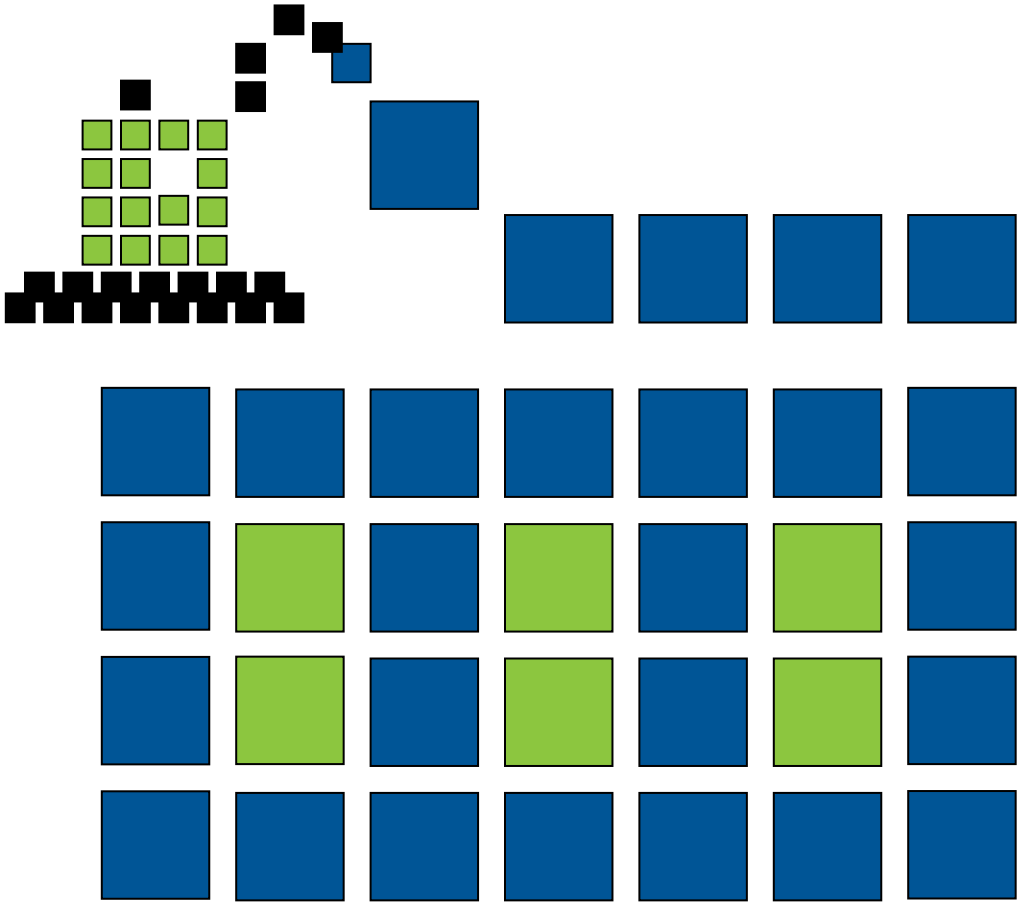
ARCHITECTURE & ENGINEERING
25-01 Jackson Avenue Long Island City, NY 11101

DESIGN REQUIREMENTS



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These Design Requirements are for the design of new schools and additions as well as modernizations of New York City Public Schools.

They cover specific materials, systems and equipment that the School Construction Authority and the Department of Education find both appropriate and economical. The use of these Requirements, in conjunction with the SCA Library of Standard Details, Room Planning Standards and Master Specification is intended to yield functional, economical and easy to maintain school buildings.

Deviation from these Requirements must receive written approval from the SCA. Notwithstanding this, the SCA welcomes, and in fact expects, suggestions for alternative methods or materials that may be more cost-effective or efficient.

Please note that each page of this document includes a footer indicating the appropriate application of each item for new construction, major modernizations and/or capital improvement projects.

Design and Planning:

Safety and flexibility are critical determinants in the Design and Planning of school facilities as are operability and ease of maintenance for the building management staff. For planning purposes, the architect must become familiar with the educational and operational needs of a school facility as well as the specific needs of the project.

Schools are frequently used by the community after regular school hours. Whenever possible, the location of common spaces should be planned for easy yet secure access. The building's location on the site should reflect desirable orientation and optimize the use of outdoor areas. The SCA/DOE **Design Guidelines** provide useful information concerning individual spaces and their adjacencies.

Those who give form to New York City's new public schools should be reminded by examples a century and more old of the lasting role their work will play in defining the social and physical character of the city's neighborhoods. As far as possible, a school should be an open, welcoming and positive presence in its community.

SECTION – 1

1.0 GENERAL

1.1 CONTRACT REQUIREMENTS

1.1.1 Drawings
1.1.1.1 Border Sheets
1.1.1.2 Drawing Numbering and Work Type Convention

1.1.2 Specifications
1.1.2.1 Specification Format and Instruction

1.1.3 Report Format
1.1.3.1 Feasibility Study – New Buildings, Additions and Conversions of Existing Buildings
1.1.3.2 Test Fit/Sketch Studies - New Buildings, Additions and Conversions of Existing Buildings

1.1.4 Design Presentations
1.1.4.1 Renderings **and** Photographs

1.1.5 Area Analysis
1.1.5.1 Building Areas - Educational spaces - Custodial spaces

1.2 (Intentionally Left Blank for future section)

1.3 PLANNING
1.3.1 Design
1.3.1.1 Building Location and Orientation
1.3.1.2 Planning Guidelines for New Schools and Additions
1.3.1.3 Square Footage Calculation – Building Efficiency
1.3.1.4 Signage
1.3.1.5 Typical Room Signage
1.3.1.6 Plumbing Fixture Count
1.3.1.7 Toilet Facilities
1.3.1.8 Refuse and Recycling Storage
1.3.1.9 Architectural Acoustic Standards
1.3.1.10 Compliance with NYC Energy Conservation Code (NYCECCLL LL51/32, LEED for Schools and NYC Green Schools Guide, Energy Modeling Studies, and CIP Project Energy Saving Calculations
1.3.1.11 Construction Requirements in Flood Hazard Areas
1.3.1.12 Interior Bicycle Storage
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1.3.1.16 Accessibility Design and Construction Tolerances
1.3.1.17 Compliance with NYC Energy Conservation Code (NYCECC) and NYC Green Schools Guide Building System Commissioning Requirements
1.3.1.18 Miscellaneous Architectural Drawing Requirements
1.3.1.19 **Planning Guidelines for Athletic Fieldhouses**

1.3.2 Construction
1.3.2.1 Construction Classification and Occupancy Classifications
1.3.2.2 Cellars, Crawl/Pipe and Duct Spaces, Slab on Grade Construction
1.3.2.3 Classroom/Office Wardrobe and Material Supply Closet Construction

1.3.3 Life Safety
1.3.3.1 Holding Area Rooms, Areas of Rescue Assistance and Fire Rescue Areas (Life Safety for Non-Ambulatory Persons)
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1.3.4 Circulation
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1.3.4.2 Vestibules and Lobbies
1.3.4.3 Corridors
1.3.4.4 Interior Stairs
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1.3.5.1 Cafeteria PK-8 and HS
1.3.5.2 Auditorium PK-8 and HS
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1.3.6 Food Services
1.3.6.1 Kitchen
1.3.6.2 Storage Space and Kitchen Staff Locker Rooms
1.3.6.3 Delivery Areas
1.3.6.4 Temporary Kitchens
1.3.6.5 Walk-In Refrigerators and Freezers
1.3.6.6 Tray Slide, Low Wall, and Serving Lines – Typical Heights
1.3.6.7 Cash Registers
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1.3.7 Natatoriums
1.3.7.1 Natatorium/Pool Design Criteria and Code Requirements

1.3.8 Design Approach and Filing Process with Public and Private Regulatory Authorities
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2.0 SITE CONSTRUCTION

2.1 PAVEMENTS
2.1.1 Asphalt and Concrete Pavements

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2.2.1 Fences, Gates and Railings
2.2.2 Guards at Mechanical Equipment

2.3 SITE EQUIPMENT
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2.3.2 Flagpoles
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3.0 STRUCTURAL SYSTEMS

3.1 DESIGN
3.1.1 Guidelines for New Foundation Design - High Water Table or Surface/Perched Water
3.1.2 Design Live Loads
3.1.3 Seismic Design Criteria
3.1.4 Vibration Criteria for Floor Construction
3.1.5 Miscellaneous Structural Drawing Requirements

3.2 FLOOR CONSTRUCTION
3.2.1 Waterproofing Systems for Foundations
3.2.2 Guidelines for Foundation and Slab Design
3.2.3 Concrete Reinforcement

3.3 SUPERSTRUCTURE
3.3.1 Economic Analysis of Structural Framing System
3.3.2 Structural Floor and Framing Systems
3.3.3 Structural Framing Systems for Roof Areas
3.3.4 Exterior Masonry Support System

SECTION – 4

4.0 BUILDING ENVELOPE

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4.2.2 Graffiti Control
4.2.3 Masonry Restoration: NY State Historic Preservation Office (SHPO)
4.2.4 Exterior Glass Block

4.3 WINDOWS
4.3.1 Window Types
4.3.2 Insect Screens
4.3.3 Window Guards (Exterior)

4.4 ROOFS

4.4.1 Roof Types
4.4.1.1 Flat Roofs
4.4.1.2 Roof-top Play Area

4.4.2 Roof Equipment and Accessories
4.4.2.1 Not used

4.4.2.2 Roof Equipment Service Access
4.4.2.3 Protection at Roof Equipment
4.4.2.4 Green/Play Roof Equipment Storage
4.4.2.5 Roof Equipment Installation

4.4.3 Roof Access
4.4.3.1 Roof Access

4.5 BULKHEADS
4.5.1 Stair Roof Bulkheads

4.6 EXTERIOR DOORS
4.6.1 Exterior Doors and Frames

SECTION – 5

5.0 INTERIORS

5.1 FINISHES
5.1.1 Typical Room Finishes

5.2 PARTITIONS
5.2.1 Concrete Masonry Units
5.2.2 Interior Partitions
5.2.3 Glazed Concrete Masonry Wall Units and Structural Glazed Facing Tile
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5.3 FLOORING
5.3.1 Floor Types

5.4 CEILING SYSTEMS
5.4.1 Suspended Ceilings

5.5 DOORS
5.5.1 Interior Doors and Frames
5.5.2 Rolling Grilles and Shutters in Kitchen Areas (or Warming Pantries)

5.6 CASEWORK
5.6.1 Casework

5.7 WINDOWS
5.7.1 Window Shades and Draperies
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5.8 INFORMATION SPECIALTIES
5.8.1. Interactive Whiteboards

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6.0 MECHANICAL SERVICES

6.1 PLUMBING

6.1.1 Kitchen Indirect Waste Piping
6.1.2 Acid Waste System – pH Neutralization
6.1.3 Piping Materials
6.1.4 Water Services for Domestic, Sprinkler and Standpipe Systems
6.1.5 Water Heaters
6.1.6 Backflow Prevention Device – Reduced Pressure Zone (RPZ)
6.1.7 Wall Hydrant Requirements for Window Washing and General Maintenance
6.1.8 Gas Service and Gas Meter Piping
6.1.9 Gas Valves/Master Gas Control Valve
6.1.10 Plumbing Fixture Mounting Heights
6.1.11 Storm Water Management
6.1.12 Gas Load Letter
6.1.13 P&D Seismic Design Criteria
6.1.14 Grease Interceptors and Oil Separators
6.1.15 Gas Boosting System
6.1.16 Potable Water Reduction – Compliance with LL **51/23**
6.1.17 Conveyance of Sanitary Waste from Plumbing Fixtures Located in Basement or Cellar Floors
6.1.18 Potable Water Sub-Metering
6.1.19 Management of Silver Halide Discharged from Plumbing Fixtures Located in Dark Rooms
6.1.20 Overpressure Protection Devices Stemming from Elevated Gas Pressure by the Serving Utility
6.1.21 Miscellaneous P&D Drawing Requirements
6.1.22 Domestic Hot Water Supply Piping - Maximum Length Requirements
6.1.23 Heat Pump Water Heaters
6.1.24 Thermal Bridges & Heated-Water Circulating Systems

6.2 HEATING, VENTILATION & AIR CONDITIONING

6.2.0 General Overview of Heating, Ventilation and Air Conditioning (HVAC) Systems
6.2.1 HVAC Unit Centralization and Coordination
6.2.2 Ductwork and Shafts
6.2.3 Non-Assembly Spaces (Classrooms, Offices, etc.)
6.2.4 Public Assembly Spaces
6.2.5 Considerations for Pre-Kindergarten, Kindergarten, 1st and 2nd Grade Classrooms
6.2.6 Convectors and Enclosures
6.2.7 Corridor HVAC Units
6.2.8 Wardrobe/Locker Ventilation
6.2.9 Heating and Cooling Design Parameters (Load Calculations)
6.2.10 Smoke Control, Smoke Venting and Post-Fire Smoke Purge Systems
~~6.2.11 Air Conditioning Existing School Buildings~~
6.2.12 Unit Ventilators (Existing School Buildings Only)
6.2.13 Arrangement and Sizing of Equipment
6.2.14 Fuel Oil Storage Tanks: Capacity and Room/Vault Ventilation
6.2.15 Cleaning and Inspection of Boilers and Chimneys
6.2.16 Fuel Burning Equipment
6.2.17 Gas Leak Detection and Alarm Systems
6.2.18 Not used
6.2.19 Boiler Burner Safety Considerations for Non-Condensing Boilers
6.2.20 Building Management System/Direct Digital Control BMS/DDC, BACnet DDC with Local BACnet Network and DDC Only Systems

6.2.21 Emergency Generator and Fuel Tank
6.2.22 Kitchen Ventilation
6.2.23 Ventilation requirements for Compressor Room of the Kitchen Walk-In Units
6.2.24 Kitchen Storeroom HVAC Requirements
6.2.25 HVAC Acoustical Standards
6.2.26 HVAC Seismic Design Criteria
6.2.27 Not Used
6.2.28 HVAC Design Requirements for Special Spaces
6.2.29 Not used
6.2.30 A2L Area Refrigeration Leak Detection and Ventilation System
6.2.31 Capital Improvement Projects (CIP): Climate Control/Ventilation Upgrades to Steam Heating and Ventilation (H&V) Units
6.2.32 Condensing Boiler Burner Safety and Operating Considerations
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6.2.34 Verification of HVAC System Design
6.2.35 Ducts Requiring Dedicated Shafts
6.2.36 Construction Document Requirements and Design Criteria for Refrigeration Systems
6.2.37 Not used
6.2.38 Miscellaneous HVAC Drawing Requirements
6.2.39 Split Heat Pumps, Packaged Heat Pump Vertical Unit Ventilators and Variable Refrigerant Flow (VRF) Systems for Occupied Spaces
6.2.40 Air to Water Heat Pumps (Chiller/Heaters)

6.3 FIRE PROTECTION
6.3.1 Sprinkler System Design
6.3.2 Fire Standpipe and Hose System Design
6.3.3 Sprinkler Floor Control Valve Assembly Location
6.3.4 Hydrant Flow Test
6.3.5 Fire Protection Seismic Design Criteria
6.3.6 Fire Protection Pump Selection
6.3.7 Miscellaneous Fire Protection Drawing Requirements

6.4 ELEVATORS
6.4.1 Elevator Design
6.4.2 Wheelchair Lift Design
6.4.3 Elevator Seismic Design Criteria

SECTION – 7

7.0 ELECTRICAL & COMMUNICATION SERVICES

7.1 POWER DISTRIBUTION
7.1.1 Electric Service
7.1.2 Emergency and Standby Generator
7.1.3 Receptacles
7.1.4 Kitchen Electrical Requirements
7.1.5 Lightning Protection
7.1.6 Miscellaneous Power Distribution Drawing Requirements

7.2 LIGHTING SYSTEMS
7.2.1 Interior Lighting
7.2.2 Stage and Platform Lighting for Primary and Intermediate Schools
7.2.3 Emergency Lighting

7.2.4 Exit Signs
7.2.5 Exterior/Site/Security Lighting
7.2.6 Athletic Fields/Sports Lighting

7.3 LOW VOLTAGE SYSTEMS
7.3.1 Fire Detection and Alarm System for School Buildings with Occupant Load <100
7.3.2 Not used
7.3.3 Main Telecommunications Room and Intermediate Telecommunication's Closet
7.3.4 Telephone System
7.3.5 Data Cabling Network
7.3.6 Intercommunication Systems
7.3.7 Not used
7.3.8 Sound, Intercommunication and Teacher Activated Security System
7.3.9 Clock System
7.3.10 Intrusion Alarm System
7.3.11 Not used
7.3.12 Auxiliary Signal System
7.3.13 Carbon Monoxide Detection and Alarm Systems
7.3.14 HVAC Remote Annunciation System
7.3.15 Fire Detection and Alarm System with Emergency Voice/Alarm Communication
7.3.16 Internet Protocol Digital Video Surveillance System (IPDVS) using Digital Cameras
7.3.17 Internet Protocol Digital Video Surveillance System (IPDVS) for Capacity Addition Projects
7.3.18 Miscellaneous Low Voltage Drawing Requirements

7.4 SEISMIC DESIGN
7.4.1 Electrical Seismic Design Criteria

SECTION – 8

8.0 SUSTAINABILITY AND RESILIENCY

8.1 SUSTAINABLE ROOF SYSTEMS
8.1.1 Sustainable Roofing Zone Determination
8.1.2 Sustainable Roofing Zone System Selection

8.2 RENEWABLE ENERGY SYSTEMS
8.2.1 Rooftop Solar Photovoltaic Systems
8.2.1.1 General Rooftop PV Requirements
8.2.1.2 Rooftop PV Regulatory Requirements

8.3 GREEN INFRASTUCTURE
8.3.1 Green Roofs

1.1 Contract Requirements

1.1.1 Drawings

1.1.1.1 Border Sheets

Description/Design Approach:

All Drawings prepared for the New York City School Construction Authority shall be on the Authority's Standard Border Sheets. The Designer shall use the appropriate sheet size and border format that will facilitate the project at an adequate scale.

A. Sheet Size:

- The preferred sheet size is 24" x 36". A **30**" x **42**" size sheet may be used when 1/8" scale floor plans would require a "match line" on the sheet due to the size of building footprint. The Authority's Design Manager must approve the use of a different size sheet.

B. Border Format:

- The preferred Border Format has one title block vertically aligned at the right side of the sheet.
- The alternative Border Format has one title block horizontally aligned along the bottom of the sheet. The Authority's Design Manager must approve the use of this sheet.

C. Drawing Key Notes:

Each of the above Border Sheets is annotated so that the Designer/User may provide the information required to be included on each of the Sheets.

1. Authority's Logo, President and Board of Trustees Names:
   - No editing required.
2. Authority's Vice President's & Director's Names for Architecture & Engineering:
   - No editing required.
3. Consultant Name(s) (If Applicable):
   - The name of the Consulting Architectural or Engineering Firms responsible for the design and drawing of the sheet shall be inserted in this area.

   Note: The "Title Sheet" shall be the only sheet used for listing and identifying all participating Architectural and Engineering Firms
4. Typical Drawing Note(s):
   - Two typical Drawing note boxes are shown, Box #1, "Preliminary not for Construction" and Box #2, "Note: Drawing may be printed at reduce scale."

a. Box #1 remains on the drawing for all submission prior to issuance of the actual bid set documents. This box shall be removed from the Bid Set prior to Bid and the final set for filing.

b. Box #2 remains on all drawings at all submissions including the Bid Set.

5. Drawing Revision Number(s), Date and Description:

- This box is reserved for Drawing revisions and changes after the issuance of the Bid Set. All revisions and changes to the drawings are bubbled and or clouded on the drawing. The revision is to be identified with a 1/4" triangle symbol and revision number depicted in the center of the triangle. The revision number, the date of the revision, and a short description of the revision is to be listed in this revision box.

Subsequent revisions and changes shall be numbered in consecutive order as indicated above.

6. Key Plan Box:

- A Key Plan of the building and site shall be provided in this location on all Drawings.

7. Project Contacts and Names:

- This area identifies the Authority's Project Contact and the Project Architect / Engineer of Record, as well as the Discipline Lead, Designer, Drafter and Checker of the Drawings. Responsible individuals shall be listed by their first name, full surname and licensing, if applicable. It also identifies the project number (Design or LLW No.), Facility Code and document date. The required contact /project names are as follows:

a. SCA Design Manager: Provide the Authority's Design Manager's name.

b. Project Architect/Engineer: Provide the name of the Discipline Design Lead (or) Partner In-charge, who is responsible for the design and development of the Drawing(s). This individual shall be a licensed professional, Architect or Engineer.

c. Discipline Lead: Provide the name of the Discipline Lead who is responsible for the design and development of the Drawing(s) for each discipline.

d. Designer: Provide the name of the Designer. The Designer shall be the individual(s) responsible for 51% or more of the design details on the Drawing.

e.	Drawn by:	Provide the name of the Drafter. The Drafter shall be the individual(s) responsible for 51% or more of the drawn details on the Drawing(s).
f.	Checked by:	Provide the name of the individual that checked the Drawing(s).
g.	Design No. or LLW No.:	All Capital Improvement Projects are assigned a Design Number by the Authority. All Capacity Projects are assigned a Low Level Work (LLW) Number by the Authority. Project Leads shall contact the Authority's Design Manager for this number. Edit the box and leave either *Design No.* or *LLW No*.
h.	Facility Code:	Each School has an alphanumeric Facility Code identifier; a letter for the borough and three numbers. Project Leads shall contact the Authority's Program Design Manager for this code.
i.	Date:	Insert the date of the drawing issue for Bid. This date and the date on the Project Specifications should be identical.

8. Project Name and Address:

   Provide the School Name, Project Name and School Address.

9. Drawing Title:

   Provide the name of the Drawing that highlights the main subject of the Drawing.

10. Seal:

    The Architect or Engineer of Record (Project Lead) shall affix their licensing seal on all Drawings for filing.

11. Drawing Number:

    Provide the Drawing Number in accordance with the Department of Building's Drawing Numbering System. Refer to DR 1.1.1.2.

12. Sheet Number in Contract Set:

    Provide the number for the Drawing that represents the sheet it is assigned in the Drawing Set and the total number of sheets in the Contract Set.

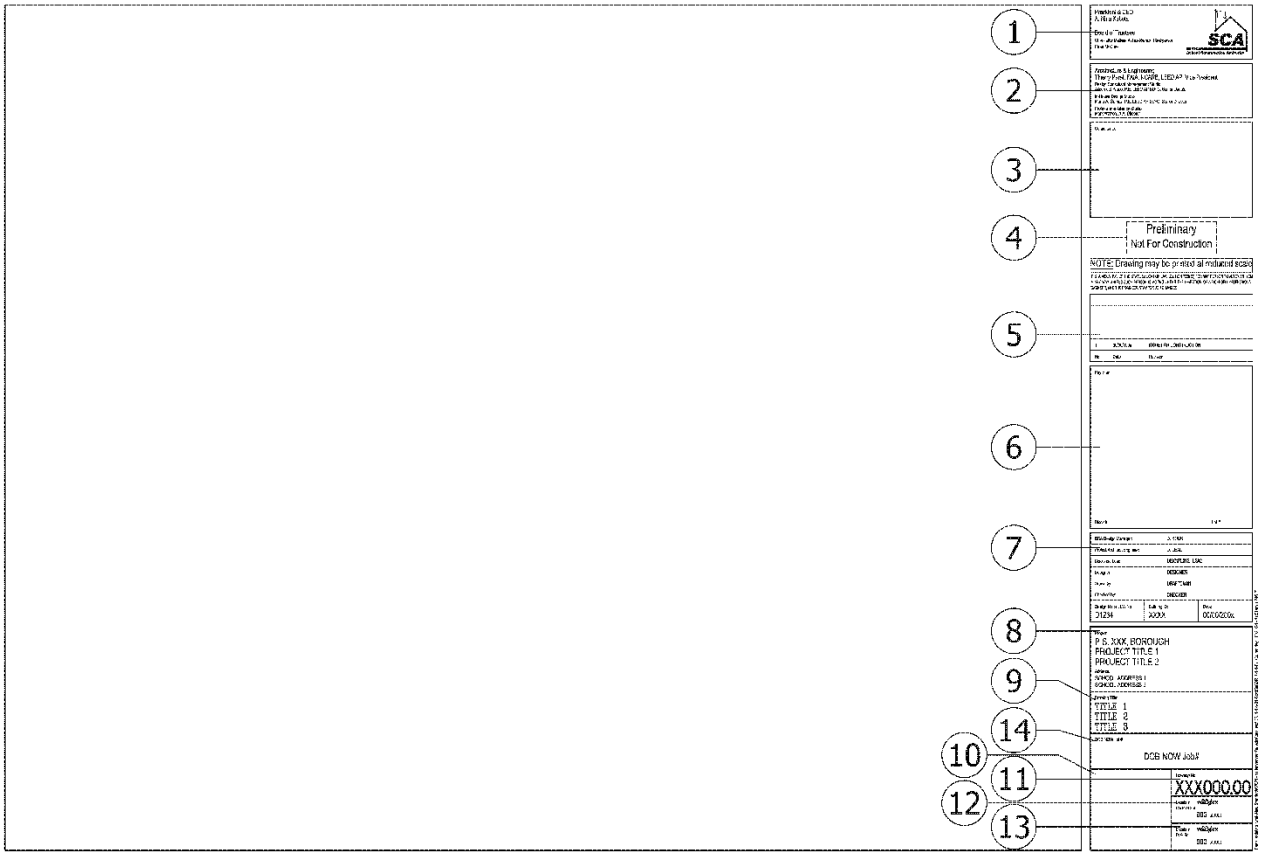
13. Sheet Number in DOB Filing Set:

    Provide the number for the Drawing that represents the sheet it is assigned in the Drawing Set and the total number of sheets in the Department of Building Filing Set.
    (This requirement will not be applicable to projects that are not required to be filed)

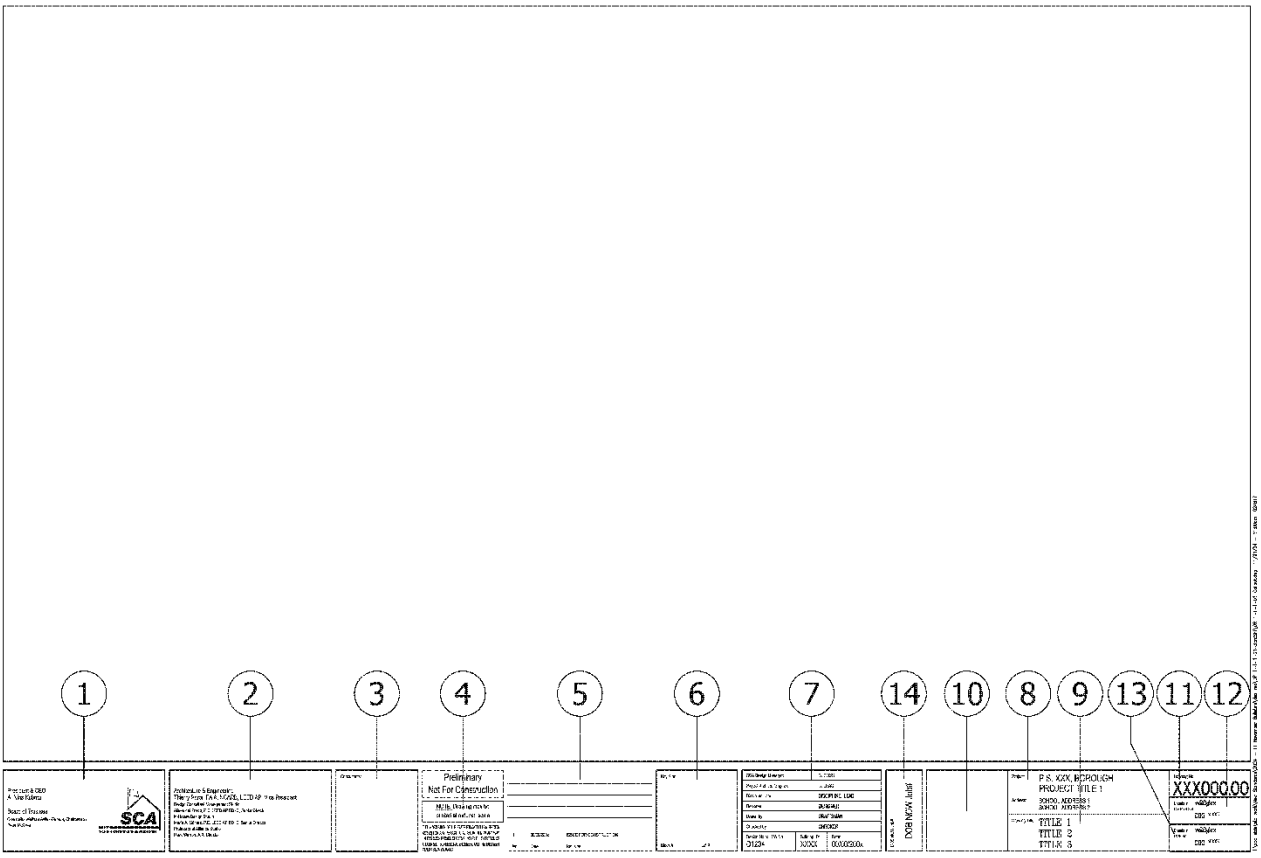
14. NYC DOB **Now** Job Number sticker:

    Provide the DOB Now Job number. Each work type for the project will have a different number.

TYPES OF BORDER SHEETS:
1. Vertical Alignment (Preferred)



2. Horizontal Alignment (Alternate)



Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

1.1 Contract Requirements

1.1.1 Drawings

1.1.1.2 Drawing Number and Work Type Convention

A. This "group numbering" system is intended to assign numbered sheets within the specific disciplines. The Department of Buildings has standardized requirements for the drawing title block including discipline designation and drawing numbering and thus the numbering is to follow the Department of Buildings Drawing Identification Number system. Only those drawings that are not filed with the DOB may deviate from the DOB Discipline Designator and are indicated in the table below.

B. A Drawing Number starts with a letter or letters indicating the discipline designator of the drawing (e.g., "A" for Architectural, "S" for Structural, etc.) followed by a three-digit drawing number. The sequential numbering sets of 3-digit numbers indicate standard grouping of drawings within the discipline. The first set starting at "001" is used for general notes, symbols and legends, and general clarification drawings. Subsequent sets are grouped in hundred series, i.e., 101, 201, 301 series, which correspond to types of drawings such as 101 series for floor plans, 201 series for elevations, 301 series for wall sections, 401 series for details, 901 series for schedules, etc. Numbering Sets vary for each discipline.

C. Following the three-digit drawing number is a revision decimal that starts with ".00." Each time there is a change to the approved document that is filed, the revision decimal is to be revised to .01, .02, etc. This revision decimal is also to be used in tracking the revisions with the date and description. However, the decimals will not be able to fit in the reference symbol bubble and may be omitted.

D. With the implementation of the Department of Buildings submittal portal, DOB NOW, documents are required to be filed by work type (GC, ST, MS, Existing BE, New BE, EN, etc.). The Initial Application (I1) is considered the main application and is typically the GC Work Type, though for a CIP project that may be mostly an HVAC project such as a Ventilation Upgrade or Boiler project, other work types can be the I1, such as MS or Existing BE. Other applications are then filed as subsequent work types (i.e., S1, S2, S3, etc.). Drawings can refer to other applications where reasonable to avoid duplication of information. There are cases where minor work that is generally GC work type but requires an inspection that is only available for the ST work type can be filed as a GC/ST work type as allowed by DOB NOW. Also, for ease of filing Designers may combine work types that are permitted by the DOB NOW system to be combined.

E. Sheet numbering conventions and numbering sets are shown in the following table. Those not shown but are required for a specific project shall follow DOB guidelines. The T series drawings apply to the entire project and include the cover sheet and are filed with the Initial Application (I1). For the list of drawings to be filed under the other Work Types, the T drawing shall refer to the other trade drawings for the list. Each work type is to have the first drawings of the trade (e.g., S001, M001, etc.) to have the list of drawings for that work type as well as the list of special and progress inspections for that work type except for those to be filed under a separate application by the Contractor's Engineer, followed by the Building Department and Notes for the trade. While the samples show the items required to be on the first sheets for each work type, based on the size of the project items may need to move to another sheet or can be combined if there is space. The Initial Application (I1) will also list the work to be filed under separate application by the Contractor. It is understood that there are inspections that are required for multiple work types,

but this will be for the Special Inspection Agency to track and sign off the inspection item for each work type individually when completed.

F. An acceptable DOB designation used on many projects but not shown below is “C” for Civil drawings. The R and FF series do not typically require information that is to be filed and thus may use the indicated designators. For Landscape drawings, use either ‘L’ series drawings or include in the ‘A’ series. There needs to be two boxes for sheet numbering. One box will be for “Sheets in Work Type Contract Set”, while the other is “Sheets in Work Type DOB Filing Set”. The numbering within each work type must be sequential for each and are to be included with the list of drawings in order to keep track of the numbering. Samples of both the title block and the List of Drawings sheet are included for reference.

G. Each work type must have its own set of EN drawings, with its associated information and progress inspections that will be attached to each application as a separate pdf. For capacity projects (or the odd CIP project that will be doing energy modeling) that will have a single applicant for the EN drawings with the energy modeling, the EN drawings for each separate work type will be the same exact drawings, including the list of Energy Code Progress Inspections. For CIP projects, each EN work type will have only those applicable energy code calculations/tables that apply to that work type as well as only those Progress Inspections that apply to that Work Type. Electrical Drawings related to energy code compliance are required to be filed. In order to simplify that process, the Electrical Drawings shall be indicated as GC (elec) Work Type.

H. As an aid to the Contractor, a sheet is to be created called “Compiled List of Drawings, Special Inspections and Progress Inspections for Contract”. This Drawing(s) will be placed in the Contract set immediately after the Cover Sheet with a designation T001A, T001B as needed. This drawing is NOT to be filed and should be created/updated when the project is ready to be uploaded into TOBSS and included as part of the bid set. The designer is to copy the tables of the list of drawings, special inspections and progress inspections from the first sheet of each Work Type/Application without revising the numbering in the tables, except where indicated below. There is to be a box entitled ‘Total Number of Drawings in Contract Set (including compiled list of drawings sheet(s)’ where the Designer is to include the total number of the drawings in the Contract set, inclusive of the complied list drawing(s). The T001A drawing is not to have numbering in the Number of Sheets in Contract/Work Type boxes. In the List of Drawings of this compiled list drawing, the drawing title is to be added into the Table after the Cover Sheet and have a ‘-‘ in the sheet number boxes. Refer to the Sample Drawing at the end of this DR.

I. Note that the following different tables may not match exactly with each other but are intended to provide intended guidance for sequencing.

Sample Title Block



Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Sample List of Drawings Sheet showing Contract Set and DOB Set Numbering

DRAWING NO.	DRAWING TITLE	GC WORK TYPE CONTRACT SET SHEET NO.	GC WORK TYPE DOB SET SHEET NO.
T001.00	COVER SHEET	1	1
T001A.00	COMPILED LIST OF DRAWINGS, SPECIAL INSEPCTIONS AND PROGRESS INSPECTIONS FOR CONTRACT	-	-
T002.00	LIST OF DRAWINGS, SPECIAL & PROGRESS INSPECTIONS	2	2
T003.00	GENERAL NOTES, BUILDING DEPT. NOTES & ALLOWANCES	3	3
T004.00	ABBREVIATIONS, SYMBOLS & LEGENDS	4	4
Z101.00	ZONING DATA & CALCULATIONS	5	5
G101.00	SITE SURVEY	6	6
A001.00	ACCESSIBLE PLUMBING FIXTURES & ACCESSORIES MOUNTING HEIGHTS AND LOCATIONS	7	7
A020.00	FIRE PROTECTION DRAWING - CELLAR	8	8
A030.00	SITE DEMOLITION PLAN	9	9
A035.00	SITE PLAN	10	10
A040.00	SITE GRADING & DRAINAGE PLAN	11	11
A050.00	SITE DETAILS	12	12
A100.00	CELLAR FLOOR PLAN	13	13
A201.00	BUILDING ELEVATIONS	14	14
A203.00	BUILDING SECTIONS	15	15
A301.00	EXTERIOR WALL SECTIONS	16	16
A310.00	EXTERIOR WALL DETAILS	17	17
A401.00	LOBBY & ENTRANCE LAYOUTS & ELEVATIONS	18	
A420.00	CORRIDOR LAYOUTS & ELEVATIONS	19	
A430.00	ROOF DETAILS	20	18
A450.00	MISC. DETAILS	21	19
A501.00	STAIR PLAN & SECTIONS	22	20
A520.00	ELEVATOR PLAN & DETAILS	23	21
A601.00	TOILET LAYOUTS & ELEVATIONS	24	22
A630.00	TOILET, SHOWER & DRINKING FOUNTAIN DETAILS	25	23
A701.00	INTERIOR PARTITION TYPES	26	24
A710.00	MILLWORK DETAILS	27	
A720.00	SPECIALTIES & EQUIPMENT DETAILS	28	
A800.00	REFLECETD CEILING PLAN - CELLAR	29	25
A810.00	CEILING DETAILS	30	26
A901.00	ROOM FINISH SCHEDULES	31	27
A910.00	DOOR SCHEDULES	32	28
A920.00	WINDOW SCHEDULES	33	29
A925.00	WINDOW GUARD DETAILS	34	30
A930.00	SIGNAGE SCHEDULE AND DETAILS	35	31
A940.00	FOOD SERVICE LAYOUT, SCHEDULE & DETAILS	36	32
FF100.00	FURNITURE KEY PLAN - CELLAR	37	
FF201.00	TYPICAL CLASSROOMS	38	
H201.00	SUB-SLAB DEPRESSURIZATION SYSTEM AND PLAN	39	33
R001.00	ZONE OF PUBLIC PROTECTION PLAN & NOTES (REFERENCE ONLY)	40	
R002.00	ADA REF. DWG. FOR FIXTURES & BLDG. ELEMENTS' CLR REQS	41	
EN001.00	NYCECC COMPLIANCE	42	34

Discipline Code and Numbering Convention

Code	Description	Drawing Number	Description	Sample Drawing Number
GC Work Type				
T	Cover & General Notes Drawings	001	Project Title, School Name	T001.00
		001A	Compiled List of Drawings, Special Inspections & Progress Inspections for Contract	T001A.00
		002	List of Drawings, Special and Progress Inspections *(Drawing is to refer to other trade drawings for the list of drawings for the other work types that are part of the Contract set and indicate which subsequent filing number that set is.)*	T002.00
		003	Location Map, General Notes, Building Dept. Notes, etc.	T003.00
		011	PAPS Notes, Location Plan, and Images *(CIP Only)*	**T011.00**
Z	Zoning Drawings	001	Zoning Data & Diagrams	Z001.00
G	Site Surveys	101	Site Survey	G101.00
DM	Demolition Drawings	001	General Notes	DM001.00
		101	Demolition Plan & Details	DM101.00
C	Civil Drawings *(If work not included in P series or other drawing series.* ***If site connection is part of C series, include on a separate sheet and file as a separate PL (Exterior) in DOB NOW.*** *)*	101	Notes, symbols	C101.00
L	Landscape Drawings *(may be part of A series)*	101	Notes, symbols, Planting Plan, Planting Schedules, planting details	L101.00
A	Architectural	001	List of Drawings and List of Special and Progress Inspections, Location Map, etc., General Notes, Building Dept. Notes *(For CIP projects if GC Work Type is not the I1 application. If Capacity project, list of drawings will be part of T Drawings)*	A001.00
		002	General (symbols, abbreviations, notes, etc.)	A002.00

Code	Description	Drawing Number	Description	Sample Drawing Number
A	Architectural	003	Accessible Plumbing Fixtures and Accessories Mounting Heights and Locations	A003
		010	3D Views (isometrics, perspectives, photographs)	A010.00
		020	Fire Protection Drawings	A020.00
		030	Site Demolition Plan & Notes *(May be part of DM series depending on project)*	A030.00
		035	Site Plan & Notes	A035.00
		040	Grading Plan	A040.00
		045	Planting plan, Schedules (may be part of L series)	A045.00
		050	Site Sections & Details	A050.00
		061	Selective Removal Plans	A061.00
		100	Cellar Floor Plan	A100.00
		101	First, Second, Third, Fourth Floor Plans (Horizontal Views)	A101.00
		201	Elevations & Building Sections (Vertical views)	A201.00
		301	Wall Sections (Sectional views)	A301.00
		401	Enlarged Partial Plans & Sections, Roofing Details	A401.00
		501	Stairs, Elevators and Escalators Plans & Details	A501.00
		601	Toilets Room Layouts, Elevations & Details.	A601.00
		701	Interior Partition Details	A701.00
		710	Millwork and Cabinetry	A710.00
		720	Casework Metal	A720.00
		730	Metal lockers, Chalk, and Tack Boards	A730.00
		800	Cellar Reflected Ceiling Plan	A800.00
		801	First, Second, Third, Fourth Floor Reflected Ceiling Plans, Ceiling & Soffit Details	A801.00
		901	Finish schedule	A901.00
		910	Door Elevations, Door Schedules	A910.00
		920	Window Type & Window Schedule, Window Details	A920.00

Code	Description	Drawing Number	Description	Sample Drawing Number
		930	Signage	A930.00
		940	Kitchen Equipment	A940.00
FF	Furniture & Furnishings and Room Layouts *(Drawings not filed)*	100	Cellar Furniture Plans	FF101.00
		101	First, Second, Third, Fourth Floor – Furniture Plans	**FF101.00**
		201	Typical Classroom Part Furniture Plans and Schedules	FF201.00
		301	Specific Room Furniture Plan: Science Labs; Science Demo/Prep Rooms; Music Suite & Choral Rooms; Wireless Language & Staff Computer Training Rooms; Reading & Speech research Rooms; etc.	FF301.00
H	Environmental Remediation/Asbestos Drawings *(Depending on item, some Drawing filed such as sub-slab depres-surization but others may not be required)*	001	Symbols & Legends, General Notes, Abbreviations	H001.00
		101	Asbestos Plans	H101.00
		110	Asbestos Details	H110.00
		201	Environmental Plans	H201.00
		210	Environmental Details	H210.00
R	Reference Drawings *(Drawings not to be filed)*	001	Zone of Public Protection Plan & Notes	R001.00
		002	ADA reference Drawing for Fixtures and Building Elements' Clearance Requirements	R002.00
		003	Drawings of existing buildings, etc., photographs, etc.	R003.00
EN	Energy Code Compliance Drawings	001	For Capacity, computer printouts from energy modeling and other energy code information, NYCECC Progress Inspection List.	EN001.00
		002	For Capacity, computer printouts from energy modeling and other energy code information	EN002.00
		003	For Capacity, computer printouts from energy modeling and other energy code information	EN003.00
		001	For CIP, GC Energy Code Compliance Information and NYCECC Progress Inspection List	EN001.00
OTHER Work Type				
BPP	Builders Pavement Plan Drawings	101	Builder Pavement Plans, General Notes, Waivers, etc. – Other	BPP101.00

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

PA Work Type				
PA	Place of Assembly Drawings	101	Place of Assembly for Auditorium, Cafeteria, Multi-purpose room, Gymatorium, & Gymnasium. Floor Plans and Travel Distances, Door Capacity, Occupancy Loads, Etc.	PA101.00
FO Work Type				
FO	Foundation Drawings *(Sitework plan and sections – Retaining Walls, etc. - may be put on Civil Drawings or if site is small on the building foundation plan)*	001	List of Foundation Drawings and List of Special and Progress Inspections	FO001.00
		002	Foundation Symbols, Abbreviations & Notes	FO002.00
		010	Sitework Plan	FO010.00
		020	Sitework Sections, Details	FO020.00
		061	Selective Removal Plan	FO061.00
		100	Foundation Plan	FO100.00
		201	Specific Foundation Sections and Details	FO201.00
		301	Pier and Footing Schedule,	FO301.00
		401	Typical Foundation Sections and Details	FO401.00
B	Soil Borings Drawings	101	Soil Boring Logs, General Notes, Symbols & Legends, Ground Water Tables, etc.	B101.00
EN	Energy Code Compliance Drawings	001	For Capacity, computer printouts from energy modeling and other energy code information, NYCECC Progress Inspection List.	EN001.00
		002	Computer printouts from energy modeling and other energy code information	EN002.00
		003	Computer printouts from energy modeling and other energy code information	EN003.00
		011	For CIP, Foundation Energy Code Compliance Information and NYCECC Progress Inspection List	EN011.00
	ST Work Type			
S	Structural Drawings	001	List of Structural Drawings and List of Special and Progress Inspections	S001.00
		002	Structural Symbols, Abbreviations, Notes, Table of Loads, and Seismic Coefficients	S002.00
		061	Selective Removal Plans	S061.00

		101	Superstructure Framing Plans	S101.00
		201	Specific Superstructure Sections and Details by Floor.	S201.00
		301	Column Schedule, Base Plate Details, Lateral Load-Resistant Frame, Sections and Details.	S301.00
		401	Typical Superstructure Sections and Details	S401.00
	MS Work Type *(Existing BE and New BE Work Types must be separated)*			
M	HVAC *(Mechanical)* Drawings	001	List of Mechanical Drawings and List of Special and Progress Inspections	M001.00
		002	HVAC Symbols, Abbreviations, and Notes	M002.00
		003	HVAC Schedules	M003.00
		061	HVAC Selective Removal Plans	M061.00
		100	Cellar HVAC floor plan (full & part plans)	M100.00
		101	First, Second, Third, Fourth HVAC floor plans (full & part plans)	M101.00
		200	Cellar HVAC Floor Piping Plan (if not a heat pump project)	M200.00
		201	First, Second, Third, Fourth HVAC Floor Piping Plans (if not a heat pump project)	M201.00
		301	Boiler & Chiller Room Part Plans & Sections; & HVAC Sections Sheets.	M301.00
		401	HVAC Chilled Water, Steam & Condensate Return, Air, and Control Risers' Diagrams	M401.00
		501	HVAC Standard Details	M501.00
EN	Energy Code Compliance Drawings	001	For Capacity, computer printouts from energy modeling and other energy code information, NYCECC Progress Inspection List	EN001.00
		002	Computer printouts from energy modeling and other energy code information	EN002.00
		003	Computer printouts from energy modeling and other energy code information	EN003.00
		021	Mechanical Energy Code Compliance and NYCECC Progress Inspection List	EN021.00

	SP & SD Work Type			
SP/SD	Sprinkler and Standpipe Systems Drawings *(If project has only sprinkler system, use SP. If standpipe system only, use SD. Ansul systems are Fire Suppression Systems and would use F designation, but are typically filed by Contractor)*	001	List of Fire Protection Drawings and List of Special and Progress Inspections	SP/SD001.00
		002	Fire Suppression Symbols, Abbreviations, and Notes	SP/SD002.00
		061	Fire Suppression System Selective Removal Plans	SP/SD061.00
		100	Cellar Sprinkler & Standpipe Floor Plan	SP/SD100.00
		101	First, Second, Third, Fourth Sprinkler & Standpipe Floor Plans	SP/SD101.00
		201	Sprinkler & Standpipe Riser Diagrams	SP/SD201.00
		301	Sprinkler & Standpipe Details	SP/SD301.00
	PL (exterior) Work Type			
P	**Plumbing Drawings – Site Connection *(filed separately in DOB NOW from sitework (exterior) plumbing drawings and interior plumbing work drawings)***	**011**	**Site Connections**	**P011.00**
	PL (exterior) Work Type			
P	**Plumbing Drawings – Sitework (*filed separately in DOB NOW from site connection plumbing drawings and interior plumbing work drawings – May also be C drawings*)**	021	Site Removals	P021.00
		031	Site Plans	P010.00
	PL (interior) Work Type			
P	Plumbing Drawings ***(both site connection and other site (exterior) plumbing work to each be filed as separate PL (exterior) Work Type applications in DOBNOW***	001	**List of Plumbing Drawings and List of Special and Progress Inspections**	P001.00
		002	P&D Symbols, Abbreviations, Notes,	P002.00
		003	Plumbing Schedules, i.e. (pumps, heaters)	P003.00
		061	Plumbing Selective Removal Plans	P061.00
		100	Cellar Floor Plan (Full & Part Plans)	P100.00
		101	First, Second, Third, Fourth Floor Plans (Full & Part Plans)	P101.00

		201	1/4” Part Plans	P201.00
		301	Sanitary, Water, Gas, Vacuum/ Compressed Air Riser Diagrams	P301.00
		401	Details Sheets	P401.00
EN	Energy Code Compliance Drawings	001	For Capacity, computer printouts from energy modeling and other energy code information, NYCECC Progress Inspection List	EN001.00
		002	Computer printouts from energy modeling and other energy code information	EN002.00
		003	Computer printouts from energy modeling and other energy code information	EN003.00
		031	Plumbing Energy Code Compliance and NYCECC Progress Inspection List	EN031.00
	GC (elec) Work Type			
E	Electrical Drawings *(drawings not typically filed- Applicable portions required to show Energy Code Compliance are also to be included in the EN series drawings)*	001	List of Electrical Drawings	E001.00
		002	Electrical Symbols, Abbreviations, Notes	E002.00
		003	Site and Service Plan	E003.00
		004	Lightning Protection System	E004.00
		005	Grounding System	E005.00
		061	Electrical Selective Removal Plans	E061.00
		100	Cellar Floor Plan - Lighting (Full & Part Plans)	E100.00
		101	First, Second, Third, Fourth Floor Plans - Lighting (Full & Part Plans)	E101.00
		200	Cellar Floor Plan – Power Systems (Full & Part Plans)	E200.00
		201	First, Second, Third, Fourth Floor Plans – Power Systems (Full & Part Plans)	E201.00
		300	Cellar Floor Plan – Low Voltage Systems (Full & Part Plans)	E300.00
		301	First, Second, Third, Fourth Floor Plans – Low Voltage Systems (Full & Part Plans)	E301.00
		401	1/4” Part Plans – Specialty Rooms (Kitchen, Telecom Room, Electrical Room, Boiler Room, Science Laboratories, Custodian’s Office)	E401.00

		501	One-Line Diagram, Power and Lighting Riser, Telephone Cabling System Riser, Data Cabling System Riser, Sound/Clock System Riser, Emergency Lighting and Exit Light Riser, Television Cabling System Riser, Intrusion Alarm System Riser, Rescue Room Intercom System Riser, Auxiliary Signal System Riser, IPDVS System Riser.	E501.00
		601	Lighting Fixture Schedules, Panel Schedules	E601.00
		701	Details	E701.00
EN	Energy Code Compliance Drawings	041	Electrical Energy Code Compliance and NYCECC Progress Inspection List	EN041.00
		042	Distribution Transformers and Electric motor information (for reference only)	EN042.00
		043	Floor Plans - Lighting controls (for reference only)	EN043.00
		044	Floor Plans - Power systems (for reference only)	EN044.00
	FA Work Type			
FA	Fire Alarm Drawings	001	List of FA Drawings, Fire Alarm System Symbols, Abbreviations, Notes	FA001.00
		010	Site and Service Plan	FA010.00
		0**6**1	Fire Alarm System Removal Plans	FA0**6**1.00
		100	Fire Alarm System Cellar Floor Plan	FA100.00
		101	Fire Alarm System First, Second, Third, Fourth Floor Plans	FA101.00
		201	Fire Alarm System Riser Diagram	FA201.00
		301	Schedules	FA301.00
		401	Details	FA401.00

FPP	Fire Protection Plan Drawings *(These are a separate set of documents filed with FDNY. Plans showing wall ratings, etc. are to be included in the A series drawings as "Fire Protection Drawings")*	001	Floor Plans, Areas, and Schedules, and Occupant Egress Calculations	FPP001.00

Drawing Number Convention

Sample Listing of Drawings
Typical of a Capacity Project, but to be similar for a CIP

Dwg. No.	Sheet Description
TITLE DRAWINGS AND OTHERS (GC Work Type)	
T001.00	COVER SHEET
T001A.00	COMPILED LIST OF DRAWINGS, SPECIAL IINSPECTIONS & PROGRESS INSPECTIONS FOR CONTRACT
T002.00	LIST OF DRAWINGS, LIST OF SPECIAL AND PROGRESS INSPECTIONS
T003.00	LOCATION PLAN, BUILDING DEPARTMENT NOTES
T004.00	BUILDING DEPARTMENT NOTES, GENERAL NOTES
T011.00	PAPS NOTES, LOCATION PLAN AND IMAGE(S)
Z001.00	ZONING DATA
B101.00	SOIL BORINGS – GENERAL NOTES
B102.00	SOIL BORINGS – SHEET 1
B103.00	SOIL BORINGS – SHEET 2
G101.00	SITE SURVEY EXISTING CONDITIONS
G102.00	SITE SURVEY WITH PROPOSED BUILDING CONFIGURATION
DM001.00	DEMOLITION GENERAL NOTES
DM101.00	DEMOLITION PLANS & DETAILS
L101.00	NOTES, SYMBOLS, PLANTING PLAN, PLANTING SCHEDULES, PLANTING DETAILS
ARCHITECTURAL DRAWINGS	
A001.00	SYMBOLS, ABBREVIATIONS & NOTES
A002.00	ACCESSIBLE PLUMBING FIXTURES & ACCESSORIES MOUNTING HEIGHTS AND LOCATIONS
A010.00	3D VIEWS (ISOMETRIC, PERSPECTIVES, PHOTOGRAPHS)
A020.00	FIRE PROTECTION DRAWINGS – FIRST & SECOND FLOORS
A021.00	FIRE PROTECTION DRAWINGS – THIRD & FOURTH FLOORS
A030.00	SITE DEMOLITION PLAN & NOTES
A035.00	SITE PLAN & NOTES
A040.00	GRADING & DRAINAGE PLAN
A045.00	PLANTING PLAN AND SCHEDULE
A050.00	SITE DETAILS
A051.00	DRAINAGE DETAILS

Dwg. No.	Sheet Description
A060.00	CELLAR SELECTIVE REMOVALS PLAN
A061.00	FIRST FLOOR SELECTIVE REMOVALS PLAN
A062.00	SECOND FLOOR SELECTIVE REMOVALS PLAN
A063.00	THIRD FLOOR SELECTIVE REMOVALS PLAN
A064.00	FOURTH FLOOR SELECTIVE REMOVALS PLAN
A065.00	FIFTH FLOOR SELECTIVE REMOVALS PLAN
A066.00	ROOF SELECTIVE REMOVALS PLAN
A100.00	CELLAR PLAN
A101.00	FIRST FLOOR PLAN
A102.00	SECOND FLOOR PLAN
A103.00	THIRD FLOOR PLAN
A104.00	FOURTH FLOOR PLAN
A105.00	FIFTH FLOOR PLAN
A106.00	ROOF PLAN
A201.00	NORTH/SOUTH ELEVATIONS
A202.00	EAST/WEST ELEVATIONS
A203.00	EAST BUILDING SECTIONS
A204.00	WEST BUILDING SECTIONS
A205.00	NORTH BUILDING SECTIONS
A206.00	SOUTH BUILDING SECTIONS
A301.00	EXTERIOR WALL SECTIONS
A302.00	EXTERIOR WALL SECTIONS
A303.00	EXTERIOR WALL SECTIONS
A304.00	EXTERIOR WALL SECTIONS
A305.00	EXTERIOR WALL SECTIONS
A306.00	EXTERIOR WALL SECTIONS
A307.00	EXTERIOR WALL PLAN DETAILS
A308.00	EXTERIOR COLUMN PLAN DETAILS
A309.00	EXTERIOR WALL DETAILS –1
A310.00	EXTERIOR WALL DETAILS –2
A401.00	WEST WING LAYOUT PLAN & INTERIOR ELEVATIONS
A402.00	EAST WING LAYOUT PLAN & INTERIOR ELEVATIONS
A403.00	CENTER LAYOUT PLAN & INTERIOR ELEVATIONS
A404.00	LOBBY & ENTRANCE LAYOUTS & INTERIOR ELEVATIONS
A405.00	INTERIOR COLUMN PLAN DETAILS
A406.00	INTERIOR EXPANSION JOINT PLAN DETAILS
A407.00	DETAIL ELEVATIONS & MASONRY COURSING
A410.00	DETAIL ELEVATIONS – 1
A411.00	DETAIL ELEVATIONS –2
A420.00	ROOF DETAILS – SHEET 1
A421.00	ROOF DETAILS – SHEET 2

Dwg. No.	Sheet Description
A431.00	COLUMN PLANS & SECTIONS DETAILS – SHEET 1
A441.00	MISC. DETAILS – SHEET 1
A501.00	STAIR 'A' PLAN & SECTIONS
A502.00	STAIR 'B' PLAN & SECTIONS
A503.00	STAIR 'C' PLAN & SECTIONS
A504.00	STAIR 'D' PLAN & SECTIONS & BULKHEAD PLANS AND SECTIONS
A505.00	STAIR 'E' PLAN & SECTIONS & & BULKHEAD PLANS AND SECTIONS
A506.00	ELEVATOR #1 PLANS & SECTIONS
A507.00	ELEVATOR #2 PLANS & SECTIONS
A508.00	ESCALATOR #1 PLANS & SECTIONS
A509.00	ESCALATOR #2 PLANS & SECTIONS
A601.00	TOILET ROOMS LAYOUTS
A602.00	TOILET ROOMS ELEVATIONS
A603.00	TOILET COMPARTMENT DETAILS & FIXTURE MOUNTING HEIGHTS
A604.00	DRINKING FOUNTAIN LAYOUTS & DETAILS
A701.00	INTERIOR PARTITION TYPES
A702.00	CORRIDOR TYPE DETAILS
A703.00	INTERIOR DETAILS – SHEET 1
A704.00	INTERIOR DETAILS – SHEET 2
A710.00	MILLWORK – SHEET 1
A711.00	MILLWORK – SHEET 2
A712.00	SHELVING DETAILS
A713.00	DISPLAY CASE LAYOUTS & DETAILS
A714.00	CABINETRY DETAILS
A715.00	SCIENCE ROOM CASEWORK DETAILS
A716.00	KITCHENETTE & MEDICAL SUITE CABINET DETAILS
A717.00	CORRIDOR DETAILS, FIRE ALARM, FIRE EXTINGUISHER & RECESSED TELEPHONE DETAILS
A720.00	CASEWORK LAYOUT PLANS AND DETAILS
A730.00	METAL LOCKERS, CHALK BOARD & TACK BOARDS DETAILS
A800.00	REFLECTED CEILING PLAN-BASEMENT
A801.00	REFLECTED CEILING PLAN-FIRST FLOOR
A802.00	REFLECTED CEILING PLAN-SECOND FLOOR
A803.00	REFLECTED CEILING PLAN-THIRD FLOOR
A810.00	CEILING & SOFFIT DETAILS & CEILING SCHEDULE
A811.00	CEILING DETAILS & SEISMIC BRACING DETAILS
A901.00	ROOM FINISH SCHEDULE – SHEET 1
A902.00	ROOM FINISH SCHEDULE – SHEET 2
A910.00	DOOR SCHEDULE

Dwg. No.	Sheet Description
A911.00	DOOR ELEVATIONS
A912.00	DOOR DETAILS
A913.00	DOOR DETAILS
A920.00	WINDOW SCHEDULE – 1
A921.00	WINDOW SCHEDULE – 2
A922.00	WINDOW ELEVATIONS – 1
A923.00	WINDOW ELEVATIONS –2
A924.00	WINDOW DETAILS – 1
A925.00	WINDOW DETAILS – 2
A926.00	WINDOW GUARDS SCHEDULE & DETAILS
A930.00	SIGNAGE SCHEDULE & DETAILS
A931.00	FLOOR PATTERN SCHEDULE – FIRST FLOOR PLAN
A932.00	COLOR PATTERN SCHEDULES & DETAILS
A933.00	SECURITY BARRIER LAYOUTS & DETAILS
A940.00	KITCHEN EQUIPMENT LAYOUT, SCHEDULE OF EQUIPMENT
A941.00	KITCHEN, SPECIAL CONDITIONS PLAN
A942.00	KITCHEN, SECTIONS, DETAILS & ELEVATIONS

FURNITURE & FURNISHINGS DRAWINGS

FF100.00	CELLAR, FIRST & SECOND FLOOR FURNITURE PLANS
FF101.00	THIRD, FOURTH & FIFTH FLOOR FURNITURE PLANS
FF201.00	TYPICAL CLASSROOM PART FURNITURE PLAN AND SCHEDULE - 1
FF202.00	TYPICAL CLASSROOM PART FURNITURE PLAN AND SCHEDULE - 2
FF301.00	SCIENCE DEMO / PREP ROOM FURNITURE PLANS & SCHEDULES - 1
FF302.00	SCIENCE DEMO / PREP ROOM FURNITURE PLANS & SCHEDULES - 2
FF303.00	SCIENCE LABS FURNITURE PLAN & SCHEDULE
FF304.00	TYPICAL SPECIAL EDUCATION FURNITURE PART PLAN & SCHEDULE
FF305.00	MUSIC SUITE & CHORAL ROOM FURNITURE PART PLANS & SCHEDULES
FF306.00	COMPUTER LABS FURNITURE PART PLANS & SCHEDULES
FF307.00	WIRELESS LANGUAGE & STAFF COMPUTER TRAINING FURNITURE PART PLANS & SCHEDULES
FF308.00	ART CLASSROOM / STOREROOM FURNITURE PART PLANS & SCHEDULES
FF309.00	READING & SPEECH RESEARCH ROOM, SPECIAL EDUCATION FURNITURE PART PLANS & SCHEDULES
FF310.00	RECEIVING / SUPPLY ROOMS, BOOK STOREROOM, FURNITURE STOREROOM PART PLANS & SCHEDULES
FF311.00	CAFETERIA FURNITURE PLAN & SCHEDULE
FF312.00	KITCHEN LAYOUT
FF313.00	MEDICAL SUITE, PARENT'S COMMUNITY, AUDIO VISUAL, SCHOOL AIDES PART FURNITURE PLANS & SCHEDULES
FF314.00	SUPERVISORY OFFICE/STORAGE OFFICE FURNITURE PLAN & SCHEDULE
FF315.00	CUSTODIAN'S OFFICE/WORKSHOP/ LOCKER ROOM/STAFF WORK ROOM/PART FURNITURE PLANS & SCHEDULES

Dwg. No.	Sheet Description
H001.00	ENVIRONMENTAL REMEDIATION – SYMBOLS & LEGENDS
H101.00	ASBESTOS PLANS
H110.00	ASBESTOS DETAILS
H201.00	ENVIRONMENTAL PLANS
EN001.00	ENERGY ANALYSIS**, NYCECC PROGRESS INSPECTIONS**
EN002.00	ENERGY ANALYSIS
EN003.00	ENERGY ANALYSIS
	OTHER Work Type
BPP101.00	BUILDERS PAVEMENT PLANS, GENERAL NOTES & WAIVERS- SHEET 1
BPP102.00	BUILDERS PAVEMENT PLANS, GENERAL NOTES & WAIVERS- SHEET 2
	PA Work Type
PA101.00	PLACE OF ASSEMBLY PLAN – AUDITORIUM
PA102.00	PLACE OF ASSEMBLY PLAN – CAFETERIA
PA103.00	PLACE OF ASSEMBLY PLAN – GYMNASIUM

SUPPRT OF EXCAVATION DRAWINGS (SOE Work Type)

SOE001.00	TRANSIT AUTHORITY GENERAL NOTES
SOE010.00	WORK ADJACENT TO NYCT STRUCTURES SECTIONS & DETAILS SHEET NO. 1
SOE011.00	WORK ADJACENT TO NYCT STRUCTURES SECTIONS & DETAILS SHEET NO. 2
SOE101.00	SCHEMATIC UNDERPINNING/SHORING PLAN AND DETAILS

FOUNDATION DRAWINGS (FO Work Type)

FO001.00	**LIST OF FOUNDATION DRAWINGS AND LIST OF SPECIAL AND PROGRESS INSPECTIONS**
FO002.00	FOUNDATION SYMBOLS, ABBREVIATIONS & NOTES
FO100.00	FOUNDATION PLAN - PART “A”
FO101.00	FOUNDATION PLAN - PART “B” AND SCHEDULES
FO201.00	FOUNDATION SECTIONS & DETAILS – SHEET NO. 1
FO202.00	FOUNDATION SECTIONS & DETAILS – SHEET NO. 2
FO203.00	FOUNDATION SECTIONS & DETAILS – SHEET NO. 3
FO204.00	FOUNDATION SECTIONS & DETAILS – SHEET NO. 4
FO301.00	PIER AND FOOTING SCHEDULE
FO401.00	FOUNDATION TYPICAL DETAILS – SHEET N0.1
FO402.00	FOUNDATION TYPICAL DETAILS – SHEET N0.2
B101.00	SOIL BORINGS – GENERAL NOTES
B102.00	SOIL BORINGS – SHEET 1
B103.00	SOIL BORINGS – SHEET 2
EN001.00	ENERGY ANALYSIS, NYCECC PROGRESS INSPECTIONS
EN002.00	ENERGY ANALYSIS
EN003.00	ENERGY ANALYSIS
EN011.00	FOUNDATION ENERGY CODE COMPLIANCE AND NYCECC PROGRESS INSPECTION

Dwg. No.	Sheet Description
	LIST (For CIP)

STRUCTURALDRAWINGS (ST Work Type)

S001.00	**LIST OF STRUCTURAL DRAWINGS AND LIST OF SPECIAL AND PROGRESS INSPECTIONS**
S002.00	STRUCTURAL NOTES, ABBREVIATIONS, TABLE OF LOADS, SEISMIC COEFFICIENTS
S0**6**0.00	CELLAR SELECTIVE REMOVALS PLAN
S0**6**1.00	FIRST FLOOR SELECTIVE REMOVALS PLAN
S0**6**2.00	SECOND FLOOR SELECTIVE REMOVALS PLAN
S0**6**3.00	THIRD FLOOR SELECTIVE REMOVALS PLAN
S0**6**4.00	FOURTH FLOOR SELECTIVE REMOVALS PLAN
S0**6**5.00	FIFTH FLOOR SELECTIVE REMOVALS PLAN
S101.00	FIRST FLOOR FRAMING PLANS
S102.00	SECOND FLOOR FRAMING PLANS
S103.00	THIRD FLOOR FRAMING PLANS
S104.00	FOURTH FLOOR FRAMING PLANS
S105.00	FIFTH FLOOR FRAMING PLANS
S106.00	ROOF FRAMING PLANS
S201.00	FLOOR SECTIONS & DETAILS – SHEET NO. 1
S202.00	FLOOR SECTIONS & DETAILS – SHEET NO. 2
S203.00	FLOOR SECTIONS & DETAILS – SHEET NO. 3
S204.00	FLOOR SECTIONS & DETAILS – SHEET NO. 4
S205.00	FLOOR SECTIONS & DETAILS – SHEET NO. 5
S206.00	FLOOR SECTIONS & DETAILS – SHEET NO. 6
S207.00	FLOOR SECTIONS & DETAILS – SHEET NO. 7
S208.00	ROOF SECTIONS & DETAILS
S209.00	ROOF AND BULKHEAD SECTIONS & DETAILS
S301.00	COLUMN SCHEDULE
S302.00	COLUMN SECTIONS & DETAILS
S303.00	COLUMN CONNECTIONS AND TYPICAL DETAILS SHEET NO. 1
S304.00	COLUMN CONNECTIONS AND TYPICAL DETAILS - SHEET NO. 2
S305.00	SEISMIC BRACING FRAMES
S306.00	SEISMIC CONNECTION DETAILS
S401.00	SUPERSTRUCTURE TYPICAL DETAILS - SHEET NO. 1
S402.00	SUPERSTRUCTURE TYPICAL DETAILS - SHEET NO. 2
S403.00	MASONRY REINFORCEMENT DETAILS

MECHANICAL (HVAC) DRAWINGS (MS Work Type)

M001.00	LIST OF MECHANICAL DRAWINGS AND LIST OF SPECIAL AND PROGRESS INSPECTIONS
M002.00	HVAC SYMBOLS, ABBREVIATIONS, AND NOTES
M003.00	HVAC SCHEDULES SHEET NO. 1

Dwg. No.	Sheet Description
M004.00	HVAC SCHEDULES SHEET NO.2
M060.00	CELLAR REMOVALS PLAN
M061.00	FIRST FLOOR REMOVALS PLAN
M062.00	SECOND FLOOR REMOVALS PLAN
M063.00	THIRD FLOOR REMOVALS PLAN
M064.00	FOURTH FLOOR REMOVALS PLAN
M065.00	FIFTH FLOOR REMOVALS PLAN
M066.00	ROOF REMOVALS PLAN
M100.00	CELLAR FLOOR PLAN
M101.00	HVAC FIRST FLOOR PLAN
M102.00	HVAC SECOND FLOOR PLAN
M103.00	HVAC THIRD FLOOR PLAN
M104.00	HVAC FOURTH FLOOR PLAN
M105.00	HVAC FIFTH FLOOR PLAN
M106.00	HVAC ROOF PLAN
M200.00	HVAC PIPING CELLAR FLOOR PLAN
M201.00	HVAC PIPING FIRST FLOOR PLAN
M202.00	HVAC PIPING SECOND FLOOR PLAN
M203.00	HVAC PIPING THIRD FLOOR PLAN
M204.00	HVAC PIPING FOURTH FLOOR PLAN
M205.00	HVAC PIPING FIFTH FLOOR PLAN
M206.00	HVAC PIPING ROOF PLAN
M301.00	BOILER & CHILLER ROOM PART PLANS & SECTIONS
M302.00	HVAC SECTIONS SHEETS
M401.00	HVAC CHILLED WATER, STEAM & CONDENSATE RETURN DIAGRAMS
M402.00	AIR AND CONTROL RISER DIAGRAMS
M501.00	HVAC TYPICAL DETAILS
EN001.00	ENERGY ANALYSIS, NYCECC PROGRESS INSPECTIONS
EN002.00	ENERGY ANALYSIS
EN003.00	ENERGY ANALYSIS
EN021.00	MECHANICAL ENERGY CODE COMPLIANCE AND NYCECC PROGRESS INSPECTION LIST (For CIP)

SPRINKLER/STANDPIPE SYSTEM DRAWINGS (SP/SD Work Type)

SP/SD001.00	FIRE SUPPRESSION SYSTEM SYMBOLS, ABBREVIATIONS, AND NOTES
SP/SD060.00	CELLAR REMOVALS PLAN
SP/SD061.00	FIRST FLOOR REMOVALS PLAN
SP/SD062.00	SECOND FLOOR REMOVALS PLAN
SP/SD063.00	THIRD FLOOR REMOVALS PLAN
SP/SD064.00	FOURTH FLOOR REMOVALS PLAN

Dwg. No.	Sheet Description
SP/SD065.00	FIFTH FLOOR REMOVALS PLAN
SP/SD100.00	FIRE SUPPRESSION SYSTEM CELLAR FLOOR PLAN
SP/SD101.00	FIRE SUPPRESSION SYSTEM FIRST FLOOR PLAN
SP/SD102.00	FIRE SUPPRESSION SYSTEM SECOND FLOOR PLAN
SP/SD103.00	FIRE SUPPRESSION SYSTEM THIRD PLAN
SP/SD104.00	FIRE SUPPRESSION SYSTEM FOURTH PLAN
SP/SD105.00	FIRE SUPPRESSION SYSTEM FIFTH PLAN
SP/SD201.00	SPRINKLER/STANDPIPE RISER DIAGRAMS
SP/SD301.00	FIRE SUPPRESSION SYSTEM TYPICAL DETAILS

PLUMBING DRAWINGS (PL Work Type)

P001.00	**LIST OF PLUMBING DRAWINGS AND LIST OF SPECIAL AND PROGRESS INSPECTIONS**
P002.00	P&D SYMBOLS, ABBREVIATIONS, AND NOTES
P003.00	PLUMBING SCHEDULES
P011.00	**SITE CONNECTIONS**
P021.00	SITE REMOVALS
P031.00	SITE PLANS
P060.00	CELLAR REMOVALS PLAN – BELOW GRADE PIPING
P061.00	CELLAR REMOVALS PLAN – ABOVE GRADE PIPING
P062.00	FIRST FLOOR REMOVALS PLAN
P063.00	SECOND FLOOR REMOVALS PLAN
P064.00	THIRD FLOOR REMOVALS PLAN
P065.00	FOURTH FLOOR REMOVALS PLAN
P066.00	FIFTH FLOOR REMOVALS PLAN
P067.00	ROOF REMOVALS PLAN
P100.00	CELLAR FLOOR PLAN – BELOW GRADE PIPING
P101.00	CELLAR FLOOR PLAN – ABOVE GRADE PIPING
P102.00	FIRST FLOOR PLAN
P103.00	SECOND FLOOR PLAN
P104.00	THIRD FLOOR PLAN
P105.00	FOURTH FLOOR PLAN
P106.00	FIFTH FLOOR PLAN
P107.00	ROOF PLAN
P201.00	1/4” PART PLANS SHEET NO.1
P202.00	1/4” PART PLANS SHEET NO. 2
P301.00	SANITARY, WATER, GAS, VACUUM / COMPRESSED AIR RISER DIAGRAMS
P401.00	P&D TYPICAL DETAILS

Dwg. No.	Sheet Description
EN001.00	ENERGY ANALYSIS, NYCECC PROGRESS INSPECTIONS
EN002.00	ENERGY ANALYSIS
EN003.00	ENERGY ANALYSIS
EN031.00	PLUMBING ENERGY CODE COMPLIANCE AND NYCECC PROGRESS INSPECTION LIST (For CIP)

ELECTRICAL DRAWINGS (GC (elec) Work Type)

E001.00	**LIST OF ELECTRICAL DRAWINGS**
E002.00	ELECTRICAL SYMBOLS, ABBREVIATIONS, AND NOTES
E003.00	SITE AND SERVICE PLAN
E004.00	LIGHTNING PROTECTION SYSTEM
E005.00	GROUNDING SYSTEM
E060.00	CELLAR REMOVALS PLAN
E061.00	FIRST FLOOR REMOVALS PLAN
E063.00	SECOND FLOOR REMOVALS PLAN
E064.00	THIRD FLOOR REMOVALS PLAN
E065.00	FOURTH FLOOR REMOVALS PLAN
E066.00	FIFTH FLOOR REMOVALS PLAN
E100.00	CELLAR LIGHTING PLAN
E101.00	FIRST FLOOR LIGHTING PLAN
E102.00	SECOND FLOOR LIGHTING PLAN
E103.00	THIRD FLOOR LIGHTING PLAN
E104.00	FOURTH FLOOR LIGHTING PLAN
E105.00	FIFTH FLOOR LIGHTING PLAN
E106.00	ROOF LIGHTING PLAN
E200.00	CELLAR PLAN - POWER SYSTEMS
E201.00	FIRST FLOOR PLAN - POWER SYSTEMS
E202.00	SECOND FLOOR PLAN - POWER SYSTEMS
E203.00	THIRD FLOOR PLAN - POWER SYSTEMS
E204.00	FOURTH FLOOR PLAN – POWER SYSTEMS
E205.00	FIFTH FLOOR PLAN - POWER SYSTEMS
E206.00	ROOF PLAN - POWER SYSTEMS
E300.00	CELLAR PLAN - LOW VOLTAGE SYSTEMS
E301.00	FIRST FLOOR PLAN - LOW VOLTAGE SYSTEMS
E302.00	SECOND FLOOR PLAN - LOW VOLTAGE SYSTEMS
E303.00	THIRD FLOOR PLAN - LOW VOLTAGE SYSTEMS
E304.00	FOURTH FLOOR PLAN - LOW VOLTAGE SYSTEMS
E305.00	FIFTH FLOOR PLAN - LOW VOLTAGE SYSTEMS
E306.00	ROOF PLAN - LOW VOLTAGE SYSTEMS
E401.00	KITCHEN PLAN
E402.00	COMPUTER LABORATORIES PLAN
E403.00	SCIENCE LABORATORIES PLAN
E404.00	T. V. STUDIO PLAN

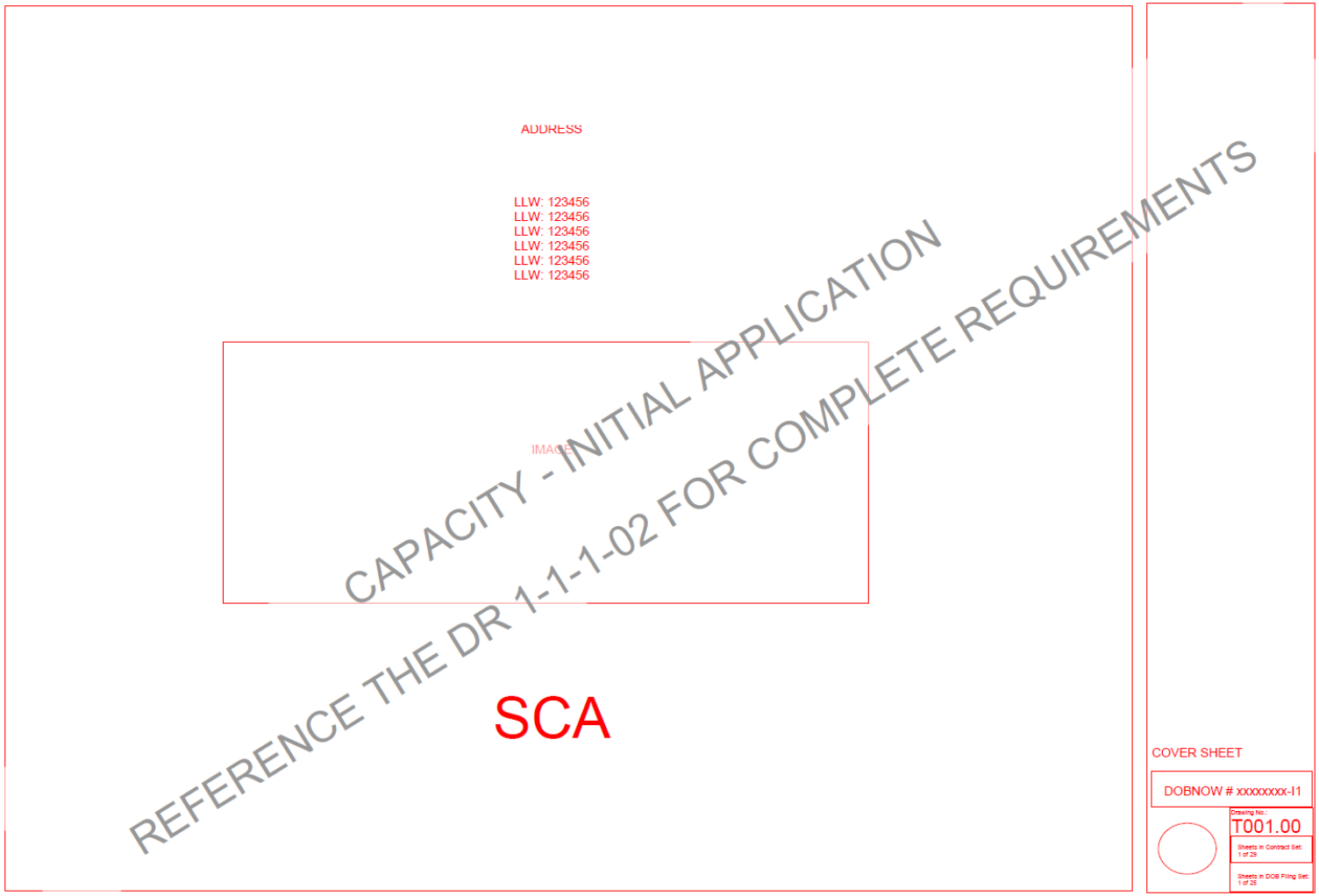
Dwg. No.	Sheet Description
E501.00	ONE LINE DIAGRAMS
E502.00	POWER AND LIGHTING RISER
E503.00	TELEPHONE INTERCOM RISER
E504.00	LAN CABLING SYSTEM RISER
E505.00	SOUND/CLOCK SYSTEM RISER
E506.00	EMERGENCY LIGHTING AND EXIT LIGHT RISER
E507.00	TELEVISION DISTRIBUTION SYSTEM & INTRUSION ALARM SYSTEM RISERS
E508.00	ELEVATOR & RESCUE ROOM INTERCOM SYSTEMS RISERS
E509.00	AUXILIARY SIGNAL SYSTEM RISERS
E510.00	INTERNET PROTOCOL VIDEO SURVEILLANCE RISER
E601.00	LIGHT FIXTURE SCHEDULES
E602.00	LIGHTING PANEL SCHEDULES
E603.00	RECEPTACLES PANEL SCHEDULES
E604.00	POWER PANEL SCHEDULES
E605.00	DISTRIBUTION PANEL SCHEDULES
E701.00	TYPICAL DETAILS
EN001.00	ENERGY ANALYSIS, NYCECC PROGRESS INSPECTIONS
EN002.00	ENERGY ANALYSIS
EN003.00	ENERGY ANALYSIS
EN041.00	ELECTRICAL ENERGY CODE COMPLIANCE AND NYCECC PROGRESS INSPECTION LIST (For CIP)
EN042.00	DISTRIBUTION TRANSFORMERS AND ELECTRIC MOTOR INFORMATION (FOR REFERENCE ONLY) (For CIP)
EN043.00	FLOOR PLANS - LIGHTING CONTROLS (FOR REFERENCE ONLY) (For CIP)
EN044.00	FLOOR PLANS - POWER SYSTEMS (FOR REFERENCE ONLY) (For CIP)

FIRE ALARM DRAWINGS (FA Work Type)

FA001.00	**LIST OF FA DRAWINGS**, FIRE ALARM SYMBOLS & LEGENDS, ABBREVIATIONS, AND NOTES
FA060.00	CELLAR REMOVALS PLAN
FA061.00	FIRST FLOOR REMOVALS PLAN
FA062.00	SECOND FLOOR REMOVALS PLAN
FA063.00	THIRD FLOOR REMOVALS PLAN
FA064.00	FOURTH FLOOR REMOVALS PLAN
FA065.00	FIFTH FLOOR REMOVALS PLAN
FA100.00	CELLAR FLOOR PLAN
FA101.00	FIRST FLOOR PLAN
FA102.00	SECOND FLOOR PLAN
FA103.00	THIRD FLOOR PLAN
FA104.00	FOURTH FLOOR PLAN
FA105.00	FIFTH FLOOR PLAN

Dwg. No.	Sheet Description
FA201.00	FIRE ALARM RISER DIAGRAM
FA301.00	SCHEDULES
FA401.00	FA TYPICAL DETAILS

The following are sample drawings of the first several T00 drawings for the initial application of a Capacity Project to show the intended cover sheet, sheet with list of drawings, special inspections, progress inspection and first EN sheet.



Requirement Applies to: ✔ New Construction ✔ Major Modernizations ✔ Capital Improvement Projects

LIST OF DRAWINGS - GC WORK TYPE			
DWG	TITLE	XX WORK TYPE CONTRACT SET SHEET NO.	XX WORK TYPE DOB SET SHEET NO.
T001	COVER SHEET	1	1
T002	DRAWING LIST, SPECIAL INSPECTIONS, GENERAL NOTES	2	2
T003	TITLE	3	3
A001	TITLE	4	4
A002	TITLE	5	5
A100	TITLE	6	6
A201	TITLE	7	7
H001	TITLE	8	
R001	TITLE	9	
EN001	TITLE	10	8
EN002	TITLE	11	9
EN003	TITLE	12	10
EN004	TITLE	13	11
EN005	TITLE	14	12

LIST OF SUBSEQUENT APPLICATIONS		
SOE	For Support of Excavation Work Type List of Drawings & Special/Progress Inspections, refer to Drawing SOE001.0	B01234567-S1
FO	For Foundation Work Type List of Drawings & Special/Progress Inspections, refer to Drawing FO001.00	B01234567-S2
ST	For Structural Work Type List of Drawings & Special/Progress Inspections, refer to Drawing S001.00	B01234567-S3
MS	For Mechanical Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M001.00	B01234567-S4
PL	For Plumbing Work Type List of Drawings & Special/Progress Inspections, refer to Drawing P001.00	B01234567-S5
GC (el)	For GC-Electrical Work Type List of Drawings & Special/Progress Inspections, refer to Drawing E001.00	B01234567-S6
SP/SD	For Sprinkler/Standpipe Work Type List of Drawings & Special/Progress Inspections, refer to Drawing F001.00	B01234567-S7
BE	For Boiler Equipment Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M300.00	B01234567-S8
MS	For Mechanical (BE) Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M001.00	B01234567-S9
BPP	For Builders Pavement Plan Work Type List of Drawings & Special/Progress Inspections, refer to Drawing BPP001.00.	B01234567-S10

SPECIAL INSPECTIONS - GC WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

PROGRESS INSPECTIONS - GC WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

Note: GC work type to be used as initial work type. Fill subsequent work types from DOBNOW list and remove those not applicable to the project.

REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS
CAPACITY - INITIAL APPLICATION

Drawing List, Special & Progress Inspections, General Notes

DOBNOW # xxxxxxxx-I1

Drawing No.: T002.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

ENERGY CODE PROGRESS INSPECTIONS - ALL WORK TYPES	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

CAPACITY - INITIAL APPLICATION
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Energy Code Progress Inspections, Energy Model Information.

DOBNOW # xxxxxxxx-xx

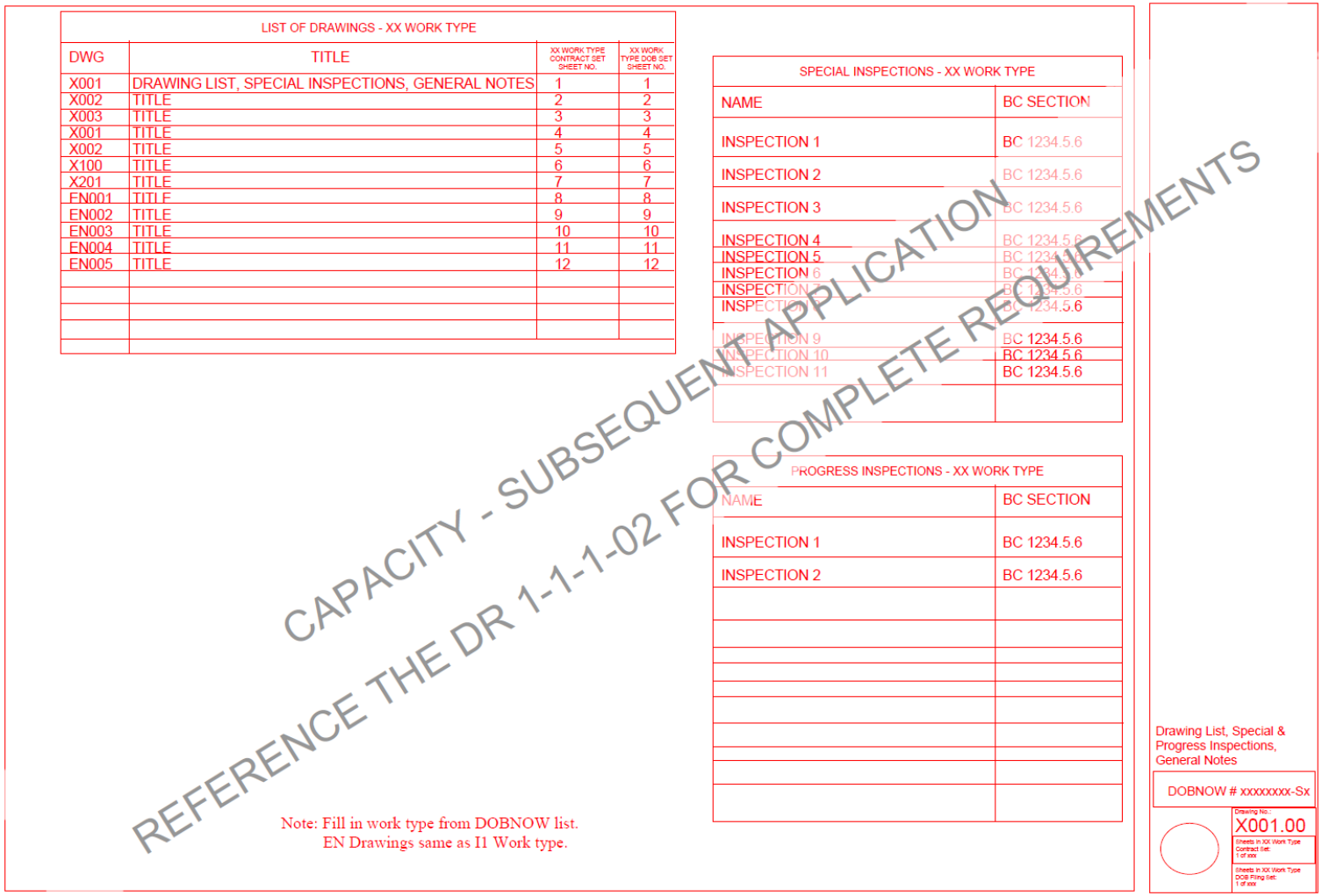
Drawing No.: EN001.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

The following are sample drawings of the first several T00 drawings for a subsequent application of a Capacity Project to show the intended sheet with list of drawings, special inspections, progress inspection and first EN sheet.



LIST OF DRAWINGS - XX WORK TYPE

DWG	TITLE	XX WORK TYPE CONTRACT SET SHEET NO.	XX WORK TYPE DOB SET SHEET NO.
X001	DRAWING LIST, SPECIAL INSPECTIONS, GENERAL NOTES	1	1
X002	TITLE	2	2
X003	TITLE	3	3
X001	TITLE	4	4
X002	TITLE	5	5
X100	TITLE	6	6
X201	TITLE	7	7
EN001	TITLE	8	8
EN002	TITLE	9	9
EN003	TITLE	10	10
EN004	TITLE	11	11
EN005	TITLE	12	12

SPECIAL INSPECTIONS - XX WORK TYPE

NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

PROGRESS INSPECTIONS - XX WORK TYPE

NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6

CAPACITY - SUBSEQUENT APPLICATION
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Note: Fill in work type from DOBNOW list.
EN Drawings same as I1 Work type.

Drawing List, Special & Progress Inspections, General Notes

DOBNOW # xxxxxxxx-Sx

Drawing No.: X001.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

ENERGY CODE PROGRESS INSPECTIONS - ALL WORK TYPES	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

CAPACITY - SUBSEQUENT APPLICATIONS
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Note: EN Drawings same as I1 Work type.

Energy Code Progress Inspections, Energy Model Information.

DOBNOW # xxxxxxxx-xx

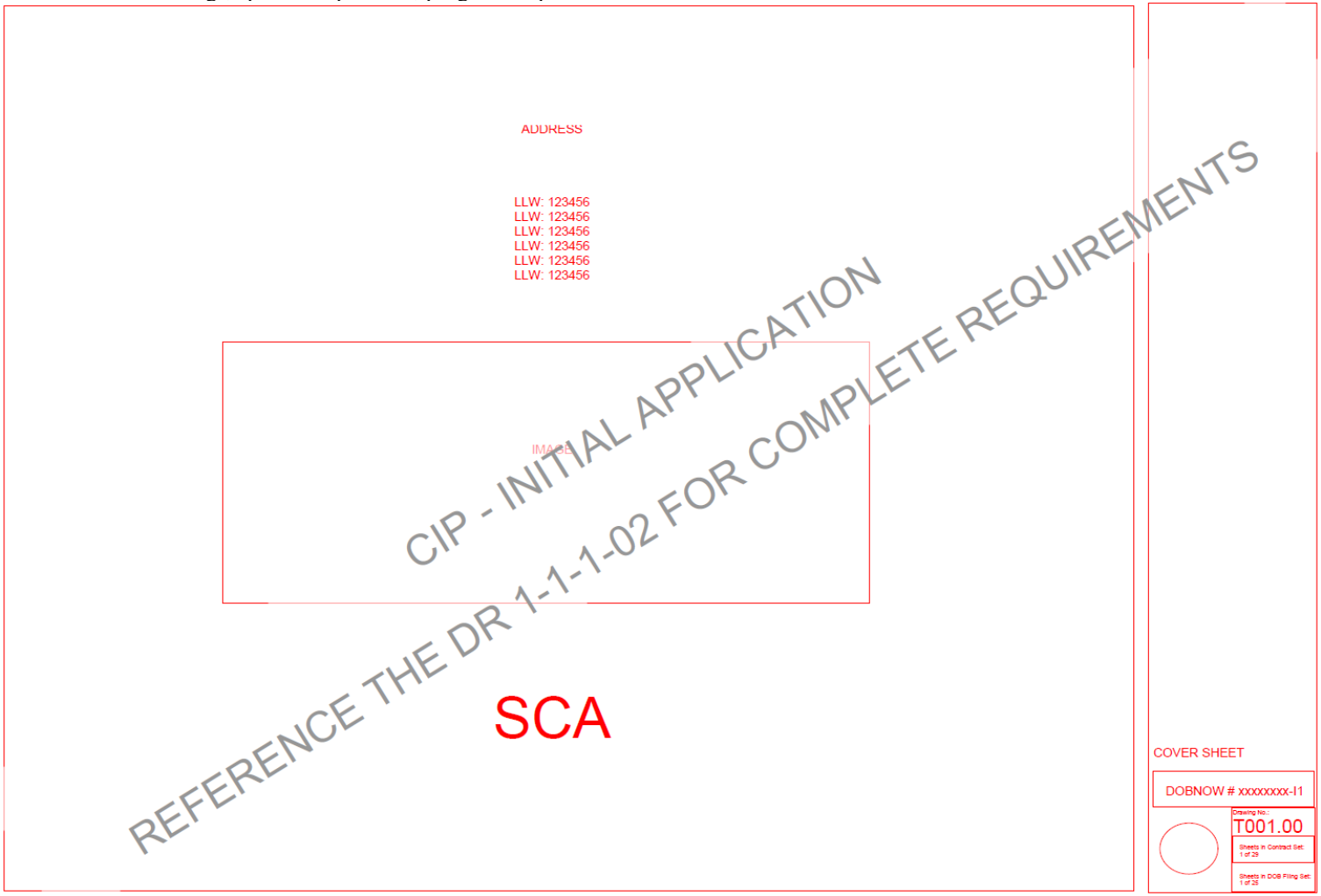
Drawing No.: EN001.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ New Construction ✔ Major Modernizations ✔ Capital Improvement Projects

The following are sample drawings of the first several T00 drawings for the initial application of a CIP Project to show the intended cover sheet, sheet with list of drawings, special inspections, progress inspection and first EN sheet.



Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

LIST OF DRAWINGS - XX WORK TYPE			
DWG	TITLE	XX WORK TYPE CONTRACT SET SHEET NO.	XX WORK TYPE DOB SET SHEET NO.
T001	COVER SHEET	1	1
T002	DRAWING LIST, SPECIAL INSPECTIONS, GENERAL NOTES	2	2
T003	TITLE	3	3
X001	TITLE	4	4
X002	TITLE	5	5
X100	TITLE	6	6
X201	TITLE	7	7
H001	TITLE	8	
R001	TITLE	9	
EN001	TITLE	10	8
EN002	TITLE	11	9

LIST OF SUBSEQUENT APPLICATIONS		
GC	For General Construction Work Type List of Drawings & Special/Progress Inspections, refer to Drawing A001.00	B01234567-S1
SOE	For Support of Excavation Work Type List of Drawings & Special/Progress Inspections, refer to Drawing SOE001.00	B01234567-S2
FO	For Foundation Work Type List of Drawings & Special/Progress Inspections, refer to Drawing FO001.00	B01234567-S3
ST	For Structural Work Type List of Drawings & Special/Progress Inspections, refer to Drawing S001.00	B01234567-S4
MS	For Mechanical Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M001.00	B01234567-S5
PL	For Plumbing Work Type List of Drawings & Special/Progress Inspections, refer to Drawing P001.00	B01234567-S6
GC (el)	For GC-Electrical Work Type List of Drawings & Special/Progress Inspections, refer to Drawing E001.00	B01234567-S7
SP/SD	For Sprinkler/Standpipe Work Type List of Drawings & Special/Progress Inspections, refer to Drawing F001.00	B01234567-S8
BE	For Boiler/Equipment Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M300.00	B01234567-S9
MS	For Mechanical (BE) Work Type List of Drawings & Special/Progress Inspections, refer to Drawing M001.00	B01234567-S10

SPECIAL INSPECTIONS - XX WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

PROGRESS INSPECTIONS - XX WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

Note: Fill work type from DOBNOW list that is the initial work type and remove from those listed in the subsequent applications list, as well as those not applicable to the project.

Drawing List, Special & Progress Inspections, General Notes

DOBNOW # xxxxxxxx-I1

Drawing No.: T002.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS
CIP - INITIAL APPLICATION

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

ENERGY PROGRESS INSPECTIONS - XX WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

CIP - INITIAL APPLICATION
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Note: Put energy code tables, information specific to the initial work type.

Energy Code Tables/Information, Progress Inspections.

DOBNOW # xxxxxxxx-I1

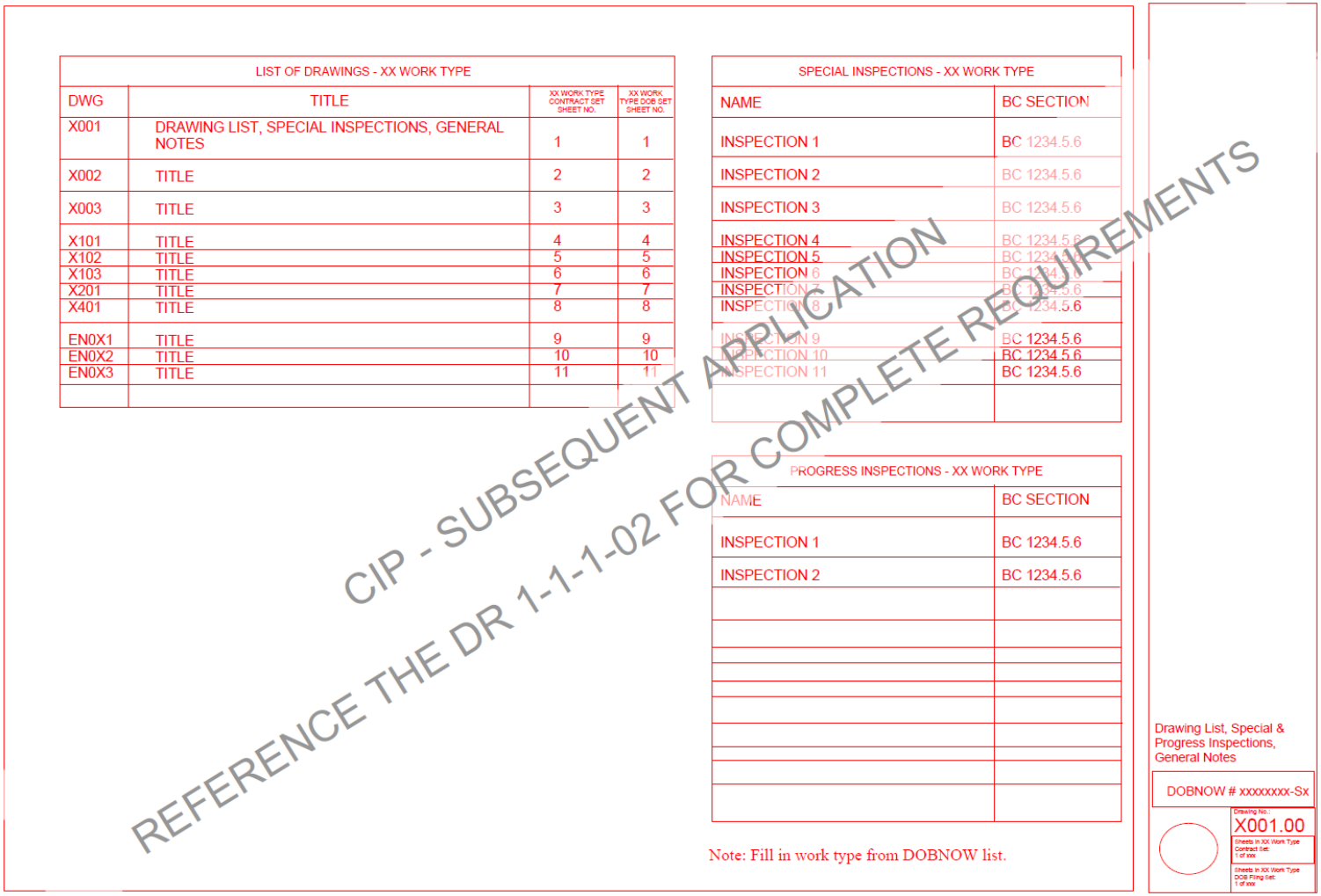
Drawing No.: EN001.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

The following are sample drawings of the first several T00 drawings for a subsequent application of a CIP Project to show the intended sheet with list of drawings, special inspections, progress inspection and first EN sheet.



