

180 NASSAU STREET
BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC VCP Number: 13CVCP076K

Prepared for:

Pink Stone Capital Group
347 Fifth Avenue, Suite 1602
New York, NY 10016

Prepared by:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

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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
VCA	Voluntary Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC VCP	New York City Voluntary 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
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, Ariel Czemerinski, 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 project located at 180 Nassau Street, Brooklyn, NY, VCP Site Number: 13CVCP076K.

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.

Ariel Czemerinski
Name

07608
NYS PE License Number

Signature

08/10/2012
Date



EXECUTIVE SUMMARY

Pink Stone Capital Group has enrolled in the New York City Volunteer Cleanup Program (NYC VCP) to investigate and remediate a 13,161 square foot site located at 180 Nassau Street 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 180 Nassau Street in the Dumbo section on Brooklyn, New York and is identified as Block 108 and Lot 12 on the New York City Tax Map. **Figure 1** shows the Site location. The Site is 13,161-square feet and is bounded by Nassau Street to the north, Duffield Street to the east, Lot 5 to the west, which is developed with a 20-story apartment building with first floor commercial space. A map of the Site boundary is shown in **Figure 2**. Currently, the Site is vacant, but an abandoned 5-story residential building is located on the eastern portion of the Site.

Lot 12 is a slightly irregular shaped corner lot consisting of 150.5 feet of street frontage on Nassau Street and 88.33 feet of street frontage on Duffield Street. The majority of the lot consists of an exposed soil cover, but one abandoned 5-story apartment building is located at the intersection of Duffield Street and Nassau Street.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a new 12-story apartment building. Layout of the proposed Site development is presented in Figure 3. The current zoning designation is C6-2. The proposed use is consistent with existing zoning for the property.

The proposed redevelopment plans for the Site include the construction of a new 12-story apartment building with a full cellar level below grade. The apartment building will have 124 dwelling units, accessory recreation areas at the cellar and first floor levels, and an outdoor



accessory recreation area at the roof level. The proposed project gross area will be approximately 125,000 ft², including the cellar level.

With the exception of two areas, the entire Site will require excavation to a depth of approximately 13 feet below grade to allow for installation of the cellars concrete slab at 12 feet below grade. The two areas that require excavation to a lesser extent include the two vehicular ramps to the cellar and first floor parking garages, and the entrance to the residential lobby located on the corner of Duffield Street and Nassau Street.

The cellar level will be utilized as accessory off-street parking, accessible from ramps located along Duffield Street. The remainder of the cellar will consist of a water service and gas meter room, fire pump room, telecommunications room, electric service room, bicycle storage room, superintendent's office and shop, compactor and recycle room, residential storage areas, and a 1,325 ft² gym/recreation area with accessory restrooms and storage. Access to the cellar is provided by a vehicle ramp from Duffield Street, two elevators and two stairwells.

The first floor of the building will also be utilized for accessory off-street parking, but will also consist of the residential lobby, a 1,287 ft² accessory recreation room, bicycle room, boiler room, ramps to the lower cellar level parking garage and first floor parking garage, and the two elevators and two stairwells. Each of the 124 dwelling units will be located on the 2nd through 12th floors.

The total volume of soil required to be excavated from the site for construction of the proposed building is estimated at approximately 6,000 cubic yards (9,000 tons).

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 (CPP);
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 4 Site-Specific SCOs. Additional testing may be performed to determine attainment of Track 1 Unrestricted Use SCOs;
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs;
6. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of any contaminated media on-Site;
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 whether Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs are achieved;
10. Demarcation of residual soil/fill;
11. Construction and maintenance of an engineered composite cover across the entire Site to prevent human exposure to residual soil/fill remaining under the Site and operation of high volume air exchange required by NYC Building Code to provide ventilation for indoor parking garage;

12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
15. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, and lists any changes from this RAWP.
16. If Track 1 Unrestricted Use SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual historic fill, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
18. If Track 1 Unrestricted SCOs are 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) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (3) 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 Site Safety Coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is Mr. Kevin Waters of Environmental Business Consultants. Mr. Waters can be reached at (631) 504-6000.

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 on-Site Project Manager, Kevin Brussee at (631) 504-6000 or NYC Office of Environmental Remediation Project Manager, William Wong at (212) 788-1482.

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 7:00AM to 6:00PM Monday through Friday.

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 Mr. Kevin Brussee (EBC Project Manager) at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager William Wong at (212) 788-1482, 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 repositories located at the Brooklyn Library - Walt Whitman Library Branch (93 Saint Edwards Street).

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

Pink Stone Capital Group has enrolled in the New York City Volunteer Cleanup Program (NYC VCP) to investigate and remediate a property located at 180 Nassau Street in the Dumbo 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 180 Nassau Street in the Dumbo section of Brooklyn, New York, and is identified as Block 108 and Lot 12 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 13,161-square feet and is bounded by Nassau Street to the north, Duffield Street to the east, Lot 5 to the west, which is developed with a 20-story apartment building with first floor commercial space. A map of the Site boundary is shown in Figure 2. Currently, the Site is vacant, but an abandoned 5-story residential building is located on the eastern portion of the Site.

Lot 12 is a slightly irregular shaped corner lot consisting of 150.5 feet of street frontage on Nassau Street and 88.33 feet of street frontage on Duffield Street. The majority of the lot consists of an exposed soil cover, but one abandoned 5-story apartment building is located at the intersection of Duffield Street and Nassau Street.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of a new 12-story apartment building. Layout of the proposed Site development is presented in Figure 3. The current zoning designation is C6-2.



The proposed use is consistent with existing zoning for the property.

The proposed redevelopment plans for the Site include the construction of a new 12-story apartment building with a full cellar level below grade. The apartment building will have 124 dwelling units, accessory recreation areas at the cellar and first floor levels, and an outdoor accessory recreation area at the roof level. The proposed project gross area will be approximately 125,000 ft², including the cellar level.

With the exception of two areas, the entire Site will require excavation to a depth of approximately 13 feet below grade to allow for installation of the cellars concrete slab at 12 feet below grade. The two areas that require excavation to a lesser extent include the two vehicular ramps to the cellar and first floor parking garages, and the entrance to the residential lobby located on the corner of Duffield Street and Nassau Street.

The cellar level will be utilized as accessory off-street parking, accessible from ramps located along Duffield Street. The remainder of the cellar will consist of a water service and gas meter room, fire pump room, telecommunications room, electric service room, bicycle storage room, superintendent's office and shop, compactor and recycle room, residential storage areas, and a 1,325 ft² gym/recreation area with accessory restrooms and storage. Access to the cellar is provided by a vehicle ramp from Duffield Street, two elevators and two stairwells.

The first floor of the building will also be utilized for accessory off-street parking, but will also consist of the residential lobby, a 1,287 ft² accessory recreation room, bicycle room, boiler room, ramps to the lower cellar level parking garage and first floor parking garage, and the two elevators and two stairwells. Each of the 124 dwelling units will be located on the 2nd through 12th floors.

The total volume of soil required to be excavated from the Site for construction of the proposed building is estimated at approximately 6,000 cubic yards (9,000 tons).

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

1.3 Description of Surrounding Property

The area surrounding the Site consists of a mix of residential and commercial properties as described below:

- 200 Nassau Street; 1-13 Duffield Street occupied by the D.R. White Catholic Community Center to the east.
- 170 Nassau Street, located between 168 Nassau Street and 172 Nassau Street, is currently being redeveloped as a covered entry-way to a new 18-story apartment complex located at 189 Bridge Street.
- 12 Duffield Street and 193 Bridge Street are located to the south, and both are used as parking for the 18-story apartment complex located at 189 Bridge Street.
- Trinity Park (Public Park and Playground) to the north.

Figure 4 shows the surrounding land usage.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, 180 Nassau Street, Brooklyn, NY*”, dated July 2012 (RIR).

Summary of Past Uses of Site and Areas of Concern

The Phase I Environmental Site Assessment prepared by EBC in April of 2008 notes prior use of the Site as the following:

- 172 Nassau Street – Residential and Mayfair Ship Supplies
- 174-178 Nassau Street – Residential and a ribbon ink and carbon paper manufacturing plant
- 180 Nassau Street / 2 Duffield Street – Residential only

Summary of the Work Performed under the Remedial Investigation

Pink Stone Capital Group performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);

2. Installed 6 soil borings across the entire project Site, and collected 12 soil samples (plus one duplicate sample) for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two groundwater monitoring wells throughout the Site and collected two groundwater samples (plus one duplicate sample) for chemical analysis to evaluate groundwater quality;
4. Installed five soil vapor probes around Site perimeter and collected five samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 56 feet.
2. Depth to groundwater ranges from 50 to 52 feet at the Site.
3. Groundwater flow is generally from south to north beneath the Site.
4. Depth to bedrock is at the Site is greater than 100 feet.
5. The stratigraphy of the Site, from the surface down, consists of up to 12 feet of historic fill underlain by a coarse brown native sand.
6. Shallow soil samples collected during the RI showed no PCBs at detectable concentrations. No VOCs were detected above UUSCOs within any of the soil samples except for two very low concentrations of m&p-Xylenes (10 ppb) and o-Xylene (5.7 ppb) detected in one of the shallow soil samples. No chlorinated VOCs including PCE and TCE were detected in any soil sample. Four SVOCs (benzo(a)anthracene, benzo(a)-pyrene, benzo(b)fluoranthene and chrysene were detected within the one of the six shallow samples at concentrations above their RRSCOs, and one SVOC was detected at a concentration above RRSCO in a second shallow soil sample. Four metals including lead (maximum of 322 ppm), mercury (maximum of 0.51 ppm), Nickel (maximum of 339 ppm) and zinc (maximum of 324 ppm) were detected at a concentration above UUSCOs within the shallow soil samples. No metals in shallow or deeper soils were detected at a concentration exceeding their RRSCOs. One pesticide, chlordane was detected above UUSCOs at 56 ppb within the shallow soil samples collected from the historic fill layer. The type, distribution and concentration of each of SVOCs and metals indicate that they are associated with historic fill material observed in shallow samples. Deep soil samples collected during the RI showed no pesticides, PCBs, or VOCs at detectable

concentrations. Two SVOCs were detected within one of the six deep soil samples at a concentration above their RRSCO. Metals including lead, mercury nickel and zinc were above UUSCO. Overall, the findings for soil were unremarkable and did not show a source area for contamination on the property. Soil results were consistent with observations for other historical fill sites in Brooklyn.

7. No pesticides or PCBs were detected in either groundwater sample collected at the Site. Groundwater samples collected during the RI showed one chlorinated VOC (chloroform) in both groundwater samples. Chloroform was detected above Groundwater Quality Standards (GQS) in the range from 1.0 ppb to 7.5 ppb. No TCE or PCE was detected in groundwater. No SVOCs were detected above their corresponding GQSs in groundwater, but two SVOCs were reported at low concentrations below their corresponding GQS. The dissolved metals including iron, magnesium, manganese, and sodium were detected above their respective GQS and are suggestive of regional saline influence in groundwater. The RI indicates that groundwater is not impacted by Site conditions and did not reveal any sources of contaminants on the Site.
8. Soil vapor samples collected during the RI showed low trace levels of petroleum and chlorinated VOCs except for acetone (detected from 752 to 2,070 $\mu\text{g}/\text{m}^3$) and ethanol (detected from 172 to 855 $\mu\text{g}/\text{m}^3$). Both compounds are common laboratory introduced contaminants. PCE was identified in all samples at a maximum concentration of 1.91 $\mu\text{g}/\text{m}^3$. TCE was identified in five of the six soil vapor samples at a maximum concentration of 1.02 $\mu\text{g}/\text{m}^3$. These results were well below the monitoring levels for PCE and TCE in the State DOH soil vapor guidance matrix and in the range of ambient air quality. Neither PCE nor TCE were detected within any of the soil samples collected at the Site and these low levels suggest a possible off-Site origin.

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.

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 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 nine 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:

Two remedial action alternatives are considered in this alternatives analysis. Alternative 1 is a Track 1 alternative that involves removal of all soil impacted above Track 1 - Unrestricted Use SCOs. Alternative 2 removes all impacted soil above Track 4 Site-Specific SCOs.

- Alternative 1 - Track 1. Removal of all soils exceeding Track 1 Unrestricted Use SCOs throughout the site and confirmation that Track 1 has been achieved with post-excavation endpoint sampling. Based on the results of the remedial investigation, it is expected that this alternative would consist of removal of historic fill to a minimum depth of 12 feet. Since the planned excavation depth for the new building's basement level is 12 feet for the entire Site, all or most historic fill should be removed during building construction. If

soil/fill containing constituents at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Unrestricted Use SCOs.

- Alternative 2 involves
 - Removal of all soils exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs has been achieved with post-excavation endpoint sampling. Excavation for development purposes would take place to a depth of approximately 12 feet. If soil/ fill containing SVOCs or metals at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Track 4 Site-Specific SCOs.
 - 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 other sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;
 - Establishment of an approved Site Management Plan (SMP) 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.

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 result in removal of all soil/fill with contaminant concentrations above Track 1 SCOs. As such, this alternative would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Eliminating the potential for direct contact with contaminated on-Site soils;
- Minimizing potential exposure to contaminated soils during construction by implementing an approved Soil/Materials Management Plan and Community Air Monitoring Plan (CAMP);
- Eliminating the risk of contamination leaching into groundwater;
- Preventing migration of soil vapors into occupied structures.

Alternative 2 would achieve comparable protections of human health and the environment by removing soil/fill with contaminant concentrations above Track 4 Site-Specific SCOs as well as placement of institutional and engineering controls, including a composite cover system. As such, this alternative would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Minimizing potential exposure to contaminated soils during construction by implementing an approved Soil/Materials Management Plan and CAMP;
- Minimizing the risk of contamination leaching into groundwater;
- Preventing direct contact with groundwater;
- Minimizing the potential for direct contact with contaminated on-site soils once construction is complete by establishing a composite cover system over the entire site and implementing institutional controls; and

3.2. Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

Alternative 1 would address the chemical-specific SCGs for soil through removal to Track 1 Unrestricted Use SCOs. Alternative 2 would address the chemical-specific SCGs for soil through removal of soil to meet Track 4 Site-Specific SCOs. Under both alternatives, SCGs for soil vapor are achieved without remedial action based on the laboratory results of the Remedial Investigation. Compliance with groundwater SCGs will not be affected by the remedial action, as only chloroform was identified at groundwater quality standards and is not believed to be associated with an on-Site source.

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 would result in short-term impacts associated with excavation, handling, load out of materials, and truck traffic. However, focused attention to means and methods during the remedial action during the removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities.

The Track 1 and Track 4 Alternatives would both 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 minimize the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures and a Health and Safety Plan (HASP) 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 and permanence related to on-Site contamination by permanently removing all impacted soil/fill.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs, establishing a composite cover system across the 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. 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 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by meeting Track 1 Unrestricted Use SCOs. Alternative 2 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil to a minimum depth of 12 feet bgs, and remaining soil/fill would meet Track 4 Site-Specific SCOs. 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.

The techniques, materials and equipment to implement Alternatives 1 and 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method, which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

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.

The costs associated with the Track 1 alternative could be higher than the Track 2 alternative in that a higher volume of soil/fill may be required to be excavated for off-site disposal to achieve a Track 1 status over the entire Site.

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.

This RAWP will be subject to a 30-day public comment period to determine if the community has any comments on the presented remedial alternatives and selected remedy. OER will consider all comments presented by community members.

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.

The proposed redevelopment of the Site is compatible with its current C6-2 zoning and is consistent with recent development patterns. Both alternatives provide comprehensive protection of public health and the environment for reasonably foreseeable uses of the Site, including restricted residential uses.

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.

Sustainability considerations under Alternatives 1 and 2 would consist of disposal of affected soil at a facility which recycles it for use in asphalt or other construction materials following processing to remove or stabilize contaminants in compliance with applicable laws and regulations. Alternatives 1 and 2 would also seek to utilize recycled materials such as recycled concrete aggregate (RCA) for backfilling where feasible. While Alternative 2 could result in lower energy use based on reducing the 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 the Track 4 Alternative. 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 (CPP);
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 4 Site-Specific SCOs. Additional testing may be performed to determine attainment of Track 1 Unrestricted Use SCOs;
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs;
6. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of any contaminated media on-Site;
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 whether Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs are achieved;
10. Demarcation of residual soil/fill;
11. Construction and maintenance of an engineered composite cover across the entire Site to prevent human exposure to residual soil/fill remaining under the Site and operation of high volume air exchange required by NYC Building Code to provide ventilation for indoor parking garage;
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
15. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, and lists any changes from this RAWP;
16. If Track 1 Unrestricted Use SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual historic fill, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
18. If Track 1 Unrestricted Use SCOs are 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) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (3) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/Fill Management

Track 4 Site Specific Soil Cleanup Objectives (SCOs) are proposed for this Site. The Track 4 Site-Specific Soil Cleanup Objectives are:.

<u>Contaminant</u>	<u>Track 4 SCOs</u>
Total SVOCs	250 ppm
Lead	800 ppm
Mercury	1.5 ppm
Nickel	310 ppm
Zinc	1,000 ppm

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 D. The entire Site (with the exception of two areas) will be excavated to a depth of approximately 12 feet to install the new building's foundation and cellar. The two areas that will require less excavation are the following: (1) an 8' by 37' area located in the northeast corner of the Site. This area will require limited excavation for the installation of pile caps; and (2) the vehicle ramps in the southeast corner of the Site, which will require sloped excavation.

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 9,000 tons. Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-Point Sampling

Remedial actions under this plan will be performed in conjunction with remedial performance end-point sampling. Sampling and testing will be performed promptly following materials removal and completed prior to Site development activities. To evaluate attainment of Track 4 SCOs, samples will be collected and analyzed for SVOCs, pesticides and TAL Metals (Lead, Mercury, Nickel and Zinc only). For areas where Track 1 Unrestricted Use SCOs are pursued, endpoint samples will be analyzed for the full list of VOCs, SVOCs, PCBs, Pesticides, and Metals. Figure 6 provides the proposed location for the collection of endpoint soil samples for both the Track 1 and Track 4 scenarios.

If hotspots are identified during the remedial action or construction, hotspot removal actions under this plan will be performed in conjunction with remedial end-point sampling. 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.

Post-remediation sample 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 exceedence is identified) utilizing the following methodology:

Soil analytical methods will include:

- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides by EPA Method 8081.

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

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4°C.

Dedicated disposable sampling materials will be used for the collection endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash withalconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides. One blind duplicate sample will be prepared and submitted for analysis every 20 samples.

Import and Reuse of Soils

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 3. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 0 tons. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is 0 tons.

4.3 Engineering Controls

Engineering Controls were employed in the remedial action to address residual contamination remaining at the site. These Engineering Controls include a composite cover system.

Composite Cover System

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. This cover system will be comprised of a 4-inch concrete-building slab across the entire Site, and a 4-inch concrete entrance way that will be located in the northeast corner of the Site.

The composite cover system is a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. 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. If Track 1 Unrestricted Use SCOs are achieved across the entire Site, no engineering controls will be required.

4.4 Institutional Controls

Institutional Controls (IC) have been incorporated in this remedial action to render the site protective of public health and the environment by managing residual soil/fill where Track 1

Unrestricted Use SCOs are not achieved 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 are:

- 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 annually 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.

If Track 1 SCOs are achieved across the entire Site, no Institutional Controls will be required.

4.5 Site Management Plan

A Site Management Plan (SMP) is proposed under this Remedial Action. Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (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 Voluntary 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.

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 part of the VCP process, 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 EA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Sources

Historic fill is present at the Site from grade to depths as great as 12 feet in some areas. Based on the results of the RIR, the contaminants of concern found are:

Soil

- Metals, including lead, mercury, nickel and zinc exceeding Unrestricted Use SCOs; and
- PAHs exceeding Restricted Residential SCOs.

Groundwater

- Metals, including sodium, manganese, magnesium and iron, exceeding GQS; and
- Chloroform exceeding GQS.

Soil gas

- VOC containing acetone and ethanol.

Nature, Extent, Fate and Transport of Contaminants

SVOCs and metals are present in the historic fill material. Metal and SVOC contaminants found in soil were not found in groundwater above their respective GQSs, indicating that this contamination is not mobilizing into groundwater or off-Site. The metal contaminants that were found in on-site groundwater (iron, manganese, magnesium and sodium) are linked with regional impacts, rather than any on-Site source. The VOC chloroform found at the drinking water standard. Soil vapor samples contained moderate levels of acetone and ethanol and did not exceed monitor or action thresholds established by NYS DOH, including those for chlorinated hydrocarbons.

Receptor Populations

On-Site Receptors - The Site is currently comprised of a vacant lot with exposed soil and abandoned apartment building, so potential human receptors are Site representatives, workers, trespassers and child and adult visitors. During construction, on-Site receptors will include Site representatives, construction workers and authorized visitors. After construction, on-Site receptors will include child and adult residents, workers, and visitors.

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

1. Commercial Businesses (up to 0.25 mile) – existing and future
2. Residential Buildings (up to 0.25 mile) – existing and future

3. Building Construction/Renovation (up to 0.25 mile) – existing and future
4. Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future
5. Schools (up to .25 mile) – existing and future

Potential Points of Exposure

Current conditions

The Site is currently comprised of a vacant lot and abandoned apartment building. The surface of the vacant lot consists of an exposed soil cover, but access to the Site is limited by an 8ft high construction fence, which limits potential points of contact with soil/fill. Groundwater is not exposed at the Site, and because the Site is served by the public water supply, groundwater is not used at the Site. The building is vacant and unoccupied.

Construction/ Remediation Activities

Once redevelopment activities begin, on-Site workers will come into direct contact with surface and subsurface soils. Groundwater is not expected to be encountered during construction/ remediation.

Proposed Future Conditions

Once the remedial actions and redevelopment of the Site have been completed, the Site will be fully capped with a concrete slab. Therefore, there will be no potential points of contact with any remaining soil/fill on Site. Groundwater will not be exposed at the Site, and because the Site is served by the public water supply, groundwater will not be used at the Site for drinking water supply. Soil vapor levels and exposure risk for this commercial facility are low but intrusion into the building will be mitigated by the composite cover system beneath the building and by the sub-grade parking ventilation system.

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

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

Overall Human Health Exposure Assessment

Based upon this analysis, currently there are exposure pathways but limited potential for exposure due to the limited access to the Site. During the remedial action, on-Site exposure pathways will exist but exposures will be minimized by preventing access to the Site, through implementation of soil/materials management, stormwater 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. The composite cover will prevent exposure to residual soils and long-term Site management will ensure protective controls are maintained in perpetuity. Groundwater will not be exposed at the Site, and because the Site is served by the public water supply, groundwater will not be used at the Site for drinking water supply. Soil vapor levels and exposure risk for this commercial facility are low but intrusion into the building will be mitigated by the composite cover system beneath the building and by the sub-grade parking ventilation system. Continued protection after the remedial action will be achieved by the implementation of periodic inspection and certification of the performance of remedial controls.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Kevin Brussee, Project Manager-EBC and Kevin Waters, Field Operations Officer-EBC. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Ariel Czemerinski P.E., AMC Engineering and Kevin Brussee, EBC.

5.2 Site Security

Site access will be controlled by a chain link or wooden construction fence, which will surround the property.

5.3 Work Hours

The hours for operation of remedial construction will be from 7:00AM to 6:00PM. 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 E. The Site Safety Coordinator will be Kevin Waters - EBC. 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. 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.

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. The planned route on local roads for trucks leaving the site is shown on Figure 5.

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.

5.13 Data Usability Summary report

The primary objective of a Data Usability Summary Report (DUSR) is to determine whether or not data meets the site specific criteria for data quality and data use. The DUSR provides an evaluation of analytical data without third party data validation. The DUSR for post-remedial samples collected during implementation of this RAWP will be included in the Remedial Action Report (RAR).

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;
- 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.
- 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, _____, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Site name Site Site number.

