

Remedial Action Plan

For

134-37 35th Avenue

Flushing, Queens, New York

Block 4949, Lot(s) 31

OER Project Number 14EHAN384Q

E-Designation E-246

CEQR Number 04DCP013Q

134-03 35th Street (aka New Millenium/Prince Street) Rezoning Action

Prepared for:

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APRIL 2015

REMEDIAL ACTION PLAN

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LIST OF ACRONYMS

| Acronym | Definition |
|----------------|--|
| AST | Aboveground Storage Tank |
| CAMP | Community Air Monitoring Plan |
| C&D | Construction & Demolition |
| CEQR | City Environmental Quality Review |
| CFR | Code of Federal Regulations |
| CHASP | Construction Health and Safety Plan |
| CO | Certificate of Occupancy |
| CPC | City Planning Commission |
| DSNY | Department of Sanitation |
| “E” | E-Designation |
| EAS | Environmental Assessment Statement |
| EIS | Environmental Impact Statement |
| ESA | Environmental Site Assessment |
| EC/IC | Engineering Control and Institutional Control |
| ELAP | Environmental Laboratory Accreditation Program |
| FDNY | New York City Fire Department |
| GPR | Ground Penetrating Radar |
| HASP | Health and Safety Plan |
| HAZWOPER | Hazardous Waste Operations Emergency Response |
| IDW | Investigation Derived Waste |
| Notice - NNO | Notice of No Objection |
| Notice - NTP | Notice To Proceed |
| Notice - NOS | Notice Of Satisfaction |
| Notice - FNOS | Final Notice of Satisfaction |
| NYC BSA | New York City Board of Standards and Appeals |
| NYC DCP | New York City Department of City Planning |
| NYC DEP | New York City Department of Environmental Protection |
| NYC DOB | New York City Department of Buildings |
| NYC DOF | New York City Department of Finance |
| NYC HPD | New York City Housing Preservation and Development |
| 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 DEC PBS | New York State Department of Environmental Conservation Petroleum Bulk Storage |
| NYS DOH | New York State Department of Health |
| NYS DOT | New York State Department of Transportation |
| OSHA | United States Occupational Health and Safety Administration |
| PAHs | Polycyclic Aromatic Hydrocarbons |
| PCBs | Polychlorinated Biphenyls |
| PE | Professional Engineer |
| PID | Photo Ionization Detector |
| PM | Particulate Matter |
| QEP | Qualified Environmental Professional |
| RA | Registered Architect |
| RAP | Remedial Action Plan |
| RCA | Recycled Concrete Aggregate |
| RCR | Remedial Closure Report |
| RD | Restrictive Declaration |
| RI | Remedial Investigation |
| SCOs | Soil Cleanup Objectives |
| SCG | Standards, Criteria and Guidance |
| SMP | Site Management Plan |
| SPDES | State Pollutant Discharge Elimination System |
| SSDS | Sub-Slab Depressurization System |
| SVOCs | Semi-Volatile Organic Compounds |
| USCS | Unified Soil Classification System |
| USGS | United States Geological Survey |
| UST | Underground Storage Tank |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| VB | Vapor Barrier |
| VOCs | Volatile Organic Compounds |

CERTIFICATION

I, Kevin Loyst, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Farrington Realty, LLC Site, OER Project #14HAN384Q.

I, Stephanie Davis am a Qualified Environmental Professional as defined in §43-140. I have primary direct responsibility for implementation of the remedial action for the Farrington Realty, LLC Site, OER Project #14HAN384Q.

I certify that this Remedial Action Plan (RAP) 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 RAP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Kevin Loyst
Name

76321-1
NYS PE License Number

[Signature]
Signature

4-17-15
Date

Stephanie Davis
QEP Name

[Signature]
QEP Signature

4-20-15
Date



EXECUTIVE SUMMARY

Farrington Realty, LLC has established this plan to remediate a 39,000-square foot site located at 134-37 35th Avenue in Queens, New York. A Phase II Subsurface Investigation (Phase II) was performed to compile and evaluate data and information necessary to develop this Remedial Action Plan (RAP). The remedial action described in this document achieves the remedial objectives, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located in the Flushing section of Queens, New York and is identified as Block 4949 and Lot 31 on the New York City Tax Map. Figure 1.1.1 is a Site location map. The Site is 39,000-square feet and is bounded by an alley to the north, 35th Avenue to the south, Farrington Street to the east, and a plumbing supply business to the west. Currently, the Site is vacant and undeveloped and contains an asphalt-paved area to the north. The former 38,000-square-foot commercial building was demolished prior to the RI.

Summary of Proposed Redevelopment Plan

The proposed use of the Site will be commercial and residential. Redevelopment will include the construction of a one- to 15-story building with a cellar partially below ground occupying the ground level and two sub-cellars to a total depth of 26 feet below grade (fbg).

The current zoning designation is R6 with a C2-2 overlay, which permits residential and retail commercial use.

The redevelopment plan includes demolishing the current Site building, with removal and proper offsite disposal of all demolition debris. No sub-grade demolition is anticipated or planned.

The new building will be approximately 38,775 square feet and will occupy the entire lot. The second sub-cellar (lowest level), which extends across the entire lot, will contain parking and mechanical rooms. The first sub-cellar, located above the second sub-cellar, will contain parking, a pool, a café, a kitchen, maintenance rooms, laundry rooms, a fitness center, and meeting rooms. The cellar (ground level) will contain nine retail units, a hotel lobby, a

residential apartment lobby, maintenance rooms, and work rooms. The first floor will contain a parking garage and maintenance rooms. The second floor will contain hotel rooms, conference rooms, and a terrace. Floors three through seven will contain hotel rooms and maintenance rooms. Floors 8 through 15 will contain residential apartments and maintenance rooms. The roof will be used as a terrace. The building will contain 210 hotel rooms, 148 apartments, and two elevators; the total gross area of the building will be 354,454 square feet.

Redevelopment will include excavation across the entire Site to a depth of 29 fbg. Approximately 41,650 cubic yards (estimated at 54,150 tons) of soil will be excavated. Depth to groundwater is estimated at 27 fbg.

Summary of the Remedy

The proposed remedial action achieves all of the remedial action goals established for the project. The proposed remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants and uses standard methods that are well established in the industry.

The proposed remedial action will consist of:

1. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
2. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
3. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
4. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency specified by disposal facility. A Waste Characterization Report documenting sample procedures, location, analytical results and disposal facility(s) approval letters will be submitted to NYCOER prior to the start of the remedial action.
5. Excavation and removal of soil/fill to the planned excavation depth of 29 feet below existing grade for the foundation. The elevator shaft will be excavated to a depth of

approximately eight feet below the sub-cellar slab. Approximately, 54,150 tons of soil will be excavated and removed from this Site.

6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
7. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
8. Closure of the open petroleum spill (NYSDEC Spill Case numbers 95-16190) under the authority of NYSDEC and in compliance with applicable local, State and Federal laws and regulations. Spill remediation will be conducted in accordance to NYSDEC approved Spill RAP. This RAWP does not alter or interfere with the remedial action for the petroleum spill.
9. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
10. 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. Appropriate segregation of excavated media onsite.
11. Collection and analysis of sixteen (16) end-point samples to determine the performance of the remedy with respect to attainment of site-specific SCOs.
12. Construction and maintenance of a three-foot engineered composite cover consisting of the building foundation slab.
13. Installation of a vapor barrier system beneath the building slab and along foundation sidewalls.
14. Implementation of storm-water pollution prevention measures in compliance 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 Remedial Closure Report (RCR) that describes the remedial activities, certifies that the remedial requirements have been achieved, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAP.
17. If Unrestricted Use Soil Cleanup Objective are not met, the property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

REMEDIAL ACTION PLAN

1.0 SITE BACKGROUND

This Remedial Action Plan (RAP) and site-specific Construction Health and Safety Plan (CHASP) have been developed for 134-37 35th Avenue in the Flushing section of Queens, New York (the Site). This project has been assigned project number 14EHAN384Q by OER. This RAP describes the remediation and/or mitigation activities to be implemented at the Site in coordination with the New York City Office of Environmental Remediation (OER) for the purposes of satisfying the requirements of the Hazardous Materials E-Designation Program and obtaining a Notice To Proceed. An E-Designation for Hazardous Materials (E-246) was placed on the Site by the New York City Department of City Planning (DCP) as part of the June 7, 2010, 134-03 35th Avenue (aka New Millenium/Prince Street) rezoning action(CEQR 04DCP013Q). The site-specific CHASP (Appendix 2) addresses site-specific hazards, identified contaminants of concern and safety requirements associated with remediation and mitigation activities in accordance with ASTM and OSHA guidelines.

1.1 Site Location and Current Usage

The Site is located in the Flushing section of Queens, New York and is identified as Block 4949 and Lot 31 on the New York City Tax Map. Figure 1.1.1 is a Site location map. The Site is 39,000-square feet and is bounded by an alley to the north, 35th Avenue to the south, Farrington Street to the east, and a plumbing supply business to the west. Currently, the Site is vacant and undeveloped and contains an asphalt-paved area to the north. The former 38,000-square-foot commercial building was demolished prior to the RI. Figure 1.1.2 is a Site plan showing the current layout of the Site.

1.2 Proposed Redevelopment Plan

The proposed use of the Site will be commercial and residential. Redevelopment will include the construction of a one- to 15-story building with a cellar partially below ground occupying the ground level and two sub-cellars to a total depth of 26 feet below grade (fbg).

The layout of the proposed Site development is presented in Figure 1.2.1. The current zoning designation is R6 with a C2-2 overlay, which permits residential and retail commercial use.

The redevelopment plan includes demolishing the current Site building, with removal and proper offsite disposal of all demolition debris. No sub-grade demolition is anticipated or planned.

The new building will be approximately 38,775 square feet and will occupy the entire lot. The second sub-cellar (lowest level), which extends across the entire lot, will contain parking and mechanical rooms. The first sub-cellar, located above the second sub-cellar, will contain parking, a pool, a café, a kitchen, maintenance rooms, laundry rooms, a fitness center, and meeting rooms. The cellar (ground level) will contain nine retail units, a hotel lobby, a residential apartment lobby, maintenance rooms, and work rooms. The first floor will contain a parking garage and maintenance rooms. The second floor will contain hotel rooms, conference rooms, and a terrace. Floors three through seven will contain hotel rooms and maintenance rooms. Floors 8 through 15 will contain residential apartments and maintenance rooms. The roof will be used as a terrace. The building will contain 210 hotel rooms, 148 apartments, and two elevators; the total gross area of the building will be 354,454 square feet. Proposed development plans showing the vertical redevelopment of the Site as well as the proposed layout for the first and second sub-cellar are included in Appendix 1.

Redevelopment will include excavation across the entire Site to a depth of 29 fbg. Approximately 41,650 cubic yards (estimated at 54,150 tons) of soil will be excavated. Depth to groundwater is estimated at 27 fbg.

1.3 Description of Surrounding Property

The Site is located in a neighborhood with commercial buildings, light industrial and manufacturing buildings, residential buildings, and public facilities and institutions. The properties in this area are typically zoned C2-2, M1-1, and M2-1. The Site is adjoined to the east by commercial buildings occupied by BLU KTV Lounge and Bar, Meiling Nail Supply Inc., Debasaki restaurant, NYDC Beauty Supply, and a yoga studio. The Site is adjoined to the south by commercial buildings occupied by The Flushing International Hotel, New York International Table Tennis Center, and Joy Foods restaurant, and a residential building. The Site is adjoined

to the west by a commercial building occupied by a plumbing supply business. An alley used for parking adjoins the Site to the north.

Figure 1.3.1 shows the surrounding land usage.

1.4 Environmental Investigation Reports

The following environmental work plans and reports were developed for the Site:

Corrective Action Investigation, prepared by Raritan Enviro Sciences, Inc.

Investigation Summary and Remedial Plan, March 14, 1996, prepared by Raritan Enviro Sciences, Inc.

Investigation Summary and Remedial Plan Addendum, December 11, 1997, prepared by Raritan Enviro Sciences, Inc.

Semi-Annual Monitoring Report, January 19, 2005, prepared by LiRo Engineers, Inc.

Semi-Annual Monitoring Report, July 11, 2005, prepared by LiRo Engineers, Inc.

Semi-Annual Monitoring Report, August 31, 2006, prepared by Roux Associates, Inc.

Semi-Annual Monitoring Report, January 31, 2007, prepared by Roux Associates, Inc.

Semi-Annual Monitoring Report, October 26, 2007, prepared by Roux Associates, Inc.

Semi-Annual Monitoring Report, September 18, 2008, prepared by Roux Associates, Inc.

Semi-Annual Monitoring Report, April 23, 2009, prepared by Roux Associates, Inc.

Site Turn-Over Status Report and Site Annual Monitoring Report, June 3, 2011, prepared by LiRo Engineers, Inc.

Semi-Annual Monitoring Report, June 5, 2012, prepared by LiRo Engineers, Inc.

Semi-Annual Monitoring Report, March 13, 2013, prepared by LiRo Engineers, Inc.

Phase I Environmental Site Assessment for the Property Located at 134-37 35th Avenue, Flushing, NY, November 2013, prepared by FPM Group.

Phase II Work Plan, March 2014, prepared by FPM Group.

Tank Removal Letter Report and Spill Closure Request, September 12, 2014, prepared by LiRo Engineers, Inc.

Remedial Investigation Report, December 2014, prepared by FPM Group

The following work has been performed at the site:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a geophysical survey of the Site to investigate for the existence of potential USTs and other subsurface infrastructure;
3. Installed 13 soil borings across the entire project Site, and collected 26 soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Collected eight groundwater samples for chemical analysis to evaluate groundwater quality;
5. Installed 10 soil vapor probes around Site perimeter and collected 10 samples for chemical analysis.

Digital (PDF) copies of the pertinent and available environmental work plans and reports are included as Appendix 1.

1.5 Findings of Environmental Investigation

1. Elevation of the property is approximately 30 feet above MSL.
2. Depth to groundwater is approximately 27 fbg at the Site.
3. Groundwater flow is generally from south to north beneath the Site.
4. Depth to bedrock is estimated at 180 feet at the Site.
5. A geophysical survey showed no USTs or other subsurface structures at the Site. All of the USTs in the area of development were removed from the Site prior to the RI in June 2014 under the direction of the NYC DDC.
6. The stratigraphy of the site, from the surface down, consists of approximately five to over thirty feet of a brown/tan medium to fine-grained sand with some fine gravel.

This layer, where penetrated, was generally noted to be underlain by a brown medium to fine-grained silty-sand a brown/tan medium to coarse-grained sand with some fine gravel and by a brown/tan medium to fine-grained sand with some fine gravel.

7. Soil/fill samples results were compared to New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives and Restricted Commercial Use Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8. Soil samples collected during the RI showed that VOCs, pesticides, PCBs and metals were not detected exceeding Unrestricted Use SCOs. Several SVOCs consisting of Polycyclic Aromatic Hydrocarbons (PAHs) were detected with benz(a)anthracene (max. of 1800 µg/kg), benzo(a)pyrene (max. of 1700 µg/kg), benzo(b)fluoranthene (max. of 2300 µg/kg), dibenz(a,h)anthracene (max. of 380 µg/kg), and indeno(1,2,3-cd)pyrene (max. of 1400 µg/kg) exceeding Restricted Residential Use SCOs within one of 26 shallow soil samples. These results are consistent with the visual observations of the soil samples, which did not suggest an onsite source.
8. Groundwater sample results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples showed exceedances of the Standards for the VOCs cis-1,2-dichloroethene (36 ppb), isopropylbenzene (7.3 ppb), PCE detected in all samples at maximum concentrations of 140 ppb, and TCE in five of the eight samples at maximum concentration of 22 ppb. Two SVOCs, benzo(a)pyrene and bis(2-ethylhexyl) phthalate exceeded their GQSs in two of the six samples. The VOC detections are located on the eastern portion of the Site. Several metals were identified, but only magnesium, manganese, and sodium exceeded their respective GQSs. PCBs and pesticides were not detected in groundwater.
9. Soil vapor samples collected during the 2008 Phase II were compared to the compounds listed by the NYSDOH located in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor samples collected during the RI showed several classes of VOCs consistent with the Site's location in an urban area. Most compounds were detected at

concentrations less than 20 $\mu\text{g}/\text{m}^3$ except for acetone detected in all samples (max. of 39,000 $\mu\text{g}/\text{m}^3$), ethyl acetate (max of 790 $\mu\text{g}/\text{m}^3$) and methyl ethyl ketone (max. of 250 $\mu\text{g}/\text{m}^3$). PCE was detected in one of the samples at a low level for which the NYSDOH would either require no further action or would require reasonable and practical actions to be undertaken to identify sources and reduce exposures (depending on the indoor air concentration of PCE). No VOCs were detected at levels for which either monitoring or mitigation would be required or that suggest the possibility of soil vapor intrusion. These results are consistent with the soil and groundwater data from the RI.

For environmental investigation data, consult reports listed in Section 1.4. Based on an evaluation of the environmental data and information, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 DESCRIPTION OF REMEDIATION

2.1 Objectives

The Site remediation and mitigation objectives are:

Soil

- Prevent contact with contaminated soil.

Soil Vapor

- Prevent migration of soil vapor into occupied structures.

Remedial and mitigation measures described herein will be performed in accordance with applicable laws and regulations, and the site-specific CHASP. This remedy is protective of public health and/or the environment for the intended use.

2.2 Summary of Remedial Action

The proposed plan achieves all of the remedial action goals established for the project. The proposed remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants and uses standard methods that are well established in the industry.

The proposed remedial action will consist of:

1. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
2. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
3. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
4. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency specified by disposal facility. A Waste Characterization Report documenting sample procedures, location, analytical results and disposal facility(s) approval letters will be submitted to NYCOER prior to the start of the remedial action.

5. Excavation and removal of soil/fill to the planned excavation depth of 29 feet below existing grade for the foundation. The elevator shaft will be excavated to a depth of approximately eight feet below the sub-cellar slab. Approximately, 54,150 tons of soil will be excavated and removed from this Site.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
7. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
8. Closure of the open petroleum spill (NYSDEC Spill Case numbers 95-16190) under the authority of NYSDEC and in compliance with applicable local, State and Federal laws and regulations. Spill remediation will be conducted in accordance to NYSDEC approved Spill RAP. This RAWP does not alter or interfere with the remedial action for the petroleum spill.
9. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
10. 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. Appropriate segregation of excavated media onsite.
11. Collection and analysis of sixteen (16) end-point samples to determine the performance of the remedy with respect to attainment of site-specific SCOs.
12. Construction and maintenance of a three-foot engineered composite cover consisting of the building foundation slab.
13. Installation of a vapor barrier system beneath the building slab and along foundation sidewalls.

14. Implementation of storm-water pollution prevention measures in compliance 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 Remedial Closure Report (RCR) that describes the remedial activities, certifies that the remedial requirements have been achieved, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAP.
17. If Unrestricted Use Soil Cleanup Objective are not met, the property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

2.3 Soil Cleanup Objectives and Soil/Fill Management

The applicable Site-Specific Soil Cleanup Objectives (SCOs) for this project are for Unrestricted Use. Soil Cleanup Objectives (SCOs) proposed for this project are listed in Table 2.3.1. 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 1.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 54,150 tons. The proposed disposal locations for Site-derived impacted materials are listed below. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

| <u>Disposal Facility</u> | <u>Waste Type</u> | <u>Estimated Quantities</u> |
|--------------------------|-------------------|-----------------------------|
| To be determined | Soil/fill | 54,150 tons |

Confirmation Sampling

Removal actions under this plan will be performed in conjunction with remedial end-point sampling and confirmation sampling. A total of 16 confirmation samples will be collected from the 29-31 foot interval, i.e. 0-2 feet beneath the proposed maximum excavation depth of 29 feet bgs, as per the requirements of this section. Confirmatory samples will be analyzed for VOCs and SVOCs. A figure showing locations of the confirmation samples is included in Figure 2.3.1.

End-Point Sampling

Should additional end-point sampling be required the frequency will consist of the following:

1. 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.
2. 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.
3. 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 1-2 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 Department of Health ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RCR. The RCR will provide a tabular and map summary of all end-point sample results. End-point samples will be analyzed for trigger analytes (those for which SCO exceedance is identified) utilizing the following methodology:

Soil analytical methods will include:

- Volatile organic compounds by EPA Method 8260; and
- Semi-volatile organic compounds by EPA Method 8270;

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

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used (1) to document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. A summary of the field and laboratory QA/QC procedures is provided below.

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, on a daily basis;
- Analysis of duplicate samples;
- Use of dedicated and/or disposable field sampling equipment;
- Proper sample handling and preservation;
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- Disposable sampling equipment including nitrile gloves will be used to minimize cross-contamination between samples;
- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary;
- Appropriate sample preservation techniques, including cold temperature storage at 4° C, will be utilized to ensure that the analytical parameter concentrations do not change between the time of sample collection and analysis; and

Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

Import 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 1. At this time however, it is not anticipated that any soils will be imported. No excavated onsite soil/fill will be reused on Site.

2.4 Engineering Controls

The excavation required for the proposed site is anticipated to achieve Unrestricted Use SCOs. No engineering controls are required to address residual contamination at the site. However, the following elements will be incorporated into the foundation design, as part of

development; composite cover system and soil vapor barrier. If Unrestricted Use SCOs are not achieved, these two elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the site:

- Composite Cover
- Vapor Barrier System

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. As part of new development, the entire property will be covered by an engineered permanent cover system. This cover system will be comprised of a three-foot thick concrete-building slab beneath the area of the proposed building.

The proposed development plans showing the concrete building slab are provided in Appendix 3.

Vapor Barrier System

Exposure to potential future, off-site soil vapors will be prevented by an engineered vapor barrier system to be installed on the Site. This vapor barrier system is comprised of:

- A vapor barrier with a minimum thickness of 31.5 mil (Grace Preprufe[®] 160R) will be installed beneath the entire footprint of the proposed building and along all perimeter walls from the bottom of the foundation to one foot above grade.

The vapor barrier details, specifications and drawings are included in Appendix 4.

3.0 REMEDIAL ACTION MANAGEMENT

3.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include the Professional Engineer (PE) Kevin Loyst and Qualified Environmental Professionals (QEP) Ben Cancemi.

3.2 Site Security

Site access will be controlled by gated entrances to the fenced property.

3.3 Work Hours

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

3.4 Construction Health and Safety Plan

The site-specific Construction Health and Safety Plan (CHASP) is included in Appendix 2. The Site Safety Coordinator will be John Bukoski. Remedial work performed under this RAP 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 CHASP and applicable laws and regulations. The CHASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice Of Satisfaction.

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 CHASP and be required to sign a CHASP 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 CHASP. That document will define the specific project contacts for use in case of emergency.

3.5 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.

3.6 Agency Approvals

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

3.7 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 RAP. 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 RAP.

Dewatering

Limited dewatering may be required for the installation of some of the foundation elements. If dewatering is required then the proper permits will be obtained and will be performed in compliance with applicable local, State and Federal laws and regulations.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. The location of proposed equipment and material staging areas, truck inspection station, stockpile areas, and other pertinent remedial management features is anticipated to be determined on a weekly basis due to the relatively small size of the Site. Management and establishment of remedial and staging areas will be communicated with the QEP and the Site Safety Officer.

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 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.

3.8 Traffic Control

Drivers of trucks leaving the 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 to head west of 35th Avenue, south on College Point Boulevard, and west on Northern Boulevard to the Whitestone Expressway.

3.9 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.

3.10 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 RAP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the RCR.

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 RCR in digital format (i.e. jpeg files).

3.11 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.

3.12 Deviations from the Remedial Action Plan

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

- Reasons for deviating from the approved RAP;
- 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.

4.0 REMEDIAL CLOSURE REPORT

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

- Information required by this RAP;
- 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 RAP 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;
- 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.
- Reports and supporting material will be submitted in digital form.

Remedial Closure Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Closure 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 134-37 35th Avenue Site 14EHAN384Q.

I, _____, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the 134-37 35th Avenue Site 14EHAN384Q.