LIST OF DRAWINGS - XX WORK TYPE

DWG	TITLE	XX WORK TYPE CONTRACT SET SHEET NO.	XX WORK TYPE DOB SET SHEET NO.
X001	DRAWING LIST, SPECIAL INSPECTIONS, GENERAL NOTES	1	1
X002	TITLE	2	2
X003	TITLE	3	3
X101	TITLE	4	4
X102	TITLE	5	5
X103	TITLE	6	6
X201	TITLE	7	7
X401	TITLE	8	8
EN0X1	TITLE	9	9
EN0X2	TITLE	10	10
EN0X3	TITLE	11	11

SPECIAL INSPECTIONS - XX WORK TYPE

NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

PROGRESS INSPECTIONS - XX WORK TYPE

NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6

Note: Fill in work type from DOBNOW list.

Drawing List, Special & Progress Inspections, General Notes

DOBNOW # xxxxxxxx-Sx

Drawing No.: X001.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

CIP - SUBSEQUENT APPLICATION
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

ENERGY CODE PROGRESS INSPECTIONS - XX WORK TYPE	
NAME	BC SECTION
INSPECTION 1	BC 1234.5.6
INSPECTION 2	BC 1234.5.6
INSPECTION 3	BC 1234.5.6
INSPECTION 4	BC 1234.5.6
INSPECTION 5	BC 1234.5.6
INSPECTION 6	BC 1234.5.6
INSPECTION 7	BC 1234.5.6
INSPECTION 8	BC 1234.5.6
INSPECTION 9	BC 1234.5.6
INSPECTION 10	BC 1234.5.6
INSPECTION 11	BC 1234.5.6

CIP - SUBSEQUENT APPLICATION
REFERENCE THE DR 1-1-1-02 FOR COMPLETE REQUIREMENTS

Note: Put energy code tables, information specific to subsequent work type.

Energy Code Tables/Information, Progress Inspections.

DOBNOW # xxxxxxxx-Sx

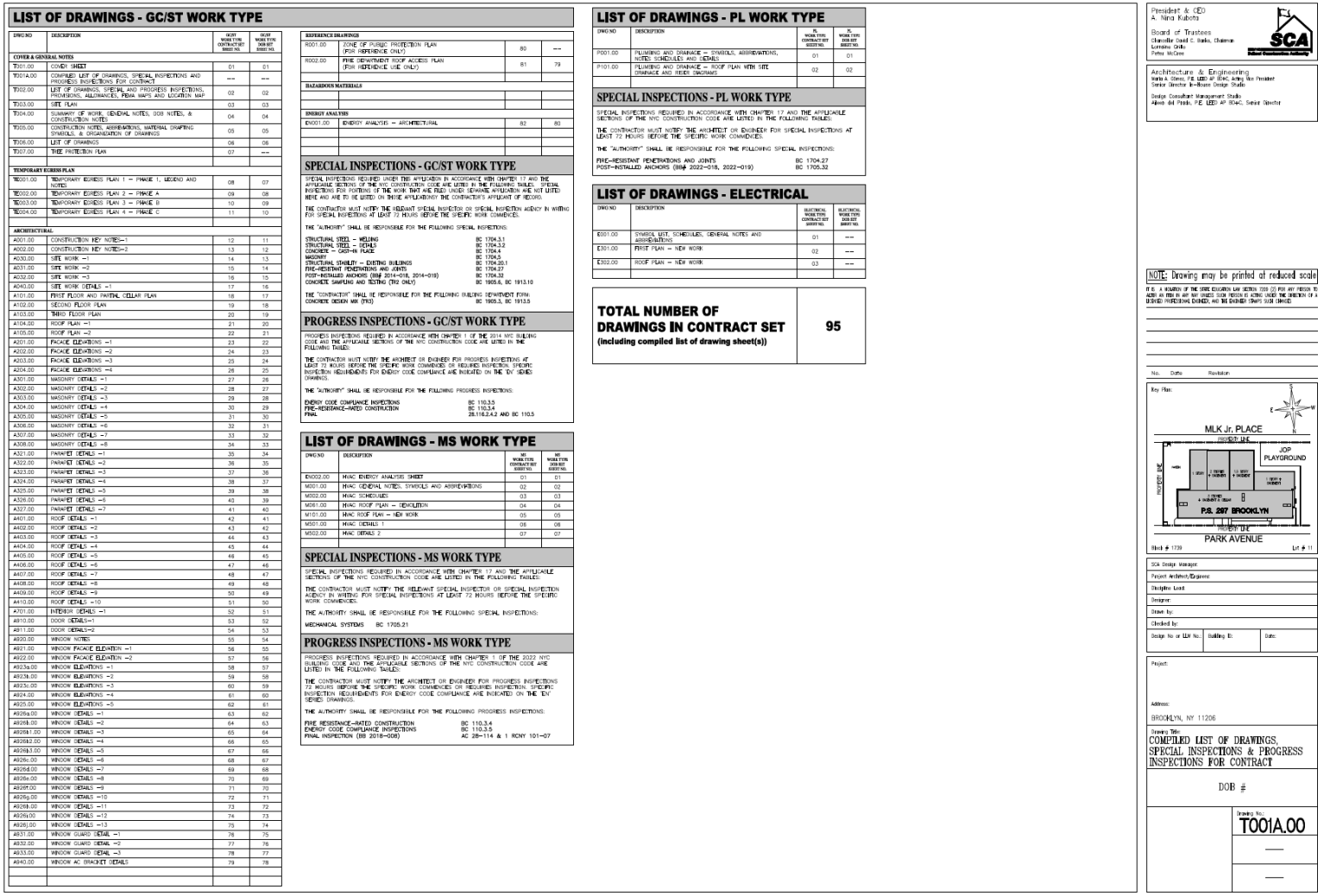
Drawing No.: EN0X1.00

Sheets in XX Work Type Contract Set: 1 of xxx

Sheets in XX Work Type DOB Filing Set: 1 of xxx

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Sample 'Compiled List of Drawings, Special Inspections & Progress Inspections for Contract"



LIST OF DRAWINGS - GC/ST WORK TYPE

DWG NO	DESCRIPTION	GC/ST WORK TYPE CONTRACT SET SHEET NO.	GC/ST WORK TYPE DOB SET SHEET NO.
COVER & GENERAL NOTES			
T001.00	COVER SHEET	01	01
T001A.00	COMPILED LIST OF DRAWINGS, SPECIAL INSPECTIONS AND PROGRESS INSPECTIONS FOR CONTRACT	---	---
T002.00	LIST OF DRAWINGS, SPECIAL AND PROGRESS INSPECTIONS, PROVISIONS, ALLOWANCES, PEMA MAPS AND LOCATION MAP	02	02
T003.00	SITE PLAN	03	03
T004.00	SUMMARY OF WORK, GENERAL NOTES, DOB NOTES, & CONSTRUCTION NOTES	04	04
T005.00	CONSTRUCTION NOTES, ABBREVIATIONS, MATERIAL DRAFTING SYMBOLS, & ORGANIZATION OF DRAWINGS	05	05
T006.00	LIST OF DRAWINGS	06	06
T007.00	TREE PROTECTION PLAN	07	---
TEMPORARY EGRESS PLAN			
TE001.00	TEMPORARY EGRESS PLAN 1 – PHASE 1, LEGEND AND NOTES	08	07
TE002.00	TEMPORARY EGRESS PLAN 2 – PHASE A	09	08
TE003.00	TEMPORARY EGRESS PLAN 3 – PHASE B	10	09
TE004.00	TEMPORARY EGRESS PLAN 4 – PHASE C	11	10
ARCHITECTURAL			
A001.00	CONSTRUCTION KEY NOTES–1	12	11
A002.00	CONSTRUCTION KEY NOTES–2	13	12
A030.00	SITE WORK –1	14	13
A031.00	SITE WORK –2	15	14
A032.00	SITE WORK –3	16	15
A040.00	SITE WORK DETAILS –1	17	16
A101.00	FIRST FLOOR AND PARTIAL CELLAR PLAN	18	17
A102.00	SECOND FLOOR PLAN	19	18
A103.00	THIRD FLOOR PLAN	20	19
A104.00	ROOF PLAN –1	21	20
A105.00	ROOF PLAN –2	22	21
A201.00	FACADE ELEVATIONS –1	23	22
A202.00	FACADE ELEVATIONS –2	24	23
A203.00	FACADE ELEVATIONS –3	25	24
A204.00	FACADE ELEVATIONS –4	26	25
A301.00	MASONRY DETAILS –1	27	26
A302.00	MASONRY DETAILS –2	28	27
A303.00	MASONRY DETAILS –3	29	28
A304.00	MASONRY DETAILS –4	30	29
A305.00	MASONRY DETAILS –5	31	30
A306.00	MASONRY DETAILS –6	32	31
A307.00	MASONRY DETAILS –7	33	32
A308.00	MASONRY DETAILS –8	34	33
A321.00	PARAPET DETAILS –1	35	34
A322.00	PARAPET DETAILS –2	36	35
A323.00	PARAPET DETAILS –3	37	36
A324.00	PARAPET DETAILS –4	38	37
A325.00	PARAPET DETAILS –5	39	38
A326.00	PARAPET DETAILS –6	40	39
A327.00	PARAPET DETAILS –7	41	40
A401.00	ROOF DETAILS –1	42	41
A402.00	ROOF DETAILS –2	43	42
A403.00	ROOF DETAILS –3	44	43
A404.00	ROOF DETAILS –4	45	44
A405.00	ROOF DETAILS –5	46	45
A406.00	ROOF DETAILS –6	47	46
A407.00	ROOF DETAILS –7	48	47
A408.00	ROOF DETAILS –8	49	48
A409.00	ROOF DETAILS –9	50	49
A410.00	ROOF DETAILS –10	51	50
A701.00	INTERIOR DETAILS –1	52	51
A810.00	DOOR DETAILS–1	53	52
A811.00	DOOR DETAILS–2	54	53
A920.00	WINDOW NOTES	55	54
A921.00	WINDOW FACADE ELEVATION –1	56	55
A922.00	WINDOW FACADE ELEVATION –2	57	56
A923a.00	WINDOW ELEVATIONS –1	58	57
A923b.00	WINDOW ELEVATIONS –2	59	58
A923c.00	WINDOW ELEVATIONS –3	60	59
A924.00	WINDOW ELEVATIONS –4	61	60
A925.00	WINDOW ELEVATIONS –5	62	61
A926a.00	WINDOW DETAILS –1	63	62
A926b.00	WINDOW DETAILS –2	64	63
A926b1.00	WINDOW DETAILS –3	65	64
A926b2.00	WINDOW DETAILS –4	66	65
A926b3.00	WINDOW DETAILS –5	67	66
A926c.00	WINDOW DETAILS –6	68	67
A926d.00	WINDOW DETAILS –7	69	68
A926e.00	WINDOW DETAILS –8	70	69
A926f.00	WINDOW DETAILS –9	71	70
A926g.00	WINDOW DETAILS –10	72	71
A926h.00	WINDOW DETAILS –11	73	72
A926i.00	WINDOW DETAILS –12	74	73
A926j.00	WINDOW DETAILS –13	75	74
A831.00	WINDOW GUARD DETAIL –1	76	75
A832.00	WINDOW GUARD DETAIL –2	77	76
A833.00	WINDOW GUARD DETAIL –3	78	77
A940.00	WINDOW AC BRACKET DETAILS	79	78

REFERENCE DRAWINGS			
R001.00	ZONE OF PUBLIC PROTECTION PLAN (FOR REFERENCE ONLY)	80	---
R002.00	FIRE DEPARTMENT ROOF ACCESS PLAN (FOR REFERENCE USE ONLY)	81	79
HAZARDOUS MATERIALS			
ENERGY ANALYSIS			
EN001.00	ENERGY ANALYSIS – ARCHITECTURAL	82	80

SPECIAL INSPECTIONS - GC/ST WORK TYPE

SPECIAL INSPECTIONS REQUIRED UNDER THIS APPLICATION IN ACCORDANCE WITH CHAPTER 17 AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLE. SPECIAL INSPECTIONS FOR PORTIONS OF THE WORK THAT ARE FILED UNDER SEPARATE APPLICATION ARE NOT LISTED HERE AND ARE TO BE LISTED ON THOSE APPLICATIONS BY THE CONTRACTOR'S APPLICANT OF RECORD.

THE CONTRACTOR MUST NOTIFY THE RELEVANT SPECIAL INSPECTOR OR SPECIAL INSPECTION AGENCY IN WRITING FOR SPECIAL INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES.

THE "AUTHORITY" SHALL BE RESPONSIBLE FOR THE FOLLOWING SPECIAL INSPECTIONS:

STRUCTURAL STEEL – WELDING	BC 1704.3.1
STRUCTURAL STEEL – DETAILS	BC 1704.3.2
CONCRETE – CAST-IN PLACE	BC 1704.4
MASONRY	BC 1704.5
STRUCTURAL STABILITY – EXISTING BUILDINGS	BC 1704.20.1
FIRE-RESISTANT PENETRATIONS AND JOINTS	BC 1704.27
POST-INSTALLED ANCHORS (BB# 2014–018, 2014–019)	BC 1704.32
CONCRETE SAMPLING AND TESTING (TR3 ONLY)	BC 1905.6, BC 1913.10

THE "CONTRACTOR" SHALL BE RESPONSIBLE FOR THE FOLLOWING BUILDING DEPARTMENT FORM:

CONCRETE DESIGN MIX (TR3)	BC 1905.3, BC 1913.5

PROGRESS INSPECTIONS - GC/ST WORK TYPE

PROGRESS INSPECTIONS REQUIRED IN ACCORDANCE WITH CHAPTER 1 OF THE 2014 NYC BUILDING CODE AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLE:

THE CONTRACTOR MUST NOTIFY THE ARCHITECT OR ENGINEER FOR PROGRESS INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES OR REQUIRED INSPECTION. SPECIAL INSPECTION REQUIREMENTS FOR ENERGY CODE COMPLIANCE ARE INDICATED ON THE 'EN' SERIES DRAWINGS.

THE "AUTHORITY" SHALL BE RESPONSIBLE FOR THE FOLLOWING PROGRESS INSPECTIONS:

ENERGY CODE COMPLIANCE INSPECTIONS	BC 110.3.5
FIRE-RESISTANCE-RATED CONSTRUCTION	BC 110.3.4
FINAL	28.116.2.4.2 AND BC 110.5

LIST OF DRAWINGS - MS WORK TYPE

DWG NO	DESCRIPTION	MS WORK TYPE CONTRACT SET SHEET NO.	MS WORK TYPE DOB SET SHEET NO.
EN002.00	HVAC ENERGY ANALYSIS SHEET	01	01
M001.01	HVAC GENERAL NOTES, SYMBOLS AND ABBREVIATIONS	02	02
M002.00	HVAC SCHEDULES	03	03
M061.00	HVAC ROOF PLAN – DEMOLITION	04	04
M101.00	HVAC ROOF PLAN – NEW WORK	05	05
M501.00	HVAC DETAILS 1	06	06
M502.00	HVAC DETAILS 2	07	07

SPECIAL INSPECTIONS - MS WORK TYPE

SPECIAL INSPECTIONS REQUIRED IN ACCORDANCE WITH CHAPTER 17 AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLES:

THE CONTRACTOR MUST NOTIFY THE RELEVANT SPECIAL INSPECTOR OR SPECIAL INSPECTION AGENCY IN WRITING FOR SPECIAL INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES.

THE AUTHORITY SHALL BE RESPONSIBLE FOR THE FOLLOWING SPECIAL INSPECTIONS:

MECHANICAL SYSTEMS	BC 1705.21

PROGRESS INSPECTIONS - MS WORK TYPE

PROGRESS INSPECTIONS REQUIRED IN ACCORDANCE WITH CHAPTER 1 OF THE 2022 NYC BUILDING CODE AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLES:

THE CONTRACTOR MUST NOTIFY THE ARCHITECT OR ENGINEER FOR PROGRESS INSPECTIONS 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES OR REQUIRED INSPECTION. SPECIFIC INSPECTION REQUIREMENTS FOR ENERGY CODE COMPLIANCE ARE INDICATED ON THE 'EN' SERIES DRAWINGS.

THE AUTHORITY SHALL BE RESPONSIBLE FOR THE FOLLOWING PROGRESS INSPECTIONS:

FIRE RESISTANCE–RATED CONSTRUCTION	BC 110.3.4
ENERGY CODE COMPLIANCE INSPECTIONS	BC 110.3.5
FINAL INSPECTION (BB 2018–008)	AC 28–114 & 1 RCNY 101–07

LIST OF DRAWINGS - PL WORK TYPE

DWG NO	DESCRIPTION	PL WORK TYPE CONTRACT SET SHEET NO.	PL WORK TYPE DOB SET SHEET NO.
P001.00	PLUMBING AND DRAINAGE – SYMBOLS, ABBREVIATIONS, NOTES, SCHEDULES AND DETAILS	01	01
P101.00	PLUMBING AND DRAINAGE – ROOF PLAN WITH SITE DRAINAGE AND RISER DIAGRAMS	02	02

SPECIAL INSPECTIONS - PL WORK TYPE

SPECIAL INSPECTIONS REQUIRED IN ACCORDANCE WITH CHAPTER 17 AND THE APPLICABLE SECTIONS OF THE NYC CONSTRUCTION CODE ARE LISTED IN THE FOLLOWING TABLES:

THE CONTRACTOR MUST NOTIFY THE ARCHITECT OR ENGINEER FOR SPECIAL INSPECTIONS AT LEAST 72 HOURS BEFORE THE SPECIFIC WORK COMMENCES.

THE "AUTHORITY" SHALL BE RESPONSIBLE FOR THE FOLLOWING SPECIAL INSPECTIONS:

FIRE–RESISTANT PENETRATIONS AND JOINTS	BC 1704.27
POST–INSTALLED ANCHORS (BB# 2022–018, 2022–019)	BC 1705.32

LIST OF DRAWINGS - ELECTRICAL

DWG NO	DESCRIPTION	ELECTRICAL WORK TYPE CONTRACT SET SHEET NO.	ELECTRICAL WORK TYPE DOB SET SHEET NO.
E001.00	SYMBOL LIST, SCHEDULES, GENERAL NOTES AND ABBREVIATIONS	01	---
E301.00	FIRST PLAN – NEW WORK	02	---
E302.00	ROOF PLAN – NEW WORK	03	---

TOTAL NUMBER OF DRAWINGS IN CONTRACT SET (including compiled list of drawing sheet(s))	95

President & CEO
A. Nina Kubota

Board of Trustees
Chancellor David C. Banks, Chairman
Lorraine Grillo
Peter McGoey

SCA
School Construction Authority

Architecture & Engineering
Maria A. Otero, P.E. LEED AP BD+C, Acting Vice President
Senior Director In-House Design Studio

Design Consultant Management Studio
Alexis del Prado, P.E. LEED AP BD+C, Senior Director

NOTE: Drawing may be printed at reduced scale

No. Date Revision

Key Plan:

MLK Jr. PLACE
PROJECT LINE
JOP PLAYGROUND
PROPERTY LINE
P.S. 297 BROOKLYN
PARK AVENUE
Block # 1739 Lot # 11

SCA Design Manager:
Project Architect/Engineer:
Discipline Lead:
Designer:
Drawn by:
Checked by:
Design No or LLW No.: Building ID: Date:

Project:

Address:
BROOKLYN, NY 11206

Drawing Title:
COMPILED LIST OF DRAWINGS, SPECIAL INSPECTIONS & PROGRESS INSPECTIONS FOR CONTRACT

DOB #

Drawing No.:
T001A.00

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

1.1 Contract Requirements

1.1.2 Specifications

1.1.2.1 Specification Format and Instructions

A. Format

1. The Authority's Specifications generally follow the Construction Specifications Institute format: Divisions, Sections, Articles, Paragraphs, and Subparagraphs.

2. Each Section, except for Division 1, is divided into three (3) parts: Part 1 – General, Part 2 – Products, and Part 3 – Execution. Some Sections may contain a "Part 4 - Schedules".

B. Language

1. The Specifications language uses both indicative and imperative mood. Where the imperative mood is used, the language is directed to the Contractor, unless specifically indicated otherwise.

2. Where a colon (:) is used after a subject, the phrase "shall be" (or variations thereof) is to be inferred.

3. Instruction Terms: Wherever reference is made in the Contract to the Work or its performance, the terms "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of similar import shall imply the direction, requirement, permission, order, designation or prescription of the Authority.

4. Approval and Acceptance Terms: "Approved", "acceptable" "satisfactory" and words of similar import shall mean and intend: approved by, acceptable to, or satisfactory to, the Authority.

5. Where the word "provide" is used, the meaning shall be that the item or product shall be furnished, delivered, and installed/erected/applied/connected for its intended use and as required for the completed Work.

C. Editing / Revising Specification Sections

The Specifications make reference and cross-reference to other Specification Divisions, Sections, Articles, Paragraphs, and Subparagraphs. Therefore a change in the numbering of a Section, Article, Paragraph, or Subparagraph may cause incorrect cross-referencing and coordination elsewhere in the Specifications.

In order to prevent such incorrect cross-referencing and coordination the Specifier shall revise and edit as follows:

- The Specifier may delete the Text Body of existing Articles, Paragraphs and subparagraphs by inserting the phrase "Not Used" after the number or alphanumerical identifier. At no time shall the Specifier actually "delete" the number or alphanumerical identifier.

- When the Specifier adds Articles, Paragraphs and subparagraphs it shall be at the end of the respective Article, Paragraph and subparagraph.

D. Notes to Specifier

The Note to Specifier may be found at the end of most Specification Sections, immediately after the last subparagraph of Articles 3 or 4.

1. Bookmarks

a. Bookmarks can be found typically in the left-hand margin of a page. See Example:



Upon seeing such Bookmark the Specifier shall make immediate reference to the "Notes to Specifier" and read the printed instructions as to what needs to be revised within the Specification Section.

2. Notes

The actual "Notes to Specifier" provides printed instructions that may include but are not limited to the following:

- Deletion of Articles, Paragraphs, Subparagraphs and other references within the Section
- Revisions to be made to specific Articles, Paragraphs, Subparagraphs to accommodate specific products, materials and conditions
- Verification of intended use with Architect/Engineer
- When to use specific products and or materials

The Specifier shall after completing their revisions, edits and coordination of the Specification Section shall DELETE the "Notes to Specifier" and all related instruction from the Specification Section.

1.1 Contract Requirements

1.1.3 Report Format

1.1.3.1 Feasibility Study - New Buildings, Additions and Conversions of Existing Buildings

Instructions to Users:

The format of the Feasibility Study required by the Authority for New Buildings, Additions, and Existing Building Conversions is described herein. The Cover, Table of Contents, Sections, Paragraphs, Appendices and Format shall be strictly adhered to unless specific instructions are provided otherwise by the Authority's Representative. Please note that the various examples cited herein are not project specific.

A Project Cost Estimate in a format required by the Authority shall be provided under separate cover.

FORMAT

Binder:

The Feasibility Study shall be bound in a ½" to 1" thick clear view three-ring binder with inside pockets front and back, Dividers shall be provided to separate the individual Sections within the Study, and three hole-punched 8.5" x 11" paper shall be used throughout the Study.

Cover Format:

The cover of the Feasibility Study shall provide the following information:

- NYCSCA Logo
- Name and Address of the NYCSCA
- Type of Study
- Date of Study
- Name and address of the Project
- Block and Lot Number for the Property
- The name and title for the following positions held within the NYCSCA;
  - President and CEO
  - Vice-President of Architecture & Engineering
  - Studio Director
- Graphics (optional)

Example: (See next page)



PS/IS - Brooklyn
New Building
Unadjusted Capacity - 822

701 Caton Avenue
Brooklyn, N.Y. 11218
Block – 5321 / Lot – 64
LLW #051360

April 15, 2008

Sharon Greenberger, MCP
President and CEO

E. Bruce Barrett, RA
Vice President, Architecture & Engineering

Maria Gomez, PE
Director, Architecture & Engineering
Studio 3

Feasibility Study

New York City School Construction Authority / 30 - 30 Thomson Avenue, L.I.C., NY 11101

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

Cover Page Format:

The cover page, which shall be the first page within the Study, shall provide the following information:

- Type of Study
- Name and address of the Project
- Block and Lot Number for the Site / Property
- Name of Firm that Prepared the Study

Example: (See next page)

FEASIBILITY STUDY

PS/IS - Brooklyn
New Building
Unadjusted Capacity - 822
District 15

701 Caton Avenue
Brooklyn, N.Y. 11218
Block – 5321
Lot –64

Prepared By:
NYC School Construction Authority
30-30 Thomson Avenue, L.I.C., NY 11101-3045

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

Table of Contents

The Table of Contents shall be divided into eight (8) typical Sections that shall be preceded by the required Executive Summary.

Example: (See next page)

TABLE OF CONTENTS:

EXECUTIVE SUMMARY ..... Page 01

01. INTRODUCTION ..... Page 02

02. OVERVIEW OF THE EDUCATIONAL PROGRAM OF REQUIREMENTS ..... Page 03

03. EXISTING SITE CHARACTERISTICS, PHOTOGRAPHS AND DESIGN INFLUENCES ..... Page 04

04. ZONING REGULATIONS ..... Page 10

05. NYC BUILDING CODE ..... Page 11

06. PROPOSED PROGRAM OF REQUIREMENTS) ..... Page 17

07. DESIGN APPROACH AND (MODEL) SCHEME) ..... Page 21

- Site / First Floor Plan ..... Page 21
- Second Floor Plan ..... Page 22
- Third Floor Plan ..... Page 23
- Fourth Floor Plan ..... Page 24
- Cellar Plan ..... Page 35

08. APPENDICES ..... Page 26

- APPENDIX A ..... Original Request for Feasibility Study
- APPENDIX B ..... Sanborn / Tax map
- APPENDIX C ..... Community Connectivity / Half-Mile Radius Map
- APPENDIX D ..... Environmental Hazards Map
- APPENDIX E ..... Draft Program of Requirements

Footnotes:

* - If the Phase I Environmental Site Assessment is not available do not include in the Appendix.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

Page Format:

The page format for the Study shall provide a Standard Header and Footer on each page. Each page shall provide the following information:

- Header:
  - SCA Logo
  - School / Project Name
  - Address
  - LLW#
- Footer:
  - Date
  - Feasibility Study
  - Page Number

Executive Summary

The "Executive Summary" shall be a concise narrative that provides the reason for the Study, the location of the Site, a description of the Site, other pertinent information essential to the understanding of the project, and shall summarize significant issues and concerns that may adversely impact the development of a project and/or present significant challenges to the development of the project.

In addition, a conclusion shall be provided that states whether or not a project is feasible and it shall state that the final determination of the project's practicality remains with the Authority's "Feasibility Committee" and the Department of Education (DOE).

Example: (See next page)

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

EXECUTIVE SUMMARY

The objective of this "Feasibility Study" is to identify existing site characteristics, local environmental conditions, and zoning regulations as well as other design influences to determine the feasibility of providing a new Primary / Intermediate School with an Unadjusted Capacity of 822, and to identify those issues and concerns that are related to its practicality and constructability at the subject Site, which is located at 701 Caton Avenue, Brooklyn, New York 11218.

In general, the subject Site is part of a larger urban environment (Brooklyn, N.Y.), and is comprised of one (1) developed Tax Lot (#64) that is located within a Residential (**R6**) Zoning District that is within a Special Purpose District (**OP**) known as "**The Special Ocean Parkway District**". Schools are permitted as-of-right.

The Site is relatively rectangular, relatively flat, approximately 29,210 square feet in area and is presently vacant previously developed land.

The design scheme for the subject school building, as presented herein, can be simply described as being "I"-shaped, 4-Stories with a cellar, has a total gross floor area of approximately 93,000 square feet. Available open area for rest and recreation is limited to approximately 9,900sf, which is approximately 10,000sf less (-50%) than the desired amount of open space.

> *Note: If the adjacent properties that lie to the north of the subject property, on Kermit Place, which are either presently occupied by wood frame residential dwellings or vacant previously developed land, were acquired with the subject property, it would provide additional area for the planning and layout of the proposed school and for the much needed outdoor play area. (See Appendix B)*

In order to fully understand the existing conditions and design influences, this Feasibility Study develops a theoretical scheme for the development of the subject school site and identifies the issues and concerns related to the site and the design scheme. Although the design scheme provided herein addresses various Site influences such as, but not limited to, area, dimensions, geometry, topography, and the surrounding developed environment, the following **issues** and **concerns** related to the site and the proposed design are those that should receive due consideration:

- In order to prevent the building from exceeding 75-feet in height, the Auditorium is designed as a 1-story space rather than as a typical 2-story space.
- Available open area for recreation is significantly limited. (See Section 07.)
- The development of the proposed school on the subject Site will require *"Zoning Waivers"* for non-compliance with "bulk" regulations as outlined in Section 04. Zoning Regulations.
- The building height of the proposed school and its proximity to adjacent residential homes and commercial structures may have an adverse impact on existing chimneys.

Conclusion:

Notwithstanding the aforementioned issues and concerns, if the "Feasibility Committee" determines that the subject Site and its proposed use is **practical**, the DOE accepts the location and the proposed design approach for the school, and there is nothing found in the "Phase I and Phase II Environmental Site Assessment" and "State Environmental Quality Review (SEQRA) Assessment" that would preempt the development of the site, the site **is feasible** for a stand-alone building.

Please note that at this time neither a "Phase I and II Environmental Site Assessment", which would provide information relevant to hazardous materials as well as topographical and geological soil conditions, nor a "State Environmental Quality Review (SEQRA) Assessment", which would provide information relevant to the impact on Traffic, Utilities, Water, Open Space/Recreation, etc..., are available. These reports are necessary to determine if the development of the Site will negatively impact the community or if the community will negatively impact the school and if there are extenuating conditions that may prevent the proposed development of the Site.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

01. INTRODUCTION

The “Introduction” shall be a concise description of the Study’s purpose, depth of analysis, and criteria used for the development of the Study.

Example: (See next page)

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

01. INTRODUCTION

The objective of this "Feasibility Study" is to identify existing conditions, zoning regulations, as well as other design influences and determine if the Educational Program of Requirements for the subject school is possible and practical for the Site.

The Study provides information that will influence the development of the Site, such as:

- Site characteristics
- Site utilization
- Topography
- Zoning Regulations
- Utilities and Services
- Historical significance
- Transportation
- Hazardous Environmental Conditions

In addition to identifying and analyzing the design influences, the Study provides a "theoretical" design scheme for the subject school. The Study facilitates an evaluation of the Site in terms of sustaining the building's bulk (size and mass), meeting the Educational Program of Requirements, allowing for a functional design, and for providing for the safety, health and comfort of the school children, administration and community with or without accommodations and/or compromise.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

02. Overview of the Educational Program of Requirements

This section of the Study shall provide the schools capacity and a general outline of the Educational Program of Requirements as well as any other Guidelines provided by the Authority for the planning and development of the proposed educational facility. Detailed requirements shall be provided in Section 06.

Example: (See next page)

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02. OVERVIEW OF THE EDUCATIONAL PROGRAM OF REQUIREMENTS*

The following Program of Requirements provided is for a typical new PS/IS with an Unadjusted Capacity of 822 seats.

Instruction	➢ Pre-Kindergarten, Kindergartens, Classrooms, Resource Rooms, CSD Sp. Ed. Classrooms, and City-Wide Special Education
Specialized Instruction	➢ Art Classroom, Music Suite
Science	➢ Science Resource Room, Science Lab/Demo Room and Prep/Storage Rooms
Physical Education	➢ Gymnasium with M/F Locker-Changing Rooms, Early Childhood Playground and General Playground
Assembly	➢ Auditorium
Library	➢ Library Complex
Student Support	➢ Guidance Suites, School Based Support Team, Medical Suite
Storage	➢ Book Storage, General Storage and Furniture Storage
Administration	➢ Administrative Suite, Support Offices and Spaces, Staff Areas and Parent / Community Room
Kitchen / Cafeteria / Staff Lunch	➢ Student Dining and Kitchen
Custodial	➢ Custodial Areas, Storage and Equipment Rooms

** - See Section 06 for a detailed listing of the educational program for this Study and any changes that may be proposed as a result of this Study.*

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

03. Existing Site Characteristics, Photographs and Design Influences

This section of the Study shall describe in detail existing site characteristics and both positive and negative design influences that exist within the site's property lines and the surrounding community. This section shall be subdivided into the following paragraphs with narratives, which shall be accompanied by color photographs, maps, diagrams and other graphics as may be necessary so to present a clear understanding to the reader of the Study;

a. Site Description / Local Environment and Surroundings:

The narrative within this paragraph shall provide the site's area, shape, location, and Zoning District(s) as well as a description of the site, all adjacent streets and properties as well as the surrounding community's infrastructure.

b. Utilization

The narrative within this paragraph shall describe in detail the existing or previous use(s) of the Site. The description shall include the type of buildings (residential, commercial, manufacturing….), height and construction of buildings, type of commercial of manufacturing use of the Site and condition of the physical improvements on the Site. The paragraph should also state specifically if the site is public parkland.

c. Topography / Geology / Soils

The narrative within this paragraph shall describe the topography, geology and soil conditions to the greatest extent possible. If available, borings and the geology report, as well as the "Phase I Environmental Site Assessment" for the Site, should be utilized. However, if borings, geology reports or the "Phase I Environmental Site Assessment" for the Site are not available, records of adjacent properties should be researched (NYC Building Department) and if no such records are available, then an assumption based on visual inspection of surrounding properties should be provided.

The narrative shall also address the need to comply with submission of a Stormwater Pollution Prevention Plan with the New York State Department of Environmental Conservation (DEC).

Provide sustainable site information and indicate if the site is:

- Previously undeveloped land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency.

- Within 100 feet of any wetlands as defined by United States Code of Federal Regulations 40 CFR, Parts 2130-233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent.

- Previously undeveloped land that is within 50 feet of a water body, defined as seas, lakes, rivers, streams and tributaries which support or could support fish, recreation or industrial use, consistent with the terminology of the Clean Water Act.

Indicate specifically whether the site is identified as habitat for any species on Federal or State threatened or endangered lists. Provide confirmation letter from US Fish and Wildlife Service 500 Saint Marks Lane Islip NY 11751. If the feasibility is completed prior to obtaining this information, state so and indicate it will be provided during the pre-schematic report.

Sustainable system opportunities – Indicate if site has special site has factors that would make alternative systems effective. Factors affecting viability of permeable asphalt pavement and geothermal systems should be described.

d. Zoning

The narrative within this paragraph shall provide a general overview of the applicable Zoning District(s) and the General Provisions of such Districts as provided by the NYC Zoning Resolutions.

e. Utilities

The narrative within this paragraph shall identify the location and availability of local utilities and services in relation to the Site. This information is typically provided on an "architectural survey". If a survey is not available, information should be researched and obtained from local governing public agencies (NYC Building Department, NYC Department of Environmental Protection, NYC Department of Transportation, etc…) and local utility companies (Con Edison, KeySpan, Time Warner, Verizon, etc…) if possible.

f. Sanitation / Refuse Removal

The narrative within this paragraph shall identify the type of removal provided and the frequency of pick-up/removal of refuse by the NYC Department of Sanitation. This information can be obtained by contacting the NYC Department of Sanitation. Provide information on re-cycling pick-up as well as regular pick-up.

g. NYS Office of Parks, Recreation, and Historic Preservation (OPRHP)-State Historical Preservation Office (SHPO) / NYC Parks Department

The narrative within this paragraph shall identify any historical significance of physical improvements on the Site (buildings, monuments, etc…), any property owned and operated by the NYC Parks Department as well as the existence of street trees in the sidewalk, which fall under the jurisdiction of the NYC Parks Department. The historical significance of physical improvements on the Site should be researched with the New York State Office of Parks, Recreation and Historic Preservation.

h. Public and Private Transportation

The narrative within this paragraph shall identify the availability of local public transportation for the site and vehicular access to the Site. This information shall be obtained by visual observations of the Site's surroundings as well as researching information with the Metropolitan Transportation Authority, Department of Transportation and Street Maps. Indicate on a plan whether there are existing (or planned and funded) commuter, rail, light rail or subway station within ½ mile pedestrian route to the site, and bus line stops within ¼ mile pedestrian route to the site. Provide distance to these stations/stops in miles.

i. Site Specific Environmental Hazards and Conditions

The "Phase I Environmental Site Assessment" (ESA), which would provide Site Specific Environmental Hazards and Conditions, is typically requested when a Feasibility Study is initiated. If the "Phase I Environmental Site Assessment" is available prior to the completion of the Feasibility Study, the information contained therein should be incorporated within applicable Sections within the Study. The narrative within this paragraph shall state why an ESA was performed and the Executive Summary of

the ESA shall be included in the Appendices of the Study.

The following information is typically provided in the "Phase I Environmental Site Assessment":

1) Description of Adjacent Properties
2) Site Historical Use
3) Regulatory Agency Records
4) Hazardous Materials and Petroleum Product Storage and Handling
5) Solid Waste Generation, Storage and Disposal
6) Underground and Aboveground Storage Tanks (USTS and ASTS)
7) Polychlorinated Biphenyls (PCBS)
8) Asbestos-Containing Materials, Radon
9) Topography, Geology, Soils and Hydrology

j. Sustainable Site Community Connectivity and Development Density Information

Provide community connectivity and development density information as per site credit S1.4 as described in the NYC Green School Guide and LEED-NC Version 2.2 Sustainable Sites Credit 2. Confirm that the project site meets the desired level of community connectivity and development density using one of the following two options. Provide documentation for the option used and provide a summary of the results:

Option 1: Submit a sketch plan locating any residential development of 10 units per acre or greater within ½ mile of proposed building entrance, and ten basic services within ½ mile of the building entrance and with pedestrian access from the building. *(Example – See page 21 and Appendix C)*

Option 2: Determine if the proposed project and its community area have a development density of 60,000sf/acre. Development density for the building (sqft/acre) = projected gross building square footage/project site area (acres).

To determine area considered community for this calculation, determine density radius as follows:
Density radius (LF) = 3 x square root of (Property area [acres] x 43,560[sqft/acre])

Determine the development density for each lot within that radius distance of the building and find an average development density to determine if the development density for this area is **at least** 60,000/acre.

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03. EXISTING SITE CHARACTERISTICS, PHOTOGRAPHS AND DESIGN INFLUENCES

This section of the Study describes existing site characteristics as well as positive and negative design influences that exist within the site's property lines and the surrounding community.

a. Site Description / Local Environment and Surroundings:

The property presently lies within an **(R6)** Residential Zoning District that is situated within a Special Purpose District **(OP)** known as "**The Special Ocean Parkway District**".

The Site, Tax Lot #64, is approximately 29,210 square feet in area that is presently vacant land that was previously developed commercial property. See Paragraph b. Utilization, below.

The Site is bounded by three (3) streets and residential buildings.

The general surroundings and conditions that surround the Site can be seen in the following photographs that accompany the description of the Sites boundaries.



Photo Key Map

Caton Avenue / South Property Line: The southern property line, which is parallel to Caton Avenue, is approximately 248-feet long. The following photos (#1 and #2) look east and west, respectively, along Caton Avenue.

- The Site is relatively flat along this property line.
- Caton Avenue is a wide (90-feet) two-way street with moderate to heavy traffic that consists of commercial, public, and private transportation. Traffic flow is from east and west.
- The street curb to property/street line depth in front of the site/property is approximately 15-feet.
- Although the street is in good condition, the sidewalk and street curb are in poor condition.
- There are no sidewalk street trees or overhead utility lines for the entire length of the Site.
- There is a MTA Bus Stop (B16) in front of the Site.
- There is a traffic light at the intersection formed by Caton Avenue and East 7th Street.



Photo #1



Photo #2

April 15, 2008 Feasibility Study - New Building Page 4

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

East 8th Street / East Property Line: The eastern property line, which is parallel to East 8th Street, is approximately 100-feet long. The following photos (#3 and #4) look north and south, respectively, along East 8th Street.

- The Site is relatively flat along this property line.
- East 8th Street is a narrow (50-feet) two-way street, with light traffic that consists of commercial and private transportation. Traffic flow is from west to east.
- The street curb to property/street line depth in front of the site/property is approximately 10-feet.
- Although the street is in fair condition, the sidewalk/street curb is in poor condition.
- There are no sidewalk street trees or overhead utility lines for the entire length of the Site.
- Street parking is regulated on Wednesdays and Thursdays between 11:30AM and 1:00PM.
- There is no traffic light at the intersection formed by East 8th Street and Caton Avenue.



Photo #3



Photo #4

North Property Line: The eastern property line, which is perpendicular to both East 7th and East 8th Streets, is approximately 248-feet long, and separates the Site from an adjacent 7-story apartment building and residential 2-story dwellings. The following photos (#5 and #5) look east and west at the east property line.

- A 7-story apartment building on East 8th Street is on the property line with windows facing the subject property.
- The property line on East 7th Street is presently improved by a temporary construction fence. (Note: Lots #44 and #73, are now vacant lots. It appears that the previously existing residential dwellings were demolished.)
- The Site is relatively flat along this property line.



Photo #5



Photo #6

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East 7th Street / West Property Line: The west property line, which is parallel to East 7th Street, is approximately 101-feet long. The following photos (#7 and #8) look north and south, respectively.

- The Site is relatively flat along this property line.
- East 7th Street is a narrow (60-feet) two-way street, with light traffic that consists of commercial and private transportation. Traffic flow is from south to north.
- The street curb to property/street line depth in front of the site/property is approximately 10-feet.
- Although the street is in fair condition, the sidewalk/street curb is in poor condition.
- There are no sidewalk street trees or overhead utility lines for the entire length of the Site.
- Street parking is regulated on Wednesdays and Thursdays between 11:30AM and 1:00PM.



Photo #7



Photo #8

b. Utilization

The proposed Site is comprised of (1) Tax Lot (#64). The existing property is utilized as follows:

- Lot 64 701 Caton Avenue : This property lies within a R6 Residential Zoning District and is vacant land.

c. Topography / Geology / Soils

The Site is relatively flat and is not within a 100-year flood plane as defined by the Federal Emergency Management Agency, is not within 100 feet of any wetlands as defined by United States Code of Federal Regulations 40 CFR, Parts 2130-233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent, nor is it previously undeveloped land that is within 50 feet of a water body, defined as seas, lakes, rivers, streams and tributaries which support/could support fish, recreation or industrial use, consistent with the terminology of the Clean Water Act. The Site is **1.74-miles** from a designated 100-year flood and is located in Zone Type "X", which is an area determined to be outside the 0.2% annual chance floodplain.

Not Available

FEMA Flood Map

The area of the Site is approximately (29,210sf), which is less than 1-acre (43,560sf) in area and thus is **not** subject to NYS Department of Environmental Conservation Rules & Regulations for "Stormwater Discharges from Construction Activity".

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Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

The Site and surrounding vicinities comprise part of a larger urban environment (Brooklyn, New York) that has been fully developed and is not believed to provide a habitat for any species on a Federal or State threatened or endangered lists.

The geology and soil conditions that would be provided by "Borings" or in the "Phase I Environmental Site Assessment" are not available at this time.

d. Zoning

The property presently lies within a Residential Zoning District (R6) and is bounded by an (R5) Residential Zoning District on Caton Avenue. The general purposes of Residential Districts are to;

(a) provide for sufficient space in appropriate locations for residential development,

(b) protect residential areas against fire, explosions, toxic and noxious matter, radiation, and other hazards, and against offensive noise, vibration, smoke and other particulate matter, odorous matter, heat, humidity, glare, and other objectionable influences,

(c) protect residential areas, as far as possible, against heavy traffic and through traffic of all kinds,

(d) protect residential areas against congestion, as far as possible, by regulating density of population and the bulk of buildings in relation to the land around them and to one another..... and provide a more desirable environment for urban living in a congested metropolitan area,

(e) protect the character of certain designated areas of historical and architectural interest,



Zoning Map (22c)

(f) provide access of light and air to windows and for privacy, as far as possible, by controls, over the spacing and height of buildings and other structures,

(g) provide appropriate space for those educational, religious, recreational, health, and similar facilities which serve the needs of the nearby residents, which generally perform their own activities more effectively in a residential environment, and which do not create objectionable influences,

(h) provide freedom of architectural design, in order to encourage the development of more attractive and economic building forms, and to

(i) promote the most desirable use of land and direction of building development in accord with a well-considered plan, to promote stability of residential development, to protect the character of the district and its peculiar suitability for particular use, to conserve the value of land and buildings, and to protect the City's tax revenues.

The purposes of the various districts that the Site lies within are as follows:

- General Residential Districts such as an R3-2, R4, R5, **R6,** R-7, R-8, R-9 and R-10 is to provide for all types of residential buildings, in order to permit a broad range of housing types, with appropriate standards for density, open space, and spacing of buildings. The various districts are mapped in relation to a desirable future residential density pattern, with emphasis on accessibility to transportation facilities and to various community facilities, and upon the character of existing development. These districts also include community facilities and open uses which serve the residents of these districts or are benefited by a residential environment.

The Site is also designated as being within **"The Special Ocean Parkway District" (OP),** which is designed to promote and strengthen the scenic landmark designation of Ocean Parkway by requiring landscaping along Ocean Parkway to; maintain the existing scale and character of the community by limiting the bulk of permitted community facilities; protect the environmental quality of and improve circulation within the District; and to promote the most desirable use of land in this area and thus to conserve the value of land and thereby protect the City's tax revenue.

Zoning Regulations pertaining to the "Special Purpose District" **(OP)** supersedes the applicable provisions that may apply to both residential and commercial portions of the Site.

e. Utilities

The subject Site is bounded by (3) streets and residential properties; East 7th and east 8th Streets are fully developed residential buildings while Caton Avenue is occupied and fully develop with residential / commercial buildings. Utilities and services are available to the Site from its adjacent street(s) as follows:

East 7th Street:

Sanitary / Storm	12" Combined	Cable	TBD(1)	*Telephone*	*TBD (1)*
Water	8-Inch Main	Electric	TBD(1)	Gas	*TBD (1)*

Caton Avenue:

Sanitary / Storm	18" Combined	Cable	TBD(1)	*Telephone*	*TBD (1)*
Water	8-Inch Main	Electric	TBD(1)	Gas	*TBD (1)*

East 8th Street:

Sanitary / Storm	15" Combined	Cable	TBD(1)	*Telephone*	*TBD (1)*
Water	8-Inch Main	Electric	TBD(1)	Gas	*TBD (1)*

(1) – To Be Determined (TBD)

f. Sanitation / Refuse Removal

General refuse removal for the proposed design will be on a daily basis and will be provided at curbside. Removal of recyclables will be provided as per the NYC Department of Sanitation's schedule for such removals. (Note: Containerization is not required for the subject school.)

g. State Historical Preservation Office (SHPO) / Parks Department

NY State Historical Preservation Office

Neither the vacant lot nor any other physical improvements on the Site (commercial parking lot) has been determined as of yet to have any historical significance with the New York State Office of Parks, Recreation and Historic Preservation. If the project is approved, a filing will be required with New York State Office of Parks, Recreation and Historic Preservation for a final determination in regard to any historical significance.

h. Public and Private Transportation

Public transportation is available within a **¼ Mile** of the Site and is located and provided as follows:

Public Bus Service

Local bus service is provided by MTA Bus Line 16, 35, 68, and 103 Lines and all stops are within a **¼ Mile** of the Site along pedestrian routes.

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Public Subway / Train Service

Local train service is provided by MTA "F" Subway Line and stops are within ½ Mile of the Site along pedestrian routes.

Private Vehicular Transportation

See street descriptions above in Section 02.-Existing Site Characteristics, Photographs and Design Influences, Paragraph a. - Local Environment and Surroundings.



MTA Subway/Bus Map

i. Site Specific Environmental Hazards and Conditions

The "Phase I Environmental Site Assessment" (ESA), which typically provides Site Specific Environmental Hazards and Conditions, is typically requested when a Feasibility Study is initiated. The following information is typically provided in the "Phase I Environmental Site Assessment": Description of Adjacent Properties, Site Historical Use, Regulatory Agency Records, Hazardous Materials and Petroleum Product Storage and Handling, Solid Waste Generation, Storage and Disposal, Underground and Aboveground Storage Tanks (USTS and ASTS), Polychlorinated Biphenyls (PCBS), Asbestos-Containing Materials, Radon, Topography, Geology, Soils and Hydrology

Please note that a Phase I Environmental Site Assessment (ESA) was not available during the preparation of this Study. However, a search of available public records indicates that a tank test failure and tank test failures have occurred in the local area and that an "air Discharge Facility" (Gas Station) is adjacent to the Site. *(See Appendix D – Environmental Hazards).*

j. Sustainable Site Community Connectivity and Development Density Information

Consistent with the Authority's New York City Green Schools Guide Section S1.4 Sustainable Sites Option 1 – Community Connectivity or Development Density, the Site satisfies Options 1 requirements as follows:

1. Involves the construction of a building on a previously developed Site, and
2. At least ten (10) Basic Services, which meets the minimum requirement of ten (10), are located within a ½ mile radius of the Site. *(See Appendix C – Community Connectivity Map)*, and
3. Pedestrian access is possible between the Site and required Basic Services.
4. The Site lies within residential and commercial districts and the average density of the neighborhood exceeds 10 dwellings per acre, and



New York City Census / 2000Census Profile
Census Tracts/Queens: 504, 524, 502.01, 522, 502.02, 506, 498, 496, 512, 500

**Number of households has been obtained from the New York City Census / 2000 Census Profiles for New York City for tracts of land that are within a ½ mile buffer of the Site.*

- Area within a ½ mile radius .....502.4 Acres
- The number of total dwellings within a ½ mile radius of the Site is.....15,509 Households*

15,509 / 502.4 = 30.86 dwellings per acre > 10 dwellings per acre

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Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

04. ZONING REGULATIONS, TABLES, REMARKS, CALCULATIONS AND DIAGRAMS

The Zoning Analysis can be both extensive and complex. The Analysis shall consider all Zoning Regulations applicable to the District(s) in which the Site is located. The purpose of a comprehensive review of all Zoning Regulations is to ensure that the necessary due diligence is performed in this regard. Zoning Regulations that are overlooked can lead to future consequences and Zoning Waivers, which are to be avoided and if not to be avoided, addressed as early as possible.

Although all applicable Zoning Regulations should be explored, it is not necessary to identify each Zoning Regulation. However, the narrative shall identify applicable Zoning District(s), Special Purpose Districts and other special considerations as defined by NYC Zoning Regulations. In addition Zoning Regulations that may have an adverse affect on the development of a project, as per the theoretical design provided within a Study, shall be identified.

The narrative shall be accompanied by a “Zoning Lot / Site Plan” that locates the “theoretical design” on the Site for illustrative purposes and provides critical dimension as well as the building’s proposed height.

Example: (See next page)

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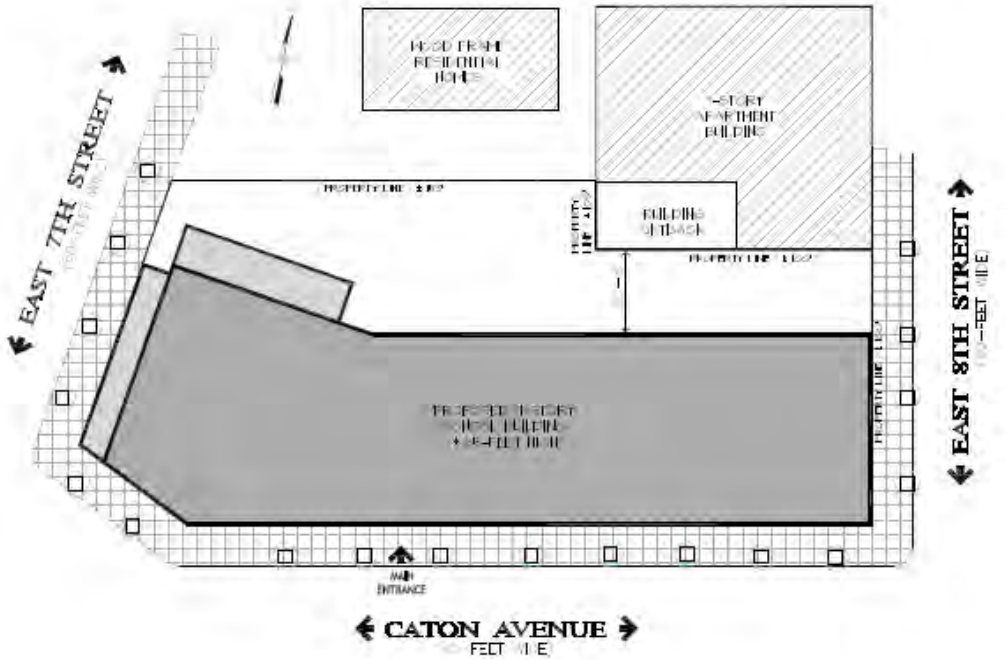
04. ZONING REGULATIONS

As previously indicated, the subject Site is located partially in a **R6** Residential Zoning District that is bounded by an **(R5)** Residential Zoning District on Caton Avenue, and is situated within a Special Purpose District **(OP)** known as "**The Special Ocean Parkway District**".

At this time, it is anticipated that compliance would not be possible for the development of the subject school on the subject Site with required Zoning Regulations such as, but not limited to:

- ZR24-522 ..... Maximum Height of Front Wall (60-feet)
- ZR113-51 ..... Maximum Permitted Floor Area (1.50)

In addition to the above, certification [ZR113-11(d)] by the City Planning Commission for Community Facility Uses on Certain Corner Lots, may be necessary so that bulk regulations as per Article II, Chapter 4 may be made applicable for the proposed development of the Site. If certification were to be granted the Maximum Permitted Floor Area may be increased to 4.80 as permitted by ZR24-11.



ZONING LOT / SITE PLAN

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

05. NYC BUILDING CODE

A Building Code Analysis can be both extensive and complex. This Analysis shall be limited to illustrating that egress has been provided and fire-ratings required for the proposed construction class of the building have been considered in the design of the "theoretical scheme".

Egress

Corridor and stair locations shall be illustrated in the "theoretical scheme".

Construction Class

Construction Class of the building, the building's location on the Site and its proximity to adjacent structures raise unique design issues that will need to be addressed in the design at additional costs. Therefore, the following needs to be considered in the planning and location of the school on any Site.

Remarks shall be provided for each Code regulation. Remarks shall indicate whether or not the regulation is applicable to the building and if so the result of its applicability.

Example: (See next page)

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05. NYC BUILDING CODE

This Analysis is typically limited to evaluating fire-ratings required for the proposed construction class of a new building and to ensure that egress has been properly addressed in the design of the "theoretical scheme".

Construction Class

The following Table (Table -4) analyzes the fire rating requirements for specific conditions in regard to a building with a Construction Class of "1-C" / Non-Combustible. Specific Codes regulate the type fire-ratings associated with certain types of construction and where and how they are used. Therefore, the building's design, construction, location on the Site and its proximity to adjacent structures may raise unique design issues that will need to be addressed in the design.

Building Code Construction Class Analysis

Table – 4

Code Section	Description			Remarks
§27-78 - Construction Class: 1-C	Includes buildings and spaces in which the bearing walls and other major structural elements are generally one-hour fire rated.			See below.
Table 3-4 – Construction Classification Construction Element		Rating in Hours	Allowable Exterior Openings (1)	
Exterior Walls with an Exterior Separation of 3-Feet or less	Non-Bearing Exterior Walls	2	Not Permitted	No such condition.
Exterior Walls with an Exterior Separation more than 3-Feet but less than 15-Feet		2	3.33% Protected	No such condition.
Exterior Walls with an Exterior Separation 15-Feet or more but less than 30-Feet		1	3.33% Protected	East 8th Street is a narrow 50-foot wide street. Hence, the distance from the building to the street centerline will be 25-feet. (3)
Exterior Walls with an Exterior Separation 30-Feet or more		0	No Limit	Has no bearing on the design of the building envelope or location on the site.
Interior Bearing Walls and Bearing Partitions		2		No such condition.
Enclosure of Vertical Exits, Exit Passageways, Hoists and Shafts		2		Has no bearing on the design of the building envelope or location on the site.
Fire Divisions and Fire Separations		See Article 5		Has no bearing on the design of the building envelope or location on the site.
Columns, Girders, Trusses (other than Roof Trusses), and Framing	Supporting One Floor	1.5		Has no bearing on the design of the building envelope or location on the site.
	Supporting more than One Floor	2		Has no bearing on the design of the building envelope or location on the site.
Structural Members Supporting a Wall		Same as required fire resistance of wall supported, but not less than rating required for member by the class of construction		Has no bearing on the design of the building envelope or location on the site.

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Code Section	Description		Remarks
Floor Construction including Beams		1.5	Has no bearing on the design of the building envelope or location on the site.
Roof Construction including Beams, Trusses, and Framing, including Arches, Domes, Shells, Cable Supported Roofs and Roof Decks	15-Feet or less in Height above floor to lowest member	1	Has no bearing on the design of the building envelope or location on the site.
	15 to 20 Feet in Height above floor to lowest member	1	Has no bearing on the design of the building envelope or location on the site.
	20-Feet or more in Height above floor to lowest member	1 or 0	Has no bearing on the design of the building envelope or location on the site.
Notes: (1) The area of openings permitted in exterior walls at any story shall be obtained by multiplying the percentage shown in the table by the exterior separation distance in feet, and then multiplying that product by the square-foot area of the facade of that story. (2) See NYC Building Code for applicable "footnotes" and referenced "Articles". (3) Exterior Separation – Definition: The shortest distance across an unobstructed outdoor space measured from the furthest projection of the exterior wall of a building to an interior lot line or to a line halfway between the wall and that of any other building on the same lot, or to the centerline of an adjacent street or other public space.			
§27-2058(e) – Openings on Lot Lines	Every window and its assembly in a wall situated on a lot line, except a street line, shall be fireproof; the assembly shall have a fire resistive rating of at least three-quarters of an hour; and the window shall be glazed with wire glass at least one-quarter of an inch thick. Every such window shall be of automatic self-closing construction whenever it is less than fifty feet above the non-fireproof roof of another structure located thirty feet or less from the lot line.		No such condition.
§27-860	Responsibility of owner of taller building. Whenever a building is erected, enlarged, or increased in height so that any portion of such building, except chimneys or vents, extends higher than the top of any previously constructed chimneys within one hundred feet, the owner of such new or altered building shall have the responsibility of altering such chimneys to make them conform with the requirements of section 27-859 of this article.		The building height of the proposed school and its proximity to adjacent commercial structures may have an adverse impact.

Egress

Stairs, corridors, exit passageways, street floor lobbies and safe areas, for egress, shall comply with the requirements of the NYC Building Code, Subchapter 6 – Means of Egress.

For the purposes of this study, egress requirements are achieved through a combination of the following, which are illustrated in the "theoretical scheme" provided within this Study:

- Corridors
- Stairs

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06. PROPOSED EDUCATIONAL PROGRAM OF REQUIREMENTS

The Proposed Educational Program of Requirements shall be presented within the Study in the format that follows so to provide a table that clearly identifies the Educational Program of Requirements, as per the Design Scheme provided within a Study, and identifies where the Design Scheme does not conform to the Proposed Program of Requirements.

Example: (See next page)

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06. PROPOSED EDUCATIONAL PROGRAM OF REQUIREMENTS

The following Table provides the required square footages for the Program of Requirements and the proposed total square footage for each Group as provided by the "theoretical scheme".

Please note that "Proposed" square footages for each "Group" are approximate and that the "Total Gross Area" (provided at the end of this Table) for the "theoretical scheme" may increase in area as mechanical chases, equipment, rooms, etc... are incorporated into any future design development of this Program.

PROGRAM OF REQUIREMENTS / PROPOSED AND AS PER DESIGN SCHEME											
		PROPOSED PROGRAM					PROGRAM PER DESIGN SCHEME				
ROOM LAYOUT AND ROOM TYPE		UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA	UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA
GROUP 1 - INSTRUCTION											
1-10	Pre-Kindergarten (w/ toilets) (if appropriate for District)	3	18	54	1,000	3,000	3	18	54	1015	3045
1-11	Kindergarten (w/ toilets) (@ first fl. If possible)	2	25	50	1,000	2,000	2	25	50	1015	2030
1-12	Typical Classrooms - Grade 1 (w/ toilets)	2	25	50	750	1,500	2	25	50	764	1528
1-12	Typical Classrooms - Grade 2 (w/ toilets)	2	25	50	750	1,500	2	25	50	764	1528
1-14	Typical Classrooms - Grade 3	2	25	50	750	1,500	2	25	50	764	1528
1-15	Typical Classrooms - Grade 4	2	31	62	750	1,500	2	31	62	764	1528
1-15	Typical Classrooms - Grade 5	2	31	62	750	1,500	2	31	62	764	1528
1-16	Typical Classrooms - Grade 6	2	30	60	750	1,500	2	30	60	764	1528
1-16	Typical Classrooms - Grade 7	2	30	60	750	1,500	2	30	60	764	1528
1-16	Typical Classrooms - Grade 8	2	30	60	750	1,500	2	30	60	764	1528
1-30	CSD Special Education Classrooms (w/ toilets)	2	12	24	500	1,000	2	12	24	500	1000
1-31	Reading Resource Room	1	---	---	375	375	1	---	---	374	374
1-32	Speech Resource Room	1	---	---	375	375	1	---	---	373	373
1-34	Small Group Instruction / Resource room (w/folding partition)	1	---	---	750	750	1	---	---	874	874
GROUP CW – CITY WIDE SPECIAL EDUCATION											
CW10-10	Special Education Classroom (w/o toilets)	3	12	36	500	1,500	3	12	36	500	1500
CW10-11	Special Education Classroom (with toilets)	2	12	24	750	1,500	2	12	24	764	1528
CW16-30	Activities for Daily Living (with toilet)	1	---	---	750	750	1	---	---	764	764
CW17-12	Special Education Speech Room (with storage)	1	---	---	200	200	1	---	---	200	200
CW30-00	Guidance Office	1	---	---	100	100	1	---	---	100	100
CW34-00	Occupational/Physical Therapy Room	1	---	---	500	500	1	---	---	500	500
CW40-70	Supervisory Office (with storage)	1	---	---	250	250	1	---	---	250	250
CW80-00	Storage Room	1	---	---	375	375	1	---	---	270	270
	Nurse's Office (with shower and changing room)	1	---	---	375	375	1	---	---	410	410

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ROOM LAYOUT AND ROOM TYPE		PROPOSED PROGRAM					PROGRAM PER DESIGN SCHEME				
		UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA	UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA
GROUP 2 – SPECIALIZED GROUP INSTRUCTION											
2-10	Art Classroom	1	30	30	1,150	1,150	1	30	30	1700	1700
2-11	Art Storage	1	---	---	250	250	1	---	---		
2-30	Music Suite	1	30	30	---	1,000	1	30	30	1300	1300
2-30.1	Music Classroom	1	---	---	725	725	1	---	---	795	*795*
2-30.2	Small Practice Cubicle	---	---	---	55	55	---	---	---	90	90
2-30.3	Large Practice Cubicle	---	---	---	120	120	---	---	---	120	120
2-30.4	Music Instrument Storage Room	1	---	---	100	100	1	---	---	115	115
GROUP 3 – SCIENCE											
3-10	Science Resource Room	1	30	30	750	750	1	30	30	754	754
3-11	Science Resource Prep and Storage	1	---	---	250	250	1	---	---	300	300
3-14	Science Lab/Demo	1	30	30	875	875	1	30	30	900	900
3-15	Science Project/Prep Room	1	---	---	375	375	1	---	---	382	382
GROUP 4 – PHYSICAL EDUCATION											
4-12	Gymnasium	1	60	60	5,400	5,400	1	60	60	6000	6000
4-30	Locker / Changing Room (boys and girls)	2	---	---	375	750	2	---	---	550	1100
4-50	Health Instructor's Office (w / shower & wc)	1	---	---	250	250	1	---	---	340	340
4-53	Gymnasium Storage Room	1	---	---	150	150	1	---	---	380	380
	PLAYGROUND: 3,000sf ECC Playground separate from larger yard; Hard-surface General Playground @ 30 sf / student if possible (exclude Pre-K & K count)						PLAYGROUND: Total open area for play and recreation = +/- 9,900 sf				
GROUP 5 – ASSEMBLY											
5-10 & 5-11	Assembly Area	1	---	---	---	4,800	1	---	---	---	*6050*
	Seating Area	1	300	300	3,000	---	1	(TBD)	(TBD)	(TBD)	---
	Platform	1	---	---	900	---	1	---	---	(TBD)	---
	Orchestra Area	1	---	---	375	---	1	---	---	(TBD)	---
	Projection Room	1	---	---	150	---	1	---	---	(TBD)	---
	Storage Room	1	---	---	125	---	1	---	---	(TBD)	---
	Utility Room (M/F Dressing Rooms)	1	---	---	250	---	1	---	---	(TBD)	---
GROUP 6 - LIBRARY											
6-12	Library Complex	1	---	---	2,700	2,700	1	---	---		*3260*
GROUP 7 - LOBBY											
7-10	Lobby	1	---	---	750	750	1	---	---		*1470*

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ROOM LAYOUT AND ROOM TYPE		PROPOSED PROGRAM					PROGRAM PER DESIGN SCHEME				
		UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA	UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA
GROUP 8 – STUDENT SUPPORT											
8-10	Guidance Suite	1	---	---	---	500	1	---	---	---	*615*
8-10.1	Guidance Office	2	---	---	100	---	2	---	---	(TBD)	---
8-10.2	Interview / Conference Room	1	---	---	150	---	1	---	---	(TBD)	---
8-10.3	Guidance Storeroom	1	---	---	50	---	1	---	---	(TBD)	---
8-10.4	Waiting Room	1	---	---	100	---	1	---	---	(TBD)	---
8-30	SBST Suite	1	---	---	---	325	1	---	---	---	*434*
8-30.1	Office	1	---	---	100	---	1	---	---	(TBD)	---
8-30.2	Interview/Conference Room	1	---	---	150	---	1	---	---	(TBD)	---
8-30.3	Waiting Room	1	---	---	75	---	1	---	---	(TBD)	---
8-50	Medical Suite	1	---	---	---	425	1	---	---	---	415
8-50.1	Medical Suite Toilet	1	---	---	50	---	1	---	---	(TBD)	---
8-50.2	Nurse's Office - (1 Nurse) / Resting Area	1	---	---	200	---	1	---	---	(TBD)	---
8-50.3	Examination Room	1	---	---	100	---	1	---	---	(TBD)	---
8-50.4	Waiting Area	1	---	---	75	---	1	---	---	(TBD)	---
GROUP 9 – STORAGE											
9-11	Book Storeroom (1 @ 1,000 or 2 @ 500)	1/2	---	---	1,000	1,000	1	---	---	777	777
9-14	Furniture Storeroom	1	---	---	500	500	1	---	---	505	505
9-16	General Supply	1	---	---	500	500	1	---	---	540	*540*
9-19	Grounds Equipment Room	1	---	---	125	125		---	---	192	*192*
9-24	Refuse and Recycling Room w/ 70 SF trash refrigerator (w/ floor drain and hose bib) (on 1st floor if possible)	1	---	---	175	175	1	---	---	Included in Kitchen Area	
9-25	Computer / Av Storeroom (50sf each)	(1 per floor)					(1 per floor)				
GROUP 10 - ADMINISTRATION											
	Administrative Suite	1	---	---	1,325	1,325	1	---	---	---	*1750*
10-11	General Office	1	---	---	500	---	1	---	---	(TBD)	---
10-13	Principal's Office / Conference	1	---	---	375	---	1	---	---	(TBD)	---
10-14	Records Room	1	---	---	150	---	1	---	---	(TBD)	---
10-16	Duplicating Area	1	---	---	200	---	1	---	---	(TBD)	---
10-22	Teacher's Mail Time Room	1	---	---	100	---	1	---	---	(TBD)	---
	Supervisory Office w/o storage	2	---	---	250	500	2	---	---	325	*650*
10-24	Teacher's Aides Work Room	1	---	---	500	500	1	---	---	530	*530*
10-25	Parents / Community Room	1	---	---	375	375	1	---	---	400	*400*
GROUP 11 – CAFETERIA / STAFF LUNCH											
11-10	Students' Cafeteria (110% capacity)	1	244	---	3,656	3,656	1	(TBD)	---	3900	*3900*
11-11	Staff Lunch / Conference Room	1	---	---	500	500	1	---	---	544	*544*

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ROOM LAYOUT AND ROOM TYPE		PROPOSED PROGRAM					PROGRAM PER DESIGN SCHEME				
		UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA	UNITS	UNIT CAPACITY	TOTAL CAPACITY	UNIT AREA	TOTAL NET AREA
Group 12 - CUSTODIAL											
12-10	Custodial Locker Room - M/F (w/ toilet & shower)	2	---	---	200	400	2	---	---	434	*434*
12-11	Custodian's Office	1	---	---	250	250	1	---	---	290	*290*
12-14	Custodian's Storage	1	---	---	475	475	1	---	---	893	893
12-16	Custodian's Workshop	1	---	---	375	375	1	---	---		
12-17	Janitor's Sink Closet	(1 per floor)					(1 per floor)				
12-25	Telecommunications Room	1	---	---	200	200	1	---	---	297	297
12-26	Telecommunication Closets	(1 per floor @60sf)					(1 per floor @60sf)				
12-28	School Safety Office / Locker Rooms	1	---	---	400	400	1	---	---	110	110
GROUP K - KITCHEN											
K1	Kitchen Complex	1	---	---	2,700	2,700		---	---	2988	2988
K2	Kitchen	---	---	---	---	---	---	---	---	---	---
K6	Dietitian's Office	---	---	---	---	---	---	---	---	---	---
K7	Help Locker Room - M/F (w/ toilet)	---	---	---	---	---	---	---	---	---	---
	Food Storage (75% may be remote from kitchen)	---	---	---	---	---	---	---	---	---	---

PROGRAM OF REQUIREMENTS / PROPOSED AND AS PER DESIGN SCHEME				
	PROPOSED PROGRAM		PROGRAM PER DESIGN SCHEME	
TOTAL PROGRAMMED AREA	60,061sf	(65%)	66,764sf	(70%)
TOTAL CORE AREA	32,341sf	(35%)	27,010sf	(30%)
TOTAL GROSS AREA	92,402sf	(100%)	93,774sf	(100%)
TOTAL UNADJUSTED CAPACITY:	822		822	

000 - Denotes programmed spaces that are more than 5% **below** the desired programmed area.

000 - Denotes programmed spaces that are more than 5% **above** the desired programmed area.

The above "Program per Design Scheme" demonstrates that the "Proposed Program" can be accommodated within the constraints of the subject Site and that there would not be any subsequent negative impact resulting from the noted spaces that fall below or above the desired program area.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

07. DESIGN SCHEME

This Section shall provide a narrative that identifies the design influences/issues and describe a "feasible" design approach to address all design influences/issues as presented within the Study. In addition to identifying and analyzing the design influences/issues, the Study shall provide a "theoretical" design scheme for the subject school type. It is by doing so that the Study permits the Authority to evaluate if the Site can sustain the building's bulk (size and mass), meet the Educational Program of Requirements, and allow for a functional and efficient design, which provides for the safety, health and comfort of the school children with or without accommodations and/or compromises.

The following design considerations shall be taken into account in the required narrative and illustrated, when practical, in the design of the "theoretical" scheme.

- Location of the school on the Site, and its relationship to it neighboring surroundings.
- Use of surrounding land and buildings shall be considered, since adjacent land use in regard, but not limited to, parks, undeveloped land, vacant buildings, residential building types; commercial and manufacturing facilities will affect the proposed school facility and visa versa.
- Local environmental conditions such as accessibility, traffic and noise.
- NYC Zoning Regulations.
- Accessibility to the site for both pedestrian and vehicular traffic.
- Access to the site and a safe path of travel for Students, parents and faculty within the community. In addition to planning paths of travel that are easily observed from the adjacent streets and sidewalks, the design of the school facility should discourage vandalism and illegal entry.
- Location and direction of travel from local points of mass transportation (bus and subway).
- Changes in grade elevation. It is important that entrances and exits be planned and designed for handicapped accessibility and that level areas are provided for outdoor activities (play yards, athletic fields and service delivery points.
- Location of available utilities. The cost of bringing utilities to the building can become excessive if proper attention is not given to the location of gas, water, sewer and electric services. If the local utility companies have to extend to the site, the cost may have to be absorbed in the construction cost of the school.
- Ideal building orientation in the Northern Hemisphere is basically southeast. As such, the south side of the building will receive more solar radiation in the winter than in the summer and consequently both east and west will receive more radiation in the summer. Unfortunately, the urban environment will not always permit the design to adapt and follow the influences of the environment due to its urban streetscape. There fore, the objective is to address the issues above and provide the best orientation possible to provide opportunities for natural daylighting and take advantage of natural environmental conditions.
- The first priority for non-built area is student recreation. On sites with potential open space beyond this use, consider minimizing developed footprint to conserve or restore vegetated areas. On more constrained sites in low-rise residential zones, building footprint and massing must take into account the impact on light and air for adjacent buildings.

Example: (See next page)

Requirement Applies to:	✔	New Construction	Major Modernizations	Capital Improvement Projects

07. DESIGN APPROACH AND THEORETICAL SCHEME

Compliance with zoning regulations and building codes are not the only factors for determining if a site is adequate for a school. The safety and welfare of the students, as well as the needs of the Educational Program and day to day operations of the school facility, must be accommodated.

In order to understand and appropriately address issues and concerns related to the development of the subject site, existing local environmental conditions, site characteristics, zoning regulations, building codes as well as other design influences need to be identified so that a design approach for a theoretical design scheme can be developed. The following issues and concerns have been identified within previous Sections of this Study.

1. Issues and Concerns

a. Site Characteristics:

- No apparent issues at this time.

b. Educational Program of Requirements (POR):

- The total gross area of the property is only 29,210 square feet and the remaining available open area for outdoor rest, recreation and play after the proposed school is sited on the property will be limited. Hence, since educational space takes precedence over open area, it is more than likely that the available open play area for rest, recreation and play will be compromised.

"Adjusted Capacity"		Square foot per Student for General Play		Total Open Play Area per POR
665*	x	30	=	19,950 square feet

  - Available open area for rest and recreation is limited to approximately 9,900sf, which is approximately 10,050sf less **(-50%)** than the desired amount of open space.

(- See Appendix E – Draft Program of Requirements)*

Footnotes:

New York City Rules & Regulations - Title 24 - Health Code; states the following:

§45.11(h) - "Indoor and outdoor play areas shall be available for the use of the children. Such play areas shall be safe, clean, easily accessible, adequate in size and suitable for the needs of the children. A shady area shall be available in outdoor play areas used during the summer months.",

§45.12(c) - "In the indoor and outdoor play areas, sufficient play equipment shall be provided which is appropriate to the stage of development of the children and which is designed to foster physical and motor development. The equipment shall be easily accessible to the children, readily washable, clean, in good repair and free from hazards.", and

§45.13 – "Children kept on the school premises for more than five hours a day shall not be required to devote more than five hours a day to classroom work and study, except for religious training. They shall be permitted to spend the excess time in play, rest or recreation. Except during inclement weather, the outdoor play space shall be used for this purpose whenever possible."

NY CLS Educ. 2556(5); states the following:

"It shall be unlawful for a schoolhouse to be constructed in the City of New York without an open-air playground attached to or used in connection with the same."

c. Site Utilization:

- No apparent issues at this time.

d. Topography / Geology:

- No apparent issues at this time.

e. Zoning:

- The development of the proposed school on the subject Site will require "Zoning Waivers" for non-compliance with "bulk" regulations.
  - See Section 04. Zoning Regulations

f. Building Codes:

- The building height of the proposed school and its proximity to adjacent commercial structures may have an adverse impact on existing chimneys.

g. Utilities and Services:

- No apparent issues at this time.

h. Historical Significance:

- No apparent issues at this time.

i. Transportation:

- No apparent issues at this time.

j. Hazardous Environmental Conditions:

- No apparent issues at this time.

k. Constructability:

- No apparent issues at this time.

2. Design Approach

The layout of the design provided herein has been provided to demonstrate what may be accomplished within the dimensional constraints of the existing Site as well as other design influences as indicated below:

a. Building Location and Orientation:

As indicated in Section 03, the existing site is presently located in a part of a larger urban environment (Brooklyn, N.Y.) that is comprised of one (1) Tax Lot (#64) that lies within an **(R6)** Residential Zoning District that is situated within a Special Purpose District **(OP)** known as "**The Special Ocean Parkway District**". The following addresses the issues and concerns described above.

1) Since the property's geometry is relatively rectangular and its longest street-front, 240-feet, is along Caton Avenue, the only practical orientation for the building is along the length of Caton Avenue, which establishes an east/west axis for a building. Hence, the building's major fenestrations would have a north and south orientation, which is **not** the preferred direction for sustainable design.

2) In order to accommodate the gross floor area of the proposed school (+/-93,000sf) within the subject property's limited area and provide the smallest foot print possible so to accommodate open area, the proposed building would have to achieve vertically what it could not accomplish horizontally. Hence, a building design (4-Stories / +/- 65-feet) that exceeds the maximum height (60-feet) permitted by present NYC Zoning Regulations would be necessary.

In order to prevent the building from going well above 75-feet in height, the Auditorium is designed as a 1-story space rather than as a typical 2-story space. *(Note: The proposed building may become and need to be a "high-rise" building as classified by NYC Building Code if a 2-story Auditorium were to be provided.)*

3) The Site is accessible from both all three (3) street fronts and traffic patterns are conducive to student bus-drop off. *(Note: Caton Avenue is the widest street with the deepest sidewalks and is the more suitable of the three street fronts for student drop-off and pick-up by school buses.)*

b. Topography and Geology: The Site appears to be level and accept for the possibility of groundwater; there are no apparent obstacles to providing a full cellar for the school.

c. Building Organization / Layout: In order to maximize limited site area for the proposed school, the design scheme is organized in an I-configuration that utilizes double loaded corridors on each floor. The scheme's I-configuration provides all instructional spaces access to natural light, the stacking of common spaces, and allows for efficient supervision of corridors from one vantage point by one individual.

Due to the limited site area, the opportunity to locate spaces that would typically be provided on the first floor is severely limited. Therefore, the auditorium, which would be more frequently used by the public than a gymnasium, is located at grade/first floor and the first floor of the proposed building would be elevated so to provide sufficient height within the auditorium. Hence, the gymnasium is located on the second floor directly above the auditorium. In terms of acoustics, this adjacency is the least desirable scenario and noise mitigation between these spaces, if possible, will require bear significant costs.

1) Entrances and Exits: The Main Entrance is located on Caton Avenue, which is the widest adjacent street that also provides the deepest sidewalk depth to facilitate the drop-off and pick-up of children by school buses.

The Main Entrance leads to a Lobby that provides direct access to the Administrative Suite, Auditorium, Pre-Kindergartens, Kindergartens, Nurse's Suite, and Staff Lunch/Conference Room as well as the Custodian's Office. The main double-stair and elevator within the immediate area of the Lobby, which also provides a centralized security desk, provides indirect access to instructional spaces, places of assembly, and other administrative areas throughout the building.

2) Planning: As indicated above, the school is organized (stacked) vertically utilizing a "Bar" plan with a double-loaded corridor.

a) Open Play Area: Open play area, although limited, is situated at the rear of the proposed building and would be accessible from both East 7th and 8th Streets. This would allow two (2) points of entry to the open yard area so that an ECC play area and a general play area may also be separated for the arrival and dismissal of children.

b) Cellar Floor: This floor is comprised of the following spaces; Student Cafeteria, Kitchen Complex, Locker Rooms, Custodial and Storage Areas as well as Mechanical Equipment Rooms.

The mechanical equipment rooms are located at the southwest corner of the building/site at the intersection formed by Caton Avenue and East 7th Street. This provides two possible service entry points from these adjacent streets.

The area beneath the Auditorium, which is on the first floor, would be partially unexcavated. Excavation would be limited to foundation walls and an on-grade slab that would be sloped down from the first floor so to achieve the height required at the stage/platform.

c) First Floor: This floor is comprised of the following spaces; Main Entrance Lobby, Administrative Suite, Auditorium, Pre-Kindergartens, Kindergartens, Nurse's Suite, and Staff Lunch/Conference Room as well as the Custodian's Office.

d) Second Floor: This floor is comprised of the following spaces; Gymnasium and Locker Rooms, Health Instructor's Office, City-Wide Special Education, SBST, Toilets and other ancillary spaces.

e) Third Floor: This floor is comprised of the following spaces; Upper-Gymnasium, CSD Special Education, Music Suite, Science Resource and Preparation Room, 2nd, 3rd and 4th Grade Classrooms, Resource Room, Toilets and other ancillary spaces.

f) Fourth Floor: This floor is comprised of the following spaces; Library, Science Lab/Demo Room and preparation Room, 5th, 6th, 7th, and 8th Grade Classrooms, Small Group Instruction, Resource Room, Toilets and other ancillary spaces.

g) Roof: The roof provides area for the Air handling Units (AHU) for Classrooms, Corridors and Offices. In addition to the mechanical equipment, the Boiler Room, and Pump Room that would been located on the roof. Additional height from the Second Floor to roof structure has been planned (approximately two feet) to address the concentration of Air-Handling Units and associated ductwork. Attention to acoustical treatment is required to address transmission of noise and vibration from mechanical equipment to the floor below. Due to the limited area for open play and assembly it may be necessary to locate the required emergency generator in the cellar or on the roof of the building.

The Plans that follow are provided to illustrate site conditions and the building's ability to accommodate the Proposed Program of Requirements so to provide a basis for open discussion and direction for the possible development of a project.

The scheme provided herein is not a final design solution.

Diagrammatic Plans:

The Diagrammatic Plans shall be single line drawings and shall be provided as follows:

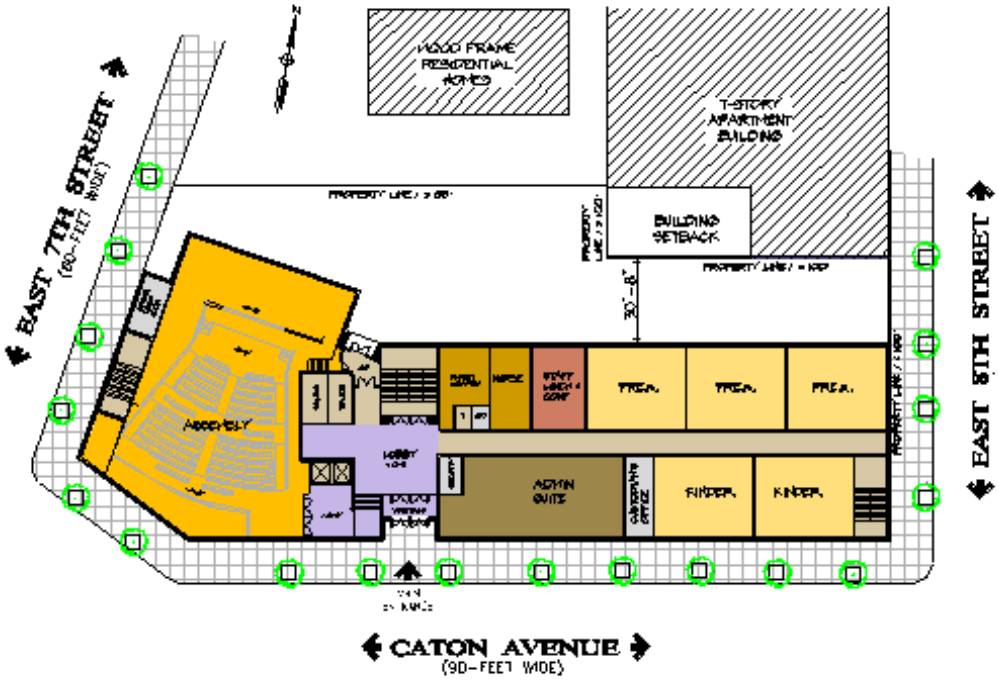
➢ Site Plan / First Floor Plan	The Site Plan shall illustrate the Site, location of the theoretical building, play yards, entrances and exits, adjacent streets, street names, street directions and street widths, Zoning Regulation Yards and Setbacks, adjacent properties and structures…
➢ Floor Plans	The Plans for each floor, in addition to being appropriately labeled, shall illustrate the major categories of the Educational Program of Requirements through the use of a color schedule for each Programmed Space, corridor, stair, elevator, toilet room and mechanical space.

For Example: (See next page)

Requirement Applies to:	✔	New Construction	Major Modernizations	Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

2. Diagrammatic Plans:



LEGEND:
- GROUP 1 - INSTRUCTIONAL
- GROUP CW - CITY WIDE SP. ED - D78
- GROUP 2 - SPECIALIZED INSTRUCTION
- GROUP 3 - SCIENCE
- GROUP 4 - PHYSICAL EDUCATION
- GROUP 5 - ASSEMBLY
- GROUP 6 - LIBRARY
- GROUP 7 - LOBBY
- GROUP 8 - STUDENT SUPPORT
- GROUP 9 - STORAGE
- GROUP 10 - ADMINISTRATION
- GROUP 11 - CAFETERIA, STAFF LUNCH
- GROUP 12 - CUSTODIAL
- GROUP K - KITCHEN/FOOD SERVICES
- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

SITE / FIRST FLOOR PLAN

April 15, 2008 Feasibility Study – New Building Page 21

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

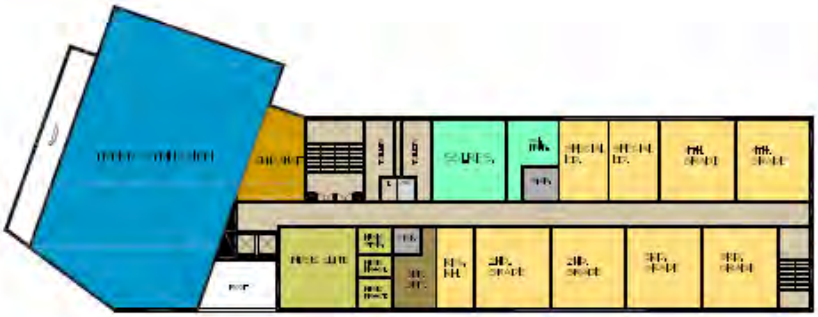




SECOND FLOOR PLAN

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360



LEVEL



THIRD FLOOR PLAN

April 15, 2008 Feasibility Study – New Building Page 23

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360



LEGEND

FOURTH FLOOR PLAN

April 15, 2008 Feasibility Study – New Building Page 24

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360





CELLAR FLOOR PLAN

April 15, 2008 Feasibility Study – New Building Page 25

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

08. APPENDICES

08. APPENDICES

- APPENDIX A - Original Request for Feasibility Study
- APPENDIX B - Sanborn / Tax Map
- APPENDIX C - Community Connectivity / Half-Mile Radius Map
- APPENDIX D - Environmental Hazards Map
- APPENDIX E - Draft Educational Program of Requirements

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

From: RACHELSON, TAMI
Sent: Tuesday, February 12, 2008 12:40 PM
To: BERGIN, ELIZABETH; GUTERMAN, DEBORAH LEE; BARRETT, E BRUCE
Cc: CASTANO, BEATRIZ; OU, KENRICK; KHAJEKIAN, VAHAK; KUBOTA, NINA; PERCUDANI, PETER; FALCONE, CARLO; ROUSSEY, GEORGE; EITINGON, MICHAEL; 'Bert Schayegh'
Subject: Request for Due Diligence and Feasibility Study - Potential District 15 Site - 701 Caton Avenue

Community Board 7 has recommended a potential site for a new school in District 15. The site is vacant land and is available for purchase. The lot is approx. 29,000 sf and is fairly rectangular in shape.

Property information is as follows:

CSD: 15

Address: 701 Caton Avenue (between E. 7th and E. 8th Street)

Block/Lot: 5321/64

Description: 29,000 sf (approx.) unimproved lot.

Zoning: R6 - Ocean Parkway District

Access: Bert Schayegh - Cornerstone - 212-768-1435

Request:

1. Capital Planning is requested to create a LLW#.
2. A & E is requested to undertake a feasibility study for a PS/IS.
3. IEH is requested to prepare a Phase I ESA.

Thank you.

Tami

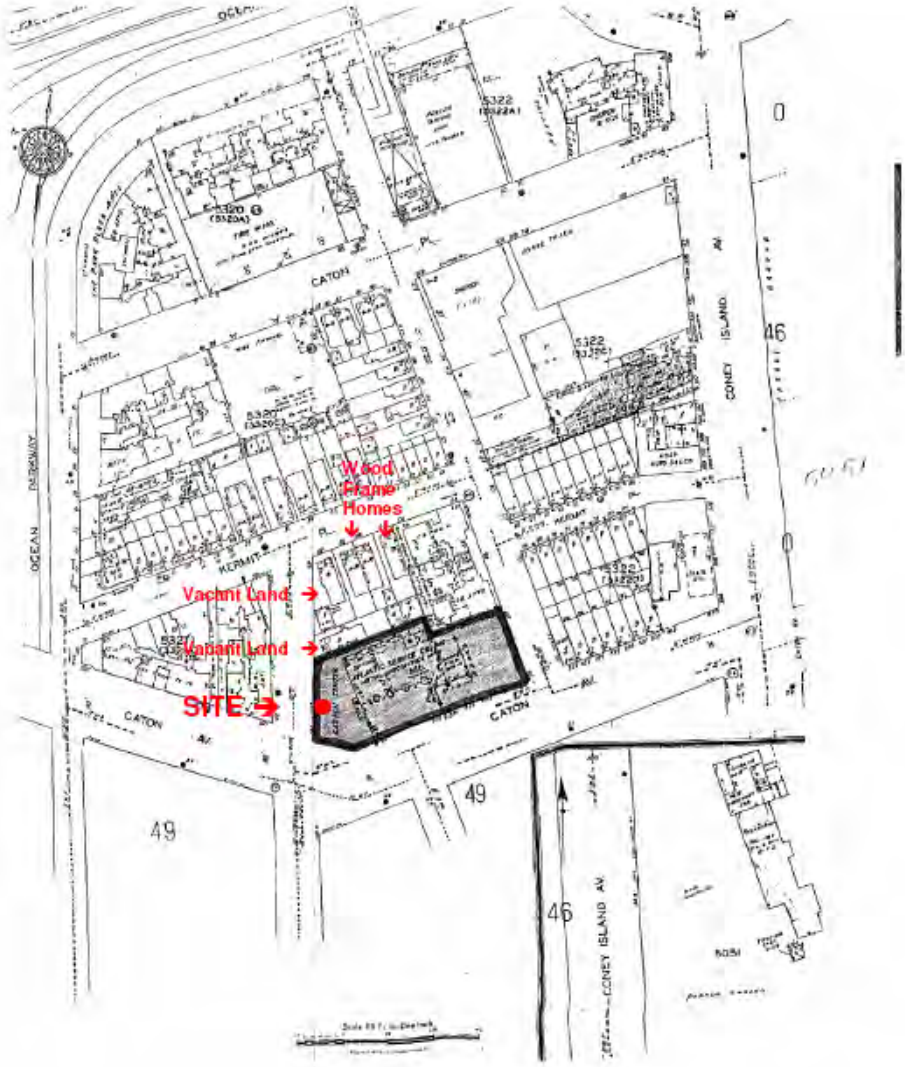
1

REQUEST FOR STUDY

APPENDIX – A

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360



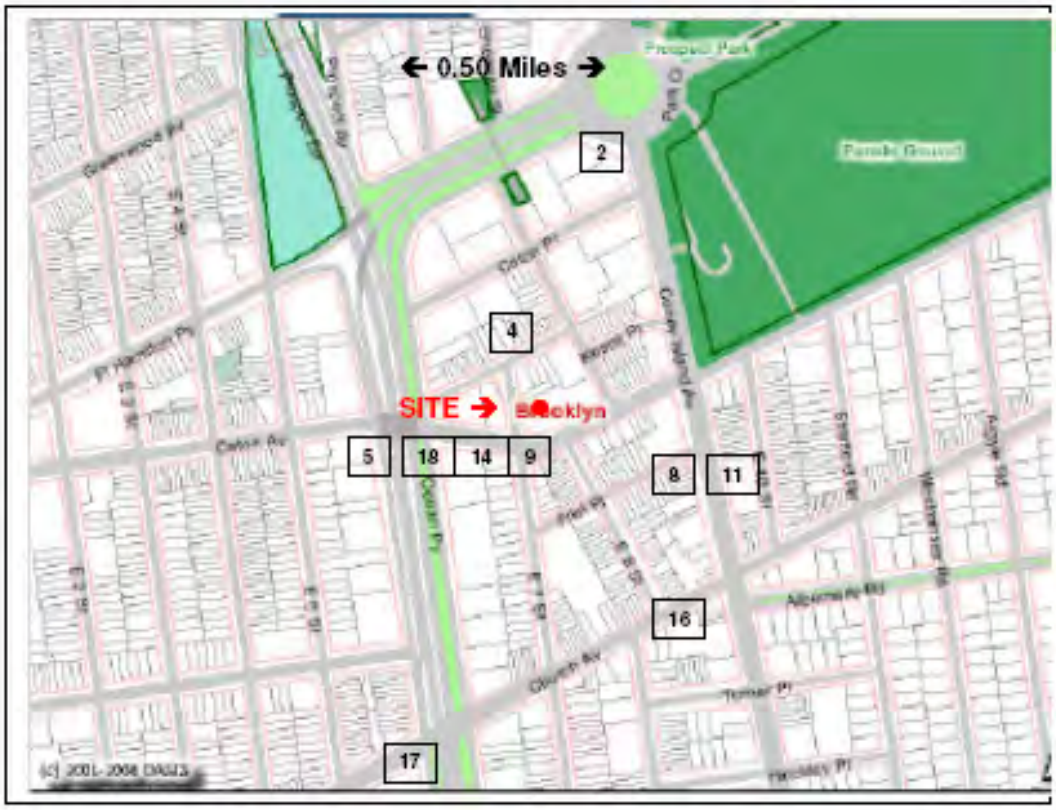
SANBORN / TAX MAP

APPENDIX – B

April 15, 2008 Feasibility Study - New Building Page 28

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360



1. Bank
2. Place of Worship ◄
3. Convenience Store
4. Day Care ◄
5. Cleaners ◄
6. Fire Station
7. Beauty Salon
8. Hardware Store ◄
9. Laundry ◄
10. Library
11. Medical / Dental ◄
12. Senior Care Facility
13. Park
14. Pharmacy ◄
15. Post Office
16. Restaurant ◄
17. Another School or University ◄
18. Supermarket ◄
19. Theater
20. Community Center
21. Fitness Center
22. Museum

COMMUNITY CONNECTIVITY / HALF-MILE RADIUS MAP

APPENDIX – C

April 15, 2008 Feasibility Study – New Building Page 29

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360



Leaking Tanks & Spills:

- MTBE Spill
- Gasoline Spill
- Tank Failure
- Spill greater than 25 gal/lbs
- Tank Test Failure

Superfund, Brownfields and Solid Waste:

- US Superfund Priority Site
- Brownfield Site
- NY Superfund Site
- Hazardous Substance Study
- US Superfund/CERCLIS Site
- Solid Waste Facility

Other Toxic Sites:

- NY Superfund Qualifying Site
- Haz Waste Treat/Store/Dispose
- Hazardous Waste Violation
- Major Oil Storage Facility
- Toxic Release Inventory Site
- Air Discharge Facility
- Hazardous Waste Corrective Act
- Legal Civil/Admin Docket

ENVIRONMENTAL HAZARDS

APPENDIX – D

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

(date)

(School Name)
Region XX / District XX FMS#
Program of Requirements for a New Primary / Intermediate School Building **PS/IS 665**
Capital Budget Line E-2362

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA [sf]	TOTAL NET AREA
	GROUP 1- INSTRUCTION					
1-10	Pre-Kindergarten (w/ toilets) (if appropriate for District)	3	18	54	1,000	3,000
1-11	Kindergarten (w/ toilets) (@ first fl. If possible)	2	25	50	1,000	2,000
1-12	Typical Classrooms - Grade 1 (toilets optional)	2	25	50	750	1,500
1-12	Typical Classrooms - Grade 2 (toilets optional)	2	25	50	750	1,500
1-14	Typical Classrooms - Grade 3	2	25	50	750	1,500
1-15	Typical Classrooms - Grade 4	2	31	62	750	1,500
1-15	Typical Classrooms - Grade 5	2	31	62	750	1,500
1-16	Typical Classrooms - Grade 6	2	30	60	750	1,500
1-16	Typical Classrooms - Grade 7	2	30	60	750	1,500
1-16	Typical Classrooms - Grade 8	2	30	60	750	1,500
1-30	CSD Special Education Classrooms	2	12	24	500	1,000
1-31	Reading Resource Room	1	---	---	375	375
1-32	Speech Resource Room	1	---	---	375	375
1-34	Small Group Instruction/Resource Room (w/ folding ptn)	1	---	---	750	750
	GROUP CW - CITY-WIDE SPECIAL ED - DISTRICT 75 (clustered at first floor or stacked on 1 & 2)					
CW10-10	Special Education Classrooms(w/o toilets) - District 75 (provide toilets in vicinity of classrooms)	3	12	36	500	1,500
CW10-11	Special Education Classrooms (w/ toilets) - District 75	2	12	24	750	1,500
CW16-30	Activities for Daily Living Rm (w/ toilet)(enlarge toilet rm w/changing table if D 75 is on 2 floors)	1	---	---	750	750
CW17-12	Citywide Special Ed Speech Rm (w/ storage) - Dist. 75	1	---	---	200	200
CW30-00	Guidance Office - District 75	1	---	---	100	100
CW34-00	Occupational/Physical Therapy Room - Dist. 75	1	---	---	500	500
CW40-70	Supervisory Office (w/ storage) - District 75	1	---	---	250	250
CW80-00	Storage Room - District 75	1	---	---	150	150
	Nurse's Office - D 75 - with shower/changing room	1	---	---	375	375
	GROUP 2- SPECIALIZED INSTRUCTION					
2-10	Art Classroom	1	30	30	1,150	1,150
2-11	Art Storage (w/ doors to art room & corridor)	1	---	---	250	250
2-30	Music Suite	1	30	30	---	1,000
2-30.1	Music Classroom	1	---	---	725	
2-30.2	Small Practice Cubicle				55	
2-30.3	Large Practice Cubicle				120	
2-30.4	Music Instrument Storeroom	1	---	---	100	

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DRAFT PROGRAM OF REQUIREMENTS

APPENDIX – E

April 15, 2008 **Feasibility Study – New Building** **Page 31**

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

(date)

(School Name)
Region XX / District XX PMS#
Program of Requirements for a New Primary / Intermediate School Building **PS/IS 685**
Capital Budget Line #-2382

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA (sf)	TOTAL NET AREA
	GROUP 3: SCIENCE					
3-10	Science Resource Room	1	30	30	750	750
3-11	Science Resource Prep and Storage	1	—	—	250	250
3-14	Science Lab/Demo	1	30	30	879	879
3-15	Science Project/Prep Rm (w/ sinks in Lab/Demo & corridor)	1	—	—	375	375
	GROUP 4: PHYSICAL EDUCATION					
4-12	Gymnasium	1	60	60	5,400	5,400
4-30	Locker/Changing Rooms (boys and girls)	2	—	—	375	750
4-60	Health Instructor's Office (w/ shower & toilet) (adj. to gym)	1	—	—	250	250
4-63	Gymnasium Storeroom	1	—	—	150	150
	PLAYGROUND: 3,000 sf ECC Playground separate from larger yard. Hard-surface General Playground @ 30 sf/student if possible (exclude Pre-K & K count)					
	GROUP 5 - ASSEMBLY					
5-10, 5-11	ASSEMBLY AREA	1	—	—		4,600
	Seating Area	1	300 seats		3,000	
	Platform	1			900	
	Orchestra Area	1			375	
	Projection room				150	
	Storage Room	1			125	
	Utility Room (w/ MF dressing rooms if appropriate for district)	1			200	
	GROUP 6 - LIBRARY					
6-12	Library Complex	1	—	—	2,700	2,700
	GROUP 7 - LOBBY					
7-10	Lobby	1	—	—	750	750
	GROUP 8 - STUDENT SUPPORT					
8-10	Guidance Suite	1	—	—	—	500
8-10.1	Guidance Offices	2	—	—	100	—
8-10.2	Guidance Office / Conference Room	1	—	—	150	—
8-10.3	Guidance Store Room	1	—	—	50	—
8-10.4	Guidance Waiting Room	1	—	—	100	—

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DRAFT PROGRAM OF REQUIREMENTS

APPENDIX – E

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

PS/IS – New Building
Unadjusted Capacity - 822
701 Caton Avenue, Brooklyn, N.Y. 11218
LLW #051360

APPENDIX – E

(date)

(School Name)
Region XX / District XX FMS#
Program of Requirements for a New Primary / Intermediate School Building PS/IS 665
Capital Budget Line E-2362

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA [sf]	TOTAL NET AREA
B-30	SBST Suite	1	---	---	---	325
B-30.1	SBST Office	1	---	---	100	---
B-30.2	SBST Interview/Conference Room	1	---	---	150	---
B-30.3	SBST Waiting Room	1	---	---	75	---
B-50	Medical Suite	1	---	---	---	425
B-50.1	Medical Suite Toilet (for students)	1	---	---	50	---
B-50.2	Nurse's Office - (1 Nurses) / Resting area	1	---	---	200	---
B-50.3	Examination Room	1	---	---	100	---
B-50.4	Waiting area	1	---	---	75	---
	GROUP 9 - STORAGE					
9-11	Book Storeroom	1 at 1000 or 2 at 500			1,000	1,000
9-14	Furniture Storeroom	1	---	---	500	500
9-16	General Supply w/ 100 SF receiving area	1	---	---	500	500
9-19	Grounds Equipment Storeroom	1	---	---	125	125
9-21	Audio-Visual /Secure Storeroom	1	---	---	250	250
9-24	Refuse and Recycling room w/ 70 SF trash refrigerator (w/ floor drain and hose bib) (on 1st floor if possible)	1		---	175	175
9-25	Computer/AV Storeroom (1 ea. Instr. floor)	3	---	---	50	150
	GROUP 10 - ADMINISTRATION					
	Administration Suite	1	---	---	---	1,325
10-11	General Office/Waiting Room	1	---	---	500	---
10-13	Principal's Office /Conference	1	---	---	375	---
10-14	Records Room	1	---	---	150	---
10-16	Duplicating Room	1	---	---	200	---
10-22	Teachers' Mail & Time area	1	---	---	100	---
	Supervisory office w/o storage	2	---	---	250	500
10-24	Teachers' & Aides Work Rm/Lounge (w/ lockers & toilet)	1	---	---	500	500
10-25	Parents / Community Room	1	---	---	375	375

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DRAFT PROGRAM OF REQUIREMENTS

APPENDIX – E

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

1.1 Contract Requirements

1.1.3 Report Format

1.1.3.2 Test Fit / Sketch Studies - New Buildings, Additions and Conversions of Existing Buildings

Instructions to Users:

The format of the "Test Fit / Sketch Study" required by the Authority for New Buildings, Additions, and Existing Building Conversions is described herein. Unless specific instructions are otherwise provided by the Authority's Representative, the following Format shall be followed. Please note that the various examples cited herein are not project specific.