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 36 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	0	-
Mobilization	0	1
Remedial Excavation	1	10
Demobilization	11	1
Record Declaration of Covenants and Restrictions	30	1
Submit Remedial Action Report	36	1

TABLES



TABLE 1 - LIST OF PROPOSED SCOS

Contaminant	CAS Number	Unrestricted Use
Metals		
Arsenic	7440-38-2	13 ^c
Barium	7440-39-3	350 ^c
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5 ^c
Chromium, hexavalent ^e	18540-29-9	1 ^b
Chromium, trivalent ^e	16065-83-1	30 ^c
Copper	7440-50-8	50
Total Cyanide ^{e, f}		27
Lead	7439-92-1	63 ^c
Manganese	7439-96-5	1600 ^c
Total Mercury		0.18 ^c
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9 ^c
Silver	7440-22-4	2
Zinc	7440-66-6	109 ^c
PCBs/Pesticides		
2,4,5-TP Acid (Silvex) ^f	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033 ^b
4,4'-DDT	50-29-3	0.0033 ^b
4,4'-DDD	72-54-8	0.0033 ^b
Aldrin	309-00-2	0.005 ^c
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094

Contaminant	CAS Number	Unrestricted Use
delta-BHC ^g	319-86-8	0.04
Dibenzofuran ^f	132-64-9	7
Dieldrin	60-57-1	0.005 ^c
Endosulfan I ^{d,f}	959-98-8	2.4
Endosulfan II ^{d,f}	33213-65-9	2.4
Endosulfan sulfate ^{d,f}	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042
Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1
Semivolatile organic compounds		
Acenaphthene	83-32-9	20
Acenaphthylene ^f	208-96-8	100 ^a
Anthracene ^f	120-12-7	100 ^a
Benz(a)anthracene ^f	56-55-3	1 ^c
Benzo(a)pyrene	50-32-8	1 ^c
Benzo(b)fluoranthene ^f	205-99-2	1 ^c
Benzo(g,h,i)perylene ^f	191-24-2	100
Benzo(k)fluoranthene ^f	207-08-9	0.8 ^c
Chrysene ^f	218-01-9	1 ^c
Dibenz(a,h)anthracene ^f	53-70-3	0.33 ^b
Fluoranthene ^f	206-44-0	100 ^a
Fluorene	86-73-7	30
Indeno(1,2,3-cd)pyrene ^f	193-39-5	0.5 ^c
m-Cresol ^f	108-39-4	0.33 ^b
Naphthalene ^f	91-20-3	12
o-Cresol ^f	95-48-7	0.33 ^b

Contaminant	CAS Number	Unrestricted Use
p-Cresol ^f	106-44-5	0.33 ^b
Pentachlorophenol	87-86-5	0.8 ^b
Phenanthrene ^f	85-01-8	100
Phenol	108-95-2	0.33 ^b
Pyrene ^f	129-00-0	100
Volatile organic compounds		
1,1,1-Trichloroethane ^f	71-55-6	0.68
1,1-Dichloroethane ^f	75-34-3	0.27
1,1-Dichloroethene ^f	75-35-4	0.33
1,2-Dichlorobenzene ^f	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.02 ^c
cis -1,2-Dichloroethene ^f	156-59-2	0.25
trans-1,2-Dichloroethene ^f	156-60-5	0.19
1,3-Dichlorobenzene ^f	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1 ^b
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
n-Butylbenzene ^f	104-51-8	12
Carbon tetrachloride ^f	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene ^f	100-41-4	1
Hexachlorobenzene ^f	118-74-1	0.33 ^b
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether ^f	1634-04-4	0.93
Methylene chloride	75-09-2	0.05

Contaminant	CAS Number	Unrestricted Use
n - Propylbenzene ^f	103-65-1	3.9
sec-Butylbenzene ^f	135-98-8	11
tert-Butylbenzene ^f	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.7
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene ^f	95-63-6	3.6
1,3,5-Trimethylbenzene ^f	108-67-8	8.4
Vinyl chloride ^f	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26

All soil cleanup objectives (SCOs) are in parts per million (ppm).

Footnotes

^a The SCOs for unrestricted use were capped at a maximum value of 100 ppm. See [Technical Support Document \(TSD\)](#), section 9.3.

^b For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

^c For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

^d SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.

^e The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

^f Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

FIGURES



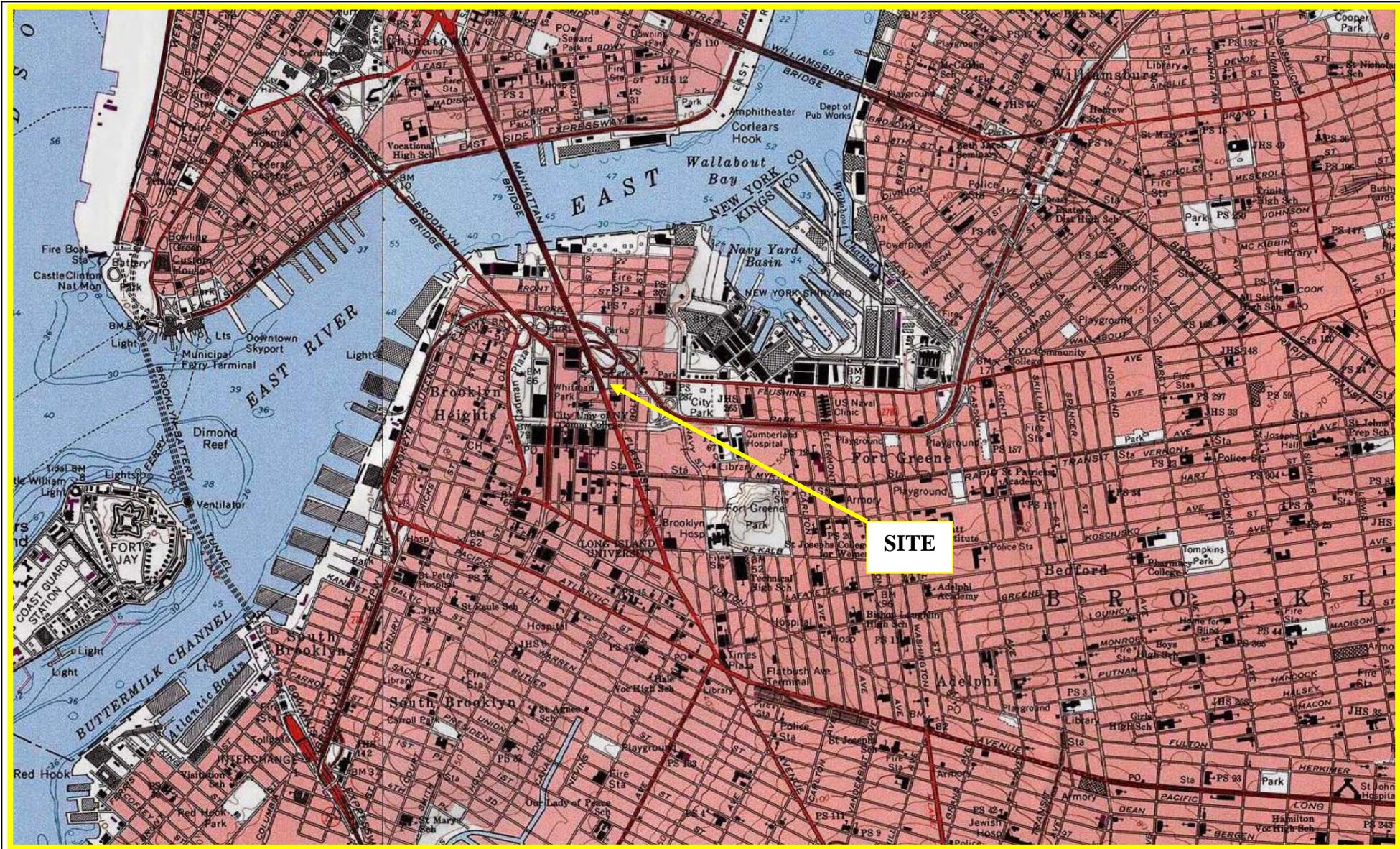


FIGURE 1 – SITE LOCATION

172-180 NASSAU STREET, BROOKLYN, NY

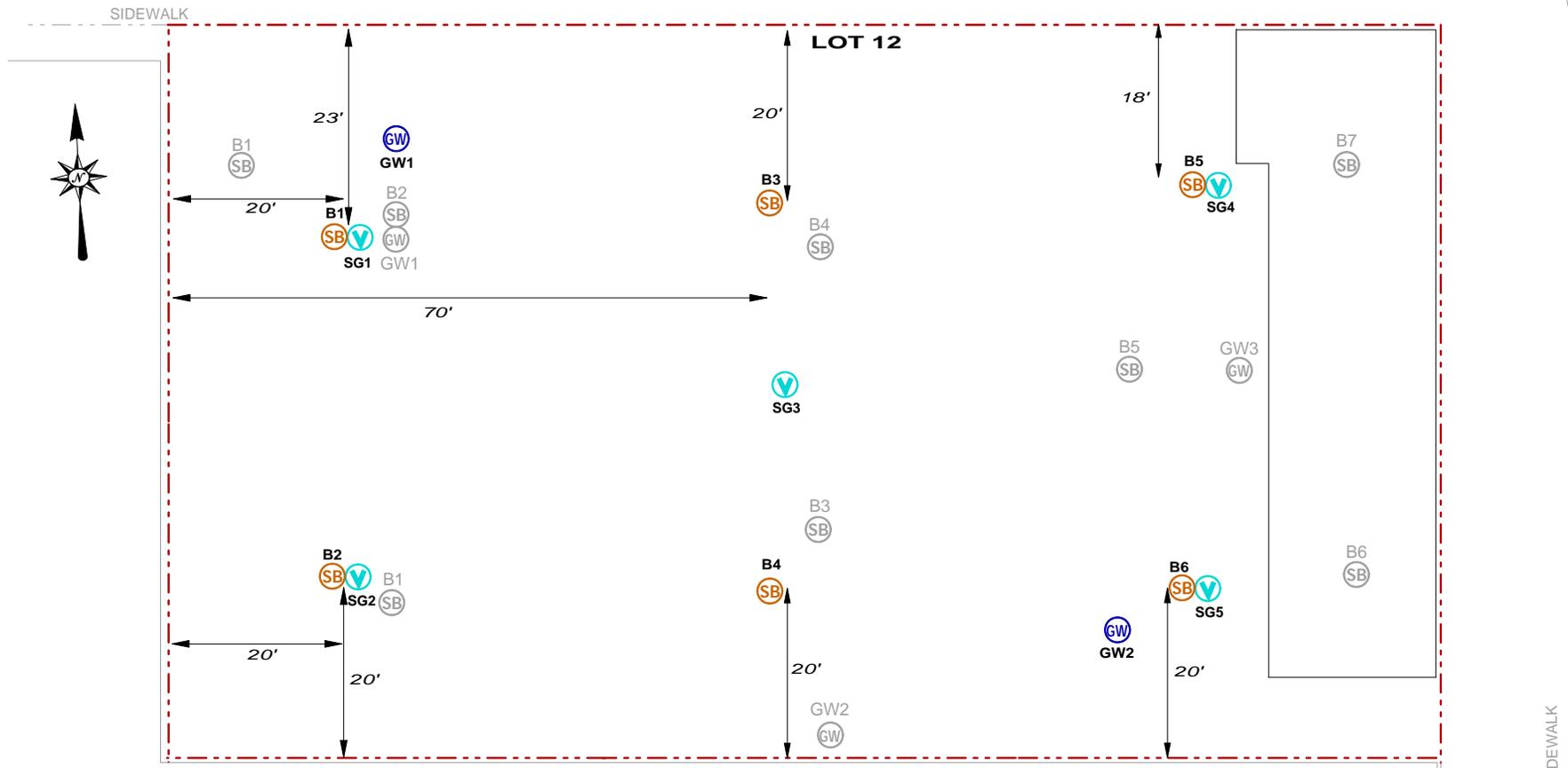
(BLOCK 108, LOTS 12 & 15)

HAZARDOUS MATERIALS REMEDIAL INVESTIGATION REPORT

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961
PHONE: (631) 504-6000 FAX: (631) 924-2870

NASSAU STREET



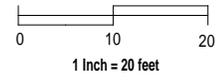
DUFFIELD STREET

SIDEWALK

KEY

- Bx/GWx
SB GW Previous Sampling Locations
- SGx
V Soil Gas Locations
- Bx
SB Soil Boring Locations
- MWx
GW Monitoring Well Location

SCALE

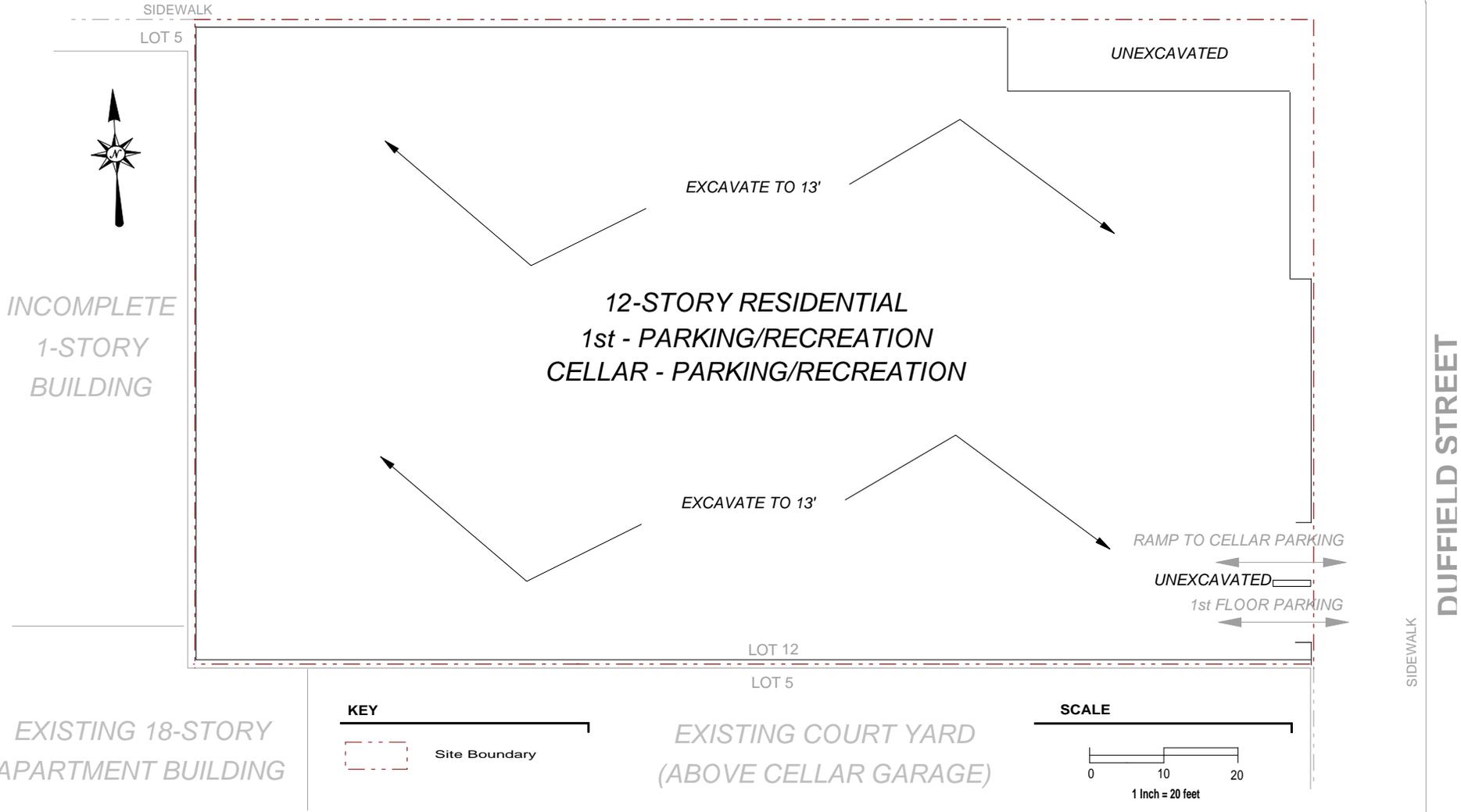


EBC
 ENVIRONMENTAL BUSINESS CONSULTANTS
 Phone 631.504.6000
 Fax 631.924.2870

**180 NASSAU STREET
 BROOKLYN, NY**

FIGURE 2 SITE PLAN

NASSAU STREET



ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

180 NASSAU STREET
BROOKLYN, NY

FIGURE 3 REDEVELOPMENT PLAN

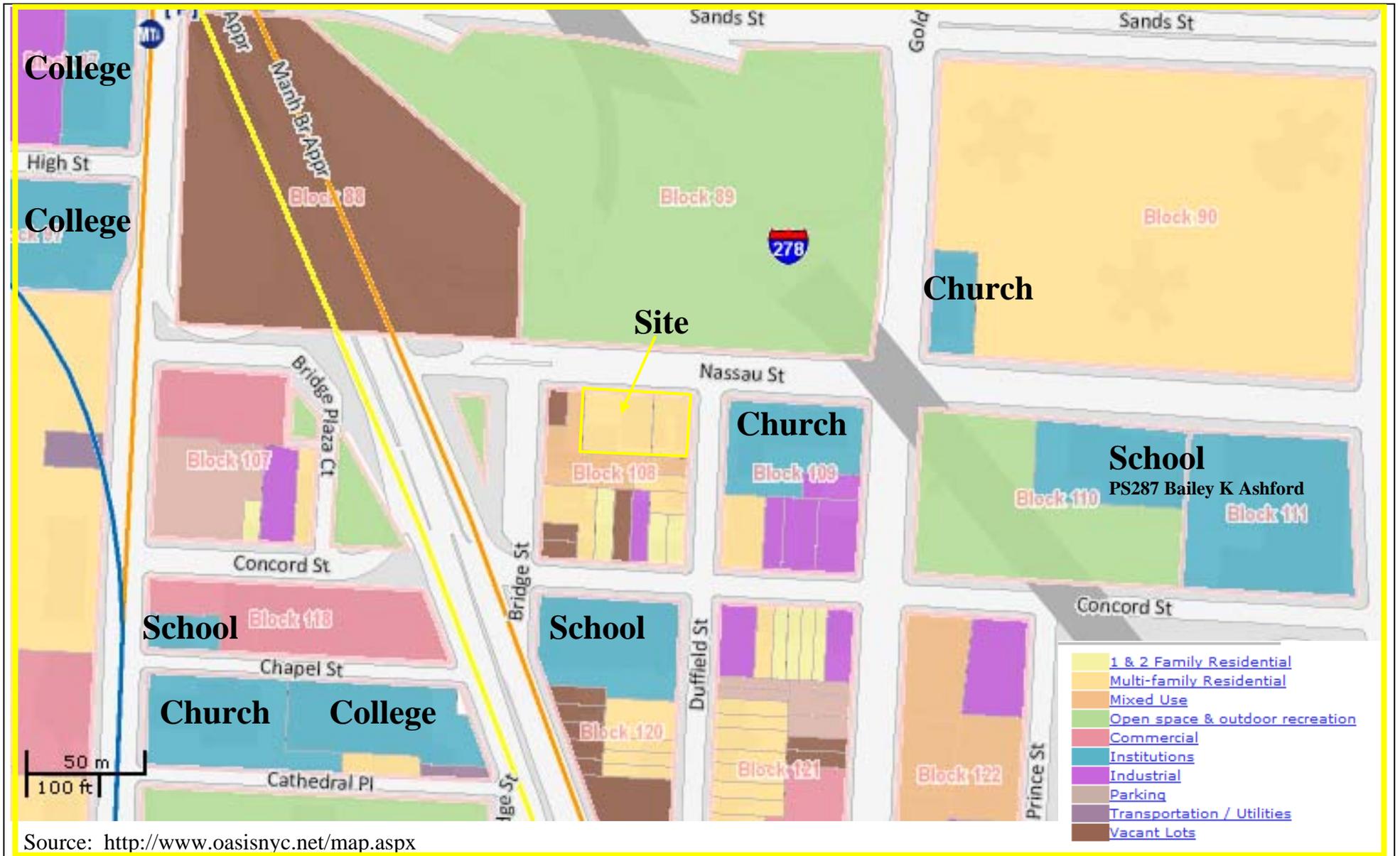


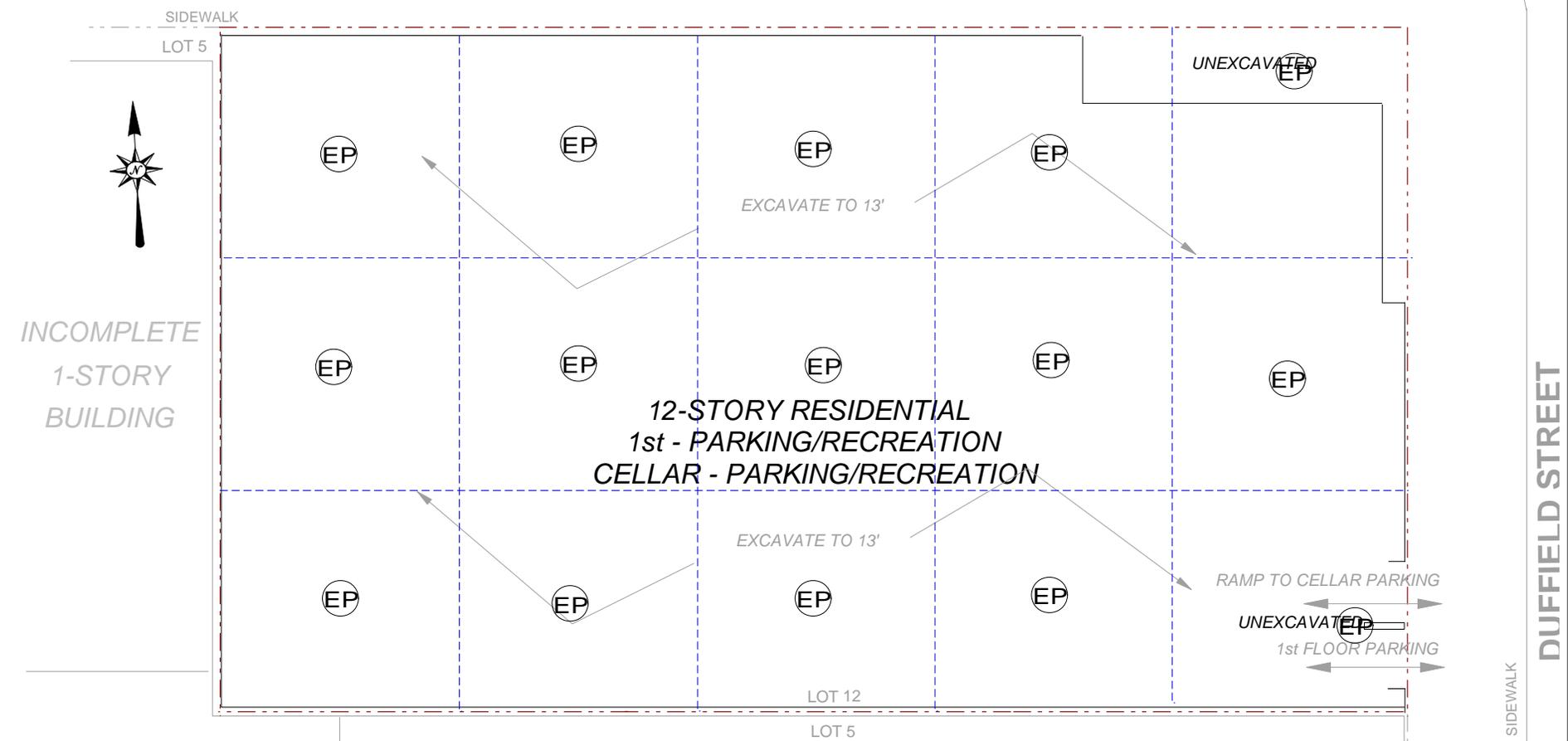
FIGURE 4
SURROUNDING LAND USE MAP

180 NASSAU STREET, BROOKLYN, NY
 HAZARDOUS MATERIALS REMEDIAL INVESTIGATION REPORT



ENVIRONMENTAL BUSINESS CONSULTANTS
 1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961
 PHONE: (631) 504-6000 FAX: (631) 924-2870