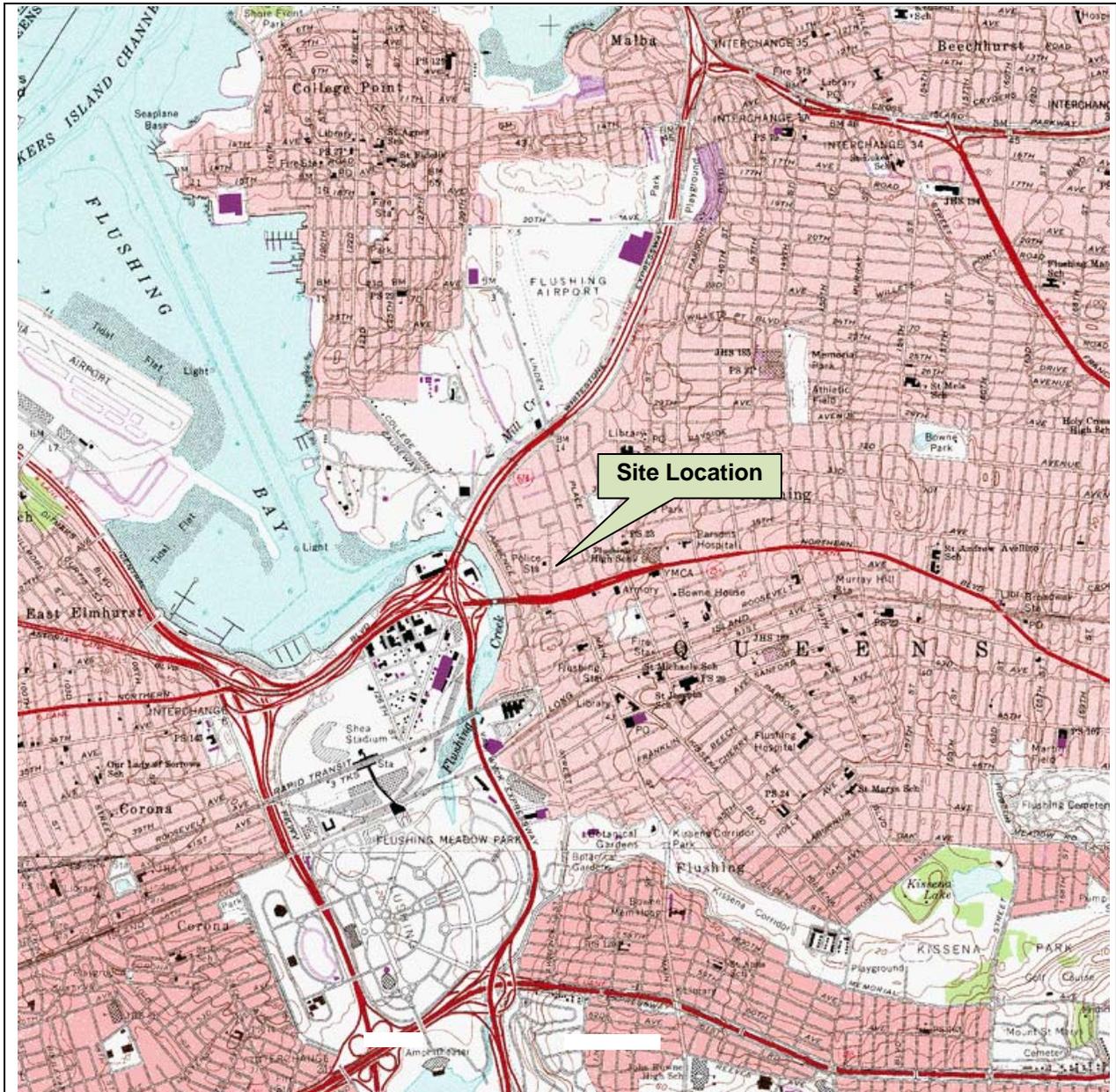
I certify that the OER-approved Remedial Action Plan dated _____ was implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

5.0 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 28 week remediation period is anticipated.

| Schedule Milestone | Weeks from Remedial Action Start | Duration (weeks) |
|--------------------------------|----------------------------------|------------------|
| OER Approval of RAP | 0 | - |
| Mobilization | 2 | 2 |
| Remedial Construction | 4 | 24 |
| Demobilization | 28 | 2 |
| Submit Remedial Closure Report | 30 | 4 |

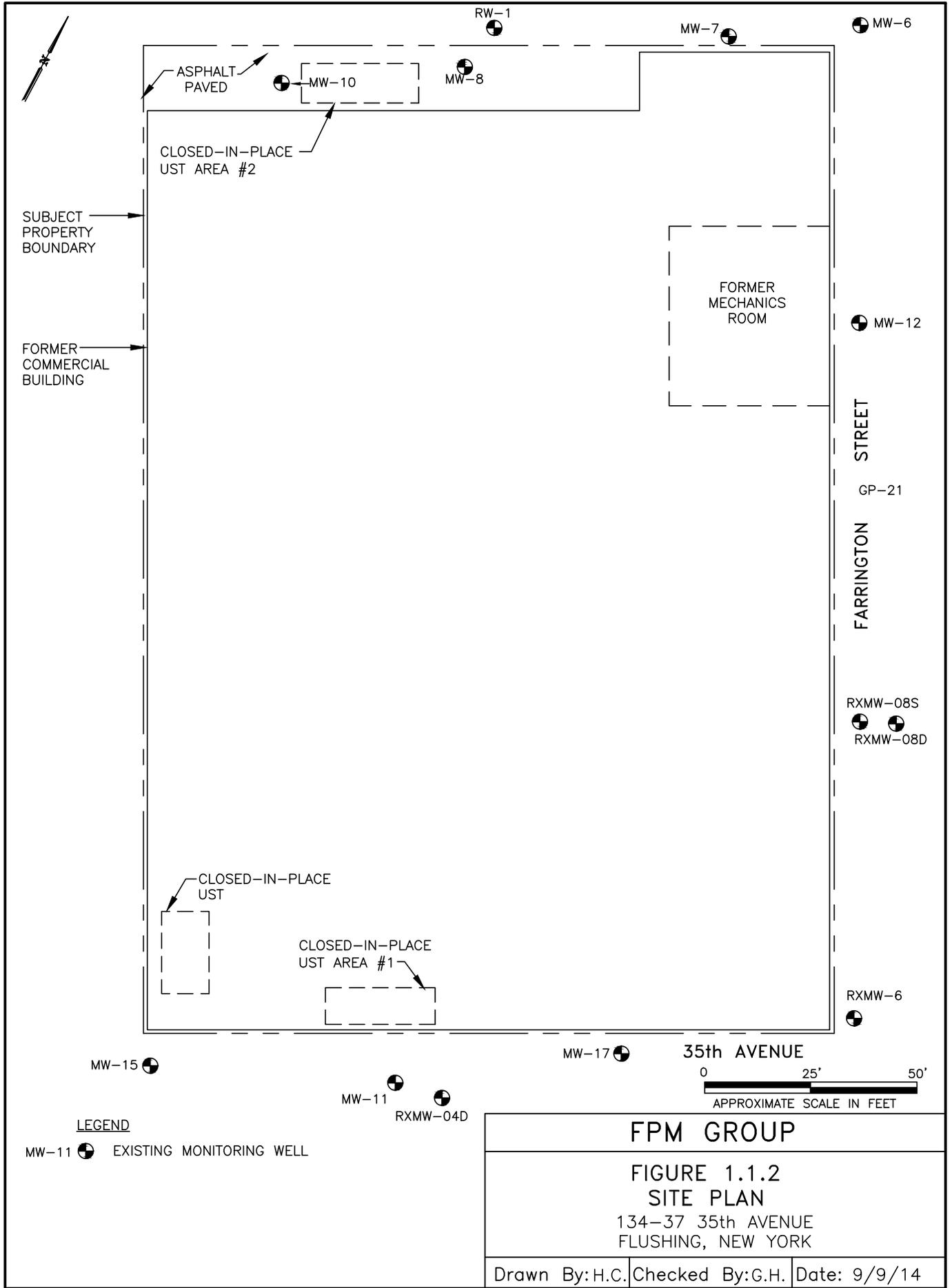
FIGURES

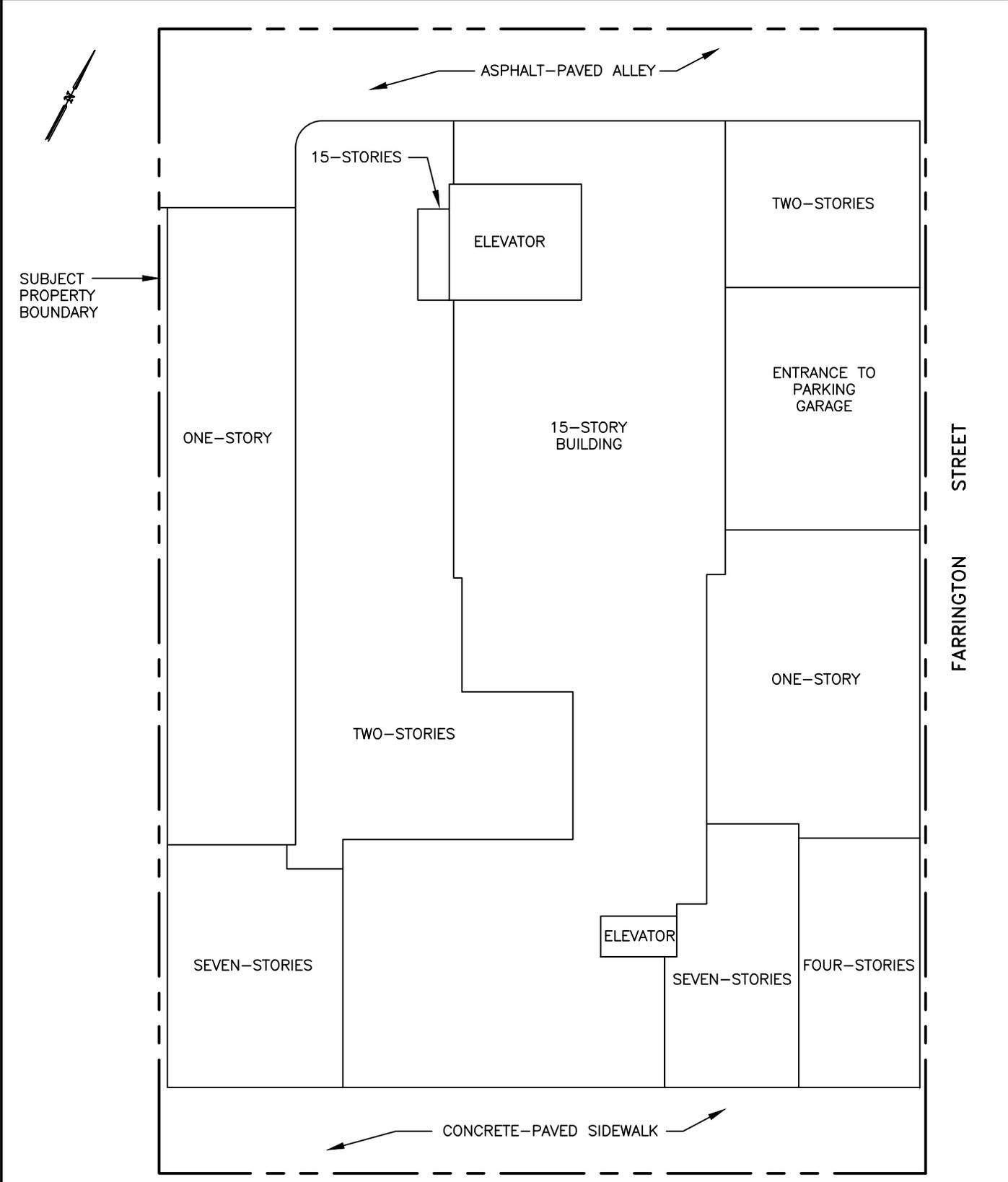


Source: US Geological Survey 7.5-Minute
Flushing and Jamaica Quadrangles



| | | |
|---|----------------|------------------|
| FPM GROUP | | |
| FIGURE 1.1.1 | | |
| SITE LOCATION MAP 134-37 35 th AVENUE FLUSHING, NEW YORK | | |
| Drawn by: GH | Checked By: GH | Date: 12/31/2013 |





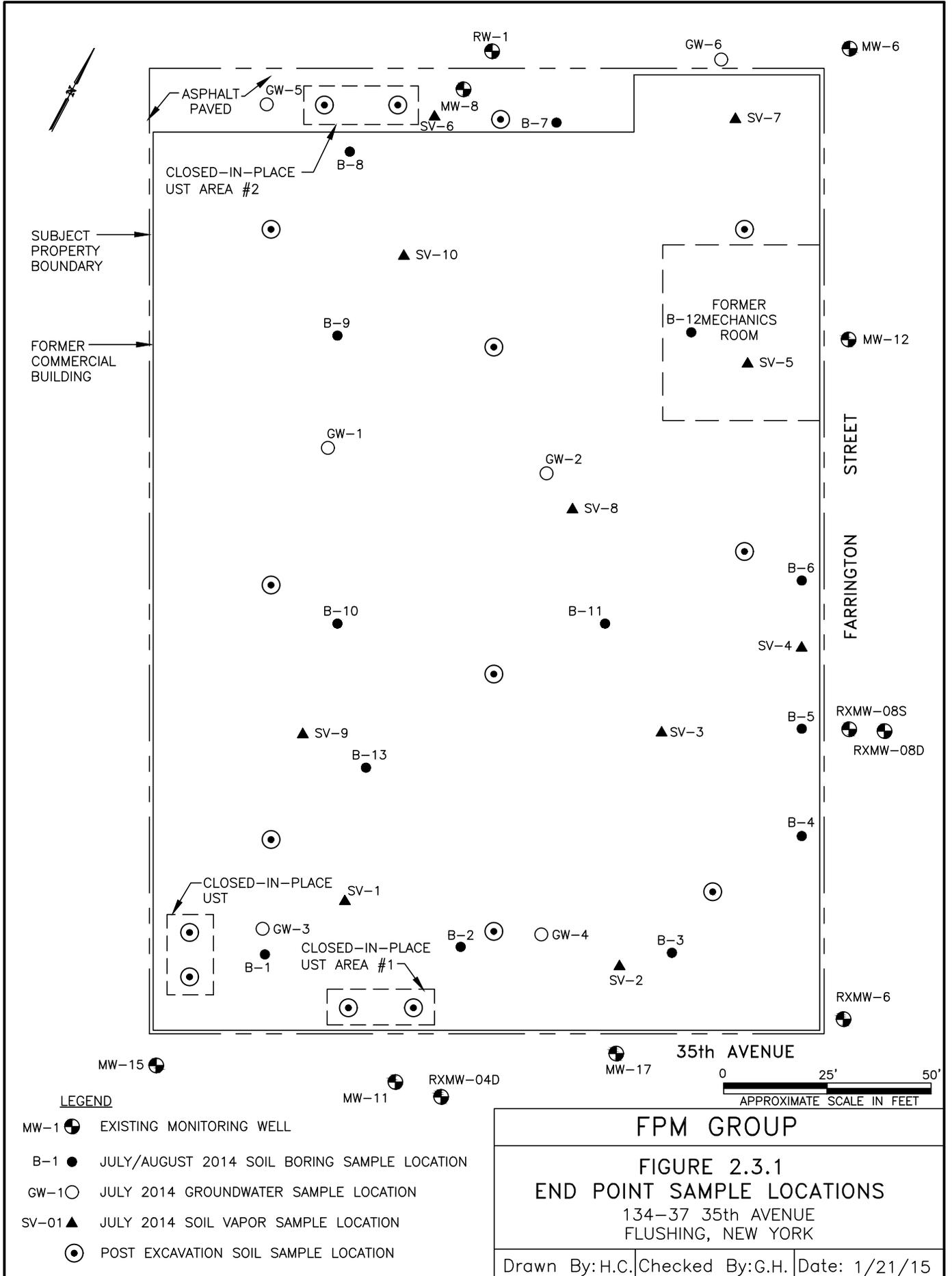
| | | |
|--|------------------|---------------|
| FPM GROUP | | |
| FIGURE 1.2.1 | | |
| FUTURE DEVELOPMENT PLAN | | |
| 134-37 35th AVENUE FLUSHING, NEW YORK | | |
| Drawn By: H.C. | Checked By: G.H. | Date: 1/13/14 |



NORTH

Source: Google Earth

| | | |
|---|----------------|-----------------|
| FPM GROUP | | |
| FIGURE 1.3.1 SURROUNDING LAND USAGE 134-37 35TH AVENUE FLUSHING, NEW YORK | | |
| Drawn by: GH | Checked By: BC | Date: 1/14/2015 |



TABLES

TABLE 2.3.1
375-6.8(a): UNRESTRICTED USE SOIL CLEANUP OBJECTIVES

| Contaminant | CAS Number | Unrestricted Use |
|-------------------------------------|------------|-------------------|
| 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 |
| 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 |

Notes:

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

^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.

APPENDIX 1

SOIL/MATERIALS MANAGEMENT PLAN

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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 Remedial Closure Report (RCR). Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Satisfaction.

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 RAP;
- 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 in Section 3.8 of the RAP. 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 Applicant 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 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 Applicant. 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 RCR.

The RCR 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 RCR.

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 RCR. A manifest system for off-Site transportation of exported materials will be

employed. Manifest information will be reported in the RCR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

1.7 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 RCR; 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 RCR. This demarcation will constitute the top of the site management horizon.

1.8 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 the RAP.

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 RAP. The RCR 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 RCR. 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.

1.9 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.

1.10 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 RAP (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 anchor will be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.11 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 Full List volatiles and semi-volatiles, pesticides/PCBs, and TAL metals, as appropriate.

1.12 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 RCR.

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 Closure 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.

1.13 Import of Clean Cover

All imported soil will be uncontaminated, clean soil that meets the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 groundwater protection SCOs.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by the PE/QEP to ensure:

- 1) That a segregated stockpile is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;
- 2) That the material does not include any solid waste, including construction and demolition material, as it's prohibited;

- 3) That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the Site for grading is completed; and
- 4) That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 250 cubic yards and analyzed for the following Full List parameters:
 - VOCs by EPA Method 8260C (rev. 2006)
 - SVOCs by EPA Method 8270D (rev. 2007)
 - Pesticides by EPA Method 8081B (rev. 2000)
 - PCBs by EPA Method 8082A (rev. 2000)
 - TAL Metals by EPA Method 6010C (rev. 2007)

Upon receipt of the segregated stockpile analytical results collected at the source, a Clean Soil Sampling Report will be submitted to OER for review/approval prior to importing. The report will include the following:

- 1) Summary of number of samples collected and analyzed, tabulated data and comparison to the selected Site Use SCOs;
- 2) Analytical data sheets and chain of custody documentation;
- 3) Summary of number of tons of cubic yards;
- 4) An affidavit from the source/facility on company letterhead stating that the segregated stockpile has been properly maintained at the source and complies with the requirements listed above; and
- 5) A copy of source/facility NYSDEC permit;

The following documentation will be presented in the Final Remedial Closure Report:

- 1) Copies of purchase invoices;
- 2) Truck transportation slips from the source to the Site;

- 3) Confirmation of the number of tons and cubic yards of OER approved clean soil cover material imported and graded at the site on top of highly visible demarcation barrier;
and
- 4) Site plan depicting all areas where the OER approved clean soil cover has been placed.

APPENDIX 2

CONSTRUCTION HEALTH AND SAFETY PLAN

**CONSTRUCTION
HEALTH AND SAFETY PLAN
FOR
134-37 35TH AVENUE
FLUSHING, NEW YORK
OER PROJECT NUMBER 14EHAN384Q**

**PREPARED FOR
FARRINGTON REALTY, LLC**

PREPARED BY
*FPM*group.
**909 MARCONI AVENUE
RONKONKOMA, NEW YORK 11779**

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LIST OF ATTACHMENTS

- A Materials Safety Data Sheets

SECTION 1.0 INTRODUCTION

This Construction Health and Safety Plan (CHASP) has been written for compliance with "OSHA Hazardous Waste Operations Standards (29 CFR 1910.120)", the guidance documents, "Standard Operating Safety Guidelines (Office of Solid Waste and Emergency Response, 1988)" and the "Occupational Safety and Health Guidance Manual for Hazardous Waste Activities" (U.S. Department of Health and Human Services, 1985).

1.1 Scope and Applicability of the CHASP

This CHASP is designed to be applicable to location(s) where the excavation of soil/fill will be performed at the Site. Dewatering is not anticipated at this time and is, therefore, not included herein. This CHASP may also be modified or amended to meet specific needs of the work proposed. This CHASP will detail the Site safety procedures, Site background, and safety monitoring. Contractors will be required to adopt this CHASP in full. A Health and Safety Officer (HSO) will be present at the Site to inspect the implementation of the CHASP. However, it is the sole responsibility of the contractor(s) to comply with the CHASP.

The CHASP has been formulated as a guide to complement professional judgment and experience. The appropriateness of the information presented should always be evaluated with respect to unforeseen Site conditions which may arise.

1.2 Site Work Zone and Visitors

The Site work zone (a.k.a. exclusion zone) during excavation activities will be a 30-foot radius about the work location. This work zone may be extended if, in the judgment of the health and safety officer (HSO), Site conditions warrant a larger work zone.

No visitors will be permitted within the work zone without the consent of the HSO. All visitors will be required to be familiar with, and comply with, the CHASP. The HSO will deny access to those whose presence within the work zone is unnecessary or those who are deemed by the HSO to be in non-compliance with the CHASP.

All Site workers, including the contractors, who may directly contact Site soil will be required to have 40-hour hazardous material training (eight-hour refresher courses annually), respirator fit test certification if respirators are to be used, and medical surveillance as required in 29 CFR 1910.120.

The HSO will also give an on-Site health and safety discussion to all Site personnel, including the contractors, prior to initiating Site work involving soil. Workers not in attendance during the health and safety talk will be required to have the discussion with the HSO prior to entering the work zone.

Emergency telephone numbers and directions to the nearest hospital are found in Table 1.2.1.

**TABLE 1.2.1
EMERGENCY TELEPHONE NUMBERS**

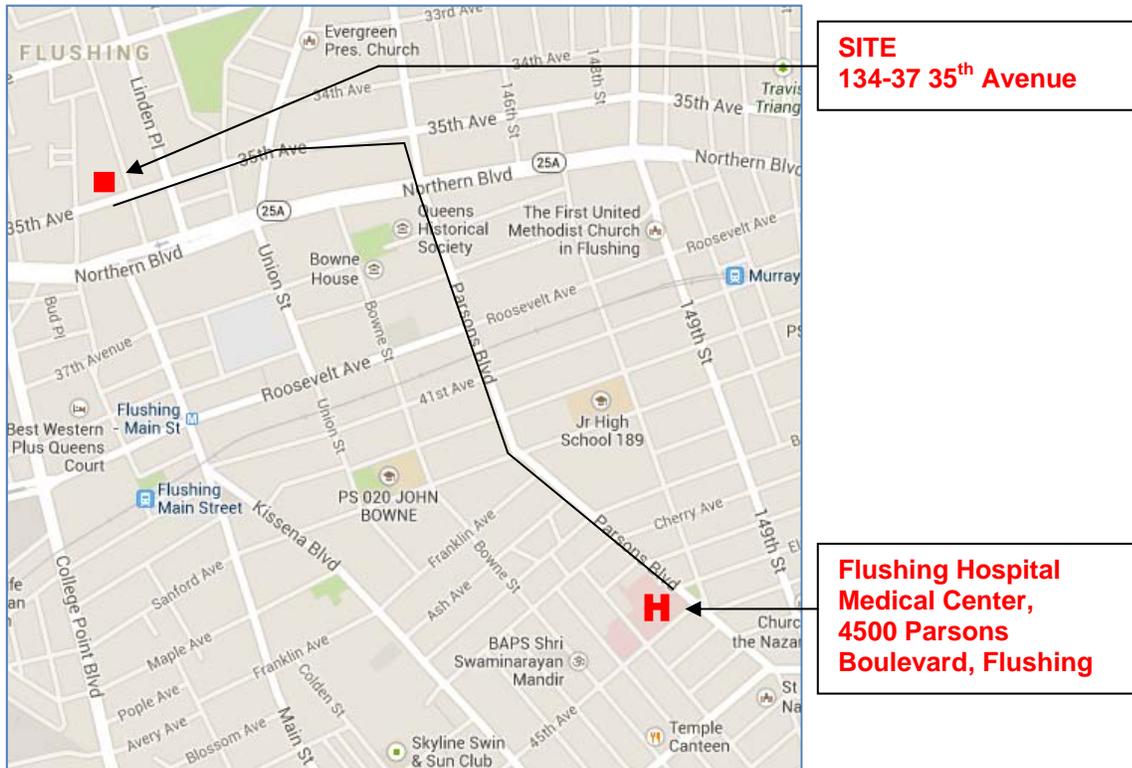
| | |
|--|--------------|
| Police | 911 |
| Ambulance | 911 |
| Poison Control Center | 212-764-7667 |
| New York State Spills Hotline | 800-457-7362 |
| Flushing Hospital Medical Center | 718-670-5495 |

FPM Contact Personnel (631-737-6200)

| | |
|--|---------------------|
| Dr. Kevin J. Phillips, P.E. | Cell # 631-374-6066 |
| Ben Cancemi, Project Manager and Health and Safety Officer | Cell # 516-383-7106 |
| Stephanie Davis, Project Coordinator, QA/QC Officer | Cell # 516-381-3400 |
| George Holmes, Alternate Health & Safety Officer | Cell # 631-512-1077 |

Directions to Flushing Hospital Medical Center (718-670-5495)

Turn left from the south side of the Site and head east on 35th Avenue about one-half mile to Parsons Boulevard. Turn right onto Parsons Boulevard and continue south approximately three-quarters of a mile. Flushing Hospital Medical Center will be on the right.



SECTION 2.0 KEY PERSONNEL AND RESPONSIBILITIES

The FPM project manager for this project will be Ben Cancemi. The FPM project field staff will include John Bukoski and George Holmes. Contractor personnel may also be on Site. The senior FPM staff member on Site will act as HSO and will report to the project manager. In the event that an FPM HSO is not present, an alternate qualified HSO will be appointed. Contractor personnel will be provided with health and safety information by the HSO and will be expected to follow this CHASP.

SECTION 3.0 SITE BACKGROUND

3.1 Site History and Known Chemical Constituents at the Site

The Site is comprised of an undeveloped property located at 134-37 35th Avenue, Flushing, New York. The Site is approximately 39,000 square feet in size. The Site was formerly utilized as a bus facility, a New York City Department of Sanitation (NYCDOS) garage, theater, restaurant, bar, store, and parking garage. Soil/fill is present at the Site and is impacted with semivolatile organic compounds (SVOCs). Although no significantly-elevated levels were detected, concentrations of several SVOCs were noted to exceed Track 1 and/or Track 2 SCOs.

SECTION 4.0

TASK/OPERATION HEALTH AND SAFETY ANALYSIS

This section will present health and safety analyses for the excavation of soil/fill.

4.1 Safety Analysis

Excavation of soil/fill and petroleum-contaminated soils will be performed by a contractor with oversight by FPM and/or the Site Supervisor. Excavation will involve the use of heavy equipment. Safety concerns will include risk of injury due to being struck by equipment, being trapped between moving equipment parts, being struck by dropped materials, and hearing damage due to equipment noise. Site personnel will take precautions against these risks when working in the vicinity of heavy equipment by being aware of equipment locations and movement, by wearing steel-toed boots and hard hats, and by using hearing protection, if necessary. Site personnel who have not previously worked in the vicinity of heavy equipment will be paired with an experienced person for at least one day to familiarize themselves with heavy equipment operations and safety procedures.

A calibrated photoionization detector (PID) will be used to monitor VOCs in the worker's breathing zone during excavation of petroleum-contaminated soils. Although previous onsite monitoring during intrusive activities has not indicated the presence of significant VOCs, steady-state PID readings greater than 10 ppm in the worker's breathing zone will require upgrading to Level C personal protective equipment. Steady-state readings, for this purpose, will be defined as readings between 10 and 20 parts per million (ppm) above background for a minimum of ten seconds. Readings will be obtained at points around and in proximity to the excavation area. These points will define the worker's breathing zone. Level C personal protection will include full-face air-purifying respirators with dust and organic vapor cartridges (personal protective equipment will be described in greater detail in Section 7.0). All FPM personnel and contractors within the potential to require respiratory protection must be properly trained and fit tested prior to donning respirators.

Upon encountering PID levels greater than 20 ppm above background in the worker's breathing zone, work will stop until the source of vapors is abated and readings are less than 20 ppm above background. If, at any time, PID readings exceed steady-state levels greater than 50 ppm above background, or any conditions exist which the HSO determines will require Level B personal protective equipment, all work at the Site will cease immediately and all personnel will evacuate the work zone. Evacuation will occur in the upwind direction if discernable. Level B conditions are not anticipated to be encountered; however, if level B conditions arise, no Site work will be performed by FPM or contractors and a complete evaluation of the operation will be performed and this CHASP will be modified.

All personnel who may directly contact soil will be required to wear chemical-resistant gloves (such as butyl or nitrile) when the potential for dermal contact with the soil is possible. Dermal contact with soils will be avoided.

Hard hats and steel-toe, steel-shank safety boots will be required when work is performed in the vicinity of heavy equipment (drill rigs, backhoes, etc.).

4.2 Other Safety Considerations

4.2.1 Noise

During excavation operations or any other operation that may generate potentially harmful levels of noise, the HSO will monitor noise levels with a Realistic™ hand-held sound level meter. Noise levels will be monitored in decibels (dBs) in the A-weighted, slow-response mode. Noise level readings that exceed the 29 CFR 1910.95 permissible noise exposure limits will require hearing protection (see Table 4.2.1.1 for permissible noise exposures).

Hearing protection will be available to all Site workers. The hearing protection will consist of foam, expansion-fit earplugs (or other approvable hearing protection) with an Environmental Protection Agency noise reduction rating of at least 29 dB. Hearing protection must alleviate worker exposure to noise to an eight-hour time-weighted average of 85 dB or below. In the event that the hearing protection is inadequate, work will cease until a higher level of hearing protection can be incorporated.

**TABLE 4.2.1.1
PERMISSIBLE NOISE EXPOSURES***

| <u>Duration Per Day Hours</u> | <u>Sound Level dBA Slow Response</u> |
|-----------------------------------|--|
| 8 | 90 |
| 6 | 92 |
| 4 | 95 |
| 3 | 97 |
| 2 | 100 |
| 1.5 | 102 |
| 1 | 105 |
| 0.5 | 110 |
| 0.25 | 115 |

Notes:

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2 + C_6/T_6$ exceeds unity, then, the mixed exposure should be considered to exceed the limit value. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

*Standards derived from 29 CFR 1910.95

4.2.2 Slip/Trip/Fall Preventative Measures

To reduce the potential for slipping, tripping, or falling, the work zone will be kept clear of unnecessary equipment. All Site workers will be required to wear work boots with adequate tread to reduce the potential for slipping (work boots must be leather or chemical-resistant and contain steel toes and steel shanks).

4.2.3 Insects and Ticks

Insect and tick problems are expected to be minimal. Potential insect problems include, but are not limited to, bees, wasps, and hornets. Prior to commencement of work, each work area will be surveyed for nests and hives to reduce the possibility of disturbing these insects. In addition, each Site worker will be asked to disclose any allergies related to insect stings or bites. The worker will be requested to keep his or her anti-allergy medicine on Site.

Tick species native to Long Island consist of the pinhead-sized deer tick and the much-larger dog tick. Due to a paucity of suitable habitat, ticks are not anticipated to be present at this site.

4.2.4 Heat/Cold Stress

Heat stress may become a concern, especially if protective clothing is donned which will decrease natural ventilation. To assist in reducing heat stress the following measures will be taken:

- An adequate supply of water or other liquids will be brought on Site. To prevent dehydration, personnel will be encouraged to drink generous amounts of water even if not thirsty.
- A shady rest area will be designated (such as beneath the trees in the northeast corner of the property) to provide shelter during sunny days.
- In hot weather, workers wearing protective clothing may be rotated.