A Project Cost Estimate **not** required.

Format

Memorandum:

The "Test Fit / Sketch Study" shall be in the form of a "Memorandum".

Objective

The principal objective of a *"Test Fit / Sketch Study"* is to asses, as quickly as possible, if a school facility may physically be provided at a subject Site and identify those issues and concerns that should be noted and given due consideration in a narrative, with plans that illustrate site conditions and the ability to accommodate a school building per a given Program of Requirements (POR), so as to provide a basis for open discussion and direction for the possible development of a project.

Issues and concerns that are typically of interest to the Authority include, but are not limited to, those that relate to a site or building's ability to accommodate a proposed Educational Program of Requirements, a building layout and organization (orientation and circulation), zoning, construction, existing physical characteristics of the proposed site and adjacent properties, and the impact of a project to adjacent properties and visa versa.

For example:

- Would there be negative design issues related to the day to day administration of the proposed school? (circuitous corridors, blind stairs, hidden areas, lack of windows, single loaded corridors, etc...)
- Would space adjacencies require special construction that increases cost? (noise transmission)
- Would there be sufficient useable outdoor area for the rest and recreation of the children as well as for the gathering of the children during arrival and dismissal times.
- Are adjacent streets conducive to the drop-off and pick-up of children that would arrive by vehicular transportation? (street direction, street width, sidewalk depth, etc...)
- Would the height of a school building classify it as a *"high-rise"* building as per NYC Building Code? (emergency generator, standpipe, temporary elevator for NYC Fire Department, etc...)
- Would an *"emergency generator"* be required and, if so, where would it be located and would there be any adverse impact from its location? (noise, zoning, etc...)
- Would a design that best accommodates the proposed Program of Requirements comply with NYC Zoning Regulations? If not, identify those zoning regulations for which the proposed design would not be compliant.

- Would existing *"tax lots"* need to be consolidated or subdivided?
- Would adjacent properties be adversely affected by the height of the proposed building?
- Would adjacent properties be adversely affected by noise from the proposed building's mechanical equipment? (Roof-top air-handling units, generator, etc...)
- Would the conversion of an existing structure require modifications to meet NYC Building Code (seismic, floor live loads, etc...) requirements and/or the Authority's Design Requirements?
- Are there obvious site specific subsurface conditions that will impact the development of the site? (Bedrock, water, subway system, detention systems, soil contamination, etc....)
- Would windows and/or party walls of adjacent properties be adversely affected? (blocking windows, shoring and repairing walls)
- Is the proposed site a NYC Park or designated as a Jointly Operated Playground (JOP)?
- Is the site located in the flight path of aircraft traveling to and from local airports?
- Is the site located adjacent to an at-grade, below grade or elevated rail-line or structure?
- Is an existing building, to be renovated or demolished, a designated *"landmark"?*
- Is the site within a designated *"flood plane"*?
- Will existing physical improvements adjacent to the site adversely affect construction activities? (adjacent buildings, retaining walls, overhead power lines, trees, etc...
- Would underpinning and shoring of adjacent properties be required?
- Would protection of adjacent properties be necessary due to the proximity of construction of the school building? (roofs, skylights, etc...)
- Would the school building's roof(s) be accessible from adjacent properties? (roofs, fire-escapes, etc...
- Would existing physical improvement require removal and relocation? (Temporary Classroom Units)
- Would portions of an existing building require conversion, renovation and/or demolition?
- Would swing-space be required for the relocation of occupants during construction activities?
- Would existing spaces, such as the kitchen and cafeteria, need to be enlarged to accommodate additional capacity due to an addition to an existing school?
- Are the floor to floor heights within an existing building sufficient in height to accommodate mechanical system and maintain the Authority's required ceiling heights?
- Would the present use of site area at an existing school be adversely affected due to a building addition?
- Would a building addition reduce the capacity of the existing school?
- Etc...

In addition to identifying issues and concerns, providing plans, providing a copy of the request for the "Test Fit / Sketch Study" and a copy of the provided draft Program of Requirements, the "Test Fit / Sketch Study" should include various attachments that provide additional insight into the subject Site.

Example "Test Fit / Sketch Study": (See next page)

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
ARCHITECTURE & ENGINEERING **Memorandum**

To	: Liz Bergin – Sr. Director – Capital Planning
Through	: George Roussey, PE - Director, Technical Standards Studio – A&E
From	: Peter J. Percudani, RA – Design Manager, Technical Standards Studio – A&E
Site / Address	: **Northwest corner of Ashland Place and Dekalb Avenue, Bklyn., N.Y.11201 (Block 2081 / Lot 1)**
District	: 13
Subject	: **New 2-Organization High School – Unadjusted Capacity 1,299 "Test Fit - Sketch Study"**
Date	: May 21, 2008 **LLW#: 052597**

As discussed with Real Estate Services, a *"Test Fit"* was performed in lieu of a Feasibility Study to determine whether or not the subject Site, with its given geometry and dimensions, could accommodate a new PS/IS School Building.

Please note that this "Sketch Study" is not as informative as a typical Feasibility Study, which would typically provide an overview of an Educational Program of Requirements (POR), describe existing positive and negative site characteristics, topography and geology, zoning, utilities, transportation and sustainable site development density information as well as a design approach for the school; nor does it include either a "Phase I or II Environmental Site Assessment", or a "State Environmental Quality Review (SEQRA) Assessment".

Although various regulatory codes, rules and regulations may be noted herein, the principal objective of this *"Test Fit / Sketch Study"* is to asses what may physically be provided at the subject Site and identify those issues and concerns that should be noted and given due consideration if such a project were to move forward.

Please note that although the proposed Site may accommodate a new 2-Organization High School with an Unadjusted Capacity of approximately 1,299 students, the following are those **issues** and **concerns** that should be noted and given due consideration if such a project were to move forward:

- There would be absolutely **no** usable outdoor area in front or behind the school building as a building would occupy the entire area of the property.
- The school building would be 6-stories with a full cellar and school would be a *"high-rise"* building.
- In order to minimize the height of the building a "stadium seating" type Auditorium has been provided that allows a 2-story Auditorium to be provided within the cellar/ first floor. This space layout allows the cellar area beneath the Auditorium to be utilized by the Kitchen/Cafeteria. Hence, the gymnasium is located on the second floor above the Auditorium and additional acoustical design/construction will be required between the auditorium and gymnasium.
- An *"emergency generator"* would be required (in the cellar or on the roof).
- Roof-top Air-Handling Units, on low-roofs, would be visible to occupants within rooms of instruction and noise from such equipment would have to be attenuated for the school occupants as well as occupants of adjacent buildings.
- At this time, it is anticipated that compliance would not be possible for the development of the subject school on the subject Site with required Zoning Regulations **(R6)** such as, but not limited to:
  - ZR24-11 .....Maximum Floor Area Ratio and Lot Coverage
  - ZR24-36 .....Minimum Required Rear Yards
  - ZR24-522.....Front Setbacks (Height and Sky-Exposure)

If it is determined that the subject Building Addition at the subject Site warrants further analysis, it is recommended that, at a minimum, a Feasibility Study that conforms to the Authority's Design Requirements be performed.

The Plans that follow are provided to illustrate site conditions and the building's ability to accommodate the Draft Program of Requirements (POR) so to provide a basis for open discussion and direction for the possible development of a project.

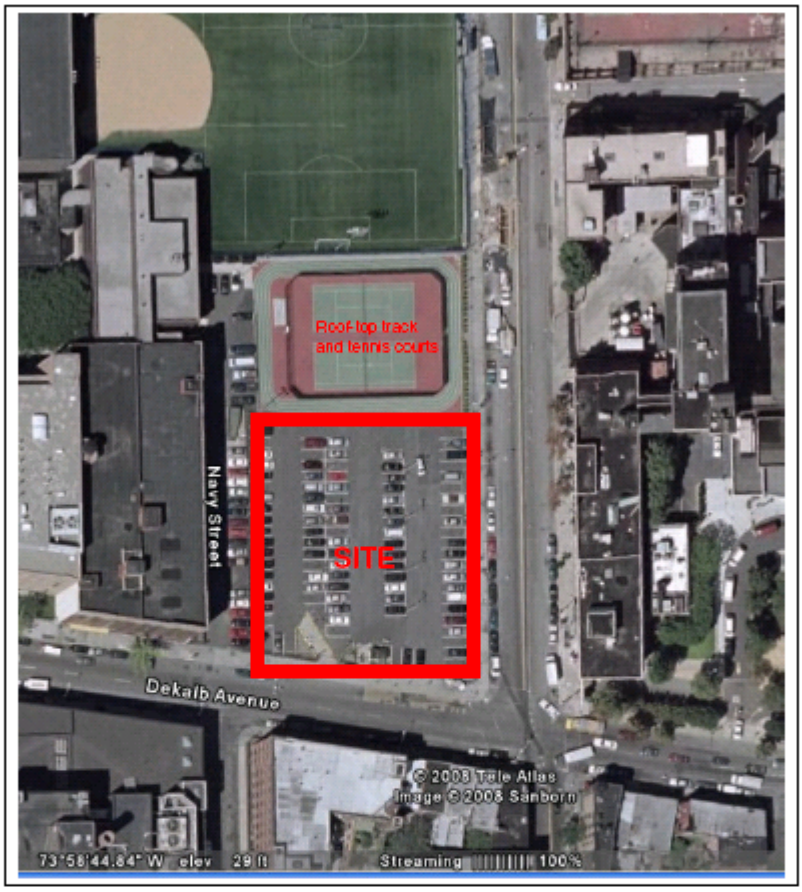
Please note that the POR is not an approved Program of Educational Requirements and that the Scheme provided herein is not a final design solution.

cc: S. Greenberger L. Grillo B. Barrett K. Ou N. Kuboa Project File (3)

1 of 14

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



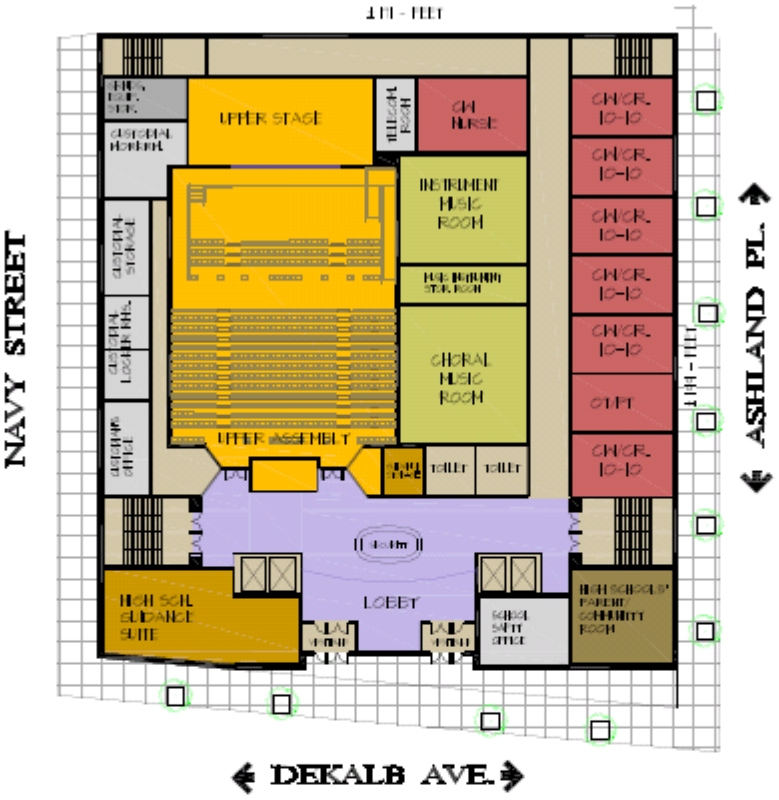
Notes:

- The adjacent track and tennis courts are on the roof of the adjacent building.
- Navy Street is being used for vehicle parking.
- Navy Street is a "de-mapped" street.

SITE / LOCATION PLAN

2 of 14

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



LEGEND:

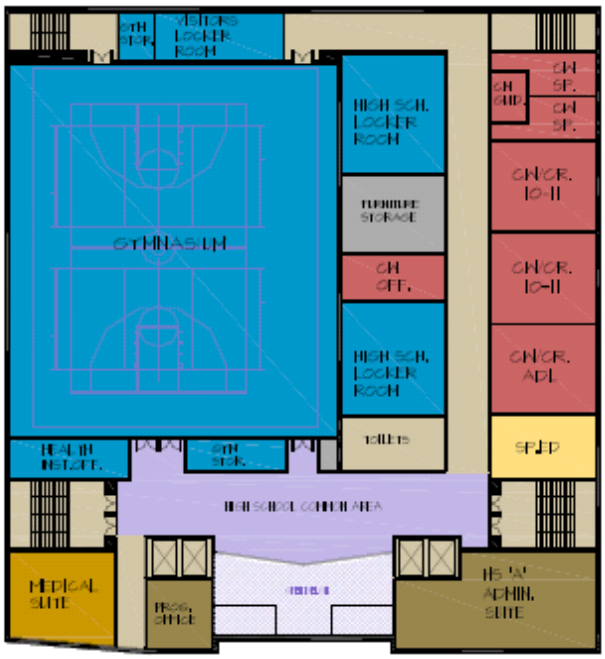
- GROUP 1 – INSTRUCTIONAL
- GROUP CW – CITY WIDE SP. ED – D75
- GROUP 2 – SPECIALIZED INSTRUCTION
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- GROUP 12 – CUSTODIAL
- GROUP 13 – KITCHEN/FOOD SERVICES
- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

SITE PLAN / FIRST FLOOR PLAN

3 of 14

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



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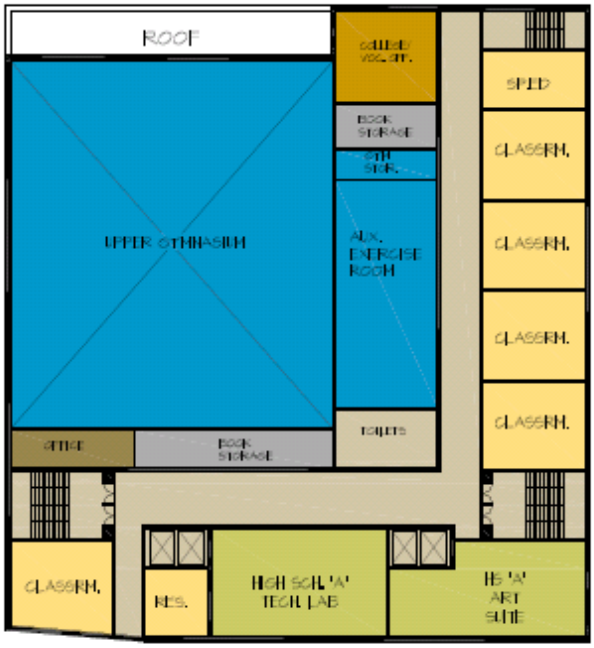
- GROUP 1 – INSTRUCTIONAL
- GROUP CW – CITY WIDE SP. ED – D75
- GROUP 2 – SPECIALIZED INSTRUCTION
- GROUP 3 – SCIENCE
- GROUP 4 – PHYSICAL EDUCATION
- GROUP 5 – ASSEMBLY
- GROUP 6 – LIBRARY
- GROUP 7 – LOBBY
- GROUP 8 – STUDENT SUPPORT
- GROUP 9 – STORAGE
- GROUP 10 – ADMINISTRATION
- GROUP 11 – CAFETERIA, STAFF LUNCH
- GROUP 12 – CUSTODIAL
- GROUP K – KITCHEN/FOOD SERVICES
- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

SECOND FLOOR PLAN

4 of 14

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



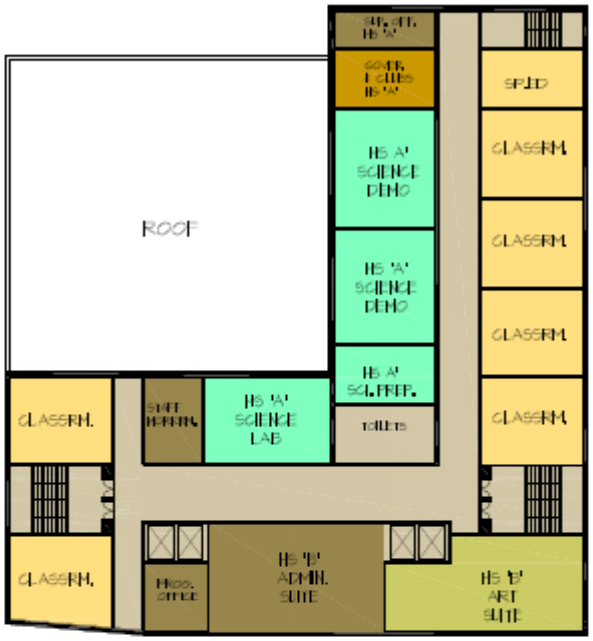
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- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

THIRD FLOOR PLAN

5 of 14

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



LEGEND:

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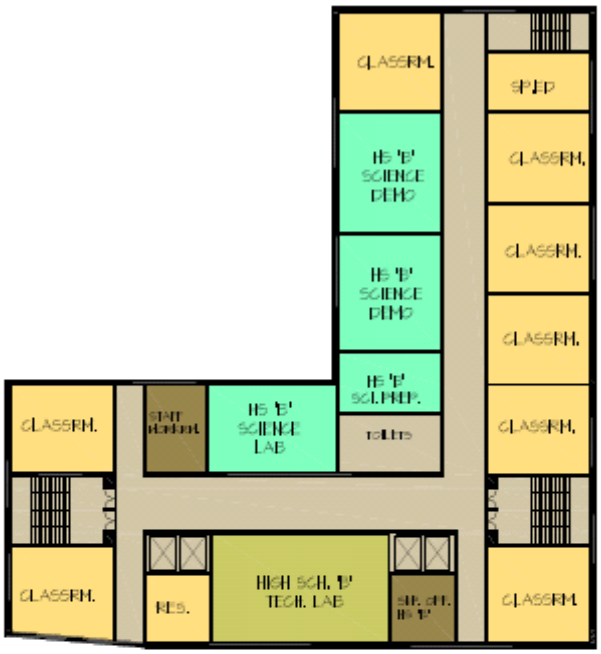
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FOURTH FLOOR PLAN

6 of 14

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



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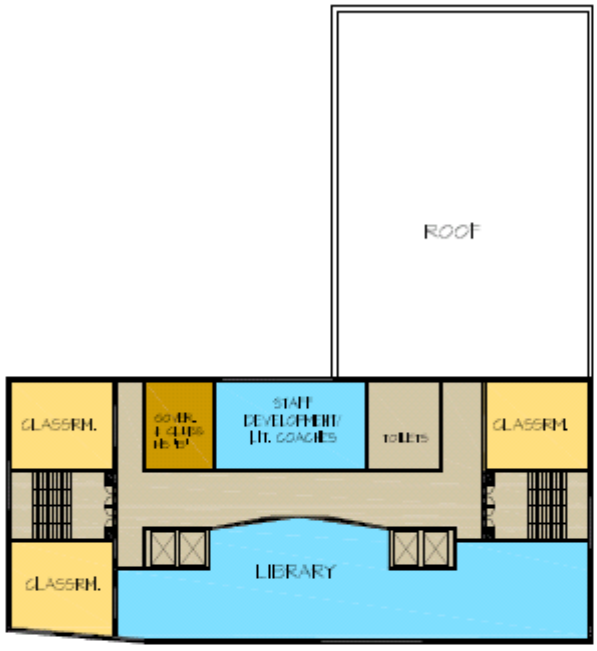
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- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

FIFTH FLOOR PLAN

7 of 14

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



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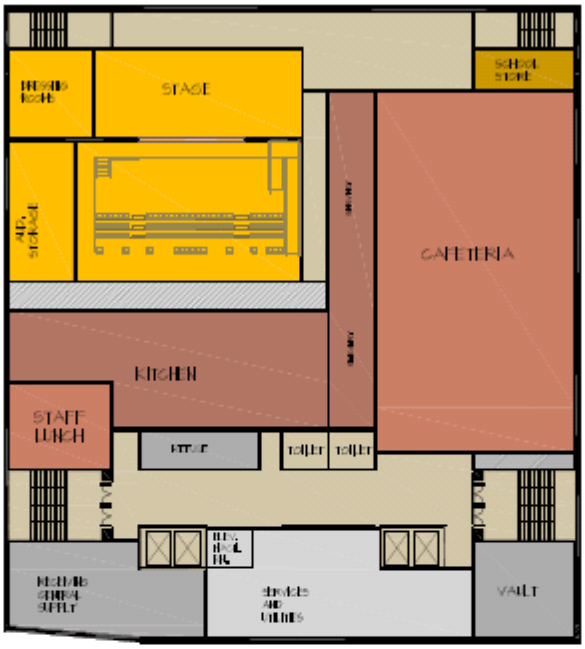
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- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

SIXTH FLOOR PLAN

8 of 14

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



LEGEND:

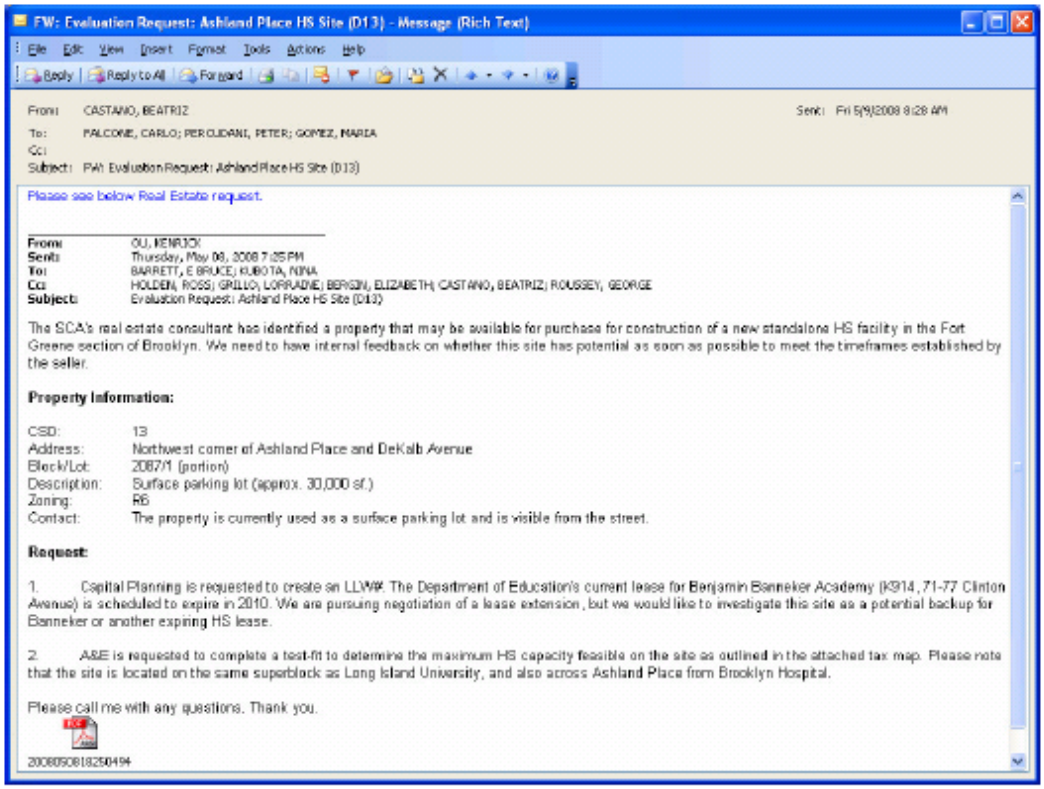
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- CORRIDOR/STAIR/ELEVATOR/ MECHANICAL/ELECTRICAL/TOILETS

CELLAR FLOOR PLAN

9 of 14

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



FW: Evaluation Request: Ashland Place HS Site (D13) - Message (Rich Text)

File Edit View Insert Format Tools Actions Help

Reply | Reply to All | Forward

From: CASTANO, BEATRIZ Sent: Fri 5/9/2008 8:28 AM
To: FALCONE, CARLO; PERCUDANI, PETER; GOMEZ, MARIA
Cc:
Subject: FW: Evaluation Request: Ashland Place HS Site (D13)

Please see below Real Estate request.

From: OU, KENRICK
Sent: Thursday, May 08, 2008 7:05 PM
To: BARRETT, E BRUCE; KUBOTA, NINA
Cc: HOLDEN, ROSS; GRILLO, LORRAINE; BERGIN, ELIZABETH; CASTANO, BEATRIZ; ROUSSEY, GEORGE
Subject: Evaluation Request: Ashland Place HS Site (D13)

The SCA's real estate consultant has identified a property that may be available for purchase for construction of a new standalone HS facility in the Fort Greene section of Brooklyn. We need to have internal feedback on whether this site has potential as soon as possible to meet the timeframes established by the seller.

Property Information:

CSD: 13
Address: Northwest corner of Ashland Place and DeKalb Avenue
Block/Lot: 2087/1 (portion)
Description: Surface parking lot (approx. 30,000 sf.)
Zoning: R6
Contact: The property is currently used as a surface parking lot and is visible from the street.

Request:

1. Capital Planning is requested to create an LLW#. The Department of Education's current lease for Benjamin Banneker Academy (K914, 71-77 Clinton Avenue) is scheduled to expire in 2010. We are pursuing negotiation of a lease extension, but we would like to investigate this site as a potential backup for Banneker or another expiring HS lease.

2. A&E is requested to complete a test-fit to determine the maximum HS capacity feasible on the site as outlined in the attached tax map. Please note that the site is located on the same superblock as Long Island University, and also across Ashland Place from Brooklyn Hospital.

Please call me with any questions. Thank you.

20080508182504.pdf

REQUEST FOR SKETCH STUDY

10 of 14

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201

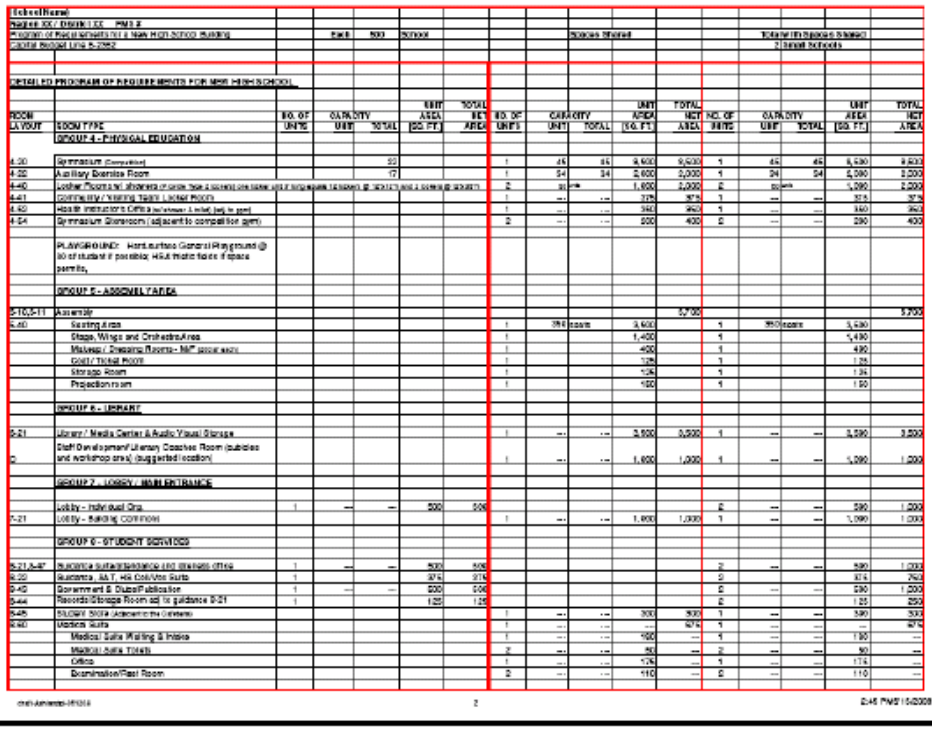
(School Name)																
Region XX / District XX FMS #																
Program of Requirements for a New High School Building		Each	500	School				Spaces Shared						Total with Spaces Shared		
Capital Budget Line # 2362														2 Small Schools		
DETAILED PROGRAM OF REQUIREMENTS FOR NEW HIGH SCHOOL																
ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA
	GROUP 1 - INSTRUCTION															
1-20	Typical Classrooms - Grade 9 - 12	11	24	264	750	8,250						22	24	748	750	16,500
1-30	HS District Special Ed. Classrooms	2	15	30	500	1,000						4	15	60	500	2,000
1-41	Resource Room (Small group instruction)	1	5	5	375	375						2	5	10	375	750
	GROUP CW CITY-WIDE SPECIAL ED - DISTRICT 75 (spaces clustered on first floor if possible, provide toilet in vicinity of cl															
CW10-10	Special Education Classrooms (w/o toilet) - District 75						5	12	72	500	3,000	6	12	72	500	3,000
CW10-11	Special Education Classrooms (w/o toilet) - District 75						2	12	24	750	1,500	2	12	24	750	1,500
CW15-30	Activities for Daily Living RR (w/ adjoining toilet rm w/changing table) (075 in all floors)						1	---	---	750	750	1	---	---	750	750
CW17-12	Citywide Special Ed Speech RR (w/ storage) - Dist. 75						2	---	---	200	400	3	---	---	200	600
CW30-00	Citywide Special Ed Guidance Office - Dist. 75						1	---	---	100	100	1	---	---	100	100
CW34-00	Occupational/Physical Therapy Room - Dist. 75						1	---	---	500	500	1	---	---	500	500
CW40-70	Supervisory Office (w/ storage) - District 75						1	---	---	250	250	1	---	---	250	250
CW80-00	Storage Room - District 75						1	---	---	100	100	1	---	---	100	100
	Nurse's Office - D 75 - with shower/changing room						1	---	---	375	375	1	---	---	375	375
	GROUP 2 - SPECIALIZED INSTRUCTION															
2-20	Art Classroom (w/ 150 sf storage)	1	24	24	1,250	1,250						2	24	68	1,250	2,500
2-40	HS Instrumental Music CR (w/ practice cubicles) (shared)			12			1	24	24	1,000	1,000	1	24	24	1,000	1,000
2-66	HS Music Instrument Storeroom (shared)						1	---	---	375	375	1	---	---	375	375
HS	Technology Lab (Distance Learning, CADD, Desk-top Publishing, V.R. etc.)	1	24	24	1,500	1,500						3	24	68	1,500	3,000
	GROUP 3 - SCIENCE															
3-20	Science Lab - Intrasol	1	---	---	1,250	1,250						2	---	---	1,250	2,500
3-24	Science Demo Room	2	24	68	1,000	2,000						4	24	136	1,000	4,000
3-42	Science Preparation Room (w/ 600 S.I. for Biology & Chem)	1	---	---	500	500						2	---	---	500	1,000

DRAFT PROGRAM OF REQUIREMENTS

11 of 14

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



DETAILED PROGRAM OF REQUIREMENTS FOR NEW HIGH SCHOOL

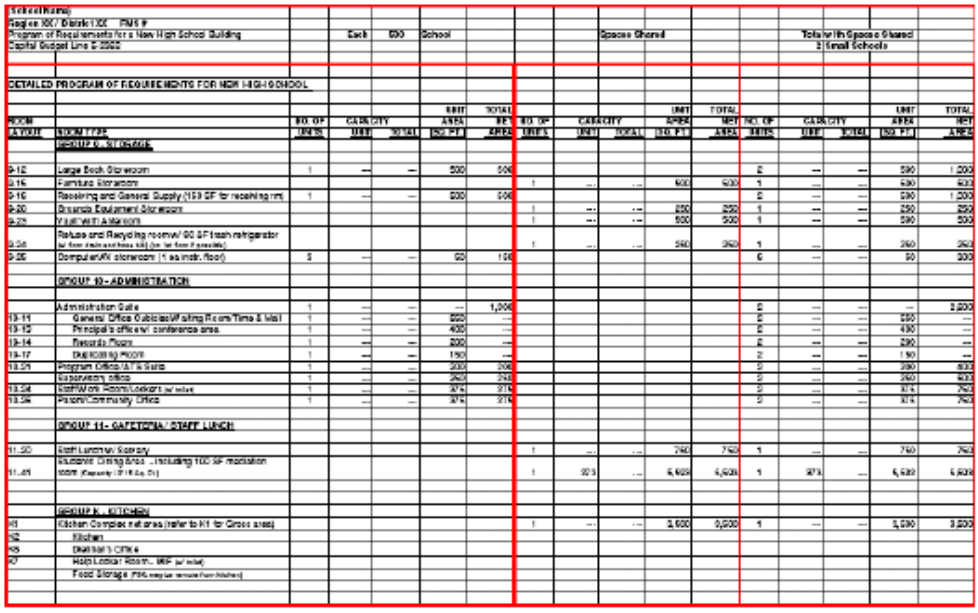
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	GROUP 4 - PHYSICAL EDUCATION															
4-20	Gymnasium (Competition)			22			1	44	44	8,600	8,600	1	44	44	8,600	8,600
4-22	Auxiliary Exercise Room			0			1	24	24	2,000	2,000	1	24	24	2,000	2,000
4-40	Locker Rooms w/ showers (Grade Type 2 School) (Includes @ 50% M/F)						2	30 M/F		1,000	2,000	2	30 M/F		1,000	2,000
4-41	Community / Visiting Team Locker Room						1	--	--	375	375	1	--	--	375	375
4-43	Health Instructor's Office (w/ toilet)						1	--	--	340	340	1	--	--	340	340
4-54	Gymnasium Storeroom (adjacent to competition gym)						2	--	--	200	400	2	--	--	200	400
	PLAYGROUND: Hard surface General Playground @ 50 sf/student if possible; Hard Multi-Sport if space permits,															
	GROUP 5 - ASSEMBLY AREA															
5-10,5-11	Assembly										5,700					5,700
5-00	Seating Area						1	350 seats		3,400		1	350 seats		3,400	
	Stage, Wings and Orchestra Area						1			1,400		1			1,400	
	Makeup / Dressing Rooms - M/F (group each)						1			400		1			400	
	Staff / Toilet Room						1			175		1			175	
	Storage Room						1			125		1			125	
	Projection room						1			100		1			100	
	GROUP 6 - LIBRARY															
6-21	Library / Media Center & Audio Visual Storage						1	--	--	3,500	3,500	1	--	--	3,500	3,500
6	Staff Development/Literacy Coaches Room (cubicles and workshop area) (suggested location)						1	--	--	1,800	1,200	1	--	--	1,200	1,200
	GROUP 7 - LOBBY / MAIN ENTRANCE															
	Lobby - Individual Org.	1	--	--	500	500						2	--	--	500	1,000
7-21	Lobby - Building Common						1	--	--	1,800	1,000	1	--	--	1,000	1,000
	GROUP 8 - STUDENT SERVICES															
8-21,8-47	Nurse's suite (reception and storage) office	1	--	--	500	500						2	--	--	500	1,000
8-20	Guidance - SAT, HS Coll/Voc Suite	1			974	974						0				974
8-40	Government & Dissol/Publication	1	--	--	500	500						0	--	--	500	1,000
8-44	Records/Storage Room adj to guidance 8-21	1			125	125						2			125	250
8-45	FACULTY SUITE (Adjacent to the Canteen)						1	--	--	300	300	1	--	--	300	300
8-60	Medical Suite						1	--	--		974	1	--	--	--	974
	Medical Suite Waiting & Intake						1	--	--	100	--	1	--	--	100	--
	Medical Suite Toilets						2	--	--	50	--	2	--	--	50	--
	Office						1	--	--	174	--	1	--	--	174	--
	Examination/Rest Room						2	--	--	110	--	2	--	--	110	--

draft-Ashland-REV2.0 2 2/45 PM 8/15/2008

DRAFT PROGRAM OF REQUIREMENTS

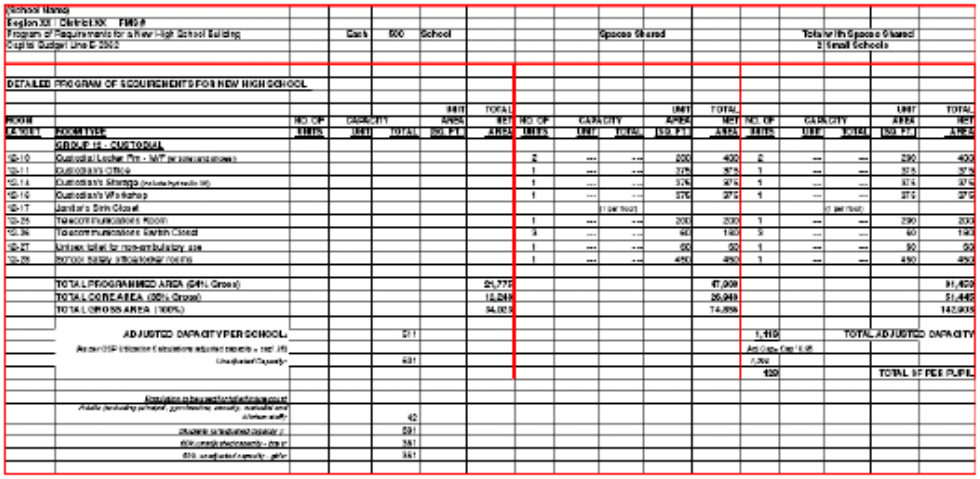
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New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



DRAFT PROGRAM OF REQUIREMENTS

New 2- Organization High School
Unadjusted Capacity 1,299
Ashland Place & Dekalb Avenue Bklyn., N.Y.11201



DETAILED PROGRAM OF REQUIREMENTS FOR NEW HIGH SCHOOL

ROOM LABEL	ROOM TYPE	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA	NO. OF UNITS	CAPACITY UNIT	CAPACITY TOTAL	UNIT AREA (SQ. FT.)	TOTAL NET AREA
	GROUP 15 - CUSTODIAL															
15-10	Custodial Locker Rm - M/F (w/ toilets and showers)						2	---	---	200	400	2	---	---	200	400
15-11	Custodian's Office						1	---	---	375	375	1	---	---	375	375
15-14	Custodian's Storage (w/ toilet/hydraulic lift)						1	---	---	375	375	1	---	---	375	375
15-16	Custodian's Workshop						1	---	---	270	270	1	---	---	270	270
15-17	Janitor's Sink Closet								(1 per floor)					(1 per floor)		
15-25	Telecommunications Room						1	---	---	200	200	1	---	---	200	200
15-26	Telecommunications Switch Closet						3	---	---	40	140	3	---	---	60	140
15-27	Unisex toilet for non-ambulatory use						1	---	---	60	60	1	---	---	60	60
15-28	Service Supply Receiving/Delivery Rooms						1	---	---	450	450	1	---	---	450	450
	TOTAL PROGRAMMED AREA (54% Gross)					21,777					47,909					91,429
	TOTAL CORE AREA (30% Gross)					12,249					26,949					51,442
	TOTAL GROSS AREA (100%)					34,026					74,858					142,905
	ADJUSTED CAPACITY PER SCHOOL			871								1,159		TOTAL ADJUSTED CAPACITY		
	As per DSF Utilization Calculations adjusted capacity + (ref. #5)											Art Class Cap. 1.0				
	Unadjusted Capacity			931								1,299				
												120				TOTAL SF PER PUPIL
	Area/station in square feet for total school program (Adults (excluding principal, gym/teaching specialty, custodial and kitchen staff)			42												
	Students in regularized classes (-)			931												
	40% unassigned classroom - core (-)			561												
	40% unassigned classroom - gym (-)			561												

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

1.1 Contract Requirements

1.1.3 Report Format

1.1.3.3 Desk Review – New Buildings, Additions, Conversions of Existing Buildings

Instructions to Users:

The format of a *Desk Review* required by the Authority for New Buildings, Additions, Existing Building Conversions, and other initiatives is described herein. Unless the Authority otherwise provides specific instructions, the following format shall be followed. Please note that the various examples cited herein are not project-specific.

A Project Cost Estimate is **not** required for a *Desk Review*.

Format

The *Desk Review* shall be in the form of a memorandum.

Objective

The objective of a *Desk Review* is to asses, as quickly as possible, if a school facility may physically be provided at a subject site and identify issues and concerns that should be noted and given due consideration. The Executive Office, Capital Plan Management (CPM), Real Estate, or other division will submit a request for a site to be given a *Desk Review*.

The *Desk Review* shall be a narrative along with plans that illustrate site conditions and the ability to accommodate a school building per a given Program of Requirements (POR), enabling open discussion and providing direction for the development of a project**.** A *Desk Review* will be utilized in certain cases when time or site access is limited, preventing a more detailed investigation (Feasibility Study).

Issues of interest to the Authority include, but are not limited to, a site or building's ability to accommodate a proposed Program of Requirements, the building layout and organization (orientation and circulation), zoning, construction, existing physical characteristics of the proposed site and adjacent properties, condition of the building, and the impact of a project to adjacent properties and vice versa.

The completed memorandum shall be submitted to CPM or other initiating Department. A Committee meeting may or may not be set up to review the memorandum. If the initiating department deems the project viable, a *Feasibility Study* or *Test Fit* may be requested for a full review process. The memorandum may utilize:

- The criteria of the *Test Fit/Sketch Studies* from DR 1.1.3.2, edited down for key issues for an executive summary.
- Plans in CADD format provided by the Developers/Consultant Architects for review of developer projects, i.e. mixed use buildings.
- EDOCS (historical school plans) system to evaluate existing design, structural or mechanical conditions.
- The Program Tracking system (PTS) to reference past or current projects related to existing schools.

- The “OASIS” system for access to digital maps, zoning information, and other reference systems available.
- Satellite mapping such as, but not limited to, “Google” maps, “Google Earth”, “Bing” maps, or other images (e.g. drone photography).
- Etc.

In addition to identifying issues, providing a copy of the request for the “Desk Review” and a copy of the draft Program of Requirements, if issued, the Desk Review should include various attachments that provide additional insight into the subject Site/Project.

Example “Desk Review”: (See next page)

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
ARCHITECTURE & ENGINEERING

Test Fit / Sketch Study

To	: Nina Kubota – Vice President, Capital Planning
Through	: Stan Dahir, RA – Sr. Director, Design and Construction Services
From	: Allyson Mantello - Senior Construction Assessment Specialist
Requested Facility	: **New Construction – Replacement - Additional Capacity**
Subject	: **Test Fit / Sketch Study**
Site / Address	: **PS47 - Queens** 9 Power Road Queens, N.Y. 11693 [Block: 15313 / Lot(s): 485]
District	: 27
Adjusted Capacity	: 424 *(without D75)*
LLW#:	000000
Date	: September 25, 2019
Estimated Cost[1]:	Not Available

As requested, a *"Test Fit / Sketch Study"* was initiated to determine whether or not the subject School property that is approximately 46,000 square feet in area and presently improved with a 2-story school facility (PS47Q) without a cellar, and open play yard, could accommodate new construction, which would provide an additional **Adjusted Capacity of 424.**

Note: This Study was done without the benefit of a site visit.

This *"Test Fit / Sketch Study"* typically provides a Draft Educational Program of Requirements (POR), describes existing site characteristics, topography and geology, zoning, utilities, transportation, and traffic; as well as a design approach for a proposed school facility. Although the *"Test Fit / Sketch Study"* does not include either a "Phase I or II Environmental Site Assessment", a "Geotechnical Report", or a "State Environmental Quality Review (SEQRA) Assessment", it may include when available through a search of public records, amongst other things, boring logs, surveys, plans, and various other applicable public records.

Although various codes, rules and regulations may be noted herein, the principal objective of this *Study* is to assess what may physically be provided at the subject Site and identify issues and concerns that should be given due consideration so that an informed decision may be made by the Feasibility Committee as to whether or not a project should move forward, or if additional research and development is warranted prior to such a decision.

cc:	L. Grillo	S. Lawitts	D. DeAngelis	G. Tung	G. Mandaro	K. Murphy	N. Kaminski	C. Columbo	J.Scalisi
	L. Guterman	E. Abneri	C. Liu	M. Gomez	G. Roussey	M. Mirisola	N. Hamoudeh	C.Panktatz	R. Sanft

[1] *"Estimated Cost"*, if needed, will be provided upon request under separate cover to Capital Plan Management.

1 of 30

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens, NY 11693

1. **Overview of Issues and Concerns**[2]

- Gross Floor Area, as per the Conceptual Plans provided herein: +/-60,700 GSF.
- The Conceptual Plan area is greater than the programed area of 31,800 GSF due to the fact the building needs to be elevated out of a *Flood Zone*.
- Additional vehicular traffic brought to this location by the proposed school may cause congestion and adversely affect the day to day activities on this street.
- The existing school building is **not** SHPO Eligible *(USN Number: 08101.011851)*
- The existing one and two story school, PS 47 Q, would need to be demolished in its entirety before the construction of the proposed new school facility.
- The subject Site/Property is located within a **(R3A)** Residential Zoning District.
- The site is in a **Special Costal Risk District**.
- At this time, compliance with NYC Zoning Regulations for "Bulk" **is not anticipated** (E.G.: Yard Regulations and Building Height and Setback).
- Ground water depth is approximately -2' as per 1989 borings.
- The site is within an "AE Flood Zone"; Flood Elevation is at 9'.
- The subject site is within a designated *"Hurricane Evacuation Zone" (Zone-1)*.
- The Site is within a designated "Flight Approach Path" of J.F.K. Airport.
- Filing with the Federal Aviation Authority (FAA) would be required as the FAA requires notice of Construction or Alteration of structures per Title 14, Part 77, and Subpart B - Section 77.9.
- *"License Agreements"* with adjacent Residential property owners may be required.

  Due to the height of the proposed school building and its proximity to adjacent structures the proposed school building may have an adverse impact on the existing chimneys[3] of adjacent structures.
- As per the Conceptual Plans provided herein, the remaining outdoor area for the rest and recreation of the children would be +/-6% greater than targeted. (See Exhibit-3)
- As per the Conceptual Plans provided herein, new construction is 4-Stories with no cellar[4].
- A State Pollutant Discharge Elimination System (*"SPEDES"*) Permit may be necessary because construction activities including clearing, grading, and excavating.

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[2] If Internet *"Hyperlinks"* (Web-Links) that are provided throughout this document do not work, copy the *"Hyperlink"* and paste into the dialogue box for *"Google Chrome"* Browser.

[3] **§28.2-2113.1.8.1 Responsibility of owner of taller building.** Whenever a building is erected, enlarged, or increased in height so that any portion of such building, except chimneys or vents, extends higher than the top of any previously constructed chimneys or vents within 100 feet, the owner of such new or altered building shall have the responsibility of altering such chimneys or vents to make them conform with the requirements of this chapter.

[4] **NYC 2014 Building Code - BASEMENT.** A story partly below the grade plane and having less than one-half its clear height (measured from finished floor to finished ceiling) below the grade plane (see definitions of "Story" in Section 28.2-202 and "Story above grade plane" in Section 28.2-502.1).

2. Volume and Type of Local Vehicular Traffic, and Traffic Patterns

The proposed Site is bounded by two (2) street front. The following is a general description of these streets, the type of vehicular traffic and observed traffic patterns:

- Power Road: This is a very narrow[5] two-way street that appears to be lightly trafficked by private and public vehicles. This street would be challenging for the drop-off and pick-up of children during arrival and dismissal times due to the following:
  - Additional vehicular traffic brought to this location by the proposed school may cause congestion and adversely affect the day to day activities on this street.

- Shad Creek Road: This is a very narrow two-way street that appears to be lightly trafficked by private vehicles. This street would be challenging for the drop-off and pick-up of children during arrival and dismissal times due to the following:
  - Additional vehicular traffic brought to this location by the proposed school may cause congestion and adversely affect the day to day activities on this street.

The aforementioned existing traffic and additional traffic brought-on by school buses[6] as well as cars and vans used by parents to drop-off and pick-up their children; and the existing traffic patterns in the immediate vicinity of the subject Site may present an undesirable and possibly hazardous condition to young school age children who typically lack the experience and sophistication to deal with complex traffic patterns. Hence, a *"Traffic Study"* is recommended.[7]

[5] Streets whose width are 75-feet or greater are wide streets; and streets whose width is less than 75-feet are narrow streets. (Street widths are measured from property/street line to property/street line. The actual roadbed (curb to curb) is the remaining street width after sidewalk depths are deducted from the "street width".)

[6] ~~Although, as indicated above, the adjacent streets are conducive to the drop-off and pick-up of children, the DTS component of the given ROR may bring additional school busses to the local streets that would take a significant amount of time to pick-up and discharge the children and further hamper existing traffic patterns.~~

[7] **NYC Health Code - §45.11 Physical Facilities:** (a) School or children's institution shall not be conducted in a factory, mercantile or business building, unless the premises are approved by the Department. Such approval shall not be granted unless the premises and the area surrounding the premises are free from fire, traffic or other safety hazards.

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3. **Site and Site Adjacencies (Local Environs)**

The subject property is approximately 46,000 s.f. in area and is located in the neighborhood known as *"Broad Channel"*, the Queens.

The Site is presently improved with a 2-story school facility (PS47Q) and open play area.



Site Location Map
http://gis.nyc.gov/taxmap/map.htm

- **Residential Properties - North Property Line**: This property line is approximately **175-feet** in length with seven (7) adjacent residential properties: Lot(s) #3, #4, # 5, #6, #7, #8, & #9.
  - Signal family homes several feet from property line.
  - Several properties have sheds and or garages close or on the property line
  - This property is separated from the subject site/property by a 6-foot high chain link fence.
- **Power Street - East Property/Street Line**: This property/street line provides +/- **130-feet** of street frontage.
  - Narrow sidewalks with no trees.
  - Overhead utilities.
  - No street curbs on the opposite side of Power Road.
  - The street is encumbered by a future *NYC/DOT Street Widening* approximately 12' wide.
  - This street is predominantly comprised residential structures.
- **Residential Properties - South Property Line**: This property/street line provides approximately **350-feet** with fourteen (14) adjacent residential properties: See tax map for individual Lot numbers.
  - Signal family homes several feet from property line.
  - Several properties have sheds and or garages close or on the property line
  - This property is separated from the subject site/property by a home owner fences of varying heights.
- **Shad Creek Road - West Property/Street Line**: This property/street line is +/- **325-feet** in length of street frontage.
  - Narrow sidewalks and no street trees along the majority of the street length and a portion of wider sidewalk at the north end of the street.
  - No overhead utilities.
  - A retaining wall and 6 foot iron fence are set back several feet from the street line to provide a narrow side walk.
  - This street is predominantly comprised residential structures and water's edge (Jamaica Bay).

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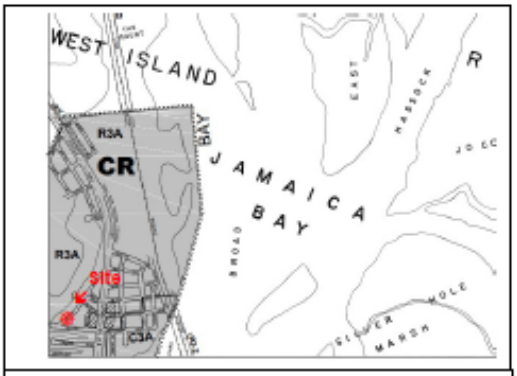
4. NYC Zoning Regulations [8]

The subject Site/Property is located within a **(R3A)**[9] Residential Zoning District and a **Special Costal Risk District.**

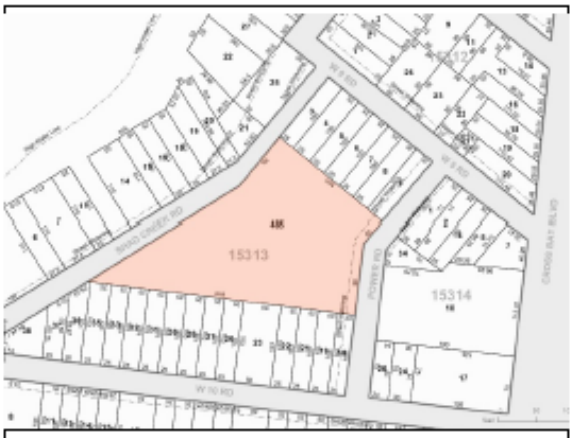
A *"Zoning Analysis"* should be performed to determine if any proposed new construction would require ***"Zoning Waivers"*** for non-compliance with existing NYC Zoning Regulations for *"Bulk"*. It is anticipated that zoning waivers will be required for Yard Regulations and Building Height and Setback.

Schools[10] are permitted as-of-right in both of the aforementioned *"Zoning Districts" and a* ***"Zoning Waiver"*** would not be required for *"Use"*.

The subject Site/Property is composed one (1) NYC Tax Lot (Lots #485) is approximately 46,000 square feet in area.



NYC Zoning Map – 24d
http://www.oasisnyc.net/map.aspx



NYC Tax Map
http://gis.nyc.gov/taxmap/map.htm

[8] The following analysis is not an analysis of compliance with all relevant NYC Zoning Regulations. The actual type and need for ***"Zoning Waivers"*** would be determined by the proposed project's final design.

[9] **ZR21-15 – R3-2, R4, R4B, R5, R6, R7, R8, R9 and R10 - General Residence Districts:** These districts are designed to provide for all types of residential buildings, in order to permit a broad range of housing types, with appropriate standards for each district on density, open space, and spacing of buildings. However, R4B Districts are limited to single- or two-family dwellings, and zero lot line buildings are not permitted in R3-2, R4 (except R4-1 and R4B), and R5 (except R5B) Districts. The various districts are mapped in relation to a desirable future residential density pattern, with emphasis on accessibility to transportation facilities and to various community facilities, and upon the character of existing development. These districts also include community facilities and open uses which serve the residents of these districts or benefit from a residential environment.

[10] **NYC Zoning Regulations – Appendix A:** "Schools *(Use Group – 3)* are not permitted, as-of-right, within a C-8 Commercial District or any Manufacturing District. Hence a "Zoning Waiver" would be necessary for a school to be in such Districts.

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Table – 1 / Other Land and Use Regulations or Property Encumbrances

Tax Lot Subdivision and/or Merger http://gis.nyc.gov/taxmap/map.htm *(The Site is (1) tax lot that needs to be subdivided, or more than one (1) tax lot that would need to be merged)*	No
City Environmental Quality (CEQR) http://www1.nyc.gov/site/planning/zoning/access-text.page [11] *(The Site is encumbered by environmental conditions - NYC Zoning Regulations Appendix "C")*	No
Environmental Restrictive Declarations http://www1.nyc.gov/site/planning/zoning/access-text.page [12] *(The Site is subject to an environmental review - NYC Zoning Regulations Appendix "D")*	No
Adverse Possession http://www.lawschoolcasebriefs.net/2016/03/walling-v-przybylo-case-brief-new-york.html [13] *(A portion(s) of the Site is openly used by others for their benefit)*	TBD
Easements and Restrictive Declarations (right-of-ways, utilities, etc.) https://a836-acris.nyc.gov/DS/DocumentSearch/BBL [14] *(The Site is encumbered by easements for access by other private or public entities)*	TBD
NYC Parks Department (Parks) [15] *(The Site is a "NYC Public Park" or a "Jointly Operated Playground")*	No
NYC Parks Department (Landmarks) http://www1.nyc.gov/site/lpc/designations/maps.page and https://cris.parks.ny.gov/ *(The Building or Site has landmark status)*	No
NYC Parks Department (SHPO) http://pts.nycsca.org/pts/#/Project%20Search/MainSearch and https://cris.parks.ny.gov/ [16] *(The Building or Site is SHPO Eligible)*	No
NYC Department of Buildings (Technical Notice #10/88) https://www1.nyc.gov/assets/buildings/pdf/tppn1088.pdf [17] *(Historic Structure or Place is contiguous to or within 90-feet of a lot under development or alteration)*	No
MTA Structures (subway, elevated rail line, open rail cut, etc.) [18] *(The Site is within 200-feet of an "MTA Structure")*	No
NYC Department of Transportation http://gis.nyc.gov/taxmap/map.htm *(The Site is encumbered by a future NYC/DOT street widening)*	YES
NYC Department of Transportation http://www.nyc.gov/html/dot/downloads/pdf/2016-06-06-truck-map-combined.pdf *(The Site is located on a NYC designated Truck Route)*	No
NYC Arterial Highways https://www1.nyc.gov/assets/planning/download/pdf/zoning/zoning-text/appendixh.pdf *(The Site is located on a NYC designated Arterial Highway - NYC Zoning Regulations Appendix "H")*	No
NYC Local Law 31 / 2016 https://legistar.council.nyc.gov/LegislationDetail.aspx?ID=2240452&GUID=0A9A645C-E3D9-4057-AEAC-426CA033FBBF&Options=ID%7cText%7c&Search= Net-Zero [19] *(The proposed school building would be 3-stories or less and a "net zero energy building" may be feasible")*	TBD

[11] An "E-Designation" is a NYC zoning map designation that indicates the presence of an environmental requirement pertaining to potential Hazardous Materials Contamination, Window/Wall Noise Attenuation, or Air Quality impacts on a particular tax lot.

[12] "Environmental Restrictive Declaration" means a document recorded against a tax lot(s) in the county office of land records and executed by all Parties-in-Interest to such tax lot(s), setting forth restrictions and enforcement provisions with respect to implementation of environmental requirements regarding hazardous materials, air quality and noise arising from the environmental review of land use actions.

[13] Court of Appeals (June 2006) in the case of *Walling v. Przybylo*, a claim of adverse possession can be made if an individual "openly, notoriously and exclusively" uses someone else's property continuously for 10 years, believing he has the right to do so.

[14] In addition to checking in "Acris", see the following "hyperlink" for types of Easements & Restrictive Covenants as well as forms that are filed with NYC Department of Buildings: https://www1.nyc.gov/site/buildings/about/forms-easements-and-restrictive-declarations.page

[15] Check with SCA Capital Plan Management and SCA Real Estate Departments to confirm if the subject school property is considered to be a NYC Department of Education / NYC Parks Department "Jointly Operated Playground".

[16] See SCA/PTS - Design Bundle - SHPO Tracking for existing school buildings.

[17] Building Code Section 27-166 (C26-it2. 4) serves to protect historic structures by requiring that all lots, buildings and service facilities adjacent to foundation and earthwork areas shall be protected and supported in accordance with the requirements of Building Construction Subchapter.

[18] The property line of a site having new construction (E.G.: foundations) that is within 200-feet of a transit (E.G.: MTA, NYCDOT, LIRR, etc.) structure will require approval from the governing agency with the likelihood of additional cost and time to the project.

[19] **Local Law 31 / 2016** - The term "net zero energy building" means a building that has been designed and constructed to produce energy on-site from renewable energy sources in an amount equal to or greater than such building's total energy needs....Capital Projects with an estimated height of **no more than 3-stories above grade** shall consider the feasibility of designing and constructing such project as a net zero energy building.....Local law 31 only applies to Capital Projects which are added to the Capital Plan **on or after July 1, 2017**.

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Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

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Table – 1 / Other Land and Use Regulations or Property Encumbrances (continued)

NYC Local Law 6 / 2016 https://www1.nyc.gov/assets/ddc/geothermal/index.html.....Geothermal [20] *(A "Geothermal System" may be both feasible and cost effective for the subject Site)*	TBD
State Pollutant Discharge Elimination System (SPDES) https://www.law.cornell.edu/cfr/text/40/122.26 ..... [21] *(Storm water/wastewater discharges into surface waters or ground waters of the state - not connected to NYC Sewer System)*	TBD
Wetlands http://www.dec.ny.gov/pubs/erm/ ..... [22] *(The Site is within a designated "Wetland")*	No
Flood Zone (FEMA) http://www.region2coastal.com/view-flood-maps-data/what-is-my-bfe-address-lookup-tool/ ..... [23] *(The Site is within a designated "Flood Zone" - Type "AE" EL 9 Feet*	YES
Groundwater https://ny.water.usgs.gov/maps/li-dtw10/ *(Maps Not Available for Manhattan, Bronx, and Staten Island)*..... [24] *(The development of the Site may be affected by high ground water - Groundwater indicated to be +/- x below grade)*	TBD
NYC Hurricane Evacuation Zone http://maps.nyc.gov/hurricane/ ..... [25] *(The Site is within a designated "Hurricane Evacuation Zone" – Zone 1)*	YES
Topographic Maps http://en-us.topographic-map.com/ ..... *(To determine approximate grade elevation use this tool....Info only.)*	Info

NOT APPLICABLE

Industrial Business Zone



FEMA Flood Zone

[20] **Local Law 6 / 2016** - Where the use of NYC Department of Design and Construction's (DDC's) "Geothermal Pre-feasibility Tool" indicates that the installation of a geothermal system may be cost-effective, an engineering and multi-criteria analysis of the use of a geothermal system, including, where appropriate, an analysis of the option of utilizing a photovoltaic system coupled with a geothermal system, shall be conducted.

[21] **50 CFR 122.26(b)(15)(i)**: Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than 1- acre and less than 5-acres. Small construction activity also includes the disturbance of less than 1-acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than 1 and less than 5-acres.

[22] The "check zone" is an area around the mapped wetland in which the actual wetland may occur. Projects that may encroach into this area, you should check with your regional DEC office to make sure where the actual wetland boundary is. If necessary, they may have a biologist come out and perform a field delineation for you to help you avoid impacts in the wetland or the regulated 100-foot buffer zone.

[23] **FEMA Flood Zones (Zone V/VE)**: An area of high flood risk subject to inundation by the 1% annual-chance flood event with additional hazards due to storm-induced velocity wave action (a 3-foot or higher breaking wave). (Zone A/AE): An area of high flood risk subject to inundation by the 1% annual-chance flood event. (Zone AO): An area of high flood risk subject to inundation by 1% annual-chance shallow flooding where average depths are between one and three feet. (Shaded Zone X): Areas of moderate flood risk within the 0.2% annual chance floodplain; or areas of 1% annual chance flooding where average depths are less than 1 foot, where the drainage area is less than 1 square mile, or areas protected from this flood level by a levee. (Unshaded Zone X): Areas of low flood risk outside the 1%- and 0.2%-annual chance floodplains. (Zone D): Areas where flood hazards are undetermined but flooding is possible.

[24] U.S. Geological Survey (USGS) Maps presently only provides approximate depths of groundwater for the Boroughs of Brooklyn and Queens.

[25] **NYC Hurricane Zones:** Zone-1 *(Most Likely to Evacuate)*..... *(Least likely to Evacuate)* Zone-6

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Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

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Table – 1 / Other Land and Use Regulations or Property Encumbrances (continued)

Industrial Business Zone https://www.nycedc.com/industry/industrial/nyc-industrial-business-zones *(The Site is within a designated "Industrial Business Zone")*	[28]	No
Fed. Aviation Admin. https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm *(FAA requires notice of Construction or Alteration of structures per Title 14, Part 77, Subpart B - Section 77.9)*	[27]	YES
NYC Zoning Special Regulations (Airports) https://www1.nyc.gov/assets/buildings/bldgs_bulletins/bb_2009-006.pdf *(The Site is within a designated "Flight Approach Path" of a Major Airport)*	[28]	YES



Flight Obstruction Path Map - LGA



Flight Obstruction Map - JFK

NYS Liquor Authority [See Exhibit - 1] *(The proposed school entrance is within 200-feet of an establishment that sells or serves alcohol)*	[29]	No
Adult Establishments [See Exhibit - 2] *(The Site is within 500-feet of an adult establishment)*	[30]	No

[28] ***"NYC Economic Development Corporation" (EDC):*** In early 2006, the City created 16 Industrial Business Zones across the City where expanded business services are available for industrial and manufacturing businesses. This designation fosters high-performing business districts by creating competitive advantages over locating in areas outside of NYC. The IBZs are supported by tax credits for relocating within them, zone-specific planning efforts, and direct business assistance from Industrial Providers of NYC Business Solutions Industrial and Transportation. In light of the purpose of IBZs to foster industrial sector growth by creating real estate certainty, the previous administration stated that it would not support the rezoning of these areas for residential use.

[27] Filing with the Federal Aviation Administration (FAA) should be made as soon as practical by the AEOR on behalf of the SCA.

[28] NYC Zoning Article VI, Chapter I - Special Regulations Applying Around Major Airports; and noise may be an additional factor https://webtrak.emsbk.com/panynl4

[29] **NYS Liquor Authority / 200-foot Rule:** The statute refers to schools on the same street as the licensed premises. The buildings do not have to be on the same block. With respect to an establishment or school/ place of worship on a corner lot, the building is considered to be on both streets, whether or not there is an entrance to the building on both streets. ***(Existing establishments are grandfathered).***

While the law *("NYS Liquor Authority / 200-foot Rule")* uses the phrase "building used exclusively" as a school, the courts have adopted a test that looks to whether the building is used primarily as a school. The court determined that a building will still be considered a school as long as any use is incidental to, and is not inconsistent with or detracting from the predominant character of the building as a school. Hence, since the proposed "Mixed-use" building would not be exclusively used as a school, establishments that serve and/or sell alcohol, within 200-feet of the school, would not be prohibited. [Note: The "NYSLA" presumes establishments are permitted within a "mixed-use" building. [See Exhibit - 1]

[30] **Rules of the City of New York:** Under 1 RCNY § 9000-1, the Department clarifies criteria for determining the dates of establishment and discontinuance for adult establishments, houses of worship and schools. New adult establishments are not permitted within a 500-foot radius of established adult establishments, houses of worship and schools.

Adult establishments that obtained a new building or alteration permit between 08/08/2001 and 07/09/2010 that has not obtained a Temporary Certificate of Occupancy (TCO), or if applicable a Department sign-off, by July 10, 2011 or started operating within six months of TCO or sign-off, will lose the priority to operate as an adult establishment if a new adult establishment, house of worship or school obtains a permit to be located within a 500-foot radius of the adult establishment. ***Note:*** *Houses of worship, schools and adult establishments in existence and operating prior to Aug. 6,2001 that have not discontinued operation for a continuous period of one year or longer are considered established.*

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Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

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5. **Design / Functionality / Other Issues and Concerns**

In addition to the aforementioned issues and/or concerns, the following pertain to design and functionality:

- The available area for outdoor play[31], for rest and recreation by the children, would be as follows:

Target as per the Draft POR	=	12,720	= (424 * 30sf/pupil)
Conceptual Outdoor Play Area	=	13,550	= (@ grade)
Difference	=	830sf	/ 12,720 sf = +/- 6% Greater than targeted

  Note: Existing legislation [See Exhibit - 3], which continues to address required open-air playgrounds for NYC Schools was amended to address the loss of existing outdoor area at existing school facilities. Hence, it is important that suitable and adequate outdoor area always be provided to accommodate the physical and recreational needs of the children for existing and new schools. (Except for Parks that are jointly operated (JOP) between the NYC Parks Department and the Board of Education, existing Public Parks do not typically lend themselves to school use [32].)

- Due to the height of the proposed school building and its proximity to adjacent structures; shoring, underpinning and overhead protection of adjacent structures may be required, and the proposed school building may have an adverse impact on the existing chimneys of adjacent structures.

- During what is deemed a conceptual design phase, the area needed for structural systems and mechanical systems (ducts, pipes, closets, etc...) are not typically accounted for at this level of design and due to the limited site area and constrained dimensions they may have an adverse impact on the final design and the POR when these systems are accounted for in the actual design and development of the subject school.

- ~~District 75 Citywide Education[33] often requests to have the flexibility of a secondary school entrance to facilitate their unique needs of the D75 children as they arrive and depart a school.~~

- ~~Noise Pollution: "Aircraft noise disturbs the normal activities of airport neighbors--their conversation, sleep, and relaxation--and degrades their quality of life. Depending on the use of land contiguous to an airport, noise may also affect education, health services, and other public activities." [34]~~

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[31] **Outdoor Space:** *"NYC Health Department and NYS Law"* requires a school to have outdoor area for rest and recreation - New York City Rules & Regulations - Title 24 - Health Code, Sections §45:11(h) and §49.13; and NY CLS Educ. 2556(5).

- When available, open space at grade, is typically utilized for the gathering of children during arrival times and for the organized dismissal of the children at the end of each school day.
- *"Research confirms the importance of physical education for health, learning, and social development. In New York City, physical education and sports have also played an integral part in the fabric of civic life and public schools. For countless children, immigrants and native-born, schoolyards and playing fields have provided the forum for friendships made and opportunity forged, the level playing field on which children from disparate backgrounds have met and tested themselves without advantage or benefit accorded privilege." – "Hit or Miss-Fitness & Sports Opportunities in the New York City Public Schools (New York, Educational Frameworks Inc., 2000)".*

[32] **Rules and Regulations of the NYC Parks Department, §1-06 Regulated Uses, paragraph c.:** Areas within the parks designated by the Commissioner for exclusive use shall include: 1. Exclusive Children Playgrounds: Adults allowed in playground areas only when accompanied by a child under the age of twelve (12).

When children are brought off a school property there are liability risks regarding the children permission is required from parents/legal guardians.

[33] ~~District 75 provides citywide educational, vocational, and behavior support programs for students who are on the autism spectrum, have significant cognitive delays, are severely emotionally challenged, sensory impaired and/or multiply disabled. [Source: http://schools.nyc.gov/Academics/SpecialEducation/D75/Feeds/Slide/AppropriateLearningEnvironments.htm]~~

[34] ~~"LaGuardia Airport: Can the Airport & Community Coexist, By Congressman Joseph Crowley, page 14 http://www.ut-caw.org/pdf/LaGuardia.pdf and https://wcbtapi.cmath.com/cgenuni/~~

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6. Conceptual Plans and Draft Program of Requirements:

Through an expedited singular design approach the following conceptual plans *["Test Fit / Sketch Study"]* attempt to accommodate a given Program of Requirements (POR) in the most straight forward viable approach possible while keeping in mind, amongst other things, functionality, layout, circulation, impact to local environs, impact to existing site conditions, impact to existing buildings, costs, codes, zoning, phasing and constructability issues.

The goal of the following conceptual plans is to successfully address all issues and concerns that can be resolved through design, and if not, at a minimum, expose those issues and concerns that may present significant challenges for both the design and construction of a proposed project.

In the end, it is hoped that if a project is assigned to a Design Team that the following conceptual plans *["Test Fit / Sketch Study"]* assists that Design Team in their efforts to develop and provide a design that best addresses the multiple complex and sometimes competing and/or contradictory needs of a project.



PS 47 Q

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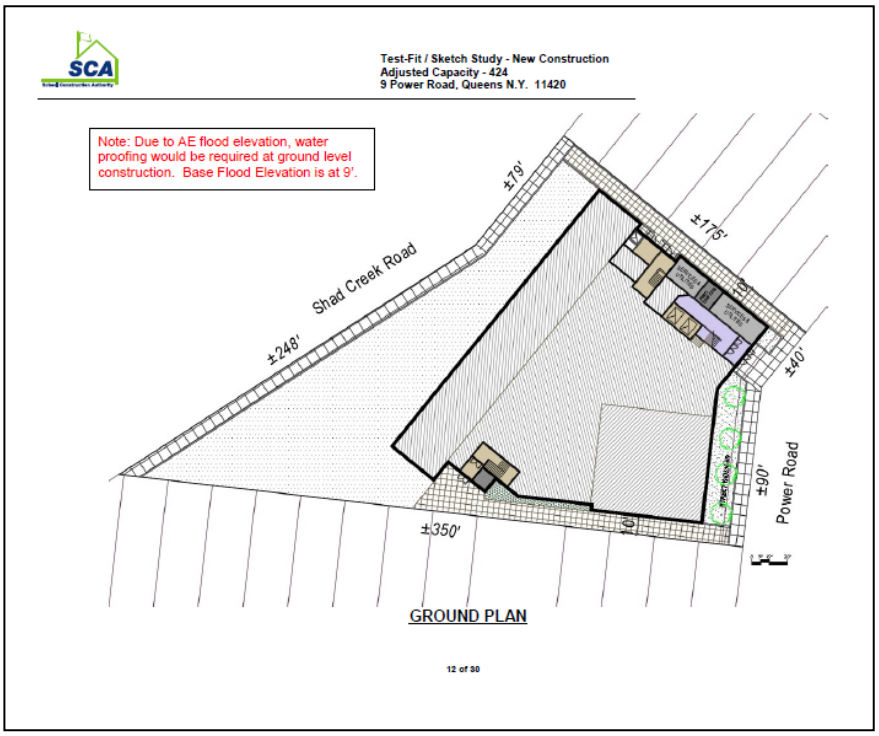
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Note: Due to the narrow streets, the new sidewalks are within the property lines at Power Road and Shad Creek Road

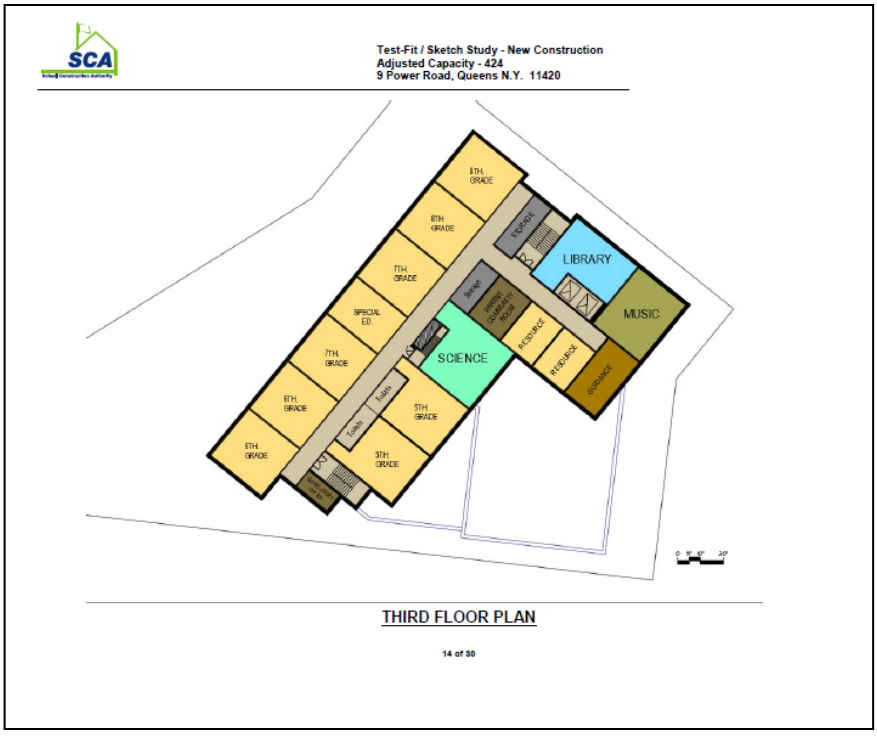


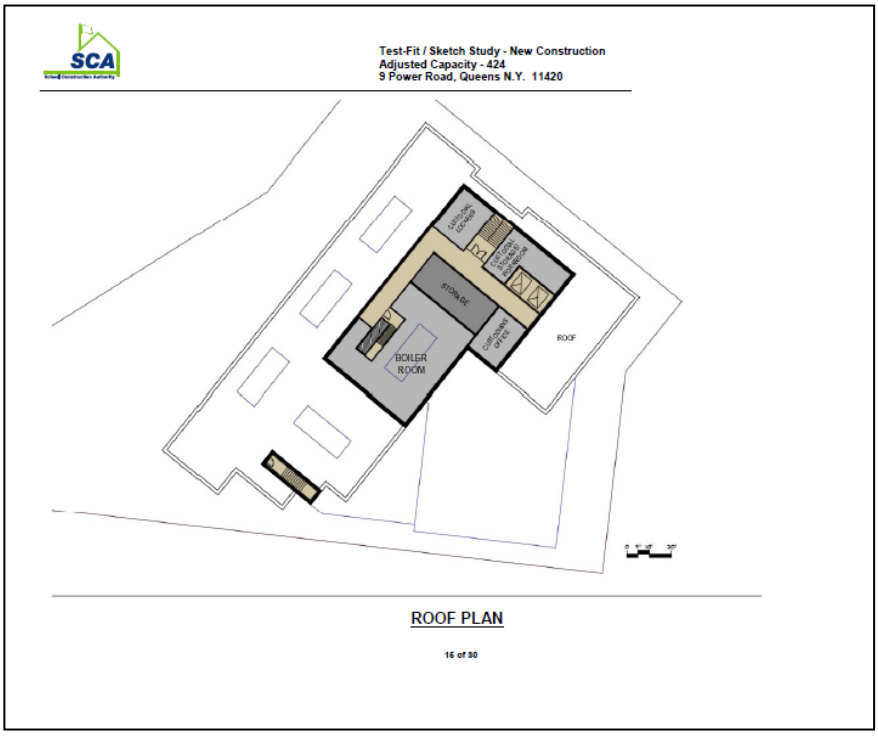
FIRST FLOOR/ SITE PLAN

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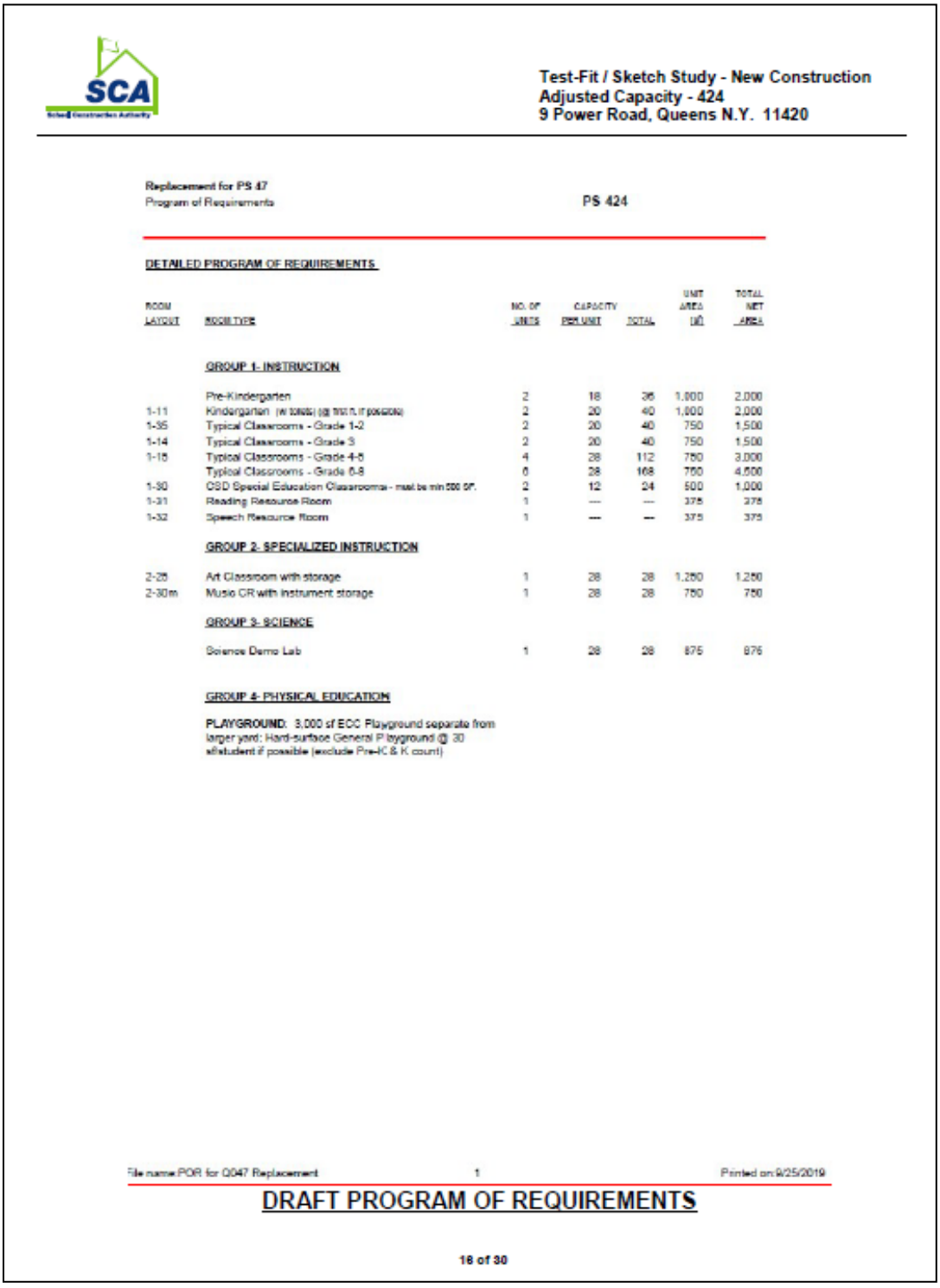

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420
Note: Due to AE flood elevation, water proofing would be required at ground level construction. Base Flood Elevation is at 9'.
±79'
±175'
Shad Creek Road
±248'
±40'
±90'
Power Road
±350'
GROUND PLAN
12 of 30


Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420
4TH. GRADE
4TH. GRADE
3TH. GRADE
SPECIAL ED.
3TH. GRADE
2ND. GRADE
2ND. GRADE
1ST. GRADE
1ST. GRADE
EXERCISE ROOM
ART
TELECOM
UPPER GYM ROOF
ROOF
SECOND FLOOR PLAN
13 of 30





Requirement Applies to:	✔ New Construction	Major Modernizations	Capital Improvement Projects



Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

Replacement for PS 47
Program of Requirements

PS 424

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA (sf)	TOTAL NET AREA
	GROUP 1- INSTRUCTION					
	Pre-Kindergarten	2	18	36	1,000	2,000
1-11	Kindergarten (w toilet) (@ first fl. if possible)	2	20	40	1,000	2,000
1-35	Typical Classrooms - Grade 1-2	2	20	40	750	1,500
1-14	Typical Classrooms - Grade 3	2	20	40	750	1,500
1-15	Typical Classrooms - Grade 4-5	4	28	112	750	3,000
	Typical Classrooms - Grade 6-8	6	28	168	750	4,500
1-30	CSD Special Education Classrooms - must be min 500 SF.	2	12	24	500	1,000
1-31	Reading Resource Room	1	---	---	375	375
1-32	Speech Resource Room	1	---	---	375	375
	GROUP 2- SPECIALIZED INSTRUCTION					
2-28	Art Classroom with storage	1	28	28	1,250	1,250
2-30m	Music CR with instrument storage	1	28	28	750	750
	GROUP 3- SCIENCE					
	Science Demo Lab	1	28	28	875	875
	GROUP 4- PHYSICAL EDUCATION					

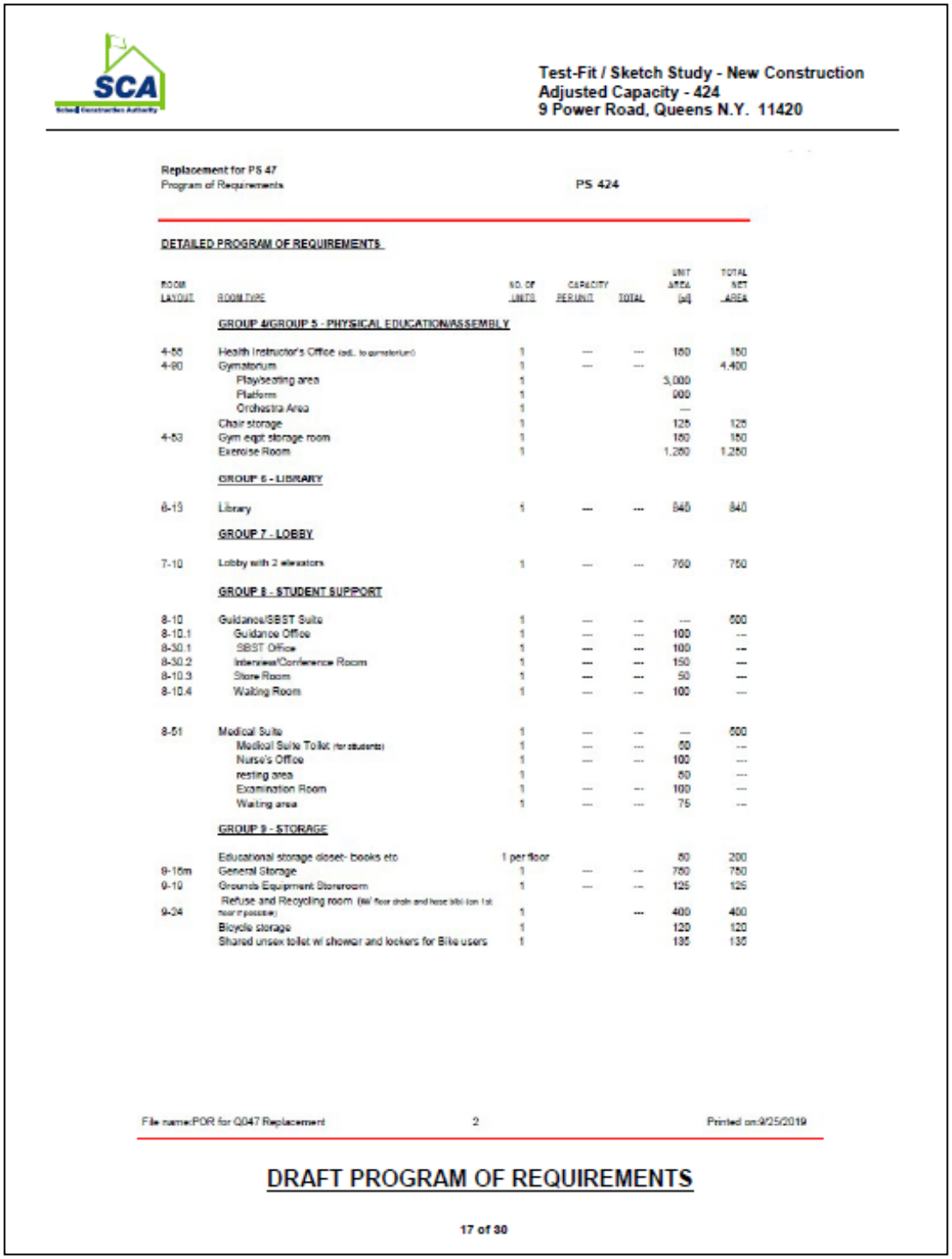
PLAYGROUND: 3,000 sf ECC Playground separate from larger yard: Hard-surface General Playground @ 30 sf/student if possible (exclude Pre-K & K count)

File name:POR for Q047 Replacement 1 Printed on:9/25/2019

DRAFT PROGRAM OF REQUIREMENTS

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Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**



Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

Replacement for PS 47
Program of Requirements

PS 424

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA (sf)	TOTAL NET AREA
	GROUP 4/GROUP 5 - PHYSICAL EDUCATION/ASSEMBLY					
4-55	Health Instructor's Office (adj. to gymatorium)	1	---	---	150	150
4-60	Gymatorium	1	---	---		4,400
	Playseating area	1			3,000	
	Platform	1			900	
	Orchestra Area	1			---	
	Chair storage	1			125	125
4-53	Gym eqpt storage room	1			150	150
	Exercise Room	1			1,250	1,250
	GROUP 6 - LIBRARY					
6-13	Library	1	---	---	840	840
	GROUP 7 - LOBBY					
7-10	Lobby with 2 elevators	1	---	---	750	750
	GROUP 8 - STUDENT SUPPORT					
8-10	Guidance/SBST Suite	1	---	---	---	600
8-10.1	Guidance Office	1	---	---	100	---
8-30.1	SBST Office	1	---	---	100	---
8-30.2	Interview/Conference Room	1	---	---	150	---
8-10.3	Store Room	1	---	---	50	---
8-10.4	Waiting Room	1	---	---	100	---
8-51	Medical Suite	1	---	---	---	600
	Medical Suite Toilet (for students)	1	---	---	50	---
	Nurse's Office	1	---	---	100	---
	resting area	1			50	---
	Examination Room	1	---	---	100	---
	Waiting area	1	---	---	75	---
	GROUP 9 - STORAGE					
	Educational storage closet- books etc	1 per floor			50	200
9-15m	General Storage	1	---	---	750	750
9-19	Grounds Equipment Storeroom	1	---	---	125	125
9-24	Refuse and Recycling room (w/ floor drain and hose bibb on 1st floor if possible)	1		---	400	400
	Bicycle storage	1			120	120
	Shared unsex toilet w/ shower and lockers for Bike users	1			130	130

File name:POR for Q047 Replacement 2 Printed on:9/25/2019

DRAFT PROGRAM OF REQUIREMENTS

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Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

Replacement for PS 47
Program of Requirements

PS 424

DETAILED PROGRAM OF REQUIREMENTS

ROOM LAYOUT	ROOM TYPE	NO. OF UNITS	CAPACITY PER UNIT	CAPACITY TOTAL	UNIT AREA (sf)	TOTAL NET AREA
	GROUP 10 - ADMINISTRATION					
	Administration Suite	1	---	---	---	1,025
10-10	General Office/Waiting Room mail and time/duplicating	1	---	---	500	---
10-15	Principal's Office /Conference	1	---	---	375	---
10-14	Records Room	1	---	---	150	---
10-24	Teachers' & Aides Work Rm/Lounge (w/ lockers & toilet)	1	---	---	500	500
10-25	Parents / Community Room	1	---	---	375	375
	GROUP 11 - CAFETERIA/STAFF LUNCH					
11-10	Students' Dining Area (100% Capacity / 3.15 sf)	1	141	---	2,120	2,120
11-11	Staff Lunch / Conference Room	1	---	---	500	500
	GROUP 12 - CUSTODIAL					
12-23	Custodial Locker Rm	2	---	---	150	300
12-11	Custodian's Office	1	---	---	200	200
12-14,16	Custodian's Storage/workshop (include hydraulic lift)	1	---	---	500	500
12-17	Janitor's Sink Closet			(1 per floor)		
12-25	Telecommunications Room	1	---	---	300	300
12-26	Telecommunications Switch Closet (@ floors w/o tel. room)	2	---	---	100	200
	GROUP K - KITCHEN					
K1	Kitchen Complex (refer to K1 for gross area)	1	---	---	1,600	1,600
K2	Kitchen- with two serving lines					
K6	Dietitian's Office					
K8	Help Locker Room - M/F	2				
	Food Storage (75% may be remote from kitchen)	2				
	TOTAL PROGRAMMED AREA (62% Gross)					35,140
	TOTAL CORE AREA (38% Gross)					21,537
	TOTAL GROSS AREA (100%)					56,677
	TOTAL ADJUSTED CAPACITY:	424				

File name:PDR for Q047 Replacement 3 Printed on 9/25/2019

DRAFT PROGRAM OF REQUIREMENTS

18 of 30

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

7. Photographs[35], Exhibits and Other Attachments

The Photographs, Plans and other attachments that follow are provided to illustrate the above noted issues and concerns, to provide a basis for open discussion, and direction for the possible development of a project. Please note that neither the Program of Requirements nor the Design Scheme provided herein is final.



View of South Property Line from Power Road



View looking North on Power Road

STREET VIEWS

[35] Photographs provided herein are not comprehensive of all site conditions, additional views of the subject site and its surrounding can be viewed through "Google Earth".

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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420



View looking South on Power Road



View looking North Property Line on Power Road

STREET VIEWS

20 of 30

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420



View looking North Property Line on Shad Creek Road



Looking at South on Shad Creek Road

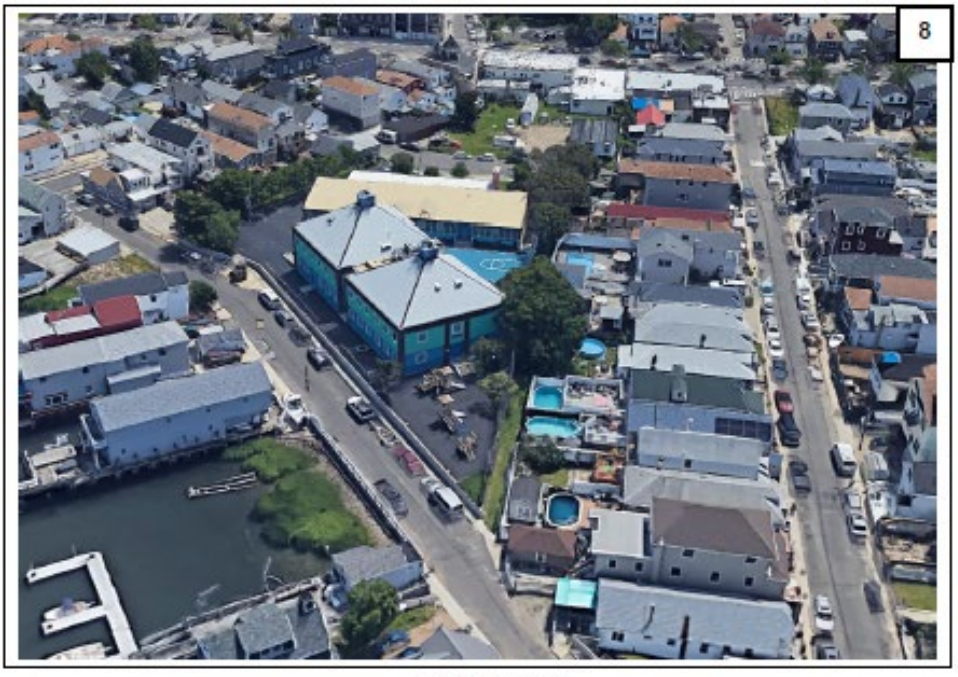
STREET VIEWS

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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420



View looking North on Shad Creek Road

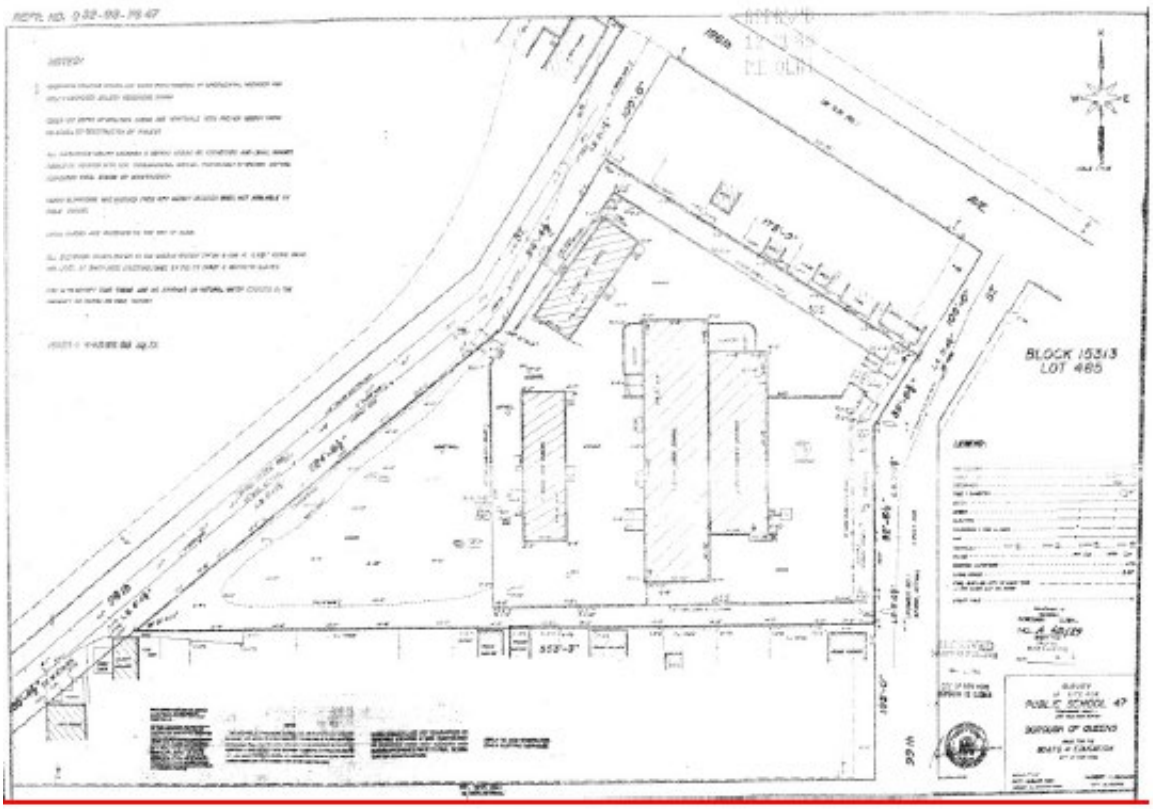


SITE VIEWS

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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

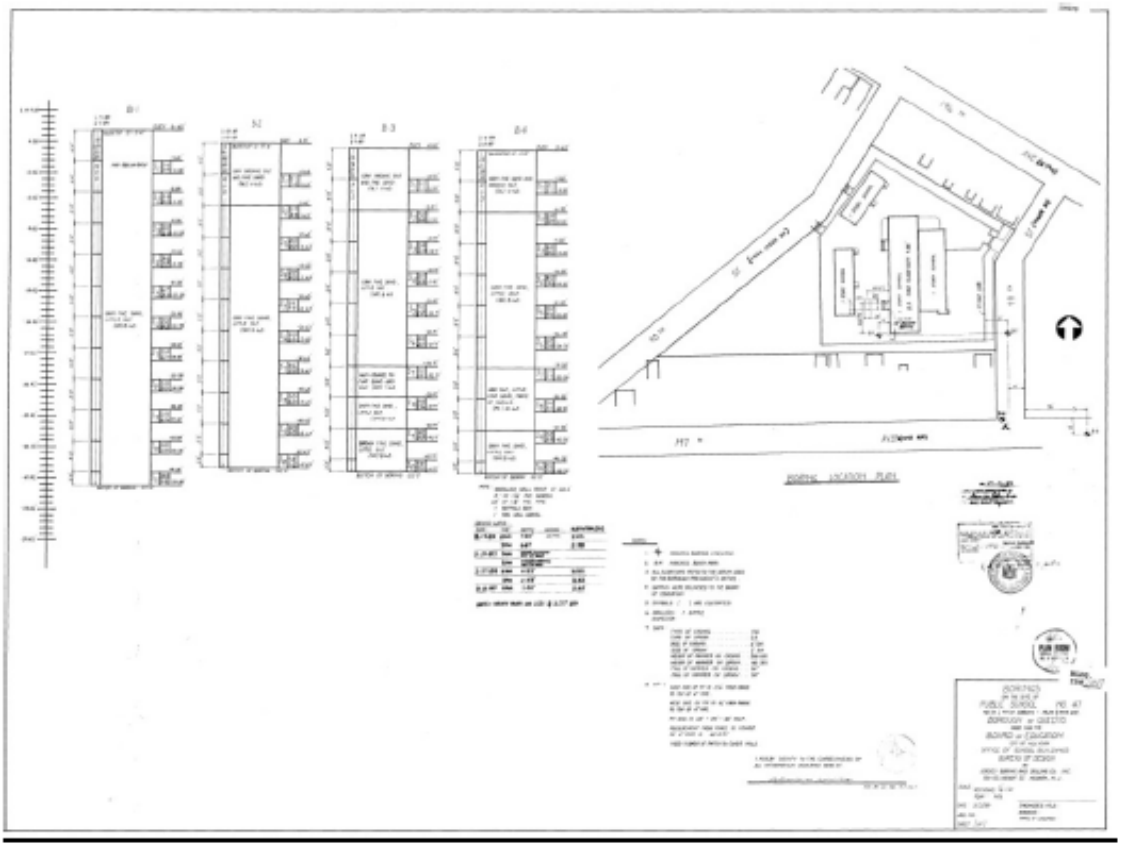
8. Existing Site Data / Information:



Survey

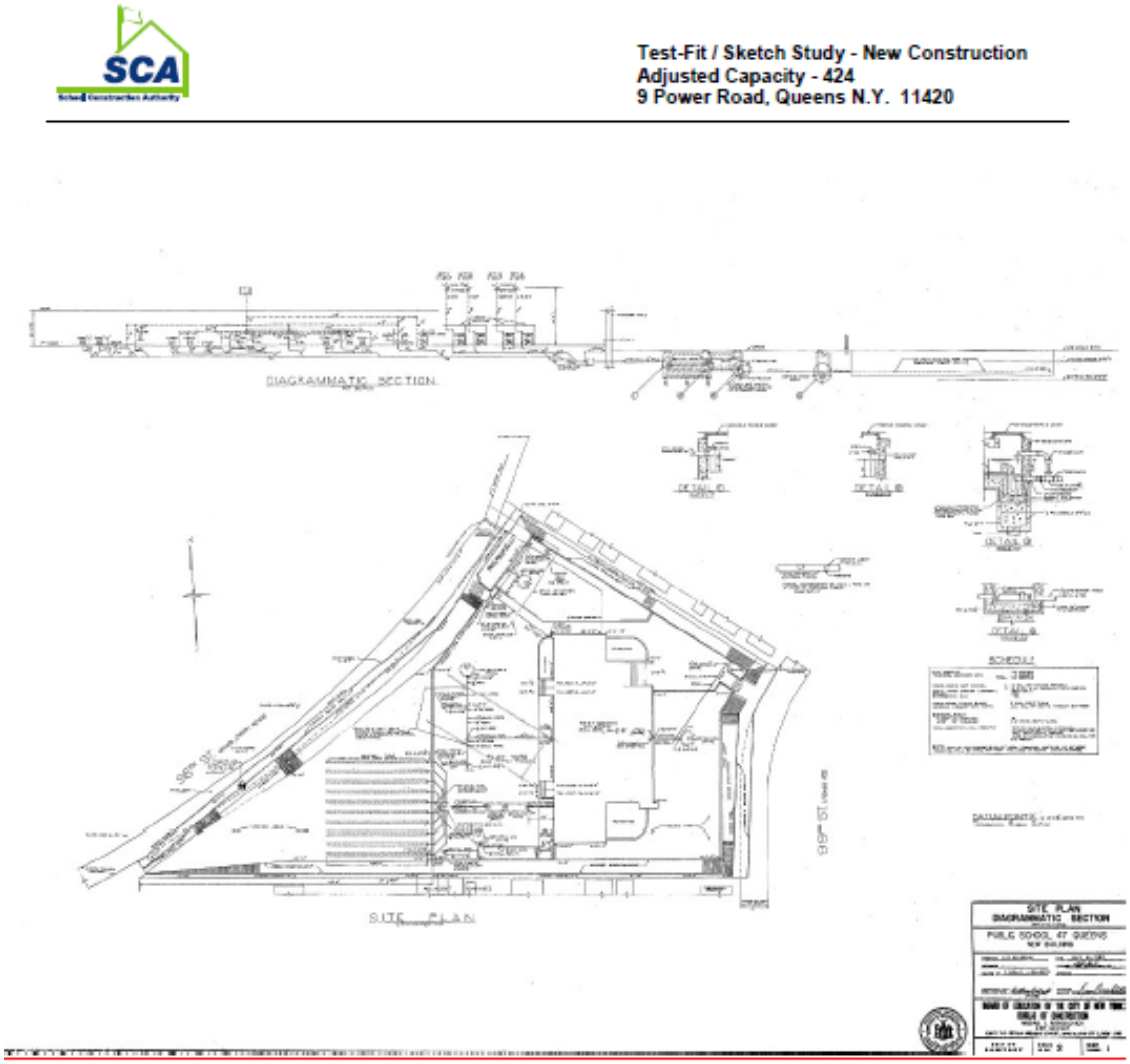
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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420



Borings (1989)

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Sanitary Plan (1955)

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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

"Measuring the Distance" The 200 and 500 Foot Rules



The 200 Foot Rule

NEW YORK STATE LIQUOR AUTHORITY
DIVISION OF ALCOHOLIC BEVERAGE CONTROL

The Alcoholic Beverage Control Law prohibits certain licenses from being issued if the location of the establishment is on the same street and within 200 feet of a building that is used exclusively as a school, church, synagogue or other place of worship. This restriction is commonly called the 200 foot rule and applies to any retail establishment where liquor will be sold for on premises consumption and any retail establishment where liquor or wine will be sold for consumption off the premises.