NASSAU STREET



INCOMPLETE
1-STORY
BUILDING

EXISTING 18-STORY
APARTMENT BUILDING

KEY

Site Boundary

EP Endpoint Soil Sample Location

EXISTING COURT YARD
(ABOVE CELLAR GARAGE)

SCALE

0 10 20

1 Inch = 20 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

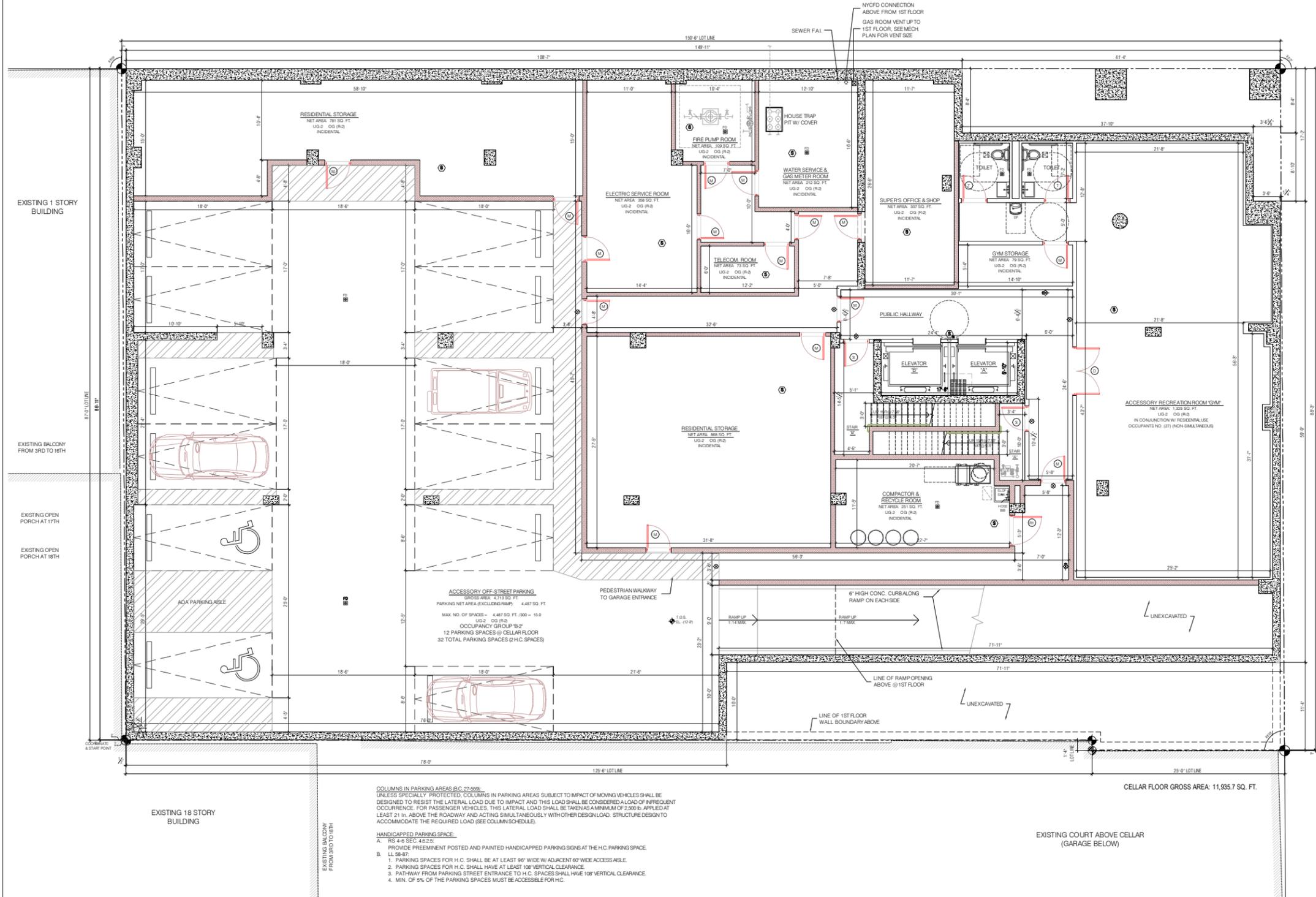
Phone 631.504.6000
Fax 631.924.2870

**180 NASSAU STREET
BROOKLYN, NY**

FIGURE 6 PROPOSED ENDPOINT LOCATIONS

ATTACHMENT A
PROPOSED DEVELOPMENT PLANS

NASSAU STREET
(67'-0" WIDE)

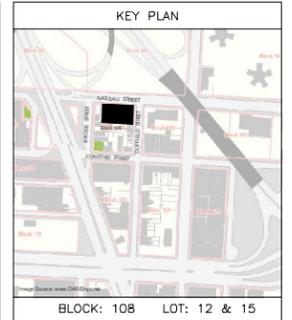


COLUMNS IN PARKING AREAS @ C-27-28-29 UNLESS SPECIALLY PROTECTED, COLUMNS IN PARKING AREAS SUBJECT TO IMPACT OF MOVING VEHICLES SHALL BE DESIGNED TO RESIST THE LATERAL LOAD DUE TO IMPACT AND THIS LOAD SHALL BE CONSIDERED A LOAD OF INFREQUENT OCCURRENCE. FOR PASSENGER VEHICLES, THIS LATERAL LOAD SHALL BE TAKEN AS A MINIMUM OF 2,500 LB. APPLIED AT LEAST 21 IN. ABOVE THE ROADWAY AND ACTING SIMULTANEOUSLY WITH OTHER DESIGN LOAD. STRUCTURE DESIGN TO ACCOMMODATE THE REQUIRED LOAD (SEE COLUMN SCHEDULE).

- HANDICAPPED PARKING SPACE**
- A. RS 4-B SEC. 46.2.5.
 - PROVIDE PREEMINENT POSTED AND PAINTED HANDICAPPED PARKING SIGNS AT THE H.C. PARKING SPACE. LL-58-87.
 - 1. PARKING SPACES FOR H.C. SHALL BE AT LEAST 96" WIDE W/ ADJACENT 60" WIDE ACCESS AISLE.
 - 2. PARKING SPACES FOR H.C. SHALL HAVE AT LEAST 108" VERTICAL CLEARANCE.
 - 3. PATHWAY FROM PARKING STREET ENTRANCE TO H.C. SPACES SHALL HAVE 108" VERTICAL CLEARANCE.
 - 4. MIN. OF 5% OF THE PARKING SPACES MUST BE ACCESSIBLE FOR H.C.

CELLAR FLOOR GROSS AREA: 11,935.7 SQ. FT.

EXISTING COURT ABOVE CELLAR
(GARAGE BELOW)



ISSUE NO.	REV.	DATE	DESCRIPTION
ISSUES/REVISIONS			

M/E/P ENGINEER: ETTINGER ENGINEERING ASSOCIATES
 228 East 45th Street, 3rd Floor, New York, NY 10017
 TEL: (212) 213-4133 FAX: (212) 213-4134
 www.ettenger.com

STRUCTURAL ENGINEER: WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 686-1300 Fax: (212) 686-1315
 www.wspcantorseinuk.com

CLIENT: PINK STONE CAPITAL GROUP
 347 FDR Avenue, Suite 1002, New York, NY 10016
 Tel: (212) 686-1300 Fax: (212) 686-1315
 www.pinkstonecapital.com

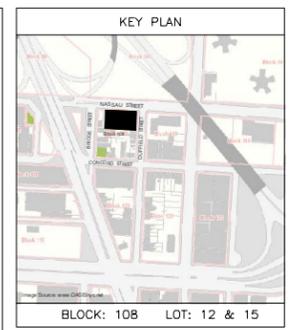
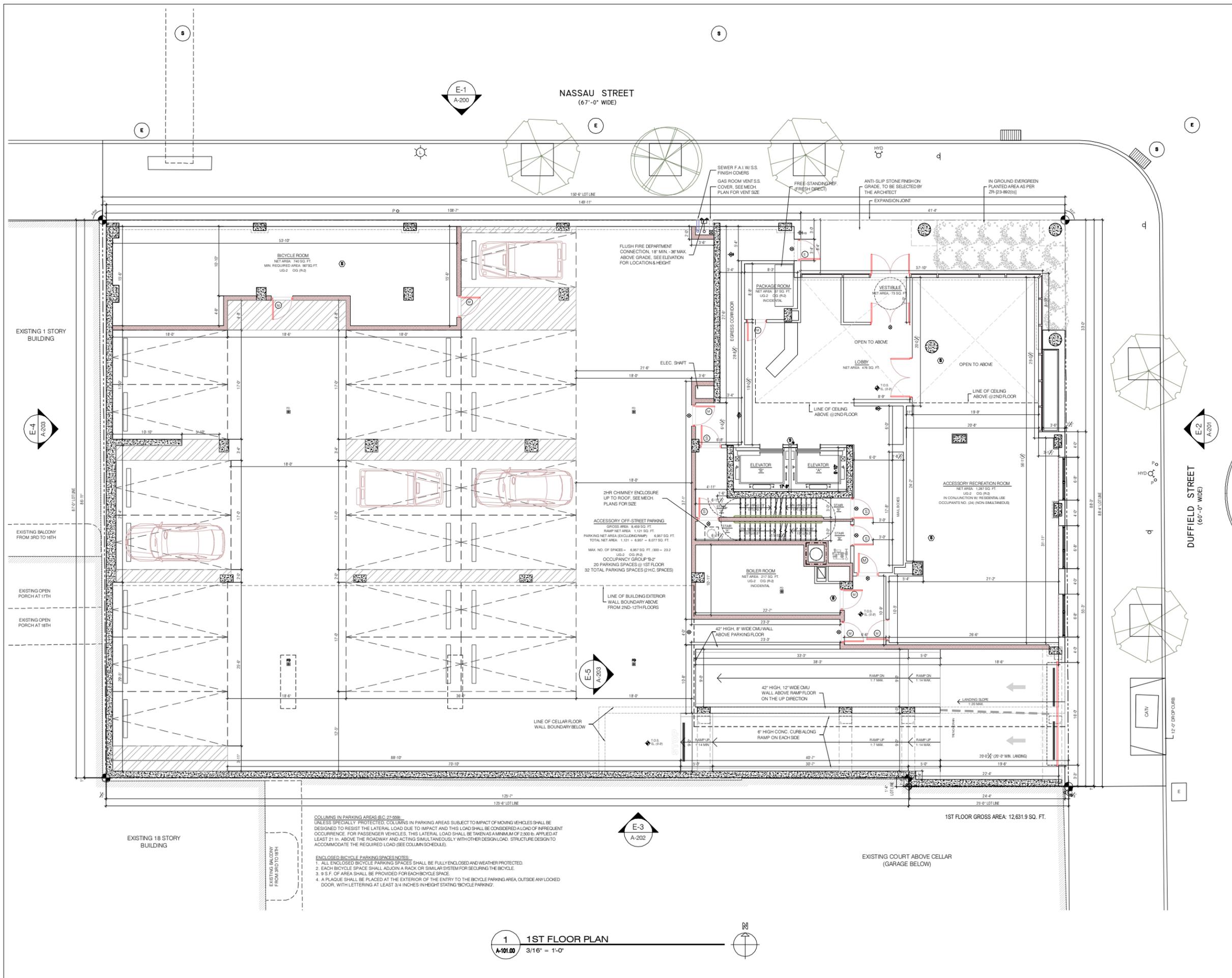
KARL FISCHER ARCHITECT AND CIVIL ENGINEER
 330 BROADWAY, 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 213-4133 FAX: (212) 213-4134
 1420 NORTH-DUNE ROAD, MONROE, LA 70119
 TEL: (504) 885-4133 FAX: (504) 885-4134
 E-MAIL: KARL@KFARCHITECT.COM

project title
RESIDENTIAL DEVELOPMENT

174 NASSAU STREET, BROOKLYN, NY 11201

drawing title
CELLAR FLOOR PLAN

scale	3/16" = 1'-0"	project no.	11-65
date	NOV. 2011	sheet no. OF
drawn		drawing no.	A-100.00
checked			



BLOCK: 108 LOT: 12 & 15



ISSUE	REV	DATE	DESCRIPTION
ISSUES/REVISIONS			

MEP ENGINEER: **ETTNGER ENGINEERING ASSOCIATES**
 218 East 45th Street, New York, NY 10017
 Tel: (212) 213-1100 Fax: (212) 213-1101
 www.ettnger.com

STRUCTURAL ENGINEER: **WSP CANTOR SEINUK STRUCTURAL ENGINEERS**
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (646) 487-1161
 www.wspcantor.com

CLIENT: **PINK STONE CAPITAL GROUP**
 347 Park Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 686-1330 Fax: (212) 213-8900
 www.pinkstone.com

KARL FISCHER ARCHITECT ONE ONE ONE ARCHITECTS
 535 BROADWAY, 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-8900
 1420 NORTH WALK, MONROE, LA 70119
 TEL: (504) 885-4122 FAX: (504) 885-4124
 E-MAIL: KARL@KARLFISCHER.COM

PROJECT TITLE: **RESIDENTIAL DEVELOPMENT**
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE: **1ST FLOOR PLAN**

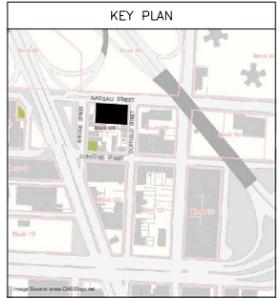
DRAWING NO: 00000000

scale	3/16" = 1'-0"	PROJECT NO.	11-65
DATE	NOV. 2011	SHEET NO.	OF
DRAWN		DRAWING NO.	A-101.00
CHECKED			

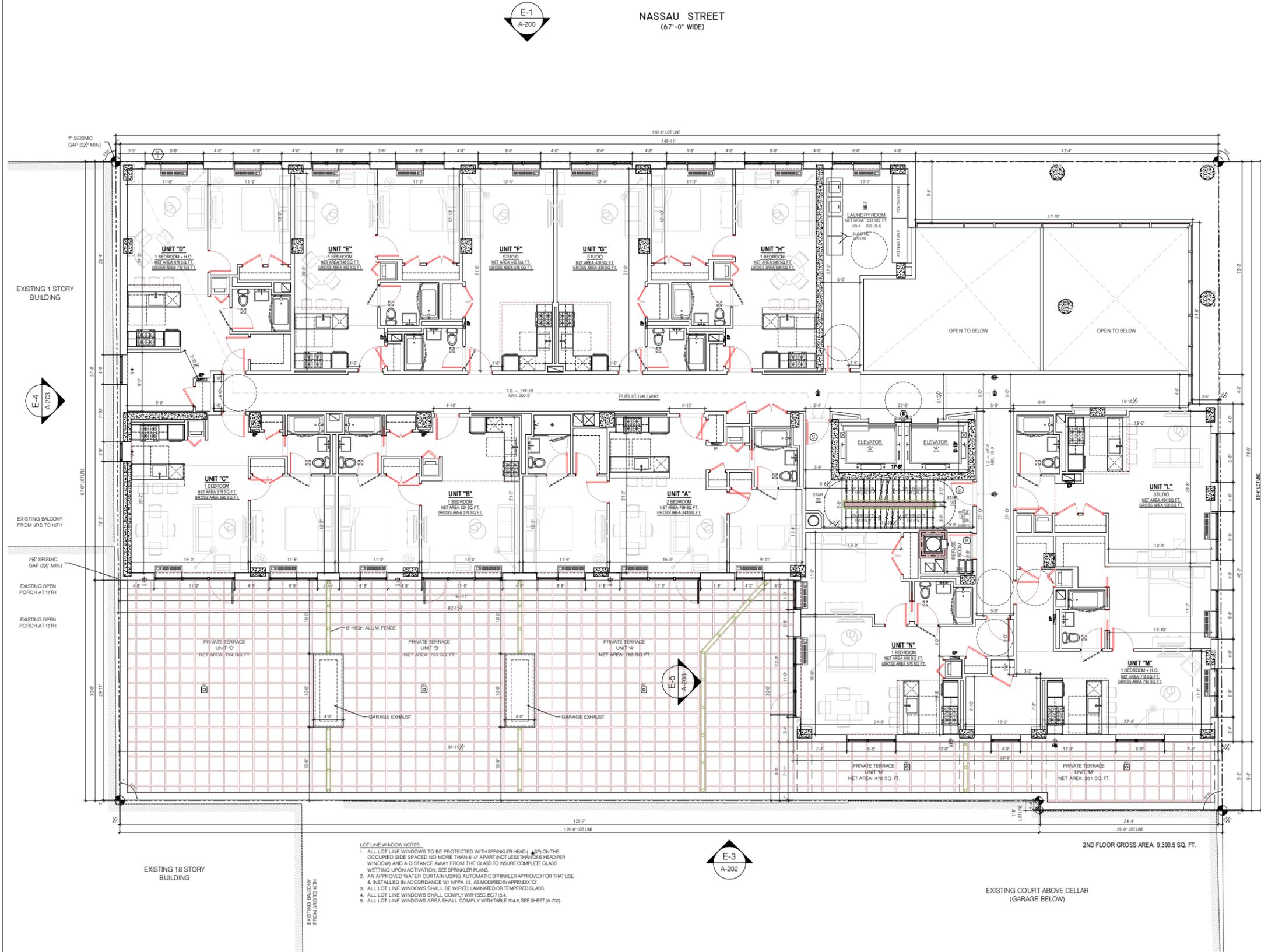
COLUMNS IN PARKING AREAS (C 27-559)
 UNLESS SPECIALLY PROTECTED, COLUMNS IN PARKING AREAS SUBJECT TO IMPACT OF MOVING VEHICLES SHALL BE DESIGNED TO RESIST THE LATERAL LOAD DUE TO IMPACT AND THIS LOAD SHALL BE CONSIDERED A LOAD OF INFREQUENT OCCURRENCE. FOR PASSENGER VEHICLES, THIS LATERAL LOAD SHALL BE TAKEN AS A MINIMUM OF 2000 LB, APPLIED AT LEAST 21 IN. ABOVE THE ROADWAY AND ACTING SIMULTANEOUSLY WITH OTHER DESIGN LOAD. STRUCTURE DESIGN TO ACCOMMODATE THE REQUIRED LOAD (SEE COLUMN SCHEDULE).

ENCLOSED BICYCLE PARKING SPACES NOTES:
 1. ALL ENCLOSED BICYCLE PARKING SPACES SHALL BE FULLY ENCLOSED AND WEATHER PROTECTED.
 2. EACH BICYCLE SPACE SHALL ADJOIN A RACK OR SIMILAR SYSTEM FOR SECURING THE BICYCLE.
 3. 9 S.F. OF AREA SHALL BE PROVIDED FOR EACH BICYCLE SPACE.
 4. A PLAQUE SHALL BE PLACED AT THE EXTERIOR OF THE ENTRY TO THE BICYCLE PARKING AREA, OUTSIDE ANY LOCKED DOOR, WITH LETTERING AT LEAST 3/4 INCHES IN HEIGHT STATING 'BICYCLE PARKING'.

1 1ST FLOOR PLAN
 A-101.00 3/16" = 1'-0"



BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION. SEE SPRINKLER PLANS.
 2. AN APPROVED WATER CURTAIN USING AUTOMATIC SPRINKLER APPROVED FOR THAT USE & INSTALLED IN ACCORDANCE W/ NFPA 13, AS MODIFIED IN APPENDIX C7.
 3. ALL LOT LINE WINDOWS SHALL BE WIRED, LAMINATED OR TEMPERED GLASS.
 4. ALL LOT LINE WINDOWS SHALL COMPLY WITH SEC. BC 715.4.
 5. ALL LOT LINE WINDOWS AREA SHALL COMPLY WITH TABLE 704.8, SEE SHEET (A-702).



ISSUES/REVISIONS

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 545 Broadway, Suite 1000, New York, NY 10012
 Tel: (212) 219-4133 Fax: (212) 219-4890
 www.ettenger.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspse.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Park Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 686-1200 Fax: (212) 686-1815
 www.pinkstone.com

KARL FISCHER ARCHITECT AND ASSOCIATES
 535 Broadway, 9th Floor, New York, NY 10012
 Tel: (212) 219-4133 Fax: (212) 219-4890
 1402 Avenue of the Americas, 10th Floor, New York, NY 10019
 Tel: (212) 686-1122 Fax: (212) 686-1124
 800 370 8888
 www.karl-fischer.com

project title
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

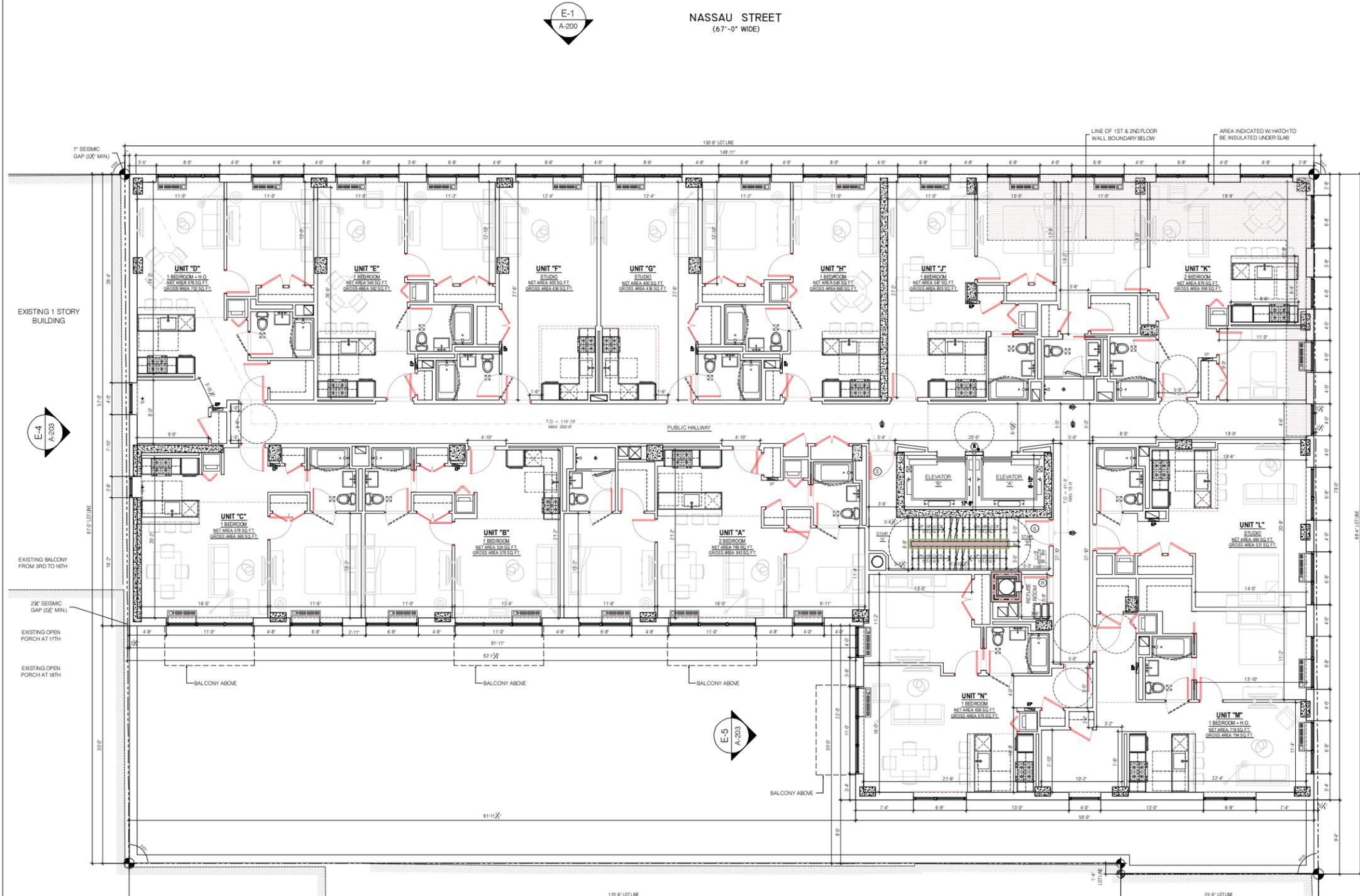
drawing title
 2ND FLOOR PLAN

job no.
 000000000

scale 3/16" = 1'-0"	project no. 11-65
date NOV. 2011	sheet no. ... OF
drawn	drawing no. A-102.00
checked	