Indications of heat stress range from mild (fatigue, irritability, anxiety, decreased concentration, dexterity or movement) to fatal. Medical help will be obtained for serious conditions. Heat-related problems are:

- Heat rash: caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.
- Heat cramps: caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle spasm and pain in the extremities and abdomen.
- Heat exhaustion: caused by increased stress on various organs to meet increased demands to cool the body. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.
- Heat stroke: the most severe form of heat stress. Can be fatal. Medical help must be obtained immediately. Body must be cooled immediately to prevent severe injury and/or death. Signs: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

Cold exposure is a concern if work is conducted during cold weather or marginally cold weather during precipitation periods or moderate to high wind velocity periods. To assist in reducing cold exposure the following measures will be taken:

All personnel will be required to wear adequate and appropriate clothing. This will include head gear to prevent the high percentage loss of heat that occurs in this area (thermal liners for hard hats if hard hats are required).

- Provide a readily available warm shelter near each work zone.
- Carefully schedule work and rest periods to account for the current temperature and wind velocity conditions.
- Monitor work patterns and physical condition of workers and rotate personnel, as necessary.

Indications of cold exposure range from shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision to drowsiness. Medical help will be obtained for serious conditions if they occur. Cold exposure-related problems are:

- Frost bite: Ice crystal formation in body tissues. The restricted blood flow to the injured part results in local tissue destruction.
- Hypothermia: Severe exposure to cold temperature resulting in the body losing heat at a rate faster than the body can generate heat. The stages of hypothermia are shivering, apathy, loss of consciousness, decreasing pulse rate and breathing rate and death.

4.2.5 Potential Electrical Hazards

Potential electric hazards consist primarily of underground and overhead power lines. Potential underground electrical hazards will be minimized by having a utility markout performed for the Site prior to any intrusive work. In addition, available as-built Site blueprints and owner knowledge will be used to avoid contact with subsurface utility lines or structures. Overhead electrical hazards will be evaluated by visually observing the work location prior to performing operations which have the potential to contact overhead utilities. No work shall be performed in close proximity to overhead utilities.

4.2.6 The Buddy System

All activities in contaminated or potentially contaminated areas will be conducted by pairing off the Site workers in groups of two (or three if necessary). Each person (buddy) will be able to:

- Provide his or her partner with assistance.
- Observe his or her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his or her partner's protective clothing.
- Notify the HSO or others if emergency help is needed.

The buddy system will be instituted at the beginning of each workday. If new workers arrive on Site, a buddy will be chosen prior to the new worker entering the work zone.

4.2.7 Site Communications

Two sets of communication systems will be established at the Site: internal communication among personnel on-Site, and external communication between on-Site and off-Site personnel.

Internal communication will be used to:

- Alert team members to emergencies.
- Pass along safety information such as heat stress check, protective clothing check, etc.
- Communicate changes in the work to be accomplished.
- Maintain Site control.

An external communication system between on-Site and off-Site personnel will be established to:

- Coordinate emergency response
- Report to the Project Manager
- Maintain contact with essential off-Site personnel

A field telephone will be available at all times in the HSO's vehicle. In addition, the nearest stationary phone will be identified prior to the commencement of Site operations and this location will be relayed to all Site workers.

4.2.8 General Safe Work Practices

Standing orders applicable during Site operations are as follows:

- No smoking, eating, drinking, or application of cosmetics in the work zone.
- No matches or lighters in the work zone.
- All Site workers will enter/exit work zone through the Site access point.
- Any signs of unusual conditions will require reporting the information to the HSO, who will take appropriate action.
- Loose fitting clothing or loose long hair will be prohibited in the work zone during drilling operations.
- A signal person will direct the backing of work vehicles.
- Equipment operators will be instructed to check equipment for abnormalities such as oozing liquids, frayed cables, unusual odors, etc.

SECTION 5.0 PERSONNEL TRAINING REQUIREMENTS

All FPM personnel and contractor personnel will receive adequate training prior to entering the Site. FPM and contractor's personnel with the potential to contact Site soil will, at a minimum, have completed OSHA-approved, 40-hour hazardous materials Site safety training and OSHA-approved, eight-hour safety refresher course within one year prior to commencing field work. The HSO will have received the OSHA-approved, eight-hour course on managing hazardous waste operations. In addition, each worker must have a minimum of three days field experience under the direct supervision of a trained, experienced supervisor.

Prior to Site fieldwork, the HSO will conduct an in-house review of the project with respect to health and safety with all FPM personnel who will be involved with fieldwork at the Site. The review will include discussions of signs and symptoms of chemical exposure and heat stress that indicate potential medical emergencies presented in Table 5.1. In addition, review of personal protective equipment will be conducted, to include the proper use of air-purifying respirators.

**TABLE 5.1
SIGNS AND SYMPTOMS OF EXPOSURE TO CHEMICALS**

| Type of Hazard | Signs and Symptoms | |
|-------------------------------|--|---|
| Chemical Hazard | Behavioral changes Breathing difficulties Changes in complexion of skin color Confusion Coordination difficulties Coughing Depression Dermatitis Dilated Pupils Dizziness Euphoria Fatigue and/or weakness Flushed face and/or neck Insomnia Irregular heartbeat Irritability | Irritation of eyes, nose, respiratory tract, skin or throat Headache Lacrimation Light-Headedness Muscle Fatigue Nausea Nervousness Numbness in limbs Paresthesia Sleepiness Tingling Tremors Vertigo Visual disturbance Vomiting |
| Heat Exhaustion | Clammy skin Confusion Dizziness Fainting Fatigue Heat rash | Light-headedness Nausea Profuse sweating Slurred speech Weak pulse |
| Heat Stroke (may be fatal) | Confusion Convulsions Hot skin, high temperature (yet may feel chilled) | Incoherent speech Staggering gait |

SECTION 6.0 MEDICAL SURVEILLANCE PROGRAM

All workers at the Site with the potential to contact Site soil must participate in a medical surveillance program in accordance with 29 CFR 1910.120. A medical examination and consultation must have been performed within the last twelve months to be eligible for Site work.

The content of the examination and consultation will include a medical and work history with special emphasis on symptoms related to the handling of hazardous substances, health hazards, and fitness for duty including the ability to wear required personal protective equipment under conditions (i.e., temperature extremes) that may be expected at the work Site. All medical examinations and procedures shall be performed by, or under the supervision of, a licensed physician.

The physician shall furnish a written opinion containing:

- The results of the medical examination and tests.
- The physician's opinion as to whether the employee has any detected medical conditions that would place the worker at increased risk of material impairment of the employee's health from work in hazardous waste operations.
- The physician's recommended limitations upon the worker assigned to the work.
- A statement that the worker has been informed by the physician of the results of the medical examination and any further examination or treatment.

An accurate record of the medical surveillance will be retained. The record will consist of at least the following information:

- The name and social security number of the employee.
- Physician's written opinions, recommended limitations, and results of examinations and tests.
- Any worker medical complaints related to exposure to hazardous substances.

SECTION 7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 General Considerations

The two basic objectives of the personal protective equipment (PPE) are to protect the wearer from safety and health hazards, and to prevent the wearer from incorrect use and/or malfunction of the PPE.

Potential Site hazards were discussed previously in Section 4.0. The duration of Site activities for individual workers is estimated to be several days. All work is expected to be performed during daylight hours and workdays, in general, are expected to be eight to ten hours in duration. Any work performed beyond daylight hours will require the permission of the HSO. This decision will be based on the adequacy of artificial illumination and the type and necessity of the task being performed.

Personal protection levels for the Site activities, based on past investigations, are anticipated to be Level D with the possibility of upgrading to Level C. The equipment included for each level of protection is provided as follows:

Level C Protection

Personnel protective equipment:

- Air-purifying respirator, full-face
- Chemical-resistant clothing includes: Tyvek[™] (spunbonded olefin fibers) for particulate and limited splash protection or Saranex[™] (plastic film-laminated Tyvek) for permeation resistance to solvents.
- Coveralls*, or
- Long cotton underwear*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), leather or chemical-resistant, steel toe and shank.
- Boot covers (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- Escape mask*
- 2-way radio communications (intrinsically safe)*

(* optional)

Criteria for Selection of Level C Protection

Meeting all of these criteria permits use of Level C Protection:

- Oxygen concentrations are not less than 19.5% by volume.
- Measured air concentrations of identified substances will be reduced by the respirator below the substance's threshold limit value (TLV).
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any body area left unprotected by chemical-resistant clothing.
- Job functions do not require self-contained breathing apparatus.
- Direct readings are below 50 ppm on the PID.

Level D Protection

Personnel protective equipment:

- Coveralls
- Gloves
- Boots/shoes, leather or chemical-resistant, steel toe and shank.
- Safety glasses or chemical splash goggles*
- Hard hat (face shield*)
- Escape mask*

(* optional)

Criteria for Selection of Level D Protection

Meeting any of these criteria allows use of Level D Protection:

- No contaminant levels above 5 ppm organic vapors and dusty conditions are present.
- Work functions preclude splashes, immersion, or the reasonable potential for unexpected inhalation of any chemicals above the TLV.

Additional Considerations for Selecting Levels of Protection

Other factors which will be considered in selecting the appropriate level of protection are heat and physical stress. The use of protective clothing and respirators increases physical stress, in particular, heat stress on the wearer. Chemical protective clothing greatly reduces natural ventilation and diminishes the body's ability to regulate its temperature. Even in moderate ambient temperatures, the diminished capacity of the body to dissipate heat can result in one or more heat-related problems.

All chemical protective garments can be a contributing factor to heat stress. Greater susceptibility to heat stress occurs when protective clothing requires the use of a tightly fitted hood against the respirator face piece, or when gloves or boots are taped to the suit. As more body area is covered, less cooling takes place, increasing the probability of heat stress.

Wearing protective equipment also increases the risk of accidents. It is heavy, cumbersome, decreases dexterity, agility, interferes with vision, and is fatiguing to wear. These factors all increase physical stress and the potential for accidents. In particular, the necessity of selecting a level of protection will be balanced against the increased probability of heat stress and accidents.

7.2 Donning and Doffing Ensembles

Donning an Ensemble

A routine will be established and practiced periodically for donning a Level C ensemble. Assistance may be provided for donning and doffing since these operations are difficult to perform alone.

Table 7.2.1 lists sample procedures for donning a Level C ensemble. These procedures should be modified depending on the particular type of suit and/or when extra gloves and/or boots are used.

Doffing an Ensemble

Exact procedures for removing Level C ensembles must be established and followed to prevent contaminant migration from the work area and transfer of contaminants to the wearer's body, the doffing assistant, and others.

Doffing procedures are provided in Table 7.2.2. These procedures should be performed only after decontamination of the suited worker. They require a suitably attired assistant. Throughout the procedures, both worker and assistant should avoid any direct contact with the outside surface of the suit.

7.3 Respirator Fit Testing

The fit or integrity of the facepiece-to-face seal of a respirator affects its performance. Most facepieces fit only a certain percentage of the population; thus each facepiece must be tested on the potential wearer in order to ensure a tight seal. Facial features such as scars, hollow temples, very prominent cheekbones, deep skin creases, dentures or missing teeth, and the chewing of gum and tobacco may interfere with the respirator-to-face seal. A respirator shall not be worn when such conditions prevent a good seal. The worker's diligence in observing these factors shall be evaluated by periodic checks. Fit testing will comply with 29 CFR 1910.1025 regulations.

7.4 Inspection

The PPE inspection program will entail five different inspections:

- Inspection and operational testing of equipment received from the factory or distributor.
- Inspection of equipment as it is issued to workers.
- Inspection after use.

TABLE 7.2.1
SAMPLE DONNING PROCEDURES

1. Inspect the clothing and respiratory equipment before donning (see Inspection in subsection 7.4).
 2. Adjust hard hat or headpiece if worn, to fit user's head.
 3. Standing or sitting, step into the legs of the suit; ensure proper placement of the feet within the suit; then gather the suit around the waist.
 4. Put on chemical-resistant safety boots over the feet of the suit. Tape the leg cuff over the tops of the boots.
 5. Don the respirator and adjust it to be secure, but comfortable.
 6. Perform negative and positive respirator facepiece seal test procedures.
 - To conduct a negative-pressure test, close the inlet part with the palm of the hand or squeeze the breathing tube so it does not pass air, and gently inhale for about 10 seconds. Any inward rushing of air indicates a poor fit. Note that a leaking facepiece may be drawn tightly to the face to form a good seal, giving a false indication of adequate fit.
 - To conduct a positive-pressure test, gently exhale while covering the exhalation valve to ensure that a positive pressure can be built up. Failure to build a positive pressure indicates a poor fit.
 7. Depending on type of suit:
 - Put on inner gloves (surgical gloves).
 - Additional overgloves, worn over attached suit gloves, may be donned later.
 8. Put on hard hat
 9. Have assistant observe the wearer for a period of time to ensure that the wearer is comfortable, psychologically stable, and that the equipment is functioning properly.
-

**TABLE 7.2.2
DOFFING PROCEDURES**

-
1. Remove any extraneous or disposable clothing, boot covers, outer gloves, and tape.
 2. Remove respirator by loosening straps and pulling straps over the top of the head and move mask away from head. Do not pull mask over the top of the head.
 3. Remove arms, one at a time, from suit, avoiding any contact between the outside surface of the suit and wearer's body and lay the suit out flat behind the wearer. Leave internal gloves on, if any.
 4. Sitting, if possible, remove both legs from the suit.
 5. After suit is removed, remove internal gloves by rolling them off the hand, inside out.
-

- Periodic inspection of stored equipment.
- Periodic inspection when a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise.

The inspection checklist is provided in Table 7.4.1.

**TABLE 7.4.1
PPE INSPECTION CHECKLIST**

CLOTHING

Before use:

- Determine that the clothing material is correct for the specified task at hand.
- Visually inspect for:
 - imperfect seams
 - non-uniform coatings
 - tears
 - malfunctioning closures
- Hold up to light and check for pinholes.
- Flex product:
 - Observe for cracks
 - Observe for other signs of shelf deterioration
 -
- If the product has been used previously, inspect inside and out for signs of chemical attack:
 - discoloration
 - swelling
 - stiffness

**TABLE 7.4.1 (CONTINUED)
PPE INSPECTION CHECKLIST**

- If the product has been used previously, inspect inside and out for signs of chemical attack:
 - discoloration
 - swelling
 - stiffness

During the work task, periodically inspect for:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.
- Closure failure
- Tears
- Punctures
- Seam discontinuities

GLOVES

Before use:

- Pressurize glove to check for pinholes. Either blow into glove, then roll gauntlet toward fingers or inflate glove and hold under water. In either case, no air should escape.

AIR-PURIFYING RESPIRATORS

- Inspect air-purifying respirators:
 - before each use to be sure they have been adequately cleaned
- Check material conditions for:
 - signs of pliability
 - signs of deterioration
 - signs of distortion
- Examine cartridges to ensure that:
 - they are the proper type for the intended use
 - the expiration date has not been passed
 - they have not been opened or used previously
- Check faceshields and lenses for:
 - cracks
 - crazing
 - fogginess
- Air purifying respirators will be stored individually in re-sealable plastic bags.

7.5 Storage

Clothing and respirators will be stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. Storage procedures are as follows:

Clothing:

- Potentially contaminated clothing will be stored in an area separate from street clothing.
- Potentially contaminated clothing will be stored in a well-ventilated area, with good air flow around each item, if possible.
- Different types and material of clothing and gloves will be stored separately to prevent issuing the wrong material by mistake.
- Protective clothing will be folded or hung in accordance with manufacturer's recommendations.

Respirators:

- Air-purifying respirators should be dismantled, washed, and placed in sealed plastic bags.

7.6 Maintenance

Specialized maintenance will be performed only by the factory or an authorized repair person. Routine maintenance, such as cleaning, will be performed by the personnel to whom the equipment is assigned. Respirators will be cleaned at the end of each day with alcohol pads or, preferably, by washing with warm soapy water.

7.7 Decontamination Methods

All personnel, clothing, equipment, and samples leaving the contaminated (work zone) area of the Site must be decontaminated to remove any harmful chemicals that may have adhered to them. Decontamination methods either (1) physically remove contaminants (2) inactivate contaminants by chemical detoxification or disinfection/sterilization, or (3) remove contaminants by a combination of both physical and chemical means. In many cases, gross contamination can be removed by physical means involving dislodging/displacement, rinsing, wiping off, and evaporation. Contaminants that can be removed by physical means include dust, vapors, and volatile liquids. All reusable equipment will be decontaminated by rinsing in a bath of detergent and water (respirators, gloves to be reused). Monitoring equipment will be decontaminated by wiping with paper towels and water.

The effectiveness of the decontamination will be evaluated near the beginning of Site activities and will be modified if determined to be ineffective. Visual observation will be used for this purpose. The HSO will inspect decontaminated materials for discoloration, stains, corrosive effects, visible dirt, or other signs of possible residual contamination.

All disposable PPE will be discarded following use. All used PPE to be discarded will be placed in an appropriate receptacle for disposal.

SECTION 8.0 DECONTAMINATION PROCEDURES FOR SAMPLING AND EXCAVATION EQUIPMENT

All non-dedicated sampling equipment shall be decontaminated prior to, and following, use at each sampling location. Decontamination procedures shall consist of the following:

1. Scrub equipment in a bath of low-phosphate detergent and potable water.
2. Potable water rinse.
3. Air dry.
4. Aluminum foil wrap, shiny side out, for transport.

Personal protective equipment decontamination has been discussed in Subsection 7.7.

All excavation equipment that has contacted Site soil will be decontaminated prior to leaving the Site. Decontamination of this equipment will consist of physically removing adhering soil using hand tools followed by rinsing the equipment with potable water. Decontamination will be performed in the immediate vicinity of the work area so that the removed soil and rinseate will be discharged in the area from which it originated.

SECTION 9.0 CALIBRATION PROCEDURES, FREQUENCIES, AND MAINTENANCE

This section will present the calibration procedures, frequencies, and maintenance for the health and safety field monitoring instruments. The use of the monitoring equipment is presented as follows (the manufacturer's owner's manuals for all equipment used will be present at the Site):

1. Photovac MicroTIP - this instrument is a photoionization detector (PID) that measures the concentration of airborne ionizable gases and vapors. The MicroTIP does not distinguish between individual compounds and will not read methane. The calibration will be performed using ambient air to "zero" the instrument and a 95 ppm cylinder of isobutylene to calibrate the span. The calibration will be performed as follows:
 - a. Connect the supplied regulator to the Span Gas cylinder. Hand-tighten the fittings.
 - b. Open the valve on the gas bag by turning the valve stem fully counter clockwise.
 - c. Attach the gas bag adapter nut to the regulator. Hand-tighten the fittings.
 - d. Turn the regulator knob counter clockwise about half turn to start the flow of gas.
 - e. Fill the gas bag about half full and then close the regulator fully clockwise to turn off the flow of gas.
 - f. Disconnect the bag from the adapter and empty it. Flush the bag a few times with the Span Gas and then fill it.
 - g. Close the gas bag by turning the valve clockwise.
 - h. Press SETUP and select the desired Cal Memory with arrow keys and press ENTER. Press EXIT to leave Setup.
 - i. Press CAL and expose MicroTIP to ambient air. Press ENTER and MicroTIP sets its zero point.
 - j. MicroTIP then asks for the Span Gas concentration. Enter the Known Span Gas concentration and then connect the Span Gas bag adapter to the inlet.
 - k. Press ENTER and MicroTIP sets its sensitivity.
 - l. When MicroTIP's display reverts to normal, MicroTIP is calibrated and ready for use. Remove the Span Gas bag from the inlet.

The instrument will be calibrated prior to the commencement of each day's work. The instrument will be charged overnight prior to each day's work.

SECTION 10.0 EMERGENCY RESPONSE PLAN

This section will present the Emergency Response Plan (ERP) for the Site. Pre-emergency planning will consist of reviewing the ERP with all workers at the Site prior to initiation of work.

Personnel Roles

It is anticipated that during excavation activities at the Site, in general, several persons will be on the Site: the HSO and contractors. Should an emergency situation arise at the Site, the HSO will assume control and decision-making. The HSO will also resolve all disputes concerning health and safety requirements and precautions. The HSO will also:

- Be authorized to seek and purchase supplies as necessary.
- Have control over activities of everyone entering the Site.

The HSO will communicate with off-Site personnel, including the Project Manager, to evaluate data and assist in the decision-making process. Phone numbers for the fire department, police, ambulance, poison control center, NYC Department of Environmental Protection, and NYS Department of Environmental Conservation Spill Response Department are listed in Table 1.2.1 of this document. The hospital that will be utilized during an emergency will be Manhattan Medical. The directions to the hospital, along with the hospital's emergency room phone number are presented in Table 1.2.1. Copies of Table 1.2.1 will be available at the Site and will be placed in vehicles of personnel involved in soil activities at the Site.

Response Follow-Up

Following an emergency, or incident, a detailed report will be generated by the HSO. All equipment will be restored to pre-emergency conditions. The CHASP will be reviewed following an emergency to determine if it provides adequate information to assist in dealing with the emergency. The CHASP may be revised to incorporate additional information as needed.

Emergency Recognition and Prevention

Before daily work assignments begin, each day a brief on-Site meeting will be held by the HSO to address health and safety issues related to the day's work. Prior to initiation of work, a detailed on-Site health and safety meeting will be held to review all potential hazards, contingencies, and safety measures.

Safe Distances and Places of Refuge

The main potential cause of work zone evacuation is a significant vapor release. Vapor release evacuation will be discussed prior to subsurface activities at the Site and in general will be in the upwind direction. Wind direction will be monitored at each work location and all workers will be notified of the direction of evacuation prior to commencement of work. Safe distances will be discussed at each location and determined by the HSO. The PID will be used to determine if workers have evacuated a sufficient distance.

At all times, vehicles which may be utilized in an emergency for transport to the hospital (or other destination) will have clear access to leave the Site. The HSO will assure that an emergency vehicle does not become blocked-in by other vehicles.

Site Security and Control

The HSO will control entry of personnel into the work zone. No unnecessary persons shall be permitted in the work zone.

Decontamination Procedures During Emergencies

In the event of a medical emergency, decontamination will be performed if it does not interfere with essential treatment. Decontamination will be performed by washing, rinsing, and/or cutting off protective clothing and equipment.

If decontamination cannot be performed, the victim will be wrapped in plastic to reduce contamination to other personnel. Emergency and off-Site medical personnel will be alerted to the potential contamination.

Emergency Medical Treatment and First Aid

Medical emergencies will be treated, in general, by medical experts by transporting the victim to the nearby hospital. A first aid kit will be present on Site for minor medical treatment.

ATTACHMENT A
MATERIALS SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: TRICHLOROETHYLENE

TRADE NAMES/SYNONYMS:

MTG MSDS 199; ACETYLENE TRICHLORIDE; ETHYLENE TRICHLORIDE; 1-CHLORO-2,2-DICHLOROETHYLENE; 1,1-DICHLORO-2-CHLOROETHYLENE; TCE; ETHINYL TRICHLORIDE; TRICHLOROETHENE; 1,1,2-TRICHLOROETHYLENE; 1,1,2-TRICHLOROETHENE; UN 1710; RCRA U228; C2HCl3; MAT23850; RTECS KX4550000

CHEMICAL FAMILY: halogenated, alkenes

CREATION DATE: Jan 24 1989

REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TRICHLOROETHYLENE

CAS NUMBER: 79-01-6

PERCENTAGE: >99

COMPONENT: INHIBITORS

CAS NUMBER: Not assigned.

PERCENTAGE: <0.1

COMPONENT: AMINES

CAS NUMBER: Not assigned.

PERCENTAGE: <0.1

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

EMERGENCY OVERVIEW:



COLOR: colorless

PHYSICAL FORM: liquid

ODOR: sweet odor

MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, allergic reactions, cancer hazard (in humans)

PHYSICAL HAZARDS: May polymerize. Containers may rupture or explode. May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: irritation, changes in blood pressure, nausea, vomiting, stomach pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, mood swings, tremors, loss of coordination, visual disturbances, bluish skin color, lung congestion, kidney damage, liver damage, unconsciousness, coma

LONG TERM EXPOSURE: same as effects reported in short term exposure, loss of appetite, weight loss, blood disorders, brain damage, cancer

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation, allergic reactions

LONG TERM EXPOSURE: irritation, allergic reactions, nausea, loss of appetite, weight loss, difficulty breathing, headache, drowsiness, dizziness, joint pain, loss of coordination, visual disturbances, paralysis

EYE CONTACT:

SHORT TERM EXPOSURE: irritation (possibly severe), blurred vision

LONG TERM EXPOSURE: irritation (possibly severe), eye damage

INGESTION:

SHORT TERM EXPOSURE: same as effects reported in short term inhalation

LONG TERM EXPOSURE: same as effects reported in long term inhalation

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

FLASH POINT: No data available.

LOWER FLAMMABLE LIMIT: 7.8% @ 100 C

UPPER FLAMMABLE LIMIT: 52% @ 100 C

AUTOIGNITION: 770 F (410 C)

6. ACCIDENTAL RELEASE MEASURES

AIR RELEASE:

Reduce vapors with water spray. Collect runoff for disposal as potential hazardous waste.

SOIL RELEASE:

Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:

Absorb with activated carbon. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

TRICHLOROETHYLENE:

100 ppm OSHA TWA

200 ppm OSHA ceiling

300 ppm OSHA peak (5 minutes in any 2 hours)

50 ppm (269 mg/m³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)

200 ppm (1070 mg/m³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)

10 ppm ACGIH TWA

25 ppm ACGIH STEL

25 ppm NIOSH TWA 10 hour(s)

2 ppm NIOSH ceiling 60 minute(s) (used as halogenated anesthetic gas)

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

At any detectable concentration -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: sweet odor
MOLECULAR WEIGHT: 131.39
MOLECULAR FORMULA: Cl-C-H-C-Cl₂
BOILING POINT: 189 F (87 C)
FREEZING POINT: -99 F (-73 C)
VAPOR PRESSURE: 58 mmHg @ 20 C
VAPOR DENSITY (air=1): 4.53
SPECIFIC GRAVITY (water=1): 1.4642
WATER SOLUBILITY: 0.1%
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: 21 ppm
EVAPORATION RATE: 0.69 (carbon tetrachloride=1)
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, acetone, chloroform, benzene, vegetable oils

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

TRICHLOROETHYLENE:

IRRITATION DATA: 2 mg/24 hour(s) skin-rabbit severe; 20 mg/24 hour(s) eyes-rabbit moderate

TOXICITY DATA: 140700 mg/m³/1 hour(s) inhalation-rat LC₅₀; >20 gm/kg skin-rabbit LD₅₀; 4920 mg/kg oral-rat LD₅₀

CARCINOGEN STATUS: NTP: Anticipated Human Carcinogen; IARC: Human Limited Evidence,

Animal Sufficient Evidence, Group 2A; ACGIH: A2 -Suspected Human Carcinogen

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:

Moderately Toxic: ingestion

Slightly Toxic: inhalation

Relatively Non-toxic: dermal absorption

TARGET ORGANS: immune system (sensitizer), central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: heart problems

TUMORIGENIC DATA: Available.

MUTAGENIC DATA: Available.

REPRODUCTIVE EFFECTS DATA: Available.