Measurement of distance

The law provides that the measurement be taken in a straight line from the center of the nearest entrance of the school/place of worship to the center of the nearest entrance of the establishment. The distance is determined using only entrances that are regularly used to give ingress to (a) the students of the school, (b) the general public into the place of worship; and (c) patrons into the establishment. Emergency/fire exits, maintenance access, and doors to gain access to non-public areas are not used in the measurement. If the entrance is set back from the sidewalk by a walkway or doorway, the measurement is taken from the center of the line where the walkway/doorway meets the sidewalk. For an establishment in a multi-story building, the building entrance at street level is used.

NYS LIQUOR AUTHORITY / 200-FOOT RULE

Exhibit - 1

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Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

From: abc.sm.albany.counsel <legal@sla.ny.gov>
Sent: Friday, September 11, 2015 3:03 PM
To: PERCUDANI, PETER
Subject: RE: Mixed-Use Building / School / Alcohol 200-foot Rule

Since the building would not be exclusively used as a school, new establishments within 200 feet would not be prohibited by the 200' law. Presumably, this would be true of a school located within the same mixed use building as well.

From: PERCUDANI, PETER [mailto:PPERCUDANI@NYCSCA.ORG]
Sent: Friday, September 11, 2015 12:17 PM
To: abc.sm.albany.counsel
Subject: Mixed-Use Building / School / Alcohol 200-foot Rule

To Whom it may concern,

We are currently evaluating a new project in NYC where a mixed-use building would be part commercial, office, and school (6th to 8th grades).

Would an establishment that sold or served alcohol be permitted within the building itself?

In addition, would any new establishments that sold/served alcohol be permitted within 200-feet of the school's entrance since the building would not be exclusively used as a school?

Thank you for your time and attention to this matter.

Peter Percudani, RA
NYC School Construction Authority
Managing Architect - Design Development
Quality Control & Construction Services Studio / 718-472-8756

RESPONSE FROM NYS LIQUOR AUTHORITY

Exhibit - 1

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Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

1 RCNY §9000-01

CHAPTER 9000

Zoning

§9000-01 Adult establishments.

Dates of establishment and discontinuance of adult establishments, houses of worship, and schools for the purposes of sections 32-01 and 42-01 of the zoning resolution. In determining whether an adult establishment may lawfully be established at a a location pursuant to sections 32-01 and 42-01 of the zoning resolution, the department will use the following criteria to determine the dates of establishment and discontinuance for adult establishments, houses of worship and schools located or proposed to be located within 500 feet of each other.

(a) The date of establishment of an adult establishment, house of worship, or school in existence and operating prior to August 8, 2001 shall be the date of issuance of an appropriate department permit or, if no permit was required, the date that it commenced operation, as determined by the department.

(b) Except as otherwise provided in subdivision a of this section, the date of establishment of an adult establishment, house of worship, or school shall be the date of issuance of an appropriate department permit, subject to the following qualifications:

(1) With respect to a new building permit or alteration permit:

(i) significant progress must be shown toward completion of the work under the permit. For the purposes of this paragraph, the term "significant progress" means the issuance of a temporary certificate of occupancy or, if applicable, department signoff of the work within one year of issuance of the permit, except that upon application, the commissioner or his or her designee, may extend the one year period in accordance with subdivision c of this section for a period of time not exceeding one year, and

(ii) the use or operation for which the building is constructed or altered must commence within six months after the issuance of a temporary certificate of occupancy or, if applicable, within six months after a department signoff that the work has been completed, except that upon application, the commissioner or his or her designee, may extend the six month period in accordance with subdivision c of this section for a period of time not exceeding six months.

(2) With respect to applications for permits filed solely to establish priority, where no work requiring a building permit is proposed, the use or operation for which the permit is issued must commence within two months of the issuance of such permit, except that upon application, the commissioner or his or her designee may extend such two month period in accordance with subdivision c of this section for a period of time not exceeding two months.

(c) An extension of time pursuant to subdivision b of this section may be granted where the permittee submits an application no later than 30 days prior to the expiration of the applicable time period together with satisfactory evidence that significant progress or the commencement of use or operations within the applicable time period is impracticable. The commissioner or his or her designee shall make a determination and notify the applicant in writing of his or her determination not later than 30 days after receipt of the application by the department. If the application is denied, the commissioner or his or her designee shall state the reason(s) therefor. If the commissioner or his or her designee fails to act upon the application within such 30-day period, the application shall be deemed to be granted.

(d) An adult establishment, otherwise in compliance with the zoning resolution, may be established within 500 feet of a discontinued adult establishment, house of worship or school. For the purposes of this subdivision, once established, an adult establishment, house of worship, or school shall not be deemed to be discontinued until it has ceased operation for a continuous period of one year or longer.

(e) The time periods set forth in this section for significant progress of work, or for commencement of operations shall commence to run as of the effective date of this section or issuance of the permit, whichever is later.

1 RCNY § 9000-1 / Adult Establishments, Houses of Worship & Schools

Exhibit - 2

28 of 30

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

S T A T E O F N E W Y O R K

151--A

2013-2014 Regular Sessions

I N A S S E M B L Y

(PREFILED)

January 9, 2013

Introduced by M. of A. NOLAN, BRENNAN, TITONE -- read once and referred to the Committee on Education -- committee discharged, bill amended, ordered reprinted as amended and recommitted to said committee

AN ACT to amend the education law, in relation to restricting the sale, lease, transfer or authorization of open-air schoolhouse playgrounds for certain uses

THE PEOPLE OF THE STATE OF NEW YORK, REPRESENTED IN SENATE AND ASSEMBLY, DO ENACT AS FOLLOWS:

Section 1. Subdivision 5 of section 2556 of the education law, such section as renumbered by chapter 762 of the laws of 1950, is amended to read as follows:

5. It shall be unlawful for a schoolhouse to be constructed in the city of New York without an open-air playground attached to or used in connection with the same. EXISTING PLAYGROUNDS SHALL NOT BE SOLD, LEASED OR TRANSFERRED, OR PERMANENTLY AUTHORIZED FOR OTHER USES SUCH AS SCHOOL BUILDING CONSTRUCTION, RENOVATION, PLACEMENT OR STORAGE OF BUILDING MATERIALS FOR SUCH WORK THAT WOULD ELIMINATE THE USE OF SUCH PLAYGROUND SPACE FOR OUTDOOR RECREATIONAL ACTIVITIES UNLESS A PLAN IS ESTABLISHED AND IMPLEMENTED TO PROVIDE SUITABLE AND ADEQUATE PHYSICAL ACTIVITIES OR SPACE TO ACCOMMODATE THE PHYSICAL AND RECREATIONAL NEEDS OF THE PUPILS OF SUCH BUILDING. THE PROVISIONS OF THIS SUBDIVISION SHALL NOT APPLY TO SCHOOL CONSTRUCTION OR RENOVATION ACTIVITIES THAT OCCUR ON OR REQUIRE THE USE OF SUCH PLAYGROUNDS FOR A DURATION OF NO MORE THAN ONE YEAR.

S 2. This act shall take effect on the one hundred eightieth day after it shall have become a law; provided however, that the commissioner of education is authorized and directed to promulgate any rules or regulations necessary for the timely implementation of this act on or before such date.

EXPLANATION--Matter in ITALICS (underscored) is new; matter in brackets [ ] is old law to be omitted.

LBD00128-03-3

NYS LEGISLATION / PLAYGROUNDS

Exhibit – 3

29 of 30

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

Test-Fit / Sketch Study - New Construction
Adjusted Capacity - 424
9 Power Road, Queens N.Y. 11420

From: LIU, CORA
Sent: Wednesday, September 18, 2019 6:29 PM
To: MANTELLO, ALLYSON
Cc: DAHIR, STANLEY; KUBOTA, NINA
Subject: Quick desk review

Importance: High

Allyson,

We need you to do a quick test-fit study/desk review. PS 47 is located at 9 Power Road in Queens. Our plan is to demolished the existing structure and build them a new facility. It is not a large piece of land. I am thinking 476 seats or 572 seats.

We need to move very quickly on this. Can you give us a quick report (one page or two) with a sketch?

Thanks a lot.

Cora Liu
Capital Plan Management Department
NYC School Construction Authority
Phone: (718) 472-8377
Email: cliu@nycsca.org

REQUEST FOR "TEST FIT – SKETCH STUDY"

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1.1 Contract Requirements

1.1.3 Report Format

1.1.3.4 Site Assessment Checklists – UPK, 3K, Stand-alone Gym, and Other Initiatives

Instructions to Users:

The format of a *Site Assessment Checklist* required by the Authority for UPKs, 3Ks, stand-alone gyms, and other initiatives is described herein. Unless the Authority otherwise provides specific instructions, the following format shall be followed. Please note that the various examples cited herein are not project-specific.

A Project Cost Estimate is **not** required as part of the submission.

Format

The *Site Assessment Checklist* shall be in the form of a checklist rather than a memorandum.

Objective

The objective of a *Site Assessment Checklist* is to determine if a school facility such as a 3K, UPK, stand-alone gym, or other initiative may be suitable for a given site selected by the Executive Office, Capital Plan Management (CPM), Real Estate, or other division. The checklist may contain charts and other documentation for a quick evaluation of the specified intent and is to identify those issues and concerns that would affect the selection of the site for a school facility. The checklist may or may not include plans that illustrate site conditions and a draft Program of Requirements (POR), which if provided help as a basis for open discussion and direction for the development of a project.

Issues of interest to the Authority include, but are not limited to, those that relate to a site or building's ability to accommodate a proposed Educational Program of Requirements, a building layout and organization (orientation and circulation), zoning, construction, existing physical characteristics of the proposed site and adjacent properties, condition of the building and the impact of a project to adjacent properties and vice versa.

The completed checklist shall be submitted to the initiating department. A committee meeting will be set up for a project review, comprised of senior management including, but not limited to, the departments mentioned in the first paragraph. The checklist shall be presented and explained to the committee members. Upon the recommendation of the committee, further action will be assigned to relevant Departments to expedite the next phase; i.e. scope, design, acquisition etc. The completed checklist shall be filed in the appropriate directories in SCAN for access and retrieval. An administration tracking form will be created to track all subsequent phases ongoing. The *Site Assessment Checklist* may utilize:

- The corresponding checklist for a stand-alone gym, Universal Pre-Kindergarten, or 3K. See examples.
- A new checklist for a Special Program need, e.g. Covid-19 test sites, Storm damage evaluation, etc.
- Plans in CADD format provided by the Developers/Consultant Architects for review of developer projects, i.e. mixed use buildings.
- EDOCS (historical school plans) system to evaluate existing design, structural or mechanical conditions.

- The Program Tracking system (PTS) to reference past or current projects related to existing schools.
- The “OASIS” system for access to digital maps, zoning information, and other reference systems available.
- Satellite mapping such as, but not limited to, “Google” maps, “Google Earth”, “Bing” maps, or other images (e.g. drone photography).
- Site photography (interiors and exteriors)
- Input from relevant departments i.e. Real Estate, BCC, IEH, to research and contribute data for their respective portion of Checklist/Report.
- Etc.

In addition to identifying issues, providing a copy of the request for the “Special Report or Review” and a copy of the draft Program of Requirements, if issued, the Special Study should include various attachments that provide additional insight into the subject Site/Project.

Example - "3K Evaluation Survey and Checklist"

3-K EVALUATION SURVEY AND CHECKLIST FOR EXISTING BUILDINGS v1.2

B:-L:

Building Address:		Borough:	Queens
Block:		ZipCode:	
Lot:		Sch. District:	Select One
Date of Site visit:		Floor Plans Available:	Select one
Report by:			

Zola Webiste

Item	Key Word	Survey Question		Information / Data	
SCA / REALESTATE (1 thru 9)					
1	Building	A Certificate of Occupancy is available.		Select one	
2	Building	Provide the gross square footage of the existing building.			
3	Building	Provide the gross square footage that is available for the proposed school. [Provide area on each floor.] *[Note: Programs with children above the 3rd Floor require approval of the Department of Mental Health & Hygiene]*	Gross:		
			Cellar/Basement:		
			First:		
			Second:		
			Third:		
			Roof:		
4	Site/ Property	Provide the lot area of the building site.	Lot:		
5	Lease	Is the building roof clear of agreements for cell phone antennas?		Select one	
6	Lease	Is the building roof clear of agreements for billboards?		Select one	
7	Tenants	Will the 3-K space (school) be the only tenant?		Select one	
8	Tenants	Identify other tenant uses that are in the same building as a Pre-K Center (school)? *[Note: Buildings that permit industrial, mercantile or business uses within a building must be approved by the Department of Health and Mental Hygiene (MOHMH). Such approval will not be granted by MOHMH unless the premises and the area surrounding the premises are free from fire, traffic or other safety hazards.]*			
9	Adjacent Properties	Identify uses within 50-feet of the proposed 3-K (School)? *[Note: Identify such uses]*			
SCA / Building Code Compliance (10 thru 15)					
10	Violations	Is the building clear of any current ECB Violations?		Select one	
11	Violations	Is the building clear of any current DOB Violations?		Select one	
12	Filing	Is the building clear of any open Alt-1 Applications?		Select one	
13	Filing	Is the building clear of any open Alt-2 Applications?		Select One	
14	Filing	Is the building clear of any open NB (New Building) Applications?		Select one	
15	Orders	Is the building clear of any "Stop Work Orders"?		Select one	

SCA / Industrial Engineering & Health (16 thru 20)				
16	Space Use	What is current or most recent use of proposed 3K space?		
17	Building Use	What are the current and past uses of building in terms of environmental assessment? *[Note: Identify uses of concern that may remain after occupancy, including information from database review.]*		
18	Surrounding Properties	Could any of the surrounding properties potentially impact environmental conditions in the proposed 3-K space? *[Note: Identify uses of concern, including information from database review.]*	Select one	
19	Building Materials	Describe the overall condition of building materials in the proposed school space. *[Note: Identify condition of paint, plaster, and flooring, note any evidence of water infiltration or mold.]*		
20	Other	Note any other potential concerns observed during the site visit; this could include discolored potable water, petroleum staining, odors, stored waste, etc.	Select one	

Architecture & Engineering (21 thru 62)					
21	Egress	Are there two (2) means of egress from every floor (or) can two (2) means of egress be provided? *[Note: Fire-escapes or fire balconies are not acceptable]* *If two (2) legal and acceptable means of egress cannot be provided for each occupied level, STOP Survey.*		Select One	
22	Egress	Required vertical means of egress is by interior stairs? *[Note: Fire-escapes or fire balconies are not acceptable]*		Select one	
23	Egress	Would the Pre-K (school) occupancy have separate fire/exit stairs from the other occupancies/tenants?		Select one	
24	Egress	Existing exit stair width(s) comply with Code for use? *[Note: As per Code, 44" minimum width for schools. Distance is measured wall to wall; stringers are permitted to project 2-inches on either side of stair - §27-375(b).]* *[Note: 48" minimum width between the handrails. Exception: 48-inch minimum width not required in*	1-Stair width (inches):		
			2-Stair width (inches):		
			3-Stair width (inches):		
25	Egress	Existing exit stair riser height(s) comply with ADA? [Note: 7" maximum for ADA Compliance.]	1-Riser height (inches):		
			2-Riser height (inches):		
			3-Riser height (inches):		
26	Stairs	Is there a dedicated (not shared with other tenants) set of stairs for internal circulation for the school (or) if not, could a stair be created for internal circulation?		Select one	
27	Zoning	What is the current Zoning District?			
28	Zoning	Can the 3-K (school) use be installed in this building without needing a "Special Permit / Zoning Waiver" for use? *[Note: Schools are not permitted as-of-right in Manufacturing Districts, and C-8 Commercial Districts]*		Select one	
29	Use	Is the property outside of any "E" designation zone? *[Note: See Appendix C & D of NYC Zoning Regulations.]*		Select one	
30	Windows	Are there windows for the classrooms (or) can windows be provided for natural light (Min. 50sf glazed area.)? [Note: 3-K classrooms must have windows or skylights. Window openings are not permitted within 3-feet of a property line. For allowable opening area for distances greater than 3-feet, see NYC Building Code. Existing property line windows can be affected, required to be removed, by a change in "use" of a space or building.]		Select one	
31	Windows	If mechanical ventilation is not available, could windows provide adequate classroom ventilation? [Note: Use Code natural ventilation requirement]		Select one	
32	Play space	Is outdoor play area available at grade or roof (no child above 3rd floor) (Min 1,350 sf)? [Note: Provide location, and area in square feet.]		Select One	
		If there is no available outdoor space, is indoor space available (no child above 3rd flr) (Min. 1,350 sf)? [Note: Provide sf area.]		Select one	

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

33	Building	Does the building have a valid Certificate of Occupancy (C. of O.) for its current use(s)?		Select one	
34	Building	As per the C. of O. provide the number of stories.		5	
35	Building	As per the C. of O. building height to the roof level.			
36	Building	Is the existing building a low-rise building? (not a high-rise] [Note: High-rise: 1968 Code 75-feet to roof; 2008 Code 75-feet to highest occupied floor]		Select one	
37	Building	Would the building's dominant occupancy remain the same with the inclusion of the proposed Pre-K (school)? *[Note: If the 3-K floor area, in non-educational buildings, is the largest tenant floor area in the building, No.]* *The dominant occupancy is determined by what occupancy group (E.g.: educational, office, retail, etc.) has the most total square footage within the building.*		Select one	
38	Occupancy	Cellar/Bsmt. , 1st, 2nd,3rd Floor, Roof: As per the C. of O. what is the allowable Live Load? [Note: Min. Live Loads: Classroom-40psf; storage, corridor and PA Spaces & Play Roof -100psf]	Cellar/Basement: First: Second: Third: Roof:		
39	Structure	Provide approximate column bay spacing.			
40	Building	Provide approximate floor to floor height?			
41	Building	Is area available on the 1st floor for an entrance vestibule and lobby? [Note: If yes, provide area.]		Select one	
42	Building	Can the 3-K (school) be built without special arrangements with other tenants to address adverse impacts? [Note: For example: Plumbing work, acoustical separation, structural, etc.] [Explain]		Select One	
43	Building	Are elevators available for school use? [Note: Provide number of elevators.]		Select one	
44	Elevators	Would the school space have an elevator dedicated/exclusive to its use? [Note: Provide capacity Load and dimensions]		Select one	
45	Entrances	How many Entrances / Exits are there to the building?	Entrances: Exit:		
46	Entrances	Could an entrance for the Pre-K (school) be provided that is separate from other tenant entrances?		Select one	
47	Entrances	Would the 3-K (school) entrance be accessible to the physically disabled (or) if not, could it be made accessible?		Select one	
48	Flood Zone	Is the building outside of any FEMA designated high hazard floodplain?		Select one	
49	Noise	Is the building clear of any subway noise/vibration?		Select one	
50	Noise	Is the building clear of any elevated train noise/vibration?		Select one	
51	Noise	Is the building clear of any open rail line noise/vibration?		Select one	
52	Fire Alarm	Does the building have a Fire Alarm system?		Select one	
53	Fire Alarm	Fire Alarm system operational?		Select one	
54	Fire Alarm	Is the Fire Alarm approved by the FDNY?		Select one	
55	Fire Alarm	Can the project be occupied without altering the building's Fire Alarm System?		Select one	

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

56	Electrical	What is the size of the existing building's electrical service?		
57	Electrical	Existing building has an emergency generator? [Note: If yes, provide size.]	Select one	
58	Mechanical	Is the building or portions of the building air-conditioned? Heating and Cooling. [Note: Describe heating and cooling system of the building]	Select one	
59	Mechanical	Does the building have fire sprinklers? [Note: 3-K (schools) with a floor area greater than 20,000sf or with more than two (2) non-ambulatory children shall be fully sprinklered.]	Select One	Select one
60	Mechanical	Does the building have a standpipe?	Select one	

• Provide and attach relevant photographs of building's exterior and interior spaces.
• If available attach floor plans.
• If available attach Certificate of Occupancy.

NOTES:

• NYC 1968 Code: §27-396.6(b) Buildings and "Building Sections" classified in occupancy group E or G which do not exceed seventy-five feet in height but have a gross area of over 15,000sf per floor or a total gross area of 100,000sf or more.

• NYC 2014 Code: §28.2-2702.2.20 Group E occupancies with occupied floor less than 75 feet above the lowest level of fire department vehicle access having a gross floor area over 15,000sf per floor or a total gross floor area of 100,000sf or more.

The major difference between the two Codes is that the 2008 Code no longer allows "Building Sections".

Other Comments and Concerns:

Describe any other observations including signs of structural damage, bulging facades, building settlement, fire damage, etc.

Describe general site conditions, traffic, building entry, and other site characteristics, etc.

Requirement Applies to: ✔ New Construction Major Modernizations Capital Improvement Projects

Example - "Stand-alone Gym Checklist":

Site Visit Preliminary Recommendation			
Standalone Gymnasium Building	☐ Recommended	☐ Conditionally Recommended	☐ Not Feasible
Renovation of Existing Auditorium to Gymatorium*	☐ Recommended	☐ Conditionally Recommended	☐ Not Feasible
Interior Conversion or Enhancement **	☐ Recommended	☐ Conditionally Recommended	☐ Not Feasible
Play Yard Upgrade***	☐ Recommended	☐ Conditionally Recommended	☐ Not Feasible
If Conditionally Recommended or Not Feasible, state conditions for recommendation or for infeasibility: *(i.e., The play yard has 6 TCUs. However, the standalone gymnasium building is feasible if 4 TCUs are removed)*			

**Auditorium Conversion should be considered only if Gymnasium Building is Conditionally Recommended or Not Feasible. **Renovation of Existing Building Interior should be considered only if Gymnasium Building or Auditorium Conversion is Conditionally Recommended or Not Feasible. ***Play Yard Upgrade should be considered only if Gymnasium Building, Auditorium Conversion or Interior Upgrade is Conditionally Recommended or Not Feasible*

Vehicular Street Access for Ease of Construction
Describe streets surrounding the site (width, traffic direction, traffic volume)

Site Conditions
Describe site topography (i.e. flat, sloped, retaining walls, etc.):
Gross Area of site available for standalone gymnasium building (based on prototypical site plan excluding areas required for clearances):
Elevation of ground water table relative to ground elevation (if known):

List of External Agency Coordination Required:	List of Testing Required:

Land Use Regulations or Property Encumbrances					
1	MTA	The site is within 200-feet of an MTA Structure (subway, elevated rail line, open rail cut, etc.)			
2	NYCDEC FEMA	The site is within a designated wetland or flood zone			
3	NYC DPR	The site is a "NYC Public Park" or a "Jointly Operated Playground"			
4	Landmarks	The building or site has landmark status			
5	SHPO	The building or site is SHPO eligible			

End of document

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

6	CEQR ULURP	The site is encumbered by environmental conditions/review (Environmental Restrictive Declarations (CEQR or ULURP))			
7	SPDES	Storm water\wastewater discharges into surface waters or ground waters of the state - not connected to NYC Sewer System (State Pollutant Discharge Elimination System (SPDES))			
8	Easements	The site is encumbered by easements for access by other private or public entities (Easements, right-of-ways, utilities, etc.))			
9	DOT	The site is encumbered by a future NYC/DOT street widening			
10	Flight Path	The site is within a designated Flight Approach Path			
NYC Zoning Regulations					
11	Zoning	What is the current Zoning District?	X	X	
12	Zoning	Can the gymnasium be constructed at this site without needing a "Special Permit / Zoning Waiver" for use? [Schools are not permitted as-of-right in Manufacturing Districts, and C-8 Commercial Districts]			
13	Zoning	Can the gymnasium be constructed at this site without needing a "Special Permit / Zoning Waiver" for bulk?			
SCA / Industrial Engineering & Health					
14	Use	Is the property within an "e" designation zone?			
15	SSDS	Are there any known environmental conditions requiring mitigation/installation of engineering controls?			TBD
16	Hazmat	Identify any potentially hazardous materials present in the proposed Gymnasium Site *[ACM, Lead, Other]*.	X	X	
17	Hazmat	Could any of the surrounding properties potentially impact environmental conditions in the proposed Gymnasium site? *[Identify those that are hazardous.]*			TBD
Architecture & Engineering (to be considered for standalone gymnasium only)					
18	Tax Lot	Would existing "tax lots" need to be consolidated or subdivided?			
19	Subsurface Conditions	Are there obvious site-specific subsurface conditions that will impact the development of the site? (Bedrock, water, subway system, detention systems, soil contamination, etc....)			
20	Adjacent Properties	Would adjacent properties be adversely affected by the height of the proposed building?			
21	Adjacent Properties	Would adjacent properties be adversely affected by noise from the proposed building's mechanical equipment? (Rooftop air-handling units, generator, etc...)			
22	Adjacent Properties	Would windows and/or party walls of adjacent properties be adversely affected? (blocking windows, shoring and repairing walls)			
23	Adjacent Properties	Will existing physical improvements adjacent to the site adversely affect construction activities? (adjacent buildings, retaining walls, overhead power lines, trees, etc...			

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

24	Adjacent Properties	Would underpinning and shoring of adjacent properties be required?			
25	Adjacent Properties	Would protection of adjacent properties be necessary due to the proximity of construction of the gymnasium building? (roofs, skylights, etc...)			
26	Adjacent Properties	Would the gymnasium building's roof(s) be accessible from adjacent properties? (roofs, fire escapes, etc...			
27	TCUs	Would the construction of the gymnasium building require removal and relocation of Temporary Classroom Units?			
28	Swing Space	Would swing-space be required for the relocation of occupants during construction activities?			
29	Licensing Agreement	Will licensing agreement with adjacent property owners be required?			
30	MTA	Is the building clear of any subway noise/vibration?			
31	Public Right of Way	Will the gymnasium be accessible from the public right of way?			

Existing Building Information (to be considered for standalone gym and for interior work)					
32	Structural	Does the existing building have spread footings or piles?			
33	Structural	Would the proximity of the gymnasium building require underpinning of the existing building foundation?			
34	Structural	Would the proximity of the gymnasium building impose a load on the existing building foundation?			
35	Water	Does the existing building have an RPZ?			
36	Electric	Does the existing building have spare capacity for the gymnasium building? (What is the existing building electrical capacity (amps)?)			
37	Fire Alarm	Is the Fire Alarm system operational?			
38	Fire Alarm	Is the Fire Alarm approved by the FDNY?			
39	Fire Alarm	Can the gymnasium building be occupied without altering the building's Fire Alarm System?			
40	Sanitary/ Storm	Can the sanitary sewer line from the gymnasium building be tied into the existing sanitary/storm sewer line?			
41	Site Detention	Does the existing building have a site detention system? If so, identify location.			
42	FDNY	The public street width is 38-feet or greater in width and the building does not need to be protected throughout by a sprinkler system as required by *NYC Fire Code Section FC 503.8.2 Substandard width* (Measurements are to be taken from curb face to curb face.)			

Interior Renovation Concerns (for all interior work)					
43	C of O	Does the school building have a C of O?			
44	C of O	Will the interior renovation work require a new or amended C of O?			
45	Violations	Does the school building have current ECB violations?			
46	Violations	Does the school building have current DOB violations?			
47	ADA	Is the space(s) recommended for renovation accessible?			

48	Live Loads	Does the floor of the space(s) recommended for renovation have the live load capacity for exercise use?			
49	HVAC	Does the space(s) recommended for renovation have adequate ventilation, natural or mechanical?			
50	Fire Alarm	Will the renovation of the space(s) trigger replacement or legalization of the existing FA system?			
51	Height	Ceiling height of the space(s) to be renovated.	X	X	
52	Acoustics	Will acoustical mitigation be required of the spaces adjacent, above, or below the space(s) recommended for renovation?			
53	Low Voltage	Will the space(s) recommended for renovation trigger upgrades to the existing low voltage systems? If so, list impacted low voltage systems.			

Other Comments and Concerns:

List of Photos:

Proposed Site Plan with Standalone Gymnasium Building

Floor Plans showing Space(s) recommended for Renovation

End of document

1.1 Contract Requirements

1.1.4 Design Presentations

1.1.4.1 Renderings and Photographs

Description/Design Approach:

A. Renderings

Number of perspective renderings to be provided shall be as per contract. Refer to the Designer's Requirements Contract to determine maximum dollar allocation.

1. Sketch layouts of proposed views shall be reviewed with the Authority prior to the creating of the rendering.

2. The Designer shall, in an acceptable format to the Authority, provide an electronic file copy of each perspective rendering on a USB drive **or as directed by the Authority**.

3. For manual renderings, the Designer shall provide photographs of all renderings that shall be scalable to 40 inches in height by 48 to 56 inches in width, with a resolution of 200 ppi when image is enlarged to the required size. The preferred file format is TIFF. If the original rendering was created electronically, provide a copy in its native format, and a copy of what was submitted to the print shop for printing (i.e., PDF). Images larger than 5 MB in size must be submitted on a USB drive **or as directed by the Authority**.

B. Photographs of Finished Building

1. 12 presentation quality digital images will be selected from a larger set (number will vary depending on the size of the project) as follows (all images to be reviewed with the Authority prior to submission of **final electronic** and framed images):

   a. Four exterior images: including, but not limited to; main entrance and entry façade; architectural features, as well as other representative aspects.

   b. Eight interior images: including, but not limited to; Lobby, Auditorium, Gymnasium, Library, Typical Classroom, Specialty Classrooms, Public Art project (if applicable) as well as other significant aspects.

2. Presentation quality, high-resolution photographs. Images are to be in TIFF file format, at the following resolution: 3912 x 3072, which is the equivalent of an image taken with a 12 Megapixel camera at an aspect ratio of 1.27:1 (14:11). This resolution will produce a 13" x10.2" print at 300dpi. The final picture size will be 19.5" x 15.3" (approximately 200dpi).

3. The Designer shall, in an acceptable format to the Authority, provide an electronic file copy of the twelve images on a USB drive **or as directed by the Authority**.

4. Two of the images, as selected by the Authority, shall be printed and framed.

1.1 Contract Requirements

1.1.5 Area Analysis

1.1.5.1 Building Areas – Educational Spaces – Custodial Spaces

Description/Design Approach:

A. A breakdown of Educational (includes public spaces) and Custodial (exterior paved spaces) spaces of the school building are required by the DOE. The sample form (attached) will help define "educational" and "custodial" areas for the purpose of the DOE's Operations and Maintenance contracts. Each capacity design submission starting with the 60% design phase up to and including bid documents are to include a tabulation that includes both programmed and non-programmed spaces, using the instructions that follow:

- To download the form click *HERE*.
- Naming convention for the form (spreadsheet) – Design or LLW number-School name-Boro-%sub-1151
  e.g., D1234-PS123-K-60%-1151.xls
- Fill in the applicable project information, i.e., the School name, Borough, date etc. in the header and footer of the excel spreadsheet.
- Areas should be listed in square feet. Enter whole numbers only.
- Fill in SF areas in the white boxes only.
- Do not fill in areas in the gray boxes.
- Do not enter text in the educational area column.
- If a particular space is not applicable or is not part of the project, enter zero in the corresponding educational/exterior paved area column.
- If space(s) other than those listed in the template is/are part of the project, add a new row and list the space(s). All classrooms, shops, labs, prep rooms are educational spaces.
- Educational spaces exclude all storage, all mechanical spaces/rooms, and all spaces specifically assigned to the custodian (e.g., Custodian's office, custodian storage, custodian workshop, custodial locker rooms, ground equipment storage room, janitor's sink closet, slop sinks, etc.)
- Interior spaces specifically assigned to the custodian (e.g., Custodian's office, custodian storage, custodian workshop, custodial locker rooms, ground equipment storage room etc.) should not be included in the table.
- Kitchen areas including kitchen storage, can wash, walk–in freezer etc should not be included in the table.
- Dietician's office should be included in the table only if it is not located within the kitchen area.
- Exterior paved areas do not include landscaped or grass areas.
- Athletic fields should be separately noted if surface of the field is other than concrete or asphalt paving.
- Include the total gross area per the POR and actual gross area (i.e., gross area per design documents).

B. In case of an addition, the table should include areas of the addition only. The spaces in the existing building that can now be re-categorized due to its change in use (e.g., custodian office and locker room being converted to a classroom, or a classroom being converted to a storage space) should be noted separately.

Note that the 'Total Educational area' is the summation of all listed educational areas and the 'Total Custodial area' is the summation of all listed exterior paved areas and paved play roof areas.

Space name	Educational floor area SF	*Exterior paved area SF*	Comment
All instructional spaces including classrooms, resource rooms, special ed classrooms, D75 classrooms, Government and club publication rooms,	0		
All offices excluding custodian office but including Guidance offices, SBST offices, school safety administration offices	0		
Auditorium dressing rooms	0		
Auditorium including orchestra area. Exclude chair storage rooms, storage rms, coat/ticket room, projection room	0		
Auditorium stage/platform	0		
Aux Gymnasium	0		
Cafeteria **- including servery**	0		
Corridor- excluding corridor lockers	0		
Dietician's office (include only if it is remote from kitchen)	0		
Exercise room(s)	0		
Exterior paved area including ramps, steps, safety surfacing, ECC play equipment, parking		*0*	
Exterior playground - athletic field astro-turf or grass (Indicate Yes or No)		*Y/N*	
Exterior playground-paved athletic field		*0*	
Exterior-paved courtyards		*0*	
Exterior-sidewalk area @ property		*0*	
Field House excluding field house mech and storage space	0		
Gymnasiums, Gymatoriums. Exclude Gym storage, chair storage rooms	0		
Library excluding AV storage	0		
Lobby	0		
Multipurpose room	0		
Roof area- green-landscaped (Indicate Yes or No)		*Y/N*	
Roof top Play area-paved or with safety surface		*0*	
Staff lunch room, staff cafeteria **(including servery)**	0		
Staff work rooms	0		
Stairs	0		
Student locker rooms - **excluding locker area**	0		
Toilets-excluding toilets in custodial locker roms	0		
Vestibule	0		
Weight lifting room	0		
Total - Educational areas	**0**		
Total - Custodial areas		***0***	
Gross Building area as listed in approved Program of requirements **xxx,xxx SF**			
Gross Building area - actual **xxx,xxx SF**			
Note:			
In the comments column, indicate if a special finish e.g. Carpet in Library or Resilient Athletic flooring in Multipurpose room is provided.			

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

1.3 Planning

1.3.1 Design

1.3.1.1 Building Location and Orientation

Description/Design Approach:

A. General

1. The location of the school and its relationship to its neighboring surroundings is critical to the overall design and function of the building.

2. Planning and design should not only delineate the school and its property from surrounding properties, it should respond to its immediate surrounding and communicate its purpose and function within the community.

3. In addition to local environmental conditions that will influence the overall planning and design of a school facility, the NYC Zoning Regulations and Resolutions have a major influence in regard to the building location size and height for a specific site.

4. The NYC Zoning Resolution as per Section 11-01 regulates the following:

- Permissible Land Use Districts, such as residential, commercial and manufacturing
- Height and bulk of buildings and other structures
- Area of yards, courts and other open areas
- Density of population
- Location of trades and industries
- Location of buildings designed for specific purpose

B. Locating the School Building on the Site:

In order to situate the school facility in conjunction with Zoning, specific attention shall be given to the following:

1. Accessibility to the site for both pedestrian and vehicular traffic

   Student, parents and faculty should be provided both ease of access to the site and a safe path of travel.

2. Direction students will be traveling in the local vicinity to attend the school

   The direction in which students, parents, within the local community, and faculty will travel to and from the school will influence the location of the main entrance, vehicular drop-off and access to open play areas.

3. Local Mass Transportation

   Location and direction of travel from local points of mass transportation (bus and Subway) will have more of an influence on Intermediate Schools and High Schools where students are of an age where travel will be unsupervised. This may influence the location of the main entrance.

4. Types of vehicular traffic and traffic flow of adjoining streets

   The frequency and type of traffic on adjoining streets may require additional attention in regard to the safety for students, parents and faculty. In addition, the noise generated by the local vehicular traffic may create significant noise to cause distraction within the school.

5. Topography

   a. If changes in grade elevations exist, effort should be made to utilize it to the proposed school facility's advantage as much as possible.

   b. In addition to cost savings associated with minimum excavation and grading, it is important that entrances and exits be planned and design for handicapped accessibility and that level areas are provided for outdoor activities (play yards, athletic fields and service delivery points).

6. Location of available utilities

   The cost of bringing utilities to the building can become excessive if proper location is not given to the location of gas, water, sewer and electric services. If the local utility companies have to extend to the site, the cost may have to be absorb**ed** in the construction cost of the school.

7. Use of surrounding land and buildings

   a. Attention should be given to adjacent land use in regard to parks, undeveloped land, vacant buildings, residential building types, commercial and manufacturing facilities and how the proposed school facilities will interact operationally and physically with such adjacencies and visa versa.

   b. Issues **that** may need to be addressed in regard to their impact on the school facility and visa versa are as follows:

   - Safety - Vehicular traffic by commercial and/or manufacturing facilities
   - Noise
   - Light (shadow) and Air
   - Security – Accessible hidden areas

8. Open space

   The first priority for non-built area**s** is student recreation. On sites with potential open space, consider minimizing developed footprint to conserve or restore vegetated areas. On more constrained sites in low-rise residential zones R1-R5, building footprint and massing must take into account the impact on light and air for adjacent buildings.

9. Safety and Security

   a. Different types of fencing, which is described elsewhere in these Requirements, typically enclose school buildings **that** are not constructed on the property line adjacent to sidewalks. The fencing typically serves to delineate school property as well as providing security for the site.

   b. Although landscaping of school property is encouraged and tree planting within the sidewalk along adjacent streets is typically required by the NYC Parks Department, it shall not be planned in such a way that hidden areas will be created. The streetscape adjacent to the school property leading to and from the building as well as areas within the site should be free of any areas **that** would keep a person hidden from view by a passing individual.

   c. In addition to planning paths of travel **that** are easily observed from the adjacent streets and sidewalks, the school facility should be planned to accommodate security lighting around its perimeter for both buildings, play area and athletic fields so to discourage vandalism and illegal entry.

   d. Again, hidden entrances and exits **of** any type to the building should be avoided. A hidden condition m**a**y provide an opportunity for an individual to w**al**k for a length of time unnoticed so **as** to gain access to the building.

C. Orientation

1. Ideal orientation in the Northern Hemisphere is basically southeast. As such, the south side of the building will receive more solar radiation in the winter than in the summer and consequently, both east and west will receive more radiation in the summer.

2. Unfortunately, the urban environment will not always permit the design to adapt to follow the influences of the environment due to its urban streetscape. Therefore, the objective of good planning and design is to address the issues identified in the above paragraph “Locating the School Building on the Site” and provide the best orientation possible to provide opportunities for natural daylighting and to take advantage of natural environmental conditions.

1.3 Planning

1.3.1 Design

1.3.1.2 Planning Guidelines for New Schools and Additions

Description/Design Approach:

A. Overview

School buildings must support the teaching and learning activities of the school community. The design of our new schools is guided by three key values: creating dynamic and vibrant learning environments through the use of natural light, human scale and color; creating facilities that are flexible, adaptable and durable enough to meet the needs of the future; and designing buildings that are cost-effective, through the use of streamlined design standards and new technologies.

These guidelines describe the operation and interrelationship of the spaces listed in the *Program of Requirements* and described in the *Room Planning Standards*. They also consider the important realities of circulation and security in the school building as a whole. While the content herein is based on many design meetings in which district and school personnel have contributed experience and ideas, these guidelines are not meant to replace the give and take of the design process. Their aim is to make known in advance the generally agreed upon qualities of successful schools so that discussion can be freed to further evolve solutions and address concerns specific to the school at hand.

B. General Design Priorities

1. **Security**

Respect for security must pervade all stages of design. Security in schools is primarily a matter of visual surveillance. Clear sight lines and elimination of potential for concealment, indoors and outdoors, are critical. Program spaces must never be isolated from other activity.

Stair enclosures can pose a particular security problem since the activity within them may not be readily seen or heard. As far as possible, all stairs should serve routine circulation in order to reduce potential isolation. For the same reason, they should have entrances at every floor level they pass. Stairs should not serve strictly as emergency egress, even with doors outfitted with alarms.

Security desks and administrative offices should be located to best serve visual control so that visitors must walk past security first before being able to access the building in general. There should be an administrative presence (offices or teacher areas) on each instructional floor.

Internet Protocol Digital Video Surveillance (IPDVS) systems are standard in new schools. Cameras are to be focused on circulation paths and other select areas. Ancillary spaces for monitors and video archiving equipment is to be provided.

2. **Building Orientation, Entrance and Open Space**

Contributing factors in the selection of both building orientation and main school entrance include direction of approach by students, potential drop-off points, adjacent buildings, traffic, views, topography and other environmental considerations. Schools designed to house multiple school organizations should include a "main" building entrance, and should, if possible, allow for individual arrival/dismissal entrances for each organization. Depending on the school size and site, it may prove beneficial to plan for a separate D75 entrance too.

Open space is often at a premium for New York City schools. It is important both in its potential as recreation space and as the outdoor area where students congregate before and after school. An arrival space that helps to bring the students safely off the sidewalks and into the school domain is important for schools of all levels. The recreational schoolyard may serve as this space, particularly when the site area is limited. Safety of the schoolyard, during school hours and after school, is enhanced by clear visibility from the street.

When there is a potential for open space of significant size, planning for a future building addition should be taken into account. This factor will influence the location of the building on the site and will affect the design of the new building itself, in order to create an opportunity for connecting a future addition in a straightforward and workable manner.

3. **Organization of the School Building**

Order, simplicity and clarity of the school building's diagram will facilitate orientation and destination finding. The design should allow students to readily know the building; they should quickly feel confident in their ability to navigate its halls with ease. The building should feel safe and supportive.

Stacking of similar spaces makes sense from a user point of view as well as from a systems aspect. The designer must understand the Design Requirements regarding mechanical and electrical distribution, as an interdisciplinary approach to the building design will help to ensure an efficient and cost-effective school plan.

Acoustical considerations are critical to the successful resolution of the Program as it becomes a building. Vertical and horizontal isolation of the 'noisy' and 'noise-sensitive' spaces is important for the learning environment. Early planning in this regard is essential. However, site constraints may require technological means to provide the acoustic isolation in order to create a functional building.

The organization of the school building must also take into account the after-school use of the large common areas. While it may not be possible or practicable for all of these spaces to be accessed from the entry lobby, a clear direct route must be planned.

4. **Preferred Building Heights**

Stairs are the typical means by which students move through the building. The building height should not be so great as to impact the student's ability to circulate through the building in a timely manner. The building height is impacted by whether a cellar or basement is to be provided. However, the smaller the building footprint, the more open outdoor area is available for recreation.

While constrained sites may dictate otherwise, typical building heights are as follows:

Early Childhood and Primary Schools:	4 stories
Intermediate Schools and High Schools:	5 stories

The intended floor-to-floor height target is 14'-0 for steel-framed buildings and 13'-4" for flat-plate concrete buildings (13'-0" of PS buildings if feasible) at all floors. Ceiling heights should be maintained at the heights indicated in DR 5.4.1. The ceiling to underside of slab "sandwich" incorporating all MEP systems is to be investigated early in the project to verify that the ceiling heights will be met. In order to accommodate larger ductwork with bends coming from the rooftop mechanical equipment, crossovers and headering of the horizontal ductwork to the shafts, the top-most floor can vary up to 2'-0" higher (Refer to DR 6.2.2). Appropriate soffits below the required ceiling height at strategic locations (typically running for limited distances such as at room entrances) can be introduced as required to minimize increases in floor height. The actual floor-to-floor height is to be determined based on brick coursing (if applicable), building configuration, MEP-structural coordination, or other factors that may affect the floor-to-floor height.

5. **Structure**

Like building organization, the structural system should be rational and logical. Extraordinary structural measures should be avoided as much as possible for design clarity, ease of construction and cost-effectiveness. Cantilevered column systems, using transfer beams or deep trusses to build over large column-free spaces should be considered only under unavoidable constraints.

6. **Flexibility**

As far as possible, designs should anticipate changes in use. A single building may need to accommodate several organizations one year and consolidate the next. Designs should anticipate rooms other than classrooms being pressed into service as such. Large common spaces should be designed for a variety of purposes so that they may be put to use throughout the school day.

PS/IS schools are designed to comply with IS standards for height and space requirements, and similarly IS/HS to HS standards, all in anticipation of future needs. Any authorized "unassigned spaces" included in a school design must be provided with HVAC and safety components as would be required for occupied spaces to allow flexibility for future use.

As suggested before, any schools with substantial outdoor space should, if possible, anticipate logical connections for a future addition.

7. **Natural Light**

Instructional rooms should have natural light; possible exceptions include computer-focused rooms and orchestra rooms. Typical classroom windows provide natural light and views to the outside, while clerestory windows will admit daylight deep into the rooms. Corridors should have natural light, if at all possible, as this adds a measure of openness to otherwise closed spaces. Offices that are occupied full-time should have windows if possible. In office suites, central spaces should borrow natural light from perimeter spaces if possible.

Care should be taken to control heat gain and glare. North light should be used to advantage for art classrooms and libraries where possible. Skylights are not a desirable alternate to windows. While direct sunlight is desirable for play areas it is not generally the chief determining factor in locating them.

On sites with restricted exposures, availability of natural light may be the first organizing principle of the school's diagram. For example, on a constrained site consideration may be given to locating classrooms around all or part of a school's open perimeter and placing program spaces that don't require natural light at the building's center.

8. **Scale and Color**

Human scale is particularly important in school building design as it will impact the feeling of well-being and quality of life of the students. The tile wainscot in corridors and millwork in instructional rooms all offer opportunities to strike a line that students of various ages will relate to comfortably. In all aspects the school must be inviting and welcoming.

The use of color in the school building is important in its ability to excite and enervate. A splash of bright color can announce the school to the community. Designers must bear in mind, however, that the students themselves, along with all the products of their educational experience, will provide color as the school year progresses. Color can be used as a means of way finding.

9. **Cost-Effective Design**

An interdisciplinary approach from the very start is essential for a cost-effective school design. The more traditional model of the architect designing the school and the engineers having to "fit their work in" is inherently inefficient, and bid prices reflect this. A full team approach, with frequent design meetings comprised of architects, engineers, design managers, construction manager, value engineering experts, technical standards and design review staff, regulatory experts and educational staff (central and local) ensure that everything that should affect the school design is put on the table and discussed, and that correct decisions are made.

Overall planning in response to site conditions, to minimize both excavation and fill, starts the project on a cost-effective path. If the existing site has excavation in the area of the new school building footprint, whether by merit of an existing building with a cellar, or a need to remove unsuitable soil, the school should be planned with a cellar or basement,

unless a high-water table exists. (Cellars and basements shall not be placed within 5'-0" of the measured groundwater table). If soils are such that a pile foundation is required, or if no excavated area exists or is planned, then a school with no cellar or basement can be planned. Similarly, if soils are such that a slab on grade can be planned with no fill, this should be the direction. The simple logic is: if there is a hole, use it; if there is no hole and no need for one, don't create one. Factors that may go against this logic include high water table, other environmental factors, and zoning requirements where an override is unlikely.

Basements place the first floor at a higher elevation that may not facilitate accessible access without the use of an elevator and thus are not commonly provided, except where a sloping site may facilitate such. The types of spaces permitted to be below grade are limited for schools other than high schools. The Cafeteria space is the only space that is permitted to be occupied by students below high school age when placed in a cellar. Thus depending on the size of the building, a full cellar may not be cost effective as it may not be able to be filled with program and thus a partial cellar should be considered.

Cost effectiveness is always an important consideration in the development of the design standards. Initial costs are weighed against useful life, constructability, and maintenance and operations needs to make decisions that are fully reasoned. Following the design standards help produce an efficient and cost-effective school building design. The standards are, however, continually evolving, and are always open to considering new suggestions that might improve the design process and product.

10. **Multi-Organization Buildings**

School buildings housing multiple small (300-550 students) organizations offer the intimate educational environment of small schools, with the large-scale amenities of big schools. "Multi-org" buildings can act as a campus within a building, with large common spaces shared by all of the schools, and a dedicated instructional floor or area for each. These buildings can bridge the traditional school levels too; PS/IS or IS/HS buildings can, over time, function successfully as one level or another, or both.

The three-organization HS or IS/HS has proven to be an especially efficient design opportunity, as the lower common levels can be topped with three virtually identical instructional floors. Ideally, each school will use mainly one set of stairs for circulating through the building. Placing specialty classrooms near to stairs allow for customization of three like-type specialty rooms (for example three different types of science labs or art studios) with easy access by the three school groups and limited incursion into the small school's instructional zone. This type of building can include a competition Gym and several other exercise rooms, and an Auditorium large enough to fit the population of any of the individual schools.

11. Building Material/System/Component Selection-Longevity

a. New School buildings, whether an Addition or Stand-Alone structure, are considered a major capital investment, built with the intent to serve the community for many generations to come. As such, the durability and reliability of all major building components/systems needs to be carefully evaluated and designed to ensure they are in alignment with this primary objective. The combination of good materials selection, best design and construction practices along with anticipated maintenance

will keep these buildings functioning and serving our communities far into the future, with minimal "unexpected" financial burden.

b. The SCA standards, and future inclusions into the standards, take into account this philosophy. Any proposed alternate building material, component and/or system (non-SCA standard) shall be evaluated and compared to SCA standards regarding quality and characteristics of longevity, as well as warranty period, and anticipated maintenance/inspections, repair and replacement cycles. As part of its deviation review, the SCA will review the alternate and compare with the quality and maintenance aspects of the SCA standard materials for that system. **Refer to Appendix A - Building Material/System/Component Longevity and Maintenance to be used if a substitution is being considered.**

C. Rooms included in the Program of Requirements - Their use, design and relationship within the school building

The Program of Requirements references each of the required rooms by name and number. The designer is responsible for modifying the 'standard rooms' in order to fit the configuration of the building as designed.

The Program of Requirements groups rooms into categories as follows:

Group 1 - Instruction
Group CW - Citywide Special Ed – District 75
Group 2 - Specialized Instruction
Group 3 - Science
Group 4 – Physical Education
Group 5 – Assembly Area
Group 6 – Library
Group 7 – Lobby/Main Entrance
Group 8 – Student Support Services
Group 9 – Storage
Group 10 – Administration
Group 11 – Cafeteria/Staff Lunch
Group 12 – Custodial
Group K - Kitchen

The efficient functioning of the school is largely dependent on the physical relationships of these areas. Organization and circulation between these types of spaces is the key to the success of the school building.

Instructional Rooms:

Instructional rooms include all of the school's classrooms – typical, special education, resource rooms, and special purpose classrooms for art, music, technology and science. These rooms are programmed for teaching and learning throughout the school day. They are outfitted accordingly with the latest educational technology and equipment to enhance their purpose. They are predominantly on the upper floors of the building, as the first floor is preferred for access to the large common spaces, the general office and Citywide Special Ed.

Through the 5th grade, all typical classrooms have sinks and bubblers to support their educational program and ease supervision. These elementary rooms are dedicated to one group throughout the day. Generally, from 6th grade up, students travel to different classes for their coursework.

As a rule, doors are to be flush with the corridor, and ideally should open directly into the classroom proper, avoiding an entry passageway between corridor and classroom. This will allow teachers to monitor the corridor from the classroom and vice versa over the course of the day.

Group 1 - Instruction

Regular Education Classrooms:

Pre-Kindergarten and Kindergarten Classrooms:

Use: As their names indicate, these rooms house the pre-kindergarten and kindergarten classes. Both typically have full-day sessions. While these classes may have an opportunity to use the specialty rooms in the school, it is likely that all curriculum topics will be taught in these rooms.

Design: While all elements contained in the *Room Planning Standards* must be included, the proportions of these classrooms may range from square to double-square. (They accommodate separate activity groups as opposed to a block of seating rows.) These classrooms typically contain built-in wardrobes sized appropriately. They also include sinks to facilitate art and science, as well as clean-up activities.

Supplemental/Associated Spaces and Adjacencies: Pre-kindergarten and kindergarten classrooms are required to have access to dedicated toilet rooms. Pre-kindergarten rooms and kindergarten rooms include a single toilet room with a toilet and 1 lavatory (as shown in the *Room Planning Standards*); The required toilet count for the occupants of these rooms is satisfied by their internal toilet rooms.

Location and Access: Classrooms for the youngest children are usually located on the lowest instructional floors of the school. Districts often have a preference for clustering the pre-kindergarten and kindergarten classrooms together on one floor. These classrooms should have easy or direct access to the early childhood playground.

Typical Classrooms - Full-Sized:

Use: These are typical homerooms/classrooms, as opposed to specialized classrooms such as those for science, art, etc. In the primary school, they are homerooms, where most of the day's instruction takes place; in middle schools and high schools, typical classrooms are instructional rooms for curriculum areas that do not require a physically specialized space.

Design: All components in the *Room Planning Standards* must be included. The proportions of these classrooms may range from square to rectangular as long as the room layout works. A double-square configuration is not preferred. Primary schools

have built-in wardrobes inside classrooms. While intermediate schools typically have lockers in corridors, wardrobes inside classrooms may be provided instead at the district's request. High schools have corridor lockers rather than classroom wardrobes.

Supplemental/Associated Spaces and Adjacencies: If requested by the school district, first and second grade classrooms may have individual toilet rooms within the classroom area for ease of supervision. Higher grade classrooms and specialized classrooms do not.

Location and Access: Classrooms are located within the school to place younger students on lower floors.

District Special Education Classrooms:

Use: These are homerooms/classrooms for the Special Education children whose educational program is under the jurisdiction of the school principal and community school district superintendent.

Design: The design of these classrooms follows the *Room Planning Standards*. All components in the *Room Planning Standards* must be included. It may be advantageous to pair these classrooms with a folding partition between so that the rooms may also serve as a single large classroom when the partition is opened. Districts may request that these rooms be likewise paired with a typical classroom to allow creation of an oversized classroom.

Supplemental/Associated Spaces and Adjacencies: Some District Special Education classrooms may have a toilet room as part of the classroom layout. In this respect they should be similar to other classrooms on their floor; on floors where the typical classrooms have individual toilet rooms, these should as well.

Location and Access: District Special Education classrooms may be distributed on several floors to accommodate students of several ages.

Resource Rooms:

Use: These rooms are for single-period special instruction of small groups of students.

Design: The design of these classrooms follows the *Room Planning Standards*.

Supplemental/Associated Spaces and Adjacencies: It is possible to pair these rooms side by side with a folding partition between so that they may be combined for use as a larger classroom. However, this limits the location of building systems components and outlets.

Location and Access: As these rooms are used by students of all ages, they may be located on upper floors. As with offices, advantageous locations include control points along circulation: next to or across from a stair, at the intersection of corridors, etc.

Group CW – Citywide Special Ed - District 75

Citywide/District 75 Special Education Classrooms:

Use: These are homerooms/classrooms for students whose educational program is under the jurisdiction of the Citywide (District 75) Special Education Superintendent. District 75 includes students from the five Boroughs, hence "Citywide". A District 75 supervisor is assigned to each building that houses a Citywide organization. The Citywide classrooms and support spaces are a clustered sub-group, although its students share the school's common spaces.

Design: The design of these classrooms follows the *Room Planning Standards*. All components in the *Room Planning Standard* must be included, with one exception; toilets within the classrooms are to be included only when prescribed by the Program of Requirements.

Supplemental/Associated Spaces and Adjacencies: District 75 classrooms slated for use by lower grades may require internal toilet rooms. If a diaper changing room is required by the POR, it must be a separate room accessible from the corridor. The Program indicates which rooms must be clustered. District 75 has office space in addition to Guidance Suites. The school's medical suite is also used by District 75 and should be easily accessible from the Citywide cluster. The Guidance suite may be on the same floor or an adjacent one.

Location and Access: These classrooms must be clustered and should be on the first floor if possible. If they cannot all be on the first floor, they must be clustered vertically on the first and second floors (or the lowest possible floor or pair of floors) near both stair and elevator.

Auxiliary Citywide/District 75 Special Education Classrooms:

- Activities for Daily Living Room
- Citywide Special Ed Speech Room
- Occupational/Physical Therapy Room

Use: These auxiliary instructional rooms are dedicated to Citywide Special Ed. These rooms include special furnishings and equipment to enable training specific to the Special Ed program. The three rooms listed above are typical; if the specific District 75 population is identified at the outset of a project, they may vary.

Design: The design of these classrooms follows the *Room Planning Standards*. All components in the *Room Planning Standards* must be included.

Supplemental/Associated Spaces and Adjacencies: Citywide auxiliary classrooms should be on the same floor(s) as their typical classrooms. Alternatively, the program may require the Occupational/Physical Therapy Room to be located adjacent to the Gymnasium or the Gymatorium.

The students will, for the most part, be brought individually or in small groups for the sessions in these spaces.

Location and Access: Citywide classrooms must be clustered and should be on the first floor if possible. If they cannot all be on the first floor, they must be clustered vertically on the first and second floors (or the lowest possible floor or pair of floors) near both stair and elevator.

Group 2 – Specialized Instruction (Art, Music, Technology)

Use: These rooms are designed for specific subjects but may serve as typical classrooms when required.

Design: The design of these classrooms follows the *Room Planning Standards*. All components in the *Room Planning Standards* must be included. Consideration should be given to flexibility. As the school's needs change over time, these classrooms may sometimes be used as typical classrooms. It is therefore advantageous to design specialty and small classrooms for possible conversion or combination into typical full-sized classrooms.

Supplemental/Associated Spaces and Adjacencies: Some specialty rooms have associated storage, prep or ancillary rooms. These rooms should have doors into both their associated specialty classrooms and onto the corridor so that:

- if the specialty classrooms are ever used as typical classrooms, the ancillary rooms can then also be generally accessed from the corridor.
- The music storage spaces can be shared by the adjacent music/choral rooms, other music rooms in the building or the auditorium.

Location and Access: Specialty rooms should be located on the same or proximate floors to the classrooms/grades they serve. This is particularly important when the building spans two or three school levels, i.e., PS/IS, IS/HS or PS/IS/HS. When possible, art rooms that require exhaust for kilns should be located on the top floor (or stacked one above the other) to minimize ductwork and chases. At the request of the district, specific adjacencies may be desired, such as clustered arts-related rooms, or the music room proximate to the auditorium.

Note that acoustical considerations must be taken into account early in the planning process. Sound isolation (vertical and horizontal) of the music rooms from the other instruction rooms must be provided.

Group 3 - Science

Use: These rooms are designed for specific subjects but may serve as typical classrooms when required.

Design: The design of these classrooms follows the *Room Planning Standards*. All components in the *Room Planning Standards* must be included. Consideration should be given to flexibility. As the school's needs change over time, these classrooms will sometimes be used as typical classrooms. It is therefore advantageous to design specialty and small classrooms for possible conversion or combination into typical full-sized classrooms.

Supplemental/Associated Spaces and Adjacencies: Science rooms have prep or storage rooms. IS and HS science suites typically sandwich a prep room between a lab and a science demonstration room; in this case the prep room will have the emergency shower for all three. When possible, the science prep or storage rooms should have doors onto both the science rooms and onto the corridor so that:

- if the science classroom or labs ever need to be used as typical classrooms, the prep/storage rooms can be generally accessed from the corridor.
- the prep room can be shared by the adjacent science rooms and other science rooms in the building.

Location and Access: Science rooms should be located on the same or proximate floors to the classrooms/grades they serve. This is particularly important when the building spans two or three school levels, i.e., PS/IS, IS/HS or PS/IS/HS. The primary school "science resource center" should be located on the same floor as the fourth and fifth grade classrooms; the IS "science lab/demo room" should be located on the floors that house grades 6-8; and the high school science suite should be located on the floors that house HS grades. Science rooms that require exhaust for the fume hoods should be located on the topmost floor of the building to avoid running exhaust ducts through other floors. In a multi-org IS/HS, science suites can be stacked to gain the efficiency of a single exhaust duct chase to the roof.

Large Common Spaces

Large common spaces include the gymnasium, gymatorium, large multi-purpose and exercise rooms, auditorium, library, lobby and cafeteria. These spaces should be easily accessible for student use during the school day and community use after hours. When possible, major spaces should be accessed from the first floor – if possible from the main entrance/lobby where they can be monitored from the lobby security desk.

Group 4 – Physical Education

Gymnasium:

Use: The gym is used for physical education classes at all levels, competitive games in intermediate and high school, and may be used for staging large groups of students at arrival and dismissal and for after-school programs or community activities.

Design: The design of the gymnasium and its ancillary spaces follow the *Room Planning Standards*. While there is some flexibility in the location of the doors and adjacent spaces, the court and minimum runoff dimensions must be maintained. All elements contained in the *Room Planning Standards* must be included. Acoustical separation from instructional spaces above and below is critical. Floor, ceiling and walls must be detailed for acoustical isolation. Windows are desirable. If provided, they should include interior window guards as needed and allow for ventilation. Control of glare and solar heat-gain is critical.

In projects where the Gym can be used as a staging area for large groups of students at arrival and dismissal, the exterior door(s) designated to be used during such staging should be provided with a vestibule and walk-off mats.

Providing doors that exit directly into an egress stair is to be avoided.

Supplemental/Associated Spaces and Adjacencies: Gym storage must be directly accessible from the gym. If possible, the gym instructor's office should be located to monitor both the gym and the locker rooms. IS/HS locker rooms to be on the same floor as the gym and should, if possible, have access from both the corridor and the gym. Toilet rooms should be available nearby, either in the locker rooms or on the corridor. Locker rooms and/or changing rooms should be proximate to the spaces that may be programmed for phys ed activities – since this is likely not possible in all cases, the order of priority would be the gym, gymatorium, dance room, auxiliary exercise room and play yard.

Location and Access: The basement, first floor and top floors of a school are locations for the gym that each have specific advantages. Gymnasiums in schools below high school level may not be placed in cellars, even if a double height space.

- A basement location has two: no need for acoustical separation from space below, and an opportune use of basement space, if a basement has been determined cost effective.
- A first-floor location has two advantages: potential direct access to the play yard and good accessibility for community after-school use.
- Locating the double-height gym space at one of the building's highest two floors, with no spaces above, has structural advantages given the long span required to cover the gym. Placing the gym at the top floor may relieve site constraints by pushing the upper volume of the gym above the main school roof, where it may be set back from sky-exposure planes or afford particular opportunities for fenestration.

With their large areas, it may make sense to stack spaces like the gym, cafeteria and auditorium vertically. Locating a gym above a cafeteria requires less attention to acoustical detailing than locating a gym above an auditorium. The latter should be proposed only for compelling reasons.
Both intermediate and high school gyms are large enough to be divided into two small gyms. Access from the corridor to both sides of these gyms is therefore advantageous – strong preference is for the length of the gym to face the corridor.

Auxiliary Exercise Room

Use: The auxiliary exercise room is a dedicated phys ed room. It is typically a single floor height and will have finishes and equipment specific to its function. It may be a dance room, weight room, or general exercise room. It may be used for after-school programs and community activities.

In the PS/IS school, a general exercise room, with padded walls, may often be used by the youngest children and by small groups of District 75 students.

Design: Some varieties of auxiliary exercise rooms are shown in the *Room Planning Standards*. Generally, the room is a clean rectangular shape, with enough room for a class activity. Acoustical separation from surrounding spaces must be considered.

Supplemental/Associated Spaces and Adjacencies: See the gym section above.

Location and Access: This space should be proximate to the locker rooms if it is for IS or HS, or to the classrooms it serves if it is for PS students.

Multi-Purpose Room

Use: The multi-purpose room by definition is capable of serving several functions, among them: exercise, assembly, or other instructional activity.

Design: Flexibility is given by the provision of moveable seating. Acoustical separation from surrounding spaces must be considered.

Supplemental/Associated Spaces and Adjacencies: A storage room for seating and equipment storage is essential.

Location and Access: The multi-purpose room is generally located on one of the lower floors. Useful functions include a green room for an auditorium, or a playroom next to the cafeteria.

Gymatorium

Use: The gymatorium serves a dual function as both gymnasium and auditorium. It is used for physical education and for school assemblies and performances, and may also be used for staging large groups of students at arrival and dismissal, as well as before and after lunch. The platform/performance area (the stage) is large enough to serve as a dance classroom or for music instruction. As is true with other large common spaces, it may be used for after-school programs and community activities.

In a school that would otherwise include both a gym and auditorium, the gymatorium offers an opportunity for double the programmable phys ed space, while still having an assembly area with stage. In fact, the seating of the gymatorium, while not fixed, outstrips that of the standard PS/IS 300-seat auditorium.

Design: The gymatorium is comprised of a stage/performance area and play/seating area. Flexibility is given by the provision of moveable seating. Raised stage with telescoping seating on a flat floor is one design approach. The Gymatorium layouts in *Room Planning Standards are based on raised stage and moveable seating approach*. A raised stage with telescoping seating is the preferred option. Alternatively, a flat performance area with moveable bleacher seating and/or fixed stadium seating may also be used. As with the gym, minimum runoff dimensions must be maintained. Site lines must be considered for the telescoping and/or moveable seating arrangement. For a large gym that can be divided with a folding partition, the preferred location of the stage is at the short end of the partition section (adjacent to the partition of either of the two partitioned sections). The height of the stage must be adequate to accommodate required lighting and stage rigging. As required by code, two means of exits from the stage must be provided. Acoustical separation from surrounding spaces must be carefully considered – the gymatorium is <u>both</u> a noisy and a noise-sensitive space. Floors and walls must be detailed for acoustical isolation.

Windows are desirable and if provided they should include interior guards as needed, and should allow for ventilation. Control of light/glare can be achieved with the use of window shades instead of the traditional drapes.

Providing doors that exit directly into an egress stair is to be avoided.

Supplemental/Associated Spaces and Adjacencies: See the gym section above, and the Auditorium section below.

Location and Access: See the gym section above, and the Auditorium section below.

Group 5 - Assembly Area

Auditorium:

Use: The auditorium is used for school assemblies and performances as well as for staging large groups of students at arrival and dismissal, and before and after lunch. The auditorium may be used for music instruction, seminars or lectures. After hours, may see community use of this space. The performance area, if large enough, may serve as a dance space.

Design: The auditorium typically includes a raised stage or platform, fixed seating and a raked seating area. When a long space is used, stadium seating may be an option, with a flat or raised performance area. The auditorium's shape may vary provided it is functional and acceptable to its users. For young children proximity to the stage is a positive aspect, so a shallow fan-shaped space offers advantages. All elements contained in the *Room Planning Standards* must be included. A route providing level access from the rear of the auditorium to the platform/stage is preferred as opposed to a mechanical lift. Flexibility is encouraged to accommodate the greatest range of uses. Fenestration is not required but may be desirable if it doesn't present acoustic problems and incorporates adequate light control. Sight lines and acoustics, as well as vertical and horizontal acoustic isolation must be considered. For this reason, placing an auditorium directly under the gymnasium should be avoided. If due to site constraints stacking the Gym above the auditorium is unavoidable, additional acoustic measures must be incorporated into the design. As the auditorium requires long span structural framing, consideration should be given to placing it under its own roof or stacking it under other column-free spaces. Locating the rooftop HVAC equipment directly above the auditorium roof will require special acoustic design consideration.
Providing doors that exit directly into an egress stair should be avoided.

Supplemental/Associated Spaces and Adjacencies: Back stage storage and dressing room/green room space should be appropriate to the level of the school. If the auditorium is to serve as a music room, an instrument storage room should be readily accessible. Toilet rooms for adults, non-ambulatory use and students should be nearby, on the corridor to the auditorium. (These may be minimal if other toilet rooms are provided on the same floor.)

Location and Access: A first-floor location is preferable for the auditorium although basement or second-floor locations are acceptable, particularly if they are linked to

the school's lobby by circulation of a public quality such as an open stair that is part of or clearly visible from the lobby. Auditoriums in schools below high school level may not be placed in cellars, even if a double height space. Consideration may be given to placing the auditorium on the top floor of a school if it is stacked above the gym and can share the volume of the upper gym to create raked seating. It is advantageous for the auditorium to communicate as directly as possible to the lobby, both because of its sometimes public use and because the lobby may serve as a pre-function space. A first floor location allows the best relationship to the lobby and may result in the most efficient satisfaction of egress requirements if exits directly to the exterior are provided. Doors and aisles should allow easy movement of large groups into and out of the auditorium.

Group 6 - Library

Use: The library plays an important role within the school population and the community and should welcome a wide range of functions from quiet individual reading, small lectures, musical performance events and teacher meetings. It may also serve the secondary function of small community meetings and other civic functions. The library is used for both lending of books and research, and supports group activities.

Design: There is flexibility in the geometry of this space. The layout should be flexible so as to allow it to be rearranged into small conference areas, lecture spaces or teaching spaces. A "teaching wall" with adequate data electrical support must be part of the design. However, supervision by one librarian must be accommodated, with clear sight lines throughout the space from the circulation desk. Colors, materials, textures and furniture must all be interwoven, so as to create an inviting very flexible, harmonious and comfortable space. All elements contained in the *Room Planning Standards* must be included. Tables should be small enough to facilitate rearrangement and change in locations. Tall bookshelves should only be placed against walls while shelves in the interior part of the library must be low enough to see over.
Acoustics are of primary importance.
Adequate natural light is required. The Designer is to provide adequate shading devices to maximize natural light while filtering direct sunlight.
The lighting design is to be creative but also functional and must have the required lighting levels for reading.
The library entrance should include graphics, signage, etc. that identifies the library and provides a visual connection between the library and the corridor or lobby immediately outside of the library.

Supplemental/Associated Spaces and Adjacencies: The library's archival and media-related functions make it a suitable space to contain or be adjacent to the audio-visual storage room. The library often serves as audio-visual distribution center for the school. Because the library is used as a meeting space, an adjacency or even a direct connection to the staff workroom may be advantageous.
The Staff development room (if included in the POR) is used for research by staff members. Direct connection to the library or location in the vicinity of the library is desirable.

Location and Access: Typically, the library is located on an upper floor because of the competition for first floor space. To support the after school secondary function of the library and for ease of access by the community, the Library must be located in close proximity to the main stair and elevator. While it is usually provided with two means of egress, only one entrance is active, the other serving as emergency, alarmed egress. Under a certain size, a single means of egress is both code compliant and acceptable.

Group 7 – Lobby/Main Entrance

Use: The lobby is the main and formal entrance to the school and also may serve as a pre-function space for the auditorium or other large spaces. It is the control point for visitors and deliveries (with the exception of kitchen deliveries).

Design: As the school's public entrance, the lobby should be welcoming and a place of importance. It may be the location for Public Art and typically it is a showcase for school accomplishments. The lobby's security desk should be positioned to maximize supervision of circulation. All elements of the *Room Planning Standards* must be included. It is advantageous for the security desk to allow observation of visitors to the general office.

While the creation of lobby atrium might be an exciting design feature, it is discouraged because of architectural, electrical, fire safety, egress and mechanical maintenance issues it poses. The designer must solve the problem of ensuring ready access to lights, smoke detectors, smoke dampers, ductwork, fire sirens, etc. for maintenance purposes. A ladder or scissor-lift may work in some cases, but not all. If such a feature is accepted during design, a maintenance plan must be prepared for the DOE custodial staff.

Supplemental/Associated Spaces and Adjacencies: The main entrance must contain a vestibule. The Lobby should include a built-in security desk, outlets to support the CAAS and POS system, an optional security scanning station, and may include a closet for short-term storage of deliveries.

Location and Access: The location of the building entrance is a primary consideration. Among the factors that must be considered are the following:

- the school's location within the neighborhood it serves
- the direction of approach to the school by its students
- likely bus or car drop-off locations for students
- traffic direction of surrounding streets
- the location of traffic lights that allow pedestrian crossings
- public transportation routes
- relationship to streets with heavy and possibly dangerous vehicle traffic
- availability of site area for students to assemble before school
- site supervision and visual control
- and the character of adjoining properties

Group 8 - Student Services

Guidance/School-Based Support Team (SBST) Suite

Use: These suites support testing, confidential evaluation and counseling, as well as attendance recording and college and vocational counseling.

Design: These office spaces must have visual and acoustical privacy but may have doors with vision panels. Districts may specifically define the use of these suites.

Supplemental/Associated Spaces and Adjacencies: A ***records room*** *(RPS layout # 8-44)* is provided adjacent to the suite. Arrangement of spaces within suites follows the *Room Planning Standards*. All elements of the *Room Planning Standards* must be provided. Without increasing the overall area of these suites, the distribution of square footages within may be adjusted as agreed by DOE and the district.

Location and Access: The office suites should be located on lower floors to be easily accessible to visiting parents.

Medical Suite

Use: This suite supports the care of students who may have become ill or accidentally injured during the school day or may need some adult comfort or counseling.

Design: Arrangement of spaces within suites may be modified but all elements of the *Room Planning Standards* must be provided. **Per §49.07(d) of the NYC Health Code, the medical room shall be in a dedicated space with no through traffic, wheelchair accessible, on a lower floor and in a central building location. It shall contain the following;**

(1) a workstation;
(2) a medical cabinet, a filing cabinet, medication refrigerator, exam table and scale;
(3) an appropriate waiting area;
(4) a bathroom internal to or adjacent to the medical room;
(5) a holding area for a student awaiting transportation or pick-up (80 square feet); and
(6) a nursing/treatment area that meets the following requirements:
  (i) minimum of 200 square feet in buildings for up to 800 students and 300 square feet in larger buildings to accommodate more staff.
  (ii) sink with hot and cold running water.
  (iii) floor-to-ceiling walls substantial enough to maintain privacy.
  (iv) easy to clean surfaces (e.g., no carpeting).
  (v) internet access and adequate electrical power (multiple outlets) for computers and medical equipment.
  (vi) telephone line able to make direct calls out of building (e.g., 911 calls) and to send and receive faxes.
  (vii) adequate heating and air conditioning, lighting and ventilation, including a window.
  (viii) secure lock that cannot be opened by other school keys (excluding master key); and

(ix) safety button to enable nurses to have immediate access to security in the event of an emergency.

Supplemental/Associated Spaces and Adjacencies: The medical suite includes a waiting area, nurse's office, toilet room and examination room(s). Sometimes schools have a partnership with a hospital or clinic to provide more extensive services. In these cases, the suite is customized accordingly.

Location and Access: The medical suite is best located on a lower floor to be easily accessible to parents. For PS/IS schools, proximity to the playground may be advantageous.

School Based Health Clinic

Use: In addition to being used as a medical suite during school hours, the health clinic serves the community after school hours.

Design: Arrangement of spaces within suites may be modified but all elements of the *Room Planning Standards* must be provided.

Supplemental/Associated Spaces and Adjacencies: The school-based health clinic includes a waiting area, intake area, a lab, toilet room and examination room(s).

Location and Access: The school-based health clinic is best located on a lower floor to be easily accessible to parents and the community for after hour use. An independent entrance and ability to isolate the suite from the remainder of the building for the after use may be advantageous.

Government & Clubs/Publication

Use: This room may be included only in high schools for student use during and after school. Its function is for student activities, related meetings and storage.

Design: The design of this room follows the *Room Planning Standards*.

Supplemental/Associated Spaces and Adjacencies: Lockable storage within this room is required.

Location and Access: The Government & Clubs room generally takes a "less desirable" location in the building, since it is not used all day long.

Student Store

Use: This small shop is run by students and may be included only in high schools. Sales include snacks and school-related supplies.

Design: The design of these rooms follows the *Room Planning Standards*. The student store has a "sales window" opening into the cafeteria. If possible, it should be accessed from the corridor; otherwise, a dutch door to the cafeteria is adequate.

Supplemental/Associated Spaces and Adjacencies: Lockable storage within this room is required.

Location and Access: The student store must be adjacent to the cafeteria.

LYFE Center

Use: This space is used to provide Day Care facility for infants and toddlers of the school students and may be included only in high schools.

Design: In addition to the NYC Building Code, the design of this room must follow the NYC Health Code requirements for Day Care Facility. *The Room Planning Standards* may be used as a guide.

Supplemental/Associated Spaces and Adjacencies: Student toilet, laundry, staff areas and storage are required within this room.

Location and Access: The LYFE center should be accessible from the school corridor and MUST be located in the building such that it also has a direct access to the outside at grade.

Group 9 – Storage

Separately programmed storage rooms (other than those associated by program with other primary spaces) are provided for books, furniture, general school supplies, grounds equipment**,** filters for the air handling units, and other custodial supplies, computer and A/V equipment, sensitive materials that require "secure storage", bicycle storage and finally for trash. These rooms must have shapes that allow for efficient storage. All elements of the room planning standards must be provided.

Small and Large Book Storerooms

Use: These are for storage of books in small rooms on each floor and/or a large room in the **cellar or** basement, depending on efficiency and availability of space.

Design: Book storage rooms must be of a size and shape that is appropriate for shelves of books - i.e., not triangular. The size of individual small book storage rooms may vary with availability of space, but the total book storage area must be provided.

Supplemental/Associated Spaces and Adjacencies: Cellar or basement book storage rooms should be located near an elevator.

Location and Access: While it is advantageous for book storage to be dispersed as described in the Program, this requirement is flexible. Under constraint, most or all book storage may be located in the cellar or basement.

Furniture Storeroom
Receiving and General Supply

Use: These spaces store furniture (new and old) and general school supplies (paper and other classroom and office supplies).

Design: These rooms must have shapes that allow for efficient storage. The R*oom Planning Standards* should be used as a guide, with all elements provided.

Supplemental/Associated Spaces and Adjacencies: These spaces are best located near stairs or elevators. They must be accessible to adults and/or supervised students.

Location and Access: The general and furniture storerooms should be located in the cellar or basement if one is planned.

Grounds Equipment Storeroom

Use: The grounds equipment storeroom is for outdoor maintenance-related equipment (snow blowers, shovels, rakes, hoses, etc.) and should be located at grade level with direct outdoor access and appropriate ventilation.

Design: Follow the requirements in the *Room Planning Standards*.

Supplemental/Associated Spaces and Adjacencies: Since the grounds equipment is likely to be wet or dirty after use, exterior access only is desirable.

Location and Access: Access from outside, at rear or side of the building is desired.

Audio Visual/Secure Storeroom
Vault with Anteroom

Use: The audio-visual/secure storeroom (for PS and IS) and the vault (for HS) are used to store valuable equipment or materials such as standardized tests that must be under lock and key.

Design: The secure storeroom is equipped with a three-point lock for vandal resistance. The vault room is the special secure storeroom for high schools. It may include an anteroom. Because it will hold the Regents Exams, the construction of the room must comply with the requirements of the NY State Education Department.

Supplemental/Associated Spaces and Adjacencies: Since these rooms are visited infrequently and only by adults, they should be removed from the student areas of the schools.

Location and Access: They are well suited to a **cellar or** basement location if one is planned.

Refuse & Recycling Room

Use: Trash and Recyclables are compacted by the custodian and stored in these rooms until the day of collection.

Design: The refuse and recycling storage room must have a hose bib, floor drain, and floor be finished for easy wash-down. All elements of the *Room Planning Standards* must be provided.

Supplemental/Associated Spaces and Adjacencies: The compactor is located within the larger recycling and refuse storage room. Although much of the school refuse comes from the lunchroom, this area is NOT part of the office of school food and nutrition– it is under the custodian's purview.

Location and Access: The route from theses spaces to the sidewalk should be as short as possible, should not traverse through the kitchen, and should interfere as little as possible with student circulation. It is advantageous for this room to be located on the first floor. If this is not possible, it may be located in the cellar or basement near an elevator.

Computer/AV Storeroom

Use: This room stores the laptop computer cart and recharging equipment as well as audio/video equipment to be used by the classrooms on that floor.

Design: Follow the *Room Planning Standards*.

Supplemental/Associated Spaces and Adjacencies: Since this room will see frequent use during each school day, it should be proximate to the classrooms it serves.

Location and Access: This room should be centrally located on each instructional floor.

Filter Storage

Use: This storeroom as the name suggests is for the RTU/air handling units' maintenance-related equipment (filters).

Design: Provide shelving to store the filters**.**

Supplemental/Associated Spaces and Adjacencies: While it is advantageous for this space to be in the proximity of the RTU/air handling units, this requirement is flexible. However, it should have easy access to the RTU/air handling units.

Location and Access: Location on the floor that houses the boiler and/or the RTU/air handling units allows the best service relationship. If this is not possible, it may be located in the cellar or basement near an elevator.

Bicycle Storage

Use: This space will primarily be used to secure and store bicycles for the staff members who prefer to use bicycles for their commute to and from the school.

Design: The design must satisfy the bicycle parking requirements of the NYC zoning. There is flexibility in the geometry of the space but the space must account for

accessible cycle storage required by Section BC 1109.9.3 of the 2022 NYC Building Code.

Supplemental/Associated Spaces and Adjacencies: The site should include additional bicycle parking located in the front of the building, where possible, to meet Green Schools Guide requirements. If the only space available is the schoolyard, the use and amount of schoolyard area required for bicycle storage needs to be evaluated and balanced with the need for children's play activities. Alternative storage options should be considered. A shower and changing area for staff use is required and provided in the building, which is typically combined with the required custodian shower. Staff should have access to the shower and changing area.

Location and Access: The bicycle storage is best located on first floor to be easily accessible from the street level. If this is not possible, it may be located in the cellar or basement near an elevator. However, the required accessible cycle storage spaces must be located on the floor accessible from the street and not require use of the elevator. The route from this space to the building entrance should be as short as possible. An area or room opening into the building's vestibule is preferred.

Proximity to the shower and changing area may be advantageous.

Group 10 – Administration

Administrative Areas include the administrative suite (general office, waiting area, etc), principal's office, supervisory offices, staff workrooms, school aides room, and the Parent/Community Room.

General Office Suite

Use: The general office suite includes the school office, with waiting area, staff work and support areas (duplicating and file rooms), an area for teachers to punch timecards and collect mail, and the principal's office.

Design: The design should satisfy the office operation as described by the district. The *Room Planning Standards* may be used as a guide. It is advantageous for the teachers' timecard and mail space to be on a one-way circulation loop within the suite but outside the general office work area. This may be achieved by use of two remote doors into the waiting area. The general office staff work area is typically separated from general circulation by a counter and a low height double-swing door.

Supplemental/Associated Spaces and Adjacencies: The *principal's office* typically has one door to the general office and one to the corridor. The office contains a conference area and shall contain a private toilet room.

Location and Access: The general office suite should be located on the first floor, accessible from the main lobby and centrally located so that it contributes to school security and allows visitors direct access. A second-floor location at the head of the stair nearest the lobby may be considered under spatial constraints or at the request of the district.

Supervisory Offices

Use: These are supervisory offices used by assistant principals, curriculum heads, and by those teachers whose instructional space does not include their desk, files, etc. High schools include a program office for assigning students their schedules of coursework, with an ATS station (a centrally networked database for attendance, grades and other detailed student and staff information).

Design: As it is advantageous for these offices to contribute to supervision of the school's circulation spaces, glazing between the offices and corridors should be provided to the maximum degree possible. If an office is used only for occasional deskwork, it may be placed in a location that doesn't allow for an exterior window.

Supplemental/Associated Spaces and Adjacencies: Some offices have associated storage rooms, which should be immediately adjacent.

Location and Access: Supervisory offices should be distributed throughout the building and located at control points along the corridor, next to or across from a stair, at the intersection of corridors, etc.

Teachers'/Aides Work Room

Use: The teachers' workroom is used by teachers during class preparation periods. It may also used by the school aides to store personnel belongings during the school day.

Design: The teachers' workroom should be a quiet haven for teachers and should have a window if at all possible. All elements contained in the *Room Planning Standards* must be included.

Supplemental/Associated Spaces and Adjacencies: The associated staff toilet may be accessed either from the corridor or directly from the workroom. The district may give direction on this.

Location and Access: The teachers' workroom should be located centrally in the building for easy access by all staff.

Parent/Community Room

Use: The parent/community room provides office space for the parent coordinator and a base for school-related community activities.

Design: The layout of this room follows the *Room Planning Standards*. All elements contained in the *Room Planning Standards* must be included.

Supplemental/Associated Spaces and Adjacencies: Shelving and storage are important to the function of this room since it will be the center of fundraising and other parent organization events.

Location and Access: The parent/community room should preferably be located on the first floor for easy access. The district may give specific direction on this.

Group 11 - Cafeteria/Staff Lunch

Staff Lunch/Conference Room

Use: This room is used as a lunchroom at midday and for staff work or meetings at other times.

Design: The layout of this room follows the *Room Planning Standards*. All elements contained in the room planning standards must be included.

Supplemental/Associated Spaces and Adjacencies: This room and the staff work room can combine their areas if one large staff multi-purpose space is desired.

Location and Access: The staff lunchroom may be near the kitchen but should not open onto the student cafeteria. Time in this room is usually taken as a respite from the flurry of school activity. The district may give specific direction as to its location.

Students' Cafeteria

Use: In the cafeteria, students are served breakfast and lunch. The cafeteria may also be used for morning and afternoon line-up. At other times during the school day, it is used as a play or instructional room. After hours it is used for after-school programs and meetings.

Design: The size of the cafeteria is based on feeding **100**% of the school capacity in three seatings per day. The cafeteria's shape must allow for supervision of its entire area from a single location within it. Circulation through the servery between kitchen and cafeteria must be considered and may establish the general orientation of the kitchen and cafeteria. All elements contained in the *Room Planning Standards* must be included.

Multiple doorways into the cafeteria are critical as the transition between lunch periods entails the flow of one third of the student body into this room and another third out. As this is the noisiest room in the building, acoustical treatment and separation from other spaces must be planned. Natural light, operable windows and a view to the outdoors are desirable, but not required if other priorities prevail.

Supplemental/Associated Spaces and Adjacencies: The cafeteria and kitchen must be on the same floor and directly accessible to each other. The kitchen area should have a visual link to the cafeteria. The wall between the servery and the cafeteria (if one exists) may be glazed.

The student cafeteria may include a small mediation room, where adults can mediate conflicts between students.

Primary and intermediate school cafeterias should have boys' and girls' toilet rooms within them. If this is not possible, the toilet rooms must be immediately adjacent to the cafeteria. High school cafeterias must have adjacent student toilets.

Because primary and intermediate school cafeterias may be used for morning line-up, and serve breakfast, they are well suited to be entry point into the schools - adjacency to both the play yard and school lobby is advantageous. (See Primary and Intermediate School Play Yard below.)

Location and Access: A first floor location is highly preferable. A cellar or basement location is acceptable if a connecting stair to the outside and upper floors is provided. In schools below high school level, the Cafeteria is the only space students are permitted to occupy when placed in a cellar and thus the cellar is an effective location for the cafeteria, especially if soil conditions are such that excavation for a cellar is logical. If site constraints demand, a high school cafeteria may be located on an upper floor. Primary and intermediate school cafeterias should open directly out onto the school play yard, if possible.

Group 12 – Custodial and Plant operations

This group of rooms includes those belonging to the school custodian, the school safety officers and the local telecommunications personnel. With the exception of the custodian's office, it is best if they are not in the main stream of school activity.

Custodian's Office

Use: These spaces are used as indicated by their room designations.

Design: The designs of these spaces follow the Room Planning Standards. The custodian's office contains the control panels for all of the building alarm systems (with the exception of the building fire alarm panel). This should be considered in the building and system design.

Supplemental/Associated Spaces and Adjacencies: The custodial, school safety locker rooms, custodial workshops and the combined school safety administration office/locker room should be located in the cellar or basement.

Location and Access: The custodian's office should be located on the main floor as near as possible to the lobby. (Custodial staff are sometimes the building's only occupants.) The custodian's workshop and storage and locker rooms should be located in the cellar or basement.

Custodian Workshop, Custodial Storage

Use: These spaces are used as indicated by their room designations.

Design: The designs of these spaces follow the Room Planning Standards.

Supplemental/Associated Spaces and Adjacencies: These custodial spaces may be located in the vicinity of the electric/ mechanical service rooms.

Location and Access: The custodial staff are the only users of these spaces, and these spaces should be located away from the educational spaces, in the cellar or basement.

Telecommunication Rooms

Use: These spaces are used as indicated by their room designations.

Design: The designs of these spaces follow the Room Planning Standards and DIIT Standards. Refer to DR 7.3.3.

Supplemental/Associated Spaces and Adjacencies: Telecommunication Rooms do not have other spaces that are associated with them or that they need to be adjacent to. Intermediate Telecommunication Rooms are to be stacked where practical.

Location and Access: Refer to DR 7.3.3. The Main Telecommunications Room is to be centrally located on an upper floor of the building not under a roof (not in the basement or cellar). Intermediate telecommunication closets are to be centrally located and placed on each floor (Other than the floor with the main telecommunications room) or every other floor depending on the size of the school as dictated by the 100m maximum cabling distance.

Toilet Facilities

Student toilet rooms

Use: Dedicated toilet rooms are included in pre-kindergarten and kindergarten and for some projects in first and second grade classrooms and certain special education classrooms. Toilet rooms on corridors, typically designated “Boys” and Girls”, should accommodate the balance of the student population with fixture counts distributed according to the need on each floor. One single user accessible unisex student toilet, accessible from the corridor, shall be provided in the building. The SCA Design Requirements should be used to calculate the required toilet fixture count.

Design: These rooms follow the *Room Planning Standards* and *SCA Design Requirements*.

Supplemental/Associated Spaces and Adjacencies: While Boys’ and Girls’ toilet rooms may be adjacent to each other, their entrance doors should be as remote as possible. Their doors should not share an entry alcove.

Location and Access: It is advantageous for these rooms to be centrally located. Toilet rooms shall not be placed over electrical/telecommunication rooms, elevator machine rooms, or kitchens.

Adult Toilet Rooms

Use: These rooms, typically designated “Men’s” and “Women's”, have keyed access and are used by staff and visitors. (Note that for large after school evening or weekend events, the Boys and Girls toilet rooms serve as general male and female toilet rooms).

Design: These rooms follow the *Room Planning Standards* and *SCA Design Standards*.

Supplemental/Associated Spaces and Adjacencies: The SCA Design Requirement must be followed in calculating the number of adult toilet rooms. The Program may also call for toilet rooms in specified spaces/floors. In buildings with a large auditorium, a unisex toilet for non-ambulatory use may also be required.

Location and Access: In large buildings, a minimum of two individual adult toilet rooms, one Men's and one Women's, is required for each floor. Alternatively, for a small building, a unisex toilet may be located on each floor. A bathroom for the principal's office is to be provided. If additional toilet fixtures are required by code, they should be located on the same floor as the General Office and the Auditorium. Toilet rooms shall not be placed over electrical/telecommunication rooms, elevator machine rooms, or kitchens.

Group K - Kitchen

The kitchen complex is under the jurisdiction of the central Office of School Food (OSF). It comprises the kitchen proper, servery, storerooms, dietician's office, walk-in freezers and refrigerators, kitchen help locker rooms and deliveries area. The design and layout of these areas incorporate the OSF requirements.

Kitchen Complex

Use: The kitchen is used by the OSF staff to prepare and serve breakfast and lunch to the school population.

Design: The design must be approved by the OSF representative who will participate in relevant design meetings. Generally, a Food Services consultant is contracted to develop the design. The *Room Planning Standards* can be used as a guide. Note that 75% of the required kitchen storage (for long-term storage of paper and canned goods) can be remote from the kitchen.

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Supplemental/Associated Spaces and Adjacencies: The *dietician's office* should be located within the kitchen to facilitate a direct view to the cooking area. The storage areas for long-term storage of paper and canned goods should be as readily accessible to the kitchen staff, but can be removed from the kitchen proper.

Location and Access: The location for the kitchen is to be directly adjacent to the Cafeteria. The servery requires direct access to the kitchen and to the cafeteria. The storage, freezer and refrigerator areas are to be located within the kitchen with easy access to the delivery/receiving area. However, a percentage of the Kitchen's Storage Area may be located on a different level and if so, preferably in the cellar or basement where such space may be most affordably created. Placing this space directly under the kitchen has the advantage of allowing access to kitchen piping. Such storage must be near stairs or elevators.

D. Plant Operation Areas

Plant operations areas include service rooms such as, but not limited to, electric, water, and sprinkler service rooms, boiler rooms etc.

Use: These are the spaces that are required to house the building services and the mechanical equipment.

Design: Design of spaces is based on the building's size, location of utilities in the street and the mechanical system design. System designs must follow the mechanical design requirements. As per Rule §4-6.8 of the NYS Industrial Code, 2 means of egress are required for such boiler room spaces over 300 SF (contrary to the Mechanical Code which indicates 500 SF). The second means of egress may be through a ladder.

Supplemental/Associated Spaces and Adjacencies: The locations for the service rooms are to be coordinated with the utility locations in the street.

Location and Access
These types of spaces are typically located in the cellar or basement along with the custodial work and storage areas. Mechanical equipment such as fans, chillers and condensers are typically located on the building's roof. Since the condensate travels by gravity, boiler room housing the condensing boilers should be located at roof level or on a floor closest to the roof.

E. Horizontal and Vertical Circulation

Corridors

Use: School corridors are high-traffic circulation zones and may appropriately increase in width to serve as waiting areas for elevators and large common spaces. Ends of corridors may accommodate small built-in seating areas.

Design: If at all possible, corridors should have natural light. This may be achieved by extending corridors to exterior walls and glazing corridor-ends, an approach that has the advantage of extending lines of sight outside the building and providing visual relief. As far as possible, corridors should be straight and simple, without opportunities for concealment. Edges of doors opening onto corridors should be flush with corridor walls to maintain unobstructed travel paths in corridor plans.

Stairs

Use: Stairs serve either as code compliant egress or strictly to enhance circulation. The latter type may be used, for example, to create a strong relationship between the building lobby and a large common space that is not on the lobby floor. Such a stair may be unenclosed if it does not connect more than two consecutive levels.

Design: Stairs should not include open areas between runs where objects might be dropped down a flight or more. Simple rectangular stairwells without open vertical shafts between stringers are recommended. The preferred minimal width of a stair is 56". Generally, it is advantageous to provide the fewest stairwells that will allow reasonable circulation through the building. Minimizing the number of stairwells is economical and adds to the security of the stairwells by increasing their traffic. Enclosed stairs that rise through more than one floor without access to an intermediate floor should be avoided as security risks. Whenever possible, stairwells should include windows, as daylighting lends a feeling of safety and wellbeing.

Landings where the "overlook" is a full floor down (at the top floor for example) must have a protective barrier.

Supplemental/Associated Spaces and Adjacencies: It is advantageous to provide Places of Public Assembly with the necessary egress without using a dedicated egress stair.

