying. For breaks in the spray operation of one hour or less, invert the sprayer and squeeze the spray handle until only air comes from the nozzle. This will avoid clogging.

Should the sprayer need repairs or parts, call the maintenance telephone number on the sprayer tank (800-323-0620).

Supply

Bituthene System 4000	0.9 m x 20 m roll (18.6 m ²) 3 ft x 66.7 ft (200 ft ²)
Roll weight	38 kg (83 lbs) gross
Palletization	25 rolls per pallet
Storage	Store upright in dry conditions below +35°C (95°F).
System 4000 Surface Conditioner	1 x 2.3 L (0.625 gal) bottle in each roll of System 4000 Membrane

Ancillary Products

Surface Conditioner Sprayer	7.6 L (2 gal) capacity professional grade sprayer with specially engineered nozzle
Bituthene Liquid Membrane	5.7 L (1.5 gal) pail/125 pails per pallet or 15.1 L (4 gal) pail/48 pails per pallet
Hydroduct Tape	2.5 cm x 61.0 m (1 in. x 200 ft) roll/6 rolls per carton
Bituthene Mastic	12 – 0.9 L (30 oz) tubes/carton or 18.9 L (5 gal) pail/36 pails per pallet

Complimentary Materials

Hydroduct	See separate data sheets.
Protection Board Adhesive	18.9 L (5 gal) pail/36 pails per pallet

Equipment by Others: Soft broom, utility knife, brush or roller for priming

Physical Properties for Bituthene 4000 Membrane

Property	Typical Value	Test Method
Color	Dark gray-black	
Thickness	1.5 mm (1/16 in.) nominal	ASTM D3767 – Method A
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -32°C (-25°F)	Unaffected	ASTM D1970
Tensile Strength, Membrane, Die C	2240 kPa (325 lbs/in. ²) minimum	ASTM D412 Modified ¹
Tensile Strength, Film	34.5 MPa (5,000 lbs/in. ²) minimum	ASTM D882 Modified ¹
Elongation, Ultimate Failure of Rubberized Asphalt	300% minimum	ASTM D412 Modified ¹
Crack Cycling at -32°C (-25°F), 100 Cycles	Unaffected	ASTM C836
Lap Adhesion at Minimum Application Temperature	880 N/m (5 lbs/in.)	ASTM D1876 Modified ²
Peel Strength	1576 N/m (9 lbs/in.)	ASTM D903 Modified ³
Puncture Resistance, Membrane	222 N (50 lbs) minimum	ASTM E154
Resistance to Hydrostatic Head	70 m (210 ft) of water	ASTM D5385
Permeance	2.9 ng/m ² sPa (0.05 perms) maximum	ASTM E96, Section 12 – Water Method
Water Absorption	0.1% maximum	ASTM D570

Footnotes:

1. The test is run at a rate of 50 mm (2 in.) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 50 mm (2 in.) per minute at 5°C (40°F).
3. The 180° peel strength is run at a rate of 300 mm (12 in.) per minute.

Physical Properties for System 4000 Surface Conditioner

Property	Typical Value
Solvent Type	Water
Flash Point	>60°C (>140°F)
VOC* Content	125 g/L
Application Temperature	-4°C (25°F) and above
Freeze Thaw Stability	5 cycles (minimum)
Freezing Point (as packaged)	-10°C (14°F)
Dry Time (hours)	1 hour**

* Volatile Organic Compound

** Dry time will vary with weather conditions

For Technical Assistance call toll free at 866-333-3SBM (3726).