ADDITIONAL DATA: May cross the placenta. Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 3100 ug/L 96 hour(s) LC50 (Mortality) Flagfish (*Jordanella floridae*)

INVERTEBRATE TOXICITY: 1700 ug/L 7 hour(s) EC50 (Regeneration) Flatworm (*Dugesia japonica*)

OTHER TOXICITY: 45000 ug/L 48 week(s) LC50 (Mortality) Clawed toad (*Xenopus laevis*)

FATE AND TRANSPORT:

BIOCONCENTRATION: 17 ug/L 1-14 hour(s) BCF (Residue) Bluegill (*Lepomis macrochirus*) 8.23 ug/L

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U228. Hazardous Waste Number(s): D040. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.5 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Trichloroethylene

ID NUMBER: UN1710

HAZARD CLASS OR DIVISION: 6.1

PACKING GROUP: III

LABELING REQUIREMENTS: 6.1



CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Trichloroethylene

UN NUMBER: UN1710

CLASS: 6.1

PACKING GROUP/CATEGORY: III

15. REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

TRICHLOROETHYLENE: 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):

ACUTE: Yes

CHRONIC: Yes

FIRE: No

REACTIVE: No

SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):

TRICHLOROETHYLENE

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:

California Proposition 65:

Known to the state of California to cause the following:

TRICHLOROETHYLENE

Cancer (Apr 01, 1988)

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: D2

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

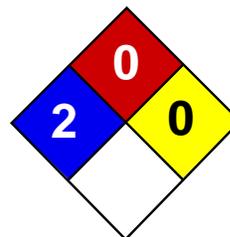
CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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| | |
|---------------------|---|
| Health | 2 |
| Fire | 0 |
| Reactivity | 0 |
| Personal Protection | G |

Material Safety Data Sheet Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolve; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂-Cl₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

| Name | CAS # | % by Weight |
|---------------------|----------|-------------|
| Tetrachloroethylene | 127-18-4 | 100 |

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema. Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver (hepatitis, fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):**Health Hazard:** 2**Fire Hazard:** 0**Reactivity:** 0**Personal Protection:** g**National Fire Protection Association (U.S.A.):****Health:** 2**Flammability:** 0**Reactivity:** 0**Specific hazard:****Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information**References:** Not available.**Other Special Considerations:** Not available.**Created:** 10/10/2005 08:29 PM**Last Updated:** 05/21/2013 12:00 PM

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Polycyclic Aromatic Hydrocarbons (PAHs)

What are PAHs?

Short for polycyclic aromatic hydrocarbons, PAHs describe chemicals that are often found together in groups of two or more. PAHs are found naturally in the environment but they can also be man-made. In their purest form, PAHs are solid and range in appearance from colorless to white or pale yellow-green. PAHs are created when products like coal, oil, gas, and garbage are burned but the burning process is not complete. Although PAHs can exist in over 100 different combinations, the National Waste Minimization Program defines this group using the Toxic Release Inventory reporting category for polycyclic aromatic compounds.

Chemicals included in this category, by name and CAS number, are:

1. Benzo(a)anthracene, 56-55-3
2. Benzo(a)phenanthrene (chrysene), 218-01-9
3. Benzo(a)pyrene, 50-32-8
4. Benzo(b)fluoranthene, 205-99-2
5. Benzo(j)fluoranthene, 205-82-3
6. Benzo(k)fluoranthene, 207-08-9
7. Benzo(j,k)fluorene (fluoranthene), 206-44-0
8. Benzo(r,s,t)pentaphene, 189-55-9
9. Dibenz(a,h)acridine, 226-36-8
10. Dibenz(a,j)acridine, 224-42-0
11. Dibenzo(a,h)anthracene, 53-70-3
12. Dibenzo(a,e)fluoranthene, 5385-75-1
13. Dibenzo(a,e)pyrene, 192-65-4
14. Dibenzo(a,h)pyrene, 189-64-0
15. Dibenzo(a,l)pyrene, 191-30-0
16. 7H-Dibenzo(c,g)carbazole, 194-59-2
17. 7,12-Dimethylbenz(a)anthracene, 57-97-6
18. Indeno(1,2,3-cd)pyrene 193-39-5
19. 3-Methylcholanthrene, 56-49-5
20. 5-Methylchrysene, 3697-24-3

21. 1-Nitropyrene, 5522-43-0

It should be noted that some PAHs are listed individually on EPA's Priority Chemical list. They are:

1. Acenaphthene, 83-32-9
2. Acenaphthylene, 208-96-8
3. Anthracene, 120-12-7
4. Benzo(g,h,i)perylene, 191-24-2
5. Fluorene, 86-73-7
6. Phenanthrene, 85-01-8
7. Pyrene, 129-00-0

Why are PAHs bad actors?

PAHs are a concern because they are persistent. Because they do not burn very easily, they can stay in the environment for long periods of time. Individual PAHs vary in behavior. Some can turn into a vapor in the air very easily. Most do not break down easily in the water.

What are PAHs used for?

Most PAHs are used to conduct research. However, some PAHs are used to make dyes, plastics, and pesticides. Some are even used in medicines.

How can PAHs enter and leave your body?

One of the most common ways PAHs can enter the body is through breathing contaminated air. PAHs get into your lungs when you breathe them. If you live near a hazardous waste site where PAHs are disposed, you are likely to breathe PAHs. If you eat or drink food and water contaminated with PAHs, you could be

exposed. Exposure to PAHs can also occur if your skin contacts PAH-contaminated soil or products like heavy oils, coal tar, roofing tar, or creosote. Creosote is an oily liquid found in coal tar and is used to preserve wood. Once in your body, PAHs can spread and target fat tissues. Target organs include the kidneys and liver. However, PAHs will leave your body through urine and feces in a matter of days.

How can you be exposed to PAHs?

You can be exposed to PAHs in the environment, in your home, and in the workplace. Because PAHs exist naturally in the environment and are man-made, you can be exposed in a number of ways. Fumes from vehicle exhaust, coal, coal tar, asphalt, wildfires, agricultural burning and hazardous waste sites are all sources of exposure.

You could be exposed to PAHs by breathing cigarette and tobacco smoke, eating foods grown in contaminated soil, or by eating meat or other food that you grilled. Grilling and charring food actually increases the amount of PAHs in the food.

If you work in a plant that makes coal tar, asphalt and aluminum, or that burns trash, you can be exposed to PAHs. You can also be exposed if you work in a facility that uses petroleum or coal, or where wood, corn, and oil are burned.

How can PAHs affect your health?

A number of PAHs have caused tumors in laboratory animals that were exposed to PAHs through their food, from breathing contaminated air, and when it was applied to their skin. When pregnant mice ate high doses of a PAH (benzo(a)pyrene) they experienced reproductive problems. In addition, the offspring of the pregnant mice showed birth defects and a decrease in their body weight. Other effects include damage to the skin, body fluids, and the immune system. However, these effects have not been seen in humans.

Is there a medical test to determine if you have been exposed to PAHs?

There is a test that can measure the presence of PAH in your urine. This test can only tell you if you have been exposed; but it can't reveal how harmful the effects of the exposure will be. This test would have to be performed in a laboratory that has special equipment to detect the PAHs. Another test currently being developed will be able to measure PAHs in your body tissue and blood.

What are the medical treatments in cases of exposure?

Most exposures to PAHs happen every day at very low levels in the air we breathe and the foods we eat. Treatment for a short-term exposure is unlikely. Contact your doctor if you experience symptoms of PAHs poisoning.

What levels of exposure have resulted in harmful health effects?

There is no information available from studies on humans to tell what effects can result from being exposed to individual PAHs at certain levels. However, breathing PAHs and skin contact seem to be associated with cancer in humans. Animal studies showed that mice exposed to 308 parts per million (ppm) of PAHs (specifically benzo (a) pyrene) in food for 10 days (short term exposure) caused birth defects. Mice exposed to 923 ppm of benzo (a) pyrene in food for months caused problems in the liver and blood.

Where can I get more information?

Contact your state health or environmental department, or:

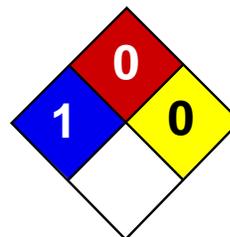
Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, N.E., E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease

Registry (ATSDR), Public Health Statement, *Polycyclic Aromatic Hydrocarbons*, December 1990. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA, December 1990.

2. United States Environmental Protection Agency, Office of Environmental Information, *Emergency Planning and Community Right-to-Know Act – Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category*, EPA 260-B-01-03, Washington, DC, August 2001.



| | |
|---------------------|---|
| Health | 1 |
| Fire | 0 |
| Reactivity | 0 |
| Personal Protection | E |

Material Safety Data Sheet

Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

| Name | CAS # | % by Weight |
|------|-----------|-------------|
| Lead | 7439-92-1 | 100 |

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m³) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m³) from OSHA (PEL) [United States] TWA: 0.03 (mg/m³) from NIOSH [United States] TWA: 0.05 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW

DANGER!

**EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT
- EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF
SWALLOWED - ASPIRATION HAZARD**



NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs):

COMPANY CONTACT (business hours):

MSDS (Environment, Health, Safety) Internet Website

CHEMTREC (800)424-9300

Corporate Safety (732)750-6000

www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

| INGREDIENT NAME (CAS No.) | CONCENTRATION PERCENT BY WEIGHT |
|--|---|
| Gasoline (86290-81-5) | 100 |
| Benzene (71-43-2) | 0.1 - 4.9 (0.1 - 1.3 reformulated gasoline) |
| n-Butane (106-97-8) | < 10 |
| Ethyl Alcohol (Ethanol) (64-17-5) | 0 - 10 |
| Ethyl benzene (100-41-4) | < 3 |
| n-Hexane (110-54-3) | 0.5 to 4 |
| Methyl-tertiary butyl ether (MTBE) (1634-04-4) | 0 to 15.0 |
| Tertiary-amyl methyl ether (TAME) (994-05-8) | 0 to 17.2 |
| Toluene (108-88-3) | 1 - 25 |
| 1,2,4- Trimethylbenzene (95-63-6) | < 6 |
| Xylene, mixed isomers (1330-20-7) | 1 - 15 |

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).



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Gasoline, All Grades

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Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES

Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY

Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION



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DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION

Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

| | |
|-------------------------------|-------------------------------------|
| FLASH POINT: | -45 °F (-43°C) |
| AUTOIGNITION TEMPERATURE: | highly variable; > 530 °F (>280 °C) |
| OSHA/NFPA FLAMMABILITY CLASS: | 1A (flammable liquid) |
| LOWER EXPLOSIVE LIMIT (%): | 1.4% |
| UPPER EXPLOSIVE LIMIT (%): | 7.6% |

FIRE AND EXPLOSION HAZARDS

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO₂, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 "Low Expansion Foam - 1994 Edition."

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.



MATERIAL SAFETY DATA SHEET

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6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

*****USE ONLY AS A MOTOR FUEL*****

*****DO NOT SIPHON BY MOUTH*****

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.



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8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

| Component (CAS No.) | Source | TWA (ppm) | STEL (ppm) | Exposure Limits | Note |
|--|--------|-----------|------------|--|------|
| Gasoline (86290-81-5) | ACGIH | 300 | 500 | A3 | |
| Benzene (71-43-2) | OSHA | 1 | 5 | Carcinogen | |
| | ACGIH | 0.5 | 2.5 | A1, skin | |
| | USCG | 1 | 5 | | |
| n-Butane (106-97-8) | ACGIH | 1000 | -- | Aliphatic Hydrocarbon Gases Alkane (C1-C4) | |
| Ethyl Alcohol (ethanol) (64-17-5) | OSHA | 1000 | -- | | |
| | ACGIH | 1000 | -- | A4 | |
| Ethyl benzene (100-41-4) | OSHA | 100 | -- | | |
| | ACGIH | 100 | 125 | A3 | |
| n-Hexane (110-54-3) | OSHA | 500 | -- | | |
| | ACGIH | 50 | -- | Skin | |
| Methyl-tertiary butyl ether [MTBE] (1634-04-4) | ACGIH | 50 | -- | A3 | |
| Tertiary-amyl methyl ether [TAME] (994-05-8) | | | | None established | |
| Toluene (108-88-3) | OSHA | 200 | -- | Ceiling: 300 ppm; Peak: 500 ppm (10 min.) | |
| | ACGIH | 20 | -- | A4 | |
| 1,2,4-Trimethylbenzene (95-63-6) | ACGIH | 25 | -- | | |
| Xylene, mixed isomers (1330-20-7) | OSHA | 100 | -- | | |
| | ACGIH | 100 | 150 | A4 | |

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid



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ODOR

A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

| | <u>Odor Detection</u> | <u>Odor Recognition</u> |
|--------------------------|-----------------------|-------------------------|
| Non-oxygenated gasoline: | 0.5 - 0.6 ppm | 0.8 - 1.1 ppm |
| Gasoline with 15% MTBE: | 0.2 - 0.3 ppm | 0.4 - 0.7 ppm |
| Gasoline with 15% TAME: | 0.1 ppm | 0.2 ppm |

BASIC PHYSICAL PROPERTIES

| | |
|--|--|
| BOILING RANGE: | 85 to 437 °F (39 to 200 °C) |
| VAPOR PRESSURE: | 6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C) |
| VAPOR DENSITY (air = 1): | AP 3 to 4 |
| SPECIFIC GRAVITY (H ₂ O = 1): | 0.70 - 0.78 |
| EVAPORATION RATE: | 10-11 (n-butyl acetate = 1) |
| PERCENT VOLATILES: | 100 % |
| SOLUBILITY (H ₂ O): | Non-oxygenated gasoline - negligible (< 0.1% @ 77 °F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 °F); ethanol is readily soluble in water |

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS

Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitroresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

| | |
|--|---|
| Acute Dermal LD50 (rabbits): > 5 ml/kg | Acute Oral LD50 (rat): 18.75 ml/kg |
| Primary dermal irritation (rabbits): slightly irritating | Draize eye irritation (rabbits): non-irritating |
| Guinea pig sensitization: negative | |

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.



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Gasoline, All Grades

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This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Gasoline
DOT HAZARD CLASS and PACKING GROUP: 3, PG II
DOT IDENTIFICATION NUMBER: UN 1203
DOT SHIPPING LABEL: FLAMMABLE LIQUID

PLACARD:



15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

Table with 5 columns: ACUTE HEALTH, CHRONIC HEALTH, FIRE, SUDDEN RELEASE OF PRESSURE, REACTIVE. Values: X, X, X, --, --

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

Table with 2 columns: INGREDIENT NAME (CAS NUMBER), CONCENTRATION WT. PERCENT. Rows: Benzene (71-43-2) 0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline), Ethyl benzene (100-41-4) < 3



MATERIAL SAFETY DATA SHEET

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| | |
|--|-----------|
| n-Hexane (110-54-3) | 0.5 to 4 |
| Methyl-tertiary butyl ether (MTBE) (1634-04-4) | 0 to 15.0 |
| Toluene (108-88-3) | 1 to 15 |
| 1,2,4- Trimethylbenzene (95-63-6) | < 6 |
| Xylene, mixed isomers (1330-20-7) | 1 to 15 |

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

| <u>INGREDIENT NAME (CAS NUMBER)</u> | <u>CONCENTRATION - Parts per million (ppm) by weight</u> |
|--------------------------------------|--|
| Polycyclic aromatic compounds (PACs) | 17 |
| Benzo (g,h,i) perylene (191-24-2) | 2.55 |
| Lead (7439-92-1) | 0.079 |

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

| <u>INGREDIENT NAME (CAS NUMBER)</u> | <u>Date Listed</u> |
|-------------------------------------|--------------------|
| Benzene | 2/27/1987 |
| Ethyl benzene | 6/11/2004 |
| Toluene | 1/1/1991 |

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

| | | | |
|-----------------------------------|-------------|-----|---------|
| <u>NFPA® HAZARD RATING</u> | HEALTH: | 1 | Slight |
| | FIRE: | 3 | Serious |
| | REACTIVITY: | 0 | Minimal |
| <u>HMIS® HAZARD RATING</u> | HEALTH: | 1 * | Slight |
| | FIRE: | 3 | Serious |
| | PHYSICAL: | 0 | Minimal |

* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

| | | | |
|-------|---|--------|---|
| ACGIH | American Conference of Governmental Industrial Hygienists | CERCLA | Comprehensive Emergency Response, Compensation, and Liability Act |
| AIHA | American Industrial Hygiene Association | DOT | U.S. Department of Transportation |
| ANSI | American National Standards Institute (212)642-4900 | | [General Info: (800)467-4922] |
| API | American Petroleum Institute (202)682-8000 | EPA | U.S. Environmental Protection Agency |
| | | HMIS | Hazardous Materials Information System |



MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

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| | | | |
|-------|--|-------|--|
| IARC | International Agency For Research On Cancer | REL | Recommended Exposure Limit (NIOSH) |
| MSHA | Mine Safety and Health Administration | SARA | Superfund Amendments and Reauthorization Act of 1986 Title III |
| NFPA | National Fire Protection Association (617)770-3000 | SCBA | Self-Contained Breathing Apparatus |
| NIOSH | National Institute of Occupational Safety and Health | SPCC | Spill Prevention, Control, and Countermeasures |
| NOIC | Notice of Intended Change (proposed change to ACGIH TLV) | STEL | Short-Term Exposure Limit (generally 15 minutes) |
| NTP | National Toxicology Program | TLV | Threshold Limit Value (ACGIH) |
| OPA | Oil Pollution Act of 1990 | TSCA | Toxic Substances Control Act |
| OSHA | U.S. Occupational Safety & Health Administration | TWA | Time Weighted Average (8 hr.) |
| PEL | Permissible Exposure Limit (OSHA) | WEEL | Workplace Environmental Exposure Level (AIHA) |
| RCRA | Resource Conservation and Recovery Act | WHMIS | Workplace Hazardous Materials Information System (Canada) |

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Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

APPENDIX 3

PROPOSED DEVELOPMENT PLANS

ZONING INFORMATION

Address : 134-37 35TH AVENUE
 FLUSHING, N.Y.
 Block : 4949
 Lot : 31, 8900
 Zone : C2-2 IN R6
 Map No. : 10a
 Construction Class : 1-B

35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT, FLUSHING, NY

| FLOOR | BUILDING GROSS FLOOR AREA (SQ. FT.) | COMMUNITY FACILITY (SQ. FT.) | COMMERCIAL | | RESIDENTIAL-APARTMENT HOTEL (SQ. FT.) | PARKING GARAGE (SQ. FT.) | TOTAL ZONING FLOOR AREA (S.F.) | NO. OF GUEST ROOM | NO. OF DWELLING UNIT | ACCESSORY PARKING | | | BICYCLE SPACE | |
|-----------------------|-------------------------------------|------------------------------|------------------|-----------------|---------------------------------------|--------------------------|--------------------------------|-------------------|----------------------|----------------------|----------|------------------------|---------------|----------------------|
| | | | RETAIL (SQ. FT.) | HOTEL (SQ. FT.) | | | | | | REQUIRED | PROPOSED | LOADING BERTH PROPOSED | REQUIRED | PROPOSED |
| USE GROUP | | 4 | 6 | 5A | 2 | 5B | | | | | | | | |
| SUB-CELLAR2 | 38775 | 0 | 0 | 0 | 0 | 35452 | 3323 | | | 325/8 = 40.63 | 147 | | | |
| SUB-CELLAR1 | 38775 | 0 | 0 | 0 | 0 | 12545 | 26230 | | | 11,170/300 = 37.23 | 29 | | | 11,170 /10000 = 1.12 |
| CELLAR | 34073 | 0 | 11170* | 5080* | 4655* | 12231 | 21842 | | | 16,377 /1000 = 16.37 | 4 | 2 | | 16,377 /10000 = 1.64 |
| 1 | 31790 | 403 | | 392 | 337 | 17660 | 12998 | | | | | | | |
| 2 | 23142 | 16377 | | 5697 | 565 | | 503 | 13 | | | | | | |
| 3 | 17577 | | | 16156 | 447 | | 974 | 41 | | | | | | |
| 4 | 17911 | | | 16486 | 447 | | 978 | 42 | | | | | | |
| 5 | 16486 | | | 15118 | 450 | | 918 | 38 | | 210/ 8 = 26.25 | | | | 84,100 /10000 = 8.41 |
| 6 | 16486 | | | 15118 | 450 | | 918 | 38 | | | | | | |
| 7 | 16486 | | | 15133 | 459 | | 894 | 38 | | | | | | |
| 8 | 12982 | | | | 12314 | | 668 | 19 | | | | | | |
| 9 | 12853 | | | | 12184 | | 669 | 19 | | | | | | |
| 10 | 12853 | | | | 12184 | | 669 | 19 | | | | | | |
| 11 | 12853 | | | | 12184 | | 669 | 19 | | 148 x 70% = 103.6 | | | | 148 x 50% = 74 |
| 12 | 12853 | | | | 12184 | | 669 | 19 | | | | | | |
| 13 | 12853 | | | | 12184 | | 669 | 19 | | | | | | |
| 14 | 12853 | | | | 12184 | | 669 | 19 | | | | | | |
| 15 | 12853 | | | | 12347 | | 506 | 15 | | | | | | |
| TOTAL | 354454 | 16780 | 0 | 84100 | 100920 | 77888 | 74766 | 210 | 148 | 224.08 | 250 | 2 | 85.17 | 85 |
| MAX. FA ALLOWED | | 16780 | | 84100 | 100920 | | | | | | | | | |
| MAX. FA OF BUILDING | | < 42,050 SF | | < 84,100 SF | < 100,920 SF | | | | | | | | | |
| TOTAL FAR OF BUILDING | | 0.40 < 1.00 | | 2.00 < 2.00 | 2.40 < 2.40 | | | 210 | 148 | 224.08 | 250 | 2 | 85.17 | 85 |

* (ZR 12-10) CELLAR FLOOR, CHASE & MECH. SPACE NOT COUNT AS ZONING FLOOR AREA.
 ** TOTAL BUILDING GROSS AREA INCLUDE CELLAR F.A. & DEDUCTIBLE FLOOR AREA.

ZR 23-142 <FOR RESIDENTIAL>
 HEIGHT FACTOR = TOTAL S.F. OF ENTIRE BUILDING / MAX. LOT COVERAGE
 201,800 / 17,911 = 11.27 = 11

MAX. ALLOWED F.A.R. IN R6 (W/H.F. = 11)
 42,050 x 2.40 = 100,920 SF ALLOWED
 = 100,920 SF PROPOSED

PROPOSED FAR = 2.40 < 2.40 (COMPLIES)

HEIGHT FACTOR (OPEN SPACE) =
 TOTAL S.F. OF RESIDENTIAL / LARGEST RES. LOT COVERAGE
 100,920 / 12,982 = 7.77 = 8

MIN. REQUIRED OPEN SPACE (W/H.F. = 8) = 31%
 100,920 x 31% = 31,285.2 SF REQUIRED
 OPEN SPACE DIAGRAM FOR UNCOVERED OR UNROOFED AREA. SEE DWG. A.004.00~A.007.00.
 PROPOSED: 31,288.9 SF > 31,285.2 SF (SEE DWG. A.005.00) (COMPLIES)

ZR 35-40 <MAX. NUMBER OF DWELLING UNITS>
 FACTOR = 680 ZR 23-22
 (LOT AREA) MAX. FAR - ACT. CF FAR - ACT. COMM. FAR / FACTOR
 42,050 x (4.80-0.40-2.00) / 680 = 148 UNITS ALLOWED
 42,050 x 2.40 / 680 = 148 UNITS PROPOSED (COMPLIES)

YARD REGULATION
 ZR 23-632 & ZR 35-51
 NO FRONT YARD IS REQUIRED. (COMPLIES)
 ZR 23-462(c) & ZR 35-52
 NO SIDE YARD REQUIRED. IF PROVIDED, 8' MIN. (COMPLIES)

23-471 & 33-261 <BEYOND 100' OF A STREET LINE>
 (a) 30' REAR YARD FOR RES. & 20' REAR LOT FOR COMM. REQUIRED WHEN REAR LOT LINE COINCIDES WITH A REAR LOT LINE OF AN ADJOINING ZONING LOT.
 (c) NO REAR YARD REQUIRED WHEN REAR LOT LINE COINCIDES WITH A SIDE LOT LINE OF AN ADJOINING ZONING LOT.

ZR 23-541 & ZR 33-301 <WITHIN 100' OF CORNERS>
 NO REAR YARD REQUIRED

ZR 23-632 & ZR 33-431 <FRONT SETBACKS @ FARRINGTON ST.>
 ON NARROW ST., 20' INITIAL SETBACK DISTANCE
 MAX. HEIGHT OF A FRONT WALL = 60' OR 4 STORIES WHICHEVER IS LESS
 MAX. HEIGHT ABOVE STREET LINE = 60' FEET

<SKY EXPOSURE PLANE>
 EXPOSURE PLANE BEGINS AT 60'
 V2.7 H1.0 ON NARROW STREET

ZR 23-64 & ZR 33-441 <ALT. FRONT SETBACKS @ 35TH AVE.>
 ON WIDE ST., 10' DEPTH OF OPTIONAL FRONT OPEN AREA
 MAX. HEIGHT ABOVE STREET LINE = 60 FEET

<SKY EXPOSURE PLANE>
 EXPOSURE PLANE BEGINS AT 60'
 V7.6 H1.0 ON WIDE STREET
 (SEE BUILDING SECTION, DWG. A.601)

PARKING REQUIREMENT
 ZR 36-21 <REQ. PARKINGS FOR COMMERCIAL>
 RETAIL: 1 PER 300 SF

HOTELS(a): 1 PER 8 GUEST ROOMS
 HOTELS(b): MEETING/ EATING OR DRINKING PLACES:
 1 PER 8 PERSON RATED CAPACITY
 COMMUNITY CLUB: 1 PER 10 PERSONS

ZR 25-23 <REQ. PARKINGS FOR RESIDENTIAL>
 TOTAL NUMBER OF DWELLING UNITS = 70%

TOTAL PARKING REQUIRED = 224.08
 TOTAL PARKING PROPOSED = 250 (COMPLIES)
 (SEE PARKING REQUIREMENT TABLE)

ZR 36-62 <REQUIRED LOADING BERTH>
 HOTELS: FIRST 25,000 SF = NONE REQUIRED
 NEXT 75,000 SF = 1 REQUIRED

COMMERCIAL USES: FIRST 8,000 SF = NONE REQUIRED;
 NEXT 17,000 SF = 1 REQUIRED

TOTAL LOADING BERTH REQUIRED = 2
 TOTAL LOADING BERTH PROPOSED = 2 (COMPLIES)

ZR 36-70 <BICYCLE PARKING>
 FOR RESIDENTIAL USES
 USE GROUP 2 = 1 PER 2 DWELLING UNITS

ALL OTHER USE GROUP 3 & 4 = 1 PER 10,000 SF
 USE GROUP 5A = 1 PER 10,000 SF
 (EXCEPT EATING & DRINKING ESTABLISHMENTS)

GENERAL RETAIL - USE GROUP 6 = 1 PER 10,000 SF

TOTAL BICYCLE SPACE REQUIRED = 85.17
 TOTAL BICYCLE SPACE PROPOSED = 85 (COMPLIES)
 (SEE PARKING REQUIREMENT TABLE)

ZR 36-73
 15 SF OF AREA SHALL BE PROVIDED FOR EACH BICYCLE SPACE.
 85 SPACE x 15 SQ. FT. = 1,275 SQ. FT. REQUIRED

STREET TREE PLANTING
 ZR 33-03 ZR 26-41
 REQUIRED ONE STREET TREE FOR EVERY 25' OF STREET FRONTAGE OF THE ZONING LOT.
 AT 35TH AVENUE, 165/25 = 6.6 TREES REQUIRED
 PROPOSED 6 TREES ON-SITE, & 1 TREES OFF-SITE
 AT FARRINGTON STREET, 235/25 = 9.4 TREES REQUIRED
 PROPOSED 6 TREES ON-SITE, & 3 TREES OFF-SITE

TABLE 1107.6.1.1
 <ACCESSIBLE DWELLING & SLEEPING UNITS>

| TOTAL NO. OF UNITS PROVIDED | REQUIRED MIN. NO. OF ROLL-IN SHOWERS | TOTAL NO. OF REQ. ACCESSIBLE UNITS |
|-----------------------------|---|---|
| 150 AND OVER | 1% OF TOTAL | 5% OF TOTAL |
| 101 TO 149 | 2 | 7 |
| 210 ROOMS (2ND-7TH FL) | 2 REQUIRED, 2 PROPOSED @ 5TH & 7TH FL | 10.5 REQUIRED, 11 PROPOSED @ 2ND-7TH FL |
| 148 ROOMS (8TH-15TH FL) | 2 REQUIRED, 2 PROPOSED @ 8TH-14TH FL. 1 PROPOSED @ 15TH FL. (TOTAL OF 15) | 7 REQUIRED, 148 PROPOSED @ 8TH-15TH FL |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUDS. ON ZONING AND BUILDING CODES.