Location and Access: Adequate and appropriate stair size and location is required for smooth school operation. Stairs should be positioned to the maximum benefit of traffic flow and with consideration for the quiet and manageable movement of groups of students into and out of large common spaces.

Elevators

Use: Elevators are used by adult staff, school visitors and students with disabilities*. They are otherwise used for moving supplies, deliveries, etc.
*Alternatively, where the school occupies only the floors above the 5th floor level in a building (e.g., in a lease building), elevators are the only means of access to the school and will be used by all occupants to enter the building in the morning.

Design: Two elevators are provided in new schools. Additions may have one or two elevators or none, depending on the existing building's elevator service. Where two elevators are provided, it is advantageous to pair them in a single location to reduce wait time, to provide redundancy in the event of repair and for construction economy.

Supplemental/Associated Spaces and Adjacencies: Sufficient space should be provided in lobbies and corridors at elevators to reduce congestion.

Location and Access: Elevators should be located in or immediately adjacent to the Lobby. Elevators must serve the **cellar or** basement and the highest occupied floor. If the building has a rooftop play area, it must be accessible by at least two elevators.

F. Outdoor Play Spaces

Outdoor school space (at grade or on a roof), for play and/or educational purposes, is critical to children's growth, health, education and enjoyment and is an important component for their well-rounded development at Primary, Middle and High School ages. An attempt should be made to create active (structured play) and passive (sitting areas) zones, with the emphasis more toward active play, while taking into account the amount of available open square footage, the specific play yard geometry, stormwater management and egress considerations. Irregularly shaped yards under 5,000 s.f. (not including the ECC yard) may be limited on the selection and amount of play yard amenities. Modest introductions of educational gardening areas, Greenhouse and Art installations may be considered on a case-by-case basis depending on the agreed upon Program of Requirements and available space. All outdoor playground spaces (at grade or rooftop) shall comply with all Design Requirements and Standards to the greatest extent possible, including Design Requirement 7.2 regarding Exterior/Site/Security Lighting.

1. Design of On-grade Open Space

a. On-grade school open space includes active areas (play areas with age-appropriate equipment) and passive areas (sitting and gardening areas) to encourage structured play as well as informal social interaction and exploration. Separation of age groups is beneficial in the design of on-grade play-spaces. In the early design-phase, a determination if the project will require a SWPPP filing (for demo and/or new construction) needs to be analyzed. The design should attempt to avoid SWPPP filing when possible by limiting the area of disturbance to the greatest extent practical. Playground spaces are broken up into the following categories:

1) Early Childhood Playground: This playground is used primarily by pre-kindergarten and kindergarten students at Primary Schools. This is an age when children enjoy using all of their senses for play and awareness of their surroundings. As much as possible the early childhood play area is to be located proximate to the part of the school building housing the pre-k & kindergarten classrooms.

2) Primary and Intermediate School Play Yard: This play yard is used by students in first grade and up. It may be used for gym classes and may include active equipment and exercise areas; informal open play areas with turf, outdoor quiet spots for writing or reading and outdoor activity areas that encourage structured play (painted games/ basketball/soccer ball) and learning experiences. The yard is also used in fair weather for morning line-up and for afternoon dismissal, requiring direct access from the street and ease of circulation from the main school entrance. This play yard has a hard surface, typically asphalt or concrete. Game lines may be painted at the school's discretion. It may have basketball backboards on the perimeter, sleeves for net games, or a small running track; otherwise, it is a large open space. It should be easily supervised, without places for concealment. It should also be open to visual surveillance from the street to discourage vandalism at night.

3) High Schoolyard: The high schoolyard is typically used for outdoor gym classes in fair weather and may include well equipped athletic space for a wide variety of outdoor active play of moderate to vigorous exercise levels. It is also used as a gathering place and social space before the school day. The district DOE coordinator will give direction as to what types of activities and equipment are appropriate for a given school. The activities may include a small artificial turf area, a small running track, basketball or volleyball court, and/or outdoor exercise equipment. They may also include passive reading areas, small landscape opportunities for shaded green space, and gardening areas on grade at the discretion of school administration.

b. Adjacencies: It is highly advantageous to locate the play yard adjacent to one of the school entry points and/or the cafeteria. In the morning, students congregate in the play yard before lining up. The cafeteria will serve as the morning point of entry for students participating in school breakfast programs. Students also use the play yard immediately after lunch. An effort shall be made to locate the play area with orientation to sunlight and views. When the playground is adjacent to residential properties, visual and sound barriers are required to mitigate noise and to provide screening of the play area. Acoustically treated windows for adjacent properties,

masonry/concrete garden walls and/or green buffer zones with fencing are among the options to be considered at the pre-schematic phase.

c. Materials: Rubber safety surface at play equipment, asphalt and colored painted asphalt and concrete options; paver and permeable paver areas may be used at non-active areas but may be a maintenance/snow removal concern; painted game areas; synthetic turf play or running areas (painted track); and natural planted border areas.

d. Equipment: Provide age-appropriate play equipment for active play. The color of play equipment must be compatible with the building façade colors. Equipment may be provided to outfit a basketball court or tennis court, game tables, benches, flag poles, other age-appropriate play equipment. On non-JOP playground redevelopments, no outdoor drinking fountains are required. Fitness equipment such as Multi bars – Push –Pull- and Stretch; Parallel bars; Sit-up bench; Horizontal Ladder; Pommel Horse; Balance beam; Jump Bars; Pull up Station; etc. may have associated safety surface. Bicycle Rack areas with screening planters and sitting walls; pole or building mounted security lights, may all be included as appropriate. Equipment selected must avoid any exposed sharp edges, splintering or other potentially injurious conditions. The use of any play equipment or site furnishings not specifically identified in the Design Requirements or Standard Specifications shall require approval prior to inclusion in the project.

e. Landscape: Play yard landscaping may include open natural areas, shrubs, small shade trees on the periphery of play areas; benches with table areas and running or walking track areas.

f. Planted Garden: A student garden is typically provided with 12” high raised gardening planter boxes.

g. Fence: Provide 4’-0” high wrought iron or chain link fence at the early childhood play area when located within larger schoolyard; wrought iron fence is typically provided along the street front property lines. Provide 15’-0” high chain link at basketball court and other open areas where ball may be played. See fence requirements in DR 2.2.1. Depending on the playground’s proximity to adjacent vehicular traffic and parking areas, the need for reinforced barriers (i.e., bollards, tire-stops or guard-rails) shall be assessed.

h. Egress and Access: Egress per NYC Codes. The schoolyard should be easily accessible from the sidewalk, where feasible, so students naturally gather there before entering the school rather than gathering on adjacent streets and sidewalks. If possible, a direct line of sight from the Lobby to the playground is advantageous for ease of circulation and supervision.

i. **Greenhouse on Grade (Only when funded by Reso A):** Provide a greenhouse structure to be located proximate to the school building for ease of MEP support; an outside vegetable garden may be located proximate to it. The greenhouse should accommodate a class, and should be constructed of steel or aluminum, with polycarbonate glazing. Provide sealed and painted concrete floor on grade, and storage space as needed. As new construction, the greenhouse must be made accessible. All Code and Zoning requirements must be considered. Note exterior lighting requirements of the Code and GSG.

j. JOP (Jointly Operated Playgrounds): For playground sites that are jointly operated with the Department of Parks (JOP sites), all proposed work will require review and approval by the NYC Department of Parks and Recreation (Parks). As such, proposed designs shall follow Parks' standard details and specifications including, but not limited to, requirements for trash receptacles and outdoor drinking fountains, type of play equipment, seating area, landscaping, turf fields, fencing, type of trees, lights, etc.

2. Design of Open Space above Grade (Rooftop Play Areas)

a. If site constraints preclude on-grade play yards, rooftop areas for active, passive play, and a planted roof may be designed as follows:

b. Adjacencies-Safety: The roof terrace should be easily accessible from the main circulation corridor of the school. It should be away from adjoining properties and separated from mechanical equipment; include sound/visual and protective barriers as necessary. Avoid any exposed sharp edges or other potentially injurious conditions and make acoustical provisions for adjoining windows. Mounting height of roof equipment including lights, security cameras, antennas, etc. to be at levels appropriate to ensure safety of students and preclude vandalism and damage of equipment.

c. Play Roofs may be designed on a roof terrace; preferably one that does not abut a high-rise building with operable windows due to concerns of objects falling from above; otherwise, overhead protection measures will need to be introduced.

1) If ball playing is allowed, total protection measures (a cage) will be required. The roof terrace shall be within proximity of classrooms in the school building to the greatest extent possible. Age-appropriate removable play equipment shall be provided for ease and flexible use of the space by all age groups. The design of the play roof should attempt, as with the on-grade play yard, to create areas dedicated to "active" and "passive" zones, with an emphasis on "active" play to the greatest extent practical, taking into consideration FDNY access, GSG requirements, circulation and mechanical equipment maintenance and clearances.

2) The extent of required protection measures also depends on the grades that will be using the roof terrace. Typically for ECC play areas (Pre-K and K), ball playing is not allowed; therefore a 10 ft. vertical barrier (fence) will suffice, but the need for overhead protection due to proximity of adjacent properties needs to be assessed. For grades 1 and over, the roof play yard allows for ball playing and therefore will require protections on all sides and overhead (full enclosure).

d. Materials: Provide raised pedestal pavers system for non-active roof terraces. A double slab construction with rubber safety surface is preferred when roof terrace is the only active play area. Pavers (where provided) shall be glare free.

e. Play Equipment: Shall be preferably movable and easily assembled for storage and flexibility of utilization of terrace by all age groups; fixed play equipment is generally discouraged due to the potential for water infiltration at the anchor points. Equipment

selected must avoid any exposed sharp edges, splintering or other potentially injurious conditions. The use of any play equipment or site furnishings not specifically identified in the Design Requirements or Standard Specifications shall require approval prior to inclusion in the project.

f. Custodial: A storage room for maintenance is required on the roof or on the same floor of the building, as well as a frost-proof wall hydrant.

g. Landscape: Roof gardening planter boxes, when provided on play roofs, are to be placed on the perimeter to ensure unobstructed and clear play space.

h. Padding: Padding is required on the perimeter surfaces of play roofs including protruding columns and piers, rough inner surfaces of surrounding parapet and adjacent building walls and any other projecting building elements for all early childhood and PS play terraces. For IS/HS roofs designated for PE, especially if run-off areas do not meet minimum clearances, interior gym padding standards to be followed.

i. Stainless Steel Cable Mesh Enclosure: Provide for rooftop playgrounds subject to ball playing (those with open areas). Provide stainless steel netting and cage, enclosed on all sides (12' clear height) to be engineered fully during the design phase of a school project. Provide overhead netting when early childhood play area abuts adjacent taller buildings with windows overlooking play area. The enclosure must be designed with children's safety in mind – no sharp edges, bolt ends, etc. should be exposed to the students.

j. Fencing: Fence must be provided at perimeter of roofs per NYC Building Code, FDNY roof accessing requirements and SCA fencing requirements.

k. Planted Roof Terrace: A variety of gardening systems may be applied, such as sedum/green roof or planting vegetable or flowerbeds typically within planter boxes. The planted roof is generally provided accessory to adjacent educational spaces, such as resource or science classrooms. Be mindful of potential public assembly egress requirements; typically, educational roof can be ancillary to the specialty rooms (science, art, library, etc.) of the school.

l. Greenhouse on Roof: Provide when included in the POR. Greenhouse to be directly accessible from main school corridor/circulation system and be connected to the existing school for structural support. Provide HVAC, water, electric, life and fire safety and egress provisions based on NYC Code. Any setbacks from the parapets should be determined based on the following:

1) Existing conditions (Roof Drains, etc.)
2) Access to and from roof bulkheads and equipment (RTUs, etc.)
3) Compliance with the NYC Code; NY City Zoning & FDNY roof access requirements.
4) Egress lighting to meet code thresholds, and GSG requirements if applicable.

m. Egress and Access: NYC Building Code ingress and egress requirements govern. PA requirements may also be triggered by design. FDNY roof access requirements must be met. Refer to DR 1.3.1.14.

Appendix A - Building Material/System/Component Longevity and Maintenance

CSI Division/System-Component			Expected Longevity of Building System/ Components	Expected maintenance/repairs	
CSI Division	Component	System Sub-component (if applicable)		Maintenance	Repair/Replace schedule by *DSF
	Sitework				
Div 2	**Sidewalk/Street Paving**				
		Concrete pavement/driveways	30+y	regular inspection	*DSF (20y repair)
		Brick pavers	30+y	regular inspection	*DSF (15y repair)
		Asphaltic concrete	20+y	regular inspection	*DSF (3y repair)
		Permeable pavers	20+y	regular inspection	*DSF (3y repair)
Div 2	**Resilient Surfaces (exterior)**				
		Running Track	20+y	regular inspection	*DSF (10y repair)
		Colored Wearing Surface	10+y	regular inspection	*DSF (10y repair)
Div 2	**Synthetic Turf**				
		Athletic Field (infill type)	10+y	regular grooming	*DSF (10y repair)
		Playground (non infill type)	10+y		
Div 2	**Chain-link fence**		25y	regular inspection	*DSF (15y repair)
Div 2	**Outdoor game Equipment**				
	Basketball		15y	regular inspection	*DSF (8y repair)
	Goals (Football/Soccer)		15y	regular inspection	*DSF (8y repair)
	Volleyball/Tennis		10y	regular inspection	*DSF (3y replacement)
	Baseball backstop		20y	regular inspection	*DSF (10y repair)
	ECC Play Eq.		10y	regular inspection	*DSF (5y repair)
Div 2	**Site/Street Furnishings**				
	Tree grates/guards		25y	regular inspection	-
	Benches		15+y	regular inspection	*DSF (10y repair)
	Bicycle racks		15y	regular inspection	*DSF (10y repair)
Div 2	**Landscaping**				
	Trees		40+y	regular inspection	*DSF (2y pruning)
	Shrubs		20+y	regular inspection	Pruning/weeding
	Sod/grass		40+y	regular inspection	Mowing/lawn care
Div 2	**Subdrainage System**				
		Walls/Foundations	50+y	regular inspection	*DSF (10y repair)
Div 2	**SSDS (Sub-slab Depressurization)**		100+ y	N/A	
		SSDS-Pumps	5-10y	monthly inspection	*DSF (5y replacement)
		SSDS Controls	10+y	monthly inspection	*DSF (3y repair)
Div 2	**Trench Drains**		40y	regular inspection	*DSF (10y repair)
Div 2	**Precast Tanks/Basins**		40y	regular inspection	*DSF (10y repair)
Div 2	**Irrigation system**		20+y	regular inspection	*DSF (2y hardware)
	Foundation System				
Div 3	Footings		100+y	N/A	N/A
Div 3	Mat Slab		100+y	N/A	N/A
Div 3	Foundation Walls				
		Exposed	75y	regular inspection	*DSF (15y Exp. Joints)
		Concealed	100y	N/A	N/A
Div 3	Retaining walls		50y	regular inspection	*DSF (5y Exp. Joints)
Div 3	Structural Slab				
		On Grade (interior)	75y	regular inspection	*DSF (15y repair)
		Above Crawl Space	60y	regular inspection	*DSF (15y repair)
Div 3	Slab on Grade				
		Exposed	60y	regular inspection	*DSF (5y joints)
		Interior	75y	regular inspection	*DSF (15y repair)
Div 3	Piles/Caps		100+y	N/A	N/A
Div 3	Grade Beams	Exposed	75+y	35y	35y
Div 3	Roof fill		40+y	new roof	N/A

CSI Division/System-Component			Expected Longevity of Building Systems/ Components	Expected maintenance/repairs	
CSI Division	Component	System Sub-component (if applicable)		Maintenance	Repair/Replace schedule by *DSF
Div 3	Ramps	Exterior	40y	regular inspection	*DSF (5y Exp. Joint repair)
		Interior	75y	regular inspection	N/A
Div 3	Stairs/Steps				
		Exterior (stl/conc)	30/40y	regular inspection	*DSF (5y)
		Interior	75y	regular inspection	*DSF (10y repair)
Div 3	Equipment Pads				
		Exposed	40y	regular inspection	*DSF (5y repair)
		Interior	75y	regular inspection	*DSF (5y repair)
Div 3	Precast Wall Panels (insulated)				
		Exterior	35y	regular inspection	*DSF (10y sealant)
	Structural Systems				
Div 5	Steel/Girders/Beams/Joists		75+ y	N/A	
Div 3	Concrete (poured/precast)		75+y	N/A	
Div 4	**Exterior Masonry**				
	Brick		50-75+y	regular inspection	*DSF (20y pointing)
	Cut Stone		50-75y	regular inspection	*DSF (20y pointing)
	Glass Block		40y	regular inspection	*DSF (10y pointing)
	Parapets		20+y	regular inspection	*DSF (10y pointing)
	Coping		20+y	regular inspection	*DSF (10y sealant)
Div 7	**Rainscreen**				
	UHPC		25+ y	regular inspection	*DSF (10y sealant)
	Terracotta		25+ y	regular inspection	*DSF (10y sealant)
Div 7	**Roof**				
	Metal		50-75y	regular inspection	*DSF (10y sealant)
	BUR/SBS		25y	regular inspection	*DSF (10y)
	Slate		50-100y	regular inspection	*DSF (20y)
	Clay Tile		50y	regular inspection	*DSF (20y)
	Protected Membrane (Planted)		20-30y	regular inspection	*DSF (5y)
	Sheet Membrane Waterproofing		15-25y	regular inspection	*DSF (10y)
	Fluid Applied WP		15-25y	regular inspection	*DSF (10y)
	Injection Grout WP		25+ y	N/A	
Div 8	**Windows**				
	Aluminum/High Performance		40y	regular inspection	*DSF (10y hrdwre, sealant)
	Steel		50y	regular inspection	*DSF (10y hrdwre, sealant)
	Wood		50y	regular inspection	*DSF (10y hrdwre, sealant)
	Skylights		20+y	regular inspection	*DSF (10y hrdwre, sealant)
	Guards		20+y	regular inspection	*DSF (10y hrdwre, sealant)
Div 8	**Exterior Doors**				
	Aluminum Curtain Wall		30y	regular inspection	*DSF (10y hrdwre, sealant)
	Aluminum Storefront		30y	regular inspection	*DSF (10y hrdwre, sealant)
	Steel		30y	regular inspection	*DSF (10y hrdwre, paint)
	Wood		30y	regular inspection	*DSF (10y hrdwre, paint)
Div 8	**Interior Doors**				
	Wood		30y	regular inspection	*DSF (10y hrdwre)
	Metal		20y	regular inspection	*DSF (10y hrdwre)
	Grilles/Coiling/Shutters		25y	regular inspection	*DSF (10y hrdwre)
Div 8	**Curtain Wall**				
	Aluminum Curtain Wall		30y	regular inspection	*DSF (10y hrdwre, sealant)
	Aluminum Storefront		30y	regular inspection	*DSF (10y hrdwre, sealant)

CSI Division/System-Component			Expected Longevity of Building Systems/ Components	Expected maintenance/repairs	
CSI Division	Component	System Sub-component (if applicable)		Maintenance	Repair/Replace schedule by *DSF
	Interior Finishes				
Div 9	Flooring				
	Terrazzo		50+y	regular inspection	*DSF (10y refinish)
	VCT		20y	regular inspection	*DSF (5y repair)
	Ceramic Tile		20y	regular inspection	*DSF (10y repair)
	Wood/Resilient		25y	regular inspection	*DSF (5y refinish)
	Rubber/Sheet Vinyl		20y	regular inspection	*DSF (5y refinish)
	Carpet		20y	regular inspection	*DSF (5y repair)
Div 9	Walls				
	Sheet Rock		30y	regular inspection	*DSF (10y repair)
	Ceramic Tile		20y	regular inspection	*DSF (10y repair)
	Masonry/Stone		50+ y	regular inspection	*DSF (10y point)
	Toilet Partitions		25y	regular inspection	*DSF (10y hrdwre)
	Paint		20y	regular inspection	*DSF (10y repair)
	Folding Partition (Gym)		20y	regular inspection	*DSF (10y hrdwre)
Div 9	Ceiling				
	ACT		20y	regular inspection	*DSF (10y repair)
	Metal		25y	regular inspection	*DSF (10y repair)
	Sheet Rock		30y	regular inspection	*DSF (10y repair)
	Wood/Slats		30y	regular inspection	*DSF (10y repair)
Div 10/11	Equipment				
	Kitchen/Walk-in Freezer		30+ y	regular inspection	*DSF (5y repair)
	Cabinetry/Casework		30+ y	regular inspection	*DSF (10y hrdwre)
	Metal Shelving		30+ y	regular inspection	*DSF (10y hrdwre)
Div 10	Exterior Signage		40y	regular inspection	*DSF (10y hrdwre)
Div 12	Furnishings				
	Telescoping Seats		20y	regular inspection	*DSF (5y hrdwre)
	Fixed Aud. Seating		30+y	regular inspection	*DSF (10y hrdwre)
	Bleachers		20y	regular inspection	*DSF (5y hrdwre)
Div 14	Elevator				
	Geared Traction		25y	1-5y (inspection)	*DSF (5y repair)
	Gearless Traction		30y	1-5y (inspection)	*DSF (5y repair)
	In-Ground Hydraulic		20y	1-5y (inspection)	*DSF (5y repair)
	Holeless Hydraulic		20y	1-5y (inspection)	*DSF (5y repair)
	Sidewalk		20y	1-5y (inspection)	*DSF (5y repair)
	Wheelchair Lift		25y	1-2y (inspection)	*DSF (5y repair)
	Inclined Lift		25y	1-2y (inspection)	*DSF (5y repair)
	Escalator		40y	2-4y (inspection)	*DSF (5y repair)
Div 15P	Fire Protection				
	Sprinkler (entire)		25-40y	regular inspection	*DSF (5y hrdwre)
	Standpipe (entire)		25-40y	regular inspection	*DSF (5y hrdwre)
Div 15	Plumbing				
	CW/HW/HWR Distribution		30y	regular inspection	*DSF (10y repair)
	Toilet Fixtures (sink/wc)		30y	regular inspection	*DSF (10y repair)
	Drinking Fountain		20y	regular inspection	*DSF (5y repair)
	Domestic Hot Water				
		Electric	10y	regular inspection	*DSF (5y repair)
		Condensing (Gas)	10y	regular inspection	*DSF (5y repair)
		Heat Pump	10y	regular inspection	*DSF (5y repair)

CSI Division/System-Component			Expected Longevity of Building Systems/ Components	Expected maintenance/repairs	
CSI Division	Component	System Sub-component (if applicable)		Maintenance	Repair/Replace schedule by *DSF
	Storm Drainage		30y	regular inspection	*DSF (5y repair)
	Sanitary Drainage		30y	regular inspection	*DSF (5y repair)
	Gas Distribution		30y	regular inspection	*DSF (5y repair)
	Pumps (various)		10-20y	regular inspection	*DSF (5y replacement)
Div 15	HVAC				
	RTU (Custom DX w/gas heat)		20 y	annual maintenance	*DSF (10y repair)
	Chiller/Heat Pumps		25y	semi-annual maintenance	*DSF (10y repair)
	Fan Coils		20y	annual maintenance	*DSF (10y repair)
	Duct Distribution		30y	regular inspection	*DSF (10y repair)
	Pipe Distribution		30y	regular inspection	*DSF (10y repair)
	Baseboard				
		Electric	10/15y	regular inspection	*DSF (10y repair)
		Hot water	10/15y	regular inspection	*DSF (10y repair)
	Dampers		20y	regular inspection	*DSF (10y repair)
	Pumps (various)		15y	semi-annual maintenance	*DSF (5y repair)
	Valves (various)		20y		
	Fans (various)		20y	semi-annual maintenance	*DSF (5y repair)
	Boilers			semi-annual maintenance	*DSF (10y repair)
		Fire Tube (steam)	25y		
		Fire Tube (hot water)	25y		
		Cast Iron	35y		
		Condensing	15y		
		Electric	15y		
	Split A/C		15y	annual maintenance	*DSF (5y repair)
	Modular Chillers		20-30y	annual maintenance	*DSF (5y repair)
	Package H/C Units		15y	annual maintenance	*DSF (5y repair)
	Split Heat Pump/VRF		15y	annual maintenance	*DSF (5y repair)
	Custom RTU (VAV system)		20y	annual maintenance	*DSF (5y repair)
	Custom RTU (Constant Volume)		20y	annual maintenance	*DSF (5y repair)
	Commercial RTU		15y	annual maintenance	*DSF (5y repair)
	Custom Heat Pump		20y	annual maintenance	*DSF (5y repair)
	Unit Vent/Split-Vertical Unit		15y	annual maintenance	*DSF (5y repair)
	DOAS (custom heat pump)		20y	annual maintenance	*DSF (5y repair)
	MZVAV (custom heat pump)		20y	annual maintenance	*DSF (5y repair)
	SZVAV (custom heat pump)		20y	annual maintenance	*DSF (5y repair)
	DOAS (commercial heat pump)		20y	annual maintenance	*DSF (5y repair)
	MZVAV (commercial heat pump)		15y	annual maintenance	*DSF (5y repair)
	SZVAV (commercial heat pump)		15y	annual maintenance	*DSF (5y repair)
	Temperature Controls		15y	Annual maintenance	*DSF (5y repair)
	Geothermal Systems				
		Ground Loop (closed)	50y	regular inspection	
		Heat Pumps	15-20y	regular inspection	*DSF (5y repair)

CSI Division/System-Component			Expected Longevity of Building Systems/ Components	Expected maintenance/repairs	
CSI Division	Component	System Sub-component (if applicable)		Maintenance	Repair/Replace schedule by *DSF
Div 16	Electrical				
	Lighting				
		Interior	25y	regular inspection	*DSF (if needed repair)
		Exterior	25y	regular inspection	*DSF (if needed repair)
	Fire Alarm		15-25y	regular inspection	*DSF (3y repair)
	PA/Clock		30-40y	regular inspection	*DSF (3y repair)
	Main Service/Distribution		50/30y	regular inspection	*DSF (10y repair)
	Wiring		50y	regular inspection	*DSF (10y repair)
	Aux Signal Systems		20+ y	8y (adjust)	*DSF (5y repair)
	Emergency Generator		20-30y	regular inspection	*DSF (3y repair)
	ATS (transfer switch)		25y	regular inspection	*DSF (3y repair)
	UPS		10y	regular inspection	*DSF (3y batt)
	Detectors (smoke/heat/carbon)		10y	regular inspection	*DSF (5y replacement)
	PV		25y	regular inspection	*DSF (5y repair)
	Surge Protection		15-20y	regular inspection	*DSF (3y replacement)
	Lightning Protection		40y	regular inspection	*DSF (10y repair)
	Security/Telephone		10y	regular inspection	*DSF (5y repair)
	Digital Surveillance Cameras		10y	regular inspection	*DIIT (as needed repair)
	Heat Trace		20y	regular inspection	*DSF (5y repair)
	Motors (various)		20-30y	regular inspection	*DSF (5y repair)
	Valves (various)		20y	regular inspection	*DSF (5y replacement)
	*DSF/Custodial;				
	Regular inspections (daily/monthly/annual/semi-annual). Repairs/Replacements governed under Directive 10				
	SOURCES:				
	BOMA (Bldg Owners/Management)				
	ASHREA				
	CLF (Carbon Leadership Forum)				
	eToolglobal				
	InterNACHI (Home Inspectors)				
	TSS Unit				
	DSF (Division of School Facilities)				
	DIIT (Division of Instructional and Information Technology)				

1.3 Planning

1.3.1 Design

1.3.1.3 Square Footage Calculation - Building Efficiency

Description/Design Approach:

A. Gross Building Area

Gross Building Area is calculated to the outside face of all exterior walls.

1. The Gross Building Area includes the following:
    a. All floors including basements and cellars. Calculation to include area of structure, walls etc.
    b. Enclosed mechanical penthouses, and other interior mechanical spaces.
    c. All shafts, stairs, and elevator enclosures on each floor (including penthouses and bulkheads).
2. The Gross Building Area excludes the following:
    a. Crawl spaces.
    b. Upper portions of double height spaces.
    c. Covered exterior spaces.
    d. Terraces and unenclosed roof top surfaces.
    e. Area under overhangs of the building.
3. For a multi-school complex, the area of shared spaces will be prorated among the individual schools.
4. For Building Additions, the area altered in the existing building shall not be included in the Gross Building Area of the new building addition.
5. Lease Spaces:
    a. For Leased Space Projects, where the lease space is a part of an existing occupied building, the leased space area shall be the square foot area of the occupied space. The occupied area is calculated from outside finish of the exterior building wall to the finished surface of the corridor side of the corridor partition and from the center of the partitions that separate the premises from adjacent adjoining rentable areas.

b. For Lease Spaced Projects, where the lease space occupies the entire building, follow the basic Gross Building Area calculations.

6. Non-DoE Spaces:

a. For projects that include non-DoE areas, such as Police Athletic League (PAL) and Agency for Child Development (ACD) spaces, include non-DoE areas in the Gross Building Area, and provide separate sub-totals for DoE and non- DoE spaces.

B. Programmed and Net Areas:

Actual or designed net area is the useable area of the spaces included in the Program of Requirements. Net area is calculated from the inside face of all exterior walls to the inside face of interior walls or partitions.

1. Programmed areas are those areas listed in the Program of Requirements. They include the following:

a. All room types and room layouts included in the Program of Requirements.

b. All toilets within offices, and classrooms.

c. Built in furniture and equipment.

2. The Programmed area is a design requirement. The designed area for each space must not deviate by more than +/- 5% or a maximum of 150 square feet, whichever is less. **However, design area for a new classroom must be a minimum of 500 SF**. Areas in excess of 5% of the program area should not be counted towards the total net area of the building when calculating the building efficiency.

C. Core Area:

The Core Area includes building support service rooms and spaces, and all horizontal and vertical circulation. The Core Area is defined as those spaces other than the spaces required in the Program of Requirements.

1. The Core Area includes:

a. All interior and exterior walls of the building.

b. Corridors and vestibules.

c. Boys and Girls toilets, staff toilets and public toilets accessed from the corridor.

d. All shafts, stairs, and elevator enclosures on each floor (including stair bulkheads.)

e. All building service rooms including mechanical equipment rooms and closets, electrical switchgear rooms, electrical distribution rooms and closets, data communication rooms and closets not in the POR, fire protection pump rooms, water meter rooms.

2. To calculate the core area, subtract the programmed area from the overall Gross Building Area.

D. Building Efficiency:

1. Every Program of Requirements (POR) for a new building or building addition includes**:** Total Programmed Area, which is the total of the listed programmed areas; the Total Gross Area, which is calculated based on a required efficiency (e.g. 64:36); and the Total Core Area, which is the resulting difference between the Gross Area and the Programmed Area.
The specified efficiency enables the SCA to target a gross area for the project.

   In order to ensure that the design for new construction meets the area requirements**,** each design submission starting with the Pre-schematic Phase (each scheme) up to and including 100% documents will include the following:

   - A tabulation of all programmed spaces indicating: the Program Net Area, the As-Designed Net Area and the percent deviation (+/-). (For each space and for the total of all spaces).

   - Calculation of building efficiency percentages:
     As-Designed Net Area/As- Designed Gross Area.

   - As-Designed Gross Area must not exceed Program Gross Area by more than **0.5%** of the Program Gross Area. **e.g. for a building with 100,000 SF gross area, the design gross cannot exceed 100,500 SF.**

   - **S**paces not listed in the program must not be credited towards As-Designed Net Area.

   - Any deviation from the required program areas and Total Gross Area must include an explanation and must be resolved with the SCA before proceeding to the next phase of design.

1.3 Planning

1.3.1 Design

1.3.1.4 Signage

Description/Design Approach:

Building Signage, exterior and interior, identifies the building as a NYC Public school. It identifies the organizations located within and each room/or space on each floor. The signage will follow a clear organization so that it facilitates way-finding. In "Campus" buildings, special colors and logos as part of the signage will identify the unique organizations that are housed in the building.

A. General Guidelines for Signage

1. The A/E of Record shall provide a signage system for new schools, leases, conversions and building additions.

2. The signage system must take into consideration how the users, staff and visitors navigate the exterior and interior of the building to arrive at their destination. The signage system should be simple, easy to understand, and should have the ability be easily implemented and changed. The font type, size, mounting heights, distances from door frames, placement on door frames and their intended visibility shall be consistently applied throughout the building for each sign type. The signage system shall meet all relevant regulatory requirements including building code, ICC A117.1-2009, 2010 ADA and the New York City Fire Department (FDNY).

3. For signage in an existing building, the A/E of Record shall develop a signage system consistent with and/or compatible with that of the existing building for SCA review and approval.

4. The proposed Interior and Exterior signage system, including room signage designation schedule and numbering of rooms, shall be finalized for the Authority's approval in the 60% submission. The Signage Designation Schedule shall be included in the 60% submission and submissions thereafter.

   The SCA Design Manager shall obtain the concurrence of the Regional Facilities Planner or the designated representative from the district for the room numbering signage system.

5. For capital improvement work involving new and altered spaces in existing buildings or accessibility projects, symbols and directional signage shall be provided as required herein. Such signage shall be included in the 50% submission and submissions thereafter.

6. Signage system shall include:

   a. Building/Campus signage and signage for individual schools located in the building.
   b. Regulatory signage
   c. Room signage
   d. Miscellaneous Signage

B. Specific Guidelines

1. Building/Campus signage and signage for individual schools located in the building. Typically includes, but is not limited to, the following:
   a. Main Entrance –School name or
      Main Entrance –Campus name (if building has more than one school organization) and
      - Individual school entrance(s) – School name(s) for each organization/school within the campus
   b. Secondary entrance(s)
   c. City of New York Seal
   d. School Dedication Plaque.
   e. Other Agency Plaques (If joint agency project)
   f. NYC Green Schools Certification Plaque
2. Regulatory signage
   a. Stairway Identification and Floor Level signs
   b. Elevator Floor Designation sign & Elevator Car Identification sign
   c. Elevator Emergency sign & Elevator Bank Identification sign
   d. Place of Assembly signage
      - Place of Assembly Posted Capacity sign
      - Certificate of Operation sign
   e. Symbols and Directional signage
      - Symbols of Accessibility
      - Directional signage to accessible building elements
      - Symbol of Access for Hearing Loss
      - Symbol for Area with Induction Loop
      - All Gender Toilet signage
   f. Fire Rescue Area/Area of Rescue Assistance/Holding Area sign
   g. Certificate of Occupancy sign
   h. Special Accessibility signs
   i. Door signs for exit stairs
   j. Live Load signs
   k. Elevator “Star of Life” sign
   l. Elevator signage
      - Equipment, NYC Identification Number and Demarcation signs (by elevator contractor)
      - Elevator Pit sign
      - Elevator Equipment Room sign
      - Elevator Top of Car Enclosure Headroom sign
      - MRL Elevator Hoistway sign
   m. Standpipe signage
      - Door sign
      - Stairway sign
   n. Exit signs
      - Raised character and braille Exit sign
      - Emergency Exit sign
      - NO EXIT sign
   o. Caution/Safety signage
      - Laboratory sign
      - Laboratory Gas Shutoff sign
      - Electrical Room/Closet sign
      - Louver sign
      - Gas Meter Room sign

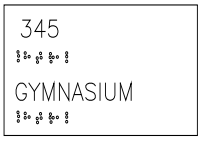
- Gas Shutoff Valve sign

p. Miscellaneous signage
- Instruction sign (for Fire Rescue Area/Area of Rescue Assistance/Holding Area)
- Stair Door Warning sign (for PA Space/Fire Rescue Area/Area of Rescue Assistance)

3. Room Signage
Includes:
a. Room Number and Room Name/Number signs that include both Tactile and Braille and are affixed to the wall surface adjacent to the door.



Room Number



Room Number

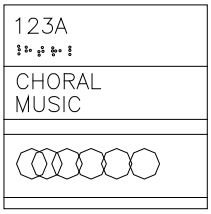
Room Name and Number

b. Room number/name/school identification sign
A sign that has the room number in both raised characters and braille; includes printed inserts for room name and school identification - used to identify spaces and schools where multiple schools are located in one building or building complex. Similar to the sign above, this sign will be affixed on the wall surface adjacent to the door. The raised character and braille room number designation on this sign shall match the room number affixed to the doorframe. The font type, size and space of the printed inserts plus their placement on the sign shall be consistent throughout the building.

Room Number

Room Name

School identification



Room Number - a permanently assigned number, unique to each room or space. Room numbering shall be sequential throughout the building including when there are multiple schools within the building.
Room name - Identifies the use of rooms within the school
School identification-Identifies each individual school within the multiple school building/campus.

C. Room Numbering Guidelines

1. For new buildings number all rooms in a pattern to facilitate the systematic and coordinated identification of rooms for building users and building system and maintenance operations.

2. For building additions, the room numbering system shall take into consideration and coordinate with the existing numbering system in the existing building.

3. Finalize numbering all rooms in the 60% submission of the construction documents. To the extent possible, avoid using "Space Numbers" or "Construction Numbers" in the construction documents. Should such designations be unavoidable, devise measures to ensure that the change of such transitional designations would not affect the contract sum or the contract duration of the project.

4. Indicate Room Numbers on floor plans and finish schedule on the construction documents.

5. Numbering System

   a. As viewed from the main entrance to the building or complex, number rooms beginning at the left front corner of the floor and proceed clockwise. Number rooms on one side of corridor with odd numbers and with even numbers on the opposite side.

   b. If possible, rooms which are vertically aligned on various floors shall receive numerical designations which are identical in the last two digits. The key to numbering rooms by floors is generally to start the room numbering with the floor with the greatest number of rooms. Designate the room numbers that are vertically aligned with the identical last two digits. On other floors the room numbers may be skipped in order to maintain vertical alignment of the numbers. Maintain the odd and even room numbers on opposite sides of the corridors.

   c. Assign numbers to all rooms off lobbies, corridors and passageways. Do not number pipe and duct spaces, shafts or riser enclosures.

   d. Multiple Door Entrances to Rooms: Rooms or offices with two or more doors leading into a single function room shall be numbered alike. The door nearest to the teacher's desk into the room is the "Primary room entrance door". The other doors are the "secondary room entrance doors".
      - Rooms with Folding Partition: Rooms with folding partitions and two main entrance doors so that each side can be used as a separate room, shall have the same room number with an alphabetic suffix, e.g., 206A and 206B.

   e. Suites: Rooms within a "Suite" and smaller rooms and closets within major rooms, shall maintain the Suite's (or major room's) number but with an alphabetic suffix. e.g., 101A, 101B.

   f. Starting with the first floor, number rooms with three-digit numbers. The first digit shall correspond to the floor. E.g., 101, 201

      - In buildings with multiple schools within the same building or complex, the room numbering shall be sequential throughout the building including the spaces shared by the individual schools and common areas so that no two room numbers on a floor are the same. Individual schools within the building will not be identified by the numbering. If the school complex is very large and has more than 99 spaces on a floor, the numbers will be four digits instead of the three digits.

   g. Rooms in basement or cellar shall have the alphabetical prefix "B" or "C" followed by a two-digit numerical designation. The starting number shall be B01 or C01.

   h. Should the design include mezzanines or other floor levels not described above, appropriate prefixes shall be used for the designation of rooms on those levels.

   i. For those addition projects where the room numbering follows the sequence of the existing building, but location of the addition is such that it is difficult to maintain the general direction of room numbers, a sign shall be posted at the lobby and/or at location where the new addition connects to the existing building but the room numbers do not follow the adjacencies of the numbering sequence. e.g., a sign with arrow pointing left indicating rooms 101-145 and a sign with arrow pointing right indicating rooms 146-187.

D. Detailed Description

The following are the detailed descriptions and requirements for various types of signage. The designer is to include all locations, conditions and the signage details in their signage drawings.

1. Building/Campus Signage and signage for individual schools located in the building

   a. Main Entrance –Campus name/School name
   The main entrance campus/school name shall be raised cast bronze individual letters with polished faces and matte sides. The letter style shall be Helvetica Medium, minimum $8^{1}/_{16}$" and maximum $10^{1}/_{16}$" tall.

      1) If there are multiple schools within the building, provide a weather-resistant vented frame enclosure for placement of a computer printout of the org ID for each individual school housed in the building. The frame is to be placed in proximity to the entrance of each organization.
      2) Additions are to get the school name signage, if the main entrance is moved to the addition.
      3) Annexes are to get the school name signage.

   b. Secondary Entrance(s)

      The secondary entrance(s) name(s) shall be a raised character and braille etched zinc sign affixed to the wall surface adjacent to the door. The letter style shall be Helvetica, minimum 1" tall.

   c. City of New York Seal

      1) The City of New York Seal shall be cast aluminum, minimum of 24" in diameter.

      2) The main entrance school name and City of New York Seal shall be prominently displayed at the main entrance, located either above the entrance doors, or on either side of the main entrance permanently affixed to the exterior façade of the building. Size and layout are to be approved by the DOE/SCA.

      3) A suspended sign or seal on wires, chains or an outrigger strut supports shall not be approved.

   d. Dedication Plaque

      1) A dedication plaque shall be provided for stand-alone new buildings and annexes.

      2) The School's Dedication Plaque shall be cast bronze with raised cast bronze letters and borders with polished faces and sides. The background shall be cast bronze with dark bronze color. The letter style shall be Helvetica Medium. The School's Dedication Plaque shall be prominently displayed at the main entrance hall, lobby or vestibule. Its location should be coordinated with the Regional Facilities Planner or the designated representative from the district. The School's Dedication Plaque shall be a permanent installation.

e. Other Agency Plaques

Other agency plaques shall be raised cast bronze letters with polished faces and matte sides. The background shall be cast bronze with dark bronze color. The letter style shall be Times New Roman, approximate 3/4" tall. The plaque shall be displayed and permanently affixed to the exterior façade of the building. Its location shall be coordinated with the Regional Facilities Planner or the designated representative from the district.

f. NYC Green Schools Certification Plaque

A NYC Green Schools Certification Plaque shall be provided for new buildings and additions that meet the NYC Green Schools certification requirements. The Green Schools Certification Plaque shall be cast bronze with raised cast bronze letters and borders with polished faces and sides. The background shall be cast bronze with dark bronze color. The letter style shall be Helvetica Medium. For projects that include a school dedication plaque, the Green School's Certification Plaque shall be installed directly under the school's dedication plaque. For addition projects that do not include a School Dedication Plaque, the Green School's Certification Plaque shall be mounted such that the top of the certification plaque is 5'-0" above finished floor. The Green School Certification Plaque shall be a permanent installation.

2. Regulatory Signage

a. Stairway Identification and Floor Level signs

1) A stair identification sign per Section BC 1023.9.1 of the 2022 NYC Building Code, indicating each stair by alphabetic letter, shall be provided on both sides of each stair door.

Top of sign is to be mounted on both sides (front & back) of each stair door, 5 feet above the finished floor. Refer to Items 2, 5 and 6 of Section BC 1023.9.4 for all requirements. Such sign shall be luminous in high-rise buildings.

2) In buildings with an interior exit stairway and ramp connecting more than three stories, a stair floor identification sign per Sections BC 1023.9.2 and BC 1023.9.4 of the 2022 NYC Building Code shall be provided at each floor landing designating:
   a) Floor level number
   b) Terminus of the top and bottom of the interior exit stairway
   c) Identification of the interior exit stairway by a letter
   d) Story of and direction to the exit discharge and availability of roof access for the Fire Department

Top of sign is to be located 5 feet above the floor landing and visible when the doors are open or closed. Refer to Section BC 1023.9.4 for all requirements. Such sign shall be luminous in high-rise buildings.

3) As per BC 1023.9.3, stair accessible floor level identification signs in visual characters, raised characters and braille and complying with ICC A117.1 shall be located at each floor level landing adjacent to the door on the stair side. Top of sign to be 60" above finished floor.

b. Elevator Floor Designation sign and Elevator Car Identification sign

1) The elevator floor designation sign shall be a raised character and braille sign secured to both jambs of each elevator doorframe as per Section 407.2.3.1 of ICC A117.1. All elevator floors stops shall have elevator floor designation plates. The plate shall be typically centered horizontally on the elevator frame jamb.

2) The elevator car identification sign shall be a raised character and braille sign secured near jamb of each elevator doorframe per Section 2.29.1 of Chapter K1 of Appendix K of the 2022 NYC Building Code.

c. Elevator Emergency sign and Elevator Bank Identification sign

1) The elevator emergency sign shall be posted and maintained on every floor at the elevator landing as per Section BC 3002.3. The sign shall be an etched zinc sign plate secured to the wall at each elevator landing. On all floors other than the main entrance floor, the sign shall read “IN FIRE EMERGENCY, DO NOT USE ELEVATOR, USE THE EXIT STAIRS”. The lettering shall be properly spaced to provide good legibility. The sign shall contain a diagram showing the location where it is posted and the location and alphabetic letter identification of the stairs and the elevator banks on the floor and meet the requirements of Section BC 3002.3. The sign shall be located adjacent to an elevator call button and the top of sign not be more that 6’-0” above the floor level.

2) Elevator Bank Identification sign

The elevator bank identification sign shall be posted and maintained on every floor at the elevator landing and shall be identified by an alphabetic letter as per Section BC 3002.3.1 and included as part of the elevator emergency sign, with letters 3” high in bold type and contracting color from the background.

d. Place of Assembly signage

1) Place of Assembly Posted Capacity sign
The place of assembly posted capacity sign required per section BC 1029.1.3 shall be posted and maintained in a conspicuously prominent location visible from the main entrance doors of the place of assembly space. The sign shall be an etched sign plate secured to the wall. The sign shall read “OCCUPANCY BY MORE THAN XXX PERSONS IS DANGEROUS AND UNLAWFUL” or “OCCUPANCY BY MORE THAN XXX PERSONS AS XXXXX IS DANGEROUS AND UNLAWFUL”. For multiple purposes involving different occupant loads, the sign shall read “OCCUPANCY BY MORE THAN XXX PERSONS AS XXXXX OR YYY PERSONS AS YYYYY OR ZZZ PERSONS AS ZZZZZ IS DANGEROUS AND UNLAWFUL”. Where the place of assembly is occupied for multiple purposes involving different occupant loads, signage must list all occupancies and posted capacities as required by Section BC 1029.1.3.1. The lettering shall be properly spaced to provide good legibility. The top of the sign shall not be more than 72" vertically above finish floor. Signs shall be lighted by artificial illumination of at least 5-foot candles at all times during occupancy in compliance with Section BC 1029.1.4.

2) Certificate of Operation sign
A framed copy of the certificate of operation sign shall be located in the public assembly space. The frame shall be sized to suit the NYC Building Department certificate document.

e. Symbols and Directional signage

Signage for the physically challenged, raised character and braille signage and symbol standards that provides emergency information or general circulation directions or identifies rooms and spaces requirements shall comply with the Sections BC 1101.3 and BC 1111.1 and ICC A117.1.

1) Symbols of Accessibility
The dynamic accessibility symbol shall be used where appropriate. Typical dynamic accessibility symbol locations shall apply to signage at building entrances, entrance ramps, all toilets and locker room signs, on all accessible toilet stalls, fire rescue area or area of rescue assistance signs and places of assembly signs.
- For buildings with both accessible and inaccessible entrances/exits, the dynamic accessibility symbol shall be posted at accessible entrances and exits. For landmark and SHPO eligible projects that are accessible, place such accessibility sign on door, for the sign is to be as unobtrusive as reasonable to maintain the historic nature of the building.

2) Directional Signage to Accessible Building Elements per Section BC 1111.2
   a) Directional signage to an accessible entrance shall be posted at all inaccessible entrances and exits.
   b) Directional signage to an accessible bathroom/toilet shall be posted at bathrooms/toilets in the building that are not accessible.
   c) Directional signage to an elevator serving an accessible route shall be posted at elevators that serve an inaccessible route.
   d) All directional signage shall include dynamic accessibility symbol.

f. Fire Rescue Area/Area of Rescue Assistance/Holding Area sign

These identifying devices shall be used when Fire Rescue Areas/Areas of Rescue Assistance/Holding Area are part of the project scope. Each Fire Rescue Area/Area of Rescue Assistance/Holding Area door shall have a sign reading one of the following as applicable:

1) “Fire Rescue Area” or “Area of Rescue Assistance” or “Holding Area”, with the accessibility logo complying with ICC A117.1. The sign shall be metal or other non-combustible material with red lettering in bold type and red border on white background. Sign shall be externally illuminated with an intensity of not less than 25 foot candles and shall be mounted on the corridor side, top of sign 1’-3” above finish floor on the center of each door.

2) A wall-mounted etched zinc sign with 5/8” high raised character and braille that includes the room number, room name and the designation “Fire Rescue Area” or “Area of Rescue Assistance” or “Holding Area”, as applicable, shall be provided on the latch side of the door.

3) In each Fire Rescue Area/Area of Rescue Assistance/Holding Area, a sign that gives instruction on the use of the area under emergency conditions shall be provided per Section BC 1009.11, which includes instructions on the use of the area's two-way communication system that shall be posted adjacent to the communicating system in accordance with Section BC 1009.8.2. The signage shall comply with ICC A117.1 requirements for visual characters. Refer to Design Requirement 1.3.3.1, paragraph C.2.

g. Certificate of Occupancy sign

A framed copy of the certificate of occupancy sign shall be located in the main entrance hall or lobby leading to the elevator. The frame shall be sized to suit the NYC Building Department certificate document.

h. Special Accessibility signs

For areas where audible communications are integral to use space, provide a sign notifying patrons of the availability of assistive listening systems.

1) Symbol of access for hearing loss
Assistive listening systems required by Section BC 1108.2.7 in accordance with ICC A117.1 (706) shall be identified by the "assistive listening system sign". Provide the "international symbol of access for hearing loss sign" as per paragraph 703.6.3.3 of ICC A117.1, top of sign to be mounted 60" above finished floor adjacent to door(s) leading to the space(s) that provide the assistive listening system other than induction loop system.

2) Sign for area with audio induction loop system
Provide audio induction loop sign adjacent to the door(s) leading to the space(s) that includes an audio induction loop system. At the security, information or reception area where induction loop is provided in any assembly space, international symbol of access for hearing loss with a "T" in the lower right-hand corner of such symbol shall be provided.

i. Door signs for exit stairs shall be provided as per the following:

1) For high-rise buildings:
A sign shall be posted on the stair side of the stair door at every floor. Such sign shall read "RE-ENTRY ON THIS FLOOR".
or
Where stair sides of doors are locked, such sign shall read "NO RE-ENTRY. RE-ENTRY IS PROVIDED DURING FIRE EMERGENCIES. NEAREST TELEPHONE ON THE … AND … FLOORS."

2) For all buildings where re-entry is not provided from a stair to every floor
   a) On the occupied side - provide a sign that reads, "NO RE-ENTRY FROM THIS STAIR". Such sign shall be posted on the stair door at every floor.
   b) On the stair side - a sign shall be posted on the stair door at every floor.
      - Where re-entry is provided, the sign shall read, "RE-ENTRY ON THIS FLOOR".

- Where re-entry is not provided on that floor, the sign shall read, “NO RE-ENTRY”
- Where re-entry is not provided on any floor, the sign shall read, “NO RE-ENTRY”
- Where re-entry is provided on other floors, the sign shall read, “NO RE-ENTRY, NEAREST RE-ENTRY ON THE ….AND….FLOORS.

j. Live Load signs

As per §28-118.21 of the 2022 NYC Administrative Code, where live loads for each floor or portion of building are or have been designed to exceed 50 lbs/SF live load, a sign indicating such design live loads shall be conspicuously posted at each story in which they apply.

k. Elevator “Star of Life” sign

Where elevators are provided in buildings five or more stories above, or four or more stories below grade plane, or underground buildings, elevators shall be sized to accommodate ambulance stretcher and shall be identified by the international symbol for emergency medical services (Star of Life). The symbol shall be 3” high and shall be placed on both jambs of the hoist way entrances on each floor per Section BC 3002.4.2.

l. Elevator signage

For buildings that include elevator(s), the following signage shall be provided per Chapter 30 and Appendix K of 2022 NYC Building Code:

1) Equipment Identification Number, NYC Identification Number and demarcation signs
   Equipment Identification number (except items (i) and (j)), NYC identification number and all required demarcation signage as per Section 2.29.1 of Chapter K1 will be provided by the elevator contractor.
2) Elevator pit sign
   Where a separate pit door is provided, a warning sign with letters 2” high shall be affixed on the pit door per Section 2.2.4.5(f) of Appendix K. Such sign shall read "DANGER ELEVATOR PIT".
3) Elevator Equipment Room sign
   Access doors to machine rooms and overhead machinery spaces shall include a door-mounted sign per Section 2.7.3.4.1(d) of Appendix K. Such sign shall read "ELEVATOR EQUIPMENT" with letters on the sign of not less than 2” high.
4) Elevator Top of Car Enclosure Headroom sign
   Where refuge space between the top of elevator car and top of shaft is less than 43”, a sign with red and white stripes with the letters “DANGER LOW CLEARANCE” shall be located in the area immediately outside the refuge space per Section 2.4.7.2 of ASME 17.1-2013.
5) MRL Elevator Hoistway sign
   While not a typical elevator for SCA buildings, access openings in MRL elevator hoistways enclosures where full bodily entry is not necessary for maintenance and inspection of components shall be labeled “DANGER: ELEVATOR HOISTWAY” as per Section 2.7.3.4.7(d).

m. Standpipe signage

For buildings that include a standpipe system, the following signage shall be provided:

1) Door sign
Doors to rooms that contain equipment of such nature that the use of water would be ineffective in fighting a fire therein, or would be otherwise hazardous, i.e. electrical rooms, elevator machine room, telecom room, telecom closets etc. shall have a sign "IN CASE OF FIRE, USE NO WATER".
2) Stairway sign
The stairs that do not include a hose connection shall have a sign on the door to the stairway stating, "NO STANDPIPE CONNECTIONS IN STAIRWAY".

n. Exit signs

1) Raised character exit sign
Per Section BC 1013.4, a raised character and braille sign stating “EXIT” and complying with ICC A117.1 shall be provided adjacent to each door to an egress stairway, an exit passageway, exit ramp, area of rescue assistance and the exit discharge.
2) Emergency exit sign
Per Section BC 1025.2.6.1, a luminous sign stating “EXIT”, the direction of exit and egress symbol shall be provided on each door to an egress stairway in a high-rise building.
3) “No Exit” sign
Per Section BC 1025.2.9**,** a sign stating “NO EXIT” shall be provided on doors along the egress path that lead to dead ends (mechanical spaces, etc.) in a high-rise building.

o. Caution/Safety signage

1) Laboratory sign
Per Title 3 RCNY 2706-01, a sign stating “LABORATORY CAUTION: HAZARDOUS MATERIALS” shall be provided on the corridor side of door to a high school science lab and prep room.
2) Laboratory Gas Shutoff sign
Per Section FGC 409.6 of the 2022 NYC Fuel Gas Code, a wall-mounted sign stating “GAS SHUTOFF” shall be provided adjacent to the gas shutoff valve in science rooms and prep rooms.
3) Electrical Room/Closet sign
Per Section BC 905.1, a sign stating “IN CASE OF FIRE, USE NO WATER” shall be provided on the corridor side of door to; Electric Closets, Electric Service room and Telecom room.
4) Louver sign
Per Section FGC 304.10.2, a sign stating “LOUVERS DAMPERS AND/OR VENTILATION OPENINGS MUST NOT BE BLOCKED OR DISABLED” shall be provided adjacent to the opening(s) within the room containing the equipment.
5) Gas Meter Room sign
Per appendix E.3 of the 2022 NYC Fuel Gas Code, a sign stating “GAS METER ROOM – NO STORAGE PERMITTED” shall be provided on the corridor/exterior side of the gas meter room door.

6) Gas Shutoff Valve sign
A sign stating ""IMPORTANT" GAS SAFETY SHUTOFF VALVES LOCATED INSIDE GAS METER ROOM MUST BE MANUALLY RESET UPON ACTIVATION OF THE GAS LEAK DETECTION SYSTEM OR LOSS OF NORMAL ELECTRICAL POWER" must be provided for each boiler burner/roof top unit control panel door.

p. Miscellaneous signage

1) Instruction sign for Fire Rescue Area/Area of Rescue Assistance/ Holding Area:
Sign shall give instructions on the use of the area under emergency conditions per Section BC1009.11, which includes instruction on the use of the area's two-way communication system.
2) Stair door warning sign for PA Space/Fire Rescue Area/Area of Rescue Assistance:
In schools that require lock down drills per NYS Education Law 807, stairway egress doors from occupied sides are permitted to be locked to prevent intruders getting access from the stair side during lockdown drills per exception 5 of Section BC 1010.1.9.11. Warning signs shall be provided on both sides of egress stair doors to unlock these egress doors upon completion of lock down drills and keeping these doors unlocked per Section BC 1010.1.9.11.

3. Room Signage

All rooms, including classrooms, offices, suites, storage rooms, building services rooms, kitchen and servery rooms etc., shall be identified with a room number.

a. Storage Rooms, Storerooms, Audio/Visual Storage Rooms: Will have room numbers but no room names and shall be provided with raised character and braille etched plate room number signs. The reason for not naming these rooms is so as to not identify the contents of these rooms and invite break-ins.

b. Public assembly spaces including the auditorium, gymnasium, gymatorium, cafeteria located along the major public corridor shall be identified by an etched plate sign with a room name and number in both raised character and braille.

c. Classrooms

1) Primary Room Entrance Door: The door which serves as the primary room entrance along major public corridors shall be furnished with an aluminum and etched zinc room number/name/school identification sign.

2) The Secondary Room Entrance Doors shall be furnished with a raised character and braille etched plate room number sign.

d. Folding Partition Rooms: Rooms along major public corridors with folding partitions and having two main entrance doors that will enable the room to be divided into the two separate rooms. Each door shall have wall-mounted aluminum and etched zinc room number/name/school identification signs.

e. Suites: The door to the suite and support rooms/offices within the suite shall have an aluminum and etched zinc room number/name/school identification sign.

f. Building Services Rooms: Building service rooms, such as, Mechanical Equipment Rooms and Closets, Electrical Rooms & Closets, Electrical Switchgear Rooms, Electrical Distribution Rooms and Closets, Emergency Generator Room, Data Communication Rooms and Closets, Telecommunication Rooms or Closets, Elevator Machine Rooms and Closets, Chiller Equipment Room, RPZ Rooms and Closets, Water Meter Rooms and Closets, and Gas Meter Rooms along major public corridors shall be furnished with a aluminum and etched zinc room-number/name/school identification type sign.
Smaller building services rooms accessed from within the main building service's room shall be signed with only the room number sign.

g. Kitchen & Servery Rooms: Kitchen & Servery rooms shall be furnished with a raised character and braille room name and number sign. Smaller rooms within the kitchen and servery rooms shall also be furnished with raised character and braille room name and number sign.

h. Locations for wall-mounted room signage: Signs shall be located adjacent to latch side of the door, the top of sign 60" above finish floor and the centerline of the signage shall be at least 9" away from the outside face of the vertical doorframe, except as indicated below:

1) For single doors: Where perpendicular (90°) return walls are 10" or less from the outside edge of the latch side of the door frame of the room, the room identification sign shall be located on the perpendicular wall. The top of room sign shall be 60" above finish floor. The sign edge shall be 4" from the corner of the perpendicular wall.
2) For double doors: Wall-mounted signs are to be located on the right side of the door. Where perpendicular (90º) return walls (similar for interior rooms within major spaces) abut double doors into rooms and are 10" or less from the outside edge of the door frame of the room, the sign shall be located on the right side (walls outside the rooms facing the double doors) on the perpendicular wall. The top of this room sign shall be 60" above finish floor. The sign centerline shall be at least 9" away from the corner of the perpendicular wall.

4. Miscellaneous Signage

a. Gymnasium Line-Up Designations signs - wall: Gymnasium line-up designation wall signs shall be 6" painted alphabetic and numeric bold type characters. The numeric designation line up signs shall be equally spaced on 6'-0" centers along the longitudinal side (long side) of the gym and the alphabetic designation signs shall be equally spaced on 6'-0" centers along the transverse side (short side) of the gym. The designation signs shall be 72" above finish floor for primary and intermediate schools and 90" above finish floor for high school.

b. Gymnasium Line-Up Designations signs - floor: Gymnasium line-up designation floor painted signs shall be 6" epoxy painted (black) alphabetic and numeric bold type characters designation. The designation signs shall be centered within a 8" minimum 3/4" thick painted border, corresponding to the gymnasium line-up wall-mounted designation signs, and shall be painted on the gym floor 3'-0" from the gym walls (on all sides of the gym) forming an imaginary grid on the gymnasium floor that will identify specific grid locations in the gym.

c. Playground Line-up Designations markers: Playground line-up designation markers shall be 8" painted (yellow) alphabetic and numeric bold type characters equally spaced and centered on a 12" painted squares borders (yellow); the borders shall be 1" thick. The

playground line-up designation markers shall be painted directly on the asphalt pavement or shall be inlayed in the color asphalt matting material. The numeric designation line up signs shall be equally spaced on 6'-0" centers along the longitudinal side (long side) of the playground and the alphabetic designation signs shall be equally spaced on 6'-0" centers along the transverse side (short side) of the playground.

The alphabetic and numeric designation signs will form an imaginary grid on the play surface that will identify specific locations for the playground.

d. Early Childhood Center (ECC) & Primary Schools (PS) Cafeteria Line-up Designation signs: Cafeteria line-up designation signs shall be provided at the discretion of the school administration's Principal. The A/E of Record shall meet with the school administration's Principal to determine if the cafeteria line-up designation signs are required for the Cafeteria or Multipurpose room. If the line-up designation signs are required, follow the requirements for line-up designation signs requirements as described above for Gymnasium Line-Up Designations signs for both wall-mounted & floor painted signs.

e. Video Surveillance signs: Video surveillance signage shall be provided in schools that are equipped with digital video surveillance system. These wall-mounted signs shall be installed on the interior and exterior of all entrances.

f. Bicycle Parking Disclaimer sign: Bicycle parking disclaimer sign shall be provided in schools where indoor and/or outdoor bicycle parking is part of the project scope. These wall-mounted sign(s) shall be installed in bicycle storage room/area and in close proximity of exterior bicycle racks.

g. Take the Stairs! sign: "TAKE THE STAIRS!" sign shall be provided in all new buildings and additions. The sign shall be located such that it is clearly visible from the lobby/corridor and mounted on the wall adjacent to each stair and elevator on every floor.

h. School Directory: A school directory with tracks for letters shall be provided at the discretion of the school administration's Principal. The A/E of Record shall meet with the school administration's Principal to determine if a school directory is required. If a school directory is required, a free-standing enclosed letter board or a wall-mounted enclosed letter board shall be provided in the vicinity of the general office or at other desired location as directed by the school Principal.

i. Green Vehicle Parking sign: Green vehicle parking sign shall be provided in schools where parking is part of the project scope and such space is provided.

Where appropriate, additional miscellaneous signage shall be provided in consultation with the school administration's Principal and the SCA.

1.3 Planning

1.3.1 Design

1.3.1.5 Typical Room Signage

Description/Design Approach

The table below is a brief description of the various types of signs that are to be utilized to identify spaces within the building. The sign type designations refer to the sign types in the SCA standard details. The Room Layout Numbers and Name refer to the ROOM PLANNING STANDARD; and are used throughout the "Table of Typical Spaces and Signage."

The following signage is typically for new construction or for building wide signage replacement. Design Requirement 1.3.1.4 describes the design and locations.
For existing buildings, new interior non-regulatory signage adjacent to or surrounded by existing signage shall match existing. New regulatory signage shall follow DR 1.3.1.4 and standard details.

Sign Type	Short Description	Remark
B1	Room Number in Raised Character and Braille Sign	Typical for secondary door to room
C1	Room Number and Name in Raised Character and Braille Sign	
D1	Room Identification Sign with Changeable Inserts with Room Number in Raised Character and Braille , slots for room name & school identification inserts, insert for room name	Type D1 and D2 are interchangeable
D2	Room Identification Sign with Changeable Inserts with Room Number in Raised Character and Braille, slots for room name & school identification inserts, inserts for room name & school identification	Type D1 and D2 are interchangeable
E1	Fire Rescue Area – Wall-mounted Sign	For sprinklered buildings and non-sprinklered buildings using Horizontal Exit
E2	Area of Rescue Assistance – Wall-mounted Sign	For non-sprinklered buildings using Area of Rescue Assistance
F1	Male Symbol, Letters - Men (or Boys) and Dynamic Accessibility Symbol	
F2	Female Symbol, Letters - Women (or Girls) and Dynamic Accessibility Symbol	
F3	Male Symbol, Letters- Male (or Boys) Locker Room - and Dynamic Accessibility Symbol	
F4	Female Symbol, Letters- Female (or Girls) Locker Room and Dynamic Accessibility Symbol	
F5	Dynamic Accessibility Symbol, Pictogram (Male or Female) and Letter – Staff Toilet	
F6	All Gender Student Toilet-non ADA w/ Pictogram	Single user student toilet
F7	All Gender Staff Toilet-non ADA w/ Pictogram	Single user staff toilet

Sign Type	Short Description	Remark
F8	All Gender Student Toilet- ADA compliant w/ Dynamic Accessibility Symbol, Pictogram	Single user student toilet
F9	All Gender Staff Toilet- ADA compliant w/ Dynamic Accessibility Symbol, Pictogram	Single user staff toilet
F10	Toilet w/ Dynamic Accessibility Symbol, Pictogram	Principal office toilet
G1	Fire Rescue Area – Door-mounted	For sprinklered buildings and non-sprinklered buildings using Horizontal Exit
G2	Area of Rescue Assistance **–** Door-mounted	For non-sprinklered buildings using Area of Rescue Assistance
H1	Exterior Ramp Sign	
H2	Dynamic Accessibility Symbol	
J1	Holding Area - F.D. Access Sign	Exterior - window sill mounted
J2	Holding Area – Door-mounted Sign	
K1	F.D. Access Sign	Exterior- window guard mounted
K2	F.D. Access Sign	Interior- window mounted
L1	Laboratory Sign	HS labs and prep rooms
L2	Laboratory Gas Shutoff Sign	Labs and prep rooms
L3	Electric Room Sign	For rooms with elec. eqpt.
L4	Louver Sign	For rooms with intake and exhaust louvers
L5	Gas Meter Room Sign	Gas meter room door
L6	Gas Shutoff Valve Sign	Boiler burner or Roof top equipment control panel
M1	Stair Identification Sign **(without raised braille)**	**On front & back of each stair door**
M2	Stair **Accessible** Floor Level **Identification** Sign	**On stair side wall near stair doors**
M3	Take the Stairs! Sign	In lobby/corridor - all floors
M4	Stair Floor Level and Identification Sign	For exit enclosures connecting three stories or more in low rise buildings
M5	Raised Character and Braille Exit Sign	**To be mounted adjacent to stairway, exit passageway, exit ramp, Area of Rescue Assistance & exit discharge**
N1	Elevator Floor Designation Sign	**On both jambs of each elevator doorframe**
N1a	Elevator Floor Designation Sign for First Floor	**On both jambs of each elevator doorframe**
N2	Elevator **Car** Identification Sign	**Near jamb of each elevator doorframe**
N3	Elevator Emergency **and Elevator Bank Identification** Sign	**Above elevator call button**
N4	International Symbol for Medical Services- Star of Life	On **both jambs of each** elevator **doorframe**

Sign Type	Short Description	Remark
N5	Elevator Pit Sign	On elevator pit door
N6	Elevator Equipment Sign	
N7	Danger Low Clearance Sign	
P1	Directional Signage to Accessible Elements Sign	
Q1	Availability of Assistive Listening System SymbolSign	Near sound system rack
Q2	International Symbol of Access for Hearing Loss Symbol**Sign**	Near entrance to spaces that include local sound system
Q3	Audio Induction Loop Sign	Near entrance to spaces that include Audio Induction Loop
R1	Place of Assembly Sign	Assembly spaces occupied for multiple purposes (e.g. Gymatorium, with occupancy ≥75)
R3	Certificate of Occupancy Sign/ **Certificate of Operation Sign**	**On main lobby/ On PA space**
S1	Video Surveillance Sign	
T1	Bicycle Parking Disclaimer Sign	At interior and exterior bike parking location
T2	Green Vehicle Parking Sign	At dedicated green vehicle parking location
U1	**Instruction Sign for Fire Rescue Area/ Area of Rescue Assistance/ Holding Area**	**Near two-way communication system**
U2	**Warning Door Sign for Stairway from PA Space/ Fire Rescue Area/ Area of Rescue Assistance**	**On front & back of each egress stair door**
AA	Luminous Stair Floor Level and Identification Sign	For high-rise buildings
BB	Emergency Exit Sign	For high-rise buildings
CC	No Exit Sign	For high-rise buildings

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
Group 1	**Instruction**			
1-10	Typical Pre-Kindergarten	D2, F6 or F8	Pre-Kindergarten	Type F6 or F8 @door to toilet
1-11	Typical Kindergarten	D2, F6 or F8	Kindergarten	Type F6 or F8 @ door to toilet
1-12	Typical Classrooms, Grades 1-2 w/ toilet	D2, F6 or F8	Classroom	Type F6 or F8 @ toilet door
1-13	Learning Classroom, Grades 1-2 w /toilet	D2, F6 or F8	Classroom	Type F6 or F8 @ toilet door
1-14	Typical Classroom, Grade 3	D2	Classroom	
1-15	Typical Classrooms, Grades 4-5	D2	Classroom	
1-16	Typical Classrooms, Grades 6-8	D2	Classroom	
1-17	Typical Classroom, Grades 6-8 Alt 1	D2	Classroom	
1-18	Typical Kindergarten, Alt 1	D2, F6, or F8	Kindergarten	Type F6 or F8 @ each door to toilet Type F2 or F1 in lieu of F6 or F8 depending upon use
1-19	Typical Classroom, Grades 6-8 Alt 2	D2	Classroom	
1-20	Typical Classroom, Grades 9-12	D2	Classroom	
1-22	Classroom w/ Operable Wall	D2	Classroom	Type D2 @ each door to classroom
NA	Speech Classroom and Health Exam	D2	Classroom	
NA	Flexible Classroom Complex	D2	Classroom	Type D2 @ each door to classroom
NA	Double Classroom	D2	Classroom	Type D2 @ each door to classroom
1-23	Small Group Instruction Room	D2	Classroom	
1-35	Typical Classroom Grades 1-2	D2	Classroom	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
1-30	Special Education Classroom	D2	Classroom	
1-31	Reading Resource Room	D2	Resource Room	
1-32	Speech Resource Room	D2	Resource Room	
1-33	Special Ed. L.D. Resource Room	D2	Resource Room	
1-34	Resource Room with Operable Wall	D2	Resource Room	Type D2 @ each door to room
NA	Word Processing Lab	D2	Word Processing	
1-40	Speech Workshop w/ Operable Wall	D2	Speech Room	Type D2 @ each door to room
1-41	Reading Resource Room	D2	Resource Room	
1-42	Special Ed. Resource Room	D2	Resource Room	
Group 2	**Specialized Instruction**			
2-10	Art Classroom	D2	Art Room	
2-11	Art Storeroom	B1	-	Type B1 @ corridor door
2-20	Art Classroom w/ Storage	D2	Art Room	
2-21	Art Studio w/ Storage	B1, D2	Art Studio	
2-22	Ceramics Classroom	D2	Ceramics Classroom	
2-23	Project Room	D2	Project Room	
2-24	Project Room	D2	Project Room	
2-25	Art Classroom with Storage	D2	Art Room	

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	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
2-30	Music Suite	D2	Music Suite	
2-30.1	Music Classroom	-	--	
2-30.2	Small Practice Cubicle	C1	Practice	
2-30.3	Large Practice Cubicle	C1	Practice	
2-30.4	Instrument Storeroom	B1	--	
2-32	Choral Music Classroom	D2	Choral Music Room	
2-40	Instrument Practice Room	C1, D2	Instrument Classroom	Type C1 – 'Practice' for practice cubicles
2-42	Orchestral Room w/ Local Sound System	B1, D2, Q1 and Q2 Q3	Orchestral Room	Verify that electrical design includes assistive listening system. Verify if Audio Induction loop is provided
2-43	Choral Room w/ Music Storage & Local Sound System	B1, D2, Q1 and Q2, Q3	Choral Room	Verify that electrical design includes assistive listening system. Verify if Audio Induction loop is provided
2-44	Music Instrument Storage	B1	--	
2-50	Wireless Language Lab	D2	Language Lab	
2-51	Materials Processing Lab and Storeroom	B1, D2	Materials Lab	
2-52	Electronics Lab	D2	Electronics Lab	Type D2 @ both doors
2-53	Culinary Arts Classroom	D2	Culinary Classroom	
2-54	Culinary Arts Storeroom	B1	--	
NA	Wireless Language Lab	D2	Language Lab	
NA	Special Ed Computer Lab	D2	Computer Lab	

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	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
NA	Computer Classroom	D2	Computer Classroom	
2-60	Programmed Instruction/ Language Lab	B1, D2	Language Lab	
NA	Perimeter Computer Classroom	D2	Computer Classroom	
NA	Cluster Computer Classroom	D2	Computer Classroom	
2-61	Distance Learning Classroom	D2	Distance Learning	
NA	Adjoining Technology Lecture Room	D2	Lecture Room	Type D2 for corridor door
2-62	Transportation Lab	B1, D2	Transportation Lab	Type B1 @ secondary door to room and storage room
2-63	Communication Technology Lab	B1, D2	Communication Technology Lab	Type B1 @ secondary door to room and storage/ audio/visual
2-64	Material Processing Lab	B1, D2	Material Processing Lab	
2-65	Electronics Lab	B1, D2	Electronics Lab	
2-66	CADD/Drafting Lab	B1, D2	CADD/Drafting Lab	
2-67	CADD/Hand Drafting Lab	B1, D2	CADD/Drafting Lab	
2-68	Mechanical Drafting Lab	B1, D2	Drafting Lab	
2-69	Virtual Enterprise Lab	B1, D2	Virtual Enterprise Lab	Type B1 for conference room Type D2 @ both doors to room
2-80	Stagecraft Lab	D2	Stagecraft Lab	
2-81	Culinary Arts Lab	D2	Culinary Lab	
2-82	Photography Lab	D2	Photography Lab	
2-83	Technology Store Room	B1	--	

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	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
Group 3	**Science**			
3-10	Science Resource Room	D2	Science Resource Room	
3-11	Science Resource Prep Room and Storage	B1**, D2**	Science Prep Room	
3-12	Science Resource Room with Storage	D2	Science Resource Room	
3-13	Science Resource Room – Alternate 1	D2	Science Resource Room	
3-14	Science Laboratory/Demo	D2	Science Demo Room	Verify if L2 is required
3-15	Science Prep Room	B1	-	Type B1 at door to room and doors to lab, demo room
NA	Standard Perimeter Laboratory	B1, D2, L1, L2	Science Laboratory	L1 on corridor side of door
NA	Standard Perimeter Laboratory - Biology	B1, D2, L1, L2	Science Laboratory	L1 on corridor side of door
NA	Project Room	D2	Project Room	
3-20	Standard Trifacial Laboratory	B1, D2, L1, L2	Science Laboratory	L1 on corridor side of door
3-21	Standard Trifacial Laboratory Biology	B1, D2, L1, L2	Science Laboratory	L1 on corridor side of door
3-22	Biology Project Preparation Room	B1, L1, L2	Science Prep Room	L1 on corridor side of door
3-23	Chemistry/Physics Project Prep Room	B1, L1, L2	Science Prep Room	L1 on corridor side of door
NA	Combined Science Project Preparation	C1, L1, L2	Science Prep Room	Type B1 at door to room and doors to lab, demo room L1 on corridor side of door
3-24	Science Demonstration Room	B1, D2	Science Demonstration Room	Verify if L2 is required
3-25	Science Lecture Room	B1, D2	Science Lecture Room A (or B)	Verify if L2 is required
3-26	Science Lecture Room	B1, D2	Science Lecture Room A (or B)	Verify if L2 is required

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	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
NA	Science Perimeter Lab. Demonstration	B1, D2, L1	Science Demo Lab	L1 on corridor side of door
3-27	Trifacial Lab Demonstration Room	B1, D2, L1, L2	Science Demo Lab	L1 on corridor side of door
3-28	Standard Physics Laboratory	B1, D2	Physics Laboratory	Verify if L2 is required
3-29	**Standard** Chemistry Laboratory	B1, D2, L1, L2	Chemistry Laboratory	L1 on corridor side of door
3-40	Double Quad Laboratory	B1, D2,L1,L2	Science Lab	L1 on corridor side of door
3-41	Plant Room	D2	Plant Room	
3-42	Science Project Prep room	B1,L1	Science Prep Room	Type B1 for door to room and doors to lab, demo room L1 on corridor side of door, Verify if L2 is required
NA	Science Storage	B1		
Group 3K	**3K**			
3K 1-10	3K Typical Classroom	D2, F8	Classroom	F8 @ Toilet door
3K 4-10	3K Exercise Room	D2	Exercise Room	
3K 7-10	3K Lobby	-	-	
3K 8-52	3K Nurse's Office	D2	Nurse's Office	
3K 8-53	3K Medical Office	D2	Medical Office	
3K 9-19	3K Grounds Equipment Storage	C1	Ground Equipment	No signage required @ exterior
3K 10-11	3K General Office/Mail/ Time/Duplicating	D2	General Office	
3K 10-13	3K Principal's Office	D2	Principal's Office	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
3K 10-15	3K Principal's Office w/ Conference Area	D2, F9	Principal's Office	Type F9 @ toilet
3K 10-25	3K Parents/Community Room	D2	Community Office	
3K 10-27	3K Staff Room	D2	Staff Room	
3K 12-11	3K Custodian's Office	D2	Custodian Office	
3K 12-25	3K Telecommunications Closet	C1	Telecommunication Closet	
3K K2	3K Warming Pantry	C1, F3/F4	Warming Kitchen	
Group 4	Physical Education			
4-10	Gymnasium (Small)	C1, R2, Q1 Q2,Q3	Gymnasium	Type C1 @ all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-11	Auxiliary Gym and Storeroom	E, R2	Auxiliary Gymnasium	
4-12	Gymnasium	B1, C1, R2, Q1, Q2,Q3	Gymnasium	Type C1 @ all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-20	Competition Gymnasium	B1, C1, R2, Q1, Q2,Q3	Gymnasium	Type C1 @ all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-21	Practice Gymnasium	B1, C1,R2 Q1, Q2,Q3	Gymnasium	Type C1 @ all corridor doors Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-22	Auxiliary Gymnasium	C1, R2, Q1 Q2, Q3	Auxiliary Gymnasium	Type C1 @ all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-23	Dance Studio	B1, D2, Q1 Q2, Q3	Dance Studio	Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-24	Weight Training	B1, D2	Weight Training	

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
4-25	Wrestling Gymnasium	B1, D2	Wrestling Gymnasium	
4-26	Gymnastics Gymnasium	B1, D2, Q1 and Q2, Q3	Gymnastics Gymnasium	Verify that electrical design includes assistive listening system. Verify if Induction loop is provided.
4-27	Competition Pool	B1, C1	Pool	
4-28	Black-Box Theater	**B1, D2**	Black-Box Theater	
4-30	Locker Room	F3/F4	Locker Room	Sign to read Boys Locker Room or Girls Locker Room as applicable
4-31	Student Locker Room – M/F w/ Toilets	F3/F4, H2	Locker Room	Sign to read Boys Locker Room or Girls Locker Room as applicable
4-40	Student Locker Room w/ Shower, Toilets – M/F	F3/F4, H2	Locker Room	Room designation to be Boys Locker Room or Girls Locker Room as applicable
4-41	Locker Room w/ Showers – Visiting Team	C1, F6 or F8	Visiting Team Locker Room	Type F6 or F8 @ toilet, Shower area
4-42	Pool Locker Rooms	H/I	Locker Room	Room Designation to be Boys Locker Room or Girls Locker Room as applicable
4-43	Shower Room	C1, H2	Shower Room	Room Designation to be Boys Shower Room or Girls Shower Room as applicable
4-50	Health Instructor's Office (Small)	D2, F7 or F9	Office	Type F7 or F9 @ toilet
4-51	Health Instructor's Office w/ Storage	D2, F7 or F9	Office	Type F7 or F9@ toilet
4-52	Health Instructor's Office	D2, F7 or F9	Office	Type F7 or F9 @ toilet
4-53	Gym Storeroom (Small)	B1	-	
4-54	Gym Storeroom	B1	-	
4-70	Gymatorium	C1, R1, Q1 and Q2, Q3	**Gymatorium**	Verify that electrical design includes assistive listening system. Verify if Induction Loop is provided.
4-71	Gymatorium	C1, R1, Y, Q1, Q2, Q3	**Gymatorium**	Verify that electrical design includes assistive listening system. Verify if Induction Loop is provided
4-80	Gymatorium (Small) w/ Telescoping Seating	C1, R1, Q1 and Q2, Q3	**Gymatorium**	Verify that electrical design includes assistive listening system. Verify if Induction Loop is provided.

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	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
4-84	Gymatorium (Large) w/ Telescoping Seating	C1, R1, Q1 and Q2, Q3	**Gymatorium**	Verify that electrical design includes assistive listening system. Verify if Induction Loop is provided.
4-90	Gymatorium (Small)	C1, R1, Q1 and Q2 Q3	**Gymatorium**	Verify that electrical design includes assistive listening system. Verify if Induction Loop is provided.
Group 5	**Assembly**			
5-12	Dressing Room	D2, F1, F2	Dressing Room	Type F1, F2 for toilets as applicable
5-13	Assembly Storeroom	B1	-	
5-20	Assembly Area - 300 Seats	C1, R2, Q1 and Q2, Q3	Auditorium	Type C1 at all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction Loop is Provided.
5-20	Stage	C1	Stage	Type C1 at all doors from corridor to stage
5-20	Assembly Storage	B1	-	
5-20	Projection Room	D2	Projection Room	
5-20	Utility Room	B1	-	
5-30	Assembly Area - 300 Seats	C1, R2, Q1 and Q2, Q3	Auditorium	Type C1 at all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction Loop is Provided.
5-30	Stage	C1	Stage	Type C1 at all doors from corridor to stage
5-30	Assembly Storage	B1	-	
5-30	Projection Room	D2	Projection Room	
5-30	Utility Room	B1	-	
5-40	Assembly Area - 300 seats)	C1, R2, Q1 and Q2, Q3	Auditorium	Type C1 at all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction Loop is Provided.

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
5-40	Stage	C1	Stage	Type C at all doors from corridor to stage
5-40	Assembly Storage	B1	-	
5-40	Projection Room	D2	Projection Room	
5-40	Boys Dressing Room	D2, H2	Boys Dressing Room	Type D2 @ doors to dressing area Type H2 @ toilet
5-40	Girls Dressing room	D2, H2	Girls Dressing room	Type D2 @ doors to dressing area Type H2 @ toilet
5-40	Coat/Ticket Room	D2	Coat/Ticket Room	
5-50	Assembly Area - 550 Seats	C1, R2, Q1 and Q2, Q3	Auditorium	Type C1 at all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction Loop is Provided.
5-50	Stage	C1	Stage	Type C1 at all doors from corridor to stage
5-50	Assembly Storage	B1	-	
5-50	Projection Room	D2	Projection Room	
5-60	Assembly Area – Stadium Layout - 550 Seats	C1, R2, Q1 and Q2, Q3	Auditorium	Type C1 at all corridor doors. Verify that electrical design includes assistive listening system. Verify if Induction Loop is Provided.
5-60	Stage	C1	Stage	Type C1 at all doors from corridor to stage
5-60	Assembly Storage	B1	-	
5-60	Projection Room	D2	Projection Room	
5-60	Boys Dressing Room	D2, H2	Boys Dressing Room	Type D2@ doors to Dressing area Type H2 @ toilet
5-60	Girls Dressing room	D2, H2	Girls Dressing room	Type D2 @ doors to Dressing area Type H2 @ toilet
5-60	Coat/Ticket room	D2	Coat/Ticket room	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
Group 6	**Library**			
6-10	Early Childhood Library	D2	Library	Sign to read 'ECC library' if more than one library in building
6-13	Library (PS)	D2	Library	
6-14	Library (PS) All Tables/Chair Seating	D2	Library	
6-15	Library- PS, PS/IS	D2	Library	
6-16	Library-PS, PS/IS, IS, IS/HS, HS	D2	Library	
6-17	Library-Large PS, PS/IS	D2	Library	
6-18	Library-Large IS, IS/HS	D2	Library	
6-20	Library/Media Center	B1, D2	Library/Media Center	
6-20	Librarian's Office	D2	Office	
6-20	Storage	B1	-	
6-20	Work Room	D2	Work Room	
6-20	Technology Center	D2	Technology Center	
6-21	Library/Media Center & AV Storage	B1, D2	Library/Media Center	
6-21	Librarian's Office	A1, D2	Office	
6-21	Work Room	B1	-	
6-21	Reserve	B1	-	
6-21	Audio/Visual Storage	B1	-	Verify if L3 is required

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
6-21	Technology Center	D2	Technology Center	
Group 7	**Circulation**			
NA	Stairs	M1, M2, M3, M4 M5	-	•M4 - For exit enclosures connecting three stories or more in a low rise buildings that must comply with **2022** code
NA	Stairs – High-rise Building	M1, M2, M3, M5, AA, BB	-	Photoluminescent markings must be indicated on drawings.
NA	Corridors – High-rise Buildings	CC	-	Verify if applicable
NA	Elevators	N1 – N4, N8	-	Verify if 'N4' is applicable to project and appropriate elevators are so marked. Verify if N5, N7 are applicable. Indicate locations for 'N8' on drawings.
NA	Lobby Security Room	B1	-	
Group 8	**Student Support**			
8-10	Guidance Suite (Small)	D2	Guidance Office	
8-10.1	Guidance Offices	D2	Office	
8-10.2	Guidance Conference Room	D2	Conference Room	
8-10.3	Guidance Storeroom	B1	-	
8-10.4	Guidance Waiting Room	-	-	
8-11	Guidance Suite (Medium)	D2	Guidance Office	
8-11.1	Guidance Offices	D2	Office	
8-11.2	Guidance Conference Room	D2	Conference Room	
8-11.3	Guidance Closet	B1	-	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
8-11.4	Guidance Waiting Room	_	-	
8-12	Guidance Suite (Large)	D2	Guidance Office	
8-12.1	Guidance Offices	D2	Office	
8-12.2	Guidance Conference Room	D2	Conference Room	
8-12.3	Guidance Storeroom	B	-	
8-12.4	Guidance Waiting Room	--	-	
8-13	Guidance Office	D2	Guidance Office	
8-20	Guidance House	D2	Guidance Office	Type D2 for all offices within the suite
8-21	Guidance Suite	D2	Guidance Office	Type D2 for all offices within the suite
8-22	College & Vocational Guidance Office	D2	College Office	Type D2 for all offices within the suite
8-30	School Base Support Team Suite (Small)	D2	College Office	Type D2 for all offices within the suite
8-30.1	School Based Support Team Office	D2	SBST Office	
8-30.2	School Based Support Team Conference Room	D2	Conference Room	
8-30.3	School Based Support Team Waiting Room	-	-	
8-31	School Based Support Team Suite w/o Storage	D2	SBST Office	
8-31.1	School Based Support Team Office	D2	Office	
8-31.2	School Based Support Team Conference Room	D2	Conference Room	
8-31.3	School Based Support Team Waiting Room	-	-	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
8-32	School Based Support Team Suite with Storage	D2	SBST Office	
8-32.1	School Based Support Team Office	D2	Office	
8-32.2	School Based Support Team Conference Room	D2	Conference Room	
8-32.3	School Based Support Team Storeroom	B	-	
8-32.4	School Based Support Team Waiting Room	-	-	
8-40	School Based Support Team Suite (Medium)	D2	SBST Office	Type D2 for all offices within the suite
8-41	School Based Support Team Suite (Large)	D2	SBST Office	Type D2 for all offices within the suite
8-42	LYFE Center Suite	D2, F7or F9	LYFE Center	Type F7 or F9 @ toilet
8-43	Government & Club House	D2	Government & Club	
NA	Publications Office	D2	Publications Office	
8-44	Records Room	B	-	
8-45	Student Store	D2	Student Store	Type D2 for all doors
8-46	Student Services Suite	D2	Student Services Suite	Type D2 for all offices within the suite
8-47	Lateness and Attendance Office	D2	Attendance Office	Type D2 for all offices within the suite
8-48	Assistant Principal's Guidance Office	D2	Assistant Principal Guidance	
8-49	A.P. Guidance Secretary	D2	A.P. Guidance Secretary	
8-50	Medical Suite (Small)	D2	Medical Office	
8-50.1	Medical Suite Toilet	F8	Toilet	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
8-50.2	Medical Suite Nurse's Office	D2	Nurse's Office	
8-50.3	Medical Suite Examination Room	D2	Exam Room	
8-50.4	Medical Suite Waiting Room	-	-	
8-60	Medical Suite (Large)	D2	Medical Office	
NA	Medical Suite Toilet	F8 D2	Toilet	Type F8 for ADA All Gender toilet
NA	Medical Suite Nurse's Office	D2	Nurse's Office	
MA	Medical Suite Examination Room	D2	Exam Room	
8-61	School Based Health Clinic	D2	Health Clinic	
NA	School Based Health Clinic Exam room	D2	Exam Room	
NA	School Based Health Clinic Office	D2	Office	
NA	School Based Health Clinic Toilet	D2, F6 or F8	Toilet	
NA	School Based Health Clinic Laboratory	D2	Laboratory	
Group 9	**Storage**			
NA	Multipurpose Storeroom	B1	--	
9-10	Book Storeroom (Small)	B1	--	
9-11	Book Storeroom (Large)	B1	--	
9-12	Large Book Storeroom	B1	--	
9-13	Small Book Storeroom	B1	--	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Signage			
Layout Number	**Layout Name**	**Sign Type**	**Room Name Designation**	**Remark**
9-14	Furniture Storeroom	B1	--	
9-15	Furniture Storeroom (Large)	B1	--	
9-16	Receiving and General Supply	B1, C1	Receiving Room	Type B1 for door to supply area
9-17	Receiving and General Storage	C1	Receiving Room	
9-18	Year Round Storeroom	B1	--	
9-19	Grounds Equipment Storeroom	C1	Ground Equipment	No signage required @ exterior
9-20	Grounds Equipment Storeroom (Large)	C1	Ground Equipment	No signage required @ exterior
9-21	Audio Visual/Secure Storeroom	B1	--	
9-22	"Vault"	B1	--	
9-23	"Vault" w/ Anteroom	B	--	
9-24	Refuse and Recycling Storage	B1	-	No signage required @ exterior
9-25	Computer/AV Storeroom	B1	-	
NA	Bicycle Storage	T1	-	Provide bicycle parking disclaimer signage @ interior wall
NA	Educational/Book Storage Closet	B1	-	

Group 10	Administration			
NA	Administration Suite	D2	General Office	
10-10	General Office/Waiting/Mail/Duplicating	D2	General Office	
10-11	General Office and Waiting Area	D2	General Office	
10-12	Principal's Office	D2 , F7 or F9	Principal's Office	Type F7 or F9 @ toilet
10-13	Principal's Office w/o Toilet	D2	Principal's Office	
10-14	Record's Room	B1	--	
10-15	Principal's Office w/ Toilet	D2, F10	Principal's Office	F10 @ toilet
10-16	Duplicating Room w/ Lockers	B1	--	
NA	Administration Office	D2	Administration Office	
10-17	Duplicating Room	B1 or D2	Copy Room	Type D2 @ door to corridor
10-18	Supervisory Office with Storeroom	D2	Supervisory Office	
NA	Educational Assistant's Room	D2	Educational Assistant's room	
NA	Staff infirmary	D2	Staff Infirmary	
10-19	Administration Office w/ Storage	B1, D2	Administration Office	Type B1 for storage room
NA	Principal's Secretary Office and Waiting Room	D2	Principal's Secretary	
10-20	Supervisor's Office w/ Conference & Storage	B1, D2	Supervisor's Office	Type B1 for conference and storage
10-21	Program Office	D2	Program Office	
10-22	Teachers Mail & Time Room	D2	Staff Mail/Time	Type D2 for corridor door

NA	Staff Workroom	D2	Staff Workroom	
10-23	Treasurer's Office	D2	Treasurer's Office	Type D2 for corridor door
NA	Payroll Secretary's Office	D2	Payroll Secretary	
NA	A.P. Secretary's Office	D2	A.P. Administration Secretary	
NA	Principal's Conference Room	D2	Conference Room	
NA	Conference room	D2	Conference Room	
NA	Sound Control Room w/ Announcer	B1	--	
NA	Multiple Supervisor's Suite	D2	Supervisory Office	
NA	Department Storeroom	B1	--	
NA	School Aide's Room	D2	School Aide's Room	
10-24	Teacher's Aides Workroom w/ Toilet	D2, F7 or F9	Teacher's/Aide's Workroom	Type F7 or F9 @ toilet
NA	Staff Infirmary w/ Toilet	D2, F7 or F9	Staff Infirmary	Type F7 or F9 @ toilet
NA	Staff Office Complex	B, D2	Staff Office	Type B1 for offices within the suite
10-25	Community Activities/ Parents' Room	D2	Community Room	
10-26	Parent/Community Office	D2	Community Office	
NA	Staff Development/Literacy Coaches	D2	Staff Area	
Group 11	**Cafeteria /Staff lunch**			
11-10	Students' Cafeteria/ Multipurpose Room	C1, R2,Q1, Q2, Q3	Cafeteria	Type C1 @ all corridor entrances only. Verify that electrical design includes assistive listening system and Induction Loop.
11-11	Staff Lunch/Conference Room (Small)	D2	Staff Lunch Room	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

11-12	Staff Lunch/Conference Room (Large)	D2	Staff Lunch Room	
11-13	Staff Lunch Room w/o Servery	D2	Staff Lunch Room	
11-20	Staff Dining w/ Servery	D2	Staff Dining	
11-41	Cafeteria w/ Banquet Seating	C1, R2, Q1, Q2, Q3	Cafeteria	Type C1 @ all corridor entrances only. Verify that electrical design includes assistive listening system and Induction Loop.
Group 12	**Custodial**			
12-11	Custodian's Office	C1	Custodian's Office	
12-12	Custodian's Office w/ Storage	B, C1	Custodian's Office	Type B for storage room
12-13	Custodian's Storeroom (Small)	B1	--	
12-14	Custodian's Storeroom (Medium)	B1	--	
12-15	Custodian's Storeroom (Large)	B1	--	
12-16	Custodian's Workshop	C1	Custodian's Workshop	
12-17	Janitor's Sink Closet	C1	J. S. C.	
NA	MEP Service & Mechanical Room	C1	-	
NA	Elevator Machine Room	C1, N6	Elevator Machine Room	
12-18	Girls' Restroom and Boys' Restroom	F1/F2, H2	Boys (or Girls)	Sign to indicate Boys or Girls as applicable, Type H2 on ADA stall door, include wall tile that reads "Wash your hands before leaving this room"
12-20	Custodian's Locker Room w/ Toilet and Shower	D2	Custodian Staff Locker Room	Sign to indicate Male or Female as applicable
12-21	Security Officers Changing Room M/F	D2	Security Officers' Changing Room	Sign to indicate Male or Female as applicable

12-22	Shower and Changing Room with Lockers	D1	Staff Locker Room	
12-23	Custodian's Locker Room	D1	Custodian **Staff** Locker Room	Sign to indicate Male or Female as applicable
12-25	DIIT Large School Main Telecommunications Room	C1, L3	Telecommunications Room	
12-26	Telecommunications Closet	C1	Telecommunications Closet	Verify if L3 is required
NA	A/V Closet	B1		
12-27	Unisex Toilet for Nonambulatory Use	F9	All Gender Staff Toilet	
12-28	School Safety Administration (SSA) Office and Locker Rooms	D2	School Safety Administration Office	
12-30	Student Unisex Toilet	F8	All Gender Student Toilet	
12-31	DIIT Medium School Main Telecommunication Room	C1, L3	Telecommunications Room	
NA	Staff Toilet with Stalls	F5	Staff Toilet	Indicate Male or Female as applicable
Group CW	**City Wide Special Education (D75)**			
CW10-10	Special Education Classroom	D2, F6 or F8	Classroom	Type F6 or F8 for toilet
CW10-11	Special Education Classroom (Large)	D2, F6 or F8	Classroom	Type F6 or F8 for toilet
CW10-12	Special Education Classroom	D2	Classroom	
CW10-13	Special Education Classroom w/ Lockers	D2, F6 or F8	Classroom	Type F6 or F8 for toilet
CW10-14	Special Education Classroom w/o Toilet	D2	Classroom	
CW10-15	Special Education Classroom	D2, F6 or F8	Classroom	Type F6 or F8 for toilet
CW12-10	Changing Room	F8	All Gender Student Toilet	
CW16-30	Activities for Daily Living	D2, F6 or F8	Classroom	Type F6 or F8 for toilet

CW17-12	Speech Room	D2	Speech Room	
CW30-00	Guidance Office	D2	Guidance Office	
CW30-80	Guidance Storeroom	B1	-	
CW34-00	Occupational Therapy/Physical Therapy	D2	O.T./P.T. Room	
CW40-70	Administration Office & Storage	D2	Office	
CW80-00	Storage Room	B1	-	
Group K	**Kitchen / Food Services**			
K2	Kitchen	C1	Kitchen	Include wall tile that reads "HAND WASH SINK" over each Kitchen Lavatory (Hand Sink).
K2	Can Wash/Mop Room	C1	Can Wash Room	
K3	Servery	C1	Servery	Include wall tile that reads "HAND WASH SINK" over each Kitchen Lavatory (Hand Sink).
K4	Temporary Kitchen	C1	Kitchen	Include wall tile that reads "HAND WASH SINK" over each Kitchen Lavatory (Hand Sink).
K5	Warming/Therm Hold Kitchen	C1	Warming Kitchen	Include wall tile that reads "HAND WASH SINK" over each Kitchen Lavatory (Hand Sink).
NA	Food Storage	B1/C1	- (OSF Storage)	Remote storage areas away from the kitchen to be labels 'OSF Storage' per DR 1.3.6.2.
NA	Non-food Storage	B1/C1	- (OSF Storage)	Remote storage areas away from the kitchen to be labels 'OSF Storage' per DR 1.3.6.2.
K6	Dieticians/Managers Office	D2	Office	
NA	Compressor Room	B1	-	
K8	Kitchen Staff Locker Room	F3/F4	**OSF** Male (or Female) Locker **Room**	
NA	Detergent Storage	B1/C1	- (OSF Storage)	Remote storage areas away from the kitchen to be labels 'OSF Storage' per DR 1.3.6.2.

Group UPK	UPK			
UPK 1-10	Typical UPK Classroom	D2, F8	Classroom	F8 @ toilet
UPK 7-10	UPK Lobby Design Criteria	-	-	
UPK 8-53	UPK Medical Office	D2	Medical Office	
UPK 9-16	Receiving and General Supply Room	C1	Receiving Room	
UPK 9-19	UPK Grounds Equipment Closet	C1	Ground Equipment	No signage required @ exterior
UPK 9-24	Refuse and Recycling Storage	B1	-	
UPK 10-11	UPK General Office/Waiting Room	D2	General Office	
NA	Principal's Office	D2	Principal's Office	
UPK 10-25	UPK Community Activities/Parents Room	D2	Community Office	
UPK 10-27	UPK Staff Room	D2	Staff Room	
UPK 12-11/16	Custodian's Office/Workshop	D2	Custodian's Office	
UPK 12-25	UPK Telecommunications **Closet**	C1	Telecommunications Closet	
UPK K2	UPK Warming Pantry	C1, F3/F4	Warming Kitchen	

Abbreviations NA- Not applicable

1.3 Planning

1.3.1 Design

1.3.1.6 Plumbing Fixture Count

Description/Design Approach:

An adequate number of toilet room facilities and fixtures shall be provided for students, administrative staff, pedagogical staff, and the public as required by **2022** NYC Building Code and as indicated herein.

A. Establishing the population basis for calculation of the minimum required fixtures

1. The student population to be used shall be calculated based on floor area allowance as per **2022** NYC Building Code (e.g. number of occupants for a classroom having a net area of 675 SF shall be 675/20 = 34). The spaces to be included for calculating student population are:

   a. All rooms of instruction i.e. typical classrooms, resource rooms, shops, science rooms, art rooms and library.

   b. Locker rooms are considered non-simultaneous use spaces. Locker room occupant load shall not contribute towards plumbing fixture count calculation.