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62 Whittemore Avenue

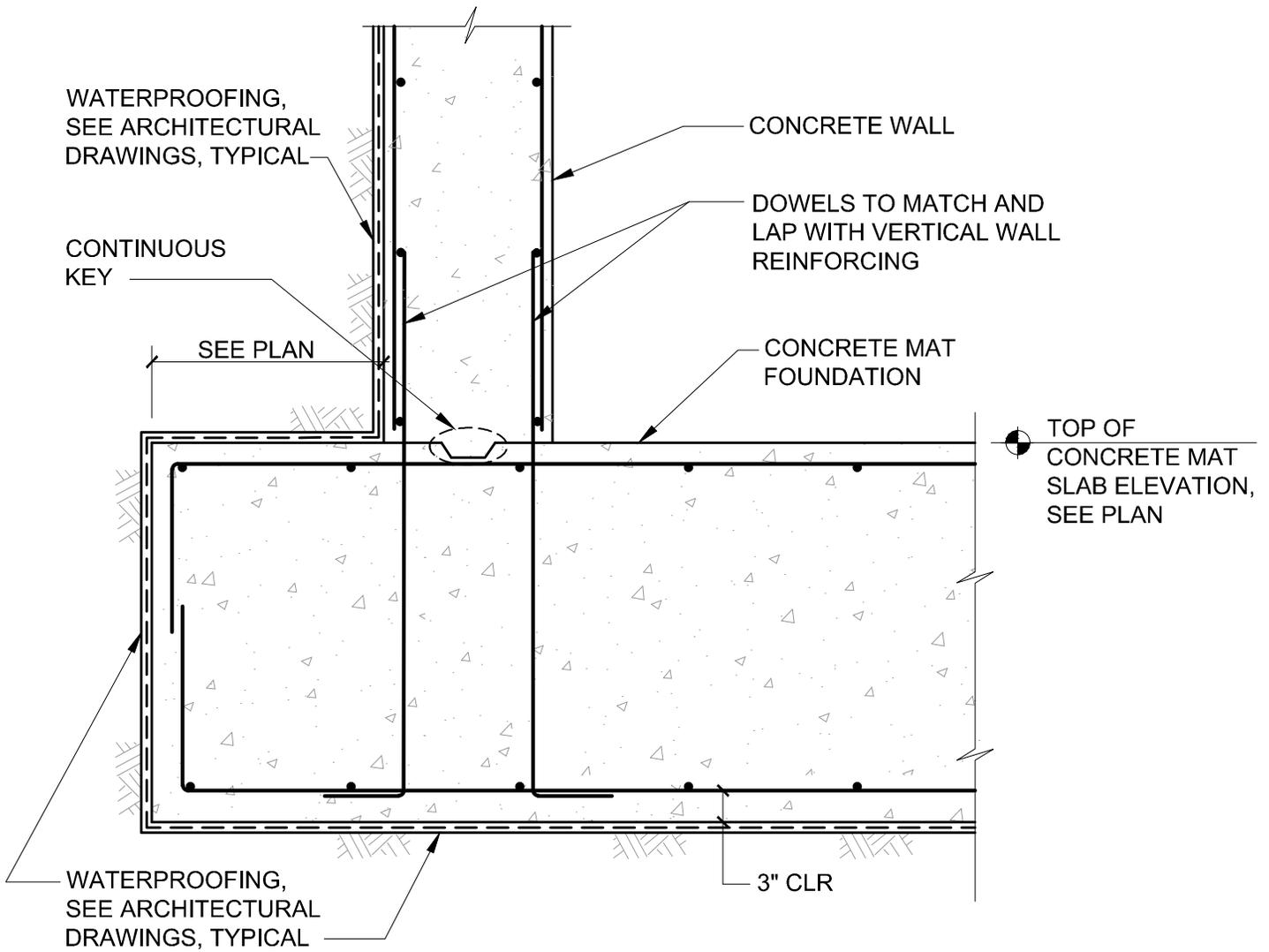
Cambridge, MA 02140

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GRACE
Construction Products



EXTERIOR CONCRETE WALL AT MAT FOUNDATION

102

De Nardis Engineering, LLC
Structural Consultants

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White Plains, NY 10603
Tel: (914) 948-8844
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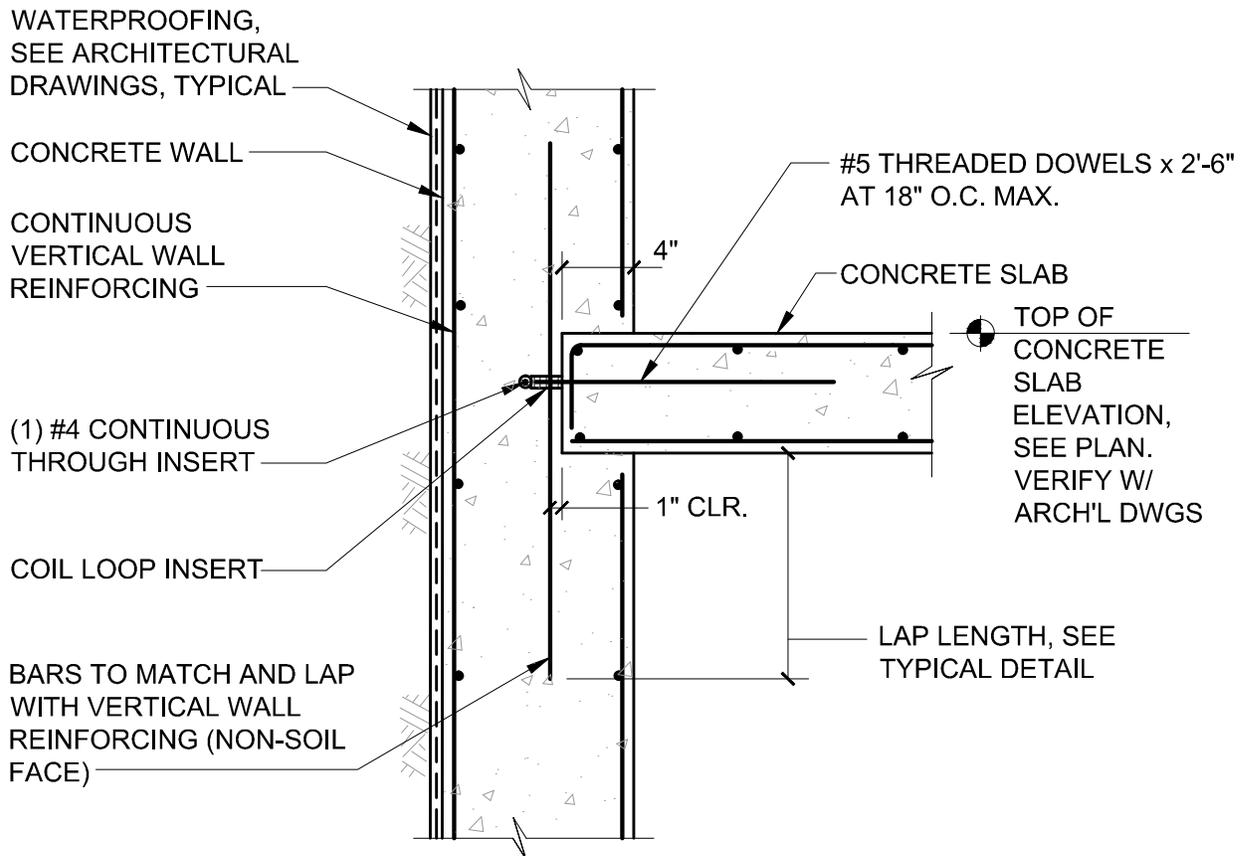
Project Name
81 Fleet Place
Brooklyn, NY 11201