PROJECT:
 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
 35TH AVE./FARRINGTON ST., FLUSHING
 DRAWING TITLE:
**ZONING/
 PLOT PLAN**

M.E.P. ENGINEER:
VICTOR CESPEDES
 TEL: (908) 789-0889 Fax: (908) 789-0889
 STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
 TEL: (917) 518-8236 Fax: (718) 864-0016
 ■ SEAL & SIGNATURE:

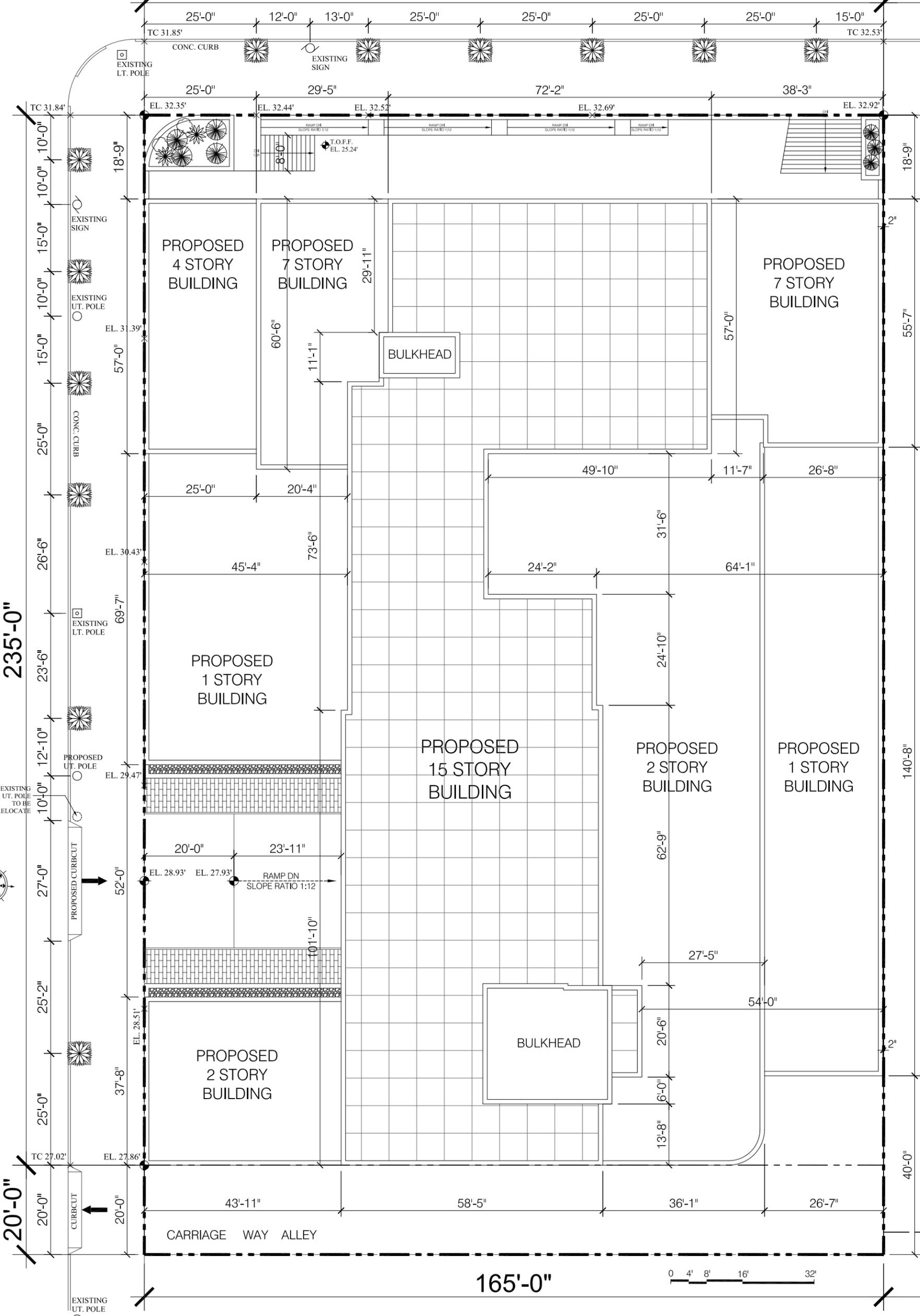
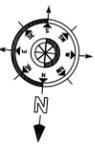


ARCHITECTS • PLANNERS
**R A Y M O N D
 C H A N**
 136-40 39TH AVENUE
 FLUSHING, NEW YORK 11354
 TEL: (718) 465-2345 Fax: (718) 558-8609
 E-MAIL: raymond@raymondchann.com
 WWW: www.raymondchann.com

DATE: 12/05/2013 DWG. NO.:
 PROJECT NO.: 2105
 PROJECT MANAGER: RCM
 DRAWN BY:
 CAD FILE NO.:
 35TH AVENUE (2105)
A-001.00
01-OF-27
 N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 233'-0" (70' WIDE)



| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING

DRAWING TITLE: SITE PLAN
SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER: VICTOR CESPEDES
Tel: (908) 788-0859 Fax: (908) 788-0859
STRUCTURAL ENGINEER: WAHLEUNG NG, P.E.
Tel: (917) 518-4236 Fax: (718) 854-4016
SEAL & SIGNATURE:



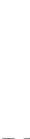
ARCHITECTS • PLANNERS
RAYMOND ARCHITECTS
136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 445-2345 Fax: (718) 558-8609
Email: raymond@raymondarchitects.com
Web: www.raymondarchitects.com

DATE: 12/05/2013 DWG. NO.:
PROJECT NO.: 21045
PROJECT MANAGER: RICHARD
DRAWN BY: A-002.00
CAD FILE NO.: 02-OF-27
N.Y.C. D.O.B. NO. :

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

| COMMERCIAL: HOTEL | | | | | | RESIDENTIAL: APARTMENT HOTEL | | | | | | | | | | | | | TOTAL NUMBER OF ROOM PER FLOOR | | |
|-------------------|--------|---------------------------|------------------------------|--------|----------|------------------------------|--------------------|---------------|----------|--------------------|------------------|--------------------|--------------------|------------------------|-------------------------------|-------------------|---------------------|----------------------|--------------------------------|--|-----|
| USE GROUP | (5A) | | | | | (2) | | | | | | | | | | | | | | | |
| ROOM TYPE | TYPE-1 | TYPE-1A | TYPE-1B | TYPE-2 | TYPE-2A | TYPE-A | TYPE-B | TYPE-C/C.1 | TYPE-C.2 | TYPE-D | TYPE-E | TYPE-F | TYPE-G | TYPE-H | TYPE-I | TYPE-J | TYPE-K | TYPE-L | TYPE-M | | |
| DOUBLE-DOUBLE | | ADA DOUBLE-DOUBLE (W/TUB) | ADA DOUBLE-DOUBLE (W/SHOWER) | KING | ADA KING | STUDIO KING | STUDIO QUEEN/QUEEN | STANDARD KING | | 1 BEDROOM SUITE | CONFERENCE SUITE | 2 BEDROOM SUITE | 3 BEDROOM SUITE | ADA STUDIO KING-SHOWER | ADA STUDIO QUEEN/QUEEN-SHOWER | ADA STANDARD KING | ADA 1-BEDROOM SUITE | ADA CONFERENCE SUITE | ADA 2-BEDROOM SUITE | | |
| FLOOR | | | | | | | | | | | | | | | | | | | | | |
| 2ND | 0 | 1 | 0 | 12 | 0 | | | | | | | | | | | | | | | | 13 |
| 3TH | 18 | 1 | 0 | 21 | 1 | | | | | | | | | | | | | | | | 41 |
| 4TH | 19 | 1 | 0 | 21 | 1 | | | | | | | | | | | | | | | | 42 |
| 5TH | 17 | 0 | 1 | 19 | 1 | | | | | | | | | | | | | | | | 38 |
| 6TH | 17 | 1 | 0 | 19 | 1 | | | | | | | | | | | | | | | | 38 |
| 7TH | 17 | 0 | 1 | 19 | 1 | | | | | | | | | | | | | | | | 38 |
| 8TH | | | | | | 1 | 7 | 4 | | 2 | | | | 1 | 1 | 1 | 1 | 1 | | | 19 |
| 9TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 10TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 11TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 12TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 13TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 14TH | | | | | | 1 | 7 | 3 | 1 | 2 | 1 | | | 1 | 1 | 1 | 1 | | | | 19 |
| 15TH | | | | | | | 7 | | | 2 | 1 | | | | 1 | 1 | 1 | | | | 15 |
| SUB-TOTAL | 88 | 4 | 2 | 111 | 5 | | 56 | 22 | 6 | 16 | 7 | 1 | 1 | | 8 | 7 | 8 | 1 | 1 | | 358 |
| TOTAL | 41.90% | 1.90% | 0.95% | 52.86% | 2.38% | | 37.84% | 14.86% | 4.05% | 10.81% | 4.73% | 0.68% | 0.68% | | 5.41% | 4.73% | 5.41% | 0.68% | 0.68% | | 358 |
| TOTAL | 210 | | | | | 148 | | | | | | | | | | | | | 100% | | |

WALL TYPES LEGENDS

| | | | |
|---|---|--|---|
|  | BRICK VENEER EXTERIOR WALL CONSTRUCTION: 2-HR RATED 4" FACE BRICK, 2" AIR SPACE, AND 6" NON-BEARING CMU WALL CONSTRUCTION; INTERIOR SIDE W/ 2 1/2" METAL STUD, 2" SEMI-RIGID INSULATION AND 5/8" GYPSUM WALL BOARD FURRING PARTITION. |  | (2) HR FIRE RATED 6" OR 8" NON-BEARING CONCRETE MASONRY PARTITION; SEE STRUCTURAL DRAWINGS FOR REINFORCING INFORMATION. |
|  | GRANITE STONE VENEER EXTERIOR WALL CONSTRUCTION: 2-HR RATED SAME AS BRICK VENEER W/ STONE MECHANICAL CLIP TO CMU WALL; PROVIDE ST. STL. CLIP, TYP. |  | (2) HR FIRE RATED & ACOUSTICAL PARTITION: (2) LAYERS OF 5/8" TYPE "X" GYPSUM WALL BOARDS ON BOTH SIDES OF 3 5/8" 20 G.A. METAL STUD @ MAX. 16" O.C.; RUN STUDS AND BOARDS FULL HEIGHT TO UNDERSIDE OF SLAB WITH 3 1/2" SEMI-RIGID THERMAFIBER INSULATION; CAULK ALL PERIMETER WITH ACOUSTICAL SEALANT; MIN. STC=50; BSA# 310-60-SM. |
|  | ALUM. COMPOSITE PANEL EXTERIOR WALL CONSTRUCTION: 2-HR RATED SAME AS BRICK VENEER W/ ALUM. PANEL CLIP / FASTEN TO CMU WALL; PROVIDE SUB-GRID & ST. STL. FASTENER, TYP. |  | (2) HR FIRE RATED SHAFT WALL CONSTRUCTION: (2) LAYERS 5/8" TYPE "X" GYPSUM WALL BOARDS AT FINISH SIDE, 2 1/2" 20 G.A. C-H METAL STUDS AT 24" O.C. AND 1" GYPSUM LINER AT SHAFT SIDE; THERMAFIBER INSULATION; CAULK ALL PERIMETER; STC=48; BSA# 354-76-M. |
|  | EXTERIOR INSULATION AND FINISH SYSTEM (EIFS) ON 2-HR RATED CMU WALL |  | (1) HR RATED PARTITION: (1) LAYER OF 5/8" TYPE "X" GYPSUM WALL BOARD ON BOTH SIDES OF 3 5/8" 20 G.A. METAL STUD @ MAX. 16" O.C.; RUN STUDS AND BOARDS FULL HEIGHT TO UNDERSIDE OF SLAB WITH 3 1/2" SEMI-RIGID THERMAFIBER INSULATION; BRACED FURRING STUDS 48" O.C. VERTICALLY; CAULK ALL PERIMETER. |
|  | CAST IN PLACE CONCRETE WALL. SEE STRUCTURAL DRAWINGS FOR THICKNESS AND REINFORCING INFORMATION. | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUDGS. ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT 35TH AVE./FARRINGTON ST., FLUSHING

DRAWING TITLE: GUESTROOM TABLE SCALE: NTS

M.E.P. ENGINEER: VICTOR CESPEDES Tel: (908) 788-0889 Fax: (908) 788-0889
STRUCTURAL ENGINEER: WAHLEUNG NG, P.E. Tel: (917) 518-8236 Fax: (718) 864-0016



136-40 39TH AVENUE FLUSHING, NEW YORK 11354
Tel: (718) 465-2345 Fax: (718) 558-8009
E-mail: raymond@raymondchanaanarchitect.com
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DATE: 12/05/2013 DWG. NO.:
PROJECT NO.: 21045
PROJECT MANAGER: RICA
DRAWN BY: A-003.00
CADD FILE NO.: 03-OF-27
35TH AVENUE (21045)

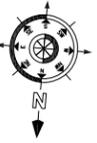
N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET (70' WIDE)

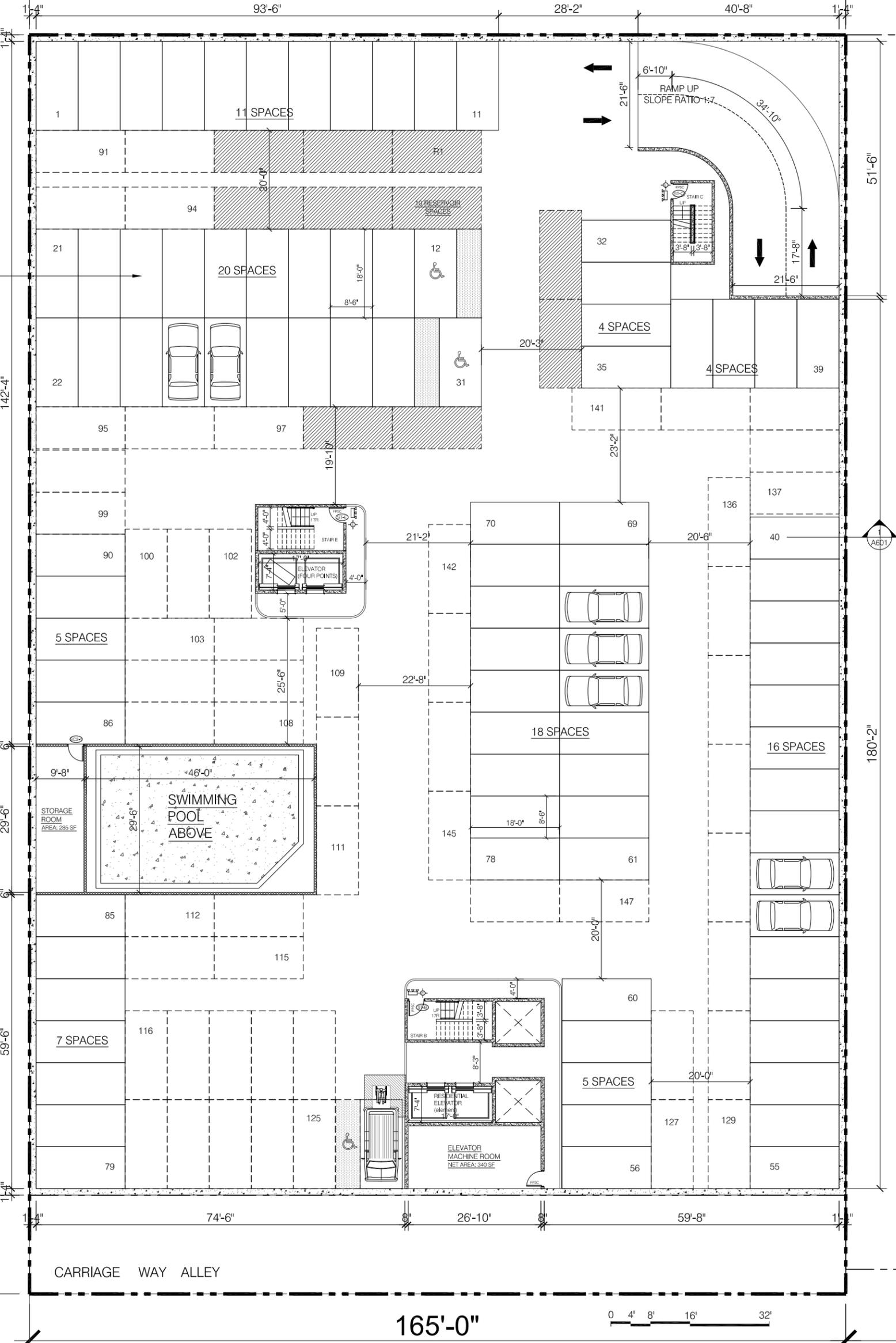
ATTENDED ACCESSORY PARKING

(O.G.-S2) (U.G.-SB)
GROSS AREA : 35,452 SF
/250 SF PER OCCUPANT
142 OCCUPANT PERMITTED
/200 SF PER PARKING
147 PARKINGS PROPOSED
(PLUS 10 RESERVOIR SPACES)



"0-5327

"0-101.00
09-OF-27



| EGRESS LOAD | |
|----------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| PARKING GARAGE | 140 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| B | 44*0.3 = 147 | 71 |
| E | 44*0.3 = 147 | 71 |
| TOTAL | 294 | 142 < 294 |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

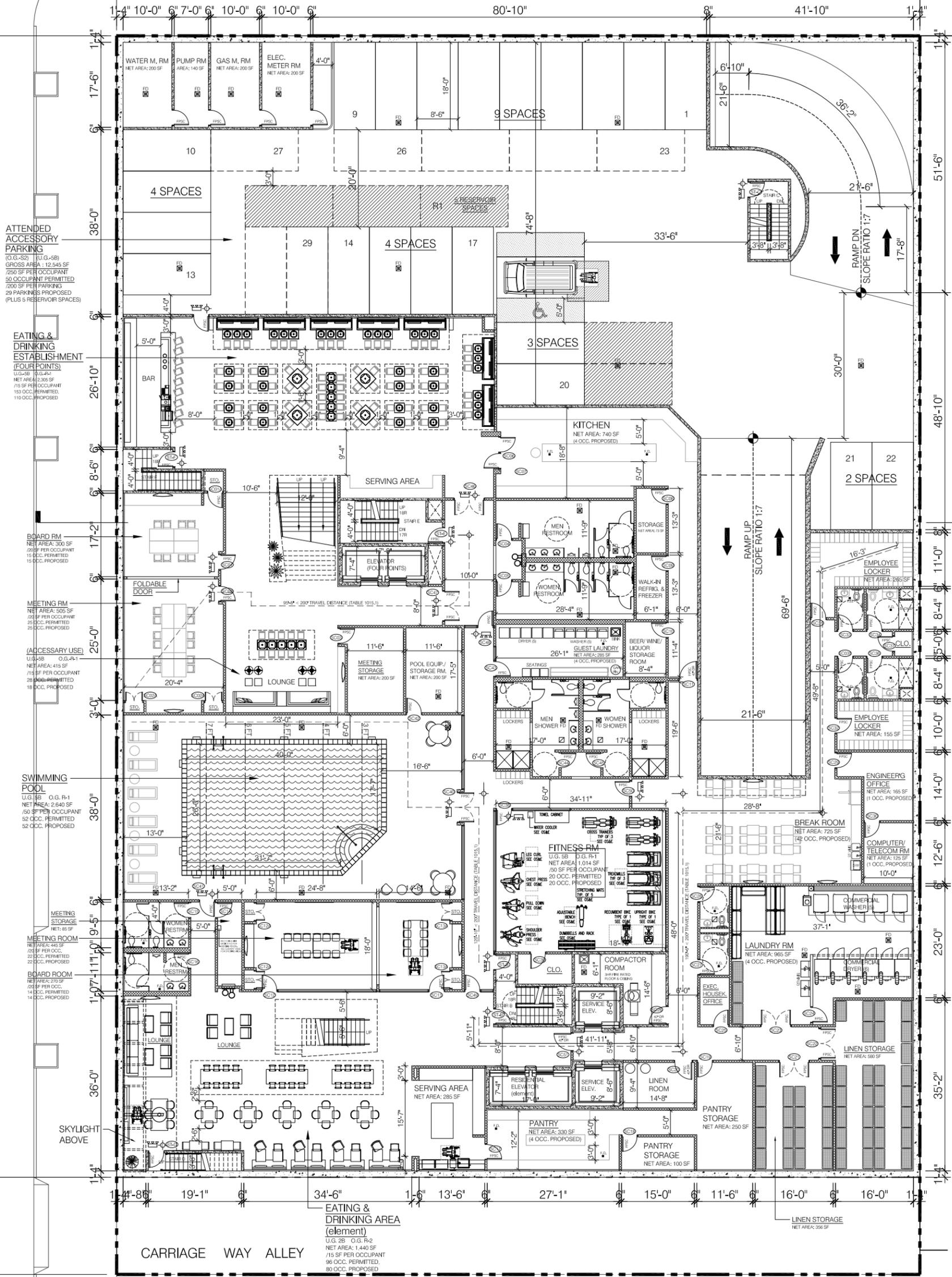
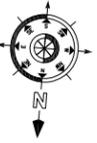
PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: SUB-CELLAR 2 (PARKING)
SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER:
VICTOR CESPEDES
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STRUCTURAL ENGINEER:
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T.E.R. (917) 518-3236 Fax: (718) 854-0016
SEAL & SIGNATURE:

RAYMOND C. HANON ARCHITECT P.C.

136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 465-2345 Fax: (718) 538-8609
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PROJECT NO.: 21045
PROJECT MANAGER: RCM
DRAWN BY: [Name]
DATE: 12/05/2013 DWG. NO.:
CADD FILE NO.: A-101.00
35TH AVENUE (21045) 09-OF-27
N.Y.C. D.O.B. NO. :



165'-0"

0 4' 8' 16' 32'

| EGRESS LOAD @ FOUR POINTS | |
|---------------------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| EATING & DRINKING: | 153 |
| DINING & LOUNGE | 40 |
| MEETING ROOM | 28 |
| LOUNGE | 28 |
| FITNESS CENTER | 10 |
| POOL | 26 |
| GUEST LAUNDRY | 2 |
| HOTEL LAUNDRY | 2 |
| BREAK ROOM | 21 |
| ENGINEERING/ | 1 |
| COMPUTER OFFICE | 4 |
| KITCHEN | 4 |
| PARKING GARAGE | 50 |
| TOTAL | 337 |

| EGRESS LOAD @ element | |
|-----------------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| EATING & DRINKING: | 96 |
| DINING & LOUNGE | 36 |
| MEETING ROOM | 10 |
| FITNESS CENTER | 26 |
| POOL | 2 |
| GUEST LAUNDRY | 2 |
| HOTEL LAUNDRY | 21 |
| BREAK ROOM | 1 |
| ENGINEERING/ | 4 |
| COMPUTER OFFICE | 198 |
| PANTRY ROOM | |
| TOTAL | |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| B | 44'0.3 = 147 | 130 |
| C | 44'0.3 = 147 | 25 |
| D | 44'0.3 = 147 | 68 |
| E | 48'0.3 = 160 | 156 |
| F | 48'0.3 = 160 | 156 |
| TOTAL | 748 | 535 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUILDINGS, ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: SUB-CELLAR 1
SCALE: 3/32" = 1'-0"

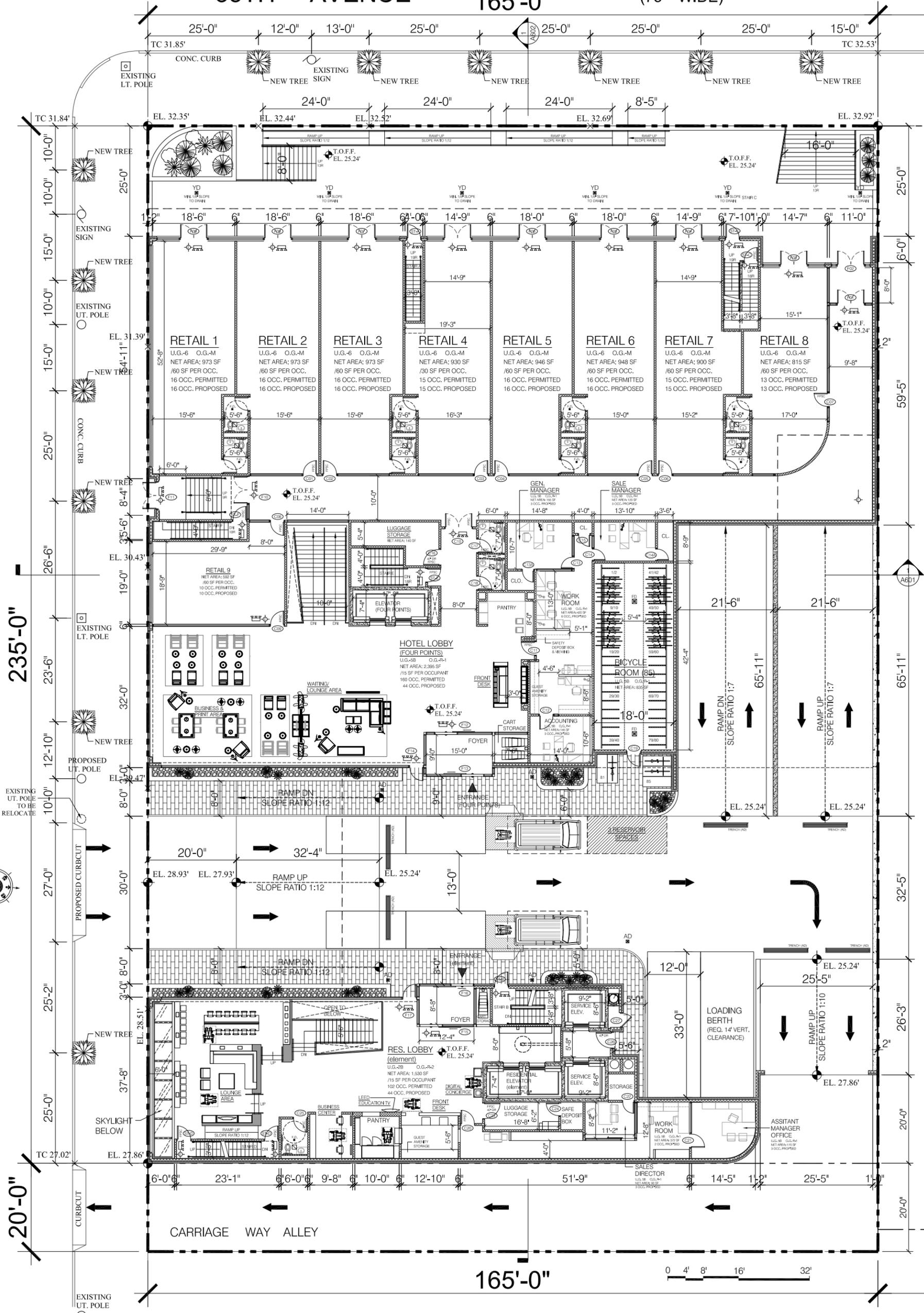
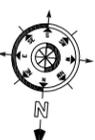
M.E.P. ENGINEER: VICTOR CESPEDES
Tel: (908) 788-0859 Fax: (908) 788-0859
STRUCTURAL ENGINEER: WAHLEUNG NG, P.E.
Tel: (917) 518-3236 Fax: (718) 854-4016
SEAL & SIGNATURE:

RAYMOND ARCHITECTS P.C.
136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 445-2345 Fax: (718) 558-8609
Web: www.raymondarchitects.com

PROJECT NO.: 2105
PROJECT MANAGER: RGA
DRAWN BY: 10-OF-27
DATE: 12/05/2013 DWG. NO.:
N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET (70' WIDE)



| EGRESS LOAD @ FOUR POINTS | | EGRESS LOAD @ element | | EGRESS STAIRS TABLE | | |
|---------------------------|-------------------------|-----------------------|-------------------------|---------------------|---------------------------|-------------------|
| USE | TOTAL OCCUPANT PROPOSED | USE | TOTAL OCCUPANT PROPOSED | STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| LOBBY | 160 | LOBBY | 102 | A | 44'0.3" = 147 | 42 |
| WORK ROOM | 6 | WORK ROOM | 2 | B | 44'0.3" = 147 | 130 |
| GENERAL MANAGER | 3 | ASSITANT MANAGER | 3 | C | 44'0.3" = 147 | 71 |
| SALES OFFICE | 3 | SALES DIRECTOR | 3 | D | 44'0.3" = 147 | 71 |
| ACCOUNTING OFFICE | 3 | TOTAL | 110 | D.1 | 44'0.3" = 147 | 27 |
| TOTAL | 175 | | | E | 48'0.3" = 160 | 156 |
| | | | | F | 48'0.3" = 160 | 156 |
| | | | | TOTAL | 1055 | |

| EGRESS LOAD @ RETAILS | |
|-----------------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| RETAILS | 133 |