2. The adult population shall be calculated as follows:

   a. 2 adults for each UPK, 3K, Pre-Kindergarten (PK), Kindergarten and D75 classroom.

   b. 1 adult for every instructional room other than UPK, 3K, PK, Kindergarten and D75 classroom.

   c. 5 adults for the lobby.

   d. 1 adult for every 100 Square Feet in each office and parent's room.

   e. A number of school aides equal to 2.5% of the unadjusted Capacity in the POR.

   f. Kitchen staff equal to 1.5% of the unadjusted Capacity in the POR

3. School Principal, kitchen and/or gym staff are to be excluded from the adult population calculation for fixture count if they have dedicated toilets per the POR.

B. Establishing the required fixture counts for the building

1. Students

   a. Provide the number of fixtures for **3**K thru 12th grade as required to meet the **2022** NYC Plumbing Code requirements**.** For population distribution, provide for 50% boys and 50% girls.

b. Fixtures in the dedicated student toilet room within the Medical Suite are to be excluded from the count.

c. Provide fixtures to serve the Public Assembly Spaces as required by the NYC Plumbing Code.*

Fixtures serving the Public Assembly Spaces are to be located in the vicinity of the Public Assembly spaces.

* Note that the **2022** Plumbing Code requires a greater number of WC's for girls (females) as compared to that required for boys (males) for Auditoriums, Gymatoriums, Gymnasiums, and Cafetoriums.

d. Water Closets (WC): Provide one WC for each 50 boys and one WC for each 50 girls.

e. Provide fixtures within spaces as dictated by the room layouts or the program of requirements.

f. Lavatories (sinks)**:** Provide one lavatory for each 50 boys and one lavatory for each 50 girls

g. Urinals**:** Urinals are to be provided in Boys toilet rooms in lieu of WCs, but not for more than 50% of the required number of WCs.

h. Drinking Fountains

1) The minimum number of Drinking Fountains to be provided in the building shall be calculated on the basis of one fixture per every 100 persons.
2) Refer to DR 6.1.10 for corridor drinking fountains to be provided with a bubbler for drinking and a separate dedicated bottle filler for filling a 10" high container.
3) Drinking fountains in corridors shall have the following at each location**, with the spout outlet height measured from the finished floor**:

3K-5th Grade – one at **29"** accessible, wheelchair **for students (parallel approach per Section 602.2 of ICC A117.1, Exception 2, Section 602.2 of ADA, Exception)**
one at 34" accessible, wheelchair **for adults (forward approach per Section 602.4 of ICC A117.1, Section 602.4 of ADA),** and
one at 40" accessible, standing

6th-12th Grade – one at 34" accessible, wheelchair, and
one at 40" accessible, standing

i. Showers: Provide four (4) showers in High School or Intermediate/High School Gymnasium Locker Rooms, or otherwise as per the project-specific Program of Requirements (POR). All Swimming Pool Locker Rooms are to be provided with showers to meet NYC Building Code requirements.

2. Adults

a. Provide the number of WC's listed in Table PC 403.1 of the **2022** NYC Plumbing Code under "Business" classification in single occupant or gender specific multi-stall toilet

rooms. Number of fixtures provided per floor must also satisfy that required by DR 1.3.1.7.

b. Adult fixture count shall include all single and multi-user adult toilets accessed from the corridor or from within staff rooms (i.e., work, lunch, etc.)

c. If dedicated toilets are provided for the principal, kitchen and/or gym staff, exclude these fixtures from the count (along with the staff.)

C. Total number of fixtures provided in the building must satisfy the **2022** NYC Plumbing Code requirements.

1.3 Planning

1.3.1 Design

1.3.1.7 Toilet Facilities

Description/Design Approach:

An adequate number of toilet room facilities and fixtures shall be provided for students, administrative staff, pedagogical staff, and the public as required by NYC Building Code and as indicated herein. Refer to DR 1.3.1.6, “Toilet Fixture Count”, for method of calculation.

A. Student Toilet Rooms

1. Adequate student toilets shall be provided on each floor for the student population residing there. The toilet facilities should be located centrally for easy access from classrooms.

2. Multiple stall (“ganged”) student toilets accessed from the corridor should reflect the number of students on that floor that are apt to be using those facilities. For example, a floor with all Pre-K and Kindergarten, which all have toilets within the room, may have ganged toilets with fewer fixtures than other floors. Where six or more stalls are provided in a multiple stall toilet, at least one additional accessible ambulatory stall shall be provided as per Section 604.10 of ICC A117.1, in addition to the standard wheelchair accessible stall complying with Section 604.9.

3. One single user accessible **all-gender** student toilet, accessible from the corridor, shall be provided in the building.

4. Student toilet rooms should be provided relatively nearby the Auditorium/ Gymatorium/Cafetorium, accessed from the corridor. These may be minimal if other toilet rooms are provided on the floor. These toilets are to be included in the building’s required fixture count.

5. ECC and PS cafeterias must have toilet rooms (with a minimum of 2 WCs per gender) directly accessible from within the space for supervisory reasons. These toilets are to be included in the building’s required fixture count.

6. IS cafeterias should have student toilet rooms (with a minimum of 3 WCs each) directly accessible from within the space for supervisory reasons. If this is not possible, they must be immediately adjacent. HS cafeterias must have proximate student toilets. These toilets are to be included in the building’s required fixture count.

B. Adult Toilet Rooms

1. Provide a minimum of at least one single user adult toilet on each floor, accessible from the corridor. **If gender specific adult toilets are provided, t**he total number of male and female toilets in the building must be equal.

2. **One of the adult single user toilet rooms shall be designed as an "All-Gender Access Toilet", with adequate space to accommodate a future changing table, Hoyer lift and**

additional storage space as provided by the Department of Education when needed. It is preferred to locate the room on an instructional floor near the elevator. A privacy curtain track is to be provided, which will be used by the DOE when a screen for the privacy of students from the designated assistant staff within toilet is required.

3. Two adult single-user toilet rooms are to be provided in close proximity to the general **and principal's office**.

4. One adult single user toilet room shall be provided proximate to the Auditorium/ Gymatorium/Cafetorium, accessed from a corridor.

C. Additional Requirements

1. Accessible toilet, washing and drinking facilities shall be provided to comply with the requirements of ICC A117.1. When only one fixture of any type is provided, in any room or location, it shall be made accessible. When more than one fixture is provided, in any room or location, of any type at least one shall be accessible. Provide grab bars at water closets as required by ICC A117.1.

2. Provide floor drain for all toilets with more than one occupant. Toilets within City Wide Special Education Classrooms shall be provided with a floor drain and hand-held shower.

3. Provide interior wire mesh guards and translucent glazing at toilet room **exterior** windows.

4. In High School Locker Rooms with showers, provide roll down aluminum shutters to segregate showers from remainder of locker room.

5. Provide privacy screens in multiple stall toilets accessible from corridor or cafeteria, to block line of vision from toilet's door to the stalls and/or urinals.

6. Include an additional 2" of float in width and depth to the minimum dimensions required for all multiple stall toilet rooms. **Per Section PC 405.3.1 of the 2022 NYC Plumbing Code, water closet, urinal or lavatory shall not be set closer than 15 inches from its center to any wall/partition, or closer than 30 inches center to center between adjacent fixture and water closet compartment shall be not less than 30 inches in width and 56 inches in depth for wall hung water closet (or 60 inches in depth for floor mounted water closet). Considering construction tolerances, typical water closet compartments or urinal partitions shall be a minimum of 31 inches wide.**

Typical Furnishings and Equipment

A. Architectural

1. Toilet Partitions

a. Locations

Toilet partitions shall be provided for water closets and urinals in toilet rooms that provide for multiple occupancy.

b. Mounting

1) Toilet stall partitions shall be floor mounted, secured to back wall, and overhead braced.

2) Pilasters for supporting partition panels shall be supported on the floor and secured to the slab or other structural members above. Where the slab above or other structural members are too high, brace the pilasters with headrails anchored to the back wall.

3) Urinal partitions shall be wall mounted.

4) Privacy screens near toilet room entrance shall be floor mounted and overhead braced.

c. Materials

1) The SCA preference and standard for new toilet, urinal and privacy partitions is for solid polymer resin, or of solid phenolic core construction with integral melamine finish.

2) Stainless steel covered partitions may be used only to match existing partitions.

3) Enamel finished steel partitions may only be used only to match existing partitions.

2. Lavatory Counters

In toilet rooms where more than one lavatory is provided, a 3/4" thick granite or cultured stone counter 23-inches deep, with a 4-inch high backsplash and sidesplash, with bullnosed edge and 5-inch fascia of same material shall be provided. Refer to DR 6.1.10 for mounting heights.

3. Soap Dispensers

a. Soap Dispensers for countertop mounted lavatories in ECC, PS and PS/IS shall be **wall** mounted.

b. Soap Dispensers for countertop mounted lavatories in IS and IS/HS shall be wall mounted.

4. Paper Towel Dispenser & Waste Receptacle

a. Surface-mounted roll paper towel dispensers are preferred to the C-fold type for large/multi-stall toilets, kitchen and shower areas. Since a more than 4" projection is expected for a surface-mounted roll paper towel dispenser 27" above the finished floor, a surface-mounted waste receptable shall be paired underneath to comply with Section 307.2 of ICC A117.1, unless the roll paper towel dispenser is placed above the countertop.

b. Recessed paper towel dispenser waste receptable unit is limited to single user toilet if there is space constraint.

1.3 Planning

1.3.5 Design

1.3.1.8 Refuse and Recycling Storage

Description/Design Approach:

A. General

To facilitate the storage of refuse and recyclables until they are removed from the school premises, the designer shall provide for an indoor Refuse and Recycling Storage room, accessible to custodial staff **with direct access to the outside**. A trash compactor shall be included in this refuse and recycling storage room. **'Tilt Trucks' with wheels will be used to transfer the bagged/bailed trash to the curbside and thus the room needs sufficient space for the required number of tilt trucks.** If included in the program of requirements, a trash refrigerator is to be provided within this refuse and recycling room.

1. New schools and Lease Facilities

In all schools, refuse generated will be bagged and **placed in 'tilt trucks' within** the refuse and recycling storage room and/or the trash refrigerator. The custodian will **bring** the **'tilt trucks'** to the designated curbside pickup area for New York City Department of Sanitation (DSNY) collection.

2. Building additions

In schools currently designated for curb-side pick-up, a refuse and recyclable storage space shall be added if the

- existing building does not have a designated refuse and recyclable storage room or
- existing refuse and recyclable storage space is inadequate to incorporate the basic requirements described in Section **B** below.

3. Recycling Program

Recycling is mandated for all schools. Recyclable materials such as paper/cardboard and metals/**glass/**plastics **will be bagged and placed in tilt trucks that are stored in** the refuse and recycling room. The custodian will **bring the tilt trucks** to the designated curbside pick-up area for DSNY collection.

4. Phase–out of the Front Loading Overhead Hoist Containers

The DSNY front-loading overhead hoist containers and their pick-up operations are currently being phased out and shall not be used on any new projects. The DSNY has agreed that in schools where front-loading overhead hoist container pick-up currently exists, service will continue. Additions to these schools should not affect pick-up, except for the additional containers needed for the increased student population. In such cases, DSNY agreed that service will continue but the DSNY Survey Officer should be contacted prior to the design completion to reaffirm the agreement.

5. **Roll-On-Roll-Off Compactor/Container (ROROC/C)**

   - **For large high schools or campus complexes with more than 3,000 students where curbside pick-up would become more impractical due to the number of tilt trucks required, and where there is room on the site as well as access for the DSNY sanitation trucks, the installation of a Self-contained Horizontal Compactor unit is to be investigated and implemented upon DSNY approval. The ROROC/C is a 30 cubic yard dumpster with an integral self-contained compactor unit, which is picked up, emptied off-site, and returned by the DSNY truck. The ROROC/C is usually planned and provided within school property lines.**

   - **If it is agreed with the SCA that the site meets the guidelines for the use of the ROROC/C, the Design Architect shall immediately request a field survey from the DSNY and plan for the ROROC/C requirements, including dumpster area, clearances, and power unit requirements by manufacturer. The ROROC/C shall be provided in a screened and fenced enclosure.**

   - **For projects where a ROROC/C is used, the refuse and recycling room shall be sized to accommodate the number of tilt trucks required for recycling and organics (in areas where organic pick-up is applicable).**

B. Basic Guidelines for Refuse and Recycling Storage Room

1. **The refuse and recycling storage room shall be located such that the exterior door from this room will open directly out to the sidewalk area (or to an exterior passageway) where the tilt trucks will be brought for the DSNY pick-up. If the kitchen is on the first floor, proximity to the kitchen is preferred. The door opening directly to the exterior shall be a 44" wide door to facilitate refuse removal to the curbside.**

2. The size of refuse and recycling storage room **and number of tilt trucks to be provided shall be based on the 'Tilt Truck and Refuse & Recycling Room Size Calculator', available on the SCA website at** http://www.nycsca.org/Design/Forms**.** The size of the trash refrigerator (if provided) is based on the school capacity and should be used for space planning purposes. The trash compactor unit shall be located within the refuse and recycling storage room with appropriate servicing and maintenance clearances. The capacity of the trash compactor unit shall be determined based on student capacity of the facility

3. In addition to the above, the refuse and recycling storage room shall be provided with a dedicated power source for the compactor unit, a floor drain and a hose bibb. The floor of the refuse and recycling storage room shall be pitched to the floor drain. The floor drain shall be located in the center of the space or just outside of the trash refrigerator (if the refrigerator is provided)**.** The floor of the trash refrigerator shall pitch to the floor drain in the refuse and recycling storage room.

4. **Tilt trucks will be used to store each type of material (trash, recyclables, organics). The Calculator indicated above will determine the number of trucks to be provided based on the school population and number of pick-ups per week of each material, which in turn will determine the room size.**

C. In schools with an existing fenced containerization area; recyclable materials such as paper/cardboard and metals**/glass/plastics** may also be stored in **Tilt Trucks** within the containerization area.

D. Miscellaneous Information

The Department of Sanitation currently uses a basic formula of **5.6** lbs. of **refuse generated** per student weekly

1. **A**ccording to DSNY the amount of recyclable material is approximately **35%** of general refuse, broken down into **21**% paper and cardboard and **14**% metal, glass **and plastics**.
2. The following is a typical pick up schedule for a school
   - Refuse**/trash** – **Three or five days a week, depending if there is a separate organics pick-up**
   - Recyclables - paper and cardboard- three times a week
   - Recyclables - metal, glass **and plastic**s – two times a week
   - **Organics – Five times a week, if applicable to that area.**

Please note that these are general guidelines and formulas and that final approval by the Department of Sanitation is required before any collection service can begin. The Architect **MUST** consult with the Department of Sanitation during **the** pre-schematic phase to establish specific requirements for a project.

Department of Sanitation Contact:

The City of New York
Department of Sanitation
Office of Collection/Containerization
125 Worth Street, Room 700
New York, N.Y. 10013
Phone 646-885-4830

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

1.3 Planning

1.3.1 Design

1.3.1.9 Architectural Acoustic Standards

This design requirement and DR 6.2.25, HVAC Acoustic Standards, were developed to meet requirements of American National Standard: "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-**2010**), as well as requirements for the NYC Green Schools Guide.

A. Reverberation Control

Uncontrolled reverberation interferes with hearing in instructional spaces. Sound absorbent finishes are needed to control reverberation. Reverberation is quantified using the reverberation time.

The reverberation times for unoccupied instructional spaces in the 500, 1,000, and 2,000 Hz octave bands shall not exceed the following:

- 0.6-seconds for room volumes of up to 10,000 ft³
- 0.7-seconds for room volumes of 10,000 to 20,000 ft³

Use of a lay-in sound absorbent (acoustical) ceiling having a minimum NRC/SAA* of 0.70 will go a long way toward meeting the reverberation time goals in classrooms. On occasion, it may be necessary to provide supplemental sound absorption on upper wall areas should the net area of sound absorptive ceiling be limited by flat-lensed light fixtures or gypsum board soffits. The project's acoustical consultant should evaluate if classroom specific calculations or testing are required.

*Noise Reduction Coefficient (NRC) and Sound Absorption Average (SAA) are defined in ASTM Standard C423.

Uncontrolled reverberation also affects other spaces and is to be addressed by design.

The reverberation times for other spaces shall not exceed the following

- 1.5 seconds for gymatorium spaces and,
- For auditoria, consult a qualified acoustical consultant.

Sound absorption within Cafeterias is to be addressed using lay-in sound absorbent (acoustical) ceiling having a minimum NRC/SAA of 0.90.

B. Sound Isolating Construction

Correctly selected sound-isolating constructions are needed to reduce the transfer of noises from adjacent spaces and from the school's exterior. This is important in minimizing interference with speech communication in learning environments.

1. Sound Isolation - Interior

Between instructional and office spaces and the adjacent spaces listed, provide constructions that, at a minimum, yield the degree of airborne sound isolation listed in the following table:

Adjacent	Airborne Sound Isolation (STC**)	
Classroom	50	
Corridor	45	(Excluding entry doors, which shall achieve STC-35)
Gang Toilets	53	
Music/Dance	60	
Mechanical	60	
Gym	60	
Cafeteria	60	

**Sound Transmission Class per ASTM E413 and ASTM E90

There are two different partition types to achieve STC-50 sound isolation for classrooms. Each of these employ gypsum board on 20 gauge steel studs with a blanket in the cavity.

a. Partitions between classrooms where rear walls of classroom are back to back - The partition composition selected is staggered steel studs in a single track (see standard details) with two layers of gypsum board on each side of the stud and a 2-inch blanket in the cavity. The depth of the studs may be $3^5/_8$" or 4" based on depth required for floor-to-floor heights.

b. Partitions between classrooms and spaces other than toilets, corridors or spaces with a higher STC or ICC requirements – The partition composition selected is a steel stud with a single layer of gypsum board on one side and a double-layer of gypsum board on the other side. The gypsum board at one side must be supported on resilient clips – this face of the partition cannot support shelving and counters. The partition must include 3-inch blanket in the cavity. The depth of the studs may be $3^5/_8$", 4" or 6" based on depth required for floor-to-floor heights. Insulation in stud cavity should correspond to stud width: 3-inch blanket at $3^5/_8$" studs, 3-inch blanket at 4" studs, and 5-inch blanket at 6" studs.

c. Should partitions between classrooms and corridors be designed to include vision panels, these are to be limited to either a sidelite or transom as part of door/frame package (sidelite is indicated in the Room Planning Standards). Glazing at door sidelite/transom shall be provided as minimum 1/4" thick laminated glass, tested to achieve STC-35 minimum. Where borrowed lights in the corridor wall are approved

through the Deviation Process, these must maintain the STC-45 rating of the corridor wall to ensure the GSG credit associated with enhanced acoustics will be achieved. In order to meet this requirement, clerestory size shall be limited to no more than 20% of the overall classroom to corridor wall area (excluding the door/sidelite assembly) and include 1/4" tempered glass, 1/2" air space, 3/8" laminated glass as the minimum glazing assembly tested to achieve STC-40 minimum.

Partition walls between ganged toilets and classrooms should be constructed using $3^5/_8$" studs at each side of the chase with a single layer of gypsum board at the classroom face of the chase and a double layer of gypsum board at the toilet face of the chase. Piping should not be mounted on the chase studs closest to the classrooms. Non-chase partitions between ganged toilets and classrooms may be constructed as described in paragraph B.1.a above.

Where partitions intersect with window mullions, closed cell neoprene foam must be used between end stud and mullion, minimum 1/2" thick with double-sided tape on both sides.

Individual toilets and toilets in pre-k and kindergarten classrooms may use the same construction as indicated for STC-45 below.

The partition between corridors and classrooms must achieve STC-45. This partition must be constructed of 20 gauge steel studs of a minimum depth of $3^5/_8$", with **a** minimum 3-inch blankets in the cavity. The faces should consist of one layer of 5/8-inch gypsum board on one side and two layers on the other, or two layers on both sides as required by fire rating requirements.

STC-60 walls common with high noise spaces such as the music instructional spaces may be achieved with the use of various masonry-based partitions or using 6-inch deep, 25 gauge studs with three layers of 5/8-inch gypsum board on both sides carried full height to structure. A 5-inch thick blanket **is to** be provided in the stud space. Due to structural concerns, there shall be a limit to what can be attached to these 25 gage studs. Consider the need for structural breaks for acoustic isolation in the floor slab.

For ceiling assemblies such as at cafeteria, the STC 60 is to be achieved by using standard concrete and metal deck construction of 3.25" lightweight concrete on 3"metal deck with a ceiling system comprised of ceiling tile with a high NRC (.90) and high CAC (38 or greater) with 3.5" of mineral wool insulation laid across the ceiling. Refer to DR 5.4.1.

Between instructional **and office** spaces and the overhead space listed, provide constructions that, at a minimum, yield the degree of structureborne sound isolation listed:

Adjacent Overhead Space	Impact Sound Isolation (IIC*)	
Classroom/Office	45	
Auditorium	60	
Gymnasium/Gymatorium	60	
Kitchen/Cafeteria/Cafetorium	50	
Mechanical	--	All equipment in mechanical rooms must be provided with external vibration isolators
Music/Dance	60	

Because it is difficult and costly to control the transmission of high-level impact or airborne sound levels from overhead spaces, building planning should avoid placing noisy spaces above instructional areas or offices. Noisy spaces include auditoriums, gymnasiums, and music teaching areas.

To meet IIC-60 for spaces with high noise levels or impact noise, such as music suites or gymnasiums, which are located over instructional rooms and offices, special floated concrete floor construction is needed.

For gymnasiums and gymatoriums, provided supporting laboratory test data is available to substantiate IIC-60 rating, floor shall be comprised of a 4-inch thick normal weight concrete slab on isolators with a 2-inch air space (filled with perlite) to the base slab.

For music suites, provided supporting laboratory test data is available to substantiate IIC-60 rating, floor may be comprised of a 4-inch thick normal weight concrete slab on isolators with a 2-inch air space (filled with perlite) to the base slab or _2" thick recycled rebonded rubber underlayment mat (or two layers of 1" thick) with 4-inch thick normal weight concrete topping (this is the preferable option but it will be the Contractor's decision – Note that 1" is adequate for design but in order to match the 2" design air space/perlite design to be included on drawings 2" or rubber mat is required).

To meet IIC-50, provided supporting laboratory test data is available to substantiate IIC-50 rating, adequate floated floor construction may be comprised of a 4-inch thick normal weight concrete slab on isolators with a 2-inch air space (filled with perlite) to the base slab, or 3/4" thick recycled rebonded rubber underlayment mat with 2-inch thick concrete topping

Impact Insulation Class 45 (IIC-45) for classrooms and office spaces above classrooms (not gymnasiums, music, dance or auditoria) may be met via use of a concrete slab and a well-

sealed suspended lay-in acoustical panel ceiling. The classroom ceiling should achieve CAC-35 or higher when tested per ASTM E1414.

2. Sound Isolation - Exterior

The intent is to provide adequate control of exterior noise penetrating into instructional spaces and offices at sites adjoining objectionable exterior transportation noise sources - highways, railroads and airports. At a minimum, design and select exterior façade constructions to achieve:

- STC-35 (OITC 28) for fenestration, and
- STC-50 for all other façade elements.

The SCA window construction, as outlined in SCA standards, relies on two layers of 1/4-inch laminated glass separated by a minimum 3/8-inch airspace. This glazing is capable of achieving approximately STC-40. If a specific STC/OITC rating for the assembly is required to be documented, specification must be modified to state testing is required and the window constructed such to meet the required STC for the assembly. Higher degrees of sound isolation should be considered for fenestration on a case-by-case basis for schools severely impacted by transportation noise sources such as aircraft or elevated trains and specification must be modified to indicate the required STC/OITC and the required testing.

STC-50 exterior walls can be achieved using CMU and face brick construction, consistent with the SCA standard details.

Lightweight (curtain wall) façade constructions need careful review for sound isolation performance by a qualified acoustical consultant.

Acoustical consultants shall conduct site survey to measure existing ambient noise levels at all project sites to identify site-specific transportation noise sources such as highways, railroads, subways (below grade and elevated) and airports. Where L_{10} statistically averaged noise level exceeds 75 dBA during school hours, acoustic consultant shall identify the recommended glazing configuration to yield classroom noise levels of NC-45 for the L_{10} condition.

C. References

American National Standard: "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-20**10**)

ASTM C423 "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E90 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"

ASTM E413 "Classification for Rating Sound Insulation"

ASTM E989 “Standard Classification for Determination of Impact Insulation Class (IIC)”

ASTM E1414 “Standard Test Method for Airborne Sound Attenuation between Rooms Sharing a Common Ceiling Plenum”

NY-CHPS Version 1.**1** “High Performance Schools Guidelines” sections 5.5.1 and 5.5.2

NYC SCA Design Requirement 6.2.25 “HVAC Acoustical Standards”

1.3 Planning

1.3.1 Design

1.3.1.10 Compliance with NYC Energy Conservation Code (NYCECC), LL 51/23, LEED for Schools and NYC Green Schools Guide, Energy Modeling Studies, and CIP Project Energy Saving Calculations

Description/Design Approach:

A. Applicability

Per LL **51/23**, new buildings and major modification/substantial reconstruction projects over $2,000,000 shall comply with the LEED v4 for Schools, Certified Rating, or equivalent, which is the Green Schools Guide 2019. The term "substantial reconstruction" is defined in LL **51/23** as "a capital project in which the scope of work includes rehabilitation work in two of the three major systems, electrical, HVAC (heating, ventilating and air conditioning) and plumbing of a building and construction work (GC Work) affects at least fifty percent (50%) of the building's floor area". This definition is discussed in greater detail in the Rules and Regulations for the Local Laws issued by the Mayor's Office of Environmental Coordination (Now Mayor's Office of Sustainability). While Local Law 86/05 **that created the Green Building Standards for city buildings** also required a 20% energy cost savings over the energy code for projects over $12,000,000 for new school buildings, Local Law **51/23** does not mandate a percentage of energy cost savings but requires buildings to meet maximum source energy use intensity targets.

B. New Construction (Stand-alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Capacity Projects

To meet GSG 2019 compliance for minimum energy performance, projects must demonstrate a total 5% annual energy cost reduction for new buildings and a total 3% annual energy cost reduction for existing building renovations relative to ASHRAE 90.1- 2010 considering both the regulated and process loads (Appendix G). However, they must also meet the source energy use intensity target of LL **51/23**. The baseline for comparative total source energy use to show compliance with LL **51/23** as set by the Mayor's Office of Sustainability is 70 kBTU/SF/yr utilizing ASHRAE 90.1-2013. This is 50% of the median source energy use intensity (140 kBTU/SF/yr) for buildings designed and constructed for similar uses according to the 2015 benchmarking data for buildings constructed after 1980. Per LL **51/23**, the required source energy use intensity target for 2030 is 38 kBTU/SF/yr for new buildings and 42 for existing buildings, and thus future SCA standards may include provisions that will bring the designs closer to the 2030 target. For an existing building to be required to comply with LL **51/23**, in addition to it being a "substantial reconstruction" as defined above, it must also have "substantial work on the building envelope", which Section 224.1 of the City Charter defines as "the replacement or alteration of 50 percent or more of the building envelope's total glazing area, or 50 percent or more of the building envelope's total area of opaque components,

including, but not limited to, recladding, work on the interior side of exterior walls, such as removal of interior wallboard or plaster, and roof replacements".

To verify that standard SCA school design is compliant with the energy use reduction target requirements of LL **51/23** and to see where the design is in relation to the 2030 requirements, the SCA has conducted several prototypical energy modeling and a detailed Energy Conservation Measure (ECM) studies. In addition to energy savings, carbon reduction is the city's other major goal. These energy modeling and ECM studies determined which ECMs were to be employed in the SCA Standards to meet the city's goals. Additionally, the prototypical modeling/study determined which MEP systems were included in the SCA Standards. The Standards now include the accepted ECMs and designers shall conduct project specific energy modeling and based on the studies, the source energy target is 60 kBTU/SF/yr or below, though may vary slightly above based on the project. Projects that modeling demonstrates the EUI is in the high 60's are to be discussed with the **Sustainable** Design and Resiliency team to determine potential reasons, such as different assumptions made, modeled occupant density and schedules, a high window to opaque wall ratio, or a large kitchen load due to serving more than just the **new** building **addition**.

C. Energy rates

The energy rates used for calculation are to be the latest DCAS rates that the Mayor's Office of Sustainability links to.

D. Capital Improvement Program Projects (CIP)

1. Boiler Replacement:

a. Local Law **32/16** requires that Capital Improvement Projects involving the installation or replacement of a boiler at an estimated construction cost for such installation or replacement of two million dollars ($2,000,000) or more be designed and constructed to reduce annual energy cost by a minimum of ten percent (10%). Local Law **51/23** has an additional stipulation that the 10% boiler energy cost reduction shall not be required for capital projects solely because the project involves replacement of a boiler, unless the cost of the project equals or exceeds 50 percent of the cost of replacing the heating distribution system of the building. Local Law **51/23** projects are to provide for the steam trap replacement. Note that the current SCA strategy is to convert existing boilers to biofuel or to electrify the HVAC system, so full replacement of boiler systems will not be typical. The 2020 NYCECC with its reference to ASHRAE 90.1-2016 is the most stringent path to compare against. The baseline for comparison are boilers with efficiencies equal to that defined in ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC. The annual boiler energy cost savings plus the annual energy cost savings attributable to the new steam traps must accumulate to a total annual energy cost savings of at least 10% compared to the ASHRAE baseline annual energy costs.

b. Energy Savings Calculations Associated with Steam Trap Replacements:

Step 1: Calculate the steam flow in lbs/hr through the fixed orifice of a trap:

Q1 = {24.24 x P (absolute in psia) X Trap Orifice Diameter^2 (Inches)}/2
where 24.24 is a unit conversion factor.

It is assumed that when a trap fails, it fails at a 50% open position (hence the above division by 2) and that any steam that passes through the 50% open trap will be vented out at the condensate return unit or vacuum pump vent. Therefore, this represents an energy loss.

Step 2: Estimate the % of traps that have failed in the building. The Federal Energy Management Program (ref DOE/EE-0193, https://www1.eere.energy.gov/femp/pdfs/FTA_SteamTrap.pdf) states that approximately 20% of the steam leaving a central boiler plant is lost via leaking traps in typical space heating systems without proactive assessment programs. If more accurate data is not available, assume 20% trap failure rate.

Step 3: Determine the total quantity of failed steam traps: % failed X total number of steam traps in the building.

Step 4: Determine the lbs/year lost from all of the failed steam traps:

Lbs/year lost = Step 1 value X Step 3 value X Annual Heating Hours
Annual Heating Hours may be assumed to be 6,193 hours (refer to ASHRAE Fundamentals Handbook 1992).

Step 5: Convert the Step 4 value to BTUs per year:

BTU/yr = Step 4 value X 966 BTU/lb steam

The above savings associated with the repair of the leaking steam traps shall be added to the savings associated with using new steam boilers/burners with improved efficiencies as determined by using the previous tables in order to verify the required 10% energy cost savings.

2. HVAC Comfort Controls Systems and Repair/Replacement of Central Ventilation Units

a. LL**51/23** requires that installation of such systems at an estimated construction cost for such installation or replacement of two million dollars ($2,000,000) or more shall be

designed and constructed to reduce energy cost by a minimum of five percent (5%). The 2020 NYCECC with its reference to ASHRAE 90.1-2016 (for projects filed after 5/12/20) is the more stringent path, but the baseline datum is the annual energy consumption before the replacement of the comfort controls and repair/replacement of the central ventilation units.

b. Savings associated with steam trap replacements are to be included in calculations of energy savings associated with boiler/burner replacements/renovations (and not HVAC Comfort Controls). The scope of HVAC Comfort Control projects should include thermostat/sensor and control valve replacements for all terminal and central units.

c. The energy savings associated with the usage of DCV on the Public Assembly H&V recirculating units are related to the reduction of the tempering requirements with reduced outside airflow. There are no significant electrical savings associated with replacement/renovation of recirculating H&V units since the units maintain constant volume operation. The energy savings associated with the usage of DCV and variable frequency drives on the Public Assembly H&V 100% outside air units are related to reduced outside air tempering requirements plus the reduced electric energy and demand associated with the usage of variable volume units with variable frequency drives. Refer to the Sequences of Operation as defined in Section 15985 for both the recirculating units and the 100% outside air units.

d. The baseline building energy consumption should be determined based on modeling from an existing school with constant volume ventilation of assembly spaces. When HVAC controls are added to Public Assembly spaces with recirculating units, the baseline building supply levels are nominally 1 cfm/sf total air and nominally 0.6 cfm/sf of outside ventilation air while the fans are operating. The improved system has CO_2 sensors that modulate the outside air dampers and hence the outside air ventilation based on occupancy. The minimum outside ventilation air is based on the occupancy defined in the Program of Requirements (POR) (reflecting the UFT contract maximum occupancies). If the space does not have an associated POR occupancy, then the Building Code Chapter 10 egress occupancies are to be utilized.

e. Before the HVAC control sequence is improved for H&V systems for Public Assembly spaces with 100% outside air, the maximum occupancy baseline building total supply (including ventilation) is nominally 1 cfm/sf while the fans are operating. The improved system has a variable volume, variable temperature air handler with CO_2 modulation of outside air by VFD. The minimum outside ventilation air is based on the occupancy defined in the Program of Requirements (POR) (reflecting the UFT contract maximum occupancies). If the space does not have an associated POR occupancy, then the Building Code Chapter 10 egress occupancies are to be utilized. At all times the minimum ventilation rate is adjusted to maintain fan stability and to avoid motor overheating.

3. Per Title 43 Chapter 10, Capital Projects for the installation of boilers at an estimated construction cost of 2 million dollars or more are not required to also comply with the energy reduction requirements for the installation of HVAC comfort controls.

4. Lighting Replacement

   While LL 32/16 **required** that lighting replacement projects over $1,000,000 reduce energy costs by a minimum of 10%, **LL 51/23 removed this requirement. With the use of LED lighting and energy code required controls**, lighting is inherently very efficient.

E. Energy Code Compliance

1. The energy codes require minimum equipment performance, minimization of distribution losses, optimization of controls, and the ability to take advantage of "free cooling", i.e., the usage of an economizer.

2. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in sufficient detail pertinent data and features of the building, equipment and systems as governed by the 2020 NYCECC and ASHRAE 90.1-2016 including, but not limited to, design criteria, exterior envelope component materials, U-factors of the envelope systems, U-factors of fenestration products, R-values of insulating materials, size and type of apparatus and equipment, equipment and systems controls and other pertinent data to indicate conformance with the requirements of the 2020 NYCECC and ASHRAE 90.1-2016.

F. Filing Requirements

1. The EN filing drawing set for each Work Type submitted to Building Code Compliance (BCC) Division shall include a statement by the Registered Design Professional of Record that states; "To the best of my knowledge, belief and professional judgment, these plans and specifications are in compliance with the 2020 Energy Conservation Code of New York City".

2. For new construction and existing buildings undergoing major modification/substantial reconstruction, Energy Analysis sheets shall be submitted that assemble the energy code compliance documentation for the Envelope, Lighting/Power, Mechanical Systems and Service Water Heating System, each signed and sealed by the Architect or Engineer of Record per Section MC 107.10 of the 2022 NYC Mechanical Code. The designer will need to include the energy model in a form acceptable to the NYC Building Department on the EN drawings to demonstrate NYCECC compliance and the designer shall file form EC-1.

1.3 Planning

1.3.1 Design

1.3.1.11 Construction Requirements in Flood Hazard Areas

Description/Design Approach:

A. New Construction

1. New School facilities built in **Flood Hazard Areas** shall be designed with particular attention paid to the potential for flood damage to the building structure and finishes, building MEP systems, utility & sewer installations and to site development activities (grading, filling, paving, excavations etc.) The design parameter for flood-resistant construction shall be the 1% (100-year) levels indicated on the "Preliminary Work Map" or "Advisory Base Flood Elevation" (ABFE) (depending on location in the city) last updated by the Federal Emergency Management Agency (FEMA) in June 2013 (and upon official issuance in the future of these elevations as provided in the final flood hazard maps, which are being developed by FEMA) and as required by Appendix G of the **2022** NYC Building Code.

2. If not revealed in either the "Preliminary Work Map" or ABFE FEMA maps (such as Zone X), FIRMs 360497 or FIS 360497, the designer shall seek the data for the 1% (100 year) flood levels from records maintained by the New York State Department of Environmental Conservation (NYSDEC). In case the NYSDEC's reponse to the designer's request for the BFE indicates that the information is not available, the BFE shall be considered to be the same as the adjacent A-zone elevation.

3. The Design Flood Elevation (DFE) relative to the "Preliminary Work Map" or ABFE (BFE when maps are revised) shall conform to guidelines established in ASCE 24**-14**, tables 2-1, 4-1, 5-1, 6-1 as amended in Appendix G for **Flood Design Class 3, which is 2'-0"** minimum above the ABFE. Selection of the DFE shall be such that the proposed locations for water supply pipe, sewer lines and other utilities as well as buried or above-ground tanks will prevent flood water from entering or accumulaitng within components of these building systems and equipment. **In addition to meeting code requirements for the DFE, as part of the IDP process of the Green Schools Guide the use of the mayors' Office of Resiliency "Climate Resiliency Design Guidelines (Version 4)" are to be reviewed and the DFE recommended by that guide discussed and, if approved by Capital Plan Management, implemented.**

4. Where at-grade entrance lobbies or other such at-grade or below grade areas are required to be below the DFE to provide access into the building, utilize flood-resistant materials for finish materials, devices or protectives and, wherever possible, keep interior mechanical and electrical items above the DFE. Utilize dry floodproofing techniques if feasible. Seeded areas adjacent to the building are to be designed to address the possible affects of scour that may undermine the soil at grade beams and pavements. Designers shall consider means to stabilize such areas; for example through the use of appropriate modular permeable paving systems. Those buildings in an area of moderate of high-velocity wave action (Coastal A-Zone **or V-Zone**) shall have the foundations and other structures designed to resist wave action.

5. The designer must develop plans, details, data and other documentation to demonstrate compliance with the provisions for flood-resistant construction as stipulated in Appendix G and shall provide on the drawings a note stating that the building is within the **Flood Hazard Area**. BCC's approval shall be required and a permit shall be issued for the developed plans which shall be formulated on, among other things, conditions of a special flood hazard in A-zones (flood-prone areas without high velocity wave action), Coastal A-zones (flood prone areas with moderate velocity wave action) or V-zones (flood-prone areas with high velocity wave action).

6. In either A-zones, Coastal A-zones, or V-zones, the designer shall indicate on the construction documents that the relevant certifications for each trade, as required in Section BC **G104.2.3**, are in place.

B. Construction in an Existing Building

1. While compliance with Appendix G is only required by code if the cost of the repair is more than 50% of the market value of the building (refer to RCNY 3606-01 for method of calculation of market value), all Capital Improvement Program projects are to have the location of the building verified against the Preliminary Work Maps" or ABFE maps (depending on location in city). If the building is within the 1% flood zone, the EOR is to utilize the DFE in designing the work and where necessary, utilize dry floodproofing methods to protect the newly installed work. The Design Flood Elevation (DFE) relative to the "Preliminary Work Map" or ABFE (BFE when maps are revised) shall conform to guidelines established in ASCE-24, tables 2-1, 4-1, 5-1, 6-1 as amended in Appendix G or future local laws as required for **Flood Design Classification 3,** which is currently **2'-0"** minimum above the BFE. Included in the dry floodproofing are to be "standby" generators and sump pumps if feasible to install. Follow the requirements of TPPN #01/2007 for loads that must be placed on this voluntary generator (Note that an elevator would need to be included as a load on the standby generator only if under the requirements of the **2022** Building Code an emergency generator would have been required for the building).

2. For areas where new work will be located below the DFE, consider the following for inclusion in the project (work above the DFE need not follow):

   a. Replacement gym floors and dance floors located below the DFE shall utilize a non-wood option. Refer to DR 5.3.1.

   b. New and replacement interior walls shall be concrete block if the proximate walls are also concrete block or other flood-resistant material. If the proximate walls are gypsum board, the new or replacement walls can follow the same construction. Selection of flood-resistant wall and floor finishes shall be considered.

   c. Mechanical and electrical equipment is to be raised as high as possible within the space while still being at a level that allows for normal operation and facilitate maintenance of the items. If the equipment cannot be raised to the DFE, the area in which they are located is to be dry floodproofed, if cost effective.

   d. Replacement of electrical distribution systems should be above the DFE, with branches feeding down to terminating devices above the DFE as much as possible.

e. Replacement **for** boilers shall be of a type (such as scotch marine **or heat pump systems**) that require minimum head room in order to permit an existing boiler pit to be filled, and a raised concrete pad installed for the boiler, all within existing height limitations. Note that seeded areas that must be excavated to bring the boilers into the building should be designed to mitigate the potential for future scour from floodwaters, such as the utilizing large gravel backfill and a modular paving system.

f. Mechanical/gas vents shall be raised above the DFE if practical. Crawl space vents and louvers **below** the DFE shall be considered for dry floodproofing (using flood barriers) or raising intakes/outlets **above the DFE**.

g. Backwater Valves shall be installed on sanitary drainage lines leaving the building. This will typically entail separating the storm lines (areaway drains, roof drain system, etc.) from the sanitary lines. The sanitary system shall be further separated so that the cellar/basement fixtures (those below the street level) are drained to a sewage ejector first. The sanitary line from the ejector shall join with the upper floor sanitary lines after the sanitary house trap and an automatic backwater valve installed downstream of that connection. The connection of the sanitary line with the storm line shall be downstream of that backwater valve. The areaway drains are to go to a sump pit first if they do not do so already and a sump pump utilized to feed into the storm line.

h. Replacement doors, if practical depending on type and frequency of use, may be of a flood resistant type.

3. Due to the potential cost and operations impact of designing to the DFE, the SCA will review the scope's recommendations to determine which items should move forward. Dry floodproofing and other flood mitigation measures that go beyond simple raising of the equipment within the existing MER shall be listed as an "Additional Recommended Item" in the Scope Report.

1.3 Planning

1.3.1 Design

1.3.1.12 Interior Bicycle Storage

Description/Design Approach:

A. Provision for **enclosed** bicycle parking shall be incorporated in the design of the building in accordance with Sections 25-811 **(residential zones)** and 36-711 (**commercial zones)** of the NYC Zoning Regulations. **Floor area used in the calculations to determine the amount of bicycle parking is based on the definition of floor area calculated in accordance with Section 12-10 of the NYC Zoning Regulations**.

1. New Buildings**, including additions filed as new buildings**

   - One bicycle parking space shall be provided for each 10,000 SF of floor area. **Any fraction of a space greater than 50% shall be counted as an additional space.**

2. Additions **filed as an Alt 1**

   - **If the area of the addition (enlargement) increases is the existing building footprint by 50% or greater, o**ne bicycle parking space shall be provided for each 10,000 SF of new floor area. **Any fraction of a space greater than 50% shall be counted as an additional space. No bicycle parking is required if the addition is less than 50% of the existing building footprint.**

3. Major modernizations where estimated cost of alteration exceeds fifty percent of the cost of replacement of the building:

   - I**f the existing building has enclosed bicycle parking, provide accessible parking spaces per Section BC 1109.9.3 of the 2022 NYC Building Code as indicated in Paragraph D below.**

B. No bicycle parking spaces are required for buildings less than 35,000 SF of floor area **(3 parking spaces or less)**.

C. Enclosed space for bicycle storage shall be provided in the building. A room or space sized to accommodate the required number of storage spaces, based on 15 SF of area per parking space shall be provided on the first floor of the building or in the basement or cellar when space on the first floor is limited. The bicycle storage space/room is to be in the proximity of the building lobby and/or stairs and accessible to the designated users.

D. Where cycle storage is provided, accessible cycle storage shall be provided as per Section BC 1109.9.3.
1. **Ten (10) percent of cycle storage shall be for accessible cycles, minimum one.**
2. **Minimum area for the accessible cycle storage shall be 86” long and 42” wide.**
3. **Provide an accessible route to the accessible cycle storage area as per ICC/ANSI A117.1-2009.**
4. **Provide turning space as per Section 304 of ICC/ANSI A117.1-2009.**

5. **Provide clear floor space for a loading area on the long side of the accessible cycle storage as per Section 305 of ICC/ANSI A117.1-2009.**

In addition to the above requirements, the entrance door with the code required automatic door opener shall be 42" wide in size to accommodate the accessible cycle. If a ramp is required along the route to access the cycle storage, provide sufficient turning space (86"x 60") for accessible cycle at the top, bottom and intermediate landing. While not mandatory, it is preferable for accessible cycle storage space to be located near the school's accessible entrance(s).

E. Storage may be provided by means of

- An area equipped with bicycle racks **with a minimum 42" wide opening**
  or
- A room **with bicycle racks** with **42**" wide HM door and lockable hardware.

F. Refer to DR 2.2.3 for the required exterior covered bike parking that must make up the remainder of required bike parking (in addition to the zoning mandated enclosed bike parking) to meet Credit L2.2 of the 2019 Green Schools Guide.

1.3 Planning

1.3.1 Design

1.3.1.13 Selection and Use of Color in Schools/Presentation Boards and Review

Description/Design Approach

A. Selection and Use of Color

Color can be a very influential element in the design of an educational facility. It is an important part of the child's development throughout the K-12 years, and is integral to their seeing themselves and their environment as special and unique. It is important that it be given appropriate attention during the design process, and not be pulled together as a result of product availability, color trends, or personal subjective preference. Design professionals are to explain the rationale behind their color choices. If a firm lacks experience or expertise in planning for an appropriate color palette and scheme for a school, an appropriate sub-consultant is to be engaged to enhance this aspect of the work.

To develop a "standard" palette of colors for all schools would not be practical or beneficial; however, the following are the general guidelines concerning color in K-12 environments.

1. General

a. The influence of Color: Studies have found that colors can influence student attitudes, behaviors and learning. Warm, bright colors are stimulating and promote movement and activity – lively colors for lively functions. Cooler colors are calming and serene. Color can affect a student's attention span, as well as the students' and teachers' sense of time. Carefully planned color schemes made up of colors that students like, and appropriate alignment of color with the intended function of a space can positively affect student performance. The successful use of color in schools will create an environment that is pleasing, exciting and motivating, and will promote positive feelings about school.

b. Age-Appropriate Colors: In general, children of different ages relate well to different color palettes. For the youngest school children, primary and secondary colors as accents are both familiar and distinct. Light, warm colors such as pale salmon or peach, or soft yellows on the walls fit well with the sunny disposition of young children. Students in intermediate and high school grades will appreciate and relate to more complex and sophisticated colors, including variations within the neutral color range, and even more adult colors such as black and gray. For these students, subtle and/or cooler hues on the walls provide an environment conducive to concentration. Pale shades of cooler colors can have a beneficial affect on the educational experience, and would be especially applicable in classrooms and other study spaces.

c. Color Value: The value of a color, its lightness or intensity, affects how a color is perceived; deep, dark colors advance, while light colors recede. If a small room is desired to appear larger, painting it a light color will create an expansive appearance. Columns within a space will be less apparent when given a light, cool color; a strong or dark value will make them stand out as solid elements. Interior rooms and corridors

benefit from wall colors that are a very light or white color. Current lighting power density requirements dictate very low watts/sq ft, and limited light will be magnified by the reflection off white or pale surfaces – this is extremely important for corridor walls. "Life Savers" candy colors should not be used for any fields of color in a school building.

d. Color and Pattern: The designer will need to develop an overall color and pattern language with rules and logic. Too much color or pattern can easily overwhelm- when in doubt, minimize. Even as the use of color and pattern vary depending on space and function, the palette and pattern variations should knit together into a meaningful whole giving the building an overall sense of identity. The successful handling of color and pattern will optimize the school experience for everyone in the building. Remember once the building is filled with children and their work, too much additional color and pattern can easily be over the top.

e. Accent Colors: Accent colors, and accent walls within spaces, can be included strategically throughout the school building to provide focus and interest. Splashes of color in a well-planned and limited way are effective in providing a moderate amount of stimulation as well as visual relief. Overuse of deeply saturated, bright hues will be over-stimulating and distracting.

f. A System of Order and Wayfinding: The use of color can offer a system of order in the building, and can help distinguish important elements in the environment from less important ones. The use of color as an aid to wayfinding is particularly important for primary school children whose early school achievements include color matching and identification. Children readily relate color to location. For example, in a school having multiple floors, different principal colors can be used to identify each floor level. Color can also signify a special function, as with stair doors or elevator doors.

2. Interior Colors

a. Specific Spaces

1) The different venues within the school building offer opportunities to use a variety of different colors - limited accents of vibrant, stimulating colors, as well as large fields of calming, comforting hues. The designer can bring all of the principal colors together in large shared spaces that will be used by all of the students. The limited inclusion of bright, attention-getting colors or the use of mild, calming colors depends a lot on the function of the space.

2) Corridors: Corridors can be ideal spaces for accents of bright colors. On the other hand, some designers prefer muted colors in the corridors to allow the colors of the children and their work to stand out. Strategic use of appropriate colors can help visually shorten long hallways and enlarge small ones. In most cases, the entire corridor should not be limited to only one color. Accent colors can be included successfully at significant locations or as part of the tile wainscot design. Whether the accent color lines the drinking fountain alcoves or punctuates the wainscot itself, the accent logic and elements should be used consistently throughout the building to yield a sense of order and well-being. The corridor floor color and pattern can also be used to provide interest and focus. Be careful that color and pattern of floors and walls do not conflict or become too busy.

Be mindful that the corridor design not be so busy or "color-full" that it ends up overwhelming the space and competing with the display of children's artwork and school experience rather than enhancing it.

3) **Classrooms**: In classrooms, students and teachers need to feel stimulated and motivated, but at the same time, the colors shouldn't discourage concentration. Painting the "teaching wall" a slightly deeper or brighter hue than the sidewalls is an effective technique, or the teaching wall can be painted a pale color while the other walls are white. This will help to focus attention on the front of the classroom, and it gives students a visual break when focus is shifted to the sidewalls. Be aware of the fact that different colors and values of color have different light reflectance and will affect the level of foot candles required for each space. Light hues will add to the feeling of lightness and airiness in the space.

4) **Libraries**: The school library should be an inviting and welcoming space for students. Using color to warm and brighten the library space encourages students to read. Walls and stacks lined with books can be energized by the use of color.

5) **Auditoriums, Gymnasiums and Cafeterias**: These spaces pose challenges when it comes to both lighting and color. Their large size makes color selection a critical issue - bright colors on large expanses can easily overwhelm the space. Lighter warm tones or neutrals are recommended for the main color; brightly colored accents can invigorate the room. For large spaces that are fully or partially below grade, the right use of light and color can give a feeling of expansiveness and openness.

b. Materials - Color and Pattern

1) A multicolor, dark carpet will hide stains and soil.

2) Grout color for floor tile should always be a tinted shade, rather than white, to avoid the appearance of staining and discoloration.

3) In the classroom, horizontal surfaces with a field of color (such as the sink and computer counters, or maybe even the tops of low built-in shelving) should be designed with the same color and materials, if possible, for a consistent appearance. Selecting a single type and color for all of the wood trim, millwork and wood furniture included in a room will add to the perception of a well-designed whole.

c. Maintenance Considerations

1) The intent of the color selection is to make the school colorful and beautiful, but also consider the maintenance crew who will be called upon to paint the school interior periodically and to replace tile as necessary.

2) It is important to have a practical limit on the number of different colors in any one corridor or individual classroom, or on any one floor. In general, when the doors and door frames on a corridor get repainted, they will all be painted the same color; when the classrooms on a specific floor get repainted, it will be much easier if their colors are consistent throughout the floor. The custodian will keep a stock of paint colors for touch-ups – be reasonable about the number of different colors.

The same is true of the ceramic tile in corridor wainscots and bathrooms. If the color palette includes two hues that are very close to the same, select only one of them for ease of upkeep over the years.

3) Be realistic about the ability of the maintenance painters to keep with your design intent. Change colors at a change in the architecture – the painter may not tape to keep a crisp line.

3. Exterior Colors

a. The exterior color palette should be developed in consideration of and relationship to the surrounding environment, both the built environment and the landscape. The design must address the neighborhood context. Consider one material and color palette of significant neighborhood buildings that may be viewed from the School (even from upper floors).

b. Light colored perforated metal security screens at windows will read as opaque; black or very dark will read as transparent.

c. Be sure to read and understand the SCA's Design Requirements regarding the use of exterior materials and components, and extent of glazed area. These requirements have been developed in consideration of constructability, life-cycle cost and sustainability, and they will channel the opportunities for the school's exterior design. Consider one material and color palette of significant neighborhood buildings that may be viewed from the School (even from upper floors).

B. Presentation Boards

1. Introductory Boards (for Executive and Community Use)

Introductory Boards shall be prepared on individual foam core boards (24"x36") for Executive and Community Presentation use and shall include:

a. Area Plan
b. Site Plan
c. Exterior Rendering/3d view of School
d. Name, location, Capacity
e. Fact Sheet with Year opening, Gross area, Grade level, etc.
f. Floor Plans and Building Sections

2. Color and Materials Presentation Boards (for selection of color schemes)

a. Color and Materials Boards Review and Selection: Materials and colors shall be provided on individual space specific boards (24: x 36").

b. Boards shall show colors, materials and patterns, on floor plans, wall elevations and reflected ceiling plans (showing "unfolded" or otherwise-related planes to give a sense of the whole space). Include colors of doors and door frames. Boards should present the following spaces:

1) Corridors, each floor
2) Assembly Spaces (i.e., cafeteria, auditorium, gym, gymatorium)

3) Lobby Area
4) Toilet Rooms, student and staff
5) Typical Classrooms (include built-ins, sink and computer counters, HVAC enclosures)
6) Library (include built-ins, etc.)
7) Other significant or unique interior spaces
8) Building Exterior with samples of all materials showing color and finish
9) Rooftop playground, if included

c. 3D perspective sketches may be provided as necessary for a comprehensive and coordinated review of key school spaces.

d. All colored renderings (including doors and door frames) should match the actual product color as closely as possible.

C. Color and Materials Review Process

1. **Project Review:** At the 60% document phase development, a presentation is to be scheduled for A&E review of the proposed colors. Senior A&E management will provide preliminary approvals before review by the SCA executive office and any outside presentations to principals or school administration.

2. **Executive Review: Following approval by A&E senior management**, there will be an internal SCA presentation to the SCA executive office for review of the color and material boards. The presentation shall include the Introductory (community) Boards for the project along with the Color and Material Boards. Subsequent to that review, modifications may be requested to ensure a consistent level of response to all related issues.

3. **Color Review by School/District Staff**: **The design team shall schedule a presentation meeting of the colors approved by the executive office for DOE concurrence by the principal for addition/annex projects or the District Superintendent for new buildings.**

4. **Executive Final Review (if needed):** If the DOE requests major deviations from the SCA executive management approved boards, the proposals will be brought back to the executive office for review and final approval.

5. **Updated Boards:** The final set of boards, inclusive of all updated information, shall remain with A&E until one year before school opening, at which time they will be transferred to the SCA's FF&E Department. The Architect of Record shall maintain a second set of the project boards for record purposes.

1.3 Planning

1.3.1 Design

1.3.1.14 New York City Fire Code Requirements Regarding Rooftop Access and Obstructions

Description/Design Approach:

A. This Design Requirement was developed specifically to address the NYC Fire Code requirements regarding rooftop access and obstructions. Designers are to verify their designs are compliant with the below requirements. If the design has areas that are not able to be compliant due to site configuration and equipment, the designer is to submit the design to the FDNY Rooftop Access Unit for review and acceptance.

B. Per Section MC 304.13 of the **2022** NYC Mechanical Code and Section FGC 306.7 of the **2022** NYC Fuel Gas Code, equipment and appliances installed on rooftops of buildings shall be installed in accordance with the requirements of the New York City Fire Code regarding rooftop access and obstructions, and shall not obstruct or interfere with firefighting operations or the operation of any doors, windows, fire escapes, or other means of egress or other building components requiring operation or access.

C. Rooftop access by the FDNY is used for ventilation and for surveillance and rescue operations in rear yards and courtyards. Ventilation involves opening the roof bulkhead door, scuttle, and skylights, and, if necessary, cutting roof openings. Ventilation serves to vent heat and smoke to facilitate interior firefighting by FDNY personnel. Ventilation also serves to prevent explosions and control the horizontal spread of the fire. **The following highlight most of the 2022 New York City Fire Code requirements as they pertain to schools.**

1. **Section** FC 504.4 - Rooftop Access and Obstructions:

The rooftops of buildings 100 feet or less in height, except rooftops with a slope exceeding 20 degrees from the horizontal, shall be designed, installed, operated and maintained in accordance with **Section** FC 504.4 and in a manner that avoids or minimizes obstructions that impede firefighting operations such as vertical ventilation of heat and smoke, surveillance of rear yards and courtyards, and rooftop-aided rescues. For purposes of **Section** FC 504.4, only, “rooftop” shall include rooftops of building setbacks, and “obstruction” shall mean any fixture or other item that is not readily movable by one person without the use of tools or equipment, including air conditioning systems, billboards and other signs, cellular antenna equipment, columns and girders, cooling towers, fuel oil storage tanks, generators, heating systems, planters, solar panels, ventilation system ducts, intakes and exhausts, and window cleaning equipment, but shall not include nonmetallic decking that is readily cut by standard power tools.

2. Section FC 504.4.1 Rooftop Access:

Access to building rooftops shall be provided for fire operations by providing unobstructed access to the rooftop, including unobstructed passage across the building parapet, perimeter fence or other obstructions, and a safe landing. Such rooftop access shall be provided in compliance with the following required clearances:

a. For each 12 linear feet of building perimeter accessible from the frontage space of the building and from any other exposure accessible to fire apparatus, a minimum clearance of 6 feet in width and 6 feet in depth from any obstruction shall be provided at the parapet wall or other perimeter of the rooftop.

b. Where such building perimeter is 24 linear feet or greater, but less than 36 linear feet, the required clearance openings shall be separated by a distance of not less than 12 linear feet.

c. Where such building perimeter is 36 linear feet or greater, the required clearance openings may be contiguous, provided, however, that such contiguous openings shall not exceed 12 linear feet and shall be separated from other required clearance openings by a distance of not less than 12 linear feet.

d. Each exposure accessible by fire apparatus may be treated separately for purposes of locating clearance openings and otherwise complying with the requirements of this provision.

e. Awnings, sun control devices, solar panels or other structures affixed to an exterior building wall below the roof line shall not obstruct fire apparatus aerial ladder access to the rooftop perimeter access locations.

f. Scaffolding obstructing rooftop access locations shall be designed to provide secure landings at such locations in an approved manner.

3. **Section** FC 504.4.2 – Rooftop Access Signs and Markings:

Where required by the fire department, a sign, decal or approved marking shall be provided on the exterior wall of a building, at an approved location on a lower story, directly below the rooftop perimeter access landings, to identify the location of such rooftop access. The fire department may require such signs or markings when rooftop conditions not apparent from the street make rooftop access unsafe at locations other than the approved building perimeter access landings, or do not allow for access to the roof.

4. **Section** FC 504.4.3 – Rooftop Access Landings:

At each rooftop perimeter access location, there shall be a safe landing area not less than 6 feet in any dimension **and 9 feet in height**, connected to the clear path required by **Section** FC 504.4.4. The landing shall not be obstructed by a fence, except as approved. If approved, such fence shall be provided with a standard 3-foot-wide gate that swings inward. Such gate may be secured by a padlock and chain capable of being cut by standard bolt cutters from either side of the gate, or secured by other approved device.

5. **Section** FC 504.4.4 – Rooftop Clear Path:

A clear path of not less than 6 feet horizontal width and 9 feet in height shall be provided from the front of the building to the rear of the building and from one side of the building

to the other for each 100 linear feet of rooftop width and depth. Such path shall comply with the following requirements:

a. Such clear path shall be accessible from each rooftop perimeter access landing required pursuant to **Section** FC 504.4.3.

b. Such clear path shall afford reasonable access to bulkhead doors, fire escapes, access ladders, cockloft vents, skylights, scuttles and shafts. Such access shall include, to the maximum extent practicable, 3-feet clearance on three sides of the skylight or scuttle.

c. A conduit or pipe may cross such clear path in accordance with **Section** FC 504.4.7 as described below.

d. Any lawful fence obstructing such clear path shall be provided with a standard 3-foot-wide gate, which may be secured by padlock or chain capable of being cut by standard bolt cutters, or secured by other approved device.

e. When the main building rooftop has more than one level, a fixed ladder or other approved means shall be provided to afford access along the clear path from one roof level to the next, excluding any height differential between levels exceeding one story or 16 feet, and any level with a rooftop area that is less than 6 feet in any dimension.

f. On an "H"-shaped building or other building whose irregular configuration renders a single clear path inadequate to provide access to each wing of the building or other rooftop area, the fire commissioner may require one or more additional clear paths to provide adequate access to such rooftop areas.

6. **Section** FC 504.4.5 – Rooftop Clear Path Protection:

Adequate protection, in the form of a securely affixed protective railing or barrier that is 42 inches above the roof surface in height along the clear path, shall be provided for any shaft, building perimeter or elevation adjoining the clear path or rooftop perimeter access landing (except the rooftop access landing itself).

Exception: Height differentials of 6 feet or less.

7. **Section** FC 504.4.6 – Required Rooftop Clearances:

A minimum clearance of 6 feet in all directions shall be provided from each door opening onto a rooftop from a dwelling unit, stairway, bulkhead, or other occupied space or means of egress, as measured from the door hinge. A minimum clearance of 3 feet in all directions shall be provided from any fire escape or rooftop access ladder, as measured from each side of the ladder or landing.

8. **Section** FC 504.4.7 – Rooftop Conduits and Piping:

To the maximum extent practicable, conduits, including cable trays, and piping, shall be installed at rooftop locations where they do not obstruct rooftop access landings, clear

path or required clearances. If it is impracticable to avoid these areas, conduits and piping shall be designed and installed to facilitate access and minimize tripping hazards. Steps or ramps (or platforms with steps, ramps or ladders) shall be provided that are constructed of noncombustible material, equipped with railings, and designed to allow any conduit or piping installations that exceed 1 foot in height above the roof surface, or more than 24 inches in width, to be readily traversed. Steps, ramps, platforms and ladders shall not be placed in areas or in a manner that would obstruct any door or means of egress. All conduits and piping installations shall be color-coded with continuous, durable and weatherproof reflective or luminescent markings as follows, and for conduit and piping installed after July 1, 2014, shall be continuously labeled in an approved manner to indicate its contents:

a. High voltage wiring – Red
b Low voltage wiring – Orange
c. Natural gas piping – Yellow
d. Other compressed gas piping – Yellow, labeled at regular intervals with the type of gas
e. Fuel oil piping – Yellow with black stripes

9. Section 504.4.8 – Rooftop access underneath cantilevered or overhead buildings.

Where a building is constructed directly above another building, including a building cantilevered over another building, a vertical clearance from the rooftop of the building below shall be provided for firefighting operations in accordance with the following requirements. Design and installation documents documenting compliance with this section, including the fire analysis filed with the Department of Buildings, shall be submitted for Fire Department review and approval. Such vertical clearance:

a. shall be at least 12 feet; and
b. shall be at least 9 feet above the highest building feature on the rooftop when the building feature is 25 feet or less from the closest exterior surface of the building constructed above; but
c shall not apply to rooftop areas above which a noncombustible screen wall or other similar structure has been constructed for purposes of zoning compliance, provided that such structure extends below the cantilever from the side wall of the new building facing a street for a width not to exceed 8 feet (2438 mm) and a depth not to exceed 12 feet.

10. Section FC 504.4.**10** – Rooftop Telecommunications Installations:

Telecommunications installations on building rooftops, including cellular antenna installations, shall additionally comply with the following requirements:

a. Transmitting antennas shall be identified by affixing to the antenna, the antenna mounting, or a conspicuous location near the antenna, continuous, durable and weatherproof reflective or luminescent markings and not less than 3-inch lettering that reads, “TRANSMITTER.”

b. A durable sign shall be conspicuously posted on or near any equipment closet, roof base station or similar telecommunications antenna installation, identifying the owner of the installation, providing a 24-hour/7-day per week telephone number by which such owner can be contacted, and identifying the installation, including antennas and other powered equipment associated with the installation, by number or other unique designation.

11. Section FC 504.4.**11** – Rooftop Gardens:

Rooftop gardens and landscaping, including living walls, shall be designed, installed, operated and maintained in compliance with the requirements of the construction codes, including the **2022 NYC** Building Code and **Section** FC 504.4.

a. Section FC 504.4.**11**.1 – Perimeter and Clear Path Access:

Rooftop gardens and landscaping shall not obstruct any rooftop area access to which is required pursuant to **Section** FC 504.4, including rooftop perimeter access and landings, clear path and clearances.

b. Section FC 504.4.**11**.2 Landscaped Rooftops:

Rooftop access landings, clear paths and other areas access to which is required pursuant to **Sections** FC 504.3 and FC 504.4.4 may be landscaped in compliance with the following requirements:

1) The earth or other landscaping material in such areas shall be securely contained and compacted in such a manner as to ensure a stable, continuous surface with a slope not exceeding the slope of the rooftop.

2) Vegetation in such areas shall be limited to grass or other plants that do not exceed 12 inches in height and do not constitute a tripping hazard or pitfall.

c. Section FC 504.4.9.3 - Maintenance and Water Supply:

Rooftop gardens and landscaping shall be maintained and provided with a water supply in accordance with **Section** FC 318. Equipment used for the maintenance of rooftop gardens and landscaping shall be stored in accordance with **Section** FC 318.

12. Section FC 504.4.**12** - Rooftop Solar Installations:

Rooftop solar installations shall be designed, installed, operated and maintained in accordance with **Section** FC 512.

1.3 Planning

1.3.1 Design

1.3.1.15 Miscellaneous Coordination and Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the Drawings:

1. In order to ensure adequate notification of work affecting adjoining properties and their required protection, the fall zone limits are to be indicated on the Drawing(s) that take into account building code and SCA Safety Unit zone of influence for protection and notification of adjacent property owners (typically removal, site or demo plans).

   a. The Designer will identify at scope completion if adjacent properties will be affected by the proposed work.

   b. Prior to completion of any project with work that will affect adjoining properties, CM, the Safety Unit, and the AEOR are to convene and determine the fall zone limit of projects affected by the work and require protection.

   c. The fall zone limits are to be drawn on a plan with the adjoining properties distinctly indicated.

   d. Historic buildings within the zone of influence required by the code for monitoring are also to be so indicated.

   e. Such drawings shall be provided to CM in advance of project turnover and do not need to be sealed or filed with DOB.

1.3 Planning

1.3.1 Design

1.3.1.16 Accessibility Design and Construction Tolerances

Description/Design Approach:

A. General

1. Construction tolerances are especially important in regard to compliance with the Americans with Disabilities Act (ADA). Too often, when the reality of tolerances are ignored, the results can include costly field modifications, delays, or even legal disputes. Per ADA 104.1.1, all dimensions are subject to conventional industry tolerances, except where the requirement is stated as a range with specific minimum and maximum end points.

2. To provide some room to allow for construction errors, all new construction shall incorporate the below requirements into the design drawings. For alterations that trigger accessibility compliance, designer shall incorporate the below requirements into the design drawings unless site conditions do not allow these construction tolerances. If the requirements cannot be incorporated, consult with the SCA Accessibility Unit (AU).

B. These dimensions are all "clear" dimensions, measured from finish floor or wall surfaces, and are *not* intended to increase the overall square footage of new school projects. These dimensional tolerances are adapted to allow for full compliance with accessibility requirements, even when field conditions during construction vary from the design.

1. When a range is permitted by ADAAG or ICC A117.1, the design shall meet the middle of the range.

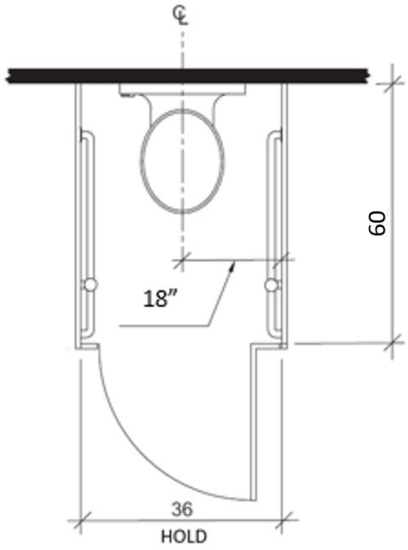
2. Where accessibility requirements call for a max. or min. dimension, a dimensional tolerance of 1" less than the required maximum or 1" more than the required minimum shall be shown on the drawings.

3. When neither a minimum, maximum nor range is specified (such as in transfer type shower compartments), absolute dimensions must be provided. Design drawing shall call out "Finish to Finish/HOLD" to direct the Contractor to ensure the required dimension is met.

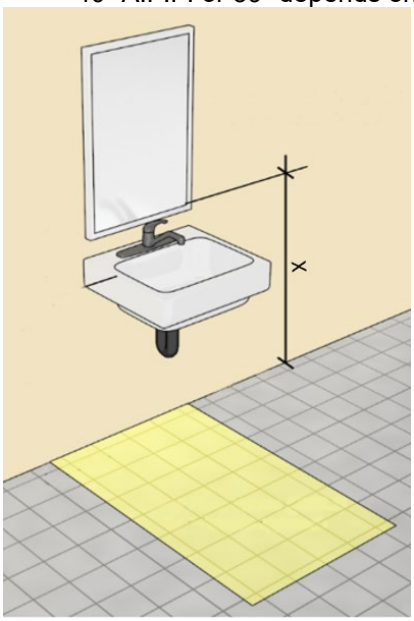
C. Some common examples of these tolerance guidelines are listed below. However, these guidelines must be applied where applicable to other elements and construction, such as reach ranges, obstructions into the circulation path(s), clear widths, etc.

1. Toilets

a. Accessible toilets: Add 1" beyond minimum required clear width between plumbing fixtures and obstructions.
b. Ambulatory accessible compartment:
   1) Depth: 60"
   2) Width: Finish to Finish/HOLD @ 36"
   3) Centerline of toilet fixture to finish partition: 18"



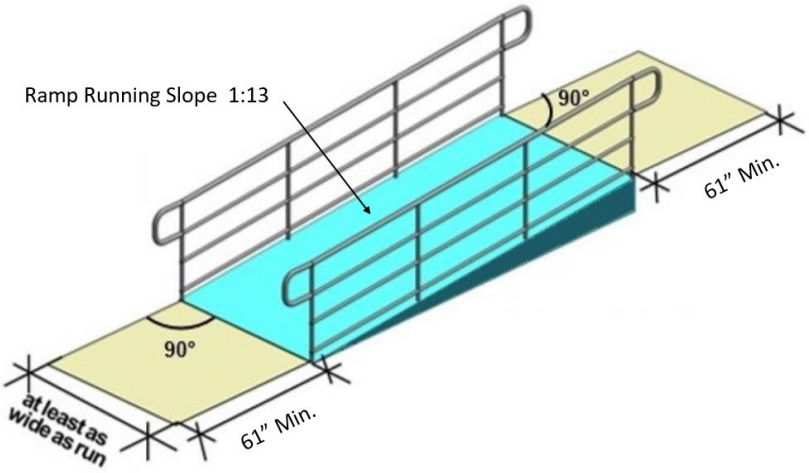
c. Mirror
   1) Above lavatories or countertops:
      a) 3K-PreK: the bottom edge of the reflecting surface shall be 33" above Finish Floor (A.F.F.)
      b) K – 5th Grade: the bottom edge of the reflecting surface shall be 39" A.F.F.
      c) 6th – 12th Grade and Staff: the bottom edge of the reflecting surface shall be 40" A.F.F. or 39" depends on type of mirror or lavatory.



   2) Not located above lavatories or countertops: the bottom edge of the reflecting surface shall be 34" A.F.F.

2. Ramps

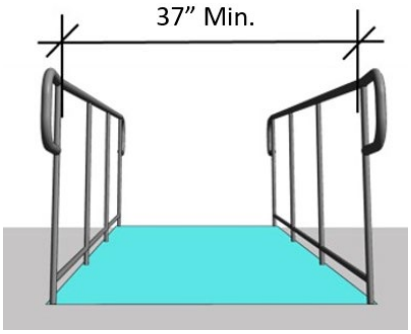
   a. Ramp designs shall have a rise/run ratio of 1:13. This should allow for settling of concrete or construction tolerances that may occur in the field.



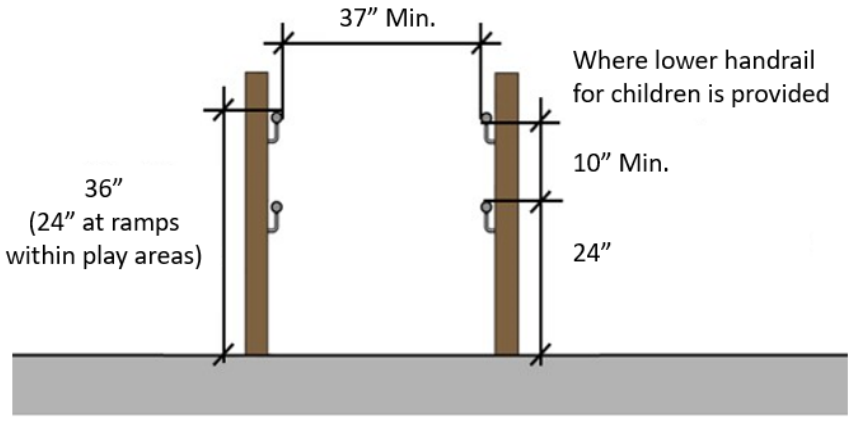
   b. Ramps within play areas connecting ground level play components shall have running slope of 1:17.
   c. The clear width of any ramp run shall be min. 37"
   d. Each individual ramp run shall not exceed 29" rise.
   e. Where ramps change direction, intermediate landing must have 61"x61" clear floor space at the narrowest points. This could be handrail to handrail, curb to curb or curb to handrail.
   f. Curved ramp is not recommended due to complicated compound cross-slope issue.

3. <u>Handrails</u>

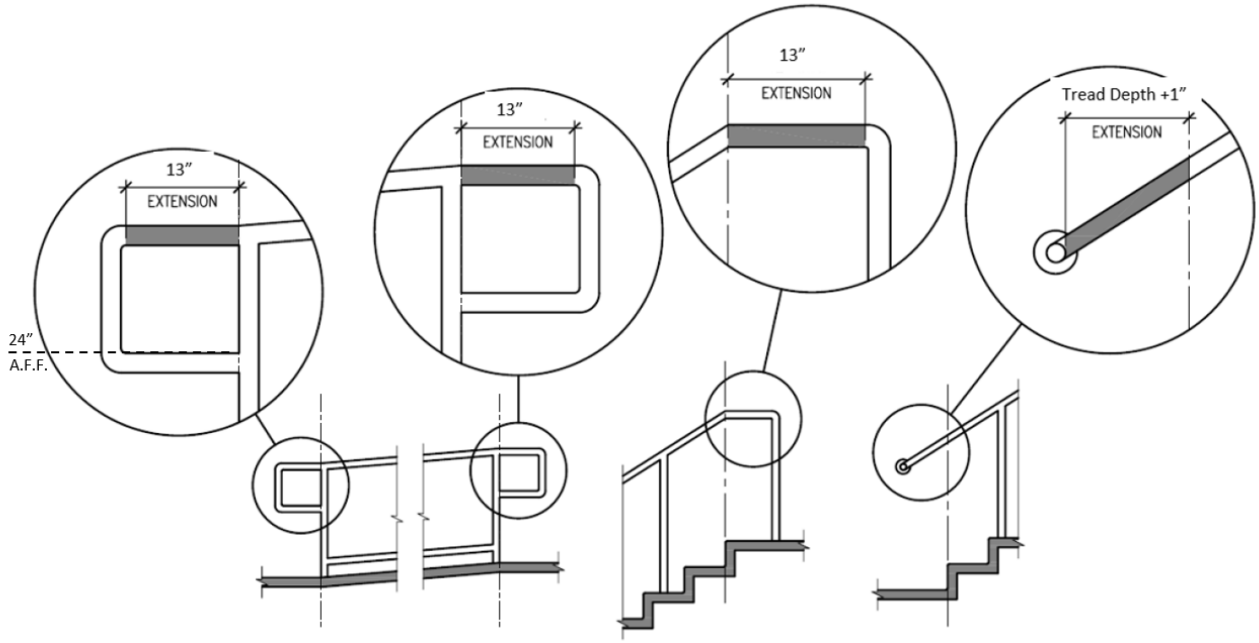
   a. Handrail to handrail clear width shall be min. 37"



   b. Circular cross section shall have an outside diameter of 1 ½" (SCH 40 Pipe – 1 ¼" has an actual outside diameter 1.66", therefore it's acceptable)
   c. Handrail height shall be 36" measured to the top of the handrail *
      * Within play areas (for children 12 years and younger), handrail height, if provided, shall be 24" measured to the top of the handrail
   d. Lower handrail height, if provided, shall be 24" measured to the top of the handrail



e. Handrail extension @ top landing shall be 13" for ramp and stairs. Dimension is measured to the start of the return radius.
f. Handrail extension @ bottom landing shall be 13" for ramp and 1 Tread width +1" for stairs. Dimension is measured to the start of the return radius.
g. If upper handrail is returned to guard, the bottom of returned handrail shall be 24" A.F.F.

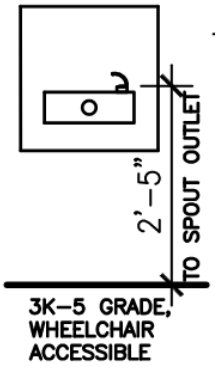


4. Doors: Add 1" to minimum door maneuvering clearances to ensure the pull and push requirements are met.

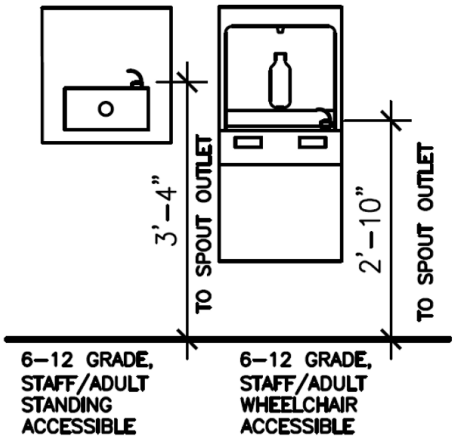
5. Vision Lights: The bottom of at least one glazed panel shall be located 42" maximum above the finish floor.

6. Drinking Fountains: In corridors of PS or PS/IS schools, provide three (3) drinking fountains (preferably grouped in one location for plumbing economy and ease of use):

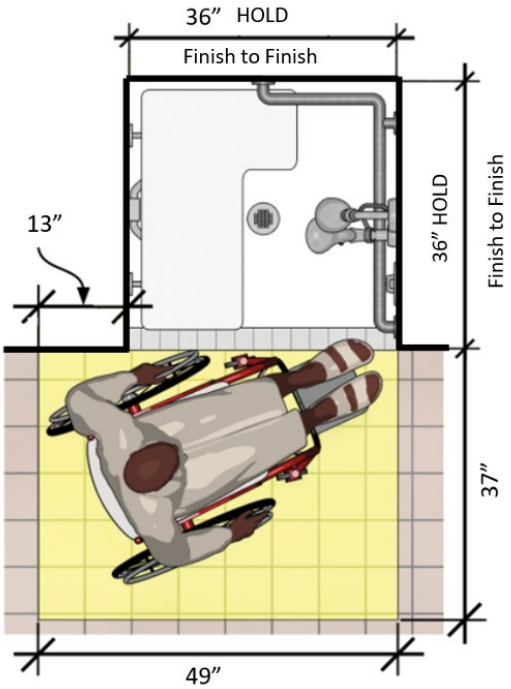
   a) One children height wheelchair accessible drinking fountain appropriate to the age group of students on each floor (with the spout outlet @ 29" A.F.F. for children under 12 years of age).



   b) One adult standard standing height drinking fountain (with the spout outlet @ 40" A.F.F.), and,
   c) One adult wheelchair accessible drinking fountain (with the spout outlet @ 34" A.F.F.).

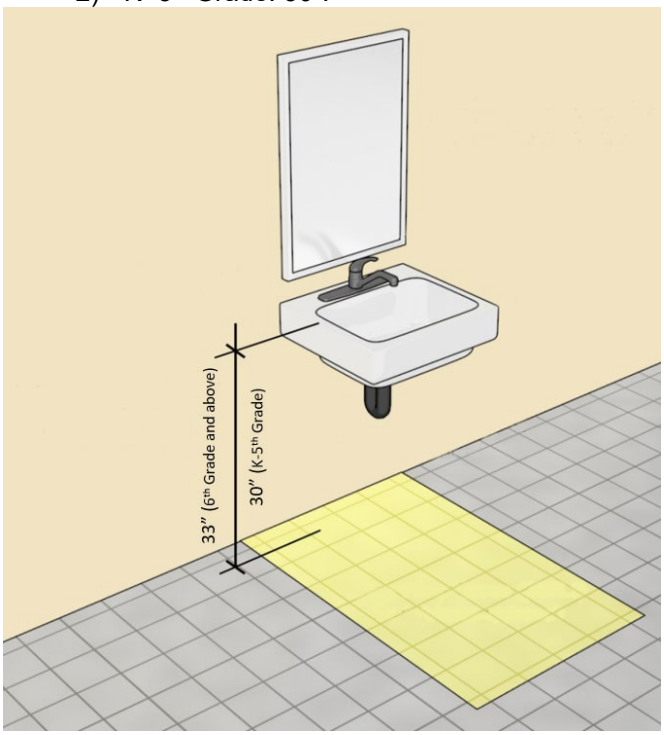


7. Shower Compartment (Transfer Type): The 36"x36" transfer-type shower dimension is finish-to-finish and is absolute. Inside dimensions are measured at the center points of opposing sides.



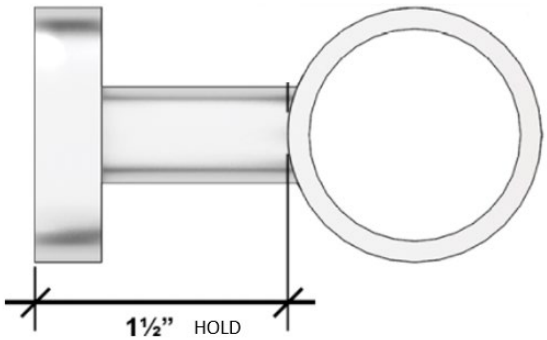
8. Lavatories and Sinks

   a. The height of the front of the higher of the rim or counter surface
      1) 6th Grade and older: 33"
      2) K- 5th Grade: 30".



b. Knee clearance
   1) 6th Grade and older: min. 27”
   2) K- 5th Grade: min. 24”.

9. Grab Bars: Grab bars shall have circular cross section with an outside diameter of 1½”; the space between the wall and the grab bar is an absolute 1½”.



C. The Contract Drawings are to utilize the following standard details as they relate to accessibility:

1. Standard details 0100010a and 0100010b are to be edited to remove details that pertain to the age group that is not in the building (i.e. remove either pk-5 or grades 6-12 as appropriate) and included as a drawing in the Contract set. The dimensions of the plan elements shall be utilized in preparation of the room plans to ensure the rooms are sized correctly and the drawings are to refer to this accessibility detail sheet for dimensions.

2. Standard details 0100030a and 0100030b are to be included in the contract set as reference drawings and are for use by the BCC inspector in determining compliance with ANSI 117 and ADA.

1.3 Planning

1.3.1 Design

1.3.1.17 Compliance with NYC Energy Conservation Code (NYCECC) and NYC Green Schools Guide Building System Commissioning Requirements

Description/Design Approach:

A. Applicability

1. The following systems require system commissioning per Section C408 (or Appendix CA Section 6.7.2.3 and Section 9.7.3) of the 2020 NYC Energy Conservation Code (NYCECC):
   a. Heating, ventilating, and air conditioning, (HVAC) systems and associated controls.
   b. Plumbing, including domestic hot water systems, insulation of piping and associated valves, domestic and process water pumping, and mixing systems.
   c. Electrical, including service, distribution, lighting, and lighting and daylighting controls.
   d. Renewable energy and energy storage systems.

2. In addition to the exemption for historic buildings for required systems commissioning, there are two exemptions to energy code commissioning per Section C408.2, which are also listed in the back of Section S01660 of the SCA specifications.

   a. Mechanical systems and service water heating systems in new buildings, additions or alterations where the total mechanical equipment capacity being installed or the total mechanical equipment connected load serving the alteration space is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.
   b. Renewable energy systems being installed with a generating capacity of less than 25 kW.

3. All energy code subject projects with lighting controls require commissioning no matter how small, as there is no exemption listed under Section C408.3.

4. The Authority intends to perform building systems commissioning as a Quality Control measure for Historic Buildings that have building and energy systems of a size that would require commissioning per the 2020 NYCECC if they weren't so designated as historic (SHPO eligible).

B. Applicable Specification Sections for use in Project

1. Utilize Section S01660 for projects that must comply with the NYC Green Schools Rating System (generally all capacity projects) and projects that must comply with the system commissioning requirements of Section C408.

2. Utilize Section S01660A for projects that are to be commissioned for quality control of HVAC, domestic hot water, electrical and photovoltaic systems of a size that would require commissioning by Section C408 of the 2020 NYC Energy Code but are exempt due to being historic. For energy code exempt projects, quality control commissioning of the lighting

controls is only required where more than ten (10) of any combination of sensor types (Occupant sensor controls, Daylighting sensor controls etc.) will be installed as part of the project.

C. Turnover Requirements

1. For buildings subject to GSG and ECC commissioning requirements as noted above, the designer would use Section S01660 and include Energy Code Compliance System Commissioning Notes (SCA Std Detail 0100006B) in contract drawings (also typically flagged in the BCC system). At turnover, the designer and DPM are to checkoff the following in the turnover checklist and the DCIM Commissioning Manager is to be notified.

☐	☐	If project requires Energy Code Commissioning per Section C408 of the 2020 NYCECC and for projects subject to Green Schools Guide Compliance, Energy Code Compliance System Commissioning Notes (Std Detail 0100006b) have been included in the final turnover set, Section S01660 has been utilized and Design and Construction Innovation Management has been notified by email to assign a commissioning agent.

2. For historic buildings that are NOT subject to energy code commissioning filing but have mechanical and energy systems of type and size required to have energy code commissioning but are exempt due to building being historic, the designer would use Section S01660A, deleting the A in the project spec. At turnover, the designer and DPM are to check off the following in the turnover checklist and the DCIM Commissioning Manager is to be notified.

☐	☐	If project requires Quality Control Commissioning as building is exempt due to historic status (SHPO eligible or NYC Landmark) but with systems of a size that would require commissioning per Section C408 of the 2020 NYCECC if not historic, or with more than 10 of any combination of lighting sensor types, Section S01660A has been utilized and Design and Construction Innovation Management has been notified by email to assign a commissioning agent.

D. FMSI Reviews

1. Any project with HVAC controls requires review by the Authority's Facilities Management Systems Integrator (FMSI) during the design, as well as concurrence by the FMSI that all review comments have been addressed which is to be signed off on the turnover checklist. This controls commissioning is separate from the energy code commissioning, but this commissioning is used by the energy code commissioning agent to sign off on the mechanical controls portion.

   a. Section 15970 is a full BMS system with Central Station Monitoring – Typical of a Capacity Project, BMS upgrade project, and major HVAC replacement including electrification where all items are being replaced.

      1) For projects utilizing 15970 spec section, include FMSI specification section 15973.

      2) Design Review by FMSI - Projects utilizing Section 15970 require submission review by FMSI at 60%, 100% & Compliance for Capacity and 50% and 100% for

CIP. Additionally, concurrence of completeness by FMSI before turnover is required. Difficult projects such as electrification may also have FMSI review at the scope phase.

b. Section 15971 is a full BMS network without central station monitoring. Typical of system replacements such boiler conversions, lease space conversions.

1) For projects utilizing 15971 spec section, include specification section 15973A.

2) Design Review by FMSI - Projects utilizing Section 15971 require submission review by FMSI at 100% and concurrence of completeness by FMSI before turnover. Difficult projects such as electrification may also have FMSI review and the scope phase.

c. Section 15975 is a DDC only system, typically for a single unit replacement or a room conversion.

1) Design review by FMSI - Projects utilizing Section 15975 require submission review by FMSI at 100% and concurrence of completeness by FMSI before turnover.

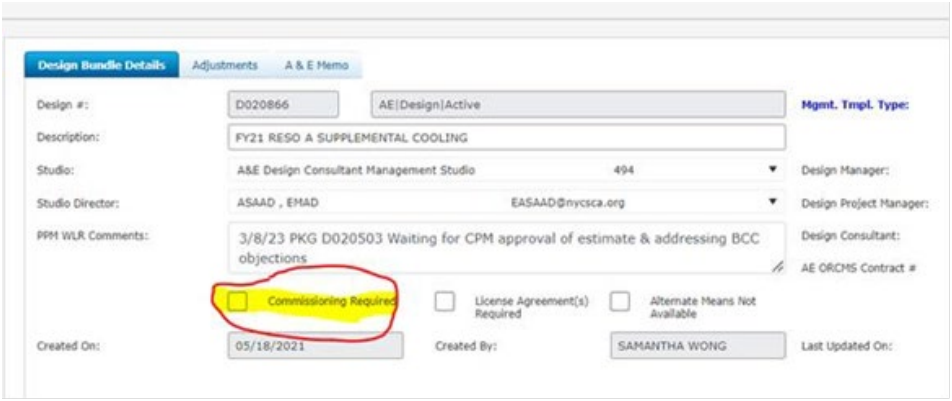
2. DR 6.2.20 describes the projects in more detail that utilize the different systems.

3. All projects must have either of the following checked off in the turnover checklist on any project that has HVAC controls.

☐	☐	Where project contains HVAC controls with a network (using Sections 15970 or 15971), all HVAC/FMSI control review comments have been incorporated into the final turnover set and Section 15973 that describes the FMSI participation in the project has been included, with the concurrence by FMSI of all corrections being made.
☐	☐	Where project contains HVAC controls without a network (using Section 15975), all HVAC/FMSI control review comments have been incorporated into the final turnover set.

E. PTS Notification of Commissioning Required

All projects are required to do system commissioning when meeting the requirements above. This is separate from the controls commissioning, which is a point-to-point programming review. The Energy Code Commissioning Agent CxA will utilize the FMSI reports as part of its report. Either Section S01660 or S01660A is to be included in the project and at turnover the DCIM Commissioning Manager is to be notified. During the design, the DPM/DM are to notify Project Controls during the weekly CIP meeting that commissioning is required so that it will be checked off in the PTS system, which will be a flag for a commissioning agent to be assigned during construction.


Design Bundle Details
Adjustments
A & E Memo
Design #:
D020866
AE|Design|Active
Mgmt. Tmpl. Type:
Description:
FY21 RESO A SUPPLEMENTAL COOLING
Studio:
A&E Design Consultant Management Studio
494
Design Manager:
Studio Director:
ASAAD , EMAD
EASAAD@nycsca.org
Design Project Manager:
PPM WLR Comments:
3/8/23 PKG D020503 Waiting for CPM approval of estimate & addressing BCC objections
Design Consultant:
AE ORCMS Contract #
Commissioning Required
License Agreement(s) Required
Alternate Means Not Available
Created On:
05/18/2021
Created By:
SAMANTHA WONG
Last Updated On:

1.3 Planning

1.3.1 Design

1.3.1.18 Miscellaneous Architectural Drawing Requirements

Description/Design Approach:

A. The following items shall be shown, coordinated with or taken into account on the Architectural Drawings as well as other trades:

1. Steel Attachments/Splices: Location and depth of walls and chases at steel cross bracing and columns needs to account for the splices/attachments and their bolt lengths with associated fireproofing, as it results in a substantially larger depth than the member measurement itself and is many times not accounted for in chase depths.

2. Local Sound System (LSS) Closet: The LSS closet (approx. 3'D x 5'W) shall be modeled in actual size to avoid any issue with open position of cabinet box (approx. 2' deep.) If it is wall-mounted within the stage or the room, then it is required to provide fixture/guards for cane detection since it is projecting more than 4".

3. Smoke hatch and shaft terminations: All shafts are to be located so they can terminate at the roof with a smoke hatch connected to the Fire Alarm system. Use of ducts coming off the shaft have not been acceptable or designed such the shaft is built horizontally and thus must be coordinated with the HVAC engineer.

4. Chase Walls for Plumbing Pipes: All banks of plumbing pipes to have 6"-8" stud wall. Need 6" clearance typically. Not enough room is accounted for on typical layouts.

5. Induction Loop & Self-leveling Underlayment: Recommended to install the induction loop system in the cafeteria within a layer of self-leveling concrete instead of within the concrete slab. Requires a minimum ¾" depression for slab.

6. Science Lab Windowsill: The science lab (6th - 12th) high countertop needs to be coordinated with thin tub installation and windowsill.

7. Speaker Clock Coordination: Speaker clock locations need to be coordinated if installed back-to-back, as the recessed boxed will interfere with each other and thus must be slightly staggered.

8. FDNY Roof Access Obstruction: FDNY access paths must be clear of items, such as lightning protection rods impeding on path. Need a clear note and detail how to pass the path to reach the parapets. Ensure FDNY clear path is provided and only permissible obstructions allowed.

1.3 Planning

1.3.1 Design

1.3.1.19 Planning Guidelines for Athletic Fieldhouses

Description/Design Approach:

A. Overview

1. Outdoor sporting events, such as Football, Baseball, Soccer, Track & Field to name a few, have a very long and strong history within NYC school communities, and the general public communities as well. It is a point where the students and the public come together for entertainment and to “cheer” as a demonstration of support for their fellow athletes, while also promoting health and exercise as a part of the school’s program.

2. As such, the Athletic Fieldhouse (AFH) has evolved as a specialized building typology, serving the school, the teams and the public with a quality, safe, inviting and cost-effective facility.

3. These guidelines describe the operation and interrelationship of the spaces listed in the Program of Requirements and described in the Room Planning Standards. They also consider the important realities of circulation and security as a whole. While the content herein is based on many design meetings in which district and school personnel (including coaches/athletic directors/sport sanctioning authority-PSAL) have contributed experience and ideas, these guidelines are not meant to replace the give and take of the design process. Their aim is to make known in advance the generally agreed upon qualities of successful fieldhouses so that discussion can be freed to further evolve solutions and address concerns specific to the school at hand. To this point, the Room Planning Standards and SCA Design Standards should be followed to the greatest extent practical, but it is understood that modifications may be necessary on a case-by-case basis to tailor any specific needs.

4. Furthermore, a distinction needs to be identified between what is considered a “new” facility versus a “restoration/rehab” of existing facility. The latter scenario may have already established and predetermined many of the criteria presented in these guidelines. Therefore, a closer analysis/evaluation of the totality of existing conditions is warranted in order to achieve the programmatic goals. These guidelines are approaching the project as a completely “new” facility.

B. General Design Priorities

1. Zoning/Building Code Analysis and Use Classification

Early in the project’s development, the project team shall perform a Zoning, Flood Zone analysis and Building Code analysis to determine the AFH’s zoning compliance, Use Classification, occupant loads and any Public Assemblies (PA) that are part of the new facility. The results of these studies will lay the proper groundwork to help guide strategies centered around required Zoning waivers (whenever possible, avoid the need for zoning waivers or overrides), DOB and other Agency filings (i.e., DEP, MTA, DoT, Parks, etc.), construction classification, MEP/FP and emergency systems requirements

(fire alarm, emergency generator) and possible reinforcement of any existing utilities. Equally important, an early determination of the extent of storm drainage requirements and if the project will require a SWPPP filing (for demo and/or new construction) needs to be studied. The design should attempt to avoid SWPPP filing, when possible, by limiting the area of disturbance to the extent practical to below 20,000 sq. ft. and newly created impervious area below 5,000 sq. ft.

2. Building Orientation, Entrance and Open Space

   Contributing factors in the selection of AFH building orientation and entrance include direction of approach by students and the general public, potential drop-off points, field orientation, proximity to adjacent buildings and school, topography, utilities and other environmental considerations. The AFH and grandstand siting need to account for regulation field dimensions including any safety run-off and team seating areas (in consultation with coaches and sports sanctioning authorities-PSAL), ADA and FDNY/Emergency services access. While the design of the actual playing field area is not part of this DR Planning Guide, the siting of the AFH, in context with the entire site and existing amenities, shall be studied.

3. Temporary Egress of Existing Building and Phasing of Temporary Egress & Site Work

   Depending on the new AFH's proximity to any existing buildings or site amenities, changes to permanent means of egress are usually unavoidable to facilitate construction. However, any temporary egress measures should always be kept to a minimum. Temporary egress plans as well as the school's requirements for temporary facilities (office, storage, toilets, lockers), relocation of any existing field amenities (i.e., storage containers) and temporary power requirements need to be closely coordinated with CM and CPM through regular Phasing meetings.

4. Organization of the Athletic Fieldhouse

   Order, simplicity and clarity of the building and grandstand will facilitate orientation and destination finding. The design should allow students and spectators to readily know the building; they should quickly feel confident in their ability to navigate with ease. The building should feel safe and supportive of its function to serve the needs of athletes, coaches and spectators.

5. Structure

   Like building organization, the structural system should be rational and logical. Extraordinary structural measures should be avoided as much as possible for design clarity, ease of construction and cost-effectiveness. Cantilevered column systems, using transfer beams or deep trusses to build over large column-free spaces should be considered only under unavoidable constraints. Load bearing masonry construction for a one-story building is typically the most suitable, but will be dependent on the structural selection matrix.

6. Building Height

   The AFH building height is typically a single-story facility. However, depending on available space and program requirements (POR), the Grandstand may need to occupy a second level over the locker room areas (coupled arrangement). A 2-story solution is very

rarely necessary and generally to be avoided as this would require providing an elevator. Depending on the field orientation (spectator viewing), the Grandstand may also be a separate, de-coupled, independent area. The building height may also be impacted by whether a cellar or basement is to be provided, usually for mechanical spaces. The need for basement/cellar level may be driven by available site space, the possibility to increase the building footprint, and/or sub-surface conditions.

7. Cost-Effective Design

   a. An interdisciplinary approach from the very start is essential for a cost-effective AFH design. The more traditional model of the architect designing the school and the engineers having to "fit their work in" is inherently inefficient, and bid prices reflect this. A full team approach, with frequent design meetings comprised of architects, engineers, design managers, construction manager, value engineering experts, environmental specialists, technical standards and design review staff, regulatory experts and educational/coaching staff (central and local) ensure that everything that could affect the building design is put on the table and discussed, and that correct decisions are made.

   b. Overall planning in response to site conditions to minimize both excavation and fill starts the project on a cost-effective path. If the existing site has deep excavation in the area of the building footprint, whether by merit of demolishing the existing building with a cellar, or a need to remove unsuitable soil, the building should be planned with a cellar or basement, unless, a high-water table exists (cellars and basements shall not be placed within 5'-0" of the measured groundwater table). If soils are such that a pile foundation is required, or if no excavated area exists or is planned, then an AFH with no cellar or basement is to be utilized. Similarly, if soils are such that a slab on grade can be planned with no fill, this should be the direction. The simple logic is: if there is a hole, use it; if there is no hole and no need for one, do not create one. Factors that may go against this logic include high water table, other environmental factors and zoning requirements where an override is unlikely. If a Cellar or Basement space is necessary and feasible, this area should only be used for MEP systems and/or Custodial/storage uses.

   c. Cost effectiveness is always an important consideration in the development of the design standards. Initial costs are weighed against useful life (longevity), constructability, and maintenance and operations needs to make decisions that are fully reasoned. Following the design standards helps produce an efficient and cost-effective building design. The standards are, however, continually evolving, and are always open to considering new suggestions that might improve the design process and product.