1 2ND FLOOR PLAN
 A-102.00 3/16" = 1'-0"





ISSUES/REVISIONS

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
228 East 45th Street, 3rd Floor, New York, NY 10017
Tel: (212) 687-1365 Fax: (212) 687-1361

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
228 East 45th Street, 3rd Floor, New York, NY 10017
Tel: (212) 687-1365 Fax: (212) 687-1361

CLIENT:
PINK STONE CAPITAL GROUP
347 FDR Avenue, Suite 1602, New York, NY 10016
Tel: (212) 686-1350 Fax: (212) 248-1015

KARL FISCHER ARCHITECT AND GRAPHIC ARTS
430 BRIDGE PL FLOOR NEW YORK, NY 10012
TEL: (212) 219-4133 FAX: (212) 219-4990
1420 NORTH OAK ST. MONROE, LA 70113
TEL: (504) 885-4477 FAX: (504) 885-8848
1800 1ST AVE. HOUSTON, TX 77002
TEL: (713) 866-0000 FAX: (713) 866-0000

PROJECT TITLE:
RESIDENTIAL DEVELOPMENT
174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
3RD FLOOR PLAN

DRAWING NO.:
00000000

SCALE: 3/16" = 1'-0"
DATE: NOV. 2011
PROJECT NO.: 11-65
SHEET NO.: OF
DRAWING NO.:
CHECKED: A-103.00

- LOT LINE WINDOW NOTES:**
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION. SEE SPRINKLER PLANS.
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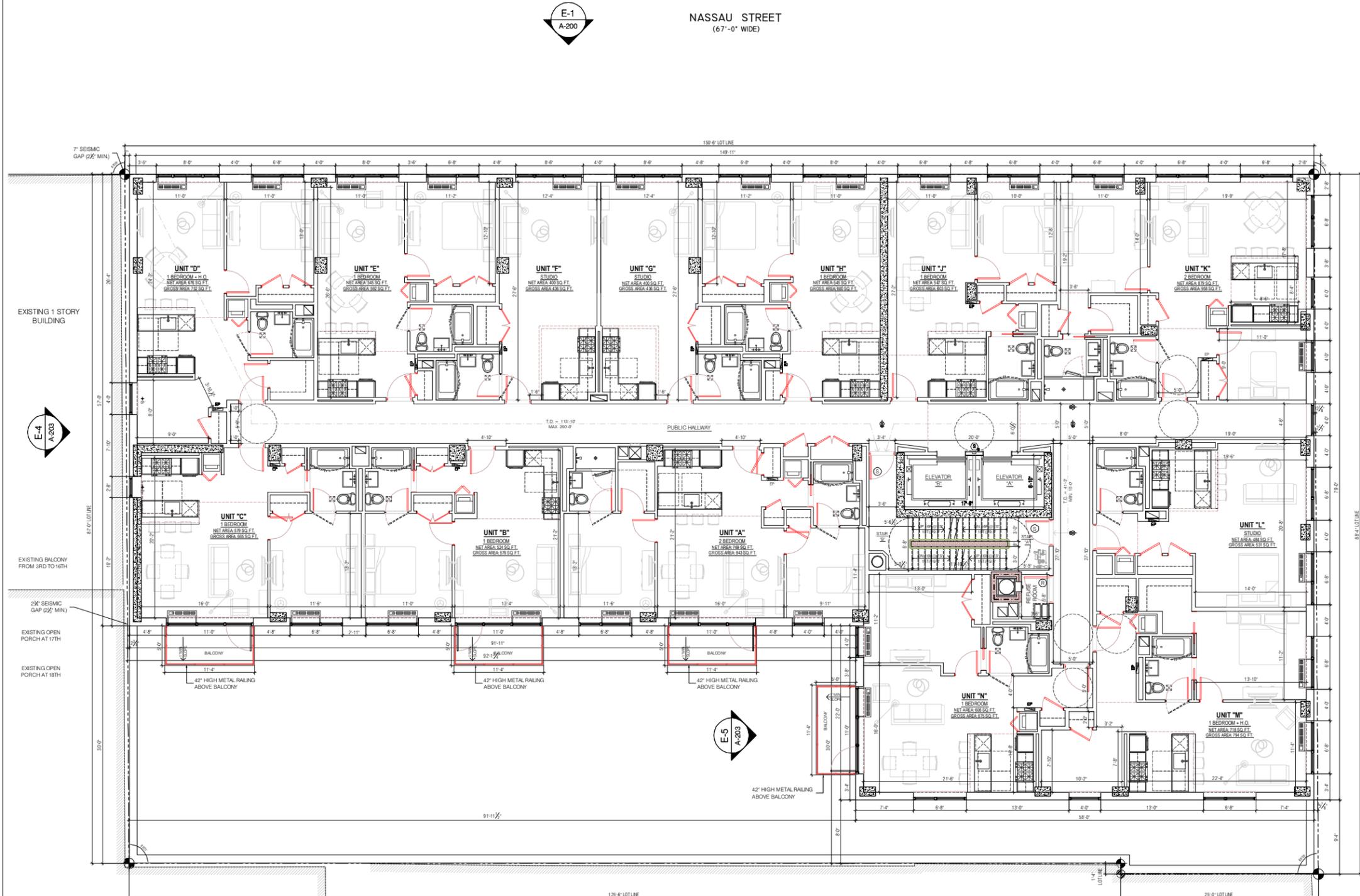
- ENCLOSED BICYCLE PARKING SPACES NOTES:**
1. ALL ENCLOSED BICYCLE PARKING SPACES SHALL BE FULLY ENCLOSED AND WEATHER PROTECTED.
 2. EACH BICYCLE SPACE SHALL ADJOIN A RACK OR SIMILAR SYSTEM FOR SECURING THE BICYCLE.
 3. 9 S.F. OF AREA SHALL BE PROVIDED FOR EACH BICYCLE SPACE.
 4. A PI ADJUF SHALL BE PROVIDED AT THE EXTERIOR OF THE ENTRY TO THE BICYCLE PARKING.

1 3RD FLOOR PLAN
A-103.00 3/16" = 1'-0"





BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
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ISSUES/REVISIONS

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 686-1300 Fax: (212) 213-8900
 www.ettinger-engineering.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 686-1300 Fax: (212) 687-1300 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Park Avenue, Suite 1602, New York, NY 10017
 Tel: (212) 686-1300 Fax: (212) 213-8900
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT AND CIVIL ENGINEER
 430 BRIDGE PL, 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-8900
 1420 NORTH-DUNE, WEST, HONOLULU, HI 96819
 TEL: (808) 841-4427 FAX: (808) 841-4428
 800 576 8888
 E-MAIL: KARL@KFARCHITECT.COM

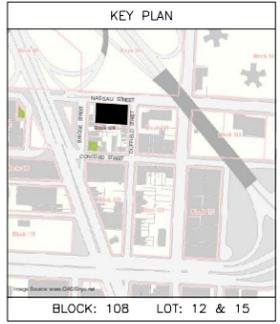
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 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

drawing title:
 4TH FLOOR PLAN

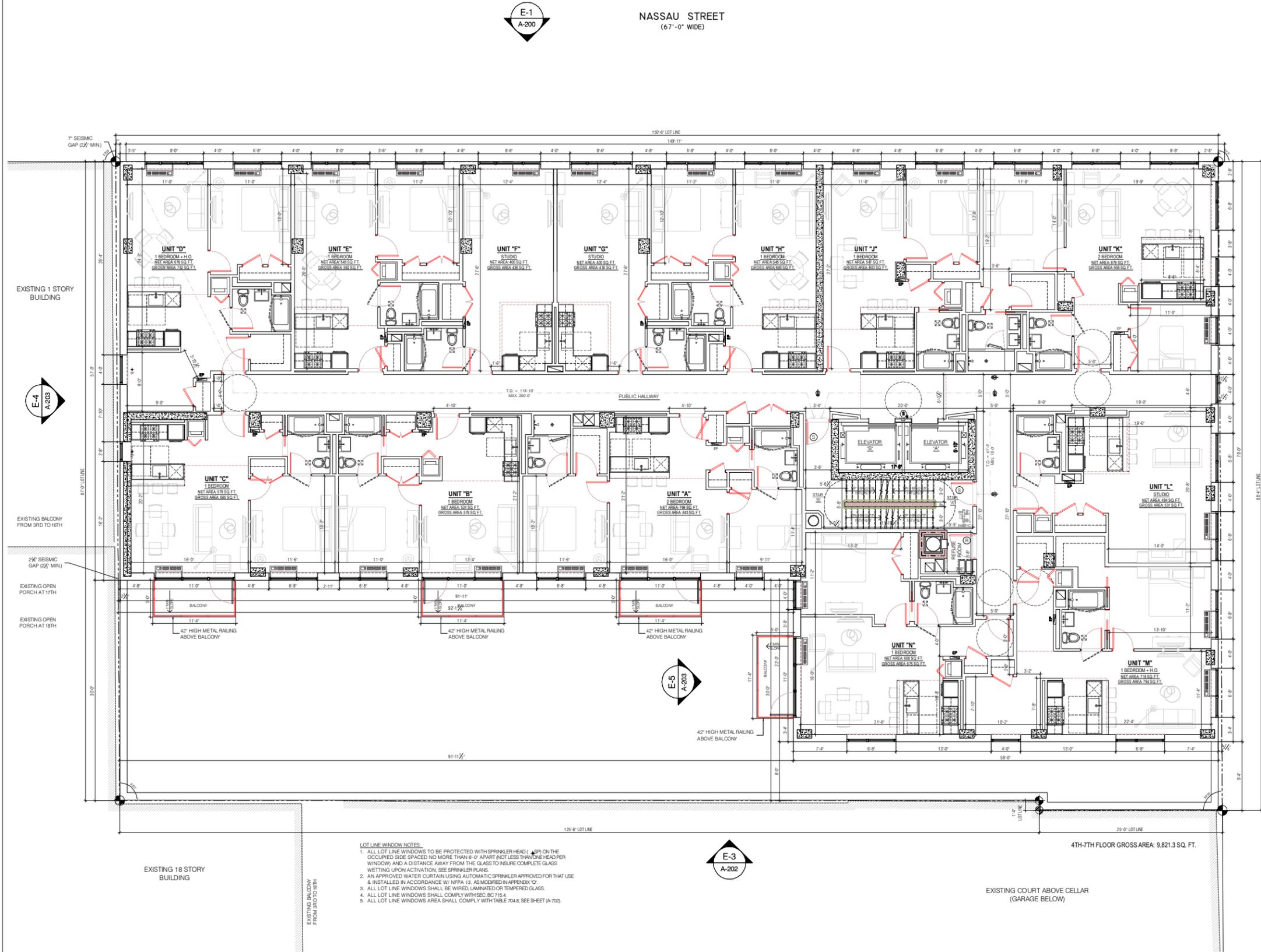
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date: NOV. 2011	sheet no.: OF
drawn:	drawing no.: A-104.00
checked:	





BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION. SEE SPRINKLER PLANS.
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1 5TH FLOOR PLAN
A-105.00 3/16" = 1'-0"



ISSUES/REVISIONS

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
228 East 45th Street, 3rd Floor, New York, NY 10017
Tel: (212) 687-1166 Fax: (212) 687-1161

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
228 East 45th Street, 3rd Floor, New York, NY 10017
Tel: (212) 687-1166 Fax: (212) 687-1161

CLIENT:
PINK STONE CAPITAL GROUP
347 Park Avenue, Suite 1602, New York, NY 10016
Tel: (212) 688-1200 Fax: (212) 688-1815

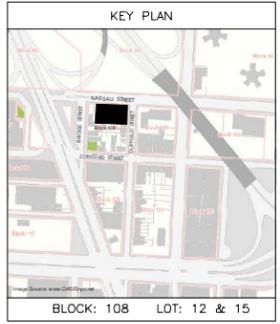
KARL FISCHER ARCHITECT AND GRAPHIC ARTS
435 Broadway, 9th Floor, New York, NY 10012
Tel: (212) 219-4133 Fax: (212) 219-4892
1422 Avenue of the Stars, Montclair, NJ 07042
Tel: (973) 881-4422 Fax: (973) 881-4408
Web Site: www.karl-fischer.com E-Mail: k.fischer@kfarch.com

project title:
RESIDENTIAL DEVELOPMENT
174 NASSAU STREET, BROOKLYN, NY 11201

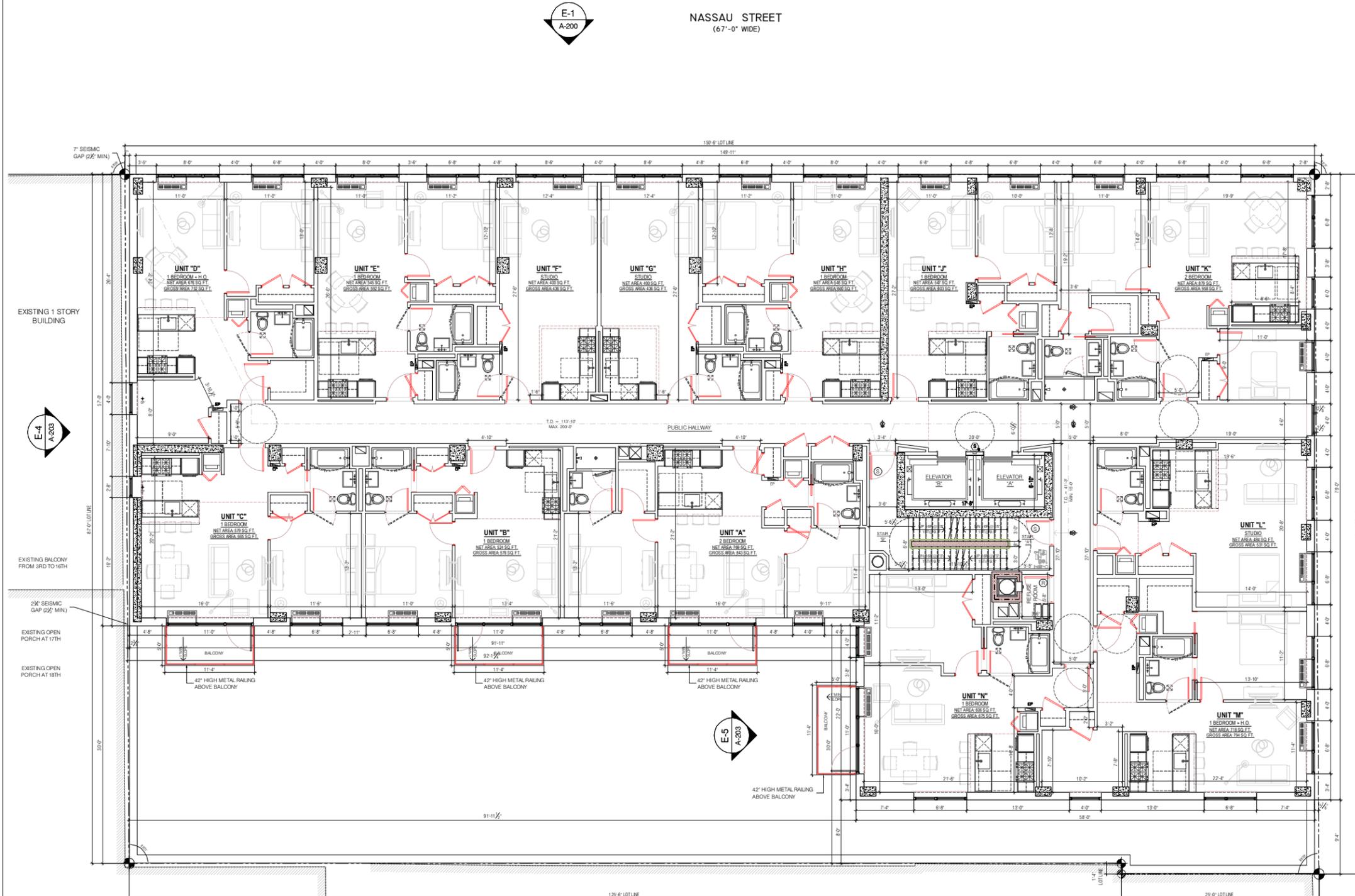
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date: NOV. 2011	sheet no.: OF
drawn:	drawing no.: A-105.00
checked:	



BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION. SEE SPRINKLER PLANS.
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Issue	Rev	Date	Description
ISSUES/REVISIONS			

MEP ENGINEER:
STYINGER ENGINEERING ASSOCIATES
 630 East 42nd Street, 10th Floor, New York, NY 10017
 Tel: (212) 692-1100 Fax: (212) 692-1101
 www.styinger.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Park Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 686-1200 Fax: (212) 686-1015
 www.pinkstone.com

KARL FISCHER ARCHITECT ONE ONA ONE ARCH
 530 BROOKLYN 9TH FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4960
 1420 ADELE STONE WAY, MONROE, LA 70601
 TEL: (504) 841-4177 FAX: (504) 841-4100
 815 ONE BROADWAY, SUITE 2000, NEW YORK, NY 10002
 TEL: (212) 686-1100 FAX: (212) 686-1101
 E-MAIL: KARL@KFARCHITECT.COM

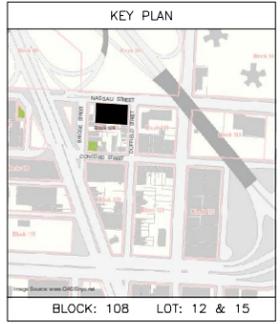
PROJECT TITLE:
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
 6TH FLOOR PLAN

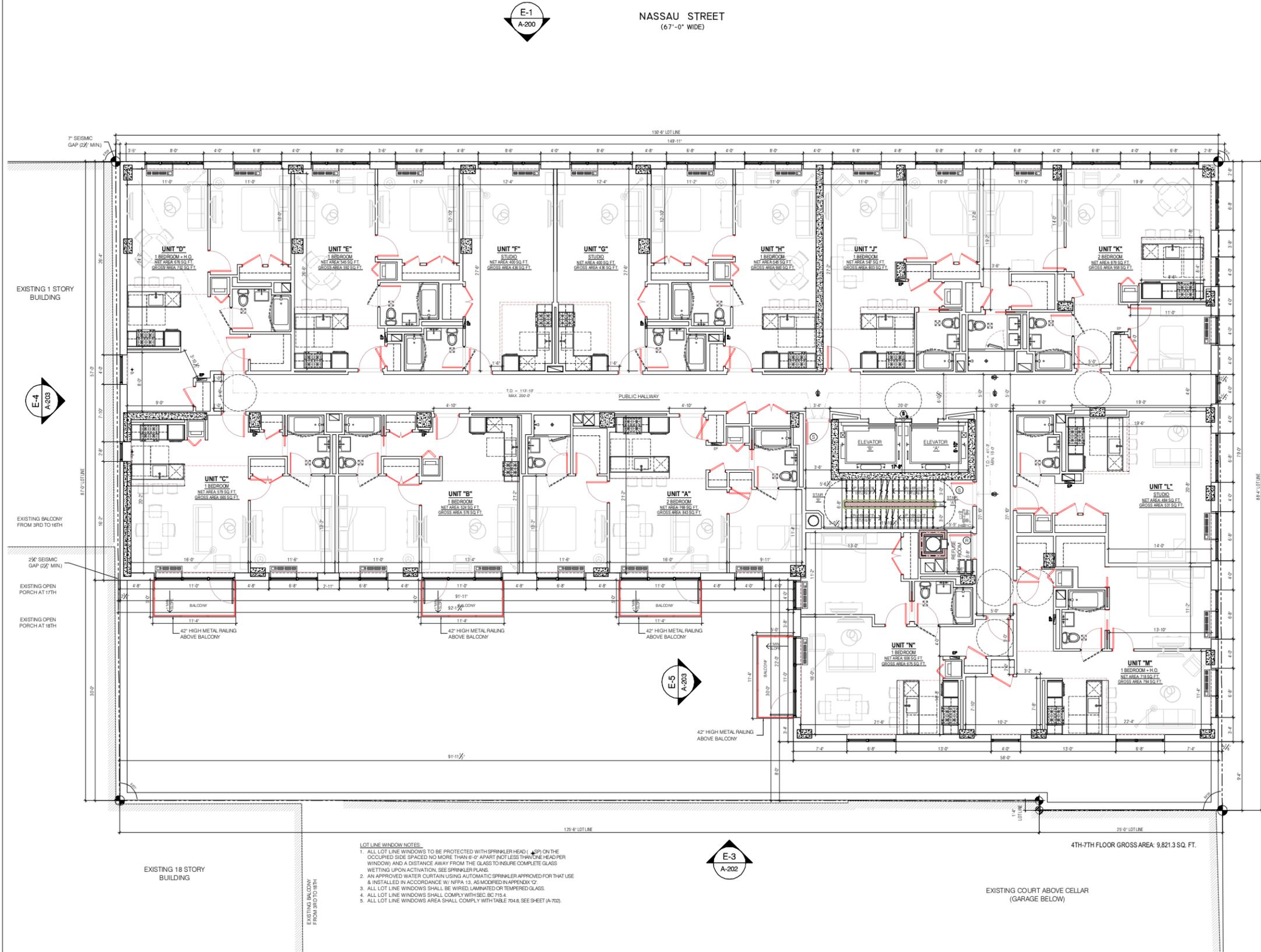
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date	NOV. 2011	sheet no.	0F
drawn		drawing no.	A-106.00
checked			





BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
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ISSUES/REVISIONS

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 635 Broadway, 10th Floor, New York, NY 10017
 Tel: (212) 219-4133 Fax: (212) 219-4892
 www.ettenger.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 59th Street, 3rd Floor, New York, NY 10022
 Tel: (212) 687-5166 Fax: (212) 687-5161 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Park Avenue, Suite 1602, New York, NY 10022
 Tel: (212) 688-1200 Fax: (212) 688-1815
 www.pinkstone.com