Drawing Title
DETAIL 102/S-500: MAT
FOUNDATION AT
SUB-CELLAR

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

Date: 10/18/12
Project#: 12005.00

Sk-25



**CONCRETE SLAB AT CONTINUOUS
CONCRETE FOUNDATION WALL**

118

De Nardis Engineering, LLC
Structural Consultants

15 Reservoir Road
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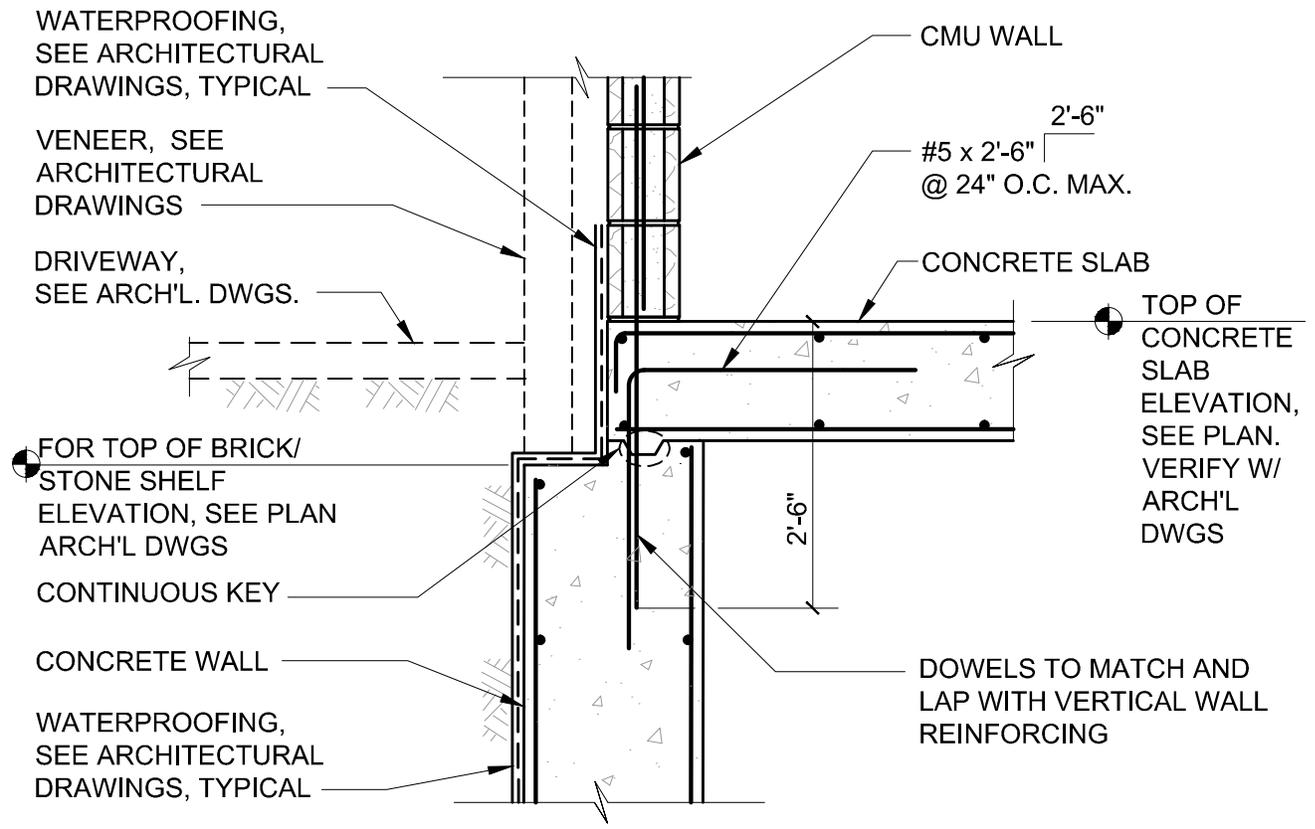
Project Name
81 Fleet Place
Brooklyn, NY 11201