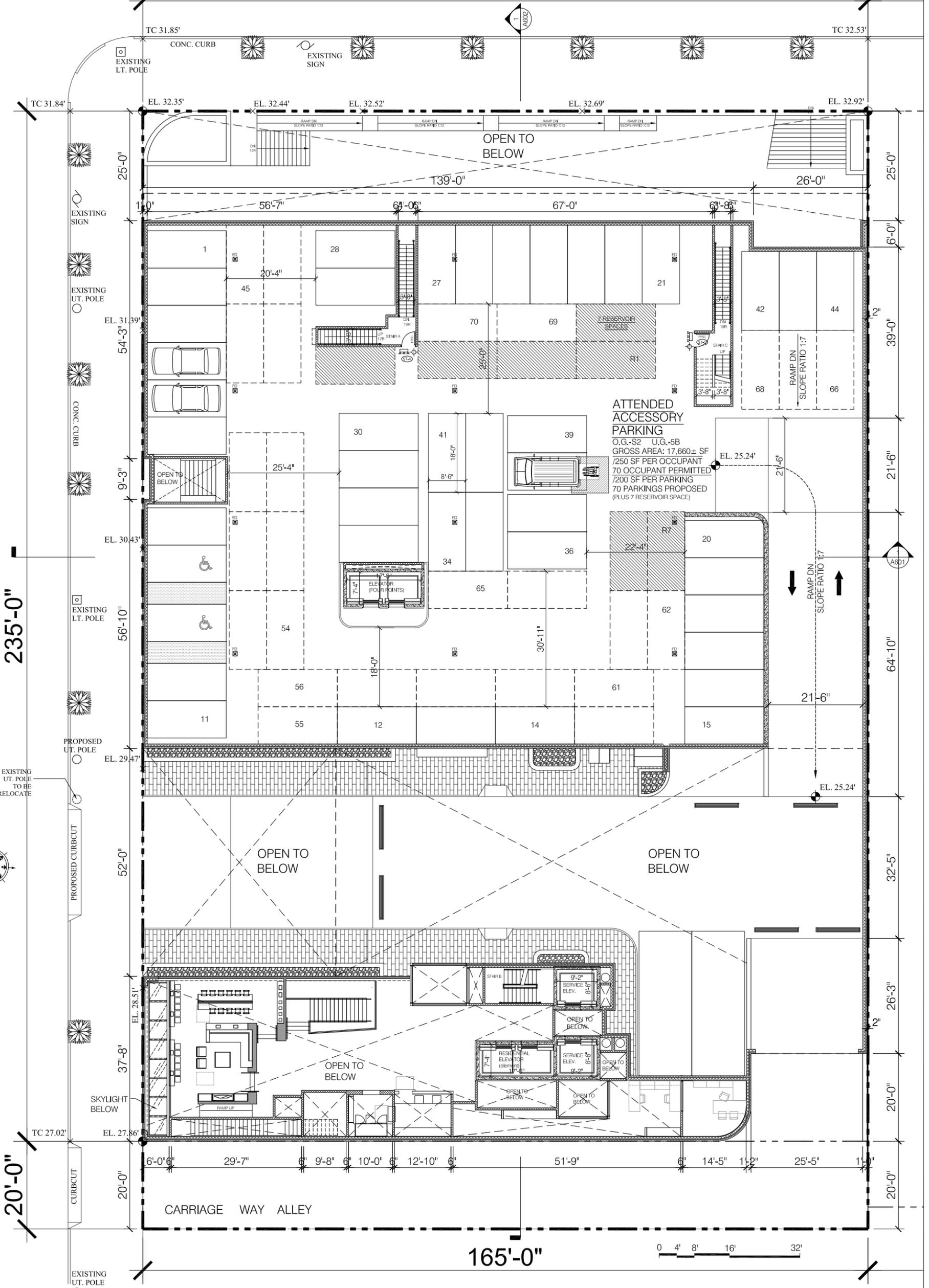
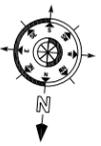
PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
CELLAR PLAN (GROUND FL)
SCALE: 3/32" = 1'-0"
M.P. ENGINEER: VICTOR CESPEDES, V.C.E., No. 00-11000
STRUCTURAL ENGINEER: WAHLEUNG NG, P.E., No. 00-11000
DATE: 12/05/2013
PROJECT MANAGER: RICHARD CHANG, No. 00-11000
DRAWN BY: JENNIFER CHANG
CADD FILE NO.: 11-OF-27
N.Y.C. D.O.B. NO.:



| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70' WIDE
"0-532"



| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| PARKING | 70 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44/0.3 = 147 | 35 |
| C | 44/0.3 = 147 | 35 |
| TOTAL | 294 | 70 < 294 |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.
PROJECT: 35TH AVE./FARRINGTON ST. HOTEL DEVELOPMENT
DRAWING TITLE: 1ST FLOOR PLAN
SCALE: 3/32" = 1'-0"

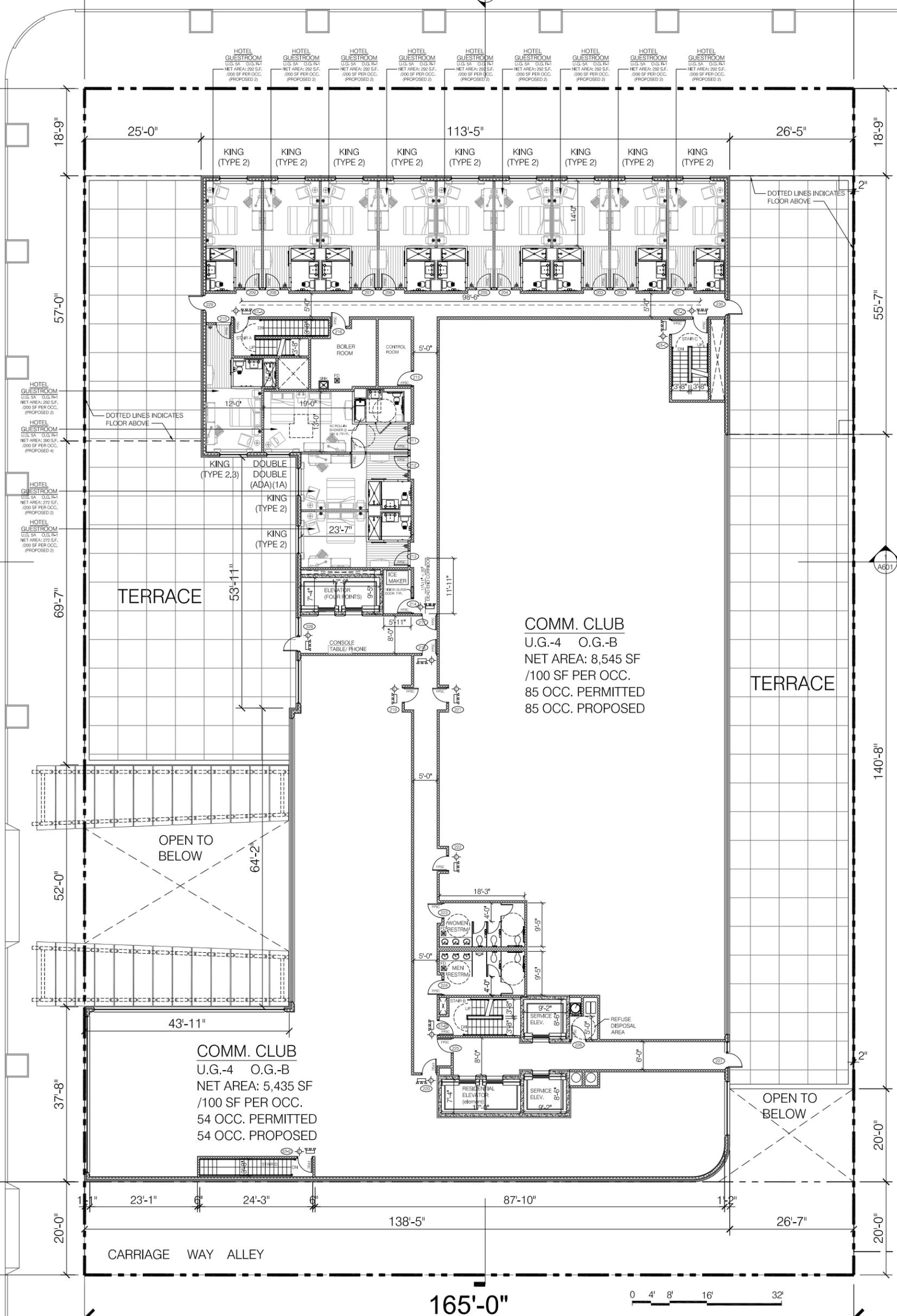
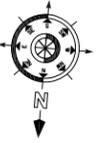
M.E.P. ENGINEER:
VICTOR GESPEDDES
E.L. (609) 789-0889 Fax: (609) 789-0889
STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
T.E.R. (917) 518-3236 Fax: (718) 854-0016
SEAL & SIGNATURE:

RAYMOND
C H A N
A R C H I T E C T
P.C.

136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 445-2345 Fax: (718) 558-8809
Web: www.raymondchanarchitect.com
DATE: 12/05/2013 DWG. No.:
PROJECT NO.: 21045
PROJECT MANAGER: RCH
DRAWN BY: 12-OF-27
CAD FILE NO.: 35TH AVENUE (21045)
N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET "0'-532" (70' WIDE)



COMM. CLUB
 U.G.-4 O.G.-B
 NET AREA: 8,545 SF
 /100 SF PER OCC.
 85 OCC. PERMITTED
 85 OCC. PROPOSED

COMM. CLUB
 U.G.-4 O.G.-B
 NET AREA: 5,435 SF
 /100 SF PER OCC.
 54 OCC. PERMITTED
 54 OCC. PROPOSED

2ND FLOOR (FOUR-POINTS)
 DOUBLE DOUBLE (ADA) (1A) (1)
 KING (2) (12)
 TOTAL GUEST ROOM = 13

| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 28 |
| COMM. CLUB | 139 |
| TOTAL | 167 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44'0.3" = 147 | 14 |
| B | 44'0.3" = 147 | 27+42=69 |
| C | 44'0.3" = 147 | 14+43=57 |
| D.1 | 44'0.3" = 147 | 27 |
| TOTAL | 588 | 167 < 588 |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUILDINGS ON ZONING AND BUILDING CODES.

PROJECT:
 35th AVE./FARRINGTON ST.
 HOTEL DEVELOPMENT
 35TH AVE./FARRINGTON ST., FLUSHING
 DRAWING TITLE:
2ND FLOOR PLAN
 SCALE: 3/32" = 1'-0"

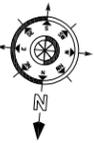
M.E.P. ENGINEER:
VICTOR CESPEDES
 TEL: (908) 788-0859 FAX: (908) 788-0859
 STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
 TEL: (917) 518-3236 FAX: (718) 854-0016
 SEAL & SIGNATURE:

RAYMOND ARCHITECT

136-40 39TH AVENUE
 FLUSHING, NEW YORK 11354
 TEL: (718) 465-2245 FAX: (718) 558-8609
 WWW: www.raymondarchitect.com
 DATE: 12/05/2013 DWG. NO.:
 PROJECT NO.: 2105
 PROJECT MANAGER: RCM
 DRAWN BY: A-105.00
 CADD FILE NO.: 13-OF-27
 N.Y.C. D.O.B. NO.:

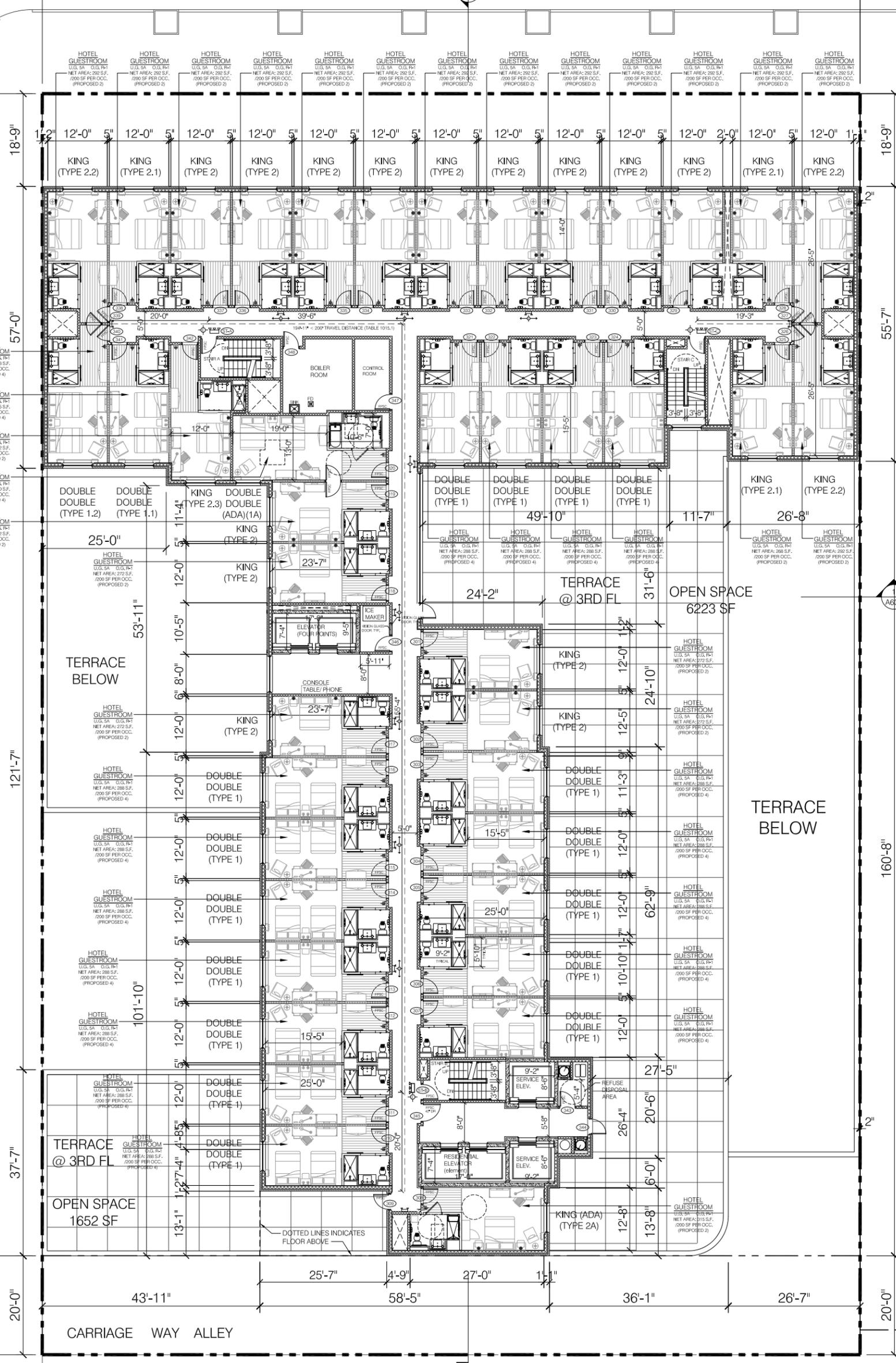
35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET (70' WIDE)



235'-0"

20'-0"



165'-0"

0 4' 8' 16' 32'

| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 122 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44*/0.3 = 147 | 41 |
| B | 44*/0.3 = 147 | 41 |
| C | 44*/0.3 = 147 | 40 |
| TOTAL | 441 | 122 < 441 |

| 3RD FLOOR (FOUR-POINTS) | |
|--------------------------|-------------|
| DOUBLE DOUBLE (1) | (18) |
| DOUBLE DOUBLE (ADA) (1A) | (1) |
| KING (2) | (21) |
| KING (ADA) (2A) | (1) |
| TOTAL GUEST ROOM | = 41 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: 3RD FLOOR PLAN
SCALE: 3/32" = 1'-0"

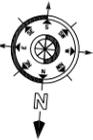
M.E.P. ENGINEER: VICTOR CESPEDES
STRUCTURAL ENGINEER: WAHLEUNG NG, P.E.
DATE: 12/05/2013 DWG. NO.:
PROJECT MANAGER: RICA
DRAWN BY: 14-OF-27
N.Y.C. D.O.B. NO. :



136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 465-2345
Fax: (718) 558-8809
Website: www.raymondarchitects.com
DATE: 12/05/2013 DWG. NO.:
PROJECT MANAGER: RICA
DRAWN BY: 14-OF-27
N.Y.C. D.O.B. NO. :

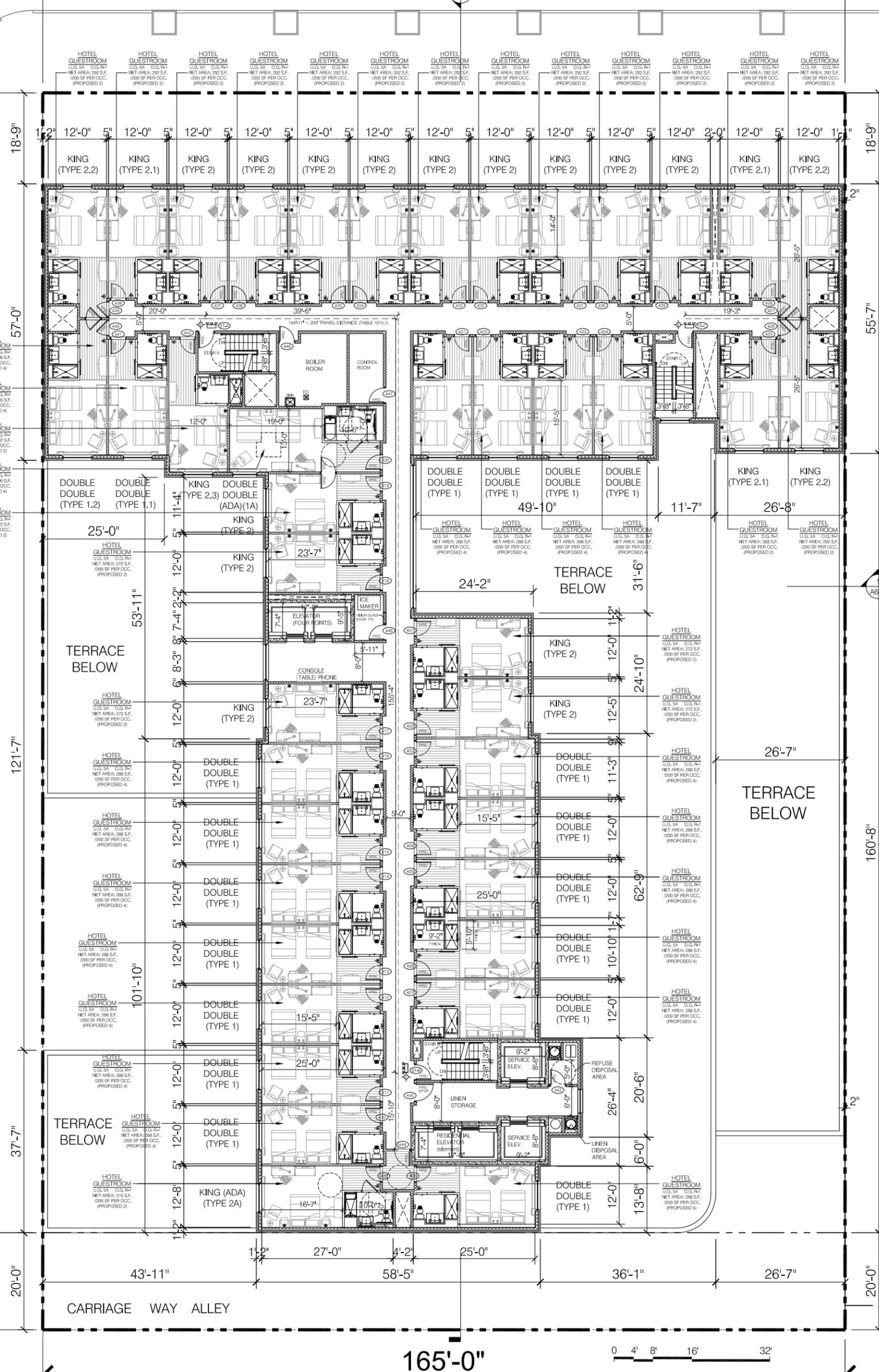
35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70' WIDE



23'-0"

20'-0"



165'-0"

0 4' 8' 16' 32'

| EGRESS LOAD | | |
|-------------|----------------|----------|
| USE | TOTAL OCCUPANT | PROPOSED |
| GUESTROOMS | | 124 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44'0.3 = 147 | 42 |
| B | 44'0.3 = 147 | 41 |
| C | 44'0.3 = 147 | 41 |
| TOTAL | 441 | 124 < 441 |

| 4TH FLOOR (FOUR-POINTS) | | |
|--------------------------|----------|-----------|
| DOUBLE DOUBLE (1) | (19) | |
| DOUBLE DOUBLE (ADA) (1A) | (1) | |
| KING (2) | (21) | |
| KING (ADA) (2A) | (1) | |
| TOTAL GUEST ROOM | = | 42 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUILDINGS ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: 4TH FLOOR PLAN
SCALE: 3/32" = 1'-0"

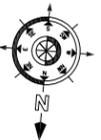
M.E.P. ENGINEER:
VICTOR CESPEDES
STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
SEAL & SIGNATURE:

RAYMOND ARCHITECT

136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 465-2345 Fax: (718) 558-8809
Email: raymond@raymondarchitect.com
Website: www.raymondarchitect.com
DATE: 12/05/2013 DWG. No.:
PROJECT No.: 21005
PROJECT MANAGER: RGA
DRAWN BY: A-107.00
CAD FILE NO.: 15-OF-27
N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

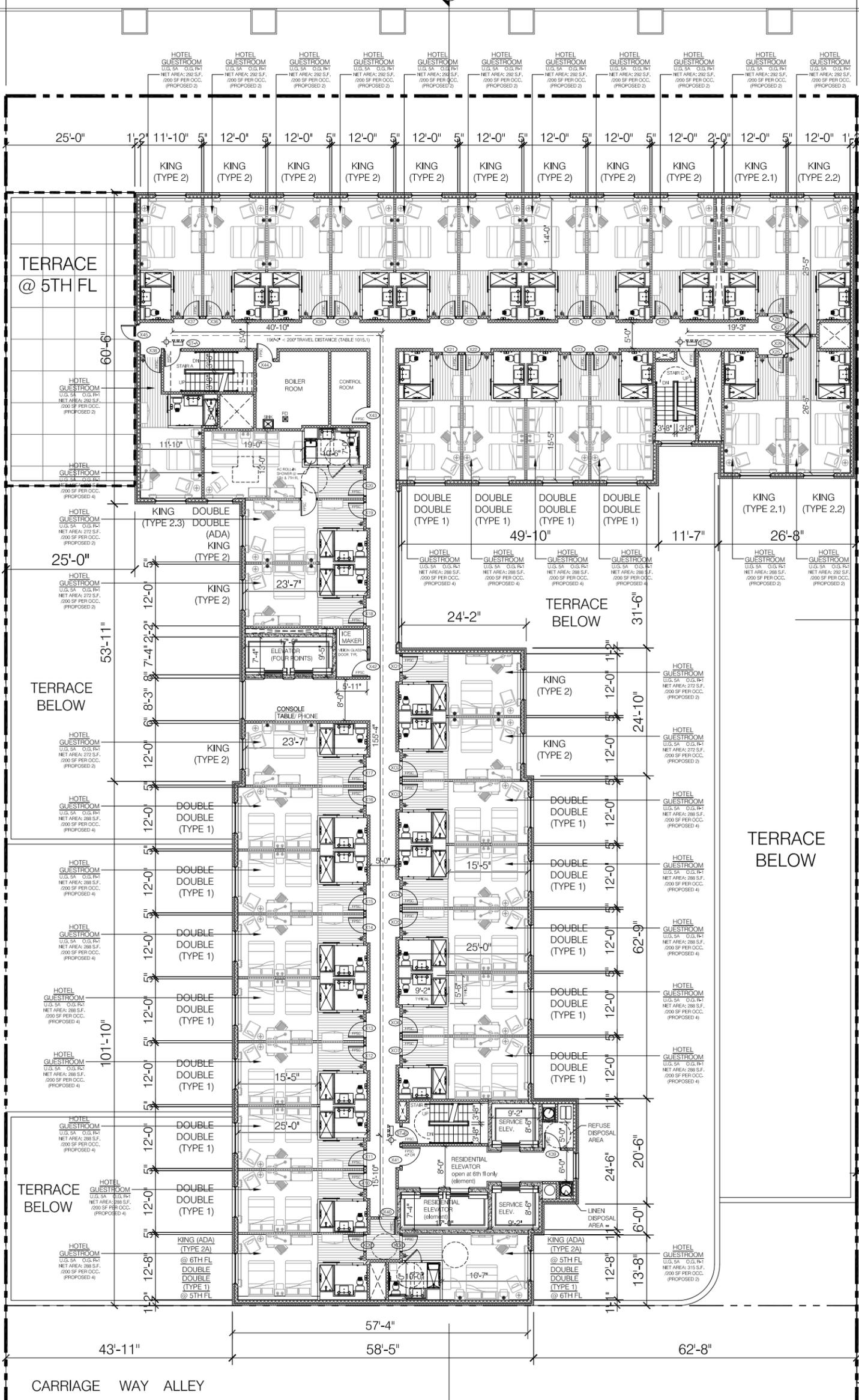
FARRINGTON STREET 70' WIDE
"0-532"



"20'-0"

165'-0"

0 4' 8' 16' 32'



| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 112 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44/0.3 = 147 | 38 |
| B | 44/0.3 = 147 | 37 |
| C | 44/0.3 = 147 | 37 |
| TOTAL | 441 | 112 < 441 |

| 5TH & 6TH FLR (FOUR-POINTS) | |
|-----------------------------|-------------|
| DOUBLE DOUBLE (1) | (17) |
| DOUBLE DOUBLE (ADA) (1A/1B) | (1) |
| KING (2) | (19) |
| KING (ADA) (2A) | (1) |
| TOTAL GUEST ROOM | = 38 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: 5TH & 6TH FL. PLAN
SCALE: 3/32" = 1'-0"

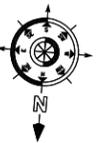
M.E.P. ENGINEER:
VICTOR CESPEDES
FAC. (908) 788-0889
ST. ENGINEER:
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FAX (718) 854-0016

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WWW.RAYMONDCHANARCHITECT.COM

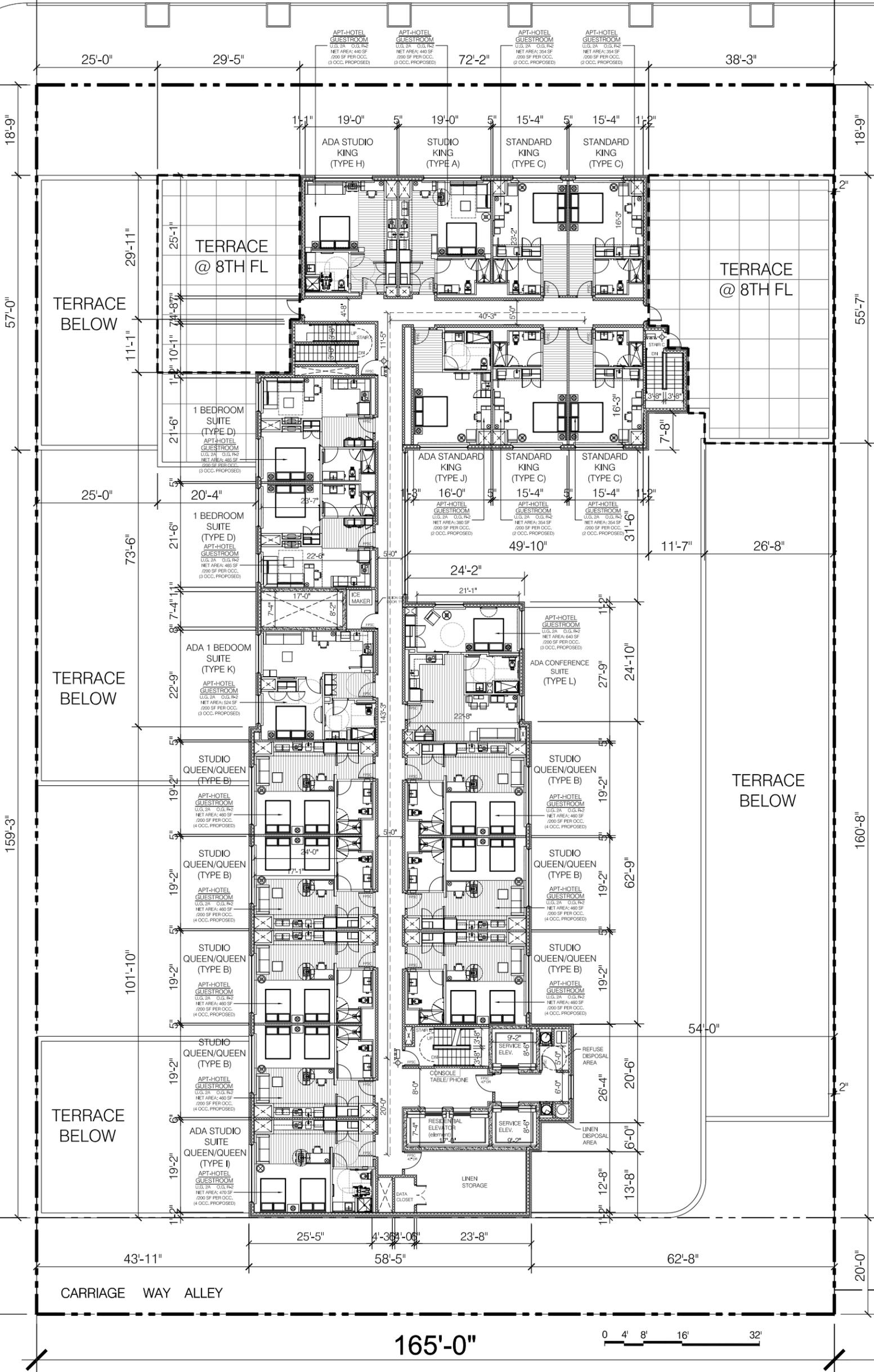
PROJECT NO.: 21045
PROJECT MANAGER: ROLAND
DRAWN BY: A-108.00
CADD FILE NO.: 16-OF-27
DATE: 12/05/2013 DWG. NO.:
N.Y.C. D.O.B. NO.:

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70' WIDE



20'-0"



| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 60 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44"/0.3 = 147 | 30 |
| B | 44"/0.3 = 147 | 30 |
| TOTAL | 294 | 60 < 294 |

| 8TH FLOOR (ELEMENT) | |
|----------------------------|-----------|
| STUDIO KING (A) | (1) |
| STUDIO QUEEN/QUEEN (B) | (7) |
| STANDARD KING (C) | (4) |
| 1 BEDROOM SUITE (D) | (2) |
| ADA STUDIO KING (H) | (1) |
| ADA STUDIO QUEEN/QUEEN (I) | (1) |
| ADA STANDARD KING (J) | (1) |
| ADA 1 BEDROOM SUITE (K) | (1) |
| ADA CONFERENCE SUITE (L) | (1) |
| TOTAL GUEST ROOM = | 19 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT 35TH AVE./FARRINGTON ST., FLUSHING

DRAWING TITLE: 8TH FLOOR PLAN

SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER: VICTOR CESPEDES TEL: (908) 788-0859 FAX: (908) 788-0859

STRUCTURAL ENGINEER: WAHLEUNG NG, P.E. TEL: (917) 518-3236 FAX: (718) 854-4016

SEAL & SIGNATURE:

RAYMOND ARCHITECT P.C.