KARL FISCHER ARCHITECT ONE ONA INC. A/E
 635 Broadway, 9th Floor, New York, NY 10012
 Tel: (212) 219-4133 Fax: (212) 219-4892
 1422 Avenue of the Americas, 10th Floor, New York, NY 10019
 Tel: (212) 688-1422 Fax: (212) 688-1424
 100 West Street, 10th Floor, New York, NY 10038
 Tel: (212) 688-1422 Fax: (212) 688-1424

project title
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

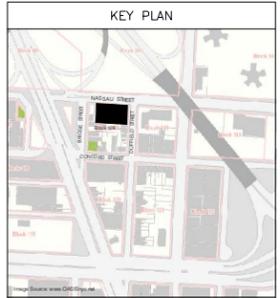
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job no.
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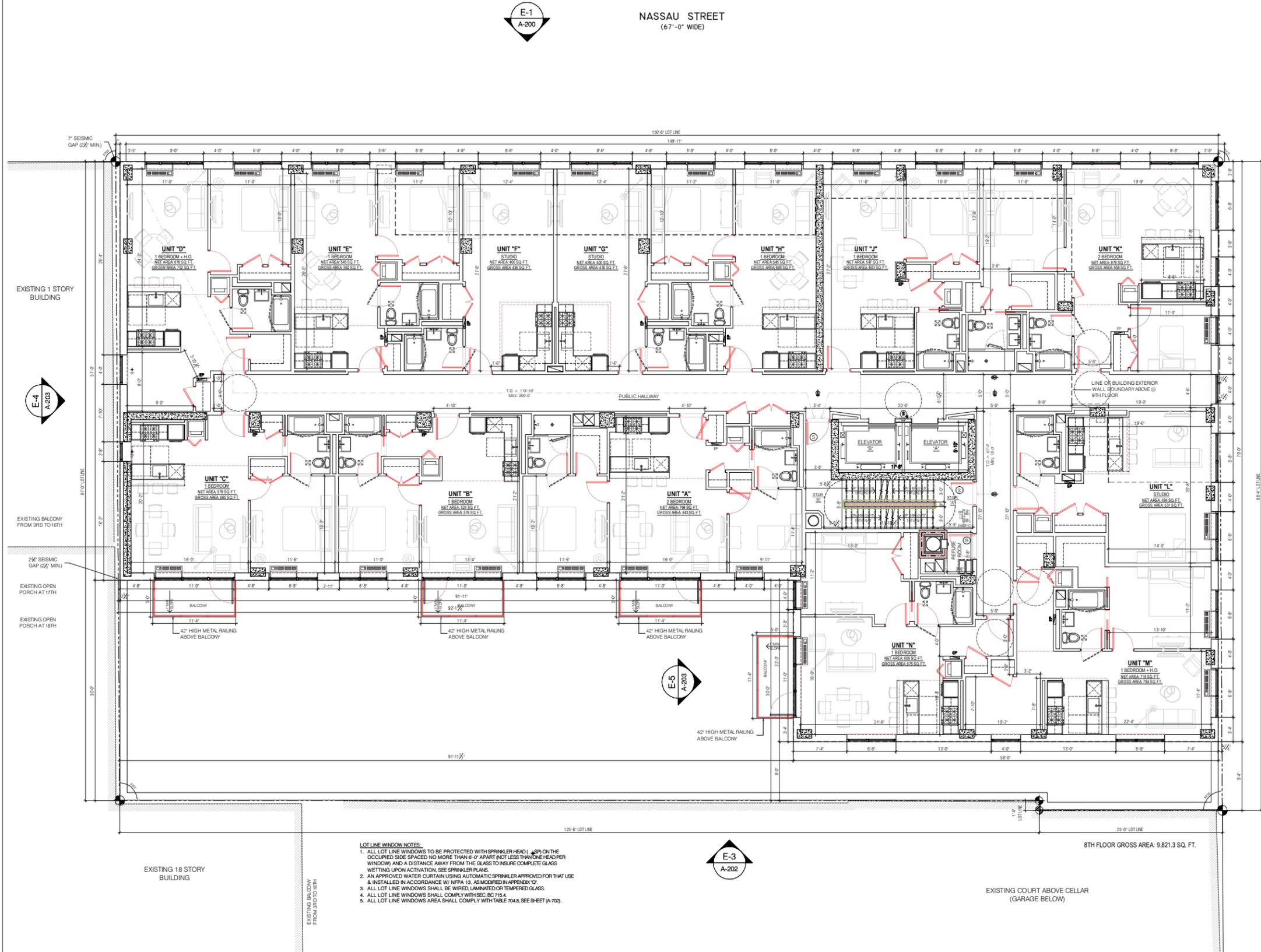
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date NOV. 2011 **sheet no.** OF
drawn **drawing no.** A-107.00
checked

1 7TH FLOOR PLAN
 A-107.00 3/16" = 1'-0"





BLOCK: 108 LOT: 12 & 15



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ISSUES/REVISIONS

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 635 WEST 116TH STREET
 NEW YORK, NY 10027
 TEL: (212) 249-1100 FAX: (212) 249-1101
 www.ettenger-engineering.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-5165 Fax: (212) 687-5161 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Fth Avenue, Suite 1622, New York, NY 10016
 Tel: (212) 688-1200 Fax: (212) 688-1815
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT ONE ONA ONE ARCH
 635 BROOKLYN BLVD, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4892
 1422 NORTH-DUNE, WEST MONROE, LA 70077
 TEL: (504) 883-4422 FAX: (504) 883-4408
 NEW YORK ARCHITECTURE LICENSE NO. 13010
 E-MAIL: KARL@KARLFISCHER.COM

project title
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

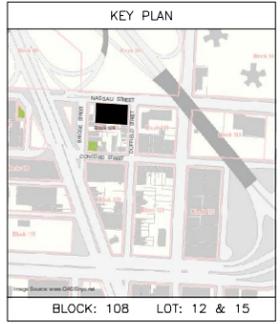
drawing title
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job no.
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date NOV. 2011	sheet no. ... OF
drawn	drawing no. A-108.00
checked	

1 8TH FLOOR PLAN
 A-108.00 3/16" = 1'-0"





BLOCK: 108 LOT: 12 & 15



ISSUES/REVISIONS

MEP ENGINEER: **ETTINGER ENGINEERING ASSOCIATES**
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.ettingereng.com

STRUCTURAL ENGINEER: **WSP CANTOR SEINUK STRUCTURAL ENGINEERS**
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspcantor.com

CLIENT: **PINK STONE CAPITAL GROUP**
 347 Fth Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 688-1200 Fax: (212) 688-1815 www.pinkstone.com

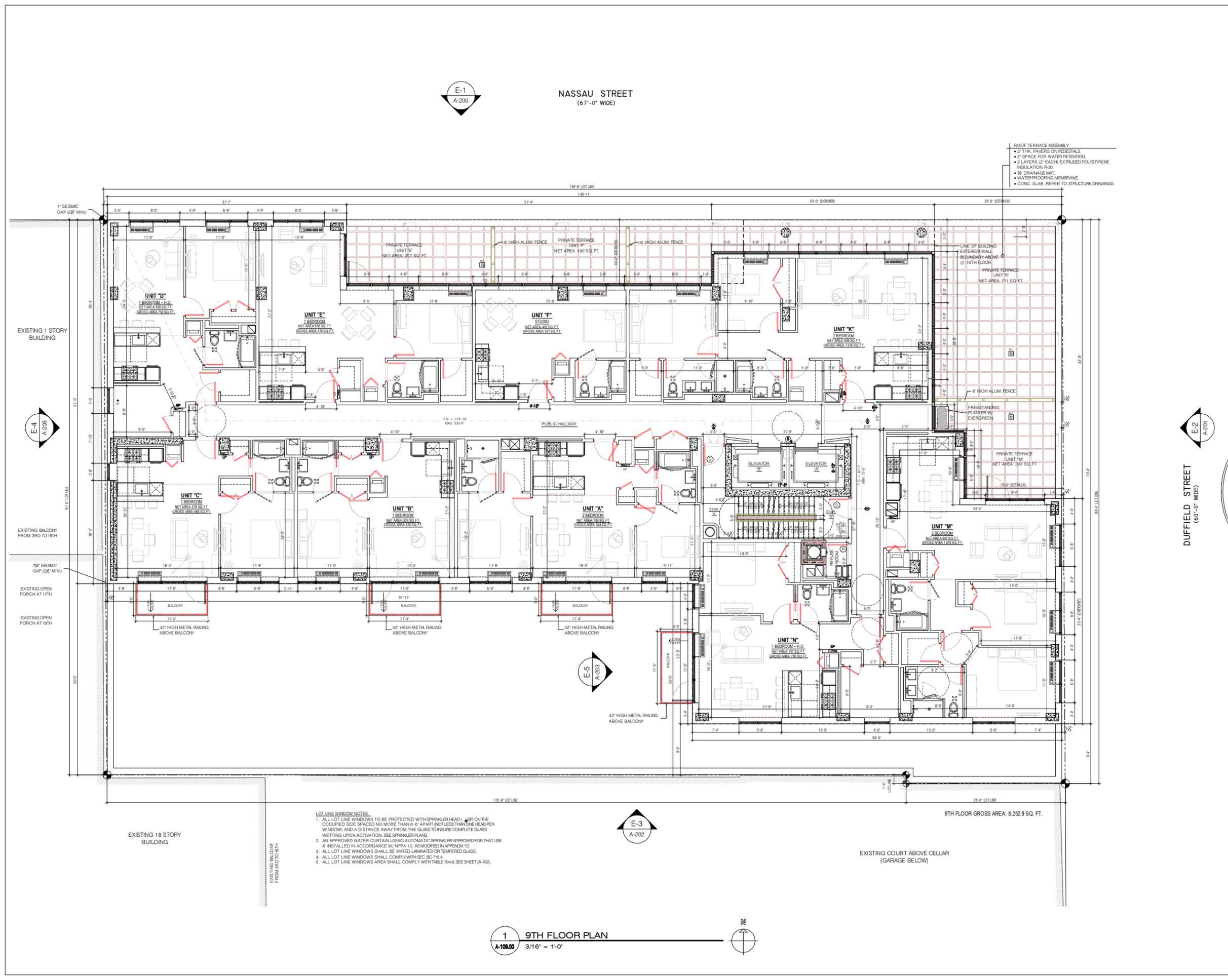
KARL FISCHER ARCHITECT ONE ONE ONE AVENUE
 101 BROADWAY, 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-8962
 1422 NORTH-DUNE ROAD, MONROE, LA 70117
 TEL: (504) 881-4422 FAX: (504) 881-4408
 WEB: WWW.KARLFISCHERARCHITECT.COM E-MAIL: KARL@KFARCHITECT.COM

project title: **RESIDENTIAL DEVELOPMENT**
 174 NASSAU STREET, BROOKLYN, NY 11201

drawing title: **9TH FLOOR PLAN**

job no: 00000000

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date: NOV. 2011	sheet no: OF
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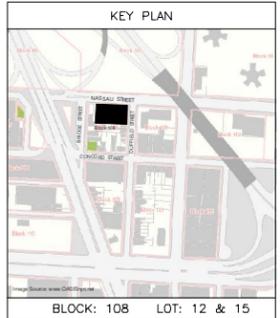
NASSAU STREET
(67'-0" WIDE)

DUFFIELD STREET
(60'-0" WIDE)

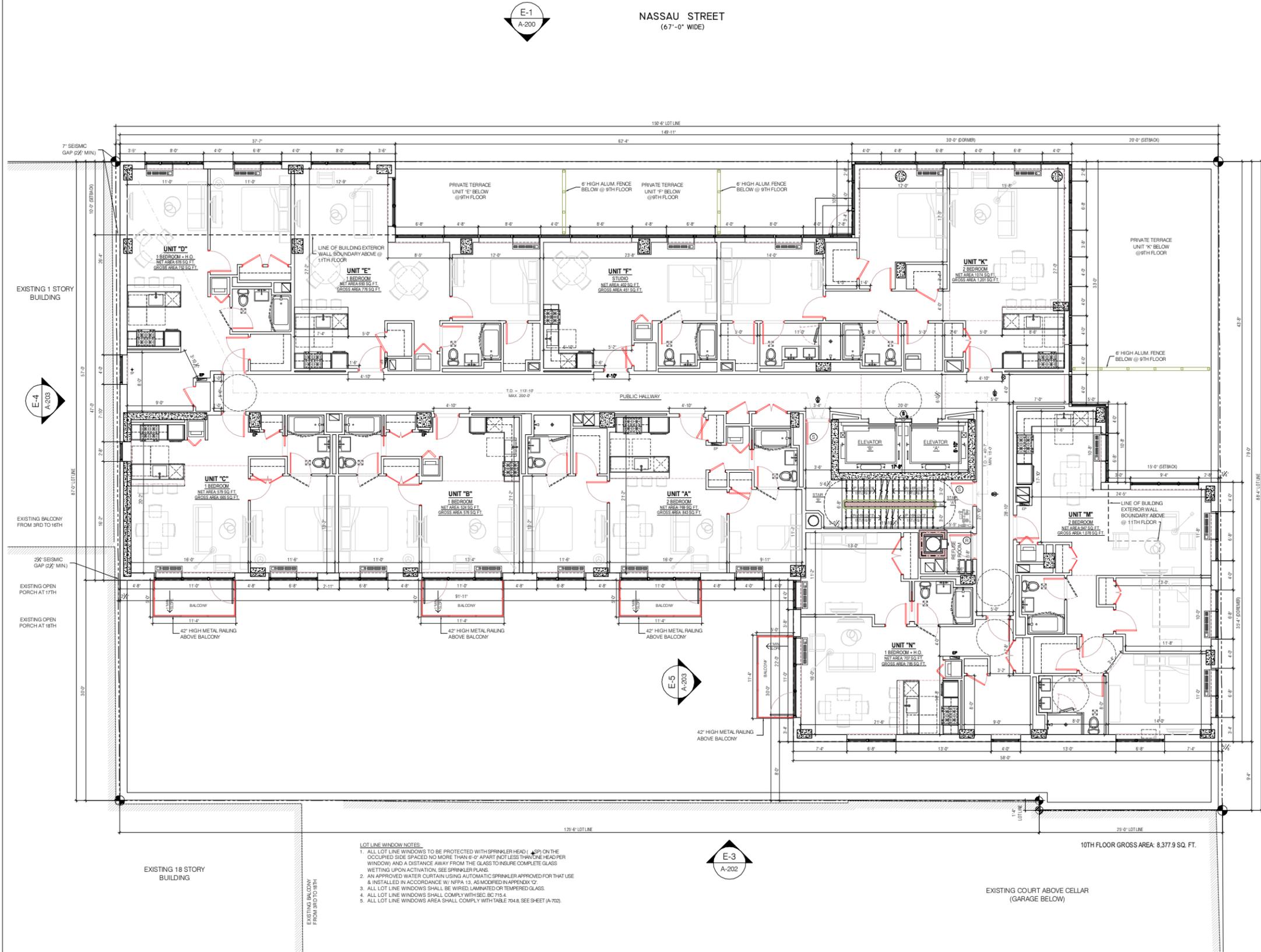
- LOT LINE WINDOW NOTES:**
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1 9TH FLOOR PLAN
 A-109.00 3/16" = 1'-0"

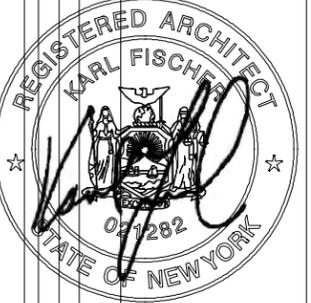




BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
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ISSUES/REVISIONS

MEP ENGINEER: **SETTINGER ENGINEERING ASSOCIATES**
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.settinger.com

STRUCTURAL ENGINEER: **WSP CANTOR SEINUK STRUCTURAL ENGINEERS**
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspcantor.com

CLIENT: **PINK STONE CAPITAL GROUP**
 347 Park Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 686-1330 Fax: (212) 686-1815 www.pinkstone.com

KARL FISCHER ARCHITECT AND CIVIL ENGINEER
 330 BROOKLYN 9th FLOOR, NEW YORK, NY 10012
 Tel: (212) 219-4133 Fax: (212) 219-4960
 1420 NORTH-DUNE WEST, MONROE, LA 70119
 Tel: (504) 841-4177 Fax: (504) 841-4100
 Tel: (504) 841-4100
 E-MAIL: KARL@KARLARCHITECT.COM

project title: **RESIDENTIAL DEVELOPMENT**
 174 NASSAU STREET, BROOKLYN, NY 11201

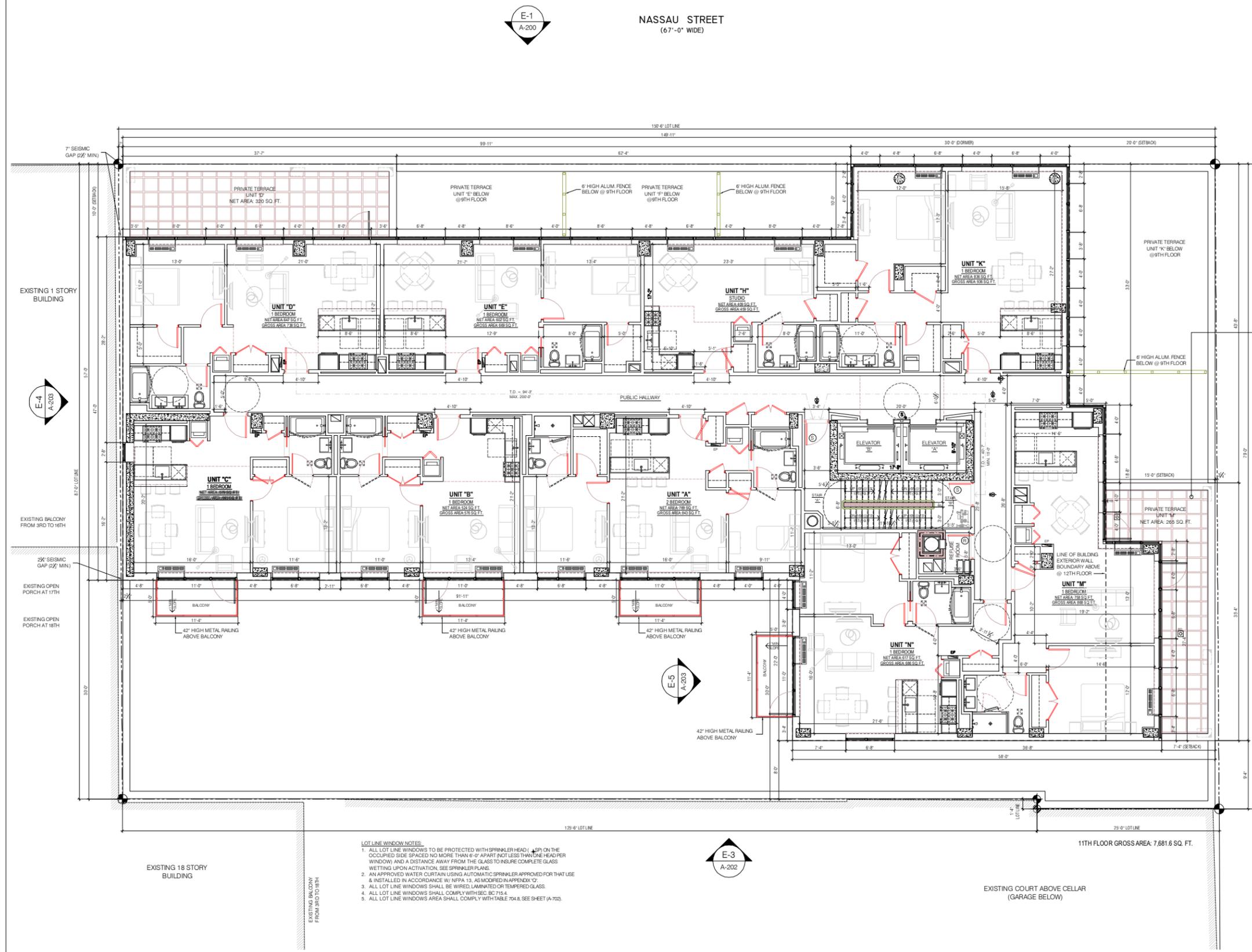
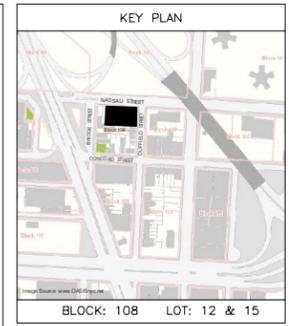
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job no: 00000000

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 date: NOV. 2011 sheet no: 0F
 drawn: drawing no:
 checked: **A-110.00**

1 10TH FLOOR PLAN
 A-110.00 3/16" = 1'-0"





ROOF TERRACE ASSEMBLY:
 • 2" THK. FIBERS ON/PRESISTALS
 • 2" SPACE FOR WATER RETENTION
 • 2 LAYERS (2" EACH) EXTRUDED POLYSTYRENE INSULATION R-20
 • 1/2" DRAINAGE MAT
 • WATERPROOFING MEMBRANE
 • CONC. SLAB, REFER TO STRUCTURE DRAWINGS

- LOT LINE WINDOW NOTES:
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASPR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION, SEE SPRINKLER PLANS.
 2. AN APPROVED WATER CURTAIN USING AUTOMATIC SPRINKLER APPROVED FOR THAT USE & INSTALLED IN ACCORDANCE W/ NFPA 13, AS MODIFIED IN APPENDIX D7.
 3. ALL LOT LINE WINDOWS SHALL BE WIRED, LAMINATED OR TEMPERED GLASS.
 4. ALL LOT LINE WINDOWS SHALL COMPLY WITH SEC. BC 715.4
 5. ALL LOT LINE WINDOWS AREA SHALL COMPLY WITH TABLE 704.8, SEE SHEET (A-702).



ISSUES/REVISIONS

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS

CLIENT:
PINK STONE CAPITAL GROUP

KARL FISCHER ARCHITECT
 330 BROADWAY, 10TH FLOOR, NEW YORK, NY 10013
 TEL: (212) 219-8133 FAX: (212) 219-8900
 1420 MORRIS AVENUE, WEST HAVEN, CT 06611
 TEL: (203) 833-4177 FAX: (203) 833-4008
 WEB SITE: WWW.KARLFISCHERARCHITECT.COM
 E-MAIL: KARL@KFARCHITECT.COM

PROJECT TITLE:
RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

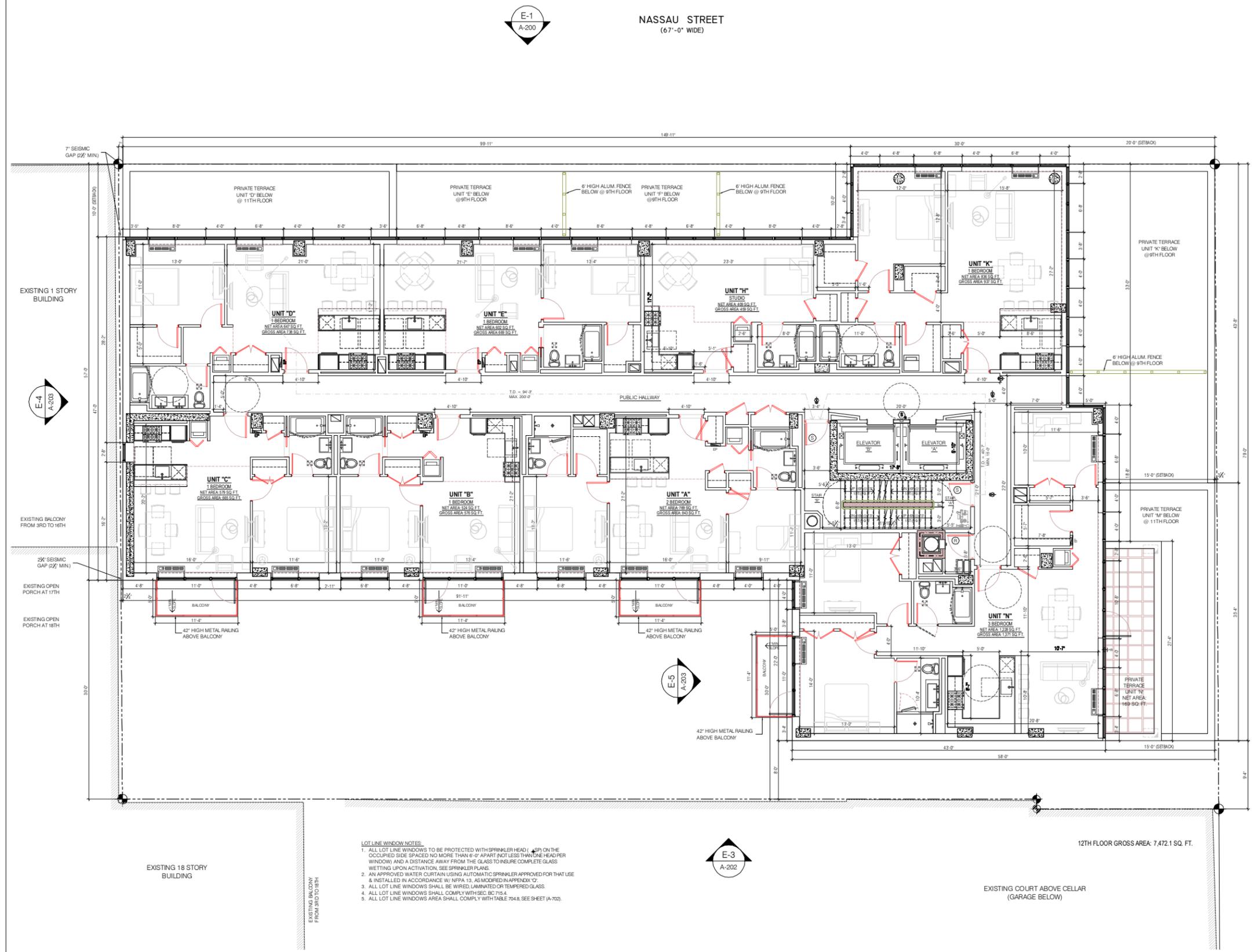
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11TH FLOOR PLAN

DRAWING NO.:
 000000000

SCALE: 3/16" = 1'-0"
 DATE: NOV. 2011
 PROJECT NO.: 11-65
 SHEET NO.: OF
 DRAWING NO.:
 CHECKED: **A-111.00**



BLOCK: 108 LOT: 12 & 15



- LOT LINE WINDOW NOTES:**
1. ALL LOT LINE WINDOWS TO BE PROTECTED WITH SPRINKLER HEAD (ASR) ON THE OCCUPIED SIDE SPACED NO MORE THAN 6'-0" APART (NOT LESS THAN ONE HEAD PER WINDOW) AND A DISTANCE AWAY FROM THE GLASS TO INSURE COMPLETE GLASS WETTING UPON ACTIVATION. SEE SPRINKLER PLANS.
 2. AN APPROVED WATER CURTAIN USING AUTOMATIC SPRINKLER APPROVED FOR THAT USE & INSTALLED IN ACCORDANCE W/ NFPA 13, AS MODIFIED IN APPENDIX C7.
 3. ALL LOT LINE WINDOWS SHALL BE WIRED, LAMINATED OR TEMPERED GLASS.
 4. ALL LOT LINE WINDOWS SHALL COMPLY WITH SEC. BC 715.4.
 5. ALL LOT LINE WINDOWS AREA SHALL COMPLY WITH TABLE 704.8, SEE SHEET (A-702).