Drawing Title
DETAIL 118/S-501:
CELLAR SLAB AT
FOUNDATION WALL

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

Date: 10/18/12
Project#: 12005.00

Sk-26



CONCRETE SLAB BEARING AT CONCRETE WALL

137

<p>De Nardis Engineering, LLC Structural Consultants</p> <p>15 Reservoir Road White Plains, NY 10603 Tel: (914) 948-8844 Fax: (914) 948-8868 www.denardis.com</p>	<p>Project Name 81 Fleet Place Brooklyn, NY 11201</p>	<p>Drawing Title DETAIL 137/S-502: FIRST FLOOR SLAB AT FOUNDATION WALL SCALE: 3/4" = 1'-0"</p>	Date: 10/18/12
			Project#: 12005.00
			Sk-27

SECTION 07 10 00 – FOUNDATION WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The work of this Section includes, but is not necessarily limited to, the following:
 1. Below-grade foundation waterproofing of horizontal foundation mats and slabs and vertical foundation walls and pit walls, as shown on the drawings.
 2. Installation accessories, including sealers, flashings, fasteners, tapes, reglets, liquid membranes and similar accessories.
 3. Installation of concrete working surface below horizontal surfaces.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide waterproofing that prevents the passage of water under hydrostatic pressure and complies with requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current sheet membrane.

1.4 REFERENCES

- A. All work shall comply with requirements of the Building Code of the City of New York, requirements of the New York State Department of Labor, requirements of Occupational Safety and Health Administration (OSHA), requirements of New York State Department of Health (NYSDOH), requirements of the New York State Department of Environmental Conservation (NYSDEC), requirements of the New York City Department of Environmental Protection (NYCDEP), requirements of the New York City Office of Environmental Remediation (NYCOER), and with applicable requirements of all other authorities having jurisdiction.
- B. Latest version of the American Society for Testing and Materials (ASTM) Standards:
 - ASTM C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
 - ASTM D 570 Standard Test Method for Water Absorption of Plastics
 - ASTM D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - ASTM D 1876 Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
 - ASTM D 1970 Self-Adhering Polymer Modified Bituminous Sheet Material Used as Steep Roofing Underlayment for Ice Dam Protection

ASTM D 3767	Standard Practice for Rubber-Measurement of Dimensions
ASTM D 5385	Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
ASTM E 96	Water Vapor Transmission of Materials
ASTM E 154	Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.5 SUBMITTALS

- A. Submit the following information for review by the Architect and Engineer:
1. Manufacturer's product data, specifications, installation instructions, product samples;
 2. Laboratory test results demonstrating the properties of the product meet or exceed the required values in Part 2.2 of this Section;
 3. Written certification that the Installer has been actively installing the submitted product (or similar product) for at least three years; and the names, addresses and contact names for three previous waterproofing projects completed by the installer (both supervisor and lead technician);
 4. Project-specific shop drawings containing:
 - a. Penetrations, curbs, drains, and projections.
 - b. Flashing details, including inside and outside corner reinforcement and terminations.
 - c. Crack and joint treatments, including expansion joints.
 - d. Interface with contiguous materials.
- B. Prior to commencing work, submit the following:
1. Contractor's Review: Before commencing work the Contractor and the Installer shall sign a written statement signed stating that the Contract Documents have been reviewed with a qualified representative of the Manufacturer of the waterproofing system, and that he is in agreement that the selected materials are proper, compatible with contiguous materials and adequate for the application shown. Indicate by transmittal form that a copy of the statement has been sent to the Manufacturer.
 2. Substrate Acceptability: Submit a certified statement issued by the Manufacturer of the waterproofing materials, and countersigned by the Installer, attesting that all areas and surfaces designated to receive waterproofing have been inspected and found satisfactory for the reception of the Work covered under this Section; and are not in conflict with the "Warranty" requirements. Installation of materials will be construed as acceptance of surfaces.
- C. Upon project closeout, submit the following:
1. Statement of Supervision: Upon completion of Work submit a written statement signed by the Manufacturer stating that the field supervision by the Manufacturer's representative was sufficient to insure proper application of the materials, that the

Work was installed in accordance with the Contract Documents and that the installation is acceptable to the Manufacturer.

2. Warranty: Submit Manufacturer's and Installer's five-year warranty upon acceptance of completed work, further described later in this Part.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer, who is certified in writing by waterproofing manufacturer as qualified, to install specified waterproofing systems.
- B. Single-Source Responsibility: Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing waterproofing.
- C. Pre-installation Conference
 1. Before installing waterproofing, meet with owner, architect, consultants, independent testing agency, waterproofing manufacturer, Contractor, waterproofing installer, and other concerned entities.
 2. Review requirements for waterproofing, including surface preparation specified under other Sections waterproofing manufacturer's requirements, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, inspection and testing procedures, and protection and repairs.
 3. Notify participants at least 7 days before pre-installation conference.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packaging with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer. Protect stored materials from direct sunlight.