136-40 39TH AVENUE FLUSHING, NEW YORK 11354

TEL: (718) 445-2245 FAX: (718) 558-8809

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PROJECT NO.: 2105

PROJECT MANAGER: RICA

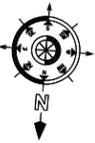
DRAWN BY: A-110.00

CADD FILE NO.: 18-OF-27

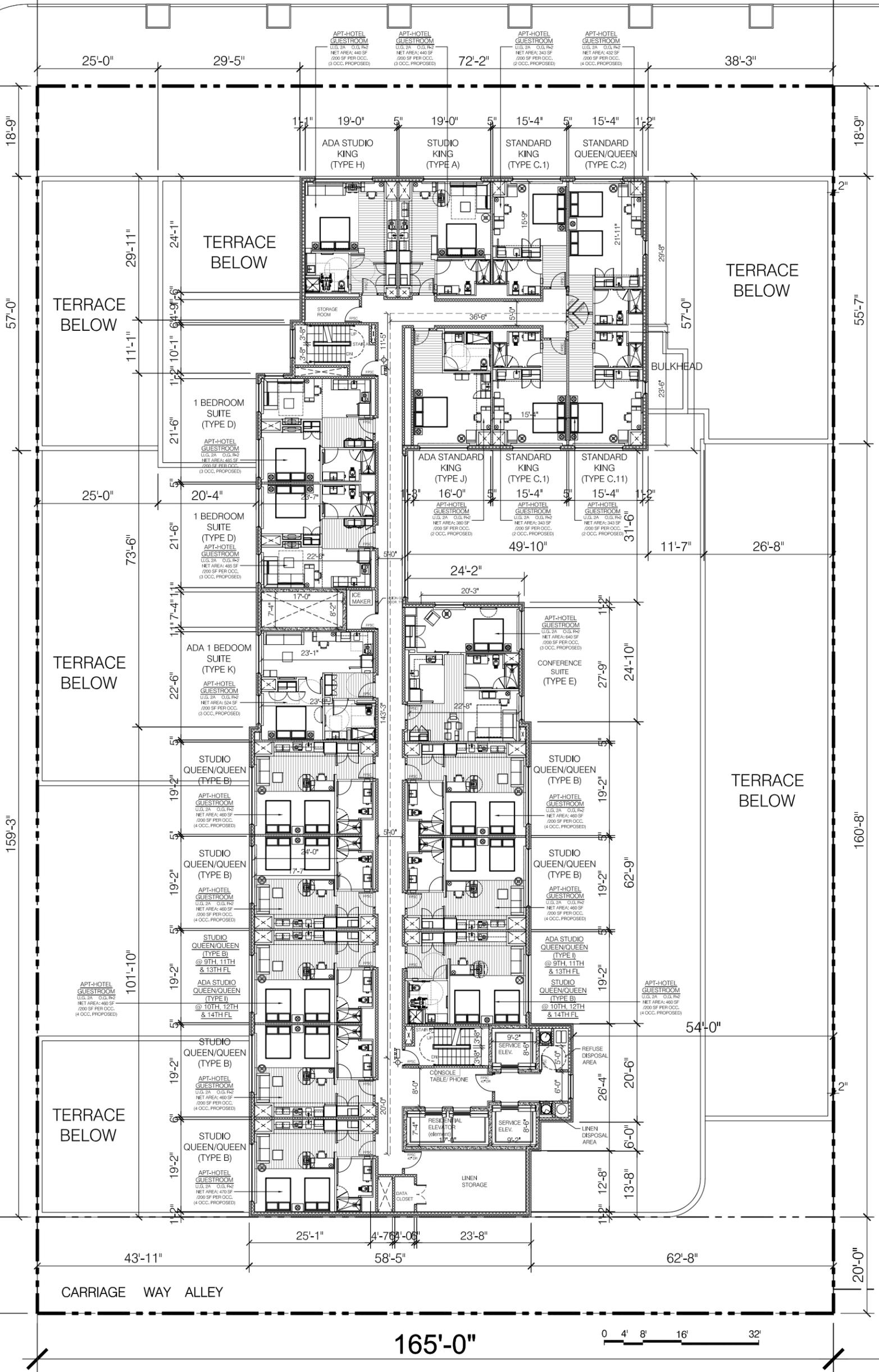
N.Y.C. D.O.B. NO. :

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70' WIDE



20'-0"



0 4' 8' 16' 32'

| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 62 |

| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44/0.3 = 147 | 31 |
| B | 44/0.3 = 147 | 31 |
| TOTAL | 294 | 62 < 294 |

| 9TH-14TH FLOOR (ELEMENT) | |
|----------------------------|-----|
| STUDIO KING (A) | (1) |
| STUDIO QUEEN/QUEEN (B) | (7) |
| STANDARD KING (C) | (2) |
| 1 BEDROOM SUITE (D) | (4) |
| CONFERENCE SUITE (E) | (1) |
| ADA STUDIO KING (H) | (1) |
| ADA STUDIO QUEEN/QUEEN (I) | (1) |
| ADA STANDARD KING (J) | (1) |
| ADA 1 BEDROOM SUITE (K) | (1) |
| TOTAL GUEST ROOM = | 19 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BUILDINGS ON ZONING AND BUILDING CODES.

PROJECT: 35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE: 9TH-14TH FL. PLAN
SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER:
VICTOR CESPEDES
TEL: (908) 788-0859 FAX: (908) 788-0859
STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
TEL: (917) 518-2326 FAX: (718) 854-0016
SEAL & SIGNATURE:

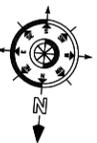


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FLUSHING, NEW YORK 11354
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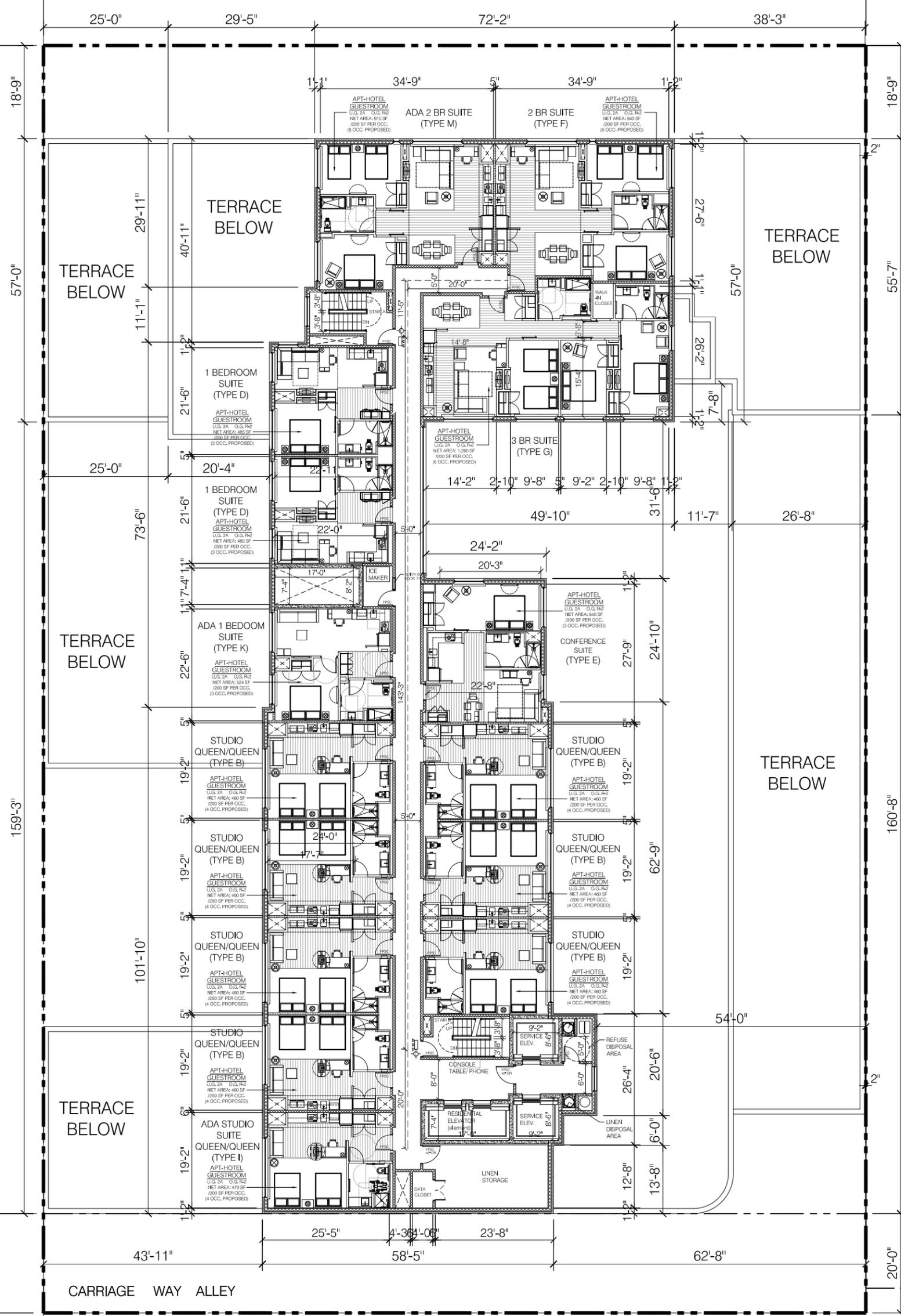
PROJECT NO.: 2105
PROJECT MANAGER: RCM
DRAWN BY: 19-OF-27
DATE: 12/05/2013 DWG. NO.:
N.Y.C. D.O.B. NO.:

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70' WIDE



20'-0"



165'-0"

0 4' 8' 16' 32'

PROJECT:
35th AVE./FARRINGTON ST.
HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING
DRAWING TITLE:
15TH FLOOR PLAN
SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER:
VICTOR CESPEDES
TEL: (908) 788-0859 FAX: (908) 788-0859
STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
TEL: (917) 518-3236 FAX: (718) 854-0016
SEAL & SIGNATURE:



136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
Tel: (718) 445-2245 Fax: (718) 558-8809
Web: www.raymondarchitect.com
DATE: 12/05/2013 DWG. NO.:
PROJECT NO.: 21045
PROJECT MANAGER: RCM
DRAWN BY: A-112.00
CAD FILE NO.: 20-OF-27
N.Y.C. D.O.B. NO. :

| EGRESS LOAD | |
|-------------|-------------------------|
| USE | TOTAL OCCUPANT PROPOSED |
| GUESTROOMS | 60 |

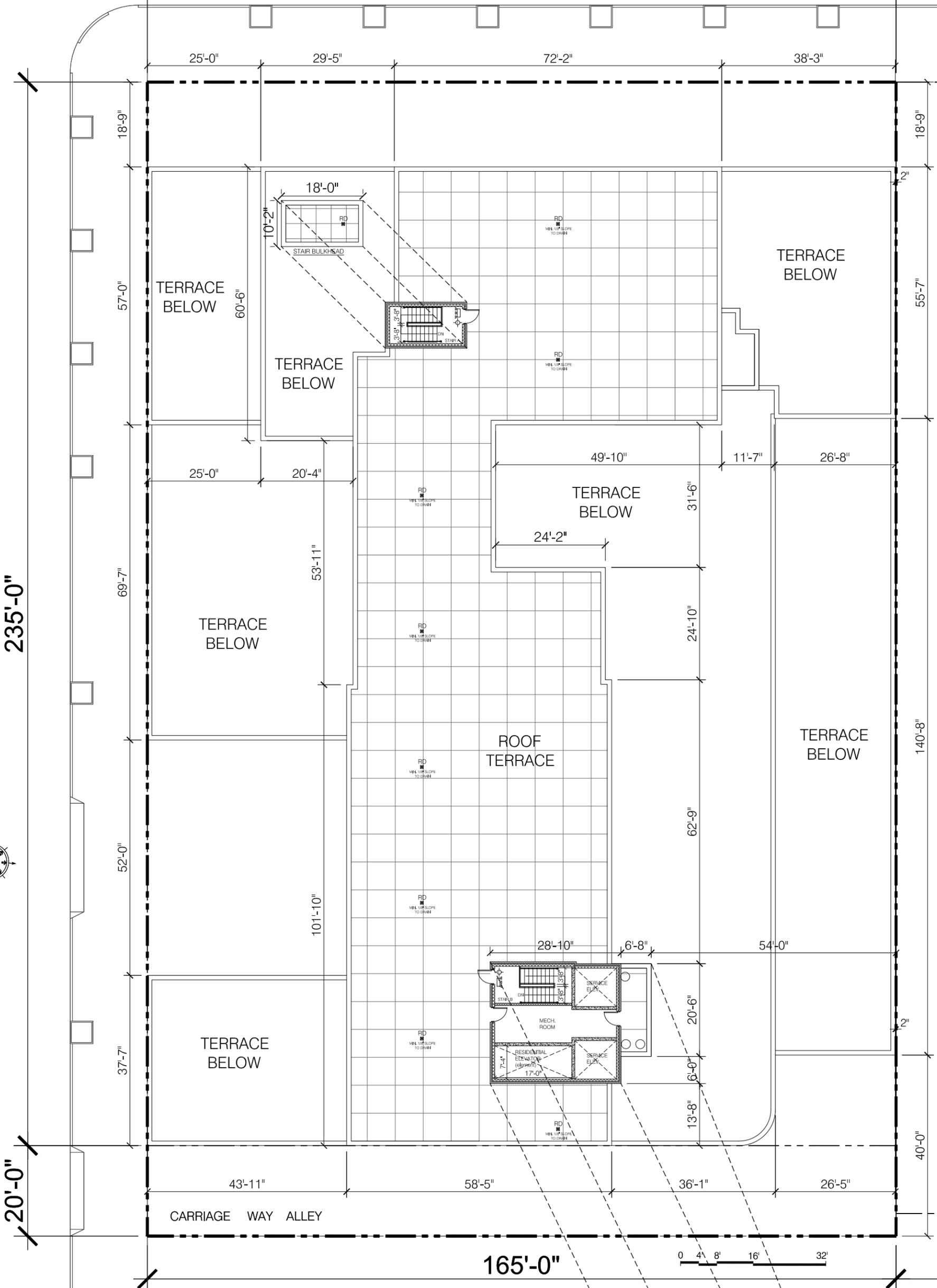
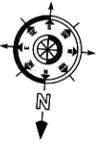
| EGRESS STAIRS TABLE | | |
|---------------------|---------------------------|-------------------|
| STAIR | ACTUAL OCCUPANT PERMITTED | OCCUPANT PROPOSED |
| A | 44"/0.3 = 147 | 30 |
| B | 44"/0.3 = 147 | 30 |
| TOTAL | 294 | 60 < 294 |

| 15 FLOOR (ELEMENT) | |
|----------------------------|-----------|
| STUDIO QUEEN/QUEEN (B) | (7) |
| 1 BEDROOM SUITE (D) | (2) |
| CONFERENCE SUITE (E) | (1) |
| 2 BEDROOM SUITE (F) | (1) |
| 3 BEDROOM SUITE (G) | (1) |
| ADA STUDIO QUEEN/QUEEN (I) | (1) |
| ADA 1 BEDROOM SUITE (K) | (1) |
| ADA 2 BEDROOM SUITE (M) | (1) |
| TOTAL GUEST ROOM = | 15 |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

35TH AVENUE 165'-0" (75' WIDE)

FARRINGTON STREET 70'-0" (70' WIDE)



| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL BE SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT:
35th AVE./FARRINGTON ST.
HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING

DRAWING TITLE:
ROOF PLAN

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

M.E.P. ENGINEER:
VICTOR CESPEDES
TEL: (908) 788-0859 FAX: (908) 788-0859
STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
TEL: (917) 518-3236 FAX: (718) 854-0016



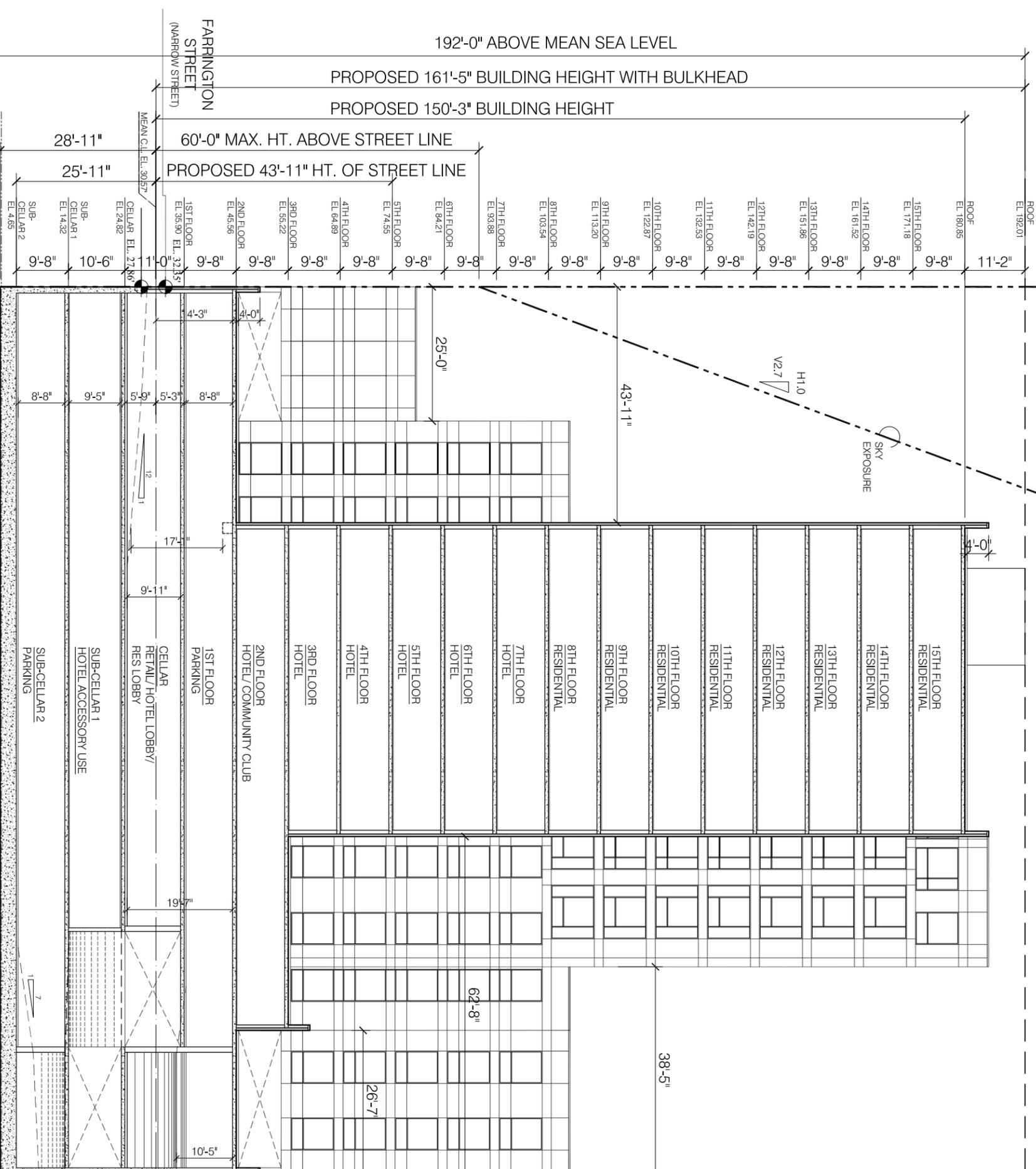
136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
TEL: (718) 465-2245 FAX: (718) 558-8809
WWW.RAYMONDARCHITECT.COM

DATE: 12/05/2013 DWG. NO.:
PROJECT NO.: 21045
PROJECT MANAGER: RICA
DRAWN BY: 21-OF-27
N.Y.C. D.O.B. NO. : A-113.00

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

PROPERTY LINE

PROPERTY LINE



MEAN CURB LEVEL CALCULATION

- MEAN CURB LEVEL AT FARRINGTON ST.
 $31.84 + 27.02 / 2 = 29.43$

- MEAN CURB LEVEL AT 35TH AVENUE
 $32.53 + 31.85 / 2 = 32.19$

$[A+B/2 \times a] + [B+C/2 \times b] =$
 $a + b$
 $[29.43 \times 235] + [32.19 \times 165] =$
 $235 + 165$
 $6,916.05 + 5,311.35 = 30.57'$
400

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS. ON ZONING AND BUILDING CODES.