1 12TH FLOOR PLAN
A-112.00 3/16" = 1'-0"



ISSUES/REVISIONS

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 110 WEST 42ND STREET, 11TH FLOOR, NEW YORK, NY 10018
 TEL: (212) 213-1100 FAX: (212) 213-1101
 www.ettingereng.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Fth Avenue, Suite 1602, New York, NY 10016
 Tel: (212) 686-1330 Fax: (212) 686-1015
 www.pinkstone.com

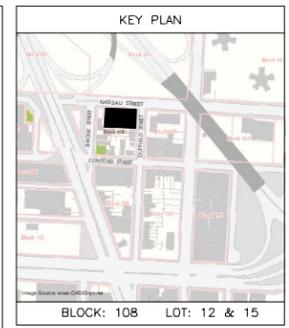
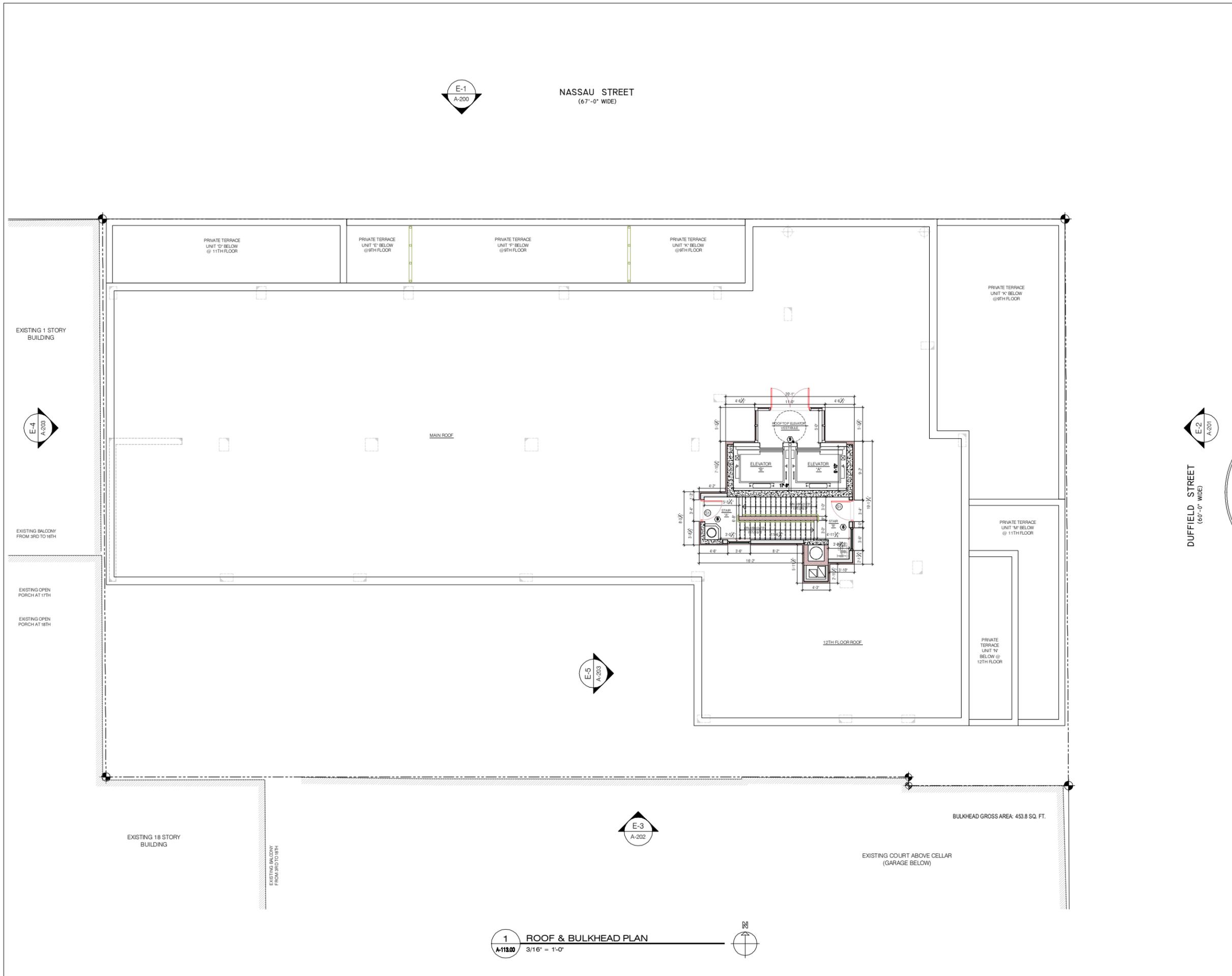
KARL FISCHER ARCHITECT AND CIVIL ENGINEER
 330 BRIDGE PL FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4990
 1420 NORTH ONE WAY, MONROE, LA 70119
 TEL: (504) 885-4477 FAX: (504) 885-4468
 815 LOCUST STREET, PHOENIX, AZ 85006
 E-MAIL: KARL@KARLFISCHER.COM

project title:
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

drawing title:
 12TH FLOOR PLAN

job no:
 000000000

scale: 3/16" = 1'-0"	project no.: 11-65
date: NOV. 2011	sheet no.: OF
drawn:	drawing no.: A-112.00
checked:	



ISSUES/REVISIONS

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 635 10th Avenue, Suite 1000
 New York, NY 10018
 Tel: (212) 213-8800
 Fax: (212) 213-8800
 www.ettingereng.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 43rd Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1166 Fax: (212) 687-1161 www.wspcs.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Park Avenue, Suite 1802, New York, NY 10017
 Tel: (212) 686-1330 Fax: (212) 686-1015
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT ONE ONA INC. AIA
 330 BROOKLYN AVE FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4900
 1420 AVENUE ONE WEST, MONROE, LA 70109
 TEL: (504) 881-4127 FAX: (504) 881-4100
 815 ONE MONROE AVENUE SUITE 1000, MONROE, LA 70109
 TEL: (504) 881-4127 FAX: (504) 881-4100

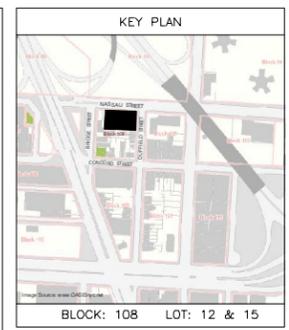
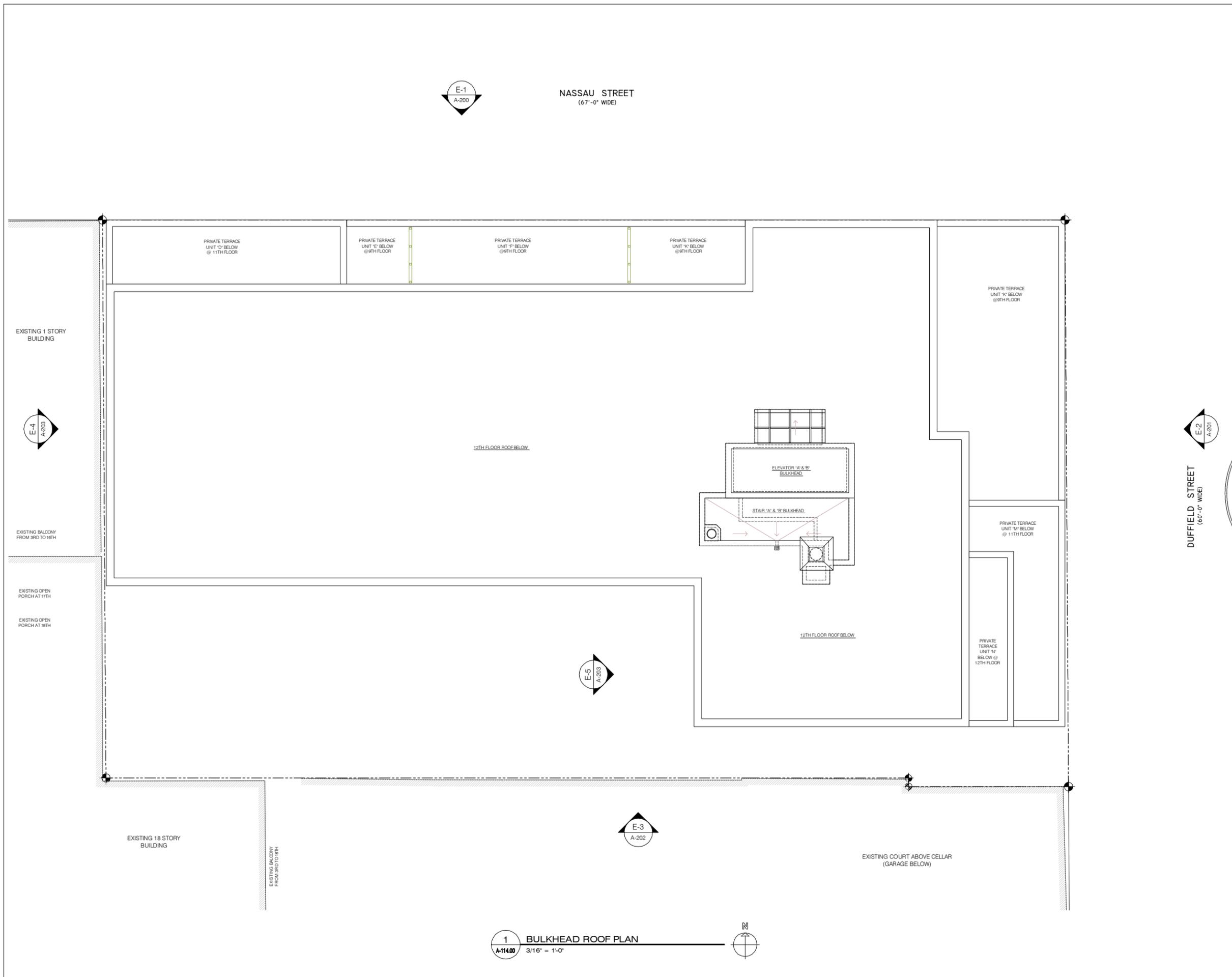
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RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
ROOF & BULKHEAD PLAN

JOB NO:
 000000000

SCALE: 3/16" = 1'-0"	PROJECT NO. 11-65
DATE: NOV. 2011	SHEET NO. OF
DRAWN:	DRAWING NO. A-113.00
CHECKED:	

1 ROOF & BULKHEAD PLAN
 A-113.00 3/16" = 1'-0"



BLOCK: 108 LOT: 12 & 15



Issue	Rev	Date	Description
ISSUES/REVISIONS			

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 610 Westchester Avenue, Suite 200
 Westchester, NY 10804
 Tel: (914) 912-1100
 www.ettenger.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-5166 Fax: (212) 687-5161 www.wspcs.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 Fth Avenue, Suite 1622, New York, NY 10016
 Tel: (212) 686-1330 Fax: (212) 686-1015
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT AND GRAPHIC ART
 330 BROOKLYN AVE FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4902
 1420 NORTH-DUNE WAY, MONROE, LA 70139
 TEL: (504) 883-4127 FAX: (504) 883-4100
 400 1/2 W. 10th Street, Suite 100, New York, NY 10014
 TEL: (212) 686-1330 FAX: (212) 686-1015

project title
RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

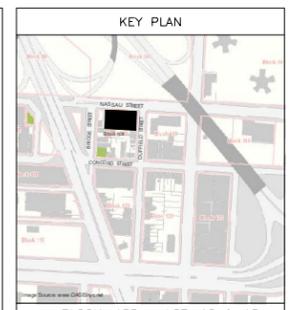
drawing title
BULKHEAD ROOF PLAN

job no.
 00000000

scale	3/16" = 1'-0"	project no.	11-65
date	NOV. 2011	sheet no. OF
drawn		drawing no.	
checked			A-114.00

1 BULKHEAD ROOF PLAN
 A-114.00 3/16" = 1'-0"





ISSUE NO.	REV.	DATE	DESCRIPTION
ISSUES/REVISIONS			

M/E/P ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 110 West 42nd Street, 10th Floor, New York, NY 10018
 Tel: (212) 213-1100 Fax: (212) 213-1101
 www.ettingereng.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 120 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-1100 Fax: (212) 687-1101
 www.wspcantorseinuk.com

CLIENT:
PINK STONE CAPITAL GROUP
 147 West 45th Street, 10th Floor, New York, NY 10018
 Tel: (212) 686-1100 Fax: (212) 686-1101
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT AND GRAPHIC ARTS
 530 BROOKLYN 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-4980
 1420 NORTH-DUNE ROAD, MONROE, LA 70119
 TEL: (504) 833-4133 FAX: (504) 833-4134
 100 WEST 10TH STREET, NEW YORK, NY 10011
 TEL: (212) 219-4133 FAX: (212) 219-4134

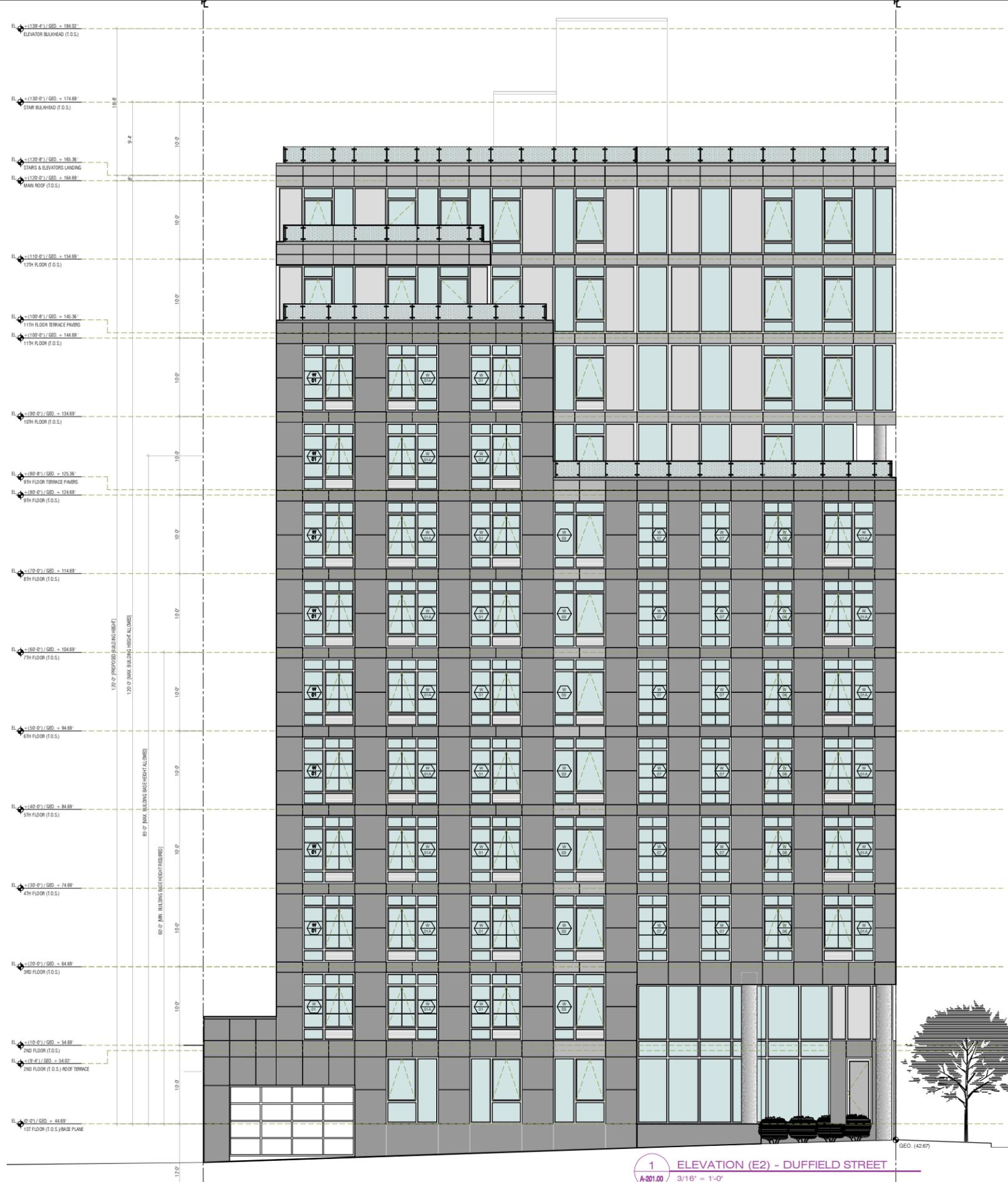
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 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
 ELEVATION (E1) - NASSAU STREET

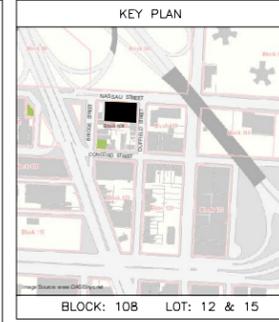
DWG NO.:
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SCALE: 3/16" = 1'-0"	PROJECT NO.: 11-65
DATE: NOV. 2011	SHEET NO.: OF
DRAWN:	DRAWING NO.: A-200.00
CHECKED:	

1 ELEVATION (E1) - NASSAU STREET
 A-200.00 3/16" = 1'-0"



1 ELEVATION (E2) - DUFFIELD STREET
 A-201.00 3/16" = 1'-0"



ISSUE	REV	DATE	DESCRIPTION
ISSUES/REVISIONS			

MEP ENGINEER:
ETTANIGER ENGINEERING ASSOCIATES
 435 WEST 42ND STREET, 10TH FLOOR, NEW YORK, NY 10018
 TEL: (212) 213-2100 FAX: (212) 213-2101
 WWW.ETTANIGERENGINEERING.COM

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-5165 Fax: (212) 687-5161 www.wspcs.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 FDR Avenue, Suite 1622, New York, NY 10016
 Tel: (212) 686-1300 Fax: (212) 686-1015
 WWW.PINKSTONECAPITAL.COM

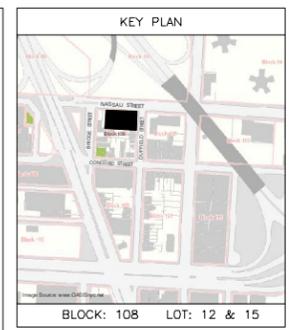
KARL FISCHER ARCHITECT ONE ONA ONE AIA
 630 BROOKLYN 9th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-4133 FAX: (212) 219-6962
 1420 NORTH-DUNE WEST, MONROE, LA 70119
 TEL: (504) 883-4127 FAX: (504) 883-4100
 400 ONE HENRI DRIVE, SUITE 1000, NEW ORLEANS, LA 70112
 TEL: (504) 586-8000 FAX: (504) 586-8000
 WWW.KARLFISCHERARCHITECT.COM

PROJECT TITLE:
 RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
 ELEVATION (E2) - DUFFIELD STREET

DWG NO:
 000000000

SCALE: 3/16" = 1'-0"	PROJECT NO. 11-65
DATE: NOV. 2011	SHEET NO. OF
DRAWN:	DRAWING NO. A-201.00
CHECKED:	



ISSUE	REV	DATE	DESCRIPTION
ISSUES/REVISIONS			

MEP ENGINEER:
ETTINGER ENGINEERING ASSOCIATES
 600 Westchester Avenue, Suite 200
 West Nyack, NY 10994
 Tel: (212) 249-2000
 www.ettenger-engineering.com

STRUCTURAL ENGINEER:
WSP CANTOR SEINUK STRUCTURAL ENGINEERS
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-5165 Fax: (212) 687-5161 www.wspcantor.com

CLIENT:
PINK STONE CAPITAL GROUP
 347 E 98th Street, Suite 1502, New York, NY 10016
 Tel: (212) 686-1260 Fax: (212) 686-1815
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT AND CIA, INC. AIA
 532 BROOKLYN 5TH FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-9133 FAX: (212) 219-8990
 1420 NORTH-DUNE WEST, WOODBURY, CT 06409
 TEL: (203) 843-4177 FAX: (203) 843-8008
 815 WEST HERRING STREET, CHICAGO, IL 60610
 E-MAIL: KARL@KARLFISCHER.COM

PROJECT TITLE:
RESIDENTIAL DEVELOPMENT
 174 NASSAU STREET, BROOKLYN, NY 11201

DRAWING TITLE:
ELEVATION (E3)

DOB NO:
 000000000

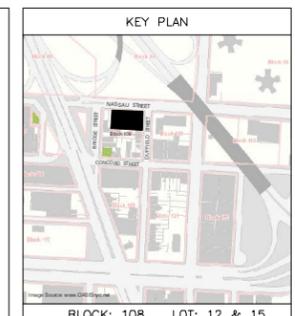
SCALE: 3/16" = 1'-0"	PROJECT NO. 11-65
DATE: NOV. 2011	SHEET NO. OF
DRAWN:	DRAWING NO. A-202.00
CHECKED:	



1 ELEVATION (E4)
A-203.00 3/16" = 1'-0"



1 ELEVATION (E5)
A-203.00 3/16" = 1'-0"



BLOCK: 108 LOT: 12 & 15



ISSUES/REVISIONS

MEP ENGINEER: **SETTINGER ENGINEERING ASSOCIATES**
 600 Madison Avenue, 10th Floor
 New York, NY 10017
 Tel: (212) 200-8000
 www.settingereng.com

STRUCTURAL ENGINEER: **WSP CANTOR SEINUK STRUCTURAL ENGINEERS**
 228 East 45th Street, 3rd Floor, New York, NY 10017
 Tel: (212) 687-5165 Fax: (212) 687-5161 www.wspcantor.com

CLIENT: **PINK STONE CAPITAL GROUP**
 347 6th Avenue, Suite 1502, New York, NY 10016
 Tel: (212) 686-1260 Fax: (212) 686-3815
 www.pinkstonecapital.com

KARL FISCHER ARCHITECT
 ONE ONE ONE AVENUE
 13th FLOOR, NEW YORK, NY 10012
 TEL: (212) 219-9133 FAX: (212) 219-8962
 1420 NORTH OAK STREET, WASHINGTON, DC 20019
 TEL: (202) 833-1177 FAX: (202) 833-8008
 418 WEST MADISON STREET, CHICAGO, IL 60606
 E-MAIL: KARL@KARLFISCHER.COM

project title: **RESIDENTIAL DEVELOPMENT**
 174 NASSAU STREET, BROOKLYN, NY 11201

drawing title: **ELEVATIONS (E4) & (E5)**

job no: 00000000

scale: 3/16" = 1'-0"	project no: 11-65
date: NOV. 2011	sheet no: OF
drawn: _____	drawing no: A-203.00
checked: _____	

ATTACHMENT B
CITIZEN PARTICIPATION PLAN

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Pink Stone Capital Group 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, Pink Stone Capital Group 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, Mr. William Wong, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

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 Brownfield 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. Pink Stone Capital Group will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Repository Name: Walt Whitman Library

Repository Address: 93 Saint Edwards Street, Brooklyn, New York 11205

Repository Telephone Number: (718) 935-0244

Repository Hours of Operation:

Mon	10:00 AM - 6:00 PM
Tue	10:00 AM - 6:00 PM
Wed	1:00 PM - 8:00 PM
Thu	10:00 AM - 6:00 PM
Fri	10:00 AM - 6:00 PM
Sat	closed
Sun	closed

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.