8. Materials and Finishes

   a. The AFH is typically a heavy traffic, "high-energy" facility exposed to the natural elements, comparable to professional outdoor sporting arenas. The choice of materials and finishes must recognize that substantial wear and abuse is to be anticipated and consideration for ease of clean-up (wash-down) and repair shall be the Designer's objective. The choice of interior materials and finishes should be durable and abuse-resistant, indicative of the facility's function and follow DR 5.1.1 to the extent practical. The use of exposed concrete and masonry (CMU), steel doors

and lockers, vandal-proof fixtures and hardware, abuse-resistant coatings and impact-resistant surface finishes are necessary to ensure the facility's longevity.

b. Since the AFH is associated with outdoor sporting events, a great deal of consideration should be given to the slip-resistant qualities of all floor and deck surfaces throughout the facility, as well as ease of regular maintenance.

c. Typically, storage and mechanical/utility areas do not require a finished ceiling. Designers are to ensure that duct work, MEP lines, light fixtures and other components are designed for exposure and in addition do not provide areas to trap debris and are protected (guards) from damage from balls and other equipment (e.g., use of round ducts might need to be considered). Offices, weight room, locker/shower areas, student toilets, multi-purpose room and other educational spaces will require standard ceiling finishes.

d. While the AFH might be considered more of a utilitarian-type facility, the exterior cladding system should attempt to convey a welcoming aesthetic. Generally, brick is the exterior cladding material of choice. However, the introduction of stone, rainscreen and curtainwall (limited) can be considered if it makes sense for the site. Close analysis of cost, constructability and other considerations need to be discussed through the Structural/Envelope Matrix Review and Façade Review processes and evaluated for a final determination as indicated in DR 4.1.1 shall be followed to the extent practical.

9. Exterior/Site/Security Lighting

a. Exterior/site/security lighting shall be provided around the perimeter of the AFH and on playing fields for safe passage of students and staff and to deter theft and vandalism as described in DR 7.2.5. Lighting design shall minimize light trespass from the building and site, reduce sky glow, improve nighttime visibility through glare reduction and reduce development impact on nocturnal environment. Design shall comply with all the requirements of NYC Green Schools Guide Credit for Light Pollution Reduction as applicable.

b. If the AFH project includes rehabilitation of the entire athletic field complex, field lighting will require a more robust system design as described in DR 7.2.6. This enhanced system shall be discussed/vetted with the school as early as possible to allow for special accommodations in power requirements and proper placement of light fixtures.

10. Scoreboard

Scoreboards, as with night-game lighting requirements, are typically addressed as part of an Athletic Field development project. However, power and controls requirements shall be investigated and provided for any existing or new equipment. The scoreboard should have the capability of wireless control from the Press Box and one ADA spectator position.

11. Sustainability- Green School Guide

New AFH projects are required to follow the SCA's Green School Guide (GSG). Beginning in the scoping and early design phases, project teams shall meet with the

SCA's Sustainability Unit to evaluate the potential for renewable energy as part of the Integrative Design Process (IDP) outlined in the 2019 NYC Green Schools Guide, and study synergistic opportunities for other energy reduction measures with building systems for compliance with Section BC 1512 of the 2022 NYC Building Code (Local Law 94 of 2019). Energy Code and Building Envelope Commissioning will be required. Refer to Section 8 of the Design Requirements for additional guidance. The SCA website under the NYC Green Schools Guide tab has energy modeling guidelines and templates.

12. MEP/FP

    a. The mechanical/electrical/plumbing/fire protection systems collectively form the essential services backbone necessary to support inhabitants and achieve the intended use of the AFH. These services provide the required comfort, safety and communications for a functioning facility. To assist in producing efficient and cost-effective design, these systems are engineered as part of a collaborative effort with other required disciplines and stakeholders. Each system is governed by various underlying Codes that must be adhered to. Accordingly, points of entry for utilities must be analyzed including the proximity of respective rooms. Ideally, these rooms will be usually placed along a street frontage for a more direct routing of utilities. Analysis of the re-use/reinforcement of any existing utilities shall be investigated as well.

    b. Based on provisions of Building Code and other design considerations, an AFH is to be considered Occupancy Classification E Educational, with the possibility of an accessory occupancy of A-3 where an indoor program space permits occupancy by 75 persons or more. The Storage Rooms in the building are used for storage of furniture, sports equipment and other purposes and would be classified as S-1 or S-2. Utility spaces, custodial rooms and groundskeeping room would be classified as such in accordance with Code and SCA Design Standards. Grandstands (spectator viewing areas) are considered Public Assembly (PA) space of A-5 occupancy.

    c. Refer to Sections 6 and 7 of the Design Requirements for guidance on the SCA's latest equipment and design preferences. Where applicable, follow SCA Room Planning Standards and DIIT Standards to the greatest extent feasible.

13. Horizontal and Vertical Circulation

    a. Corridors and Vestibules

        1) The efficient, safe, code compliant layout of interior corridors to access rooms will be worked out in the early phase of design. However, due to their use/function and depending on the layout, some rooms should access directly to the exterior. Generally, outdoor (open) grandstands egress directly outside, and other enclosed rooms such as sports equipment storage, grounds equipment and mechanical/utility spaces should have access directly outside to the field. In order to meet Energy Code requirements, vestibules will need to be provided where applicable.

        2) Corridors are usually very high-traffic circulation zones and require adequate width (capacity) to serve the population load being served. As far as possible, corridors should be straight and simple, without opportunities for concealment.

Edges of doors opening onto corridors should be flush with corridor walls to maintain unobstructed travel paths in corridor plans.

c. Stairs

Normally, the AFH is a single-story facility and requirements for stairs and ramps will be relegated to the grandstand or site access. However, if stairs are required in the AFH, code analysis of egress to enhance circulation shall be studied. Stairs are typically made of reinforced concrete. Simple rectangular stairwells without open vertical shafts between stringers are recommended. The preferred minimal width of a stair is 56". Adequate and appropriate stair size and location is required for smooth, safe facility operation. Stairs should be positioned to the maximum benefit of traffic flow and with consideration for the manageable movement of groups of patrons/visitors into and out of large common spaces. Stairs/Ramps integral with the grandstand shall be analyzed and laid out in a similar Code-compliant, efficient manner including required ADA access.

d. Egress and Access:

NYC Building Code ingress and egress requirements govern. PA requirements may also be triggered by design. FDNY access requirements must be adhered to as well (refer to DR 1.3.1.14).

14. Fences

Fences are generally categorized as either Site Security (perimeter) fences or Spectator/Building protection fencing necessary during sporting events. The type and beneficial height of each fence type shall be studied. Refer to DR 2.1.1 for guidance.

15. Accessibility

a. Ensuring accessibility for all individuals, including those with disabilities, is an essential aspect of designing athletic field projects. Compliance with the Americans with Disabilities Act (ADA) and the New York City (NYC) Building Code is required to create inclusive, functional, and safe environments. Providing school athletics programs with a unique opportunity to improve the quality of learning environment for a challenged and particularly vulnerable segment of our students will also contribute to meeting federal "program access" requirements.

b. Starting from the site accessible entrance, a 5'-0" wide accessible route is recommended to AFH, grandstand, indoor or outdoor sports activities, and all other accessible elements and spaces. When site constraint, the accessible route shall not be reduced less than 37". When ramps are used along the accessible route, especially to connect to elevated grandstand accessible spectator areas, proper planning shall be given at the early phase with the running slope to be max. 1:13 in mind.

c. In addition, accessible parking stalls and accessible van parking stalls should be provided when they are required by NYC Zoning Resolutions, Building Codes, ADA, ICC A117.1, or the school program.

d. Two ramps on both sides of the grandstand are usually required to provide the required accessible ingress and egress. When there are site constraints, an exterior area of rescue assistance may be used as an alternative to the second ramp. Multiple, accessible, unobstructed-view options for wheelchair users shall be provided on the grandstand. Use creative approaches to providing a social experience for disabled students or visitors that is as similar as possible to that enjoyed by other spectators and avoid any design that might tend to isolate those with disabilities. For a grandstand or bleacher that is a Place of Assembly occupancy and equipped with a local sound system, an FM assistive Listening System (ALS) should be provided accordingly. Press boxes that are 500 SF or more should be also made accessible as per BC 1104.3.2.

e. Besides accessible toilet rooms and showers, each locker room shall have the proper number of accessible lockers provided near accessible benches. Accessible drinking fountains (both interior and/or exterior) should be provided accordingly. If fitness equipment is provided within the fieldhouse, accessible route and enough clear floor space adjacent to the equipment shall be provided.

f. Accessible signages should be also provided as per SCA's DR, ADA, ICC A117.1, and NYC Building Codes.

C. Typical Rooms included in the AFH Program of Requirements (POR) - Their use, design and relationship within the fieldhouse building and adjoining athletic field(s)

1. The Program of Requirements (POR) references each of the required rooms by name and number. A detailed/site-specific POR will be issued at the inception of the AFH project. The designer is responsible for modifying the 'standard rooms' in order to fit the configuration of the building as designed. Refer to the Room Planning Standards for general guidance on Use and Design.

   **The school administration should be consulted to determine the necessity of "Special Spaces" such as Concession Stand, Ticket Booth, Grandstand and Press Box. Any proposed changes to the design standards or POR must be submitted in writing to the SCA by the school administrator.

2. The Program of Requirements groups rooms into categories as follows:

   Group 1 - Instruction (Multi-purpose/ Weight room)
   Group 4 – Physical Education (locker rooms)
   Group 5 – Assembly Area (grandstand)
   Group 7 – Lobby/Main Entrance
   Group 8 – Student Support Services (medical office)
   Group 9 – Storage (sports equipment, custodial, concession)
   Group 10 – Administration (coach's office, press-box, ticket booth)
   Group 12 – Plant Operations/Custodial (JC, MER-utilities, Toilets/public-students, DIIT)
   Group K - Kitchen (concession stand)

3. The functional efficiency of the AFH is largely dependent on the physical relationships between these areas and their relationship to the Athletic Field. Organization and circulation between student/athlete drop-off, public access, ticket booth, concession stand, grandstand (spectators), locker rooms, storage, custodial areas, multi-purpose

room, toilets (public/students), press box, coach's/medical office is the key to the success of the facility.

Group 1- Multi-purpose Room (MPR)

As the name implies, this room can facilitate a variety of different uses which the school/coach may require (i.e., exercise, weight-room (Auxiliary Exercise room), instructional/training). These spaces should be easily accessible for student use during practice sessions and, depending on the AFH's proximity to the main school building, the MPR may even serve as an auxiliary instructional space for the school. Flexibility is given by the provision of moveable seating. A storage room for seating and equipment storage is essential. In certain circumstances, the MPR may also include lockers for "Visiting" teams.

Windows are desirable and if provided they should include interior or exterior guards as needed and should allow for ventilation. Control of light/glare can be achieved with the use of window shades instead of the traditional drapes.

Group 4 – Physical Education (locker room)

Locker rooms and/or changing rooms should be proximate to the field. Lockers should be separated and designated as either Home and Visitor or Boys and Girls. The number of sets of lockers is dependent upon the types, frequency and scheduling of sporting events being hosted at the field. One set of Boys and Girls (or Home and Visitor) lockers may be sufficient for schools with smaller sports programs. Schools with larger, more robust sports programs, that may host simultaneous games and practice sessions may require two sets of locker groups. Each locker room should have its own toilet facility. Shower requirements should be discussed with the school/coach.

Group 5 – Assembly Area- PA (grandstand)

Grandstands (spectator viewing area) is considered a Public Assembly (PA) of A-5 occupancy. They may be categorized as either a "Coupled" arrangement, when the grandstand sits above (top) the fieldhouse footprint and may be considered a second level of the building. Circulation for this type of grandstand arrangement shall remain independent of the AFH interior, to which separate egress needs to be analyzed and calculated. Alternatively, a "Decoupled" arrangement, when the grandstand is completely separate, is an independent area not physically connected to the fieldhouse. In either case, spectator and ADA access are primary considerations. The size and capacity of the grandstand is dictated by the available area and the anticipated patronage. Optimal field viewing orientation, solar angles (glare) and access to public toilet facilities and concession stand should be analyzed.

Generally, a "coupled" grandstand will have a raked (saw-tooth) profile of cast-in-place concrete (or other hybrid structural system depending on the Structural Matrix study), with a rise and depth dimensions appropriate for adult seating. The grandstand might also serve as the roof of the AFH. A "decoupled" grandstand will typically have a similar raked profile and may be framed steel with structural aluminum super-structure. In either case, ADA access and viewing areas and egress stairs and ramps will need to be analyzed and incorporated into the design. Storage

areas under the grandstand may require Fire Protection and needs to be discussed early in the project.

Group 7 – Lobby/Main Entrance

The lobby is the main and formal entrance to the AFH and may serve as a hub area. The main entrance must contain a vestibule. The Lobby may include a built-in security desk, outlets to support the CAAS and POS system, an optional security scanning station, and may include a closet for short-term storage of deliveries. The security needs should be discussed with CPM and the school administration.

The location of the building entrance is a primary consideration. Among the factors that must be considered are the following:

- the AFH's proximity to the existing school building and neighborhood it serves
- the direction of approach to the AFH by its students and the public
- likely bus or car drop-off locations
- relationships to traffic direction of surrounding streets
- the location of traffic lights that allow pedestrian crossings
- public transportation routes
- site supervision and visual control
- and the character of adjoining properties

Group 8 – Student Support Services (Medical Office)

This Medical office supports the care of students/athletes who may become ill or injured during a game or practice session. The Medical office should contain an examination area, toilet and lockable storage. The Medical office should be in close proximity to the field and Coach's office. The arrangement of the space may be modified but all essential elements of the *Room Planning Standards* must be provided. The need for a Medical Office should be discussed with CPM for inclusion in the POR.

Group 9 – Storage (sports equipment, custodial, concession):

1. Programmed storage rooms are provided for sports equipment, the coach/medical office, grounds/custodial/mechanical equipment supplies, computer and A/V equipment, trash, concession sales, and MPR. These rooms must have shapes that allow for efficient storage. All elements of the room planning standards must be provided.

2. Sports equipment storage rooms must be of a size and shape that is appropriate for the possible variety of equipment being stored (for baseball, football, soccer, track/field equipment) and provide direct access to the field area.

3. Grounds equipment storeroom is for the storage of outdoor maintenance-related equipment (snow blowers, shovels, rakes, hoses, turf maintenance, etc.) and should be located at grade level with direct outdoor access and appropriate ventilation.

4. Refuse & Recycling Room: Following a sporting event, trash and recyclables are collected by the custodian and stored in these rooms until the day of collection. The refuse and recycling storage room must have a hose bib, floor drain, and the

floor be finished for easy wash-down. All elements of the *Room Planning Standards* must be provided. Trash handling should be discussed with the Custodian and DSNY.

5. Bicycle Parking: This space will primarily be used to secure bicycles for patrons who prefer to use bicycles for their commute to and from the sporting event. The site should include bicycle parking located in the front of the building, where possible, to meet Green Schools Guide and ADA requirements. Refer to DR 2.3.3 for zoning required enclosed bicycle storage and accessible cycle storage space (Racks) per Section BC 1109.9.3.

Group 10 – Administration- (Coach's office, Press-box, Ticket booth)

Administrative Areas include Coach's office, Ticket Booth and Press-box areas. Generally, the Coach's office can be designed as a modified Principal's office including private toilet and conference area (Refer to SCA Design Requirements). The number of Coach's offices is commensurate with the size of the school's sports program. There may be the need for two (2) coach's offices, one for "Home" and one for "Visiting" teams. Refer to the POR for the specific requirements.

The Press-box and Ticket Booth can be designed similar to a modified supervisory office or staff room (without storage) with minimal furnishings. This Press-box is typically at the upper-most level of the grandstand, centrally located with optimal views of the entire field, with total square footage below 500sqf. The Press Box is typically a limited occupancy space that is auxiliary to the spectator grandstand seating (to be considered part of the Grandstand/Bleacher's A-5 occupancy). If the program requires a larger press box, an accessible route to get to the press box must be provided. The Press-box may be designed as an integral component of the bleacher system, which typically is oriented for optimal viewing as well. The Ticket Booth would normally be located in close proximity to the Public (spectator) entrance. Minimal power (convenience outlets), lighting and security are to be provided. The Press box does not require any heating or cooling accommodation. Additionally, the Press box shall have connectivity to the scoreboard and PA system. The Ticket Booth can be arranged as a separate functional space or integrated with the Concession Stand area to provide common indoor/exterior door access. Refer to Sections 6 and 7 of the Design Requirements for additional MEP requirements of these special spaces.

**The school administration should be consulted to determine the necessity of "Special Spaces" such as Concession Stand, Ticket Booth, and Press Box. Any proposed changes to the design standards must be submitted in writing to the SCA by the school administrator.

Concession Stand

1. The concession stand is an area serving light refreshments to the game patrons and should be located in close proximity to the grandstand for ease of access and convenience. It should be equipped with power, water, heating and light. No gas service is to be provided. There should be a dry-storage room (for paper goods and canned condiments), two (2) residential-type refrigerators and a sink. Power outlets should be provided for grilling (food warming), cooling appliances

and general-purpose outlets. Provide adequate overhead area lighting. Cooking of food is not performed in the Concession Stand.

2. Public access to the concession stand should be directly from outside and kept separate from the main building's entry. The stand will need to be secured when not in use and equipment placement will need to be protected from the elements. The Ticket Booth can be arranged as a separate functional space or integrated with the Concession Stand area to provide common indoor/exterior door access.

3. General outdoor seating immediately adjacent to the stand can be provided if there is adequate area. Otherwise, patrons will normally return to the grandstand area with their purchases. The concession shall be provided with an 8 ft. counter area for staff to prepare, gather and complete sales. A portion of the stand counter shall be accessible for people with disabilities. This area should follow the Room Planning Standards and SCA Design Standards to the greatest extent possible and be modified accordingly on a case-by-case basis. Refer to Sections 6 and 7 for additional MEP requirements of this special space.

   **The school administration should be consulted to determine the necessity of "Special Spaces" such as Concession Stand, Ticket Booth, and Press Box. Any proposed changes to the design standards must be submitted in writing to the SCA by the school administrator.

Group 12 – Custodial and Plant Operations

1. Depending on the proximity of the main school building to the AFH, there may be the need for a separate Custodian's office and workshop. The need is to be analyzed on a case-by-case basis. If the POR calls for a separate Custodian's office/workshop, follow the Room Planning Standards accordingly.

2. Generally, the AFH will require a Janitor's closet/sink and custodial storage. These custodial spaces may be located in the vicinity of the electric/water and other mechanical service rooms.

3. Roof access shall be via an interior ship's ladder (sloped). The roof hatch shall be sufficiently sized to facilitate custodial staff for the regular maintenance of rooftop equipment and appurtenances.

Telecommunication Room

These spaces are used as indicated by their room designations. The designs of these spaces follow the Room Planning Standards and DIIT Standards. Refer to DR 7.3.3. As fieldhouses are typically one-story structures, the Telecommunications Room is to be placed centrally located on the floor at grade. If the fieldhouse is more than one story, room is not to be placed in a cellar of basement, or at the second floor under the roof. A separate telecommunication closet is not typically required due to the building size, but if required is to be centrally located and dictated by the 100m maximum cabling distance. Refer to DR 7.3.5.

Toilet Facilities

1. Student/Athlete Toilet Rooms

   Dedicated athlete toilet rooms are to be provided for each locker room. The SCA Design Requirements should be used to calculate the required toilet fixture count based on locker room occupancy. These rooms follow the *Room Planning Standards* and *SCA Design Requirements*. The toilet entrance doors should be from within the locker room areas. In addition, the need for separate student toilets shall also be calculated based on other room assignments listed in the POR. These will include Girls, Boys and Gender-neutral toilets.

2. Adult/Public Toilet Rooms

   These rooms, typically designated “Men’s” and “Women's” gang toilets, are used by visitors/general public. The location of the Public Toilets shall be located for convenient patron access, accessible from outside and usually consolidated at the ground level. In addition, one single-user gender-neutral toilet, accessible from the outside, shall be provided for the building. These rooms follow the *Room Planning Standards* and *SCA Design Standards*. The SCA Design Requirement must be followed in calculating the number of adult toilet rooms. The Program may also call for private toilet rooms in specified spaces (i.e., Coach, Custodian and Medical offices) or a separate Staff toilet facility. Toilet rooms shall not be placed over electrical/telecommunication rooms.

3. The toilet facilities open to spectators/patrons (public) during scheduled athletic events or other outdoor school functions should be designed to meet the applicable requirements of the NYC Building, Mechanical, Electrical and Plumbing Codes.

Plant Operation Areas

Plant operations areas include service rooms such as, but not limited to, electric, water, sprinkler service rooms and mechanical equipment rooms, etc. These are the spaces that are required to house the building utilities/services and the mechanical equipment. Design of these spaces is based on the building’s size, location of utilities in the street and the mechanical system design. These types of spaces are typically located at the lowest level (in the cellar or basement if provided) along with the custodial work and storage areas. Mechanical equipment such as fans, chillers and condensers are typically located on the building’s roof. Refer to Sections 6 and 7 of the Design Requirements for specific MEP/FP system requirements.

1.3 Planning

1.3.2 Construction

1.3.2.1 Construction Classification and Occupancy Classifications

Description/Design Approach:

Building Classification

A. New construction (new buildings and additions) shall comply with the **2022** NYC Building Code for Non-combustible Construction, Type IB or Type IIA for Occupancy Group E.

1. All new Schools and Additions shall be fully sprinklered unless otherwise indicated below.

- Temporary Classroom Buildings and Transportable Classroom Units, Type IIB Construction, with an aggregate area of less than **12**,000 SF and one story in height are excluded from being sprinklered. Follow requirements of Section §28-111 of the NYC Administrative Code for construction conformance/approvals and requirements of Table BC 602 of the **2022** NYC Building Code for fire-resistance rating.

B. Room and Space Occupancy Classifications

1. As per the NYC Building Code, every room or space shall be classified within an Occupancy Group.

2. Work in existing buildings that requires an occupancy classification is to use this design requirement**.**

3. Per the Building Code, a designer has the option to comply with the applicable provisions of Sections BC 508.2, BC 508.3 or BC 508.4, or a combination of these sections for buildings with mixed occupancy use. For new buildings and additions **of Type IB construction and sprinklered, the maximum height is 420 feet, while for Type IIA construction the maximum height is 85 feet and 5 stories*. The maximum allowable areas for each type is dependent on the street frontage and utilizes Equation 5-2 of Section BC 506.2.3 for single-occupancy or Equation 5.3 of Section BC 506.2.4 if school is part of a multi-occupancy building.** The designer is to use the provisions of **Section** BC 508.3, **which is nonseparated occupancies,** as it is the Authority's preferred option because it minimizes or eliminates the requirement for fire separation between the various spaces except as required by **Sections** BC **508,** 509, BC 903 and BC **1023**.

* Numbers are based on the most restrictive occupancy for the school building, which is either E or S-1 (depending on if per building height or number of stories). Refer to **Tables BC** 504.3 and BC **504.4**, and considering a fully sprinklered building. Provide the following note on the Fire Protection Plans**, based on a Type II-A construction class**:

"Building is filed as 'Non-separated Occupancies' as per Section BC 508.3 and follows the most restrictive requirements for xx occupancy. Each portion of building has been individually classified in accordance with Section BC 302.1. The building's maximum area is xx,xxx SF at the xth floor, the building is x stories and is xx feet high and does not exceed the limitations for a sprinklered xx occupancy . The combined maximum area of all

incidental spaces is x,xxx SF and is less than 10% of the total area (xx,xxx SF) of the building**, exclusive of Assembly Areas that are permitted to occupy more than 10% of the floor area of a story**."

4. The **following** table is based on the Authority's Room Planning Standards and provides a general guide for the classification of rooms and spaces within school buildings (Occupancy Type E). Unless required or indicated otherwise by NYC Building Code or the use as indicated in the Program of Requirements (POR), the occupancy of the following rooms and spaces should be classified as indicated on the table:

Occupancy Classifications for Rooms and Spaces in School Buildings (a)

Room/Space	Occupancy Classification
Group 1 - Rooms of Instruction	
Pre-Kindergartens, Kindergartens, Classrooms, Resource Rooms, speech workshop and Small Rooms of Instruction,	E
Group 2 – Specialized Instruction/Art/Music and Choral	
Art Classrooms and Art Studios	E
Art Storage	S-1(2) (7) (20)
Music Classrooms, Music Suites, Cubicles, and Practice Rooms	E
Music Storage	S-2(2)
Group 2 – Specialized Instruction/Technology	
Classrooms for Wireless Language, Programmed Language, Distance Learning, Virtual Enterprise,	E
Classrooms for Electronics, Stagecraft, Communication, Materials Processing, Mechanical and CADD Drafting	E(11)(3)
Classrooms for Culinary Arts, Transportation, and Photography	E(11)(3)
Group 3 – Science	
Resource Rooms, Demo Rooms, Project Rooms	E
Science Lecture Rooms- seating capacity less than 75 occupants	E
Science Lecture Rooms - seating capacity 75 or more occupants	A-3(8)
Laboratories, Plant Rooms	E(1)
Preparation Rooms	E(1)
Acid Storage Room – area 60 SF or less	S-1(5)

Occupancy Classifications for Rooms and Spaces in School Buildings (a)

Room/Space	Occupancy Classification
Group 4 – Physical Education	
Gymnasiums (without bleachers), Multipurpose Rooms, and Pools	A-3(8)
Gymnasiums (with bleachers) and Gymatoriums(17)	A-4(8)
Dance Studio, Weight Training Rooms- capacity less than 75 occupants	E
Dance Studio, Weight Training Rooms- capacity 75 or more occupants	A-3(8)
Exercise Classroom	E
Auxiliary Gym	A-3(8)
Gymnasium Offices, Locker Rooms	B(2)
Showers and Toilets	(12)
Gymnasium Storage	S-1(2) (7) (20)
Athletic Field with bleachers	A-5
Group 5 – Assembly	
Auditoriums (with scenic elements and without full fly stage)	A-3(8)
Auditoriums (without scenic elements and without full fly stage)	A-3(8)
Auditoriums (with scenic elements and with full fly stage)	A-1(8)
Roof or Roof Terrace intended for use by 75 or more occupants	A-3(8)
Group 6 – Library	
Libraries and Media Centers (less than 75 occupants)	E
Libraries and Media Centers (75 or more occupants)	A-3(4)(8)
Office and Server Rooms	B(2)
Group 8 – Student Support	
Suites, Conference Rooms, Offices, Guidance Houses, Waiting Rooms, Medical offices and Health Clinics	B(2)
LYFE Centers with direct access to exterior	E(6)
LYFE Centers without direct access to exterior	I-4
Group 9 – Storage	
Book, Furniture, Receiving and General Supply, Year Round, Record room, Non-food Storage Rooms and Vaults	S-1(2) (7) (20)
Bicycle Storage Room	S-2(2)

Occupancy Classifications for Rooms and Spaces in School Buildings (a)

Room/Space	Occupancy Classification
Can Wash and Food Storage Room	S-2(2)
Refuse/Recycling Room	E(1)
Audi/Visual and Computer/AV Rooms	S-2(2)
Ground Equipment Rooms	S-1(2) (7)
Group 10 – Administration	
Offices, Mail/Time Rooms, Conference Rooms, Work Rooms, Community/Parent Rooms, and Waiting Areas	B(2)
Duplicating room	S-1(2) (7) (20)
Group 11 – Cafeteria	
Cafeterias, Cafetoriums(17),Cafeterias/Multipurpose Rooms and Servery	A-3(8)
Staff Lunch/Conference Rooms	B(2)
Group 12 – Custodial	
Locker Rooms, Offices	B(2)
Toilets, Restrooms, Janitor Sink Closets, and Changing Rooms	_(12)
Workrooms	F-2(2)
Telecommunication Rooms and Closets	E(19)(21)
Mechanical Room	E(1)(9)(15)
Boiler Room	E(1)(9)(15)
HW heater Room	E(1)(9)(15)
Gas Meter Room	--(13)
Emergency Generator Room	E(1)(14)
Fuel Oil Storage Room	(14)(16)
Fire Pump Room	E(1)(18)
Sprinkler Booster Pump Room	E(2) (23)
Electric Service Room, Electrical Switchgear Room, Electrical Closets	E(19)(21)
Group CW – Citywide Special Education	
Classrooms, Activity Rooms, Therapy Rooms, and Speech Rooms	E
Offices	B(2)

Group K – Kitchen Food Services

Warming Pantry (not associated with a cafeteria)	E(25)
Kitchen **and** Therm and Hold Kitchen associated with a Cafeteria	**F-2**(9)(22)
Dietician's Office	B(2)

Footnotes:

(a) The Architect/Engineer of Record shall ensure that there are no extenuating circumstances or hazardous conditions within their design that will adversely affect the provided classification of the rooms and spaces indicated above. If the Architect/Engineer of Record's design adversely affects the provided classification of the rooms and spaces indicated above, the Architect/Engineer of Record shall revise the indicated classification accordingly and review with the A&E Department. The NYC Building Code shall be utilized by the Architect/Engineer of Record in conjunction with the Table to ensure that all related Code requirements are provided and are compliant with all aspects of the Code

(1) Can be classified as Incidental use area if total area of all incidental use spaces are less the 10% of the area of the building. Provide separation as per table 509

(2) Can be classified as accessory use if aggregate of all accessory use spaces are less the 10% of the area of the story in which they are located. No fire separation is required between an accessory occupancy and its main occupancy.

(3) Use of space categorized as a vocational space

(4) See NYC Building Code, Occupancy Group E – Education, BC 305.1 Classification, exception 1

(5) Refer to BC **427.8** and BC **427.9**. Typical storage will not exceed 5 Gal/SF based on standard shelving design

(6) See NYC Building Code, Occupancy Group E – Education, BC 305.1 Classification, exception 3

(7) Provide sprinklers as per BC 903.2.9.1

(8) Accessory use - refer to BC 508.2.**3**, exception 1.2

(9) Calculate Egress and Occupant load in accordance with use of space per table 1004.1.**3**.

(10) **Not used.**

(11) Classified as 'E' unless special directions given in the POR

(12) Occupancy Classification not required for Toilets, Janitor Sink Closets, restrooms, Changing room and Shower area

(13) Refer to Appendix E of the NYC Fuel Gas Code. Provide a 3-hr enclosure for all projects- note that this may be more stringent than what the code requires but is the SCA standard.

(14) Refer to Sections MC 1305.11 and MC 1305.13 of the **2022** NYC Mechanical Code

(15) Refer to Section BC **505.2.2**. Two means of egress from the roof top mechanical room, boiler room or hot water heater room are satisfied by providing two remote doors from the room. Unobstructed path of egress across the open roof is acceptable.

(16) Provide minimum 2-hr enclosure. Refer to Section MC 1305.11

(17) The term 'Gymatorium' and 'Cafetorium are used in the Program of Requirements but are not recognized in the DOB system. Gymatoriums and Cafetoriums are to be categorized as Assembly space with concentrated (not fixed) seating and should be filed as "Multipurpose room" for SCA BCC, Department of Building, Fire Department, etc. related documents.

(18) Provide 2-hour enclosure **separated from all other areas of a building as per Section BC 913.2.1. As per exceptions, it can also be a 1-hour enclosure if building is sprinklered per Sections BC 903.3.1.1 or BC 903.3.1.2 or no separation is required for a fire pump where such fire pump is located in a mechanical equipment room with a 2-hour enclosure.**

(19) Educational use – refer to Section BC 508.1 exception 4.

(20) Building must be fully sprinklered if an S-1 fire area is located more than 3 stories above grade plane. Refer to Section BC 903.2.9

(21) Houses equipment classified as dry-type electrical equipment. Provide a 2-hr enclosure per Section BC 903.2, exception 1, with no sprinkler.

(22) Fire separation from adjacent dining area **is** required per Section BC 508.4.4**, unless requirements of exception 5 of BC 508.1 are met**. **Projects are to utilize a 1-hr fire separation and not Exception 5. Note** that Servery is considered part of the dining area.

(23) Sprinkler Booster Pump can be within another room.

(24) **Not used.**

(25) Warming pantries only have electric **warming cabinets** for keeping food warm and thus **are** given an E designation since they do not fall into other occupancies listed.

1.3 Planning

1.3.2 Construction

1.3.2.2 Cellars, Basements, Crawl/Pipe and Duct Spaces, Slab-on-Grade Construction

Description/Design Approach:

A. The intent of this Requirement is to define when *Cellars, Basements, Crawl/Pipe and Duct Spaces* and *Slab-on-Grade* should be provided. The Designer shall, through the utilization of each type of space, provide the most economical and operational building possible.

B. Definitions

1. Cellar: A floor level is deemed a *cellar* when the floor to ceiling height is sufficient in height for occupancy and more than 50% of its height is *below* mean curb elevation as per NYC Building Code and NYC Zoning Resolutions.

2. Basement: A floor level is deemed a basement when the floor to ceiling height is sufficient in height for occupancy and more than 50% of its height is above mean curb elevation as per NYC Building Code and NYC Zoning Resolutions.

3. Crawl/Pipe and Duct Space: The space between the first-floor level and grade is deemed a *crawl/pipe and duct space* when the height of the space is for occupancy, by NYC Building Code.

4. Slab-on-Grade: For the intent at purposes of this Design Requirement, Slab-on-Grade shall be defined as a concrete slab that is not above a *Cellar, Basement, or Crawl/Pipe and Duct Spaces*.

C. The design of structural elements for *Cellars, Basements, Crawl/Pipe and Duct Spaces* and *Slab-on-Grade* shall be based on specific soil conditions encountered at the project site as revealed by borings and a Geo-technical Report. Please note that all floor slabs (cellar, crawl space, basement floors) shall be designed as structural slabs connected to and supported by the building's foundation system.

When planning these spaces, the Designer shall locate spaces with large amounts of plumbing (e.g., kitchens, toilets, etc.) over cellar, basement or crawl/pipe and duct spaces.

Where slab-on-grade construction is permitted only storm water and sanitary drainage piping shall be permitted beneath the concrete slab-on-grade. Storm water and sanitary piping beneath the concrete slab shall be laid with a pitch of ¼ inch per foot.

D. Locations and Spaces

1. Cellars

Cellars should typically be provided for Mechanical Spaces, Equipment Rooms and Operational Spaces such as, but not limited to, the following:

- Electrical Service Room, Water and Sprinkler Service Room, Kitchen Storage, Custodial Work Room and Storage, Storage, Kitchen, Locker Rooms.

2. Basements

   Basements are typically utilized for the same spaces as indicated above for *cellars*. In addition to being utilized for Equipment Rooms and Operational Spaces, *basements*, since they are 50% above grade, may be additionally utilized for large volume spaces such as:

   - Gymnasiums and Auditoriums.

3. Crawl/Pipe and Duct Spaces

   In buildings constructed without a cellar or basement where first floor construction is raised above mean curb elevation (grade) and open space is provided, a minimum clear headroom of 4'-0" shall be provided directly under the floor beams, girders or sill of the first-floor construction. Crawl/Pipe and Duct Spaces are typically utilized to raise a building's first floor above grade and to facilitate the installation of mechanical equipment pipe and duct runs.

   - Access shall be provided to these spaces as well as heat and lighting.
   - These spaces shall be vented as per NYC Building Code.
     If insulation is required beneath the first-floor slab to meet NYC Energy Code, high-density rigid insulation board, foil side up, shall be provided of appropriate R-Value. Batt Insulation is NOT permitted.

4. Slab-on-Grade

   - Buildings that need only to comply with the 2020 NYCECC:
     - Spaces placed on slab-on-grade should be limited as much as possible to spaces that do not require a warm floor, such as Cafeterias, Gyms, Auditoriums and Operational Spaces.
     - Insulation is to be provided as required by the 2020 NYCECC.
     - In facilities where Pre-Kindergarten and Kindergarten classrooms are situated on a slab-on-grade, the Designer is to provide R-15 rigid insulation under the Pre-Kindergarten and Kindergarten classrooms' floor slab.

   - Buildings that must comply with LL **51/23**: Designer is to provide continuous R-15 rigid insulation under all conditioned spaces' floor slab. Conditioned spaces include stairs, corridors and lobbies.

   Electrical and plumbing lines servicing areas that are slab-on-grade are to be located above the first-floor ceiling and feed down, with the exception of storm and sanitary drainage lines that must be below the first floor.

   - Gymnasiums and Auditoriums. Storm and sanitary drainage lines may be buried below the slab located in pipe tunnels or partial crawl space.

   - The drainage lines should be planned to minimize the extent of these access spaces.

1.3 Planning

1.3.2 Construction

1.3.2.3 Classroom/Office Wardrobe and Material Supply Closet Construction

Classroom and office wardrobe and material supply closets (also known as material and chart closet) are to be made of gypsum board construction rather than the historical wood casework, which is considered furniture. The classroom and office wardrobe and material supply closets are to be designed to the following requirements:

A. Student and teacher wardrobe closet design

1. The closet depth shall be no more than 24".
2. The closet floor area shall be no greater than 20 sq. ft.
3. Sprinkler requirements
   a. For buildings that comply with the 1968 **NYC** Building Code, the closet floor area is to be considered part of the room area in designing the required number, spacing, and location of sprinkler heads.
   b. For Buildings designed under the **2022** NYC Building Code, sprinklers are to be installed in student and teacher wardrobes per NFPA 13-**2016.**
4. The ceiling height is to be below the ceiling or soffit of the space adjacent to the closet. For practical usage, the height of the ceiling of the closet is to be no greater than 8"-0 above the floor.
5. Ceiling material
   a. For buildings that comply with the 1968 **NYC** Building Code, the ceilings are to be constructed of ceiling tile supported on the perimeter edge trim in order to allow access to the fire/smoke damper in the shaft wall. The ceiling exhaust grille in the ceiling of the student wardrobe, approximately 12"x24" is to be supported on the perimeter edge trim. The ceiling exhaust grille in the ceiling of the teacher's wardrobe, approximately 8"x8" is to be placed in the center of one of the ceiling tiles, with reinforcement on the back of the tile for fastening.
   b. For buildings that comply with the **2022 NYC** Building Code, the ceilings are to be constructed of ceiling tile supported on the perimeter edge trim in order to allow access to the fire/smoke damper in the shaft wall.

B. Material supply closet design

1. The closet depth shall be no more than 24"
2. The closet floor area shall be no greater than 10 sq. ft.
3. Sprinkler requirements:
   a. For buildings that comply with the 1968 **NYC** Building Code**,** the closet floor area is to be considered part of the room area in designing the required number, spacing, and location of sprinkler heads.
   b. For Buildings designed under the **2022 NYC** Building Code, sprinklers are to be installed in the material supply closets per NFPA 13-**2016.**
4. The ceiling height of the material supply closet is to be below the ceiling or soffit of the space adjacent to the closet. The height of the ceiling of the closet is to be no greater than 8"-0 above the floor.

5. Ceiling Material
   a. For buildings that comply with the 1968 **NYC** Building Code, the ceiling is to be constructed of fire-rated gypsum board.
   b. For Buildings designed under the **2022 NYC** Building Code, the ceilings are to be constructed of ceiling tile supported on the perimeter edge trim in order to allow access to the fire/smoke damper in the shaft wall**.**

C. Wall construction

1. For buildings that comply with the 1968 **NYC** Building Code**,** the entire wardrobe/supply closet assembly is to have the sheet rock of the walls extended full height and made airtight along the wall with the room ceiling to close off the ceiling plenum.

2. For Buildings designed under the **2022 NYC** Building Code, the walls of the wardrobe/supply closet assembly is to extend a minimum of 6” above the ceiling of the wardrobe/supply closet.

1.3 Planning

1.3.3 Life Safety

1.3.3.1 Rescue Areas (Areas of Rescue Assistance, Horizontal Exits and Fire Rescue Areas) and Holding Area Rooms - Rescue and Evacuation of Non-Ambulatory Persons

Description/Design Approach:

Rescue Areas (Areas of Rescue Assistance (ARA), Horizontal Exits and Fire Rescue Areas) and Holding Area Rooms and have been/are used to provide for rescue and evacuation of non-ambulatory persons in multi-story buildings where floors not at grade can be accessed by elevators or lifts. Over the last approximately 25 years, New Buildings, Additions, and buildings modified to become Program Accessible have used one of these means. Each has distinct parameters based on the time when they were/are implemented and as they relate to other attributes of the building itself. Besides these measures, there are other administrative Fire Department (FDNY) and Department of Education (DoE) regulations that apply to existing buildings that need to be taken into consideration.

A. Holding Area Rooms (for evacuation through windows by FDNY in non-sprinklered buildings)

1. Pre-1995 Holding Area Rooms

   a. Background: In the 1980's and early 1990's, prior to the code requirement or policy to fully sprinkler new school buildings, the DOE entered into an agreement with FDNY that certain accessible buildings and accessible new school buildings would include, on each floor above grade, one Holding Area Room where, in the event of an emergency, non-ambulatory people would gather and wait for evacuation by fire fighters. Since the new buildings at that time were not sprinklered, evacuation through window via a tower ladder truck was to be the method. These rooms were stacked vertically, had a hinged window for evacuation and a red painted sill to identify them from the street. They also had a 2-hour rated enclosure and a dedicated communication system.

   b. Applicability: School buildings with FDNY approved Holding Area Rooms are a finite group of non-sprinklered buildings that had the rooms built in the late 1980's and early 1990's. This method was discontinued when FDNY determined at the time that tower ladder resources were at their limit. Following that, all new public school buildings were designed to be fully sprinklered (even before the Code mandate). Existing Approved Holding Area Rooms (list of schools with approved Holding Areas is attached in part D) shall be retained (per Title 3 RCNY Chapter 48) during and after any construction or improvements to the building.

2. Post 2019 Holding Area Rooms

   a. Background: In October 2017, the SCA met with FDNY and the NYC Department of Buildings (DOB) to determine if there was an alternative to ARAs in the existing building portion of addition projects when the planned work did not trigger requiring accessible stairs for the existing building. Areas of Rescue Assistance require direct access to the stairs, which problematic due to egress requirements and constructability. If stairs do not have 48" clear width between handrails, access to the stair must be through a horizontal

exit. The case was presented that if an addition is filed as a new building, the accessible stair/creation of ARAs in the existing building would be voluntary and FDNY agreed in 2018 that they currently have the resources to provide ladder rescue and can accommodate the use of Holding Area Rooms in these new sets of buildings.

b. Applicability

1) Addition Projects filed as a new building where the work in the existing building does not require the building to be brought to conformance with Chapter 11 of the 2022 NYC Building Code, and where the fully sprinklered New Addition Building is attached to an existing unsprinklered building and thus provides mechanical access to floors above grade: The existing building is thus made programmatically accessible and Holding Area Rooms can be utilized for rescue and evacuation as per agreement with FDNY. In these cases, the new fully sprinklered construction will typically serve as the Rescue Areas on that side of the existing building. Holding area rooms in the existing unsprinklered building will be required if the new fully sprinklered construction is beyond the maximum travel distance from any accessible space permitted for the occupancy specified in Section BC 1009.6 of the 2022 NYC Building Code. Use of holding area rooms is limited to buildings that are 5 stories or less above grade.
2) Existing buildings for addition projects as described in 1 above with existing unapproved Holding Area Rooms designed and built before the determination to discontinue tower ladder evacuation: The use of such rooms are now acceptable if they meet the requirements for a Holding Area Room. Such room shall be upgraded to meet any of requirements that had not been implemented.

c. Requirements

Follow the same requirements as the pre-1995 program meeting Title 3 RCNY Chapter 48. This includes the following:

1) Holding Area Rooms are to be within a 2-hour rated enclosure adjacent to a stair with an appropriately rated self-closing door.
2) All rooms are to line up and be accessible from the street and be free from physical impediments that would interfere with position of Fire Department Equipment. Windows selected for access on each floor shall line up vertically with each other.
3) Access windows shall provide, when opened, an area free of obstructions that is at least 32” wide by 48” high. Windows shall be openable without use of a key. Windowsills shall not be greater than 36” high and shall be painted red on inside and outside. A sign made of metal or other durable non-combustible material shall be attached 6” above the head of the access window and shall read “F.D. Access”. Sign shall be white with 4” high red lettering.
4) Doors leading to Holding Area Room(s) shall be provided with a "HOLDING AREA" sign. Sign shall be made of metal or other durable non-combustible material with 3" red lettering in bold type on a white background. Signs shall be mounted on the lower half of the door and be properly maintained.
5) Any penetrations through the rated construction of the room shall be firestopped. Ductwork passing through the walls are to have fire-smoke dampers.
6) The maximum travel distance to a Holding Area Room shall not exceed the travel distance from any accessible space permitted for the occupancy per Section BC 1009.6, which will typically result in two rooms per floor. The sprinklered addition building can be

considered as a Holding Area Room in relation to this distance requirement as a substitute for one set of rooms.

7) See Section C below.

B. Rescue Areas (for evacuation via exit stairway and/or horizontal exit by FDNY)

1. Background

a. In multi-story buildings, with elevators or lifts to access floors not at grade, a Rescue Area is the typical rescue and evacuation solution for persons unable to use the stairs during an emergency.
b. The NYC Building Code requires that, for non-sprinklered buildings, exit stairways include an Area of Rescue Assistance or be accessed from a horizontal exit to qualify as an accessible means of egress. Any such building that the level of alterations requires the building to be in full compliance with Chapter 11 will require compliance with these requirements. For sprinklered buildings, such requirements are not mandated by code.
c. A Fire Rescue Area is a DOE/SCA designation for a gathering room for non-ambulatory persons that is administrative in nature; they are not intended for window evacuation and are not required by the code. Non-ambulatory persons in fully sprinklered schools with Fire Rescue Areas will be evacuated by FDNY via corridor and exit stairway. In non-sprinklered buildings, non-ambulatory persons will be evacuated from the Fire Rescue Room through a horizontal exit, unless an ARA can be provided meeting code requirements. The SCA will provide accessible means of egress in existing-non-sprinklered buildings even where the level of alterations does not trigger full compliance of accessibility pursuant to Section 28-101.4.3 of the Administrative Code and thus a code required accessible means of egress.
d. Rescue Areas (ARA, Horizontal Exit, Fire Rescue Area) are to be provided for ALL buildings, except where Holding Area Rooms are being provided as described in A above. Such Rescue Area can be one of the following:
   - A Fire Rescue Area in a fully sprinklered building
   - A Fire Rescue Area within the refuge area of a Horizontal Exit in a non-sprinklered building
   - The refuge area of the Horizontal Exit in a non-sprinklered building. Such area shall also meet requirements for a Fire Rescue
   - An ARA in a non-sprinklered building
e. Rescue Areas will be used to group together and account for persons having physical disabilities in the event of fire or other emergency.

2. Applicability

a. In fully sprinklered multi-story new stand-alone or new addition buildings: One Fire Rescue Area per floor (other than floors at grade) shall be provided proximate to an exit stairway.
b. Program Accessibility Projects: These projects typically add an elevator and an accessible route, and are to include an accessible means of egress as per the SCA mandate and/or NYC Building Code. The maximum travel distance to a Rescue Area shall not exceed the travel distance from any accessible space permitted for the occupancy per Section BC 1009.6, which will typically result in two rooms per floor.
c. Addition Projects attached to the existing building where the addition is not filed as a new building or work in the existing building requires building to meet Chapter 11 requirements. The new addition provides mechanical access to floors above grade,

making the existing building accessible and thus Rescue Areas are to be provided for rescue and evacuation. The maximum travel distance to a Rescue Area shall not exceed the travel distance to a Rescue Area from any accessible space permitted for the occupancy per Section BC 1009.6, which will typically result in two rooms per floor. Note that in these cases, the new fully sprinklered construction will typically serve as the Rescue Area for that side of the existing building.

d. Accessible buildings with Unapproved Holding Area Rooms: These schools had holding area rooms built before the determination to discontinue tower ladder evacuation. Any accessibility project or a new addition project as indicated in c immediately above will require an accessible means of egress and thus a Rescue Area. The existing unapproved Holding Area Room may be incorporated as a Rescue Area if the maximum travel distance to a Rescue Area does not exceed the travel distance from any accessible space permitted for the occupancy per Section BC 1009.6, which will typically result in two rooms per floor.

Refer to the attached diagrams for the most practical alternates/locations.

3. Requirements

a. When the clearance between the handrails of existing stairs is 48” or greater in non-sprinklered buildings, Areas of Rescue Assistance can be provided. Such areas are to be within a 2-hour rated enclosure and shall have direct access to a stair and can be located in the existing corridor having access to at least two exit stairs. (Refer to Diagrams 1 and 2)
b. When the clearance between the handrails of existing stairs is less than 48” (typical of most schools) in non-sprinklered buildings, such enclosed exit stairs must be accessed from a horizontal exit. (Refer to Diagrams 3 and 4)
c. Any penetrations through the rated construction of the room shall be firestopped. Ductwork passing through the walls are to have fire-smoke dampers.
d. In non-sprinklered buildings, cross-corridor exit doors used as part of the horizontal exit system shall be equipped with magnetic hold opens connected to the fire alarm system.
e. In non-sprinklered buildings, the maximum travel distance to a Rescue Area (ARA, Fire Rescue Area, or Horizontal Exit) shall not exceed the travel distance from any accessible space permitted for the occupancy (Section BC 1009.6.1).
f. Each Rescue Area shall accommodate one (1) wheelchair space 30” x 48” for each 200 occupants based upon occupant load on the floor (Section BC 1009.6.3)
g. See Section C below.

Typically, the Fire Rescue Area shall be a standard size classroom within a 2-hour rated enclosure with movable desks and chairs.

C. Specific Requirements for Areas of Rescue Assistance (ARA), Holding Area Rooms, and Fire Rescue Areas

1. Each room shall be 2-hour rated.
2. Each room shall have a separate, dedicated communication system that shall provide instant two-way voice communications with the Custodian's Office and General Office (Section BC 1009.6.5). Refer to Design Requirement 1.3.1.4, D.2.f for communication system signage.
3. Each room shall have an emergency lighting system, which provides general illumination with an intensity of not less than one (1) foot-candle within the room and not less than 25 foot-candles on

the outside to externally illuminate the sign posted on the door (Sections BC 1009.9, BC 1013.3 and BC 1013.6.2).

4. Each room/space shall be furnished with a 20 lb. Class ABC Fire extinguisher.
5. Each room shall have movable furniture and allow when moved to provide at least 25 SF of open area per wheelchair.
6. Each room shall have door-mounted identification signage and wall-mounted tactile identification signage provided per DR 1.3.1.4, D.2.f.
7. Instructions on how to use the room during an emergency shall be provided per Section BC 1009.11, regardless of the type of room being provided on the project. Provide note on Drawings indicating to provide instruction signage.
8. **Rated door to each room from corridor shall be hollow metal door with narrow vision panel.**

D. List of DOE/FDNY approved Holding Areas (Pre 1995)

List of DOE/Fire Department approved Holding Areas					
Bldg. ID	**School and Borough**	**Holding area room number**	**Bldg. ID**	**School and Borough**	**Holding area room number**
MANHATTAN					
M025	I.S. 25-M	209, 309, 409	M146	P.S. 146-M	218, 318
M137	P.S.137-M	202, 303, 402	M079	P.S. 79-M	212, 238, 312
M142	P.S. 142-M	230, 323	M092	P.S. 92-M	203, 303
M033	P.S. 33-M	Room No. to be verified	M195	I.S. 195-M	208, 308
M070	I.S. 70-M	210, 310, 410	M143	JHS 143-M	230, 430
M118	JHS 118-M	Room No. to be verified	M153	P.S. 153-M	Room No. to be verified
M199	P.S. 199-M	228, 328	M520	Murry Bergtraum	203, 303, 403, 504
M117	JHS 117-M	122, 222, 322			
BRONX					
X156	P.S. 156-X	Room No. to be verified	X085	P.S. 85-X	119, 219, 319, 419
X162	I.S. 162-X	Room No. to be verified	X137	I.S. 137-X	324,508,609
X184	I.S. 184-X	Room No. to be verified	X153	P.S. 153-X	258,358
X152	P.S. 152-X	203A, 303A	X180	I.S. 180-X	160, 260
X174	I.S. 174-X	20, 30 ,40	X084	I.S. 84-X	Room No. to be verified
X192	I.S. 192-X	218, 318, 418	X158	I.S. 158-X	Room No. to be verified
X042	P.S. 42-X	Room No. to be verified	X198	I.S. 198-X	Room No. to be verified
X132	P.S. 132-X	Room No. to be verified	X193	I.S. 193-X	203-8,303-8, 403-8
X147	P.S. 147-X	Room No. to be verified	X435	Theodore Roosevelt	216, 246, 316, 337A, 466, CE-2
BROOKLYN					
K009	P.S. 9-K	B3, 103, 203	K227	I.S. 227-K	Room No. to be verified
K093	P.S. 93-K	Room No. to be verified	K247	P.S. 247-K	Under Consideration
K113	I.S. 113-K 300 Adelphi street (J-294)	(J-294) 214, 318, 418	K226	P.S. 226-K	Room No. to be verified

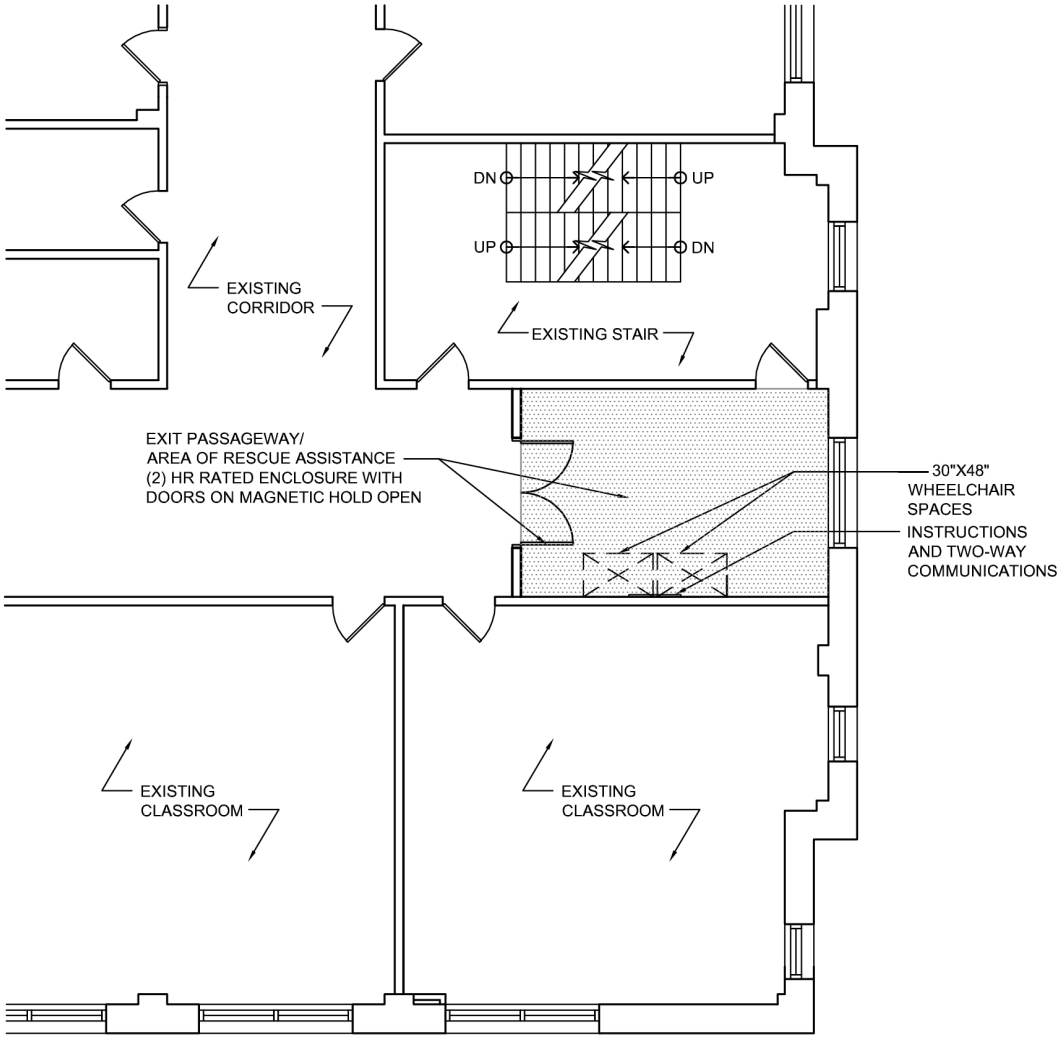
List of DOE/Fire Department approved Holding Areas					
Bldg. ID	**School and Borough**	**Holding area room number**	**Bldg. ID**	**School and Borough**	**Holding area room number**
K071	I.S. 71-K	232, 332	K228	JHS 228-K	217, 317, 417
K257	P.S. 257-K	208, 308	K238	P.S. 238-K	Room No. to be verified
K318	P.S. 318-K	Under Consideration	K072	P.S. 72 K	107, 207, 307, 407
K120	P.S. 120-K	Under Consideration	K014	I. S. 14K	126, 226, 326
K010	P.S. 10-K	Under Consideration	K222	P. S. 222-K	217, 317, 417
K088	I.S. 88-K	249, 349	K286	P. S. 286-K	221, 321
K261	P.S. 261-K	Under Consideration	K055	I.S. 55-K	101, 203, 303, 403
K081	P.S. 81-K	Under Consideration	K184	P.S. 184-K	Under Consideration
K308	P.S./I.S. 308-K	Room No. to be verified	K332	P.S. 332-K	209, 309, 409
K324	I.S. 324-K	271, 371	K396	P.S. 396-K	250, 350, 268, 368
K329	P.S. 329-K	234A, 334A	K384	P. S. 384-K	227, 327
K391	I. S. 391-K	166, 266	K377	P. S. 377-K	263A, 363A
K211	JHS 211-K	B3, 211, 311	K383	I. S. 383-K	Room No. to be verified
K242	P.S. 242-K	Under Consideration	K450	Eastern District	320, 420
K279	P.S. 279-K	207, 307	K495	Sheepshead Bay	031, 069, 213, 313, 263
K289	P.S. 289 K	223, 333	K213	Ps 213K	Under Consideration
K302	I.S. 302K	209, 309, 409	K176	P.S. 176K	205, 309, 409
QUEENS					
Q061	I.S. 61-Q	202, 302, 402	Q040	P.S. 40-Q	Under Consideration
Q153	P.S. 153-Q	Under Consideration	Q080	P.S. 80-Q	Room No. to be verified
Q229	P.S. 229-Q	222, 322	Q217	P/I 217-Q	Room No. to be verified
Q079	P.S. 79-Q	224A, 324A	Q135	P.S. 135-Q	225, 325
Q107	P.S. 107-Q	207, 307, 407, 507	Q147	P.S. 147-Q	Room No. to be verified
Q237	I.S. 237-Q	205A, 305A, 405A	Q835	P.S. 134-Q (P. 233-Q = Org'n)	Under Consideration
Q074	I.S. 74-Q	Room No. to be	Q238	I.S. 238-Q	123, 223, 323

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

List of DOE/Fire Department approved Holding Areas						
Bldg. ID	**School and Borough**	**Holding area room number**		**Bldg. ID**	**School and Borough**	**Holding area room number**
		verified				
Q046	P.S. 46-Q	Room No. to be verified		Q076	P.S. 76-Q	Room No. to be verified
Q811	P.S. 811-Q	Room No. to be verified		Q112	P.S. 112-Q	Room No. to be verified
Q053	I.S. 53-Q	247A, 347A, 447A		Q145	I.S. 145-Q	Room No. to be verified
Q215	P.S. 215-Q	101, 238, 338		Q410	Beach Channel	Room No. to be verified
Q223	P.S 223-Q	202, 303		Q505	Hillcrest	280C, 380C, 350, 480C, 450
Q226	I.S. 226-Q	Room No. to be verified				
STATEN ISLAND						
R024	I.S. 24-R	330,430		R055	P.S. 55R	235
R051	I.S. 51-R	Room No. to be verified		R069	P.S. 69R	215B, 315B
R052	P.S. 52-R	205,305		R072	I.S. 72 R	216H, 316H, 416H
R460	Wagner HS R	156, 257, 356, 456				

E. Explanatory Diagrams - Existing Schools with added Rescue Areas

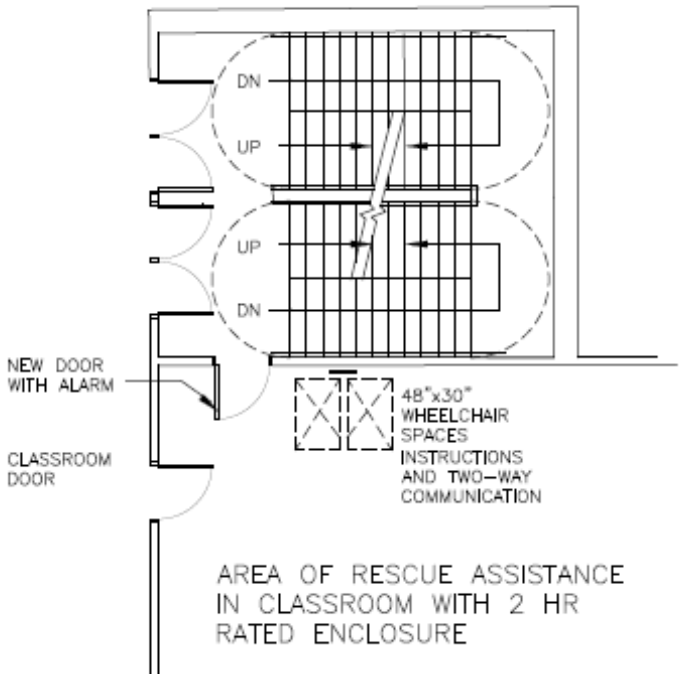
Diagram 1 Clearance between handrails minimum 48".
Part of existing corridor converted to ARA



Direct access to stair required

Plan of existing corridor used as Area of Rescue Assistance

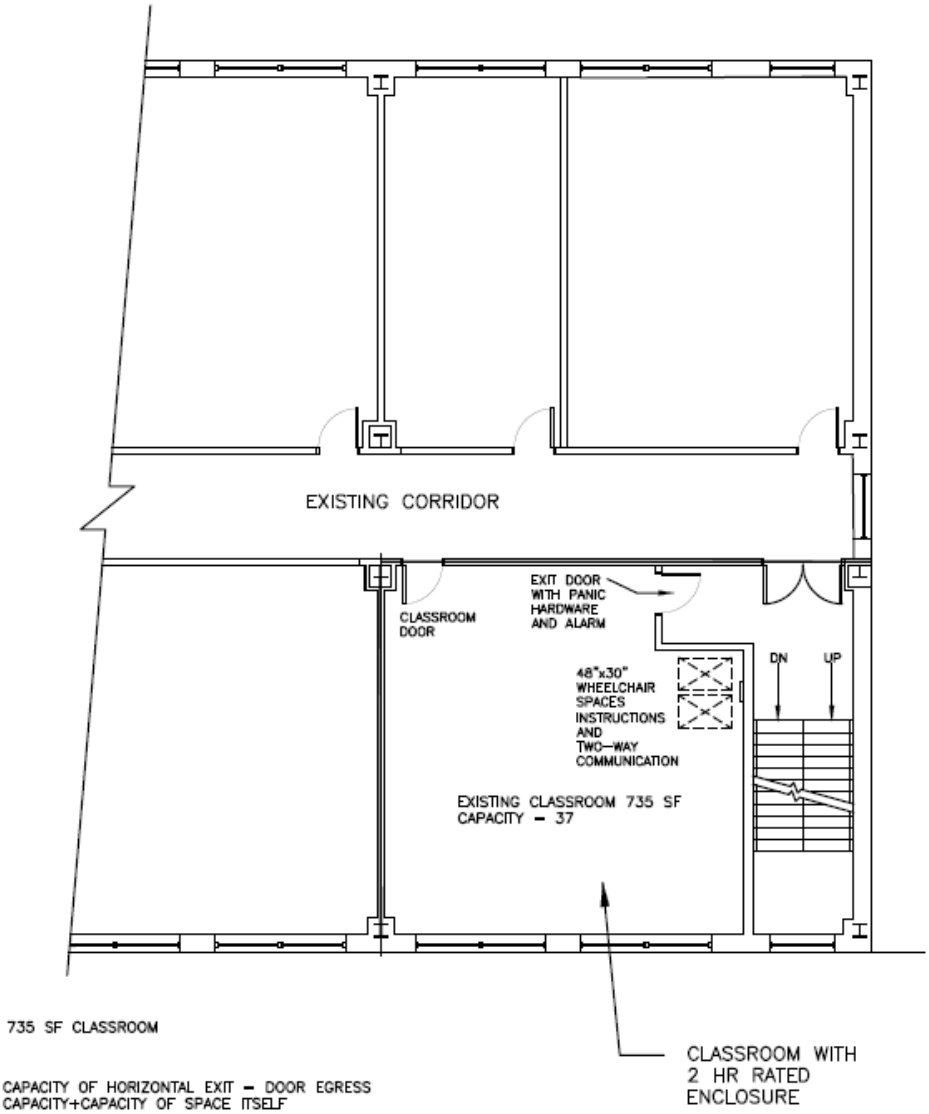
Diagram 2 Clearance between handrails minimum 48".
Classroom adjacent to stair converted to ARA



Direct access to stair required
Door from Classroom to stair can swing into classroom or into stair.

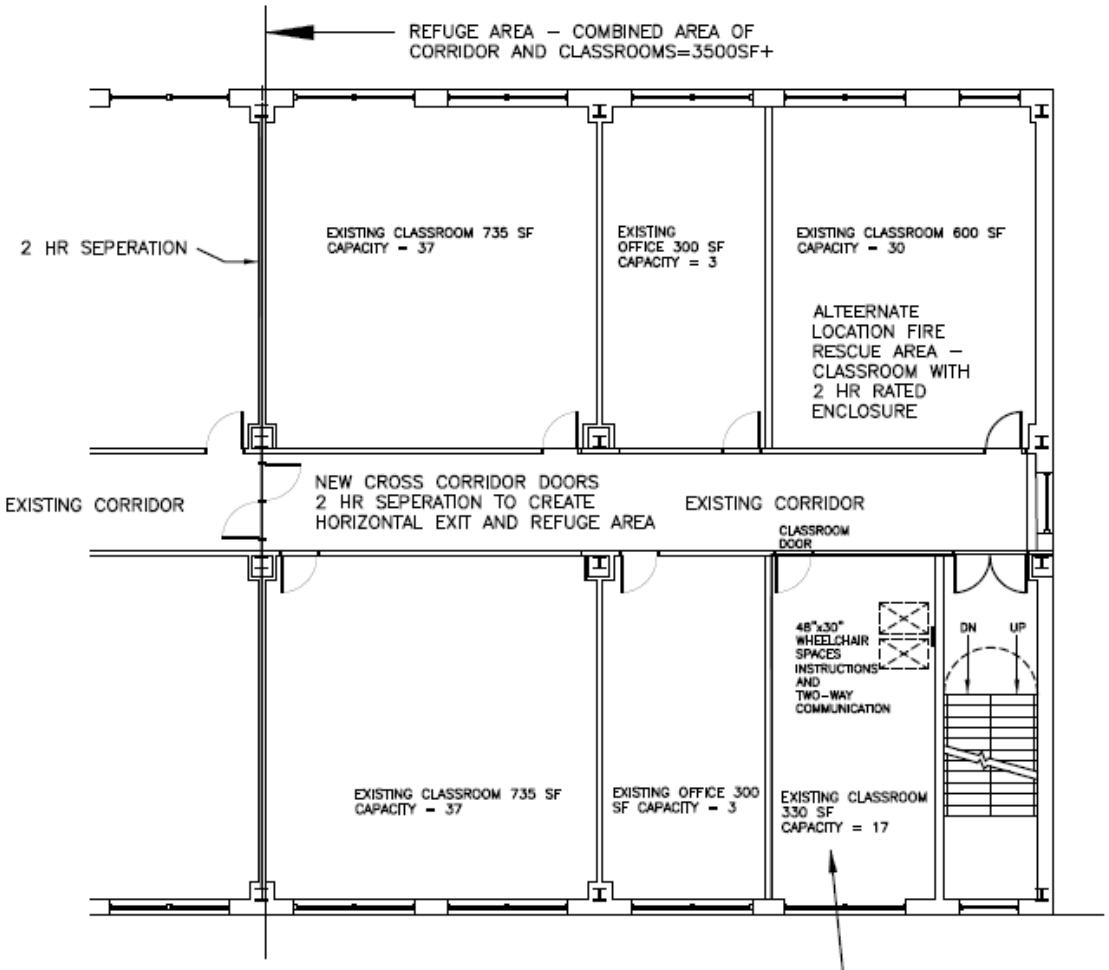
Plan of existing classroom used as Area of Rescue Assistance

Diagram 3 Clearance between handrails less than 48".
Stair must be accessed thru 'Horizontal exit".
Existing classroom used as refuge area of Horizontal exit and Fire Rescue Area



Plan of existing classroom used as Fire Rescue Area in conjunction with Refuge area/Horizontal Exit (Calculations included for explanation**)**

Diagram 4 Clearance between handrails less than 48".
Stair must be accessed thru 'Horizontal exit".
2-hour separation and cross-corridor doors used to create refuge area of Horizontal exit. Classroom used as Fire Rescue Area



330 SF CLASSROOM

CAPACITY OF HORIZONTAL EXIT = DOOR EGRESS CAPACITY+CAPACITY OF SPACE ITSELF

DOOR CAPACITY OF SPACE
IF DOOR OPENING = 34" (1.5 UNIT)
DOOR CAPACITY = 80 (PER UNIT) X1.5 =120 CAPACITY OF SPACE ITSELF=17
AREA REQUIRED =3(120+17)=411 SF MINIMUM.

ROOM AREA – 330SF ROOM CANNOT QUALIFY AS HORIZONTAL EXIT.
DIRCET ACCESS FROM ROOM TO STAIR NOT REQUIRD.

A 2 HR SEPERATION WITH CROSS CORRIDOR DOORS REQUIRED IN THE CORRIDOR. LOCATION OF 2 HR SEPARATION SUCH THAT AREA OF CORRIDOR + ROOMS OPENING INTO THE CORRIDOR IS LARGE ENOUGH TO ACCOMMODATE TOTAL OF
1)OCCUPANTS BASED ON DOOR CAPACITY OF CROSS CORRIDOR DOOR. IF DOOR OPENING = 34" (1.5 UNIT) DOOR CAPACITY =80(PER UNIT) X1.5 =120

2)OCCUPANT LOAD OF ALL SPACES THAT OPEN TO THAT PORTION OF CORRIDOR = 37+3+30+37+3+17=114

HORIZONTAL EXITS REFUGE AREA REQUIRED =3(120+127) = 681 SF

Plan of existing classroom used as Fire Rescue Area in conjunction with cross-corridor doors/ Horizontal Exit (Calculations included for explanation**)**

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

1.3 Planning

1.3.3 Life Safety

1.3.3.2 Life Safety for Non-Ambulatory Persons – Use of Sprinkler Systems

Description/Design Approach:

A. In the mid 1990's, the New York City Fire Department (FDNY) determined that it only possessed a sufficient quantity of firefighting equipment for window evacuation of non-ambulatory persons from Holding Areas in a limited number of Public Schools. It was agreed to by the SCA, Board of Education, and FDNY that all schools would be sprinklered as a means to provide fire-safety for non-ambulatory persons in New York City Public Schools and thus avoid the use of holding areas, except for those schools that already had approved holding rooms at the time.

B. Per Section BC 903.2.3 of the 2022 NYC Building Code, a sprinkler system in schools is mandated when the fire limit area threshold exceeds 12,000 square feet (previously, beginning with the 2008 code, sprinkler system was required when the fire limit area threshold exceeded 20,000 SF). In addition, Section BC 903.2.11.7 requires providing an automatic sprinkler system throughout school buildings that have one or more stories with an occupant load of 30 or more located 55 feet above the lowest level of Fire Department vehicle access, as measured to the finished floor. The Building Code does not require Areas of Rescue Assistance in buildings or facilities that are equipped throughout with an automatic sprinkler system, and thus Areas of Recue Assistance is not required to be included in the design.

C. The design criteria to provide for the safety of non-ambulatory persons in the event of fire are as follows:

1. New School Construction:

   - Fully Sprinklered, typically with wet standpipe as required by code

2. New Additions with Minor Modernizations:

   Where the modernization of the existing school building is limited to the minor alteration of individual rooms or spaces and does not include providing accessibility to non-ambulatory persons in the existing school, the new addition shall be fully sprinklered and contain 'Fire Rescue Areas' (refer to design requirement 1.3.3.1). The existing building shall be separated from the addition by a **3**-hour rated vertical Fire Wall **if addition is filed as a separate building (NB application) from the existing building (typical of most designs)**. The existing Building shall have Horizontal Exits on each floor to provide access to the new addition through the **3**-hour rated Fire Wall. Vertical Fire Walls shall conform to Section BC 706 of the 2022 New York City Building Code.

3. Minor Modernizations and Accessibility projects

   a. Where the modernization of the existing non-sprinklered school building is limited to the minor alteration of individual rooms or spaces and/or includes providing accessibility to non-ambulatory persons, a minimum of two areas of rescue assistance conforming to Section BC 1009.6 shall be provided on each floor not accessible to grade.

b. The existing building or the areas of rescue assistance are not required to be sprinklered.

4. Major Modernizations

Existing schools whose alterations include providing accessibility to non-ambulatory persons shall be fully sprinklered. However, where full sprinklering of a building is impractical or each fire area in the building is 12,000 SF or less and the top occupied floor of the building is less than 55' above the lowest level of fire department access, a minimum of two areas conforming to Section BC 1009.6 for Areas of Rescue Assistance shall be provided on each floor not accessible to grade. Refer to DR 1.3.3.1 for when a Horizontal Exit can be used.

However

- Below grade floors with occupied spaces must be sprinklered in accordance with Section BC 903.2.3.
- If the top occupied floor of the building (with 30 or more occupants) is more than 55' above the lowest level of fire department access, the building shall be fully sprinklered in accordance with Section BC 903.2.11.7**.**
- If the top occupied floor of the building is located 75 feet or more above the lowest level of fire department vehicle access, the building shall be fully sprinklered in accordance with Section BC 403.3

5. Existing School Buildings

School Buildings with existing Holding Areas that are approved by the FDNY are not required to be fully sprinklered.

1.3 Planning

1.3.4 Circulation

1.3.4.1 Entrances and Exits

Description/Design Approach:

All entrances shall comply with local, state and federal requirements for handicapped accessibility.

There are typically more than one type of entry point to a school building as well as points of egress/exiting. Both of these types are separated into primary and secondary types as follows:

A. Entrances

1. Primary Entrance (Main)

a. When determining the location of the main entrance, the following shall be taken into consideration:

1) Location within the neighborhood it will serve
2) Relationship to adjoining properties and residences
3) The general direction of approach to the school by students
4) Bus and car drop-off locations for students
5) Traffic type and traffic direction of surrounding streets
6) Pedestrian crossing and traffic lights
7) Public transportation routes
8) Site and Security Lighting
9) Available area for parents and students to gather during arrival and dismissal times
10) Visual control

b. Vestibules in general should be provided at all entrances and exits to the building that lead to corridors or occupied spaces.

c. The main lobby shall be accessed from the main entrance. **For schools with an occupancy of over 300, one set of entrance doors (vestibule door and entrance door into the lobby) shall be a low-energy power operated door as per Section BC 1105.1.8 of the 2022 NYC Building Code.**

d. If the main lobby is accessible to two street fronts the school may have two primary entrances.

e. Building entrances shall have permanent entryway systems at least ten **(10)** feet long in the primary direction of travel to **facilitate installation of the walk-off mats to** capture dirt and particulates **required for Green Schools Guide compliance.**

f. Where appropriate, utilize existing building orientation, land formations and vegetation to provide shelter from extreme weather or to deflect automobile exhaust and unwanted noise away from building entry.

2. Secondary Entrance (School Yard Access)

    a. When determining the location of school yard entrances the following shall be taken into consideration:

        1) Direct and/or indirect access to the main lobby
        2) Direct and/or indirect access to gymnasiums, cafeterias and auditoriums
        3) Access to interior stairs
        4) Cross circulation as students access or depart the yard during period changes
        5) Site and Security Lighting
        6) Available area for parents and students to gather during arrival and dismissal times
        7) Visual control

B. Exits

1. Primary Exits (Egress)

    a. The location and number of exits are typically dictated by the life safety requirements to allow students to evacuate the building as quickly as possible.

    b. When determining the location of this type of exit the following shall be taken into consideration:

        1) Reference shall be made to the **2022** NYC Building Code for number, type, location and capacity.
        2) Access to interior stairs
        3) Site and Security Lighting
        4) Available area for parents and students to gather during evacuation
        5) Visual control

2. Secondary Exits (School Yard Access):

    See paragraph A.2, above - Secondary Entrance (School Yard Access)

3. Interior Stairs

    Provide for at least 50% of the building occupants to exit directly to the exterior without re-entering the building at street floor level as per Section BC **1028.1. No more than 50% are to exit though the main lobby as permitted by** Exception 1 and/or 2. **Note that if the exceptions are not incorporated, which would not be typical of a school, a separate Fire Department access is required per Section BC 1028.1.1.**

1.3 Planning

1.3.4 Circulation

1.3.4.2 Vestibules and Lobbies

Description/Design Approach:

The following applies to Vestibules and Lobbies for all schools.

A. Vestibules

The Vestibule is the transitional space between the buildings exterior and interior environments. Its general purpose is to prevent extreme changes between indoor and outdoor temperatures that will have an adverse effect on the indoor heating and cooling loads as well as comfort levels within the building.

1. Locations

Vestibules in general shall be provided at all entrances and exits to the building that lead to corridors or occupied spaces.

Exceptions:

a. Stair shafts that lead directly to the outdoors.
b. Entrances to Service Areas.

2. Size

Vestibule shall be minimum seven (7) feet deep. Vestibules at entrances shall be ten (10) feet deep to provide the required walk-off matt for GSG compliance. Vestibule area shall be a maximum 2% of the gross floor area of that level of the building per Section 5.4.3.4 of ASHRAE 90.1-16 as modified by Appendix CA of the 2020 NYCECC**.**

B. Lobbies

The main and formal entrance to a school is through the school's Lobby that also acts as a reception area to the school. Therefore, since this is the first space to be experienced by children and the public, it should be welcoming and reflect the importance of the school as both an educational and a civic building.

Lobbies shall be planned to facilitate circulation and avoid congestion for the areas they serve.

1. Locations

a. Lobbies in general shall be accessible from main entrance(s) and main corridor of the first floor.

b. Large Group Spaces such as Gymnasium, Gymatorium, Auditorium and Cafeteria should, if possible, be planned so to have direct access to and from the Lobby.

These spaces may require that the Lobby serve as a gathering area for both school and civic functions.

2. Security

   a. Design and location of doors must take into account that exit stairs must be designed to allow for at least 50% of occupants to exit directly to the exterior as per Section BC **1028.1** Exception 1 and/or 2 of the **2022** NYC Building Code.

   b. A security desk shall be planned so that its location provides a single vantage point for the supervision and security of entrances, lobbies and corridors.

The combination of a main entry with a carefully located, constantly manned administration area can aid visual supervision of school entries, stairs, and hallways.

C. Sample Layout:

The sample diagram below illustrates a central main entrance and vestibule leading to the main lobby area. The Security Desk is situated so that it may visually control the main entrance, lobby corridor and stairs.

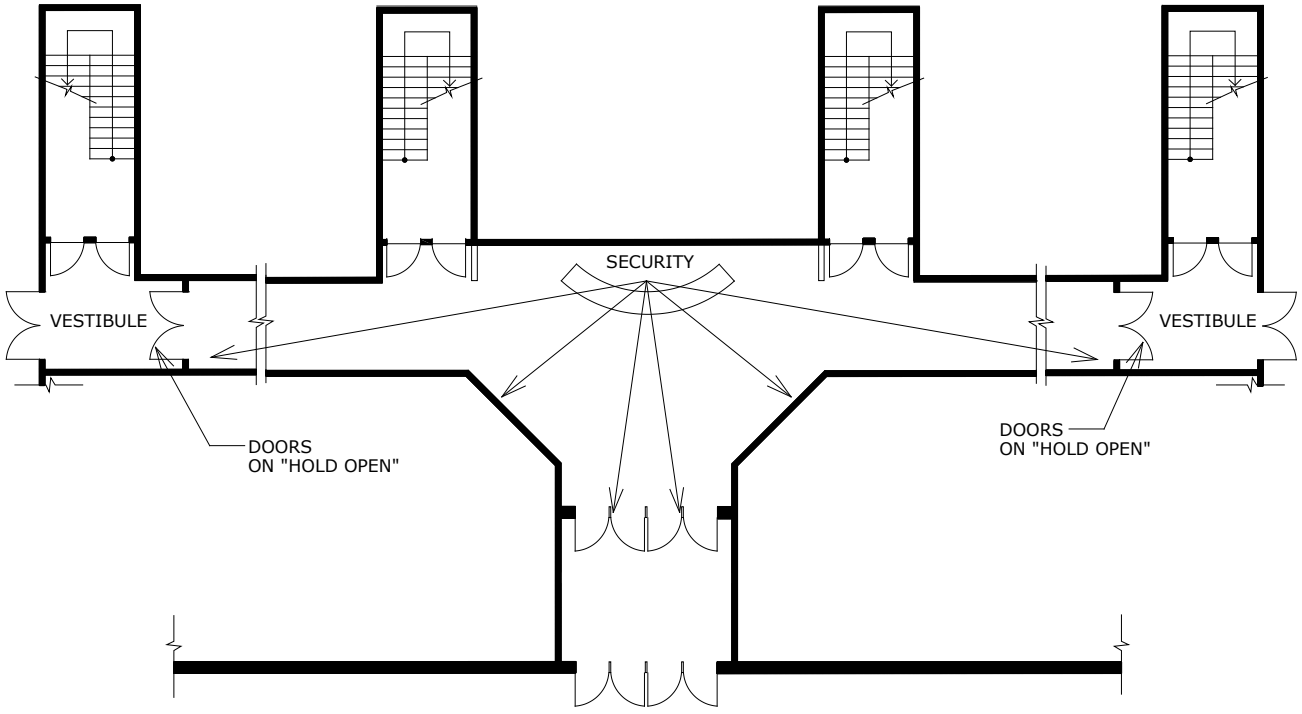


Diagram - Main Entrance

1.3 Planning

1.3.4 Circulation

1.3.4.3 Corridors

Description/Design Approach:

A. Much of the design of school corridors is dictated by the life safety requirements to allow students to evacuate the building quickly. As a general rule, passageways should be broad, well lit, and void of projections.

B. All corridors shall be designed in order to facilitate supervision from one location, with views of the entire corridor.

C. The following applies to the school's circulation corridors. It does not apply to corridors within spaces or suites.

1. Minimum Width:

   a. Primary and Intermediate Schools

   - All corridors shall have a minimum clear width of 8'–0" if there are no lockers.

   b. Intermediate and High Schools

   - Corridors that do not have lockers shall have a minimum clear width of 8'–0".
   - Corridors that have lockers on one side shall have a minimum clear width of 10'–0" from wall to front surface of lockers.
   - Corridors that have lockers on both sides shall have a minimum clear width of 12'–0" from front surface to front surface of lockers.

   (NOTE: The additional width is required to maintain 8'-0" clear and allow 1'-0" for the open locker door and 1'-0" for the student using the locker)

2. Acceptable Obstructions

   a. Columns or other construction elements may reduce the required minimum width of corridors by a maximum of 4 inches.

   b. Drinking fountains shall be recessed and lockers shall be flush with the wall.

3. Corner protection

   A metal corner bead must be provided for external corners at walls with ceramic tile finish to prevent damage to the wall.

4. Security

   To reduce hiding places, alcoves, nooks and other small spaces along corridors that compromise supervision of the corridor shall be avoided.

5. Typical Furnishings and Equipment

   a. Architectural

      Provide glazed display cabinets, glazed display boards and display boards/tackable surface in lobby and corridors and as otherwise noted below as follows:

      1) Primary and Intermediate Schools

         a) Display Boards/Tackable Surface

            - Existing Buildings: Provide a minimum of one display board 4’-0” high x 8’-0” long in corridors per classroom.

            - New Construction: Provide tackable surface covering an area not less than 4’-0” high x 8’-0” long in corridors per classroom. The tackable surface is to be an infill area within the field of the glazed tile **with a ‘J’ trim** and shall be adhered directly to the corridor wall.

.

            The total area of such display boards or tackable surface cannot exceed 20% of the corridor wall area to comply with FDNY requirements.

         b) Glazed Display Cabinets

            Glazed display cabinets shall be 4', 6', or 8' long depending on space available, located in or near the Main Entrance Hall and library.

      2) High Schools:

         a) Glazed Display Cabinets

            Glazed display cabinets shall be 4', 6', or 8' long depending on space available, located in or near the Main Entrance Hall, Shop Areas, Auditorium and Gym. Glazed display cabinets flanked by 4'-0" glazed display boards shall be located at Art, Science, Library and Conference Rooms. Maximize glazed display board surface near the Art Rooms. However, the definitive number and location shall be at the discretion of the Department of Education, Division of High Schools for specific projects.

         b) Glazed Display Boards

            - Glazed display boards shall be located at vantage points for optimum exposure and at least every 40 feet on alternate sides of corridors. The size shall be 4'-0" high x 6' to 8' long.

- Glazed display boards of the maximum size possible in corridors shall be located adjacent to Principal's Office and near General Office.

- Provide glazed display boards, 3' to 4' long, outside the cafeteria, custodian staff locker room, teacher's mail and time room (if provided), and kitchen.

b. Fire Extinguishers

Provide the minimum number of fire extinguishers that will satisfy all of the following requirements:

1) Provide fire extinguisher in a recessed fire extinguisher cabinet in corridor walls.

2) For sprinklered buildings, provide one extinguisher for every 6,000 SF of gross building area (**Section FC 906.3.1.1 and** Table FC 906.3.1 of the **2022** NYC Fire Code).

3) For non-sprinklered buildings, provide one extinguisher for every 3,000 SF of gross building area (Table FC 906.3.1).

4) Fire extinguishers shall be spaced such that 75 feet is the maximum travel distance to a fire extinguisher (Table FC 906.3.1)

5) For extinguishers less than 40 lbs., there shall no more than 5 feet from the floor elevation to the top of the fire extinguisher and a 4" minimum clearance from the floor to the bottom of the extinguisher per Section FC 906.9. However, per Section 308 of ICC A117.1-2009, cabinets are to be within the required accessible reach of 48".

6) Provide one fire extinguisher in a recess or cabinet within 25' of each stairway.

c. Benches

Built-in benches at ends of corridors or at shallow corridor nooks may be provided when corridor layout and geometry permit locating such features. Built-in benches are to be made of stone or other non-flammable material.

1.3 Planning

1.3.4 Circulation

1.3.4.4 Interior Stairs

Description/Design Approach:

The location, number and capacity of stairs shall be planned to facilitate orderly, efficient and safe, ingress, egress, and circulation within the school, particularly to and from Public Assembly spaces (lunchroom, auditorium, gymatorium and gymnasium). Stair capacity may exceed the minimum required by code in order to meet these functional requirements.

A. Design Criteria

Double stairs (i.e., two 56" wide stairs in tandem) are preferable to wider single stairs because they allow for separate but adjacent up and down use, ensure that each pupil will be next to a handrail and are an efficient use of space. Typically, at least one centrally located double **or** wide single stair is desired to facilitate circulation.

1. Exit stairs that must exit directly outside to comply with Section BC 1028.1 of the 2022 NYC Building Code should also be accessible from the building lobby or corridor at street level.

2. A 48" wide single stair may be used where site constraints do not allow for 56" wide stair.

3. Mian stairway landing shall provide enough depth to avoid any conflict with the required stairway clear width per **Section** BC 1010.1.6 and fire hose cabinet bump-out partitions within fire rated stairway enclosure. (See diagrams on the following pages.)

4. Mullion frames to be provided for stair doors (i.e., for heavy-use and fire-rated hardware).

The following Table provides the minimum and maximum stair dimensions for risers, treads and stair widths:

Type of School	Maximum Risers	Minimum Treads	Minimum Width of Stair (between walls, grilles, guards or newel posts)
Primary	7"	11"	56"
Intermediate	7"	11"	56"
High School	7"	11"	56"

B. Construction

1. Typical for enclosed circulation stairs used by students and staff

a. Steel-framed buildings
- Steel channel and metal pan stair. Exposed steel shall be painted.
- Stair treads shall be 2" pre-cast concrete with abrasive strip inlaid into the tread. Steel riser shall be painted.
- Intermediate platforms and floor landings shall be poured concrete with ceramic tile, porcelain tile or terrazzo tile finish.

- Gypsum ceilings are to be provided at floor and mid-landings to hide the structure and MEP components.

b. Concrete-framed buildings
   - Poured-in-place concrete stairs.
   - Stair treads shall be 2" pre-cast concrete with abrasive strip inlaid into the tread. Remainder of stair riser (exposed poured portion) shall be patched with structural repair concrete and be painted.
   - Intermediate platforms and floor landings shall have ceramic tile finish, porcelain tile or terrazzo tile finish.
   - Hung ceilings are not required at landings. Exposed concrete surfaces of poured concrete shall patched smooth with structural repair concrete and be painted.
   - Steel channel and metal pan stair assembly may be utilized if appropriate and if agreed to by the Authority.

2. Typical for open communicating stairs used by students and staff:
   - Construction shall per the building construction listed in 1 above.
   - Stair treads shall be either pre-cast concrete or terrazzo with abrasive strip inlaid into the tread.
   - Intermediate platforms and floor landings shall be poured concrete with ceramic tile, porcelain tile or terrazzo tile.

3. Typical for stairs used by custodial staff only, which lead to cellars and roofs (i.e., separate & dedicated stairs from main circulation/egress stairs)
   - Cast concrete. All treads shall have cast-in-place non-slip nosing with sealed concrete finish.
   - Steel channel and metal pan stair with poured concrete treads, with cast-in-place non-slip nosing. Intermediate platforms and floor landings shall be poured concrete with sealed concrete finish.

C. Railings and Guards

1. Provide handrails at both sides of stair with top of gripping surface 3'-0" above nosing for all schools. Provide an additional second handrail at 2'-0" above nosing for Early Childhood, Primary and Primary/Intermediate Schools. Support for railings and handrails can be mounted on the top of stringers or on the side of walls to resist the loads per Sections BC 1014.1 and BC 1607.8.1.

2. Provide a wire mesh for the entire width of the stair that leads to the roof level enclosure with wire mesh gate/door and lock-set (Section BC 1010.1.9.3, Item 6). Since this is not an egress stair, swinging into the path of travel is not prohibited as it will only be used intermittently by maintenance staff. This door shall be located on the main landing of the top floor (i.e., it is not acceptable for the door to be placed on the mid-landing between the top floor and the roof, to discourage unsupervised activity on this area). Thumb turn lockset with key to be provided if the roof is not for any occupancy egress other than maintenance personnel and FDNY access. To prevent unauthorized access to the roof, it is required to provide solid metal plate where needed to shield the opening latch on the roof side of the lock from being reached.

3. When a stair does not continue to the roof, a **full-height** wire mesh barrier shall be provided at the topmost floor where the landing overlooks the stair below.

4. Wide stairs shall have intermediate handrails dividing the stairway into widths not less than 44” nor more than 66” so that all portions of the stair are within 30” of a handrail in accordance with Section BC 1014.9 (See attached diagram).
   In addition to the required dividing handrails, which shall also comply with paragraph C.1 above, the top rail of the divider shall be at 44” high.

5. When the open side of a stair landing or a corridor overlooking an atrium is more than 12’-0” above the floor below, provide fall protection to a height of a minimum of 5’-0” above the adjacent landing/floor where the landing or corridor overlooks the floor below.

6. Where vertical fenestration or fall protection elements include glazing starting at floor level, provide a toe rail at 5” and a barrier rail at 3’-6” AFF to protect such glazing.

D. Exit stairs that serve floors located more than 75 feet above the street (high-rise building) are to receive:

   1. Exit Path Markings: All high-rise buildings are to have luminous exit path markings on exit doors and within exit stairs, horizontal exits and exit passageways in accordance with Sections BC 403.5.5 and BC 1031.11.

   2. Enclosures: Exit stairs are to be constructed in accordance with Section BC 1023.2 (2hr-rated). Pressurize exit stairways in accordance with Section BC 909.20. Access through an open exterior balcony or through a naturally or mechanically ventilated vestibule are not acceptable.

E. Venting of Exit stairs

   1. Exit stairs, including high-rise exit stairs in fully sprinklered buildings designed per the 2022 NYC Building Code, are required to be smoke vented per Section BC 910.2.

   2. Exit stairs in Buildings that can comply with 1968 Building Code are required to be vented per Section 27-344 (d) and (e) of the 1968 building code, the means of which must also comply with the 2020 NYCECC in that shaft cannot be continually vented to the exterior.

F. Public Assembly Space Interior Exit Stairs and Dedicated Vestibule for Stairs

   1. If interior exit stair enclosures are opened directly into public assembly spaces and they are also serving other floors for egress, then an additional vestibule is to be provided between public assembly spaces and rated exit stair enclosures. These vestibule enclosure walls shall be smoke partitions with no rating in general per Section BC 710. However, if a fire rating for these vestibules is required for the areas of refuge within the vestibule per Section BC 709 or by other code sections, then a smoke barrier with minimum one-hour fire resistance rating will be required, including doors.

   2. While not a code requirement, the objective of this requirement is to minimize the possibility of fire or smoke spreading into an enclosure from public assembly spaces to the rated stair enclosure and endangering the occupants or even preventing the use of the exit stairs at a time when it is most needed.

3. **As the vestibule space will separate the egress stairway from the PA space, the stairways doors requirement per Section BC 1010.1.9.11, including exception 5, will no longer be applicable on the PA space doors to vestibule to stairways.**

G. Location of Fire Hose Valve Cabinets

Fire hose valve cabinets shall be recessed. Wall must be designed to maintain the required fire-rating at the recess. Coordinate location of cabinet and riser to minimize interference with the seismic bracing, if possible. Fire hose valve cabinets must be located such that there is no interference with the ability to open the cabinet due to obstruction caused by the opening or closing of exit stair doors or other obstructions as per Section 7.3.1.2 of NFPA 14-16 and such that excessive bending of the hose due to the stair doors shall be avoided. Where hose valve cabinets cannot be completely recessed, the design of the stair must take into account that the cabinets must be placed such that they will not interfere with the clear path of travel. Refer to the stair diagrams below for acceptable and unacceptable fire hose valve cabinet locations. Typical fire hose connection will be from the fire hose cabinet below floor with the fire.

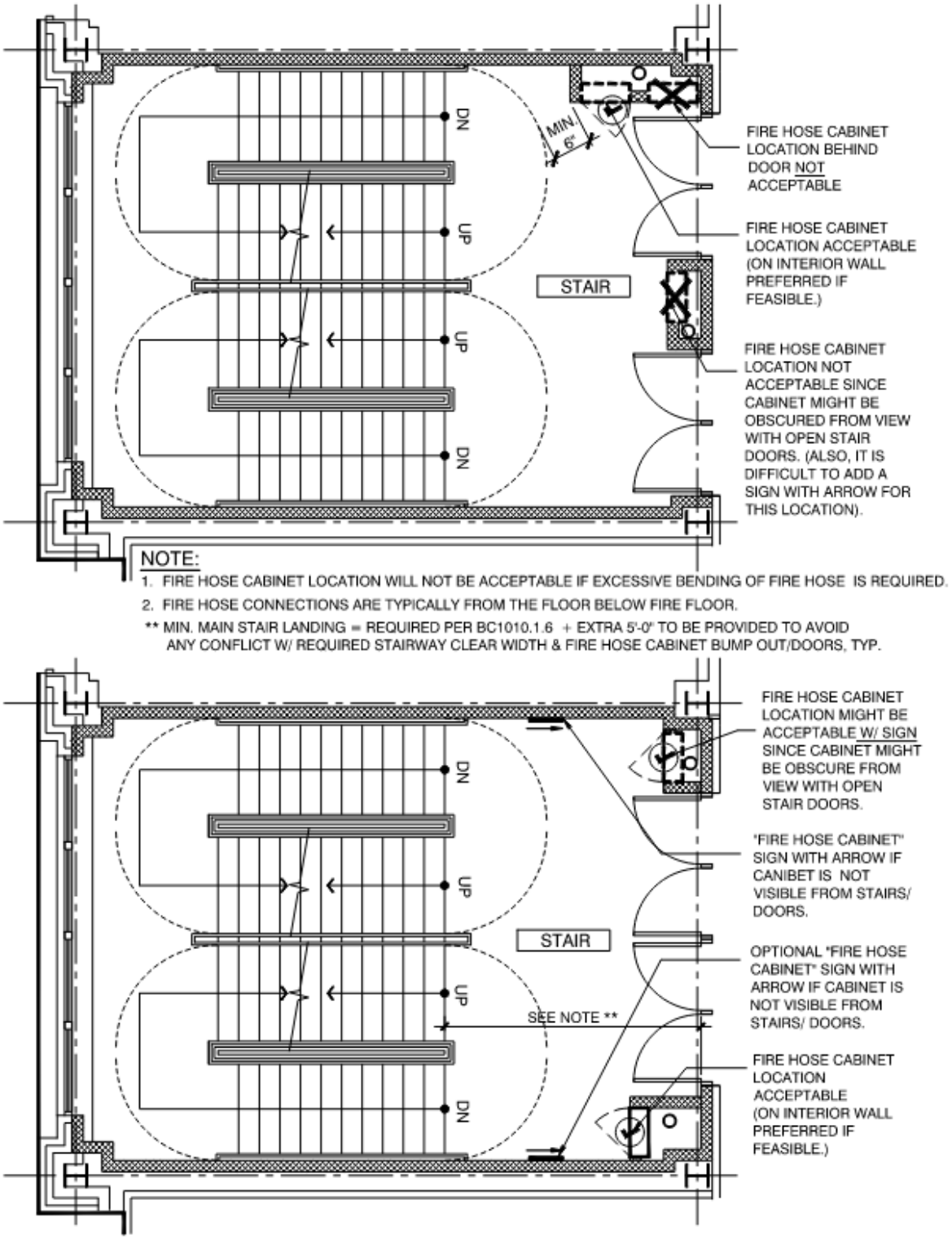


Fig.1 - Plan of Double Stair with Intermediate Handrail

Note:

Minimum stair width is 44” (Section BC 1011.2) Maximum stair width to be 66” to comply with maximum reach of 30” to handrail without requiring an intermediate handrail (Section BC 1014.9).

Fire hose connection shall not be obstructed by open or closed stair doors and excessive bending of the hose due to the stair doors shall be avoided.

Per Section BC 905.7, fire hose cabinet shall not be blocked from use or obscured from view. Additional “Fire Hose Cabinet” signs with arrow to be provided if cabinet is not visible from the stair side or door side. The preferred approach is to have the cabinet on the side wall beyond the door and should be met if landing depth requirements indicated in sketches is followed. Any alternate to the side wall mount due to constraints must be specifically discussed during the design.