1.8 PROJECT CONDITIONS

- A. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.9 WARRANTY

- A. Special Warranty: Submit a written warranty signed by waterproofing manufacturer and installer agreeing to repair or replace waterproofing that does not meet requirements or that does not remain watertight during the specified warranty period. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1.6 mm in width.
 1. Warranty Period: 10 years after date of "Substantial Completion".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Product: Provide foundation waterproofing systems, as manufactured by W. R. Grace & Co. Construction Products, Inc. or approved equivalent subject to compliance with the requirements herein.
 - 1. Horizontal Application: “Blind Side,” “Preprufe 300”
 - 2. Vertical Applications, “Blind side” Conditions: “Preprufe 160”.
 - 3. Vertical Applications to constructed walls: “Bituthene 4000”

2.2 HIGH DENSITY POLYETHYLENE (HDPE) COMPOSITE SHEET

- A. Adhesive-Coated HDPE Composite Sheet, Horizontal Applications: 1.42-mm-thick (nominal), uniform, flexible sheet consisting of 0.75-mm-thick high density polyethylene sheet coated with a pressure sensitive rubber adhesive, a protective adhesive coating, a detackifying surface treatment, an undercoated self-adhering side lap strip and a release liner.
- B. Adhesive-Coated HDPE Composite Sheet, Vertical Applications: 1.07-mm-thick (nominal), uniform, flexible sheeting consisting of 0.4-mm-thick high-density polyethylene sheet coated with pressure sensitive rubber adhesive, a protective coating, and a release liner.
- C. Physical Properties: Provide waterproofing complying with the following:
 - 1. Tensile Strength, Film: 4,000 psi minimum; ASTM D412
 - 2. Low-Temperature Flexibility: Unaffected at minus –10 deg F; MOAT 31:6D.
 - 3. Peel Adhesion to Concrete: 5 lbs/in; MOAT 27:5.1.3.
 - 4. Lap Adhesion: 2.5 lbs/in minimum; ASTM D1876, modified.
 - 5. Hydrostatic-Head Resistance: 231 feet; ASTM D5385, modified.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing sheet membrane.
 - 1. Auxiliary materials shall be compatible with hydrocarbon-contaminated soils.
- B. Furnish liquid-type auxiliary materials that meet VOC limits of authority having jurisdiction.
- C. Primer: Liquid primer recommended by manufacturer of sheet waterproofing material for substrate.
- D. Sheet Flashing: Self-adhering, rubberized asphalt composite sheet of same material, construction and thickness as waterproofing sheet membrane.
- E. Liquid Membrane: Elastomeric, 2-component, liquid, cold fluid applied, trowel grade or low viscosity, as recommended by waterproofing manufacturer for application.

- F. Patching Membrane: Low-viscosity, 2-component, asphalt modified coating.
- G. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
- H. Penetration Seal: Self-adhering reinforced membrane, 2-½-inches wide, with a tack-free protective adhesive coating on one side and release film on self-adhering side.
- I. Metal Termination Bars: Aluminum bars, approximately 1-inch by 1/8-inch thick, predrilled at 22-mm-centers.
- J. Joint Tape: 1/16 inches felt reinforced self-adhesive tape, 6-inches wide, with a release film on adhesive side.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which waterproofing systems will be applied, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Do not proceed with installation until after minimum concrete curing period recommended by waterproofing manufacturer.
- C. Verify substrate is visibly dry and free of moisture. Test for capillary moisture for plastic sheet method according to ASTM D4263.
- D. Notify Architect in writing of anticipated problems using waterproofing over substrate.

3.2 CONCRETE SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.
- C. Remove grease, oil, form release agents, and other penetrating contaminants from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrate. Remove dust and dirt from joints and cracks according to ASTM D4258.
- F. Install membrane strip and center over construction and control joints and cracks exceeding a width of 1/16-inch.
- G. Inside Corners: Prepare, prime, and treat inside corners according to waterproofing manufacturer's written instructions.

- H. Install membrane strip centered over vertical inside corners. Install 19-mm-fillets of liquid membrane on horizontal inside corners as follows:
 - 1. All footing-to-wall intersections extend liquid membrane each direction from corner or install membrane strip centered over corner.
 - 2. All deck-to-wall intersections extend liquid membrane or sheet membrane flashing onto deck waterproofing and to finished height of sheet flashing.
- I. Outside Corners: Prepare and treat outside corners according to waterproofing manufacturer's written instructions.
 - 1. Install strip of membrane 12-inches-wide, centered over corner.
- J. Prepare, treat, and seal horizontal and vertical surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to waterproofing manufacturer's written instructions.
 - 1. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge and cover with sheet membrane strips.