Identify Issues of Public Concern. The major issues of concern to the public will be potential impacts of nuisance odors and dust during the disturbance of historic fill/soils at the Site. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Construction Health and Safety Plan and a

Community Air Monitoring Plan are required components of the remedial program. Implementation of these plans will be under the direct oversight of the New York City Department of Environmental Remediation (NYCOER).

These plans will specify the following worker and community health and safety activities during remedial activity at the Site:

- On-Site air monitoring for worker protection,
- Perimeter air monitoring for community protection.

The Health and Safety Plan and the Community Air Monitoring Plan prepared as part of the Remedial Action Work Plan will be available for public review at the document repository

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 Pink Stone Capital Group, reviewed and approved by OER prior to distribution and mailed by Pink Stone Capital Group. 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:

- **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

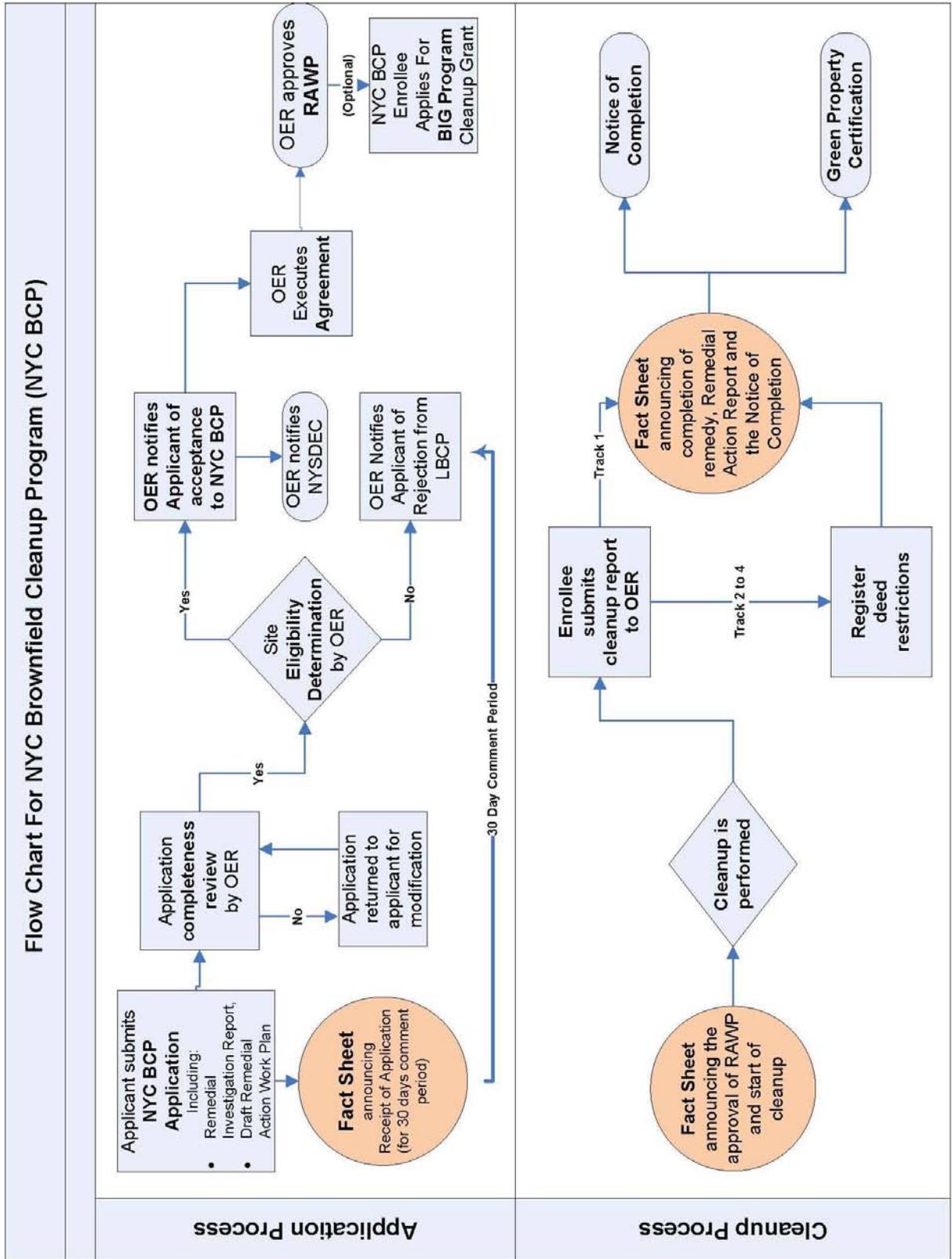
List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will 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.



ATTACHMENT C
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.

This project intends to use recycled concrete aggregate wherever possible in grading and backfilling the Site.

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.

The project will reduce the consumption of virgin materials by substituting recycled concrete aggregate for mined gravel and/or sand backfill whenever possible.

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.

Recycled concrete materials and other backfill materials will be locally sourced reducing the energy consumption associated with transporting these materials to the Site.

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.

Paperless Voluntary Cleanup Program. Pink Stone Capital Group is participating in OER's Paperless Voluntary 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. Pink Stone Capital Group 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.

ATTACHMENT D
SOIL MATERIALS MANAGEMENT PLAN

APPENDIX D

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 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 shown on **Figure 5**. 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 Pink Stone Capital Group 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 Pink Stone Capital Group. The letter will include as an attachment 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 1**. '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 VCP 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.

It is common to reuse clean soil at a construction site for use as backfill around footings and other foundation structures. If on-Site material is to be reused for these purposes at the Site, soil piles no greater than 500 cubic yards are to be staged on and under 5-mil polyethylene sheeting while awaiting sampling. Each soil pile will undergo a testing program to confirm the soil meets site SCOs prior to reuse on-Site. Confirmation testing of clean soils will be as follows:

Analysis

Frequency

Sample Type

SVOCs (PAHs)	1 per 500 yd ³	Composite of 5-point grab
Metals	1 per 500 yd ³	Composite of 5-point grab
Pesticides	1 per 500 yd ³	Composite of 5-point grab

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 1**.

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 methodology 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.

ATTACHMENT E
SITE SPECIFIC CONSTRUCTION
HEALTH AND SAFETY PLAN

REDEVELOPMENT PROJECT

172-180 NASSAU STREET
BROOKLYN, NEW YORK

CONSTRUCTION HEALTH AND SAFETY PLAN

JULY 2012

Prepared for:

Pinkstone Capital Group
347 Fifth Avenue
New York, NY 10016

Prepared By:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

HEALTH AND SAFETY PLAN

Site: **Redevelopment Project - PCG**

Location: **172-180 Nassau Street, Brooklyn, NY**

Prepared By: **ENVIRONMENTAL BUSINESS CONSULTANTS**

Date Prepared: **July - 2012**

Version: **1**

Revision: **0**

Project Description:

Waste types: **Solid**

Characteristics: **Semi-Volatile Organic Compounds, metals, and pesticides – in historic fill (Grade to 12 feet of soil)**

Overall Hazard: **Low**

ENVIRONMENTAL BUSINESS CONSULTANTS (EBC) AND EBC'S SUBCONTRACTORS DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION.

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STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 172-180 Nassau Street, Brooklyn, New York.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. The General Contractor and their subcontractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees. The General contractor has the option of adopting this HASP or providing its own for the planned scope of work under the Remedial Action Plan.



1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of a Remedial Action Plan at Redevelopment Project located at 172-180 Nassau Street, Brooklyn, NY, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during the removal of underground storage tanks and the excavation and loading of contaminated soil. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The CHASP may be revised by EBC at the request of Pinkstone Capital Group (“the owner”) and/or the New York State Department of Environmental Conservation (NYSDEC) or New York City Office of Environmental Remediation (NYCOER) upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC’s Project Manager, site safety officer and/or the EBC Health and Safety Consultant.

1.1 Scope

This CHASP addresses the potential hazards related to the site Remedial Action Plan (RAP). The RAP activities are as described below:

- 1) Site mobilization of General Contractor (GC) and Subcontractors to install the building foundation.
 - a) Excavate top 12 feet of historic fill from Site.
 - b) Excavate as necessary for installation of new building's foundation.

1.2 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- General Contractor
- EBC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Construction Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mr. Kevin Brussee	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 338-1749
Mr. Kevin Waters	EBC Site Safety Officer	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Designating exclusion, decontamination and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

2.0 SITE BACKGROUND AND SCOPE OF WORK

The Site is located at 180 Nassau Street in the Dumbo section in Brooklyn, New York and is identified as Block 108, Lot 12 (formerly lots 12 and 15) on the New York City Tax Map. The Site is 13,161-square feet and is bounded by Nassau Street to the north, Duffield Street to the east, Lot 5 to the west, which is developed with a 20-story apartment building with first floor commercial space. Currently, the Site is vacant, but an abandoned 5-story residential building is located on the eastern portion of the Site.

Lot 12 is a slightly irregular shaped corner lot consisting of 150.5 feet of street frontage on Nassau Street and 88.33 feet of street frontage on Duffield Street. The majority of the lot consists of an exposed soil cover, but one abandoned 5-story apartment building is located at the intersection of Duffield Street and Nassau Street

2.1 Prior Investigations

2.1.1 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment was prepared by EBC in March of 2008. The Phase I noted the former use of the property as the following:

- 172 Nassau Street (west portion of Lot 12) – Residential uses and Mayfair Ship Supplies
- 174-178 Nassau Street (eastern portion of Lot 12) – Residential uses, and a ribbon ink and carbon paper manufacturing plant
- 180 Nassau Street / 2 Duffield Street (Lot 15) – Residential uses

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, The Phase I ESA revealed the following recognized environmental conditions in connection with the subject property with the exception of the following:

- Lot 12 has been assigned an “E” designation for “hazardous materials” and “noise attenuation and alternate ventilation” as part of the Bridge Plaza zoning changes adopted by the City in 2003. The site was assigned E-117 under the City Environmental Quality Review (CEQR) number 03DCP035K.

It should be noted that if redevelopment plans for multiple lots include a lot labeled “E” by the Department of Buildings, all other lots part of the redevelopment plan are designated with an “E” and are subject to the same requirements assigned to an “E” designated site. Therefore, lot 15 is subject to the restrictions applied to an “E” site.

2.1.2 Phase II Subsurface Investigation

EBC performed a Phase II Subsurface investigation between March 27, 2008 and March 31, 2008 for 172-180 Nassau Street.

Seven soil boring locations (B1-B7) were advanced at 172-180 Nassau Street (Lots 12 and 15). B1, B2, B3 and B4 were to be performed on Lot 12 and B5, B6, and B7 were to be performed on Lot 15. However, during sampling activities performed on March 27, 2008 and March 30, 2008, one additional boring location was selected for Lot 12 by EBC. Therefore, soil borings B1-B5

were performed on Lot 12 and B6, B7 and B8 were performed on Lot 15, to gain representative soil quality information across the site.

For soil borings B1, B2 and B3, soil samples were collected continuously from grade to a final depth of 12 feet below existing grade using a four-foot steel macro-core sampler with acetate liners and Geoprobe direct-push technology equipment. Each of the remaining soil borings (B4-B8) were performed within a basement, and were therefore performed utilizing a decontaminated stainless steel hand-auger to a final depth of 5 feet below the basement floor. The depth of the basement floor is estimated to be approximately 8-10 feet below grade, making the termination depth of the boring approximately 13-15 below grade.

EBC concluded, subsurface soils composed primarily of fill material was encountered to a depth of approximately 1-2 feet below grade in B1, B2 and B3 (exterior soil borings initiated at grade). The fill materials consist of varying amounts of brick, concrete, rubble in a silty soil matrix. This fill material contains elevated levels of SVOCs and metals. Native material (orangish or redish/brown silty-sand) was encountered at depths greater than 4 feet below grade and beneath the concrete slab of the buildings for borings B4-B8. Slightly elevated levels of one or more metals were noted in each of the soil samples.

Groundwater occurs at a depth of approximately 52 feet below grade and therefore, should not be encountered during excavation for the new building's basement. As noted in the analytical results of the groundwater samples collected for the site, no VOC or SVOC contamination were present.

2.1.3 Remedial Investigation Report

During the remedial investigation a total of 12 soil samples were collected from 6 soil borings and 2 groundwater samples (plus one duplicate sample) collected from two monitoring wells. EBC installed five soil vapor probes around the Site perimeter and collected five samples for chemical analysis. In addition, EBC conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);

Soil Sampling Results

Soil/fill samples collected during the RI showed no PCBs at detectable concentrations.

No VOCs were detected above UUSCOs within any of the soil samples, but two very low concentrations of m&p-Xylenes (10 ppb) and o-Xylene (5.7 ppb) were detected in one of the shallow soil samples.

Three SVOCs were detected within the one of the six shallow samples at concentrations above their RRSCOs, and one SVOC was detected at a concentration above it's RRSCO in a second shallow soil sample.

Four metals (nickel, lead, mercury and zinc) were detected at a concentration above UUSCOs within the shallow soil samples. No metals were detected at a concentration exceeding their RRSCOs. Two pesticides (4,4,4-DDT and chlordanes) were detected within the shallow soil samples collected from the historic fill layer at concentrations above UUSCOs, but well below RRSCOs. The type, distribution and concentration of each of SVOCs and metals indicate that they are associated with historic fill material observed in shallow samples.

Deep soil samples collected during the RI showed no pesticides, PCBs, or VOCs at detectable concentrations.

Two SVOCs were detected within one of the six deep soil samples at a concentration above their RRSCO. The same soil sample reported lead, mercury and zinc above UUSCO. Nickel was detected within three of the other deep soil samples at a concentration above UUSCO.

The metals and SVOCs detected within two of the deep soil samples are likely associated with the historic fill material observed within the deep samples. Overall, the findings were consistent with observations for other historical fill sites in Brooklyn.

Groundwater Sampling Results

Groundwater samples collected during the RI showed no pesticides or PCBs at detectable concentrations in either groundwater sample collected at the Site.

Groundwater samples collected during the RI showed one chlorinated VOC (chloroform) in both groundwater samples. Chloroform was detected within GW1 at 7.5 ppb and GW2 at 1.0 ppb. No chlorinated VOCs were identified in any of the soil samples collected on Site, which indicates the low concentrations of chloroform detected within the groundwater samples is associated with off-Site impacts.

No SVOCs were detected above their corresponding GQSs in groundwater, but two SVOCs were reported at low concentrations below their corresponding GQS.

The following dissolved metals were detected above their respective NYSDEC GQS; iron, magnesium, manganese, and sodium. The RI indicates that groundwater is not impacted by site conditions and did not reveal any sources of contaminants on-Site.

Soil Gas Sampling Results

Soil vapor samples collected during the RI showed petroleum and chlorinated VOCs at generally low concentrations. Total petroleum VOCs were identified from 348 to 1,427 $\mu\text{g}/\text{m}^3$. PCE was identified in all samples at a maximum concentration of 1.91 $\mu\text{g}/\text{m}^3$, TCE was identified in five of the six soil vapor samples at a maximum concentration of 1.02 $\mu\text{g}/\text{m}^3$ and carbon tetrachloride was identified in all samples at a maximum concentration of 0.503 $\mu\text{g}/\text{m}^3$. These results were well below the monitoring levels for PCE and TCE in the State DOH soil vapor guidance matrix. Neither PCE nor TCE were detected within any of the soil samples collected at the Site and these low levels suggest a possible off-Site origin. Notable detections include ethanol (ranging in concentration from 172 to 855 $\mu\text{g}/\text{m}^3$) and acetone (ranging in concentration from 752 to 2,070 $\mu\text{g}/\text{m}^3$). Both compounds are common laboratory introduced contaminants, and may not be reflective of on-Site conditions.

2.2 Redevelopment Plans

Lots 12 and 15 will be developed with one new 12-story residential building, which will occupy the entirety of both lots. A full cellar will extend under the whole foot print of the building. The western portion of the cellar will be utilized as a parking garage and the eastern portion of the cellar will consist of a mechanical room, recreational area and recreational equipment storage room, and an elevator shaft with two elevators. The entrance and exit are located on the Duffield

Street side of the building. The basement floor will be located approximately 12 feet below grade, but the excavation in certain areas will extend to approximately 18 feet below grade for construction of the elevator shaft.

2.3 Description of Remedial Action Plan

Site activities included within the Remedial Action Plan that are included within the scope of this HASP include the following:

The proposed remedial action will consist of:

Site-specific remedial elements

1. Establishment of Track 4 Site-Specific SCOs.
2. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs.
3. Collection and analysis of end-point samples to determine whether Track 1 Unrestricted Use or Track 4 Site-Specific SCOs are achieved.
4. Construction and maintenance of an engineered composite cover across the entire Site to prevent human exposure to residual soil/fill remaining under the Site.

All other remedial elements

5. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan.
6. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
7. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
8. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
9. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of any contaminated media on-Site.
10. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
11. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
12. 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.
13. Demarcation of residual soil/fill.
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. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
16. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, and lists any changes from this RAWP.
17. If Track 1 Unrestricted Use SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual historic fill,

3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention

- a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
- b. Work in Pairs. Individuals should avoid undertaking any activity alone.
- c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
- d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment

a. Heat Rash (or prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove source or irritation and cool skin with water or wet cloths.

b. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

Soil collected as part of several subsurface investigations performed at the Site have revealed elevated levels of SVOCs, metals, and pesticides in historic fill at the Site. In addition, a groundwater sample collected at the site showed an elevated level of chloroform.

Semi-Volatile organic compounds reported to be present in soil and/or groundwater include the following:

Benzo(a)anthracene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene	Chrysene
Benzo(g,h,i)perylene	Benzo(a)pyrene	Benzo(k)fluoranthene	

Metals reported to be present soil, and/or groundwater includes the following:

Arsenic	Barium	Mercury	Magnesium	Nickel
Cadmium	Copper	Zinc	Lead	

Pesticides reported to be present soil, and/or groundwater include the following:

4,4-DDT	Chlordane
---------	-----------

The primary routes of exposure to identified contaminants in soil to on-site construction workers are through inhalation, ingestion and absorption.

Appendix C includes information sheets for all detected chemicals that may be encountered at the site.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m³ over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when

necessary.

3.3.2 *Dust Control and Monitoring During Earthwork*

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu\text{g}/\text{m}^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 *Organic Vapors*

Although no VOCs were detected within any of the soil samples collected at the Site, the site safety officer will periodically monitor organic vapors with a Photo-ionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work clothes, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when sustained concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), by more than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection, engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of excavations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

- 1 The SSO will be consulted immediately
- 2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
- 3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	<ul style="list-style-type: none"> • Continue excavating • Level D protection • Continue monitoring every 10 minutes
1-5 ppm Above Background, Sustained Reading	1-10%	<ul style="list-style-type: none"> • Continue excavating • Go to Level C protection or employ

		<p>engineering controls</p> <ul style="list-style-type: none"> • Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustained Reading	10-20%	<ul style="list-style-type: none"> • Discontinue excavating, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at excavation pit
>25 ppm Above Background, Sustained Reading	>20%	<ul style="list-style-type: none"> • Discontinue excavating • Withdraw from area, shut off all engine ignition sources. • Allow pit to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less than 5 ppm (see Community Air Monitoring Plan).

6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

Due to the dimensions of the Site and the work area, it is expected that an exclusion zone will include the entire fenced area with the exception of the construction entrance area, which will serve as the decontamination zone. A support zone if needed will be located outside of the fenced area. All onsite workers during excavation of historic fill materials must provide evidence of OSHA 24 or 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer, if provided.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
Suffolk County Police	911
NYC Fire Department	911
The Brooklyn Hospital Center	(718) 250-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4010
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;
- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;
- Ensure appropriate decontamination, treatment, or testing for exposed or injured

personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager Mr. Kevin Brussee (631) 504-6000
- Site Safety Officer Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**), and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been

evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A
SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date: _____ Person Conducting Briefing: _____

Project Name and Location: _____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc...):

2. OTHER ISSUES (HASP changes, attendee comments, etc...):

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B
SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

Alternative Procedures: _____

Required Changes in PPE: _____

Project Superintendent (signature)

Date

Health and Safety Consultant (signature)

Date

Site Safety Officer (signature)

Date

APPENDIX C
CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

CHLOROFORM

ICSC: 0027



Trichloromethane
Methane trichloride
Formyl trichloride
CHCl₃

Molecular mass: 119.4

ICSC # 0027
CAS # 67-66-3
RTECS # [FS9100000](#)
UN # 1888
EC # 602-006-00-4
November 04, 2000 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. See Notes. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
• INHALATION	Cough. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
• SKIN	Redness. Pain. Dry skin.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• EYES	Redness. Pain.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.	Separated from food and feedstuffs and incompatible materials ,(see Chemical Dangers). Ventilation along the floor.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Xn symbol R: 22-38-40-48/20/22 S: 2-36/37 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0027

European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHLOROFORM

ICSC: 0027

<p style="text-align: center;">I M P O R T A N T A D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: VOLATILE COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour is heavier than air.</p> <p>CHEMICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride ICSC0163,phosgene ICSC0007 andchlorine fumes ICSC0126). Reacts violently withstrong bases,strong oxidants, some metals, such as aluminium, magnesium and zinc, causing fire and explosion hazard. Attacks plastic, rubber and coatings.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 10 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004). MAK: 0.5 ppm, 2.5 mg/m³; Peak limitation category: II(2); skin absorption (H); Carcinogen category: 4; Pregnancy risk group: C; (DFG 2004). OSHA PEL[†]: C 50 ppm (240 mg/m³) NIOSH REL: Ca ST 2 ppm (9.78 mg/m³) 60-minute See Appendix A NIOSH IDLH: Ca 500 ppm See: 67663</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes . The substance may cause effects on the central nervous system , liver and kidneys . The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The liquid defats the skin. The substance may have effects on the liver and kidneys . This substance is possibly carcinogenic to humans.</p>
<p style="text-align: center;">PHYSICAL PROPERTIES</p>	<p>Boiling point: 62°C Melting point: -64°C Relative density (water = 1): 1.48 Solubility in water, g/100 ml at 20°C: 0.8</p>	<p>Vapour pressure, kPa at 20°C: 21.2 Relative vapour density (air = 1): 4.12 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.7 Octanol/water partition coefficient as log Pow: 1.97</p>
<p style="text-align: center;">ENVIRONMENTAL DATA</p>	<p>The substance is toxic to aquatic organisms.</p> 	
<p>NOTES</p>		
<p>Turns combustible on addition of small amounts of a flammable substance or an increase in the oxygen content of the air. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. Card has been partly updated in April 2005. See section Occupational Exposure Limits.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-61S1888</p> <p style="text-align: right;">NFPA Code: H 2; F 0; R 0;</p>		
<p>ADDITIONAL INFORMATION</p>		
<p>ICSC: 0027</p>	<p>CHLOROFORM</p>	
<p>(C) IPCS, CEC, 1994</p>		

**IMPORTANT
LEGAL
NOTICE:**

Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385



1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # [CV9275000](#)
EC # 601-033-00-9
October 23, 1995 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ICSC: 0385

BENZ(a)ANTHRACENE

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS:	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none	Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
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ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood.	
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NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

ICSC: 0385

BENZ(a)ANTHRACENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104



Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
 $C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0104
CAS # 50-32-8
RTECS # [DJ3675000](#)
EC # 601-032-00-3
October 17, 2005 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

<p>I M P O R T A N T A D D I T I O N</p>	<p>PHYSICAL STATE; APPEARANCE: PALE-YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts with strong oxidants causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005). MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm³</p>	<p>Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

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ICSC: 0104	(C) IPCS, CEC, 1994	BENZO(a)PYRENE
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<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720



Benz(e)acephenanthrylene
 2,3-Benzofluoranthene
 Benzo(e)fluoranthene
 3,4-Benzofluoranthene
 $C_{20}H_{12}$
 Molecular mass: 252.3

ICSC # 0720
 CAS # 205-99-2
 RTECS # [CU1400000](#)
 EC # 601-034-00-4
 March 25, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation
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PHYSICAL DANGERS:

CHEMICAL DANGERS:

Upon heating, toxic fumes are formed.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: A2 (suspected human carcinogen); (ACGIH 2004).