PROJECT:
35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
 35TH AVE./FARRINGTON ST., FLUSHING

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

M.E.P. ENGINEER:
VICTOR CESPEDES
 TEL: (908) 788-0859 FAX: (908) 788-0859

STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
 TEL: (917) 518-3236 FAX: (718) 854-0016

SEAL & SIGNATURE:



ARCHITECTS • PLANNERS
RAYMOND CHAN ARCHITECT
 136-40 39TH AVENUE
 FLUSHING, NEW YORK 11354
 TEL: (718) 465-2345 FAX: (718) 558-8609
 E-MAIL: raymondchanarchitect.com
 WEB: www.raymondchanarchitect.com

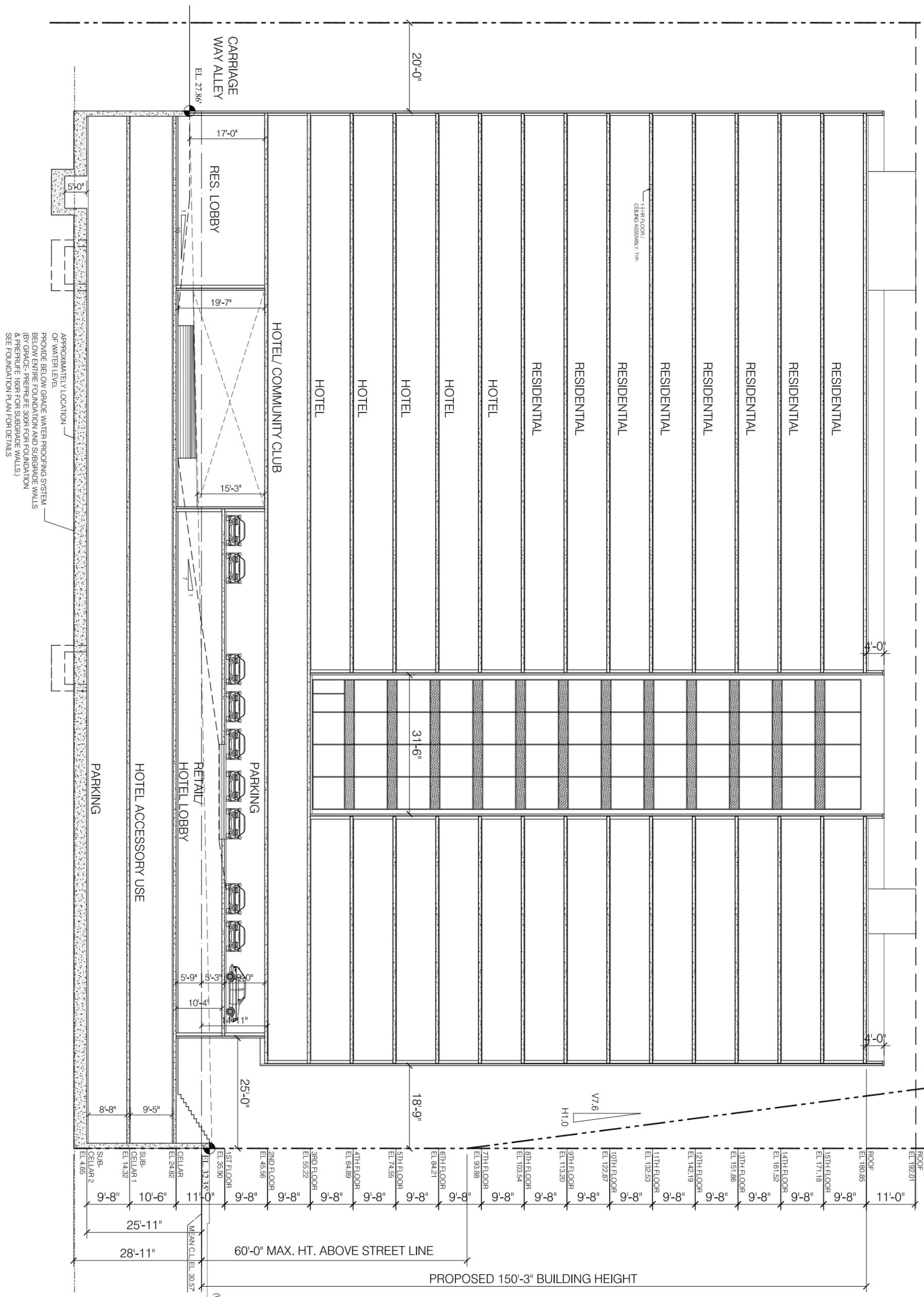
DATE: 12/05/2013 DWG. NO.:
 PROJECT NO.: 21045
 PROJECT MANAGER: RICHARD
 DRAWN BY: A-601.00
 CAD FILE NO.: 22-0F-27
 35TH AVENUE (21045)
 N.Y.C. D.O.B. NO. :

PROPERTY LINE

SKY EXPOSURE

PROPERTY LINE

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |



PROPOSED 150'-3" BUILDING HEIGHT

60'-0" MAX. HT. ABOVE STREET LINE

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PROJECT:
35th AVE./FARRINGTON ST. HOTEL DEVELOPMENT
35TH AVE./FARRINGTON ST., FLUSHING

DRAWING TITLE:
BUILDING SECTION

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

M.E.P. ENGINEER:
VICTOR CESPEDES
TEL: (908) 788-0859 FAX: (908) 788-0859

STRUCTURAL ENGINEER:
WAHLEUNG NG, P.E.
TEL: (917) 518-4236 FAX: (718) 864-4016

SEAL & SIGNATURE:



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ARCHITECT
136-40 39TH AVENUE
FLUSHING, NEW YORK 11354
TEL: (718) 465-2345 FAX: (718) 558-8609
WWW.RAYMONDCHANARCHITECT.COM

DATE: 12/05/2013 DWG. NO.:
PROJECT NO.: 21045
PROJECT MANAGER: RCM
DRAWN BY: A-602.00
CAD FILE NO.: 23-OF-27
N.Y.C. D.O.B. NO. :

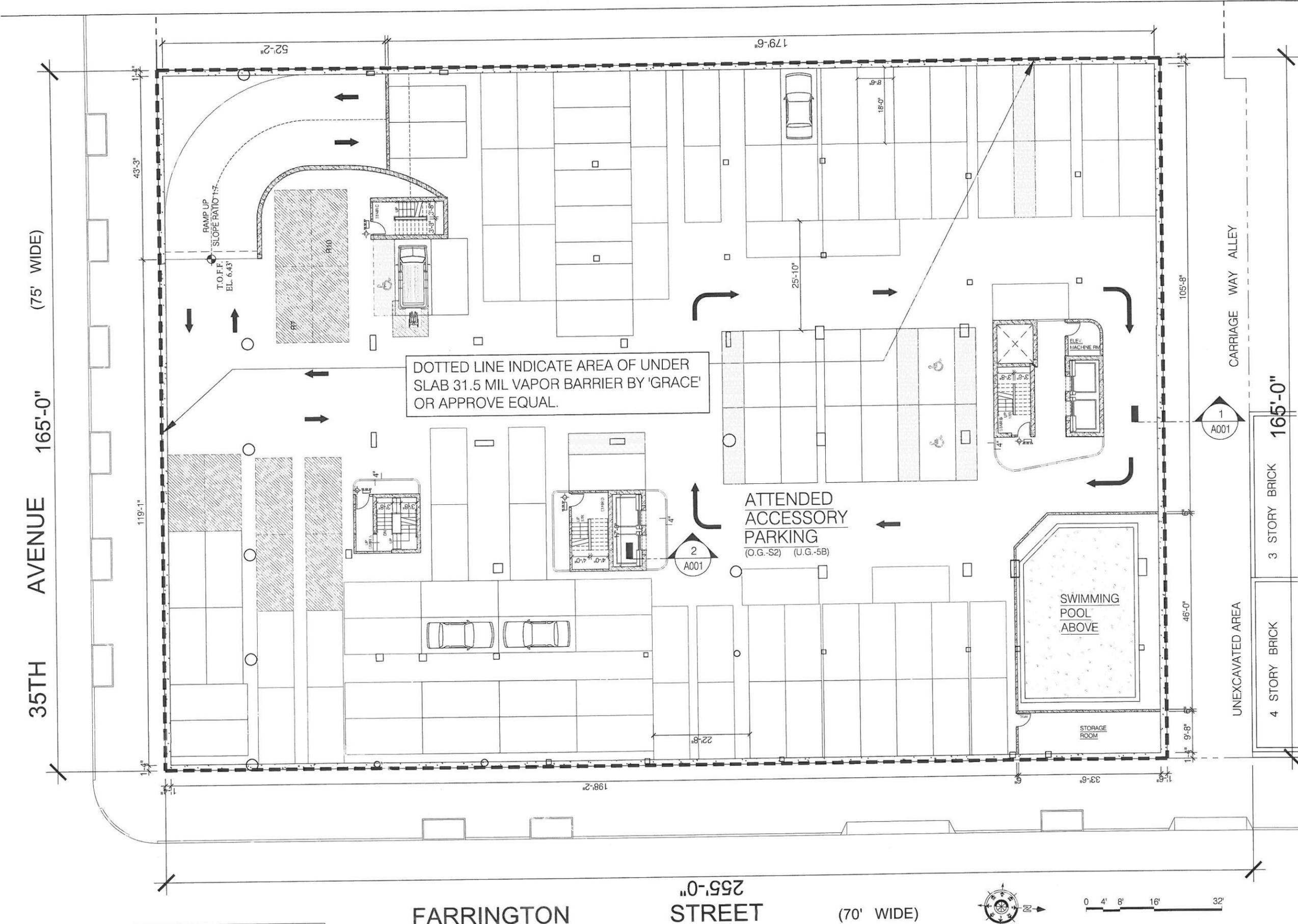
APPROXIMATELY LOCATION OF WATER LEVEL

PROVIDE BELOW GRADE WATER PROOFING SYSTEM BELOW ENTIRE FOUNDATION AND SUBGRADE WALLS (BY GRADE - PREPARE 300R FOR FOUNDATION & PREPARE 160R FOR SUBGRADE WALLS) SEE FOUNDATION PLAN FOR DETAILS

APPENDIX 4

**VAPOR BARRIER SPECIFICATIONS,
PRODUCT LITERATURE, AND
DESIGN DRAWINGS**

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |



NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS ON ZONING AND BUILDING CODES.

PROJECT:
35th AVE./FARRINGTON ST.
HOTEL DEVELOPMENT
35TH AVE./ FARRINGTON ST. FLUSHING

DRAWING TITLE:
SUB-CELLAR 2 (PARKING)
SCALE: 3/32" = 1'-0"

M.E.P. ENGINEER:
VICTOR CESPEDES
Tel: (908) 789-0859 Fax: (908) 789-0859

STRUCTURAL ENGINEER:
WAI-LEUNG NG, P.E.
Tel: (917) 518-3236 Fax: (718) 854-0016

SEAL & SIGNATURE:



136-40 39TH AVENUE FLUSHING, NEW YORK 11354
Tel: (718) 445-2345 Fax: (718) 359-8809
Email: info@raymondchanarchitect.com
Web: www.raymondchanarchitect.com

DATE: 01/09/2015 DWG. No.:
PROJECT No.: 21045
PROJECT MANAGER: RCA
DRAWN BY: E.L.
CADD FILE NO.: 35TH AVENUE (21045)
A-002.00
-OF-33

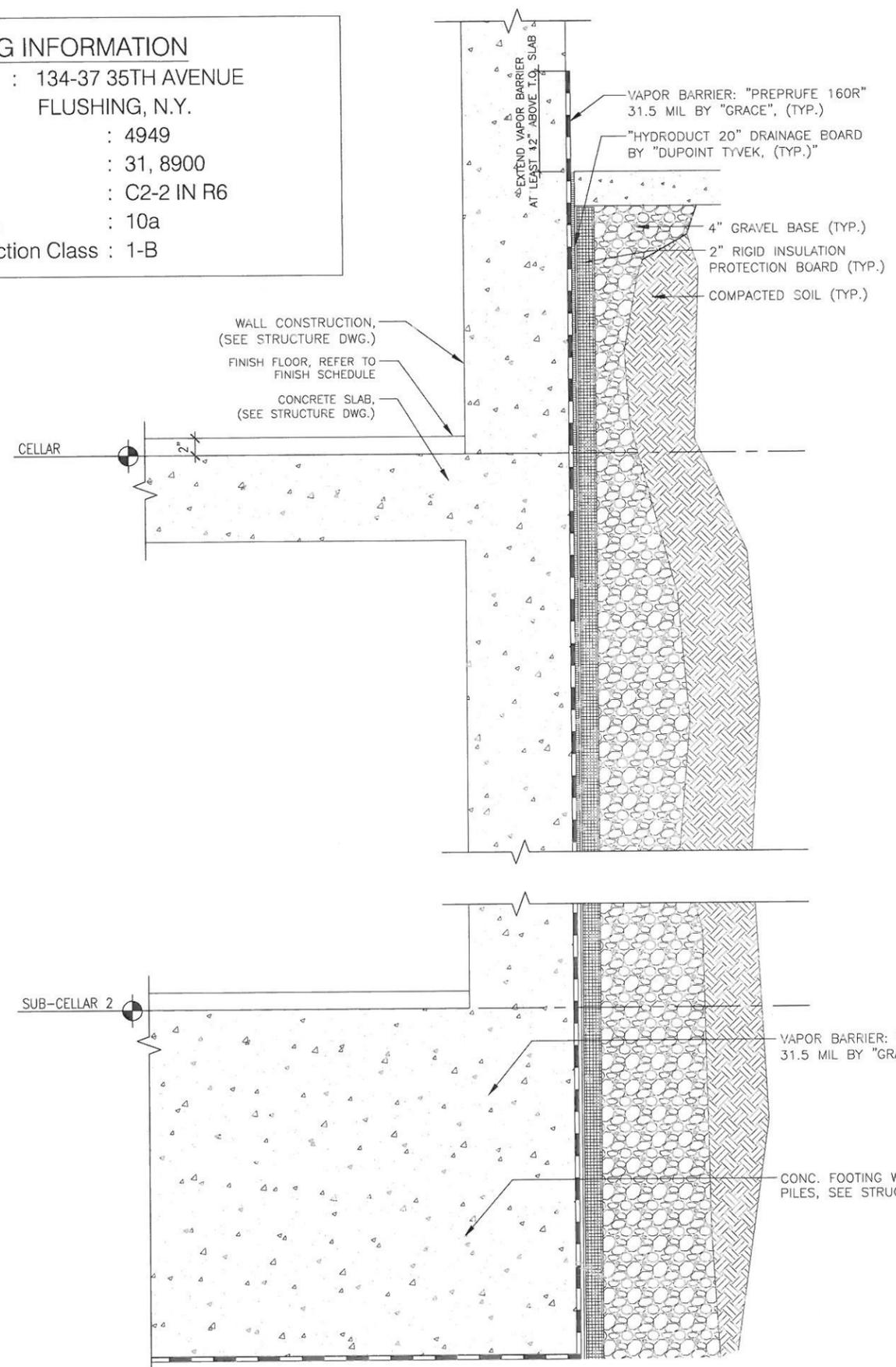
N.Y.C. D.O.B. NO. :
420892323

1 SUB-CELLAR 2 VAPOR BARRIER PLAN
SCALE: 3/32" = 1'-0"

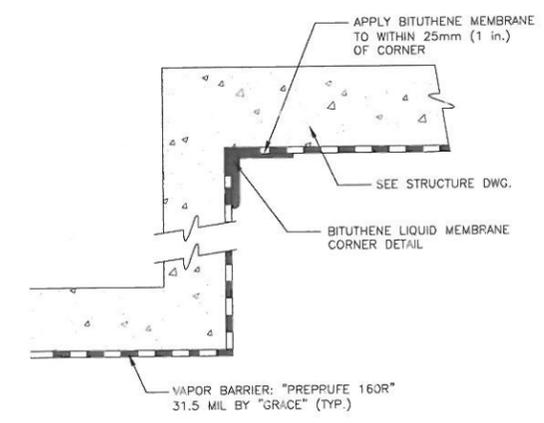
| No. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |

ZONING INFORMATION

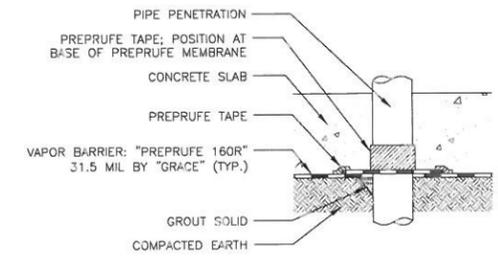
Address : 134-37 35TH AVENUE
 FLUSHING, N.Y.
 Block : 4949
 Lot : 31, 8900
 Zone : C2-2 IN R6
 Map No. : 10a
 Construction Class : 1-B



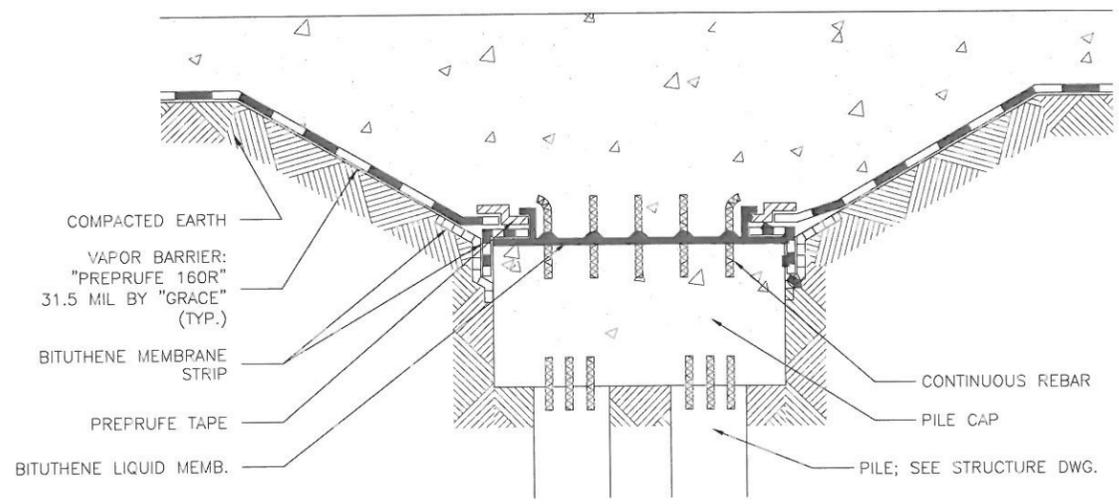
① TYPICAL DETAIL @ EXTERIOR WALL
 SCALE: 1 1/2" = 1'-0"



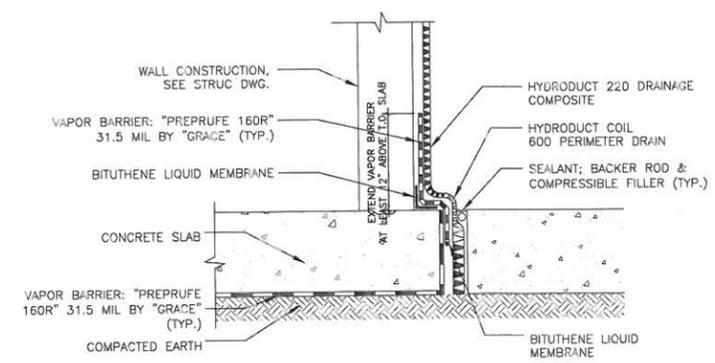
② TYPICAL DETAIL @ ELEVATOR PIT
 SCALE: NTS



③ TYPICAL DETAIL @ SLAB PENETRATION
 SCALE: NTS



④ TYPICAL DETAIL @ PIPE CAP
 SCALE: NTS



⑤ TYPICAL DETAIL @ SLAB JOINT
 SCALE: NTS

NOTE: THIS IS A SCHEMATIC DESIGN & SHALL SUBJECT TO REVIEW & INTERPRETATION BY NYC DEPT. OF BLDGS ON ZONING AND BUILDING CODES.

PROJECT:
 35th AVE./FARRINGTON ST.
 HOTEL DEVELOPMENT
 35TH AVE. / FARRINGTON ST. FLUSHING
 DRAWING TITLE:

VAPOR BARRIER DETAILS
 SCALE: NTS

M.E.P. ENGINEER:
VICTOR CESPEDES
 Tel: (908) 789-0859 Fax: (908) 789-0859

STRUCTURAL ENGINEER:
 WAH-LEUNG NG, P.E.
 Tel: (917) 518-3236 Fax: (718) 854-0016

SEAL & SIGNATURE:

RAYMOND CHAN ARCHITECT

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136-40 39TH AVENUE FLUSHING, NEW YORK 11354
 Tel: (718) 445-2345 Fax: (718) 359-8809
 Email: info@raymondchanarchitect.com
 Web: www.raymondchanarchitect.com

DATE: 01/09/2015 DWG. No.:
 PROJECT No.: 21045
 PROJECT MANAGER: PCA
 DRAWN BY: E.L.
 CADD FILE NO.:
 35TH AVENUE (21045)

N.Y.C. D.O.B. NO. :
 420892323

A-001.00
 -OF-33

PREPRUFE® 300R & 160R

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

Description

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

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

The Preprufe R System includes:

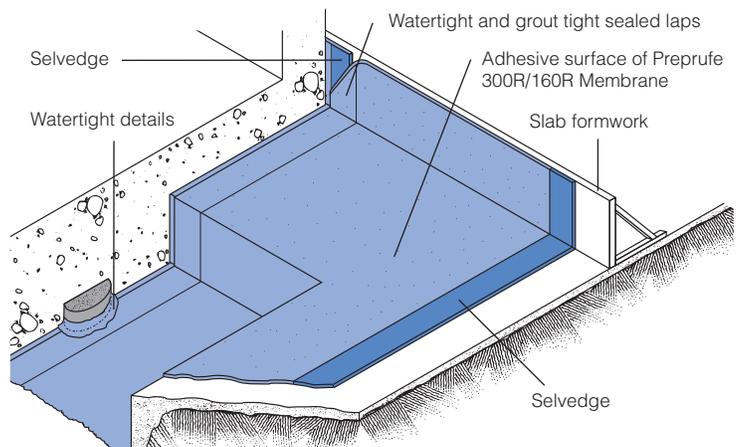
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT**—for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe Tape HC**—as above for use in Hot Climates (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane**—for sealing around penetrations, etc.
- **Adcor™ ES**—waterstop for joints in concrete walls and floors
- **Preprufe Tieback Covers**—preformed cover for soil retention wall tieback heads
- **Preprufe Preformed Corners**—preformed inside and outside corners

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

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

Advantages

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



Drawings are for illustration purposes only. Please refer to graceconstruction.com for specific application details.

Installation

The most current application instructions, detail drawings and technical letters can be viewed at graceconstruction.com. For other technical information contact your local Grace representative.

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

Substrate Preparation

All surfaces—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

Horizontal—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

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

Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe LT data sheet for more information.

Horizontal substrates—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

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

Refer to Grace Tech Letter 15 for information on suitable rebar chairs for Preprufe.

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to

overlap. Roll firmly to ensure a watertight seal.

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

Details

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

Membrane Repair

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

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

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

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

Refer to Grace Tech Letter 17 for information on removal of formwork for Preprufe.

Figure 1



Figure 2

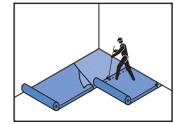
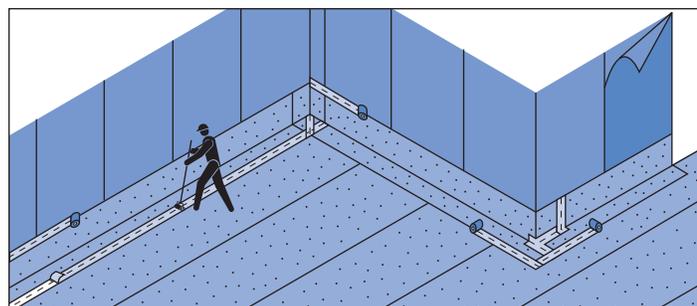
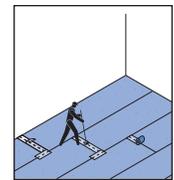


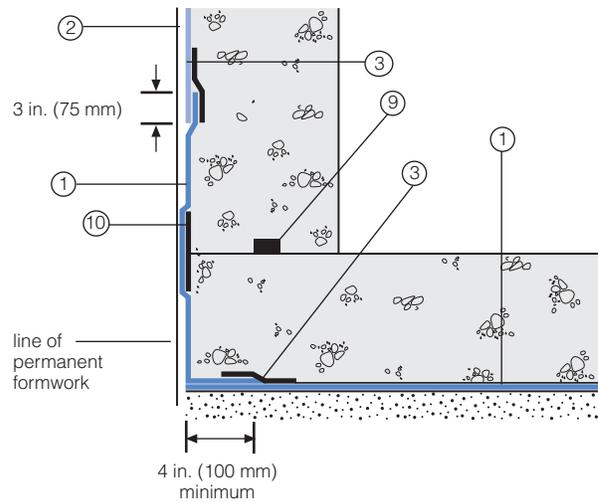
Figure 3



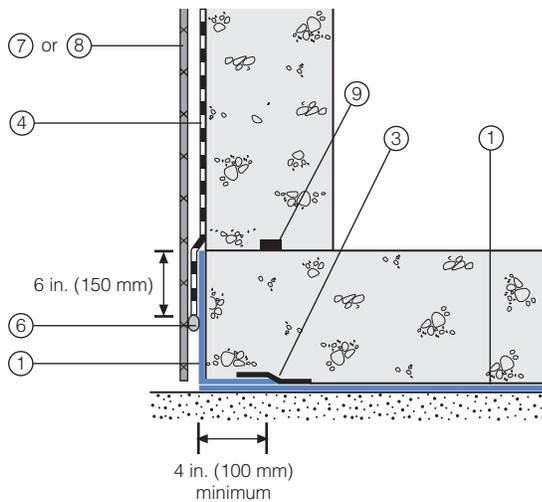
Detail Drawings

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

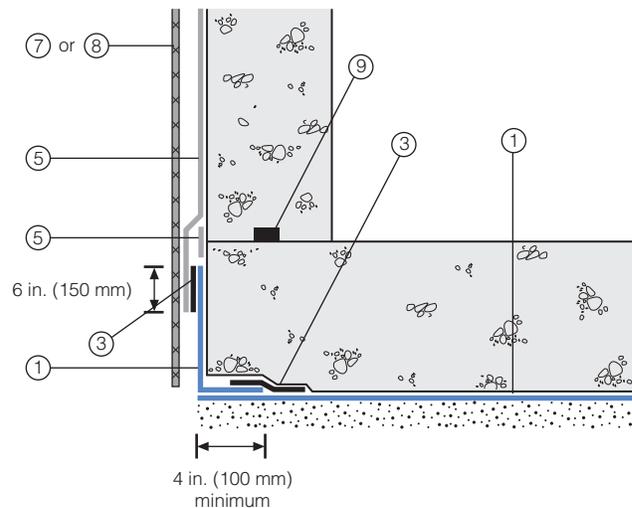
Wall base detail against permanent shutter



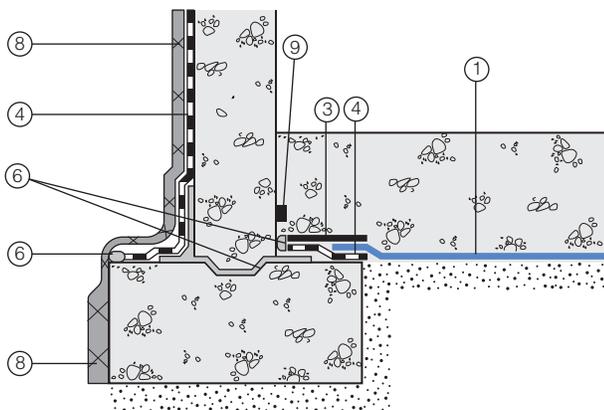
Bituthene wall base detail (Option 1)



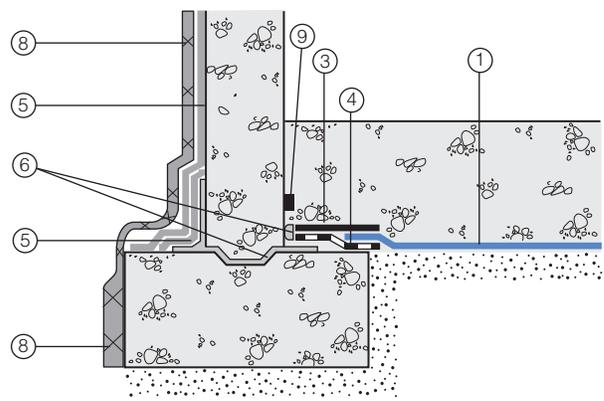
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



- 1 Preprufe 300R
- 2 Preprufe 160R
- 3 Preprufe Tape
- 4 Bituthene

- 5 Procor
- 6 Bituthene Liquid Membrane
- 7 Protection

- 8 Hydroduct®
- 9 Adcor ES
- 10 Preprufe CJ Tape

Supply

| Dimensions (Nominal) | Preprufe 300R Membrane | Preprufe 160R Membrane | Preprufe Tape (LT or HC*) |
|---|--|--|-------------------------------|
| Thickness | 0.046 in. (1.2 mm) | 0.032 in. (0.8 mm) | |
| Roll size | 4 ft x 98 ft (1.2 m x 30 m) | 4 ft x 115 ft (1.2 m x 35 m) | 4 in. x 49 ft (100 mm x 15 m) |
| Roll area | 392 ft ² (36 m ²) | 460 ft ² (42 m ²) | |
| Roll weight | 108 lbs (50 kg) | 92 lbs (42 kg) | 4.3 lbs (2 kg) |
| Minimum side/end laps | 3 in. (75 mm) | 3 in. (75 mm) | 3 in. (75 mm) |
| * LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C)) | | | |
| Ancillary Products | | | |
| Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter) | | | |

Physical Properties

| Property | Typical Value 300R | Typical Value 160R | Test Method |
|---|--|--|-----------------------------------|
| Color | white | white | |
| Thickness | 0.046 in. (1.2 mm) | 0.032 in. (0.8 mm) | ASTM D3767 |
| Lateral Water Migration Resistance | Pass at 231 ft (71 m) of hydrostatic head pressure | Pass at 231 ft (71 m) of hydrostatic head pressure | ASTM D5385, modified ¹ |
| Low temperature flexibility | Unaffected at -20°F (-29°C) | Unaffected at -20°F (-29°C) | ASTM D1970 |
| Resistance to hydrostatic head | 231 ft (71 m) | 231 ft (71 m) | ASTM D5385, modified ² |
| Elongation | 500% | 500% | ASTM D412, modified ³ |
| Tensile strength, film | 4000 psi (27.6 MPa) | 4000 psi (27.6 MPa) | ASTM D412 |
| Crack cycling at -9.4°F (-23°C), 100 cycles | Unaffected, Pass | Unaffected, Pass | ASTM C836 |
| Puncture resistance | 221 lbs (990 N) | 100 lbs (445 N) | ASTM E154 |
| Peel adhesion to concrete | 5 lbs/in. (880 N/m) | 5 lbs/in. (880 N/m) | ASTM D903, modified ⁴ |
| Lap peel adhesion | 5 lbs/in. (880 N/m) | 5 lbs/in. (880 N/m) | ASTM D1876, modified ⁵ |
| Permeance to water vapor transmission | 0.01 perms (0.6 ng/(Pa × s × m ²)) | 0.01 perms (0.6 ng/(Pa × s × m ²)) | ASTM E96, method B |
| Water absorption | 0.5% | 0.5% | ASTM D570 |

Footnotes:

- Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

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

Health and Safety

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

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

Adcor is a trademark and Preprufe, Bituthene and Hydroduct are registered trademarks of W. R. Grace & Co.—Conn. Procor is a U.S. registered trademark of W. R. Grace & Co.—Conn., and is used in Canada under license from PROCOR LIMITED.

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

This product may be covered by patents or patents pending.
PF-111H Printed in U.S.A. 07/12

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