3.3 PREPARATION FOR VERTICAL BLIND-SIDE APPLICATIONS

- A. Provide a continuous smooth rigid vertical facing to receive the waterproofing material. The material may consist of plywood or rigid insulation.
- B. Steel sheet piles must be treated with a rigid facing.
- C. Timber lagging may be used, but it must be close-butted to provide support and to be more than 0.5 inch out of plumb.

3.4 SOIL SUBGRADE PREPARATION

- A. Install a minimum 3-inch-thick concrete working slab beneath all building slabs or other substrate support acceptable by the waterproofing manufacturer.
- B. Prepare surface of concrete working slab in accordance with paragraph 3.2 above.
- C. Place membrane waterproofing directly on top of concrete working slab, in accordance with paragraph 3.4, herein.

3.5 INSTALLATION OF WATERPROOFING FOR ACCESSIBLE WALLS

- A. General: Conform to recommendations and published specifications of the manufacturer including environmental requirements.
- B. Wall Applications
 - 1. General: The Bituthene Waterproofing membrane, when in place, must withstand a minimum static ground water pressure of 150 feet.
 - 2. Priming: Application of primer shall be limited to what can be covered with Bituthene Waterproofing Membrane in a given work day. Primed areas not covered

by membrane during the work day will be reprimed. Apply primer by spray, roller or brush at a rate of 250 - 350 sq. ft. per gallon. Roller shall be natural material such as lamb's wool, having a nap of approximately one inch. Primer shall be applied to a clean, dry, frost-free and dust-free surface. Sufficient primer must be used on the dry surface to condition it to a dust-free state suitable for the application of Bituthene Waterproofing Membranes.

- a. Bituthene Surface Conditioner should not be applied below 40 deg. F. on vertical surfaces. Allow primer to dry 30 minutes.
- b. Membrane Installation: Apply membrane vertically in sections of 8' in length or less. On higher walls apply two or more sections with the upper overlapping the lower by at least 3 inches. Press all membrane in place with heavy hand pressure or rollers during application.
- c. Sealing Edges: Membrane shall be applied over the edge of the slab or over the top of the foundation or parapet wall. If the membranes are terminated on the vertical surface, a reglet or counter flashing may be used or the membrane may be terminated directly on the vertical surface by pressing very firmly to the wall. Press edges with a metal or hardwood tool such as a hammer or knife handle. Apply a troweled bead of Bituthene Mastic to all vertical and horizontal terminations. Bituthene Liquid Membrane can be used as an alternative method at the Contractor's option.
- d. Sealing Seams: All edges and end seams must be overlapped at least 3 inches. Apply succeeding sheets with a minimum 3 inches overlap and stagger end laps. Roll or press the entire membrane firmly and completely as soon as possible. Patch misaligned or inadequately lapped seams with approved patching procedures. Slit any fish mouths, overlap the flaps, and repair with a patch of Bituthene and press or roll in place. The edges of the patch shall be sealed with a troweling of mastic. Laps within 12 inches of all corners shall be sealed with a troweling of mastic.
- e. Corner Forming: Outside corners must be free of sharp edges. Inside corners shall receive a fillet formed with Liquid Membrane, latex modified cement mortar equal to Daraweld C made by Grace mixed with cement mortar or epoxy mortar. Do not use fiber or wood cants. One of three methods may be used for treating corners at the General Contractor's option:
 - 1) Apply Bituthene Liquid Membrane 6 inches in each direction from the corner and form a fillet with a minimum 3/4-inch face.
 - 2) Install a 12-inch minimum strip of Bituthene Membrane centered on the corner. Install Bituthene Membrane over the treated inside and outside corners.
 - 3) Use preformed corners per manufacturer's recommendations and installation guidelines.
- f. Over waterproofing, apply protection, and/or drainage composite board per Contract Documents by adhering board to cured membrane using tape or adhesive per Manufacturer's recommendations.

3. Seal penetrations through membrane to provide watertight seal with penetration seal patches or wrapping and liquid membrane fillet as recommended by the waterproofing system manufacturer.