MAK:

Carcinogen category: 2;
(DFG 2004).

of its aerosol and through the skin.

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481°C
Melting point: 168°C
Solubility in water:
none

Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality.



NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0720

BENZO(b)FLUORANTHENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527



2,13-Benzofluoranthene
Benzo(mno)fluoranthene
 $C_{18}H_{10}$
Molecular mass: 226.3

ICSC # 0527
CAS # 203-12-3
RTECS # [DF6140000](#)
March 25, 1998 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION		Local exhaust or breathing protection.	
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
• EYES		Safety goggles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0527

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527

I	PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
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P	PHYSICAL DANGERS:	

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INHALATION RISK:

CHEMICAL DANGERS:

The substance decomposes on heating producing toxic fumes.

EFFECTS OF SHORT-TERM EXPOSURE:

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

See Notes.

PHYSICAL PROPERTIES

Melting point: 149°C
Solubility in water: none
Vapour pressure, Pa at 20°C: <10

Relative vapour density (air = 1): 7.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.0
Octanol/water partition coefficient as log Pow: 7.23

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.



NOTES

Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Also consult ICSC #0720 and 0721.

ADDITIONAL INFORMATION

ICSC: 0527

BENZO(g,h,i)FLUORANTHENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721



Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
 $C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0721
CAS # 207-08-9
RTECS # [DF6350000](#)
EC # 601-036-00-5
March 25, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

I M	PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
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PHYSICAL DANGERS:

CHEMICAL DANGERS:

Upon heating, toxic fumes are formed.

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.

MAK:

Carcinogen category: 2;
(DFG 2004).

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 480°C
Melting point: 217°C
Solubility in water:
none

Octanol/water partition coefficient as log Pow: 6.84

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish.



NOTES

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0721

BENZO(k)FLUORANTHENE

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

CHRYSENE

ICSC: 1672



Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # [GC0700000](#)
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Aqua-Cancer Suspected of causing cancer Very toxic to aquatic life with long lasting effects Very toxic to aquatic life

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO BEIGE CRYSTALS OR POWDER</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³</p>	<p>Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

ADDITIONAL INFORMATION

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ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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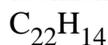
International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431



1,25,6-Dibenzanthracene



Molecular mass: 278.4

ICSC # 0431
 CAS # 53-70-3
 RTECS # [HN2625000](#)
 EC # 601-041-00-2
 October 23, 1995 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0431

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

I	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALLINE POWDER.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
M	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration
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CHEMICAL DANGERS:

of airborne particles can, however, be reached quickly.

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 524°C
Melting point: 267°C
Relative density (water = 1): 1.28

Solubility in water:
none
Octanol/water partition coefficient as log Pow: 6.5

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.



NOTES

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH).

ADDITIONAL INFORMATION

ICSC: 0431

DIBENZO(a,h)ANTHRACENE

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

ARSENIC

ICSC: 0013



Grey arsenic
As
Atomic mass: 74.9

ICSC # 0013
CAS # 7440-38-2
RTECS # [CG0525000](#)
UN # 1558
EC # 033-001-00-X

October 18, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.	Do not transport with food and feedstuffs. Marine pollutant. T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0013

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ARSENIC

ICSC: 0013

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.01 mg/m³ as TWA A1 (confirmed human carcinogen); BEI issued (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004). OSHA PEL: 1910.1018 TWA 0.010 mg/m³ NIOSH REL: Ca C 0.002 mg/m³ 15-minute See Appendix A NIOSH IDLH: Ca 5 mg/m³ (as As) See: 7440382</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract cardiovascular system central nervous system kidneys , resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system liver bone marrow , resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Sublimation point: 613°C Density: 5.7 g/cm³</p>	<p>Solubility in water: none</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.</p>	
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NOTES

The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).

Transport Emergency Card: TEC (R)-61GT5-II

ADDITIONAL INFORMATION

ICSC: 0013 **ARSENIC**

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827



Barium sulphate
Blanc fixe
Artificial barite
BaSO₄
Molecular mass: 233.43

ICSC # 0827

CAS # 7727-43-7

RTECS # [CR0600000](#)

October 20, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.			R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0827		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts violently with aluminium powder.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 10 mg/m³ as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m³; (Respirable fraction) 1.5 mg/m³; (DFG 2004). OSHA PEL[†]: TWA 15 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH REL: TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH IDLH: N.D. See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to dust particles, resulting in baritosis (a form of benign pneumoconiosis).</p>
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PHYSICAL PROPERTIES	<p>Melting point (decomposes): 1600°C Density: 4.5 g/cm³</p>	Solubility in water: none
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ENVIRONMENTAL DATA	
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NOTES

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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ICSC: 0827	BARIUM SULFATE
(C) IPCS, CEC, 1994	

<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

CADMIUM

ICSC: 0020



Cd
Atomic mass: 112.4

ICSC # 0020
CAS # 7440-43-9
RTECS # [EU980000](#)
UN # 2570
EC # 048-002-00-0
April 22, 2005 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s).	Dry sand. Special powder. NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place.	Fireproof. Dry. Keep under inert gas. Separated from ignition sources, oxidants acids, food and feedstuffs	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: E T+ symbol N symbol R: 45-26-48/23/25-62-63-68-50/53 S: 53-45-60-61 UN Hazard Class: 6.1

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0020

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CADMIUM

ICSC: 0020

<p>I M P O R T A N T A D D I T I O N</p>	<p>PHYSICAL STATE; APPEARANCE: SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001.) Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium, causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: (Total dust) 0.01 mg/m³ (Respirable fraction) 0.002 mg/m³ as TWA A2 (suspected human carcinogen); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004). OSHA PEL*: 1910.1027 TWA 0.005 mg/m³ *Note: The PEL applies to all Cadmium compounds (as Cd). NIOSH REL*: Ca See Appendix A *Note: The REL applies to all Cadmium compounds (as Cd). NIOSH IDLH: Ca 9 mg/m³ (as Cd) See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The fume is irritating to the respiratory tract Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys, resulting in kidney impairment This substance is carcinogenic to humans.</p>
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PHYSICAL PROPERTIES	<p>Boiling point: 765°C Melting point: 321°C Density: 8.6 g/cm³</p>	<p>Solubility in water: none Auto-ignition temperature: (cadmium metal dust) 250°C</p>
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ENVIRONMENTAL DATA	
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NOTES

Reacts violently with fire extinguishing agents such as water, foam, carbon dioxide and halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home. Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

ADDITIONAL INFORMATION

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ICSC: 0020	CADMIUM
(C) IPCS, CEC, 1994	

IMPORTANT LEGAL NOTICE:	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

COPPER

ICSC: 0240



Cu
(powder)

ICSC # 0240

CAS # 7440-50-8

RTECS # [GL5325000](#)

September 24, 1993 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from - See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0240

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

COPPER

ICSC: 0240

<p>I</p> <p>M</p> <p>P</p>	<p>PHYSICAL STATE; APPEARANCE: RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS:</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p>
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Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. See Notes.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.2 mg/m³ fume (ACGIH 1992-1993).
TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993).
Intended change 0.1 mg/m³
Inhal.,
A4 (not classifiable as a human carcinogen);
MAK: 0.1 mg/m³ (Inhalable fraction)
Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005).
OSHA PEL*: TWA 1 mg/m³ *Note: The PEL also applies to other copper compounds (as Cu) except copper fume.
NIOSH REL*: TWA 1 mg/m³ *Note: The REL also applies to other copper compounds (as Cu) except Copper fume.
NIOSH IDLH: 100 mg/m³ (as Cu) See: [7440508](#)

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES

Boiling point: 2595°C
Melting point: 1083°C
Relative density (water = 1): 8.9

Solubility in water:
none

ENVIRONMENTAL DATA

NOTES

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

ICSC: 0240

COPPER

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

LEAD

ICSC: 0052



Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # [OF7525000](#)
October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.		Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0052		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

<p>I M P O R T A N T T A D A</p>	<p>PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004). MAK: Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004). EU OEL: as TWA 0.15 mg/m³ (EU 2002). OSHA PEL*: 1910.1025 TWA 0.050 mg/m³ See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH REL*: TWA 0.050 mg/m³ See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH IDLH: 100 mg/m³ (as Pb) See: 7439921</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.</p>
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PHYSICAL PROPERTIES	Boiling point: 1740°C Melting point: 327.5°C	Density: 11.34 g/cm ³ Solubility in water: none
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ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.	
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NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.
 Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

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ICSC: 0052	LEAD
(C) IPCS, CEC, 1994	

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International Chemical Safety Cards

MAGNESIUM (POWDER)

ICSC: 0289



Mg
Atomic mass: 24.30

ICSC # 0289
CAS # 7439-95-4
RTECS # [OM2100000](#)
UN # 1418
EC # 012-001-00-3 (pyrophoric)
April 12, 2000 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with moisture, acids, halogens and many other substances.	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Do NOT expose to friction or shock. Prevent build-up of electrostatic charges (e.g., by grounding).	
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION	Cough. Laboured breathing. Headache. Dullness. Weakness. Fever or elevated body temperature.		
• SKIN			
• EYES	Redness. Pain.	Safety goggles.	
• INGESTION	Abdominal pain. Diarrhoea.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Fireproof. Separated from strong oxidants, acids. Dry.	Airtight. F symbol R: 15-17 S: 2-7/8-43 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0289

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MAGNESIUM (POWDER)

ICSC: 0289

I M	PHYSICAL STATE; APPEARANCE: GREY POWDER	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation.
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PHYSICAL DANGERS:

Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

CHEMICAL DANGERS:

The substance may spontaneously ignite on contact with air or moisture producing irritating or toxic fumes Reacts violently with strong oxidants. Reacts violently with many substances causing fire and explosion hazard. Reacts with acids and water forming flammable/explosive gas (hydrogen - see ICSC0001) causing fire and explosion hazard.

EFFECTS OF SHORT-TERM EXPOSURE:

Inhalation of fumes may cause metal fume fever.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.
MAK not established.

PHYSICAL PROPERTIES

Boiling point: 1100°C
Melting point: 651°C
Density: 1.7 g/cm³

Solubility in water: none
Auto-ignition temperature: 473°C
Explosive limits, vol% in air: see Notes

ENVIRONMENTAL DATA

NOTES

Burns with an intense flame. In order to prevent eye injury do not look directly at magnesium fires. Reacts violently with fire extinguishing agents such as water, carbon dioxide and powder. Explosive limits, vol% in air: (LEL) 0.03 kg/m³.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R2;

ADDITIONAL INFORMATION

ICSC: 0289

MAGNESIUM (POWDER)

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

MERCURY

ICSC: 0056



Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # [OV4550000](#)
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MERCURY

ICSC: 0056

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m³ Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL_f: C 0.1 mg/m³ NIOSH REL: Hg Vapor: TWA 0.05 mg/m³ skin Other: C 0.1 mg/m³ skin NIOSH IDLH: 10 mg/m³ (as Hg) See: 7439976</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!</p> <p>INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.</p>
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PHYSICAL PROPERTIES	<p>Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none</p>	<p>Vapour pressure, Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009</p>
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ENVIRONMENTAL DATA	<p>The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

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ICSC: 0056

MERCURY

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

NICKEL

ICSC: 0062



Ni
Atomic mass: 58.7
(powder)

ICSC # 0062
CAS # 7440-02-0
RTECS # [QR5950000](#)
EC # 028-002-00-7
October 17, 2001 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	
• INHALATION	Cough. Shortness of breath.	Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Separated from strong acids.	Xn symbol R: 40-43 S: 2-22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NICKEL

ICSC: 0062

I	<p>PHYSICAL STATE; APPEARANCE: SILVERY METALLIC SOLID IN VARIOUS FORMS.</p> <p>PHYSICAL DANGERS:</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of the dust.</p>
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Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:

Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: (Inhalable fraction) 1.5 mg/m³ as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004). MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004). OSHA PEL*†: TWA 1 mg/m³ *Note: The PEL does not apply to Nickel carbonyl. NIOSH REL*: Ca TWA 0.015 mg/m³ [See Appendix A](#) *Note: The REL does not apply to Nickel carbonyl. NIOSH IDLH: Ca 10 mg/m³ (as Ni) See: [7440020](#)

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

May cause mechanical irritation. Inhalation of fumes may cause pneumonitis.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 2730°C
Melting point: 1455°C
Density: 8.9 g/cm³

Solubility in water: none

ENVIRONMENTAL DATA

NOTES

At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062

NICKEL

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International Chemical Safety Cards

ZINC POWDER

ICSC: 1205



Blue powder
Merrillite
Zn
Atomic mass: 65.4
(powder)

ICSC # 1205
CAS # 7440-66-6
RTECS # [ZG8600000](#)
UN # 1436 (zinc powder or dust)
EC # 030-001-00-1
October 24, 1994 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust.	In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus.	Fireproof. Separated from acids, bases oxidants Dry.	Airtight. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1205

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS GREY TO BLUE POWDER.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of fumes may cause metal fume fever. The effects may be delayed.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 907°C Melting point: 419°C Relative density (water = 1): 7.14</p>	<p>Solubility in water: reaction Vapour pressure, kPa at 487°C: 0.1 Auto-ignition temperature: 460°C</p>
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<p>ENVIRONMENTAL DATA</p>	
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NOTES

Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R1;

ADDITIONAL INFORMATION

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ICSC: 1205

ZINC POWDER

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International Chemical Safety Cards

DDT

ICSC: 0034



Dichlorodiphenyltrichloroethane
 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane
 2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane
 1,1'-(2,2,2-Trichloroethylidene)bis(4-chlorobenzene)
 p,p'-DDT
 $C_{14}H_9Cl_5$
 Molecular mass: 354.5



ICSC # 0034
 CAS # 50-29-3
 RTECS # [KJ3325000](#)
 UN # 2761
 EC # 602-045-00-7
 April 20, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety goggles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Tremors. Diarrhoea. Dizziness. Headache. Vomiting. Numbness. Paresthesias. Hyperexcitability. Convulsions.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT let this chemical enter the environment. Sweep spilled substance into sealable non-metallic containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Provision to contain effluent from fire extinguishing. Separated from iron, aluminum and its salts, food and feedstuffs See Chemical Dangers.	Do not transport with food and feedstuffs. Severe marine pollutant. T symbol N symbol R: 25-40-48/25-50/53 S: 1/2-22-36/37-45-60-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0034

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ICSC: 0034

DDT

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS WHITE POWDER. TECHNICAL PRODUCT IS WAXY SOLID.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: On combustion, forms toxic and corrosive fumes including hydrogen chloride. Reacts with aluminium and iron.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 1 mg/m³ as TWA A3 (ACGIH 2004). MAK: 1 mg/m³ H Peak limitation category: II(8) (DFG 2003). OSHA PEL: TWA 1 mg/m³ skin NIOSH REL: Ca TWA 0.5 mg/m³ See Appendix A NIOSH IDLH: Ca 500 mg/m³ See: 50293</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: May cause mechanical irritation. The substance may cause effects on the central nervous system, resulting in convulsions and respiratory depression. Exposure at high levels may result in death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system and liver. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 260°C Melting point: 109°C Density: 1.6 g/cm³</p>	<p>Solubility in water: poor Octanol/water partition coefficient as log Pow: 6.36</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds. Bioaccumulation of this chemical may occur along the food chain, for example in milk and aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be given to avoid any additional release, e.g. through inappropriate disposal.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Consult national legislation. Agritan, Azotox, Anofex, Ixodex, Gesapon, Gesarex, Gesarol, Guesapon, Clofenotane, Zeidane, Dicophane, Neocid are trade names.

Transport Emergency Card: TEC (R)-61GT7-III

ADDITIONAL INFORMATION

<p>ICSC: 0034</p>	<p>DDT</p>
<p>(C) IPCS, CEC, 1994</p>	

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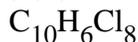
International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740



1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene



Molecular mass: 409.8

ICSC # 0740

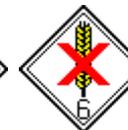
CAS # 57-74-9

RTECS #

UN # 2996

EC # 602-047-00-8

March 26, 1998 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	(See Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Confusion. Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs bases and incompatible materials See Chemical Dangers. Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Severe marine pollutant. Xn symbol N symbol R: 21/22-40-50/53 S: 2-36/37-60-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0740

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

<p>I M P O R T A N T A D V I S O R Y</p>	<p>PHYSICAL STATE; APPEARANCE: TECHNICAL: LIGHT YELLOW TO AMBER VISCOUS LIQUID</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on burning, on contact with bases producing toxic fumes including phosgene hydrogen chloride Attacks iron, zinc, plastic, rubber and coatings.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 mg/m³ as TWA (skin) A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004). MAK: (Inhalable fraction) 0.5 mg/m³ Peak limitation category: II(8); skin absorption (H); Carcinogen category: 3B; (DFG 2004). OSHA PEL: TWA 0.5 mg/m³ skin NIOSH REL: Ca TWA 0.5 mg/m³ skin See Appendix A NIOSH IDLH: Ca 100 mg/m³ See: 57749</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the liver immune system, resulting in tissue lesions and liver impairment. This substance is possibly carcinogenic to humans.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point at 0.27kPa: 175°C Relative density (water = 1): 1.59-1.63 Solubility in water: none</p>	<p>Vapour pressure, Pa at 25°C: 0.0013 Octanol/water partition coefficient as log Pow: 2.78</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to soil organisms, honey bees. It is strongly advised that this substance does not enter the environment. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

If the substance is formulated with solvents also consult the ICSCs of these materials. Carrier solvents used in commercial formulations may change physical and toxicological properties. Belt, Chlor Kil, Chlortox, Corodan, Gold Crest, Intox, Kypchlor, Niran, Octachlor, Sydane, Synklor, Termi-Ded, Topiclör, and Toxichlor are trade names. Also consult ICSC 0743 Heptachlor.

Transport Emergency Card: TEC (R)-61GT6-III

ADDITIONAL INFORMATION

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ICSC: 0740

CHLORDANE (TECHNICAL PRODUCT)

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APPENDIX D
HOSPITAL INFORMATION AND MAP
FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO. _____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

Vehicular Personal Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

Description of Accident _____

Action Taken _____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

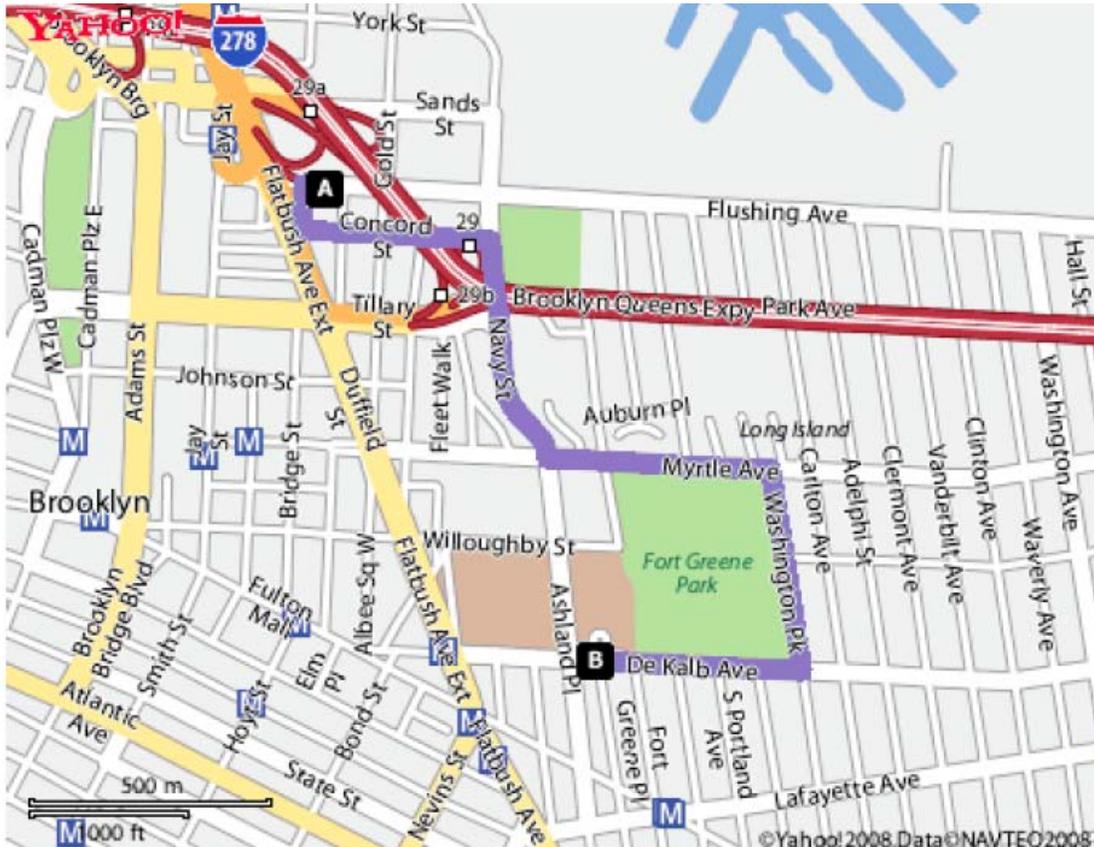
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

The Brooklyn Hospital Center
121 DeKalb Avenue Brooklyn, NY 11201
Information Line (718) 250-8000



Directions

1. Start at **174 NASSAU ST, BROOKLYN** - go < 0.1 mi
2. Continue on **NASSAU ST** - go < 0.1 mi
3. Turn **L** LEFT on **BRIDGE ST** - go < 0.1 mi
4. Turn **L** LEFT on **CONCORD ST** - go 0.2 mi
5. Turn **R** RIGHT on **NAVY ST** - go 0.3 mi
6. Turn **L** LEFT on **MYRTLE AVE** - go 0.3 mi
7. Turn **R** RIGHT on **WASHINGTON PK** - go 0.3 mi
8. Turn **R** RIGHT on **DE KALB AVE** - go 0.3 mi
9. Arrive at **121 DE KALB AVE, BROOKLYN**, on the **R** RIGHT