3.6 INSTALLATION OF WATERPROOFING FOR BLINDSIDE WALLS AND UNDERSLAB WATERPROOFING

- A. General: Conform to recommendations and published specifications of the manufacturer including environmental requirements.
- B. Wall Applications
 1. Refer to manufacturer's literature for complete installation instructions but not limited to the following:
 - a. Apply Hydroduct 220 Drainage Composite to a point within 6" of grade line. Fasten Hydroduct 220 to the adjacent buildings foundation wall or soil retention system.
 - b. Apply membrane in accordance with the manufacturer's recommendations to the soil retention system or adjacent foundation. Remove the release liner and fasten membrane to Hydroduct drainage composite with large head nails or staples. Fasteners shall be repaired using penetration repairs specified herein.
 - c. Apply succeeding sheets by overlapping the previous sheet 3 inches along the uncoated edge of the membrane.
 - d. Overlap the ends of the membrane 3 inches. Apply Preprufe Tape centered over the end lap and roll firmly. Remove release liner.
 - e. Concrete must be poured within 30 days of membrane application.
 - f. Protect membrane until concrete pour.
 - g. If membrane ties into a vertical membrane, leave an additional 12-inch flap of Preprufe membrane to tie into Bituthene membrane.
- C. Securely fasten top termination of wall-mounted sheet membrane with continuous metal termination bar anchored into concrete substrate. Fastening on adjacent structures is not permitted. Comply with the details indicated and the manufacturer's written instructions.
- D. Seal penetrations through membrane to provide watertight seal with penetration seal patches or wrapping and liquid membrane fillet as recommended by the waterproofing system manufacturer.
- E. Repair tears, voids, and lapped seams in waterproofing not meeting requirements. Tape perimeter of damaged or non-confirming area extending 6 inches beyond repaired areas in all directions. Firmly apply a patch of sheet membrane.

3.7 SEAM REINFORCEMENT FOR PREPRUFE SHEETS ONLY

- A. All selvedge edges not present shall be taped with Preprufe Tape.

- B. Integration of old onto new pre-applied sheet membrane.
 - 1. Integration of Sheet Membrane onto Sheet Membrane that has been installed in excess of 30 days prior.
 - a. Lap sheets 12 inches, apply a 1/8-inch thick by 12-inch wide application of fluid membrane between sheets, to provide a 12-inch wide seal at this location.
 - b. Install Waterproofing Tape centered at edge of lap and roll firmly into place with an approved roller.
 - c. Install additional Waterproofing Tape to cover white film that has been installed over 30 days prior.
 - 2. Repair of pre-applied sheet membrane
 - a. Scratch on white coating exposing underlying black surfing of Sheet Membrane: Install Waterproofing Tape at areas where the white coating of the membrane is damaged, including boot scuff marks and abrasions by rebar.
 - b. Damage or Puncture of Sheet Membrane: Install Patch of short Membrane set in Liquid Membrane. Patch must extend 3 inches in every direction around extent of damaged area. Install Waterproofing Tape centered over the edge of the patch. If the damaged area does not have 5 inches of sound material around it, inject Liquid Membrane into puncture until Liquid Membrane backs out, and proceed with patch as space allows.

3.8 PROTECTING AND CLEANING

- A. Protect waterproofing from damage and wear during application and remainder of construction period, according to manufacturer's written instructions.

3.9 HORIZONTAL APPLICATION:

- A. Protect top surface of membrane with protection board from punctures, tears, or burns.

3.10 VERTICAL APPLICATIONS:

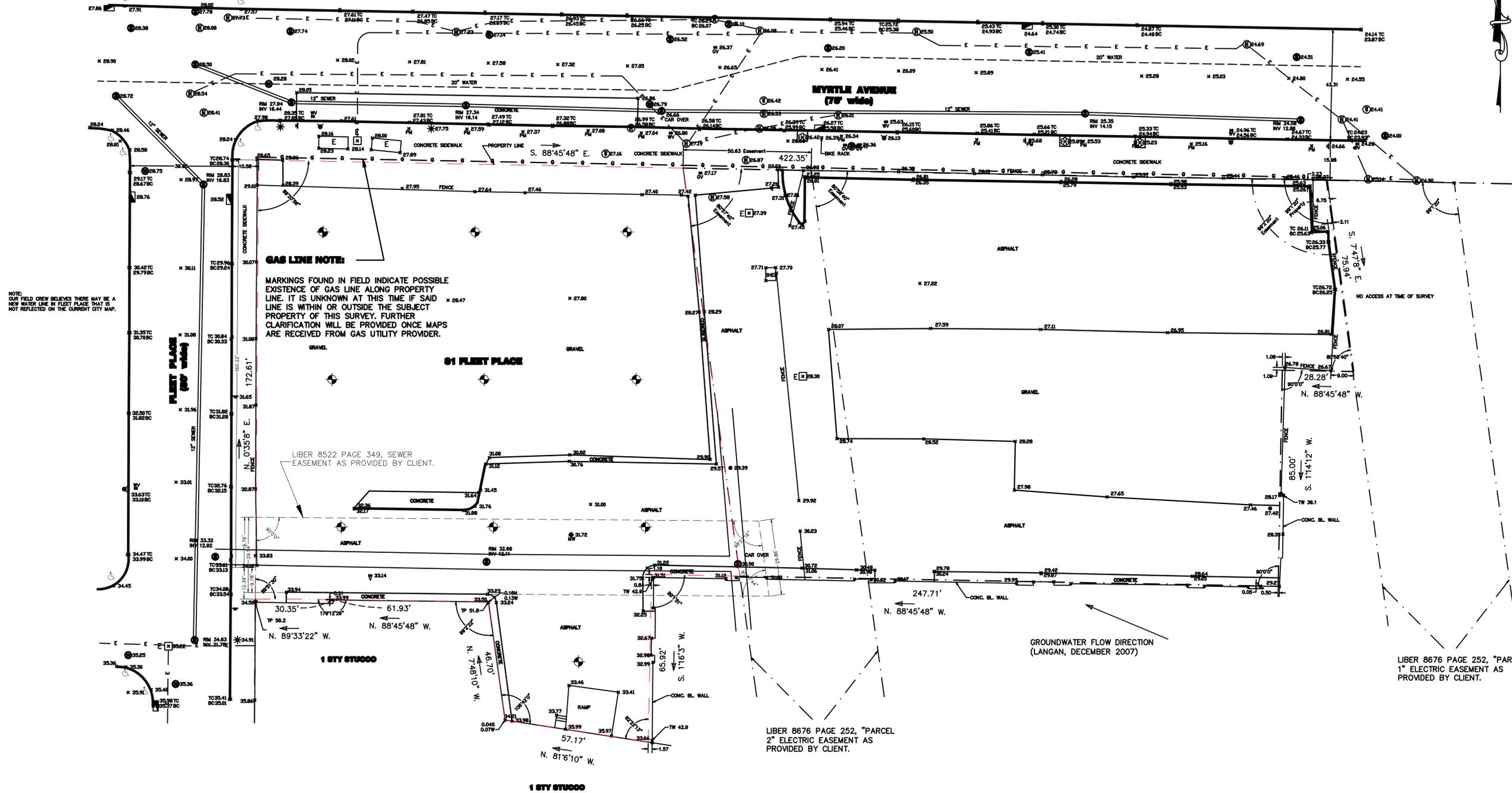
- A. Protect membrane waterproofing from damage due to uneven substrate. This includes placement of a rigid barrier such as a plywood or rigid insulation between the membrane waterproofing and the soil backfill material.
- B. Protect membrane waterproofing from damage during backfilling operations. This includes placement of a rigid barrier such as a plywood or rigid insulation between the membrane waterproofing and the soil backfill material. Damaged waterproofing because of backfilling methods will be replaced at no additional expense to the Owner.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 10 00

APPENDIX H
BUILDING SECTION

APPENDIX I

ENDPOINT SAMPLING LOCATIONS



NOTE:
OUR FIELD CREW BELIEVES THERE MAY BE A
NEW WATER LINE IN FLEET PLACE THAT IS
NOT REFLECTED ON THE CURRENT CITY MAP.

GAS LINE NOTE:

MARKINGS FOUND IN FIELD INDICATE POSSIBLE
EXISTENCE OF GAS LINE ALONG PROPERTY
LINE. IT IS UNKNOWN AT THIS TIME IF SAID
LINE IS WITHIN OR OUTSIDE THE SUBJECT
PROPERTY OF THIS SURVEY. FURTHER
CLARIFICATION WILL BE PROVIDED ONCE MAPS
ARE RECEIVED FROM GAS UTILITY PROVIDER.

LIBER 8522 PAGE 349, SEWER
EASEMENT AS PROVIDED BY CLIENT.

LIBER 8676 PAGE 252, "PARCEL
1" ELECTRIC EASEMENT AS
PROVIDED BY CLIENT.

LIBER 8676 PAGE 252, "PARCEL
2" ELECTRIC EASEMENT AS
PROVIDED BY CLIENT.

GROUNDWATER FLOW DIRECTION
(LANGAN, DECEMBER 2007)

LEGEND

- ENDPOINT SAMPLING LOCATIONS
- SUBJECT SITE

SURVEYORS LEGEND:

- TC-TOP OF CURB
- BC-BOTTOM OF CURB
- LG-LEGAL GRADE
- TB-TOP OF WALK
- SW-BOTTOM OF WALL
- CU-CURB LINK FENCE
- ASPH-ASPHALT PAVEMENT
- CONC-CONCRETE PAVEMENT
- PH-FIRE HYDRANT
- S-SEWER
- E-ELECTRIC
- W-WATER
- OV-OVERHEAD VALVE
- UV-UNDERGROUND VALVE
- TV-TELEPHONE
- TP-TOP OF PARAPET
- LP-UTILITY POLE
- LM-MONITORING WELL
- [0.00]-LEGAL GRADE

UNAUTHORIZED ALTERATION OF, OR ADDITION TO
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ORIGINAL OF THE PROFESSIONAL ENGINEERS INKED
SEAL OR HIS EMBOSSED SEAL SHALL NOT BE
CONSIDERED TO BE VALID TRUE COPIES.

REV.	DATE	DESCRIPTION	BY
JOB NO.		R.A. REAL ESTATE, INC. FLEET PLACE, BROOKLYN, N.Y.	
DRAWN			KAK
CHECKED		ENDPOINT SAMPLING LOCATIONS PLAN	KLB
APPROVED			RDG
SEAL		Galli engineering, p.c. 734 Walt Whitman Road, Suite 402A Melville, New York 11747	
DATE	SCALE		DRAWING NO.
08/20/12	1"=20'		