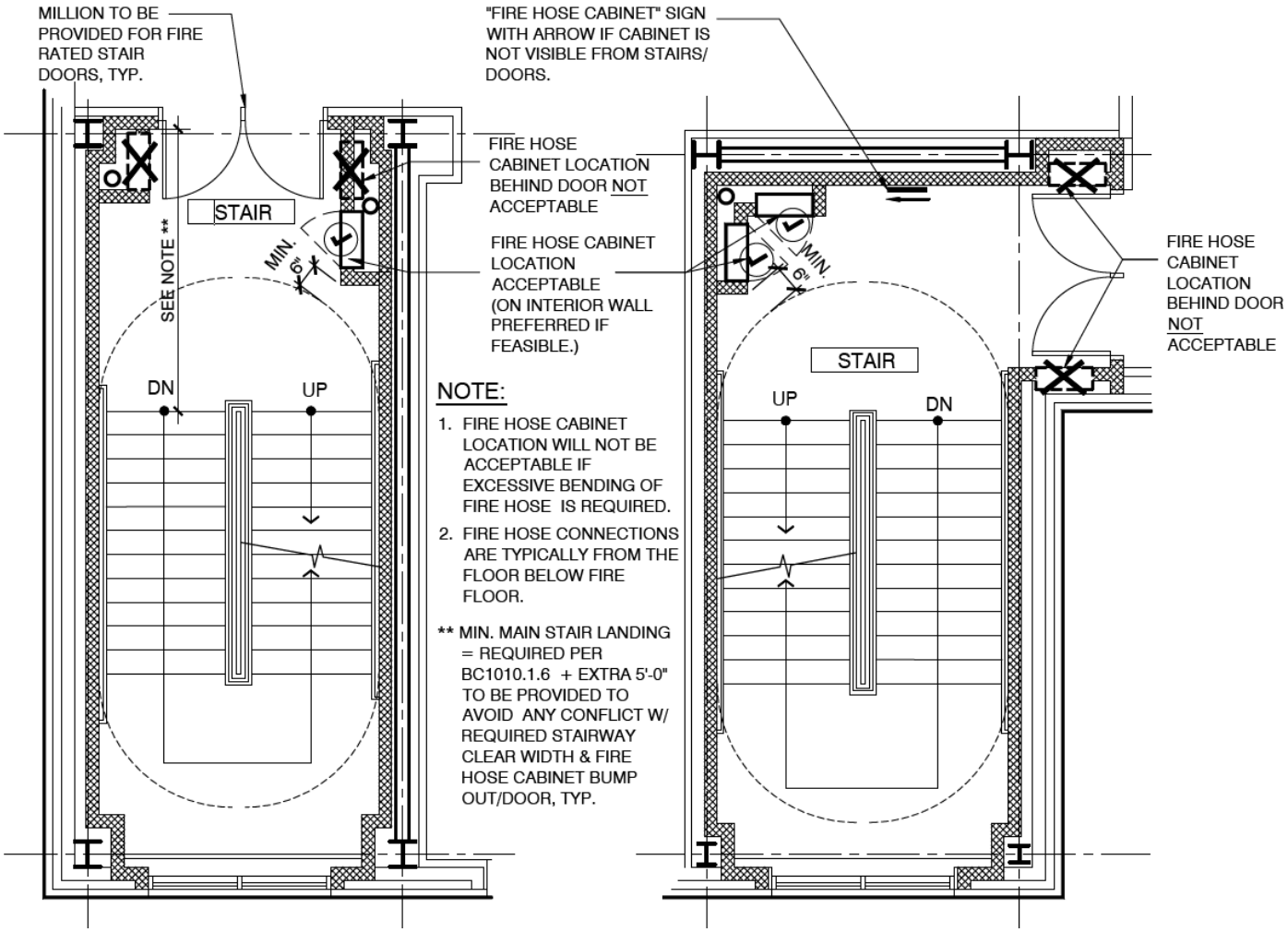


Fig. 2 - Plan of Single Stair with Handrail

1.3 Planning

1.3.4 Circulation

1.3.4.5 Elevators

Description/Design Approach:

A. General

1. Staff, school visitors, and students with disabilities typically use elevators. In addition, at least one elevator may be designated for use by custodial staff for deliveries and equipment.

2. Two elevators are typically to be provided in new capacity projects. One elevator is typically provided in a Program Accessibility project. If the building design is such that it will require substantial use of vertical transportation to move students (such as schools within a high rise structure) or there is planned to be a large number of students of limited mobility, a written traffic analysis is to be performed by the Architect/Elevator consultant indicating how the population will be moved. This may require several banks of elevators or a modification to the size of the elevators.

   a. For typical school buildings, all elevators shall be designed to accommodate ambulance type stretcher requirements (84" length) per the following criteria:

   - Size (Clear inside area) - Approx. 6'-8" by 5'-4"
   - Capacity - 3500#
   - Speed - Refer to DR 6.4.1
   - Door - Single-speed (preferred)
   - Door Opening - 3'-6" Side-slide

   b. For schools with a large amount of limited mobility students or where the elevator is to provide access for the general school population to the upper floors as shown in the traffic analysis, the elevator design criteria may be as follows:

   - Size (Clear inside area) - Approx. 6'-0" by 9'-8" hospital type car
   - Capacity - 6000#
   - Speed - Refer to DR 6.4.1
   - Door - Single-speed (preferred)
   - Door Opening - 4'-0" Center-opening (preferred)

   Depending on existing building conditions, Additions may have one, two or no new elevators.

3. For 3K and Pre-K leased spaces (typically only 2 or 3 stories at most and thus do not meet the height criteria requiring the elevator to be sized to accommodate a stretcher, but still meet ADA requirements), if a new elevator needs to be provided it is to meet the following criteria:

   - Size (Hoistway area) - Approx. 8'-0" by 6'-0"
   - Size (Cab size) - 68"x51"
   - Capacity - 2100#
   - Speed - Refer to DR 6.4.1

- Door - single-speed (preferred)
- Door Opening - 3'-6" Side opening

4. Where the kitchen is located in the basement and a separate elevator is required to provide access for supplies, provide a one-story elevator per the following criteria:

   - Size (Clear inside area) - Approx. 6'-8" by 5'-4"
   - Capacity - 3500#
   - Speed - Refer to DR 6.4.1
   - Door - Single-speed (preferred)
   - Door Opening - 4'-0" Center-opening (preferred)

B. Locations

Elevators should be centrally located adjacent to main circulation spaces, i.e. entry lobbies and primary corridors. However, where elevators are not required for movement of a high population of students, they shall be placed to avoid the elevator being readily visible from the entrance in order to encourage the use of stairs, if feasible. General access to elevators should be controlled with limited access to authorized individuals.

1. Elevators shall typically be banked and located within the main lobby near the main entrance. Depending on building configuration, multi-org schools may require additional elevators at other locations as determined by a traffic analysis during design.

2. When practical, elevators shall be banked. When a side-by-side configuration is not practical, elevators shall be within close proximity of one another.

3. Planning should take into account the needs for both the movement of people as well as the need to transport deliveries, supplies and equipment.

4. Sufficient area shall be provided in front of elevators so to avoid congestion within corridors or lobbies.

C. Service access

For roped hydraulic elevators, pit mounted governors are to be used. Pit mounted governors do not require an access panel and fixed ladder at the hoistway overhead as does the standard hoistway mounted governor. The ladder and access panel are difficult to locate where needed as those areas are typically accessible to the student population. Current DOB code no longer allows the use of remote reset governors.

1.3 Planning

1.3.5 Large Group

1.3.5.1 Cafeteria PK-8 and HS

Description/Design Approach:

The school's Cafeteria plays an important role in the development of the children's social interaction. It is a programmed space where the children learn the best ways to solve basic problems and in making social adjustments.

A. Location

The Cafeteria should be as centrally located as possible on the first floor directly off the main lobby. Exceptions may be made if the due to planning constraints whereas the Cafeteria may have to be located to the cellar or an upper floor. If so, it should still be centrally located. In addition stairs and an elevator shall be located for ease of access by both students and staff.

The Cafeteria should be directly accessible from the main corridor or lobby of the building and provide a minimum of two points of entry and exit to meet the NYC Building Code.

The points of entry and egress should be located as such so that access to the entire building can be prevented and can be monitored and properly secured in a manner consistent with the entire building security system.

B. School Activities /Programs

1. In addition to feeding the children the Cafeteria may be used for assembly (line-up) during inclement weather and for large group instruction.

2. The Cafeteria should be directly accessible from the main corridor or lobby of the building, provide a minimum of two points of entry and exit, from the interior of the building, to facilitate the movement of children for changes in feeding periods and other school activities.

3. One means of directly exiting from the Cafeteria to the playground is preferred. However, indirect egress through the main corridor or lobby is also acceptable.

4. The Cafeteria shall have sufficient exits so to comply with the NYC Building Code.

5. The Cafeteria should be provided with natural light.

C. Community and Civic Programs

1. The Department of Education through various programs provided by the City of New York provides breakfast, lunch and other feeding programs for both the children and the community.

2. The Department of Education and the City of New York may utilize school Cafeterias for electoral voting of Federal, State, City as well as other elected offices within the Department of Education and Community.

3. The Department of Education has a longstanding agreement to allow emergency use of school facilities as coordinated by the Office of Emergency Management.

D. Relationship to Kitchen

The Student Cafeteria and Student Serving Area must have a direct connection to the kitchen. Care must be taken to provide line-up space for students waiting to enter the serving area. Cross-traffic patterns must be avoided when entering and leaving serving area. The student serving area shall be secured when meals are not being served.

E. Design Parameters

1. Typically, there are three (3) lunch periods for all grade levels. **This will determine the lunchroom capacity.**

2. **The number of serving lines in the cafeteria is to be based on the lunchroom capacity.**

F. Miscellaneous

1. Trash**/**Recycling Area

The cafeteria shall include trash**/**recycling center(s) for trash generated during the lunch periods. One trash/recycling center is required for **every serving line.** Each trash/recycling center shall be **12'-0"**L x 2'-0"D. Such trash/recycling area shall be recessed outside the "clean rectangle" of the cafeteria area and away from the serving line so it does not hamper the flow of serving line traffic. **The trash/recycling area includes space for:**

- **a wall mounted 'milk sink' for liquid waste**
- **a container for paper/cardboard recyclables**
- a container for metal/glass/plastic recyclables
- a container for organic waste
- a container for trash, i.e. landfill waste

2. Display Boards

- 4'-0" High by 8'-0" long mounted 3'-0" above finished floor (Minimum of two in the Cafeteria)

1.3 Planning

1.3.5 Large Group

1.3.5.2 Auditorium PK-8 and HS

Description/Design Approach:

A. General

The Auditorium plays an important role in the development of cultural efficiency and social achievement. It not only serves the school population, but is also a cultural center for the entire community.

In addition to being used for regular school purposes such as group instruction, study hall, assembly programs, dramatic performances, and graduation exercises; consideration in planning of the Auditorium must also address the socio-civic-economic activities of the community.

The principal adult activities may include parent teacher meetings, debates, lectures, forums, musicales, plays, community meetings and other civic functions.

Accessibility, adaptability and space relationships as well as attractiveness of appearance, comforts and conveniences must not be overlooked.

In order to achieve an attractive and well functioning auditorium special attention shall be provided to the seating arrangement so to provide adequate and uninterrupted vision of the stage, lighting, artwork, acoustics and ventilation.

B. Location

- The preferred location of the Auditorium is in a central location on the first floor off of the main lobby or corridor for ease of access by students, faculty and the public. By locating the Auditorium off of the main lobby the lobby will provide an area for the public to gather when the space is in use as well as for students.

- If, due to planning constraints the Auditorium must go to an upper or lower floor it shall be within close proximity to an elevator.

- Planning should also consider locating other Large Group Spaces, such as the Gymnasium and Cafeteria off the same main lobby so that it may serve all Large Group Areas simultaneously for both school and community.

- Access to public toilets in main lobby

C. Platform/Stage

The requires for a platform and stage vary between primary and secondary schools and sometimes may be a variation of the two schools requirements for schools such as Primary / Intermediate schools.

1. Primary Schools:

   The facilities required for an elementary school auditorium are of a simple nature and are not used for elaborate, dramatic or theatrical performances. The platform / stage will typically be used by the school for simple performances, group instruction, film presentations or lectures.

2. Intermediate and High Schools

   The facilities required for **secondary school** auditoriums is more sophisticated that that of elementary schools. In addition too simple performances, group instruction, film presentations or lectures functions may include dramatic performance and musicals.

D. Auditorium Curtains**,** Cyclorama Curtains and Border Curtains

Proscenium (Act) Curtains**,** Cyclorama Curtains and Border curtains shall be provided for Stages and Platforms.

1. Proscenium Curtain and Valance

   A Proscenium Curtain, fire safety curtain, shall be provided at the stage / platform opening facing the Audience.

   - Number of Suspensions : 5
   - Overlap : Proscenium Valance: None
   - Act Curtain : 3'-0" at the center
   - Width : Proscenium Valance, Act Curtain (two halves)

2. Rear Cyclorama Curtains

   - Number of Suspensions : 5
   - Overlap : Rear Cyclorama Curtain: 3'-0" at the center
   - Width : Rear Cyclorama Curtain (two halves),

3. Side Cyclorama Curtains

   - Number of Suspensions : 3
   - Overlap : Side Cyclorama Curtains: 2'-0" at the center
   - Width : Side Cyclorama Curtains (two halves), and Border #1,2,3,4

4. Border Curtains

   - Number of Suspensions : 5
   - Overlap : None

Note: For specific detail of type and construction see Specifications.

E. Seating

Fixed Opera type chairs with plywood seats and backs, floor-mounted, with self-rising seats which raise automatically to a uniform 3/4 fold position and a 24" back shall be provided throughout the seating area of the Auditorium.

Note: For specific detail of type and construction see Specifications.

1.3 Planning

1.3.5 Large Group

1.3.5.3 Gymnasium PK-8 and HS

Description/Design Approach:

A. The Gymnasium shall be planned with a two-fold purpose in mind. It must be suitable for both educational and developmental activities, and it must be large enough for informal competitive sport programs developed by health education program. The suitability of the educational program is largely a matter of equipment and its proper placement, whereas the suitability of the informal program is largely a matter of size and shape.

B. The placement of equipment, however, must be suitable to accommodate both functions.

C. Basketball is the predominating sport of any gymnasium in a school. The gymnasiums shall be planned primarily as such with provisions for folding bleachers for spectators for both Intermediate Schools and High Schools.

D. The educational program includes instruction in the following activities: marching, running, tumbling, dancing, calisthenics, games and various combinations. The typical educational program includes climbing, dodging, hurdling, jumping combined with falling and rolling in addition to typical equipment used to develop reflexes, balance and coordination.

E. Typical activities and related equipment for Primary, Intermediate and High Schools are as follows:

- Primary School: Basketball, volleyball, calisthenics, and various other games and floor exercises.
- Intermediate School: Basketball, volleyball, calisthenics, and various other games and floor exercises.
- High School: Basketball, volleyball, weight training, gymnastics, calisthenics, and various other games and floor exercises.

F. Typical Furnishings and Equipment

1. Basketball

Two types of backboards are used in Primary, Intermediate and High Schools. These are the Opaque Backboards and the Transparent Backboards. Applications are as follows:

Backboard Types	Application
Opaque Backboards	The opaque backboards are used in P.S., (Wood fiber particleboard) P.S./I.S. and I.S. for full court and half court practice and game play.

Fixed mounted, adjustable in height mounted and swing away mounted frames are used depending on the need and requirements of the school administration.

Backboard Types	Application
Transparent Backboards	The transparent backboards are used solely in I.S./H.S. & H.S. gymnasiums for (Tempered Glass Type - all full court basketball practice, instructional and competition game play. transparent and light transmitting) Opaque backboards will be used for all half court I.S./H.S. and H.S. applications, unless otherwise specified by the school administration. Fixed mounted and swing away mounted frames are used depending on the need and requirements of the school administration. Transparent backboards are also used when bleachers are located behind the full court or half court backboards, where the spectators require line of sight to observe the court action or receive instructional directions and demonstrations from instructors/teachers through the transparent backboards.

G. Minimum Skylight Fenestration Area (Applicable to projects that follow the 2020 NYCECC or the prescriptive requirements of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC for Energy Code Compliance)

Gymnasiums that are larger than 2500 SF in area, have a ceiling height greater than 15' for greater than 75% of ceiling area and are located directly under a roof the floor area must be daylit such that a minimum of 50% of floor area is daylit:

- by means of skylights amounting to a max of 3% of floor area,
  or
- by a combination of primary and secondary sidelights and skylights to comply with the requirement of Section 5.5.4.2.3 of ASHRAE 90.1-2016.

1.3 Planning

1.3.5 Large Group

1.3.5.4 Accessibility Guidelines for Auditorium Repair

Description/Design Approach:

Changes to the existing Auditorium space resulting from repairs in the space may trigger Building Code and accessibility issues. However, the comfort, convenience and attractiveness of the auditorium must be maintained.

A. **2022** NYC Building Code and ICC A117.1-2009 compliance

1 Compliance with NYC Building Code and ICC A117.1 is required for the types of work listed below. Extent of compliance is based upon the corresponding relevant work as per Title II regulation 28 CFR part 25 Para 35.151. Any element of a building that is renovated or repaired must be made accessible for the extent of its own renovation.

2. Complete replacement of stage flooring or any enlargement/reduction/structural modification to the stage requires the stage/platform to be compliant with Section 303 of ICC A117.1. *A ramp or lift to access the stage is required. When practical, a ramp is preferred.*

3. The minimum clear width of an accessible ramp is 36" **and**, a handrail in compliance with section 405.5 of ICC A117.1 is to be installed. The drawings must clearly indicate ramp width. **The handrail is permitted to project into the egress width in accordance with Section BC 1014.8 of the 2022 NYC Building Code. However, for accessible routes the minimum width is measured between handrails**.

4. Partial removal/replacement/refurbishment of seat and standards **(stanchions)** requires that seating arrangements incorporate accessibility.
Note that removal and reinstallation of supporting standards is considered 'removal of seats'

a) Partial removal and replacement of seat and standards at the front or rear of the auditorium require that seating arrangement for the wheelchair-bound be incorporated, to the extent that it is feasible in the seating layout of the Auditorium in accordance with the guideline in Section 802 of ICC A117.1. Replacement of seat and standards in the middle of a seating area does not require removal of additional seats to create accessible spaces.

b) Removal/refurbishment of seat and standards next to an aisle requires that the appropriate number of seats with removable/foldaway armrests be installed. Such designated aisle seats shall be identified by the **Dynamic** Accessibility Symbol.

5. Total removal and reinstallation/replacement of seat and standards requires that the seats/seating arrangement including Aisle and cross Aisle width be ICC A117.1 compliant. A handrail is required at the accessible aisle. Where the ramp run exceeds 30 feet, a mid-landing must be provided, unless it is satisfactorily demonstrated to the plan examiner to be structurally impractical to do so. *Space for wheelchair seating and*

chairs with removable/foldaway armrests are required to comply with Sections BC 1108.2.2 and BC 1108.2.. The allocation of seats for the wheelchair bound should be dispersed throughout the seating area. Each such Space to be large enough to accommodate a wheelchair and an adjoining companion seat or two side-by side wheel chair spaces.

Note that removal and reinstallation of all standards/seats to facilitate repair or refurbishing of floor surface of auditorium is considered 'total removal of seats'.

6. Removal and replacement of door requires that the replaced door and hardware be ICC A117.1 and NYC Building Code compliant.

7. Removal of door and frame requires that the opening, door and hardware be ICC A117.1 compliant, including relocation to comply with the maneuvering clearances indicated in paragraph 404.2.3 of ICC A117.1.

8. Removal and Replacement of floor slab or fill requires that the slope of the floor and the seating arrangement be ICC A117.1 compliant.

9. Partial or full replacement of the local sound system requires that an 'audio amplification system' be installed in each area where the local sound system is installed/replaced as required by Section BC 1108.2.7 in accordance with ICC A117.1 (706). The space shall be identified by the International Symbol of Access for Hearing Loss as per paragraph 703.6.3.3 of ICC A117.1.

10. For projects with an estimated baseline construction cost of $950,000, an induction loop assistive listening system must be installed as per Local Law 51/17 if the cost of the system is less than 5% of the project cost. In addition to the system within the Auditorium space, a **microloop** system shall be provided for the security desk with appropriate signage. Provide the required directional signage to the assistive listening assembly areas.

B. Compliance with ICC A117.1 and **the** NYC Building Code is not required for the following types of work:

1. Painting of the wall or ceiling

2. Painting/Refurbishing/repair of floor surface. If work requires seat and standards to be removed, comply with ICC A117.1 as indicated in section A above for seating.

3. Repair/Replacement of stage**/**platform rigging or lighting.

4. Repair/Replacement of stage**/**platform curtains or drapes.

5. Repair or Replacement of heating and cooling system. If work requires seat and standards to be removed, comply with ICC A117.1 as indicated in Section A above for seating.

6. Replacement/Refurbishing of the seats and backs without removal of the floor mounted standards.

7. Repair/replacement of ceiling

8. Minor repairs to stage/platform floor.

1.3 Planning

1.3.6 Food Services

1.3.6.1 Kitchen

Description/Design Approach:

A. The Kitchen should be planned and designed with cognizance of the importance of handling and preparing food for students and staff. When planning the kitchen, the following criteria should be addressed:

1. Layout: Size and equipment shall be based on the student capacity of the building. A Therm **and** Hold Kitchen with a Type II kitchen hood system can be used to support a maximum student population of 400. School buildings with a student population of 401 and above must use a full cooking kitchen with a Type I kitchen hood rated for heavy-duty appliance and ansul system.

2. Servery: Number of serving lines shall be based on number of students served per lunch period.

3. Kitchens should have easy access to the delivery entrance.

4. Kitchens located on the first floor and at grade level do not require a loading dock. If the kitchen floor is significantly above or below grade level and creates a delivery problem, a service ramp, lift or elevator must be provided. In the case of a very large school, a loading dock may be considered.

5. If a loading dock (or any delivery entrance) is contemplated, it should be planned for use by the custodial and educational staff for receipt of regular supplies.

6. All doorways leading from the outside into the kitchen must be a minimum of 44" wide in order to allow for future equipment replacement. T**hese doors to be equipped with local door alarm and a door release system**. **Separate insect screen doors to be provided for all exterior kitchen doors.**

7. Kitchens with operable windows must be equipped with movable insect screens. Space shall flow as follows: receiving, storage, preparation, cooking, serving, clean-up.

8. Unobstructed aisles and working spaces shall be provided with a minimum width of 5' to permit employees to perform their duties readily without contamination of food or food-contact surfaces by clothing or personal contact.

9. Related functions shall be grouped together with easy access to cold storage units and sinks.

10. Garbage removed from Lunchrooms cannot be taken through the kitchen.

11. Provide a sign over each Kitchen Lavatory (Hand Sink). Sign shall read "HAND WASH SINK".

12. Provide a liquid soap dispenser and a paper towel dispenser next to each Kitchen Lavatory (Hand Sink).

13. Provide sufficient space in the kitchen to accommodate three (or four if the school is part of the Organics program) garbage containers for metal/glass/plastic, cardboard/paper and trash (and organics if applicable). The cans are for temporary storage of these materials until they can be removed to the school's refuse & recycling storage room.

14. Provide Class K rated portable fire extinguishers as required per Section FC 609.**9** of the **2022** NYC Fire Code. Extinguisher must be within 30 feet travel distance of the cooking appliance

15. For a Therm **and** Hold Kitchen, provide a Type II ducted hood above the therm and hold unit.

16. **Any soffits below ceilings are to be tiled in Kitchen and Servery. Refer to DR 5.1.1 for information on other finishes.**

B. The overall equipment and space required for this function is based on a Program of Requirements prepared by The New York City Department of Education Office of School Food (OSF), which has been included in the Program of Requirements (POR) for the project.

C. Design drawings that detail the kitchen's location in relationship to other building services and equipment placement shall be approved by The New York City Department of Education Office of School Food (OSF).

D. As the construction approaches substantial completion, inspections shall begin that insure that the new kitchen meet all required codes.

E. Kitchen drawings approvals and construction inspections shall be performed by and questions directed to:

Mr. Paul Quattropani
The New York City Department of Education
Office of School Food
44-36 Vernon Boulevard, Room 409B
Long Island City, New York 11101
Telephone (718) 707-4476
Email: PQuattr@schools.nyc.gov

1.3 Planning

1.3.6 Food Services

1.3.6.2 Storage Space and Kitchen Staff Lockers Rooms

Description/Design Approach:

A. Kitchen Storage Rooms

- There shall be no stairs along the delivery route.
- Delivery entrance and storage rooms shall be located so that deliveries that arrive during peak prep/serving times do not disrupt operation of the kitchen.
- When remote storage is provided, an intercom system supplied and installed by Electrical Contractor shall connect remote locations with the Manager's Office.
- At least 1/4 of the required storage area must be located in the kitchen itself. If space limitations require remote storage, in an area other than the first floor, an elevator must be provided.
- Plans submitted for OSF's consideration must show delivery route. If storage is remote, in the basement for example, a layout for that area must be submitted as well. All remote areas must be clearly labeled for Department of Education Office of School Food (OSF) use.
- The dimensions of all storage rooms must be indicated on all drawings.
- Storage room shelving and/or dunnage layouts must be provided on all 1/4" drawings.
- Food storage areas must be well ventilated and dry.
- **Acceptable temperature range for these areas is 50° - 70° F.**
- All remote storage areas shall be labeled "OSF Storage".

B. Staff Lockers Rooms

- The 1/4" Scale Plans shall show locker layouts for all OSF Locker Rooms.
- One Room must be clearly labeled "OSF Female Locker Room."
- One Room must be clearly labeled "OSF Male Locker Room."
- In the case of a modernization, the OSF Male and Female Locker Rooms may be remote when sufficient space is not available.
- One single occupancy unisex toilet room for male and female staff use shall be located in the Kitchen Area.

C. Lockers

1. Provide full size lockers for each employee:

2. Number of lockers in the locker room shall be based on adjusted capacity listed in the Program of Requirements, or for an upgrade in an existing building the actual enrollment.

   a. Female Locker Room/toilet to accommodate:

Adjusted Capacity 300 or less:	4 females
Adjusted Capacity 301-500:	6 females
Adjusted Capacity 501-700:	8 females
Adjusted Capacity 701-900:	9 females
Adjusted Capacity over 900:	9 females

   b. Male Locker Room/toilet to accommodate:

Adjusted Capacity 300 or less:	2 males
Adjusted Capacity 301-500:	2 males
Adjusted Capacity 501-700:	2 males
Adjusted Capacity 701-900:	3 males
Adjusted Capacity over 900	3 males

D. Notes

1. Signs shall be posted over each staff lavatory. The wording shall be "EMPLOYEES MUST WASH HANDS BEFORE LEAVING THIS AREA".

1.3 Planning

1.3.6 Food Services

1.3.6.3 Delivery Areas - Kitchens

Description / Design Approach:

A. The following criteria shall be followed for the delivery of goods to Kitchens:

1. If a platform is required, a loading dock shall be provided.
2. If a delivery bay is not provided, a curb cut must be provided adjacent to the delivery entrance that allows only truck loading and unloading during school hours.
3. There shall be no steps along the delivery route.
4. Delivery entrance and storage rooms shall be located so that deliveries that arrive during peak preparation/serving times do not disrupt operation of the kitchen nor the school.
5. **Delivery entrance shall include an insect screen door.**
6. A bell at the delivery entrance that rings in the Kitchen Area and/or Manager's Office shall be provided.
7. Delivery doors shall be equipped with a vision panel and guard.
8. Outside area shall have drain and hose bib for easy cleaning.
9. Inside receiving area shall also be easily cleanable.

B. Food Services Deliveries: Typical deliveries to Kitchens include:

1. Bread/Milk – Daily
2. Produce/Meat – Weekly
3. Disposables – Monthly
4. Other Items as needed

1.3 Planning

1.3.6 Food Services

1.3.6.4 Temporary Kitchens

Description / Design Approach:

Schools must always have a functioning kitchen. Provisions shall be made for a temporary kitchen, serving line and temporary storage if planned work will disrupt the existing kitchen.

Temporary kitchens are to remain operational until Department of Education Office of School Food and Nutrition Services (OSFNS) has formally accepted the new kitchen. After the Department of Education Office of Food and Nutrition Services accepts new kitchen, the temporary serving line and kitchen equipment should be removed as per disposition list from OSFNS supervisor.

A. One of three arrangements shall be provided:

1. Temporary Kitchen mounted on the trailer would be installed.

2. The Office of Food and Nutrition Services would arrange for satellite food preparation.

3. Temporary kitchen will be installed in the school, utilizing available space.

For either of these arrangements a temporary serving line should be established in the cafeteria.

B. The following approaches shall be followed for the above referenced arrangements:

1. Temporary Kitchen mounted on the trailer would be installed.

- Mobile kitchen unit, mounted on the trailer, is to be utilized, wherever possible. It is equipped as a full service kitchen with walk-in refrigerator and freezer and contains manager's office. Installation of the Mobile Kitchen at the school requires utility connections and building of the ramps, fencing and **an enclosed walkway connecting the Kitchen Trailer and the Cafeteria, i.e. the cooking and the serving areas**. It is not equipped with the grease trap and provisions should be taken to install such. Chemical sanitizing or hot water booster heater should be also provided if the raw food is going to be handled in the kitchen. Mobile kitchen installation must meet Building Code requirements for most installations.

Old kitchen equipment **that** is not being reused **should be disconnected**. **Equipment to be re-used in conjunction with the temporary kitchen must be approved by the Department of Education's Office of Food and Nutrition Services.** All **disconnected** equipment must have the disposition from the Department of Education Office of Food and Nutrition Services and has to be moved by the Contractor to the nearby, designated schools. Upon completion of work, the General Contractor should move the Mobile Kitchen and dismantle/move or store all temporary structures as directed by the Department of Education Office of Food and Nutrition Services.

2. The Office of Food and Nutrition Services would arrange for satellite food preparation

   - Where satellite food preparation is to take place, only temporary serving line, utilizing existing equipment, wherever possible, should be established in the Cafeteria.
   -

3. Temporary kitchen will be installed in the school, utilizing available space

- In situations where there is room and utility connections are available to install temporary kitchen within the school, the existing equipment from old kitchen shall be re-used if possible.

Provide Typical Furnishings and Equipment as per Room Planning Standards.

Office Equipment:

The following Office Equipment shall be relocated from the existing Kitchen:

- Desk
- Chair
- Safe.
- Phone (The telephone line must be transfer from the existing kitchen)
- Calculator.

Miscellaneous:

- A secured storage space must be provided in any case.
- Existing serving line equipment, in good condition, should be reused for the temporary line.
- If the existing serving line cannot be used, a serving line should be provided.

1.3 Planning

1.3.6 Food Services

1.3.6.5 Walk-In Refrigerators and Freezers

Description/Design Approach:

The following criteria shall be applied to Walk-in Refrigerators and Walk-in Freezers:

1. Walk-in Refrigerators and Walk-in Freezers shall be built to specification with prefabricated wall panels. The floor shall have urethane slab insulation and quarry tiles. Lease type or Walk-in replacement projects may be built with diamond tread over a standard metal floor.

2. Walk-ins finishes' floors shall be flush aligned with the kitchen finish floor. If this is not possible, an interior ramp either quarry tile or diamond tread over standard metal floor within the walk-ins shall be provided.

3. Floorless walk-ins shall be installed upon a properly insulated slab.

4. Remote compressor/condensing system may be installed:

    a. In a ventilated "compressor room" where the ventilation requirement for this room shall be 1100 CFM per each unit horsepower,

    b. In a ventilated mechanical room that meets the ventilation requirement for horsepower specified, or

    c. On a roof, in a caged (secured) location with crankcase heater and outdoor control. **Unit shall be supported on rail curbs.** For roof mounted installation, the remote condensing unit must be situated within 75 ft or less of each walk-in evaporator coil.

5. The remote condensing units and evaporator coils are split systems and shall be wired accordingly, along with all the required accessories.

6. Floor drains shall be located at the edge of the walk-ins to receive the evaporator drain line.

1.3 Planning

1.3.6 Food Services

1.3.6.6 Tray Slide, Low Wall, Serving Lines - Typical Height

Description/Design Approach:

Serving line equipment, tray slide and low wall shall conform to the following requirements.

- Primary School: Serving line equipment shall be at 32" AFF. Tray slide shall be at 30" AFF
- Intermediate/Junior High School: Serving line equipment shall be at 34" AFF. Tray slide shall be at 32" AFF.
- High School: Service line equipment shall be at 36" AFF. Tray slide shall be at 34" AFF.
- For new construction and major modernizations serving line equipment shall be provided with fold down tray slide.
- ECC (Early Childhood Center): Serving line equipment shall not be provided with tray slides, except where applicable. Serving line equipment shall be 30" AFF. Tray slide shall be at 28" AFF installed on top of the low wall.
- **For Capital Improvement Program (CIP) projects, serving line equipment without folding tray slides and tray slide fixed on low wall shall be used. Designer is to consult the Office of School Foods (OSF) representative during the Scoping phase.**

When a building is designed to accommodate children from various grade ranges, for example a K to 8 school, use the equipment and tray slide height appropriate for the lowest grade level.

1.3 Planning

1.3.6 Food Services

1.3.6.7 Cash Registers (Kitchens)

Description/Design Approach:

Cash Registers are only required for Intermediate Schools and High Schools and are furnished by the NYC Department of Education, Office of School Food and Nutrition Service (OSFNS).

Receptacles with the electrical requirements outlined below shall be provided for the cash register. Coordinate with the Electrical Engineer on the location and electrical requirements of these receptacles.

- Electrical Requirements: 120V, 1ph, 60HZ, 25 watts.
- Receptacles shall match the cash register's electrical plug.
- Electrical Engineer shall provide separate circuit from the panel.
- The manufacturer and model number of cash register: CASIO Model CE 3415

1.3 Planning

1.3.6 Food Services

1.3.6.8 Time Clock and Card Rack (Kitchens)

Description/Design Approach:

Time Clock (Time Card Recorder) and Card Rack shall be provided for all Kitchens

The Electrical Contractor shall provide Time Clock (Time Card Recorder) and Card Rack. The location of the Time Clock and Card Rack shall be indicated on the Kitchen Drawings and coordinated with and shown on the Electrical Drawings.

1.3 Planning

1.3.6 Food Services

1.3.6.9 Conveyor Belt Removal (Kitchens)

Description/Design Approach:

For Projects which include the removal of a kitchen conveyor belt, the following work shall also be included:

1. Modular, mobile serving line equipment that conforms to New York City School Construction Authority (NYCSCA) requirements:

   Elementary Schools:

   - 1 - Utility Counter 18"-24" wide
   - 1 - Four Well Hot Unit
   - 1 - Utility Counter 18"-24" wide
   - 1 - Cold Well
   - 1 - Milk Unit
   - Tray slide and low wall set at 30", equipment at 32". Tray slide shall be secured to the low wall.

   Intermediate or Junior High Schools:

   - 1 - Utility Counter 18"-24" wide
   - 1 - Four Well Hot Unit
   - 1 - Cold Well
   - 1 - Milk Unit
   - 1 - Cashier Stand
   - Tray slide and low wall set at 32", equipment at 34". Tray slide shall be secured to the low wall.

2. Provide new opening for service. Opening should be large enough to accommodate all of the equipment. A roll down shutter shall be provided. In those cases where the configuration of the kitchen does not allow for a sufficiently large service opening, the milk chest may be positioned in the Dining Room with a dedicated electrical outlet. The doorway into the Kitchen must allow for the milk chest to be moved inside.

   The removal of the 'belt' results in a lack of lay-down space. Provide each Kitchen with tables:

   - Two (2) - Kitchen Work Tables, 48" long and 30" wide. Equip each table with a drawer, under-shelf and single deck table mounted shelf. Table should also have convenience outlets.

- Two (2) - Kitchen Work Tables, 36" long and 30" wide. Equip each table with a drawer, under-shelf and single deck table mounted shelf. Table should also have a convenience outlet.

3. Remove any existing 'NEVO' warmers and replace them with mobile hot cabinets, electrically heated. This will require an electrical receptacle for each hot cabinet as the 'NEVO' warmers were hard wired.

4. Provide electrical and plumbing work as needed to accomplish above items. If there is a floor drain in the area near the serving line, it should not be sealed.

1.3 Planning

1.3.7 Natatoriums

1.3.7.1 Natatorium/Pool Design Criteria and Code Requirements

Description/Design Approach:

A. General

The following is a summary of the existing applicable codes and the design criteria to be used for each discipline (HVAC, Plumbing, Architectural, Electrical) when designing new Natatorium spaces and pools and upgrades to existing installations. Applicable requirements from the following codes are included: NYC Building Code, NYC Mechanical Code, NYC Plumbing Code, NYC Fuel Gas Code, NYC Energy Conservation Code, NYC Electrical Code, NYC Amendments to the National Electric Code and NYC Department of Health Code. The below includes quality control concerns and code mandates (as noted). Designers shall incorporate as many of the below quality control features for existing pool projects where possible (within the limits of funding for the project). All new work must be code compliant. Designers shall consult the full referenced documents for the complete requirements. Since there are no SCA standard specifications for Natatoriums/Pools, this Design Requirement is atypical in that it includes some specification type information. Article 165 Bathing Establishments of the NYC Department of Health (NYCDOH) Code is referred to in this Design Requirement and can be accessed electronically by the following links:

https://www1.nyc.gov/site/doh/about/about-doh/health-code-and-rules.page

https://www1.nyc.gov/assets/doh/downloads/pdf/about/healthcode/health-code-article165.pdf

The major issues have been highlighted and include (but are not limited to) the following:

B. Mechanical HVAC/Plumbing Design

1. Design Criteria

a. The Natatorium contains one of the most challenging and dynamic indoor environments that mechanical equipment is asked to effectively condition. The equipment must dehumidify, heat and cool, as well as ventilate while withstanding the corrosiveness that exists due to the chemicals used within the structure. The high temperatures and high humidity levels of the Natatorium demand a system with a low sensible and a high latent cooling capacity in contrast to conventional air conditioning equipment **that** is designed for a high sensible and low latent load in order to be energy efficient. Conventional air-conditioning equipment is therefore not effective as Natatorium dehumidifiers. Specialized HVAC equipment as described herein is required to properly condition the Natatorium environment.

b. In designing an indoor swimming facility, the most critical component is the protection of the most critical part of the facility, the building structure. The structure will suffer dangerous and expensive deterioration when proper humidity and ventilation are not

maintained. The critical issue is to eliminate the possibility of producing condensation on any surfaces. The chloramine-laden condensate is deleterious to many materials. Even stainless steel is not immune.

c. The second consideration is occupant comfort. The pool water temperature is dictated by the type of activity and the type of individuals who will be using the pool. The selection of the Natatorium design air conditions (i.e. Natatorium space temperature and space relative humidity) is guided by the desire to keep the vapor pressure difference between the human skin and the surrounding air as close as possible to reduce evaporation and increase comfort. In addition, less pool evaporation takes place with higher humidity and less pool evaporation means less required pool heating. However, the humidity must not be so high that the dew point is higher than the temperature of the walls, windows and structure surfaces or destructive condensate will accumulate. Pool water evaporation will remain a continuous 24 hour/day load on the dehumidifier.

d. The relationship between relative humidity and indoor air quality is well known. High relative humidity levels inside a building are well known for their destructive effects on building components and can pose health concerns. They facilitate the growth of mold and mildew which can attack wall, floor and ceiling coverings and their spores can adversely impact the air quality. Condensation can also degrade many building materials. The consequences of high humidity in indoor Natatoriums can be significant. Besides being detrimental to health, the industry reports there are incidents on record of significant damage including compromising the roof structure as a result of the corrosive effects of water condensing within the building's support structure.

e. Considering the need to eliminate structural deterioration, to minimize the build-up of chloramine gas and to minimize health concerns, the ventilation system must function 24 hours a day, seven days a week. This is an industry standard.

f. The specialized Natatorium units shall be manufactured by Nautica, Dectron, Munters (Des Champs) or approved equal. The central units shall be equipped with DX dehumidification coils to dehumidify the Natatorium when the outside air is warm and humid. When the outside air is cold and dry enough to dehumidify the Natatorium, the mechanical DX **cooling/**dehumidification system shall not be utilized, rather the adequately dry outside air shall be brought in and warmed up by the unit's hot water coil **or electric coil.**

g. Note that the unit's hot water coil for Natatorium space heating shall be heated by a dedicated gas-fired hot water boiler. This dedicated hot water boiler shall also function as the pool heater. The central school boilers shall not be utilized to provide space heating hot water to the Natatorium central unit or to heat the pool, in order to avoid the possibility of the central school boilers being shut off to avoid the school overheating (when a climate control project is required and has not yet been undertaken). Similarly, a DX dehumidification coil shall be provided in lieu of a chilled water dehumidification coil to guard against the possibility that the central chillers might be shut down or not energized on the shoulder seasonal days.

h. Energy recovery from the DX dehumidification coil waste heat shall be utilized to heat the pool and/or reheat the supply air or liberate moisture from an active desiccant wheel. Other air reheat options consist of a heat exchanger and heat pipe. Energy recovery air

reheat and pool heating from the DX dehumidification coil waste heat shall be generated by hot gas air reheat coils and hot gas refrigerant pool heat exchanger (when air cooled condensers are utilized) or condenser water air reheat and condenser water pool heat exchanger (when water cooled condensers are utilized). Note that on cool/cold days when the outside air is utilized to perform the dehumidification when the DX coil is inactive, no salvageable waste heat will be available from the DX dehumidification coil, hence the need for a dedicated hot water boiler **or electric coil.**

j. Energy recovery shall be utilized to pre-condition the outside air intake via an outside air intake/exhaust air total enthalpy energy recovery wheel, heat pipe or heat exchanger.

k. The separate dedicated gas fired or electric hot water boiler with a high recovery potential shall be sized to provide the initial pool warm up and warm up of the pool water after an extended school break. The dedicated gas-fired or electric boiler shall be sized to be able to heat up the pool within 48 hours and the rate of pool water temperature rise shall not exceed 1°F per hour. The maintenance pool water heating load to cover the heat loss associated with pool water evaporation shall be provided by the energy recovery system off of the DX dehumidification coil when the outside air conditions are warm and humid. When the outside air conditions are cooler and adequately dry and there is no DX dehumidification waste heat to recover, the maintenance pool water heating load shall be provided by the dedicated gas-fired or electric boiler.

l. In applications with high solar loads (i.e. high glass loads) a conventional dehumidifier may be undersized for cooling. It is not reasonable to expect a single unit designed specifically for dehumidification and water heating to efficiently meet the cooling requirement without compromise. Therefore a properly designed system should treat cooling separately from dehumidification and pool water heating. Provide a separate DX cooling coil for space cooling in addition to the DX dehumidification coil if necessary considering the amount of fenestration.

m. The Designer shall specify aluminum ductwork, diffusers, registers and grilles for shower rooms, locker rooms, and swimming pool areas. Preferred arrangement is to have exhaust and return air inlets located high to capture hot and humid air with low perimeter supply diffusers. The next best alternate is to have high perimeter diffusers with low exhaust and return inlets. Care shall be taken to avoid supply air short cycling especially considering that windows and metal exit doors that are not provided with 3 to 5 cfm per square foot will experience condensation.

n. Natatorium central air handling units shall be provided with factory mounted Original Equipment Manufacturer (OEM) controls and shall operate with the OEM's standard sequence of operation. The ventilation rate shall not be reduced during unoccupied periods because the fresh air is needed to protect the Natatorium structure and mechanical equipment from the build-up of chloramine gas. (Chloramine (NH_2Cl) is a corrosive toxic gas formed by the combination of chlorine and the nitrogen in the air).

o. Ventilation shall be provided for purging of the space in the event of a chemical emergency and for when the pools are "shocked" with high doses of chlorine.

p. Per Table MC **403.3.1.1** of the **2022** NYC Mechanical Code and industry standards, the minimum ventilation rate delivered to the Natatorium shall be the maximum of (0.48 cfm

per square foot of pool and wet deck) as compared to (7.5 cfm per spectator plus 0.06 cfm per square foot of spectator area). The exhaust rate shall exceed the outside air intake rate by nominally 10% to maintain negative pressurization of the Natatorium. A negative pressure is needed to prevent Natatorium air from being "pushed" through the wall cavity and condensing on cold surfaces and to minimize the migration of pool odors to adjacent areas. The minimum ventilation rate for Educational sports locker rooms shall be 0.50 cfm per square foot.

q. Natatorium unit control system shall be designed to limit the maximum relative humidity levels to 60% during active pool usage periods and to 50% for inactive pool usage periods. Air from the Natatorium shall not be recirculated to other spaces. Air may be recirculated within the Natatorium since the relative humidity shall not exceed 60% (refer to Section MC 403.2.1).

r. Four to six total air changes per hour are recommended for an indoor pool without spectators. A pool with spectators requires six to eight air changes per hour. The primary reason is to achieve good mixing of the dehumidified air and outside air, with room air. Air changes can also be provided with ceiling hung propeller fans and other air recirculation devices. (Note that Article 165.47 of the NYC Department of Health Code only requires a minimum of two air changes per hour for indoor pools. This two air changes per hour however is considered inadequate by industry standards.)

s. Defogging: The goal of defogging is to raise the interior surface temperature of the window panes above the room dew point temperature. Double pane low E glass is a minimum requirement. Simply moving air across a window pane will facilitate defogging. It is optimum to have the air that is moving across the window pane to be ducted from the dehumidification system. When high diffusers are provided, linear diffusers located over the entire window length are recommended which directs the flow of air downward. The flow of the air across the windows should be 3 to 5 cfm per square foot of glass. Also, direct air over metal exit doors to avoid condensation. If the dehumidification system does not provide the air to blow across the windows and metal exit doors, a localized fan may be used. Ideally the air terminal should be close to the glass and metal exit door to ensure maximum turbulence on the glass and door and optimum effectiveness.

t. For summer heat rejection, provide outside air cooled condensers or dry coolers for water cooled condensers to reject the heat when it is not needed for air reheat and pool heating.

u. The calculation of the pool evaporation rate which represents a significant dehumidification load and defines the pool temperature maintenance heat requirements shall be calculated in accordance with industry standards. This calculation involves determining the activity factors, evaporation rate factors at 50% and 60% Natatorium relative humidity, water surface area, pool water capacity, active hours of operation, Natatorium air temperature, pool water temperature, etc.

2. 20**22** NYC Building Code

   a. Natatorium Design Conditions:

      1) Per Table BC 1204.1 of the **2022** NYC Building Code, swimming pools, and shower rooms shall be maintained at 75ºF minimum. Industry standards for Competitive Swimming pools are as follows:

Air Temperature	Water Temperature	Relative Humidity
78-85ºF	76-82ºF	50-60%

      2) NYC school Natatoriums shall be designed for the following average design conditions (consistent with industry standards):

Air Temperature	Water Temperature	Relative Humidity
82ºF	80ºF	50% inactive pool usage periods 60% active pool usage periods

      3) Note that the air temperature should be nominally 2°F warmer than the pool water temperature to minimize pool evaporation.

   b. Entrapment Avoidance:

      Per Section BC 3109.3.1.1, suction outlets shall be designed and installed in accordance with ANSI/APSP-7 for suction entrapment avoidance.

   c. Pool Alarms:

      Per Section BC 3109.3.2, all swimming pools and spas shall be equipped with an approved pool alarm. Pool alarms shall comply with ASTM F2208 and shall be installed, used and maintained in accordance with the manufacturer's instructions. Note per Exception 2 a swimming pool (other than a hot tub or spa) equipped with an automatic power safety cover that complies with ASTM F1346 need not be provided with a pool alarm.

   d. Water supply, circulation, water treatment, and drainage:

      Per Section BC 3109.3.3, the supply, circulation, treatment, and drainage of water for swimming pools shall meet the requirements of the **2022** New York City Plumbing Code.

   e. Appendix G Flood Resistant Construction:

      Refer to Appendix G of the 2022 NYC Building Code and ASCE 24-14.

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3. **2022** NYC Mechanical Code – Natatorium Ventilation Rates

   See above Design Criteria for the ventilation requirements.

4. **2022** NYC Plumbing Code Backflow Prevention

   a. Water Connections: Section PC 423.1 of the **2022** NYC Plumbing Code for water connections requires that swimming pools be protected against backflow in accordance with Section PC 608.

   b. Indirect/Special Waste: Section PC 802.1.4 for swimming pools requires that wastewater from swimming pools, backwash from filters and water from pool deck drains that discharge to the building drainage system shall have the discharge through an indirect waste pipe by means of an air gap.

5. **2022** New York City Fuel Gas Code

   Per Section FGC 617.1 of **2022** NYC Fuel Gas Code, gas-pool heaters shall be tested in accordance with ANSI Z21.56 and shall be installed in accordance with the manufacturer's installation instructions.

6. 2020 New York City Energy Conservation Code

   a. Minimum Performance of Water-Heating Equipment: Per Section C404, Service Water Heating Table C404.2, gas pool heaters of all input sizes shall have a minimum 82% Thermal Efficiency (Et) in accordance with ASHRAE 146 Testing and Rating Pool Heaters.

   b. Energy consumption of pools: The energy consumption of pools shall be controlled by the requirements in Sections C404.9.1 through C404.9.3.

      1) C404.9.1 Heaters: The electric power to all heaters shall be controlled by an on-off switch that is an integral part of the heater, mounted on the exterior of the heater, or external to and within 3 feet of the heater in a location with ready access. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

      2) C404.9.2 Time switches: Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

         Exceptions:
         a) Where public health standards require 24-hour pump operation.
         b) Pumps that operate solar-and waste-heat-recovery pool heating systems.

      3) C404.9.3 Covers: Outdoor heated pools shall be provided with a vapor-retardant cover or other approved vapor-retardant means.

         Exception:
         Where more than 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from site-recovered energy such as

from a heat pump or on-site renewable energy system, covers or other vapor-retardant means shall not be required.

7. NYC Department of Health Code

   a. Article 165.47 addresses ventilation and states that all indoor pools shall be adequately ventilated, either by natural or mechanical means. (Note that per the above Design Criteria, mechanical dehumidification is required for the NYC area during the warmer more humid months). Indoor portions of a bathing establishment, including indoor pools, dressing rooms, mechanical equipment rooms, storage areas, bathhouses, shower rooms and lavatories, shall be ventilated pursuant to Article 12 of the Building Code or any successor law or regulation. The ventilation system for indoor pools and dressing rooms shall be designed so the bathers are not subjected to drafts and shall minimize condensation. Article 165.47 requires that a minimum of two air changes per hour be provided for indoor pool. (Note that per the above Design Criteria and in accordance with ASHRAE, designers are to provide 4 to 6 air changes per hour for non-spectator pools and 6 to 8 air changes per hour for spectator facilities). Any heating units shall be kept from contact with swimmers. Fuel burning heating equipment shall be installed and vented to the outdoors in accordance with the Building Code. CO_2 cylinders shall be placed in a ventilated enclosure for facilities using carbon dioxide (CO_2) as the method of pH control (where cylinders are provided in the interior of occupied structures). The CO_2 ventilated enclosure shall be provided with a louvered fresh air intake near the ceiling and mechanical exhaust ventilation shall be provided at the rate of one air change every three minutes and shall take suction near the floor as far as practical from the door and fresh air intake. The exhaust of CO_2 ventilated enclosures shall be ducted to the exterior of the building through a continuous pipe of at least $1^1/_2$" in diameter with the point of discharge so located as not to contaminate air inlets to any rooms or structures.

   b. Per Article 165.41, deck drains, when used, shall be spaced and arranged so that not more than four hundred square feet (400 ft^2) of area is tributary to each drain, and drains shall not be spaced more than twenty-five feet (25 ft) apart. There shall be no direct connection between the pool deck drains and the pool gutter or recirculation system.

   c. Rinse showers shall be provided per Article 165.41. Adjacent recreational areas shall be separated from the bathing area by a suitable fence or barrier. If bathers are permitted free access between the deck and an adjacent recreational area without having to pass through a bathhouse or bather preparation facilities, a rinse shower area shall be installed so that bathers shall pass through the rinse shower area when going from the recreational area to the deck.

   d. Per Article 165.43, drinking fountains shall be of a slanting jet-type with a surrounding guard and nonsubmersible opening. They shall be accessible by patrons at the pool and be supplied with adequate water pressure.

   e. Provide the number of water closets, urinals, wash basins and shower heads in accordance with NYCDOH Article 165.49. Per Article 165.49 (e) showers shall be supplied with water at a temperature of at least 90ºF and no more than 110ºF and at a minimum rate of 1.5 gpm and maximum rate of 2.5 gpm per shower. (SCA Design Requirement 6.1.05 specifies that 110ºF temperature water shall be provided by the showers.

f. Per Article 165.45(k), a water heater shall be installed at all indoor pools. Heaters shall be installed in accordance with the standards contained in the Construction Code (Section MC 916 Section FGC 617) and the manufacturer's recommendations. A heating coil or pipe shall not be installed in the pool. Pools equipped with heaters shall have a fixed thermometer in the recirculation line downstream of the heater and another near the outlet of the pool.

g. Per Article 165.49 (h), hose bibbs shall be provided within the bathhouse to enable the entire area to be flushed with a fifty foot (50') hose. Hose bibbs shall be provided with an anti-siphonage device. Per Article 165.41, at least one hose bibb shall be provided to facilitate flushing of the deck area and each bibb shall be provided with an anti-siphonage device.

h. Per Article 165.43, the potable water supply shall be protected against inter-connection or cross-connection to any potential source of contamination, including but not limited to backflow and back-siphonage. Water introduced into the pool either directly or to the recirculation system, shall be supplied through an air gap of at least 6 inches or two times the pipe diameter, whichever is greater. In pools where it is not possible to provide an air gap, the pool shall be protected by an approved backflow prevention device. When a fill spout is used to introduce water into the pool, it shall be covered so as not to create a hazard to the patrons. The open end of the fill spout shall have no sharp edges, shall not protrude more than two inches beyond the edge of the pool and shall be at least six inches above the deck level. The fill spout shall be located under the diving board when the pool is equipped with a diving board.

i. Per Article 165.29 and Article 165.45, the filtration flow rate shall not exceed the maximum filtration design flow rate specified by the filter manufacturers' specifications and in accordance with N.S.F. standards.

   1) Sand filters

      a) The flow rate shall not exceed fifteen gallons per minute per square foot (15 gpm/ft^2) of filter area for high-rate sand filters, and shall not exceed three gallons per minute per square foot (3 gpm/ft^2) for other sand filters.
      b) Sand filter shall be backwashed at a flow rate of twelve to fifteen gallons per minute per square foot (12 to 15 gpm/ft^2) or at the design rate specified by the manufacturers.
      c) Influent pressure gauge, effluent pressure gauge, backwash sight glass and air relief valve shall be provided on all sand filters. Where multiple filter tanks are used, a separate gauge panel shall be provided for each filter tank.

   2) Diatomaceous earth regenerative filters: (Note that the below is the NYC Department of Health Code requirements for diatomaceous earth (DE) regenerative filters. DE is carcinogenic. Therefore, non-carcinogenic perlite shall be used instead of DE. The usage of regenerative filters offers a lower volume of backwash water to be drained as compared to sand filters plus regenerative filters are physically smaller than equivalent capacity sand filters, which is a benefit when filter space is limited).

Diatomaceous earth filters shall be properly maintained and operated according to the manufacturers' instructions and at a filter rate not exceeding two gallons per minute per square foot (2 gpm/ft^2) with body slurry feed or 1.5 gpm/ft^2 without body slurry feed. Per Article 165.33(c), diatomaceous earth filter wash or backwash water shall first pass through a separation tank designed for removal of the diatomaceous earth and suspended solids before discharging to an approved sanitary sewer system. The separation tank sludge shall be disposed of or treated as a solid waste material in accordance with applicable law. Regenerative type of filters shall meet the same standards as pressure filters. Pumping by air or manual means shall be provided for and provision for visual inspection of elements shall be provided. Required accessories for pressure-type filters are a backwash sight glass, effluent pressure gauge, influent pressure gauge and air relief valve. Required accessories for vacuum-type filters are a compound gauge which will indicate both positive and negative head and the gauge shall be installed on the suction side of the pump. An adjustable high vacuum switch shall be provided to prevent damage to the pump by cavitation.

3) Cartridge filters: Cartridge filters shall be operated at a filter rate not to exceed the design or a maximum of 0.375 gallons per minute per square foot (0.375 gpm/ft^2). Influent pressure gauge, effluent pressure gauge and air relief valve shall be provided on all the filters. One complete extra set of filter cartridges shall be on hand at the facility's location.

j. Per Article 165.41, all equipment used or proposed for use in pools shall be tested and listed by N.S.F. or another testing laboratory under standards promulgated by N.S.F. Equipment that is experimental or not N.S.F. approved shall be submitted to the Department for review.

k. Article 165.45 addresses the required water treatment system that must attain the water chemistry as defined in Article 165.23 and 165.25. A water treatment system consisting of pumps, piping, filters, water conditioning and disinfection equipment, and other accessory equipment, shall be provided which will clarify, chemically balance and disinfect the pool water. The system shall be designed for a recirculation flow rate that will result in a turnover period in each pool not exceeding 6 hours. Construction shall comply with all other provisions of this Code regarding water and waste water. Each pool shall have a separate water treatment system. Construction of fill and draw pools is prohibited. The components of the pool water recirculation system shall be kept in continuous operation 24 hours a day to provide water quality consistent with Articles 165.23 and 165.25.

l. Pools constructed prior to March 31, 1973 may have an eight-hour turnover rate.

m. Waste water disposal is covered in Article 165.43. The sanitary sewer system shall have sufficient capacity to serve the facility, including the bathhouse, locker rooms and related accommodations. The building drains and sewer system shall have adequate capacity to carry filter backwash flows without surcharging or flooding. Sanitary sewage and pool waste water shall be discharged to the municipal sanitary sewer system whenever possible. The establishment shall obtain the waste water discharge permit or approval from the appropriate regulatory agency (for example, the New York City Department of Environmental Protection) prior to discharge. When no such sewer is available, the

connection shall be made to a suitable private subsurface disposal system or other system approved by the Department and such agencies having jurisdiction. The pool waste water shall be discharged to the sanitary sewer system through an air gap of at least six inches (6") or two times the pipe diameter, whichever is greater, so as to preclude the possibility of backup of sewage or waste water into the pool piping system.

n. Article 165.45 lists the acceptable piping and fitting materials for the recirculation piping system as well as the required plumbing color coding schedule.

o. Per Article 165.45, all pipes, fittings and valves of the recirculation system shall be designed to reduce friction losses to a minimum and to carry the required quantity of water at a maximum velocity not to exceed six feet per second (6 ft/s) under suction, ten feet per second (10 ft/s) under pressure and three feet per second (3 ft/s) in gravity flow.

p. Per Article 165.45, all equipment and piping shall be designed and fabricated to drain completely by use of drain plugs, drain valves or other means. All piping shall be supported continuously or at sufficiently close intervals to prevent sagging. All suction piping shall be sloped in one direction, preferably toward the pump. All supply and return pipelines to the pool shall be provided with valves or other means to allow the piping to be drained to a point below the frost line. Provision shall be made for expansion and contraction of pipes.

q. Per Article 165.45, the recirculation pump shall have adequate capacity (flow rate and pressure) to meet the design requirements of the pool, including filter backwashing and turnover rate. It shall be of a self-priming type if installed above the hydraulic gradient. A gauge which indicates both pressure and vacuum shall be installed on the pump suction header and a pressure gauge shall be installed on the pump discharge line. Gauges shall be installed as near to the pump inlet as possible.

r. The recirculation system shall include suitable strainer(s) or screen(s) to prevent hair, lint, and other debris from reaching the pump and filters. See Article 165.45 for details.

s. Per Article 165.45, each main drain shall be connected to the recirculation system. The branch pipe from each main drain shall be designed to carry at least one hundred percent (100%) of the design recirculation flow rate. The single main suction pipe to the pump shall be equipped with a valve to control total main drain flow. The suction velocity in the pipe shall not exceed six feet per second (6 ft/s). At least thirty percent (30%) of the total recirculation rate should flow through the main drains. A hydrostatic relief valve shall be provided at each main drain for in-ground pools.

t. Per Article 165.45, a means of continuously measuring rate of flow shall be provided in the recirculation system. For sand filters, the flow-measuring equipment shall be located where the backwash flow rate can also be determined. The indicator shall be capable of measuring at least $1^1/_2$ times the design flow rate and shall be accurate within ten percent (10%) of true flow. The indicator shall have a range of readings appropriate for the anticipated flow rates, and be installed where it is readily accessible for reading and maintenance, and with straight pipe upstream and downstream of any fitting or restriction in accordance with the manufacturer's recommendation. Where multiple pumps or filters are provided, each unit shall have a flow-regulating device installed.

u. Article 165.45 (l) addresses disinfection and chemical feeders. Pools shall be designed to provide for continuous disinfection of the pool with a chemical which is an effective disinfectant and which imparts an easily measured, active residual. The pools shall be equipped with a chlorinator, hypochlorinator, or other disinfectant feeder or feeders. An automatic controller shall be provided for continuous monitoring and adjusting the level of free residual disinfectant. An automatic device shall be provided to deactivate chemical feeders when there is no flow in the recirculation system. The feeder shall be automatic, easily disassembled for cleaning and maintenance, and capable of providing the required chemical residuals which meet the following requirements:

1) Design specifications: The feeder shall be of sturdy construction and materials which will withstand wear, corrosion or attack by disinfectant solutions or vapors, and which are not adversely affected by repeated, regular adjustments or other normal use conditions. The feeder shall not allow flow of unintended chemicals or those containing foreign materials into the pool. The feeders shall incorporate anti-siphon safeguards so that the disinfectant cannot continue to feed into the pool, the pool piping system, the pool enclosure, if any type of failure of the equipment occurs.

2) Point of addition of disinfectant: All chemicals shall be fed into the return line after the pump, filter and heater unless the feeder is otherwise designed and specified by the manufacturer, and approved by N.S.F. and the department.

3) Equipment capacity: Feeders shall be capable of supplying disinfectant to the pool in a range of chlorine demand of up to 10 mg/l or equivalent.

4) Disinfection with bromine or solid forms of chlorine: Where bromine or chlorine in stick or pellet form is used as a disinfectant, equipment shall be provided for feeding on continuous feed.

5) Disinfection with ozone: Ozone generating equipment (OGE) is acceptable only as a supplement to chlorine or bromine disinfection system. OGE and its components shall be listed by N.S.F. or other listings that are approved by the department and meet the following design standards:
   a) The ozone concentration in the pool water shall be less than 0.10 mg/l. Off-gassing of ozone shall not result in ozone levels exceeding 0.10 mg/l in the equipment room or in the pool area. When the OGE is installed and annually thereafter, the air space within six inches (6") of the pool water level and air in the equipment room shall be tested to determine compliance with this requirement.
   b) All corona discharge OGE systems shall be vacuum systems.
   c) Backflow of pool water into OGE shall not occur.

6) Hypochlorinators (positive displacement pumps): Where positive displacement pumps are used to inject the disinfectant solution into the recirculation line, the following requirements shall apply:
   a) Feed: Feed shall be continuous at the proper addition rate under all conditions of pressure in the recirculation system without constriction of the recirculation pump suction.
   b) Solution tanks: If granular calcium hypochlorite is used, two solution tanks, each with minimum capacity of one-day supply, shall be provided. All chemical

containers including those used with chemical feeders shall be clearly labeled regarding their contents.

7) Gas chlorination. Gas chlorination is prohibited.

8) Copper/silver and copper ion generators. All copper/silver and copper ion generators shall be approved by N.S.F. or equivalent which are approved by the Department and are acceptable only as a supplement to chlorine or bromine disinfection system.

v. Article 165.45(m) addresses pH control. Mechanical feed equipment for the purpose of adding a chemical for pH adjustment shall be provided for all pools. An automatic controller shall be provided for continuously monitoring and adjusting the level of pH. The method of chemical addition shall protect the bather from contact with concentrated chemicals. Soda ash, caustic soda, sodium bisulfate, carbon dioxide gas, muriatic acid, or other chemicals approved for water supply use by the United States Environmental Protection Agency, as food additives by the United States Food and Drug Administration, or by the Department, shall be used to raise or lower pool water pH. The method shall provide adequate distribution of the chemical throughout the pool and distribution shall be verified by pool water testing prior to bather exposure. Where carbon dioxide (CO_2) is used as a method of pH control, the following features shall be provided:

1) CO_2 shall be injected into the recirculation pipe at the same point where pH adjustment solutions (i.e., acid) would normally be added. The recirculation pipe shall be of sufficient size and length to provide a minimum of five seconds contact time prior to bather contact.

2) CO_2 cylinders shall be anchored to prevent damage. Cylinders shall be inaccessible to the general public.

3) The manufacturers' instructions shall be followed for installation and operation of cylinders. The units shall be operated by the pool operator as specified in the pool safety plan.

4) CO_2 cylinders shall be stored in a protective enclosure at the exterior of occupied structures. If CO_2 cylinders are provided in the interior of occupied structures, they shall be placed in a ventilated enclosure.

An automatic device shall be provided to deactivate chemical feeders when there is no flow in the recirculation system.

w. Article 165.45(o) addresses the pool vacuum system and cleaning system. A cleaning system shall be provided to remove sludge, sediment and other accumulations from the bottom of the pool. When a vacuum system is used as an integral part of the recirculation system, hose connections shall be located in the walls of the pool at least eight inches (8") below the waterline, and at such points that the floor of the pool can be cleaned with not more than fifty feet of suction hose.

C. Architectural Natatorium/Pool Design

1. Design Criteria

a. Suspended ceilings shall not be used since they create an unconditioned space that is prone to condensation and corrosion problems. Pools with suspended ceilings have experienced corroded hardware (T bars and hangers) and condensation soaked tiles are subject to failure and subsequently falling into the pool.

b. Skylights can only be used with the approval of the Authority. Skylights are prone to condensation problems in cold weather. The quantity of supply air (3 to 5 cfm per square foot of glass) necessary to blanket the glass with air so as to avoid condensation is difficult to control for the high elevation skylights. Visible ductwork would otherwise be required to supply this air to the skylight and can cause concerns about aesthetics. If skylights are provided, in time their frames will corrode. The frames must then be scraped, re-primed and top coated. The pool would then have to be drained and scaffolding would have to be erected to complete this work. Considering the level of difficulty in maintaining the skylights, they are to be avoided.

c. It is imperative that the vapor retarder be properly located on the inboard warm side of the insulation to guarantee that no condensation will occur within the exterior envelope which would otherwise destroy the insulation and cause structural corrosion. This is especially important for Natatoriums considering the rate of pool water evaporation. Designer shall verify that the Insulation and Moisture Control/Vapor Retarder Progress Inspections required by Rule 5000 of the NYC Building Code have been properly identified on the bid documents so that inspections will occur during envelope construction, prior to covering the insulation and vapor retarder.

d. To avoid the deleterious effects of corrosion, all surfaces that could be splashed upon or reach the dew-point shall be made of corrosion-resistant material or covered with a corrosion resistant coat. This applies to stair nosings, signage frames, screw heads, door hinges, lintels, toilet partitions, shower room curtain poles, handicapped grab bars, skylight structural members, pool gutters, etc.

2. **2022** NYC Building Code

a. Natatorium Occupancy Groups

Per Chapter 3 of the **2022** NYC Building Code, Assembly uses intended for recreation without spectator seating shall be classified in Occupancy Group A-3. Assembly uses intended for viewing of indoor sporting events and activities with spectator seating shall be classified in Occupancy group A-4. Most Natatoriums will be classified as A-4 Occupancy Groups.

b. Natatorium Maximum Floor Area Allowances per Occupant (Refer to Table BC **1004.1.3**)

Swimming pools	50 gross square foot floor area per occupant
Decks	15 gross square foot floor area per occupant

c. Accessibility

Per Section BC **1109.10.2**, Detectible Warnings at Pools, the edges of pools shall be provided with detectable warnings. **Chapter 2 of the 2022 NYC Building Code** defines a "Detectable Warning" as a standardized surface feature built-in or applied to walking surfaces or other elements to warn visually impaired persons of hazards on a circulation path.

e. Safety Glazing

Per Section BC 2406.4, Hazardous Locations, glazing in walls and fences enclosing indoor swimming pools shall be considered specific hazardous locations requiring safety glazing materials where all of the following conditions are present:

1. The bottom edge of the glazing on the pool side is less than 60 inches above a walking surface on the pool side of the glazing; and

2. The glazing is within 60 inches horizontally of the water's edge of a swimming pool.

f. Swimming Pools, Swimming Pool Enclosures and Safety Devices per **Section** BC 3109

1) Per Section BC 3109.3.5, facilities for people with physical disabilities shall be provided where required by Chapter 11 **of the 2022 NYC Building Code**.

2) Per Section BC 3109.4, public swimming pools shall comply with the requirements for safety and accessibility as provided in Sections 3109.3 and BC 3109.4. Refer also to NYC DOH Article 165.41.

Exceptions: A swimming pool with a power safety cover complying with ASTM F1346.

3) Per Section BC 3109.4.1, barrier height and clearances, public swimming pools shall be completely enclosed by a fence, wall, building, or other solid barrier, or any combination thereof, at least 6 feet in height. Openings in the enclosure shall not permit the passage of a 4-inch-diameter sphere. The enclosure shall be equipped with self-closing and self-latching gates.

Exception: Enclosures shall be at least 4 feet in height when surrounding wading pools with water less than 24 inches in depth.

4) Per Section BC 3109.4.3 Other laws: In addition to the requirements of BC 3109, any other, more stringent requirements for the construction and design of swimming pool and barriers that are provided for in Article 165 of the New York City Health Code, as administered by the New York City Department of Health and Mental Hygiene, shall also be applicable.

g. NYC Building Code: Appendix G Flood Resistant Construction

Refer to Appendix G of the 2022 NYC Building Code and ASCE 24-14. Section 9.6 of ASCE 24 specifies specific pool requirements.

3. NYC Department of Health Code

   a. Provide dressing rooms, toilets and showers in accordance with Article 165.49 with floors that slope at least ¼" per foot to drains. Per Article 165.49 (g), pool lockers shall be set either on solid masonry or concrete bases at least four inches above the floor. Lockers shall be vented. For all pools, the bather preparation facility shall be located so that the patrons shall pass through the bather preparation facilities to enter the pool. The layout of the preparation facilities shall be such that the patrons on leaving the dressing room pass the toilets and then the showers in route to the pool.

   b. Per Article 165.41, an emergency exit from the pool room shall be provided. All exits should be clearly marked.

   c. Article 165.41 governs pool design and construction including material finishes, rounded corners, accessibility, minimum water depth, bottom slope, contour of pool walls, safety ledges, decks and walkways, deck capacity, deck covering, deck slope, deck level gutters, pool enclosures, depth markings and safety lines, diving area and diving boards, minimum dimensions for diving portion of the pool, ladders, pool steps, pool stairs, handrails, safety and warning signs.

   d. Pool capacities and patron loading is covered in Article 165.41. The maximum permissible number of bathers allowed in the pool at one time is as follows:

      1) Pools: Twenty-five square feet (25 ft^2) of water surface area shall be provided for each patron.

      2) Diving area: Three hundred square feet (300 ft^2) of pool water surface area shall be reserved around each diving board or diving platform, and this area shall not be included in computing the permissible patron use.

   e. Required First Aid rooms are covered in Article 165.41. Pools with a surface area in excess of four thousand square feet (4000 ft^2) shall have a readily accessible room or area designated and equipped for emergency care.

   f. Article 165.45 addresses the equipment and storage area. All the pumps, filters, chemical feeders and other mechanical equipment and chemicals shall be secured and protected by an appropriate enclosure or room, separate and apart from the pool. The size of the equipment room shall provide working space to perform routine operations. Clearance shall be provided for all equipment as prescribed by the manufacturers to allow normal maintenance operation and removal without disturbing other piping or equipment. Operating instructions and a schematic drawing for all equipment shall be provided in the equipment enclosure room. Adequate storage area shall be provided for chemicals and supplementary equipment. A dry above ground storage area shall be provided for facilities using calcium hypochlorite as a disinfectant. Equipment rooms shall not be used for storage of chemicals emitting corrosive fumes or for storage of other items to the extent that entrance to the room for inspection or operation of the equipment is impaired.

g. Article 165.45 addresses the required quantity and location of the pool inlets. Wall or floor inlets shall be provided for all pools and shall be located and directed to provide distribution of treated water to facilitate the maintenance of a uniform disinfectant residual throughout the entire pool.

   1) Number: Wall inlets shall be spaced at a distance of no greater than twenty feet (20') apart, with one inlet within five feet (5') of each corner of the pool and one in each recessed step area or other space where water circulation might be impaired.

   2) Location: Wall inlets shall be located at least twelve inches (12") below the design water surface. Bottom inlets shall be uniformly spaced with a separation distance of no greater than twenty feet (20') and with rows of inlets within fifteen feet (15') of each side wall. In any pool over sixty feet (60') in width, floor inlets should be provided. These shall be flush with the floor.

   3) Type: Inlet fittings shall be of the adjustable rate-of-flow type. Directional flow inlets shall be used with skimmer type pools. Inlets shall not extend from the floor or wall to create a hazard.

   4) Testing: Dye testing (crystal violet or equivalent) should be performed to determine and adjust the recirculation pattern.

h. Article 165.45 addresses the pool main drains. Every pool constructed after July 15, 1998, shall have at least two hydraulically balanced main drains to the pool filter system installed in the pool floor at the deepest point. The minimum distance between the main drains shall be three feet (3') measured from center to center of the drains. The main drains shall be connected to a single main suction pipe by branch lines and the branch lines shall not be valved so as to be capable of operating independently. Pools constructed before July 15, 1998, shall have at least one main drain installed in the pool floor at the deepest point.

   1) Location: The main drains shall not be spaced at more than twenty feet (20') on centers and fifteen feet (15') from side walls and shall be connected in parallel.

   2) Grating: The main drain shall be protected by gratings or other approved covers having an opening sufficient to restrict water velocity to less than $1^1/_2$ feet per second through the grating. The maximum width of grate opening shall be one-half inch. Gratings or drain covers shall not be removable without the use of tools.

i. Article 165.45 addresses skimmers and overflow gutters. A surface skimmer system, perimeter overflow system or recessed automatic surface skimmers, shall be provided on all pools and shall be designed and installed to continuously remove all floating material, surface dirt and waste water. A perimeter overflow system shall be required on all pools which have a pool width exceeding thirty feet (30'), or a surface area of over one thousand six hundred square feet (1,600 ft^2). Pools having a width of thirty feet (30') or less, or a surface area of one thousand six hundred square feet (1,600 ft^2) or less shall be provided either with perimeter overflows or skimmers. A combination of perimeter overflow systems and skimmers may also be used when approved by the Department. All overflow systems and skimmers shall be capable of continuously removing all floating material, surface dirt and waste water.

1) Perimeter overflow systems: All pools shall be designed to provide continuous skimming from the pool's surface at a rate of at least one hundred percent (100%) of recirculation rate. In pools where perimeter overflow systems are provided, the following shall be met:

   a) Design: The perimeter overflow systems shall extend completely around the pool, except at steps or recessed ladders in the shallow portion and shall be level to a tolerance of one-eighth inch (1/8"). The gutter shall be capable of continuously removing one hundred percent (100%) of the recirculation water and return it to the filter.

   b) Size and shape: The gutters, drains and return piping to the surge tank shall be designed to rapidly remove overflow water caused by recirculation displacement, wave action or other causes produced from the maximum pool bathing load. Make-up water supply equipment shall be provided to maintain continuous skimming.

   c) The gutter shall be designed to serve as a handgrip and to prevent entrapment of bather's arms, legs and feet. It shall permit ready inspection, cleaning and repair.

   d) The overflow gutter outlets shall be provided with outlet pipes at least two inches (2") in diameter. The outlet fittings shall have a clean opening in the grating at least equal to 1.5 times the cross-sectional area of the outlet pipe.

   e) Drainage shall be sufficient to minimize flooding and prevent backflow of skimmed water into the pool.

   f) Surge capacity: All overflow systems shall be designed with an effective surge capacity of not less than one gallon for each square foot of pool surface area. Surge shall be provided within a surge tank, in the gutter or filter above the normal flow line, or elsewhere in the system. Surge tanks, gutters and filter tanks should have overflow pipes to convey excess water to waste. Surge tanks shall be provided with means for complete draining.

2) Skimmers: Skimmers shall be designed and installed to prevent electrical hazards or short circuiting. Recessed automatic surface skimmers are permitted on pools where the width does not exceed thirty feet (30') and a water surface area is less than one thousand six hundred square feet (1,600 ft^2). In pools where skimmers are provided, the following shall be met:

   a) Number: One skimmer for each four hundred square feet (400 ft^2) of water surface area or fraction thereof shall be provided. Additional skimmers may be required to achieve effective skimming.

   b) Location: Skimmers shall be so located to optimize skimming of the entire water surface with minimum interference and placed so as to prevent short circuiting. The pool outline shall be considered in the selection of skimmer locations and the location of skimmers shall be such that the interference of adjacent inlets and skimmers is minimized.

c) Capacity: The piping and other pertinent components of skimmers shall be designed for a total capacity of one hundred percent (100%) of the required filter flow of the recirculation system and no skimmer shall be designed for a flow through rate less than thirty gallons per minute per foot (30 gpm/ft) of weir length.

d) Control: Skimmers shall have weirs that adjust automatically and operate freely and continuously with variations of at least four inches in water level. All skimmed water shall pass through an easily removable and cleanable basket or screen before encountering control valves or entering the pump suction line. Each skimmer shall be equipped with a device to control flow.

e) Relief line: Skimmers shall include a device to prevent an air lock in the suction line. If equalizer pipes are used, they shall pass an adequate amount of water to meet pump suction requirements should pool water drop below the weir level. The equalizer pipes shall be located at least one foot below the lowest overflow level of the skimmer. A valve or equivalent device that will remain tightly closed under normal operating conditions, but automatically open when the water level drops below the minimum operating level of the skimmer, shall be provided on each equalizer pipe.

f) Construction: Skimmers shall be installed in the pool walls, be sturdy and be constructed of corrosion-resistant materials.

g) Handgrips: Rounded coping not more than two inches (2") thick or other handgrip adjacent to the pool wall shall be provided. The handgrip shall not be more than nine inches above the minimum skimmer operating level. When the handgrip is formed by the pool deck, it shall slope away from the pool with a one-inch (1") drop in a one-foot (1') distance.

h) Testing: Flotation testing should be performed to determine and adjust the recirculation system for optimum skimming.

D. Electrical Design

1. Design Criteria

   a. To avoid the deleterious effects of corrosion, all surfaces that could reach the dew-point shall be made of corrosion-resistant material or covered with a corrosion resistant coat. This applies to exit signs, light switch cover plates, speaker box covers, recessed lighting fixtures, fire alarm strobe cages, etc.

   b. Electrical outlets should be eliminated or at least minimized on exterior walls since they represent areas that may compromise the integrity of the vapor retarder which can result in insulation deterioration and structural corrosion.

2. **2022** NYC Building Code: Electrical Precautions

   Per Section BC 3109.3.4, no overhead electrical conductors shall be installed within 15 feet of any swimming pool. All metal fences, enclosures, or railings that might become electrically

charged as a result of contact with broken overhead conductors or from any other cause near or adjacent to, a swimming pool shall be grounded in accordance with the provisions of lightning protection in the New York City Electrical Code.

3. 2011 NYC Electrical Code Amendments to the 2008 National Electrical Code (NEC – NFPA 70) per Section 27-3025 of the Administrative Code per Local law 39/11. The following are the NYC Amendments to the 2008 NEC Code, Article 680 in relation to Swimming Pools:

   a. Section 680.4: - At the end of the paragraph add the following:
   All applicable provisions of the New York City Construction Codes shall apply.

   b. Section 680.9 - At the end of the paragraph add the following:
   All such circuits shall be provided with GFPE. Electric water heaters of the immersion or submersible type shall not be permitted.

   c. Section 680.21, Subsection 680.21(A)(3) - Revise by deleting the words “or liquidtight flexible nonmetallic conduit”.

   d. Section 680.23, Subsection 680.23(B)(1) - Revise the first sentence to read as follows:
   Listed and approved forming shells shall be installed for the mounting of all wet-niche underwater luminaires (fixtures) and shall be equipped with provisions for conduit entries.

   e. Section 680.23, Subsection 680.23(B)(2) - Revise by deleting the words “liquidtight flexible nonmetallic” throughout.

   f. Section 680.23, Subsection 680.23 (B)(2)(b) - Revise the first sentence to read as follows:
   Where a rigid nonmetallic conduit is used, an 8 AWG insulated solid or stranded copper equipment grounding conductor shall be installed in this conduit unless a listed low-voltage lighting system not requiring grounding is used.

   g. Section 680.23, Subsection 680.23(D) - Revise to read as follows:
   (D) No-Niche Luminaires (Fixtures). A no-niche lighting fixture shall be supplied from a transformer meeting the requirements of 680.23(A)(2) and shall:
   (1) Have no exposed metal parts
   (2) Have an impact resistant polymeric lens and body, and
   (3) Be listed and approved for the purpose

   h. Section 680.23, Subsection 680.23(F)(1) - Revise to read as follows:
   (1) Wiring Methods. Branch-circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to wet-niche and no-niche luminaires (fixtures), and the field wiring compartments of dry-niche luminaires (fixtures), shall be installed using listed and approved rigid metal conduit, intermediate metal conduit, or rigid nonmetallic conduit.
   Exception: Electrical metallic tubing shall be permitted to be used to protect conductors, when installed within buildings.

   i. Section 680.33 - Revise to read as follows:
   Storable Pool Luminaires (Lighting Fixtures). Luminaires (lighting fixtures) for storable pools shall not be permitted.

j. Section 680.41 - Revise section by deleting the last sentence.

k. Section 680.42, Subsection 680.42(A)(1) - Revise subsection by deleting the words “liquidtight flexible nonmetallic conduit” throughout.

4. NYC Department of Health Code

a. Per Article 165.17(c): An emergency telephone shall be immediately accessible within 300 feet unimpeded distance of the pool water (an unlocked door or gate shall not be considered an impediment) for emergency communications in the bathing establishment. The design bid package shall indicate the required emergency telephone.

b. Article 165.47 addresses Lighting and Electrical Installation.

c. Artificial lighting shall be provided for all bathing establishments which are to be used at night, or which do not have adequate natural lighting. The light and electrical installation shall be provided in accordance with the following:

1) All new electrical wiring shall conform with Chapter 3 of Title 27 of the Administrative Code of the City of New York, entitled the "Electrical Code" and the National Electrical Code of the National Underwriters Laboratory, or any successor regulation or code.

2) Underwater: When underwater lighting is used, not less than 8.35 lumens or 0.5 watt per square foot of pool water area shall be provided. Such lights shall be spaced to provide illumination so that all portions of the pool including the bottom, may be readily seen without glare. Overhead illumination on the water surface shall be a minimum of 30 foot-candles.

3) If underwater lights are not provided, a minimum illumination of 50 foot-candles on the water surface and the deck shall be provided.

4) Decks: A minimum of 50 foot-candles should be provided at deck area.

5) The illumination level in indoor pools shall be so designed to limit glare and excessive reflection.

6) No overhead electrical wiring, except when secured within a ceiling, shall pass within twenty feet (20') of the pool enclosure **and/or spray pad.**

7) Emergency lighting: All indoor pools where night swimming is permitted, and indoor pools where no natural light is present shall be provided with an adequate emergency lighting service.

8) Electrical outlets. Lighting or other electrical outlets in the deck, shower room, and the water treatment areas shall have properly installed ground fault circuit interrupters (GFCI) at the outlet.

9) Each underwater light shall be individually grounded by means of an adequate ground-wire with a screwed or bolted connection to the metal junction box from which

the branch circuit to the individual light proceeds. Such junction boxes shall not be located in the pool deck within four feet of the pool.

10) Equipment room and storage area: All pool equipment and chemical storage rooms shall be provided with artificial lighting sufficient to illuminate all equipment and supplies.

d. Article 165.07 Construction Inspection and Certification

1) Certification: All bathing establishments with pools shall file on completion of the construction, modification or addition, and prior to public use of new facilities or equipment, a construction compliance certificate to the Department. This certificate shall be prepared and signed by a professional engineer or architect licensed to practice in New York State. The certificate shall include a written statement that the establishment has been constructed in accordance with the plans and specifications approved by the Department.

2) The applicant shall notify the Department of the completion of construction, modification, alteration or addition in order to schedule a compliance inspection. An approval for construction compliance inspection will be granted by the Department when all of the required items are completed to the Department's satisfaction.

e. Article 165.09 Requirements for Permit Approval

1) Per Article 165.01(c), schools, do not require a DOH permit; however other provisions of Article 165 do apply to schools, hence Article 165.09 applies as defined in 2) below:

2) All establishments shall be designed, constructed and completed in accordance with the requirements of Article 165.09. For all bathing establishments:

a) A completed and approved safety plan is required in accordance with Section 165.19.

b) Certificate of Occupancy for the bathing establishment, from the New York City Department of Buildings shall be submitted to DOH including an approval letter for underwater lighting construction and certificate of inspection for electrical work and certificate of inspection for the gas fired heating system.

c) Waste water or sewer discharge permit from an approved agency shall be submitted to NYCDOH.

d) Copies of Aquatic Supervisory Certificates as required by Section 165.15 shall be submitted to NYCDOH.

e) Copies of Pool Operator Certificate as required by Section 165.15 shall be submitted to NYCDOH.

f. Article 165.41(b) Structural Stability

The designing architect or engineer shall certify the structural stability and safety of the bathing establishment. All bathing establishments shall be designed and constructed to withstand all anticipated loading for both full and empty conditions, and hydrostatic and earth pressures involved in each case. The strength of the assembled and installed components and accessories to be used in and around the pools should be such that no structural failure of any component part shall cause the failure of any other component part.

2.1 Pavements

2.1.1 Asphalt and Concrete Pavements

Description/Design Approach:

The following pavement thicknesses are based on the subgrade being of good quality. Thickness of pavements over fills and other poor soils are to be investigated and pavement design revised accordingly if required.

Pavement Type	Applications
Asphalt Pavement, Full Depth:	
4" Plant mix base course with 1½" fine surface mix topping course over 6" aggregate base. (Refer to Specification Section 02511)	Use in play yards, court yards, walks, car parking areas and access roads for car traffic.
Asphalt Topping over existing Asphalt Pavement:	
1" to 1½" fine surface mix placed over existing asphalt pavement. Scarify surface and provide reflective cracking membrane over all cracks and joints after filling them. (Refer to Specification Section 02511, 02521, and 03300)	Use for resurfacing existing pavement to extend life, with understanding that cracks will likely still go through the new surface course. Existing pavement must be determined to be in good condition to have chance for success. Use in play yards, court yards and walks
Asphalt Topping over Concrete Pavement:	
1" to $1^1/_2$" fine surface mix placed over Portland cement concrete base. Provide reflective cracking membrane over all joints after filling joints. (Refer to Specification Section 02511, 02521, and 03300)	Use over existing or concrete paving for resurfacing, with understanding that joints, score lines, and cracks will likely still go through the new surface course. Use in play yards, court yards and walks.
Asphalt Pavement with Colored Athletic Wearing Surface:	
Wearing surface consisting of a combination of filler and finish coats of acrylic, rounded silica particles placed over full depth asphalt pavement (3" plant mix, 1" intermediate coarse, 1 to 1.5" surface mix, on 6" aggregate base or asphalt topping (Refer to Specification Section 02533)	Use on tennis courts. If placed on an existing resurfaced topping, use with understanding that cracks will likely still go through the new surface course.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Pavement Type	Applications
Asphalt Pavement with Child Safety Surface:	
Molded rubber safety mat placed over full depth asphalt pavement or asphalt topping. (Refer to Specification Section 02860)	Use on early childhood play areas - under and around play equipment. Rubber mat shall be installed in play areas with minimum coverage extending 6'-0" beyond equipment. Play equipment shall be installed a minimum of 8'-0'' from any adjoining walls or fencing with rubber mat extending to walls or fencing. See US Consumer Product Safety Commission "Handbook for Public Playground Safety". Latest edition available at www.cpsc.gov.
Synthetic Turf with 1¾" thick resilient infill System:	
Synthetic turf **with TPE infill** placed on new **stone base that permits water to "flow thru" the stone base into a porous pipe collection and/or retention system.** (Refer to Specification Section **02541**)	Use on football, soccer, baseball, softball fields, etc., wherever synthetic turf is required. **(use for new construction and replacement of previously constructed 'vertical drain' systems)**
Asphalt Pavement with Impervious Rubber Resilient Surface:	
A base mat of recycled rubber granules and an impervious wearing coat of colored rubber granules with polyurethane binder placed on full depth asphalt pavement. (Refer to Specification Section 02531)	Use on running track, pole vault and high jump areas with surface drainage.
Concrete Pavement:	
A 4" thick Portland cement concrete slab cast in place and reinforced with wire mesh over 6" aggregate base. (Refer to Specification Section 02521 or 03300)	Use exposed in terraces, entrances, and walkways. Use in play areas only to match existing adjacent play surface. Use as a base for asphalt topping when needed to match an existing condition. Pavement is not to be colored.
Concrete Pavement:	
A 5" thick Portland cement concrete slab cast in place and reinforced with wire mesh over 6" aggregate base. (Refer to Specification Section 02521 or 03300)	Use exposed for handball courts. Joints are to be outside the playing surface of each court.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Pavement Type	Applications
Reinforced Concrete Pavement:	
A 7" to 8" Portland cement concrete slab reinforced with heavy mesh equivalent to #4@12"over 6" aggregate base. (Refer to Specification Section 02521 or 03300)	Use in sidewalk **driveways**, roadways, parking areas, service areas, and container pads subject to heavy vehicular traffic (such as garbage truck and food service) and where heavy loading is expected. Pavement is not to be colored
Unit Pavers on Roof or Plaza Decks:	
Brick or asphalt pavers on asphalt setting bed (Refer to Specification Section 02515)	Pavers are not to be used on grade. **For** use in roof terraces, roof top play areas, and plaza decks of existing **built-up** roofs being redone **where a PRMA configuration with fluid applied membrane is not feasible**.
Unit Pavers on Roof or Plaza Decks:	
Concrete pavers on pedestal system	Use in plaza decks and roof top playgrounds of new schools **ad existing schools, where feasible**. **Depending on game activity, poured concrete roof top playground may need to be utilized.**
Concrete Pavement and Curbs outside of Street Line:	
Portland cement concrete pavement and curbs of thickness and reinforcement required by NYCDOT. (Refer to Specification Section 02513.)	For use in all concrete sidewalks, pavements, pedestrian ramps, concrete curbs, steel faced concrete curbs, drop curbs and tree pits. Follow NYCDOT requirements.
Asphalt Pavement outside of Street Line:	
Plant mix base course with fine surface mix topping course of thickness required by NYCDOT. (Refer to Specification Section 02513.)	For use in all street paving. Follow NYCDOT requirements.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Pavement Type	Applications
Permeable Interlocking Concrete Paver System for Permeable Paving Areas adjacent to Tree Pits in Sidewalks:	
Interlocking concrete pavers with open joints over compacted, open-graded, crushed angular stone bedding, leveling and base courses, washed and free of fines, and structural soil base. (Refer to Specification Section 02513: Sidewalk and Street Paving and 02900: Landscaping, and standard details) **A 1/4" thick x 6" height galvanized steel paver edging to provide a secure edge condition wherever the field of interlocking concrete pavers with open-joints abuts a non-rigid or unpaved condition, such as the edge of a tree pit.**	**For use in sidewalk permeable paving areas adjacent to and along the curb located in-between and adjacent to individual tree pits (see Design Requirement DR 2.5.1, Section B.1.a Planting Strips). Field of pavers is to be designed using a single color and a single paver type as the Basis of Design.**
Permeable Interlocking Concrete Paver System for Permeable Paving Areas without Tree Pits in Sidewalks:	
Interlocking concrete pavers with open joints over compacted, open-graded, crushed angular stone base, washed and free of fines. (Refer to Specification Section 02513: Sidewalk and Street Paving, and standard details)	**For use in sidewalk permeable paving areas adjacent to and along the curb where there are no tree pits (see Design Requirement DR 2.5.1, Section B.1.a Planting Strips). Field of pavers is to be designed using a single color and a single paver type as the Basis of Design.**

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

2.2 Barriers

2.2.1 Fences, Gates and Railings

Description/Design Approach:

Fences and gates are typically provided to delineate NYC Department of Education Property from other public and privately owned properties

Fence Type	Location
6’ or 8’ High Wrought Iron Picket Fence	• Use on property line fronting streets. • Use on property lines with adjacent properties when school property is landscaped. See Chain Link Fencing for Play Areas.
4’ High Wrought Iron Picket Fence	• Use within property between heavy pedestrian traffic areas and planted areas. (Fence is not required between play areas and perimeter planting strips). • May be used at early childhood playgrounds along street frontage.
15’ High Chain Link Fence	• Use on property line along adjacent properties and streets fronting play areas. • Use to segregate Jointly Operated Playground (JOP) areas from school play yard. For JOPs and Parks Department properties, coordinate with Parks Department for required fence heights.
8’ or 10’ high Chain Link Fence	• Use on property line along adjacent properties, and paved/planted areas. • Use to segregate parking, containerization areas from school play yard. Chain link fence height shall match Parks Department fence heights.
4’ high Chain Link Fence	• Use to segregate early childhood play areas from the remainder of the school play yard.
Chain link fence with 1” Mesh Fabric	• Use in areas of high risk of vandalism, on 8’, 10’ or **15**’ fences.
3’-6” or 4’ High “Bear Claw Fence”	• Use on top of low roofs in areas of high risk of vandalism.

Railings	Location
1½” diameter	• For all exterior pipe railings including barrier rails, free standing end pipe railing.
1¼”-1½” diameter	• Gripping surface for all exterior hand railing for steps and /or ramp against wall.

2.2 Barriers

2.2.2 Guards at Mechanical Equipment

Description/Design Approach:

Where mechanical equipment that requires service is located within 10’ (ten feet) of an open side of a walking surface and such open side is more than 30” above the grade below, 3’-6” high guards shall be provided per Section BC **1015.6** of the **2022** NYC Building Code. Such guard(s) shall extend not less than 30” beyond each end of equipment.

2.0 Site Construction

2.3 Site Equipment

2.3.1 Roll-on-Roll-off Compactor/Container

Description/Design Approach:

The Department of Sanitation (DSNY) requires the use of "Roll-on-Roll-off" compactor/containers (Ro-Ro's) for trash storage and removal in large New School or Addition projects with student capacity in excess of 3,000 students. In some cases this may not be feasible due to the size of the site. A Refuse and Recycling Storage Room inside the school building is still to be provided for storage of recyclables.

A. Basic Guidelines

The following are basic guidelines per DSNY to forecast the amount of refuse (trash) generated and the required refuse storage capacity for a particular school.

DSNY currently uses a basic formula of 5.6 lbs. of refuse/recycling materials per student on a weekly basis. Of the total refuse/recycling generated, recyclable material is approximately 35%. The Ro-Ro's required by DSNY hold approximately 30 cu. yd. of compacted trash, or the equivalent of 550 (55 gal.) bags of loose refuse weighing approximately 30,000, lbs.

Recycling is mandated for all schools. Recyclable materials such as paper/cardboard and metal/glass/plastics (and in some locations organics) will be stored in the school building until ready for DSNY curbside pick-up. A refuse and recycling storage room shall be provided in the building. Refer to DR 1.3.1.8.

B. Components

1. Roll-on Roll-off Compactor/Container

The Ro-Ro is a 30 cubic yard dumpster with an integral self-contained compactor unit, which is picked up, emptied and returned by DSNY trucks. The ROROC/C must be planned to be located and picked up/serviced from within school property lines.

When a Ro-Ro is required, the Design Manager and Design Project Manager, AEoR, Project Officer and DSNY Survey Officer will meet at the site with school officials (Principal & Custodian (if school has such designated personnel)). The number of Ro-Ro's will be determined by the Design Architect and DSNY, based on the size of student population, type of refuse and number of weekly pickups.

Ro-Ro location, electrical power requirements, adjustments for truck access, modifications to street curbs and sidewalks, fencing and gates, school pavements and retaining walls, etc. will be established by the AEoR to comply with SCA and DSNY Standards.

2. Site Requirements

   Dropped curbs at street entrances are to be provided. School fences and gates shall be wide enough and openings raised as needed to provide proper clearances for trucks. Chain link fences and chain link gates shall be provided to enclose the Ro-Ro location.

3. Truck Access

   Truck access must conform to DSNY requirements. Truck access requirements vary according to the width of the street and vicinity of existing obstructions such as utility poles, trees and hydrants. A narrow street (less than 75') would require a larger curb cut and a larger gate opening. The maximum curb cut being thirty feet (30') and the minimum curb cut being Fifteen feet (15'). In all instances, a minimum overhead clearance of fourteen feet six inches (14'–6") is necessary on the way to the service area. At the service area, as the Ro-Ro is pulled onto the flatbed, it is tilted up a maximum of twenty-five feet (25') above the ground. A concrete pad of 25' wide X 50' deep minimum must be provided at the container location.

   The container pads and driveway leading to the container shall be an 8" thick reinforced concrete slab placed on 6" of compacted stone base and shall have a minimum strength of 3,500 psi with a maximum water to cement ratio of 0.40.

Section 2 Site Construction

2.3 Site Equipment

2.3.2 Flag Poles

Description / Design Approach:

All school buildings shall have a flagpole. The flagpole may be installed at one of the following locations: (listed in order of preference.)

1. A vertical pole at street level in the vicinity of the main entrance to the building.
2. Diagonal pole on the face of the building above or adjacent to the main entrance to the building.
3. Vertical/Diagonal pole on a low setback roof or roof of the building such that it is visible from the street level when approaching the building.

The height of a vertical flagpole shall be determined based on the height of the building. The flagpole shall be a minimum of 20' high and a maximum of 60' high. Appropriate structural foundation shall be provided based on the manufacturer's recommendation for installation of the flagpole and the soil condition.

If the flagpole is attached to the exterior wall (outrigger wall mount), the flagpole may not be attached at an elevation lower than 15' above the ground or curb level. The flagpole may extend to 18' from the building but no farther than two feet from the curb line at street level.
For installation on the building face and installation on the roof, the flagpole shall be safely secured to structural members of the building.

Easy accessibility to lower or mount the flag shall be considered during the design process via either a window or access door.

Non illuminated flags can be displayed only from sunrise to sunset. Unless directed otherwise, the designer is to provide illumination for the flag to allow display after dark.
Illumination may be by pole top luminaire or a ground/wall mounted spot light.

For projects that have to comply with the NYC Green Schools Guide, the maximum initial illuminance value specified shall meet the requirements for the light pollution reduction credit.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

The size of the flag shall be proportional to the flagpole size and the wind velocity anticipated. The minimum being 3' X 5' and the maximum being 9' X 15'. Typical Pole Heights and Typical Flag Sizes are tabulated below:

Pole Height	Flag Size	Pole Height	Flag Size	Pole Height	Flag Size
60'	9' x 15'	40'	6' x 10'	25'	4' x 6'
50'	8' x 12'	35'	5' x 9'-6"	20'	3' x 5'
45'	6' x 12'	30'	5' x 8'		

Notes:

- Flag lengths for poles for typical vertical poles are typically 1/3 the length of the pole.
- Flag lengths for poles for typical vertical poles where high wind velocity is anticipated are typically 1/4 the length of the pole.
- Flag lengths for poles mounted 45-degrees to the building's vertical surface are typically 3/8 to 1/2 the length of the pole.

Consultation with the State Historic Preservation Office will be required, if an existing building has been determined to be eligible for listing on the National Register of Historic Places.

2.3 Site Equipment

2.3.3 Bicycle Facilities

Description/Design Approach:

A. To promote fitness and health benefits and to support students and/or staff who seek to commute to school by bike, bicycle parking facilities shall be provided for school buildings **in the building interior to address zoning mandated enclosed parking and on the outside of the building, if outdoor space is available, to meet Credit L2.2 of the 2019 GSG and for the existing building population, space permitting.** Bicycle racks shall be used to provide such parking spaces.

- Parking facilities shall be provided for students above third grade, part-time and full-time staff and transient users (i.e., visitors).

B. The number of occupants shall be calculated as follows, with the intent that this will satisfy Green Schools Guide requirements for bicycle parking, which is based on LEED for Schools **v4**:

1. Student population shall be based on **the following:**

   a. 'Adjusted' capacity listed in the Program of Requirements (POR) for typical classrooms above the third grade.

   b. D75 classrooms – calculate number based on percentage of typical classrooms above third grade in relation to total number of typical classrooms

2. Adult population shall be calculated as follows:

   a. Full-time staff

      1) 2 adults for each UPK, 3K, Pre-Kindergarten (PK), Kindergarten and D75 classroom.
      2) 1 adult for every instructional room other than UPK, 3K, PK, Kindergarten and D75 classroom.
      3) 5 adults for the lobby
      4) 1 adult for every 100 Square Feet in each office and parent's room
      5) A number of school aides equal to 2.5% of the unadjusted Capacity in the POR
      6) Kitchen staff equal to 1.5% of the unadjusted Capacity in the POR

   b. Part time staff: One Full-Time Equivalent (FTE) staff member for each 200 student occupants or part thereof.

   c. Visitors: one FTE visitor for every 500 student occupants or part thereof.

C. **Bicycle** Spaces to be provided

1. The Population for calculating the number of bicycle spaces required shall be computed as follows:

   a. New Building projects:

      - Total of student population **above 3rd grade**, full-time staff, and FTE for part time staff and visitors **of the new construction**.

   b. Additions filed as an Alt 1 addition and additions filed as a new building:

      - **For GSG required covered bike parking, total of student capacity above 3rd grade, full-time staff, FTE for part time staff and visitors based on the addition only.**

      - **For non-covered bike parking if space is available, in addition to GSG required covered bike parking the total of student capacity above 3rd, full-time staff, FTE for part-time staff and visitors based of the existing building. This shall be a rough estimate as a POR is not available for the existing building.**

2. The **total** number of bicycle parking spaces required to be provided is 5% of the Population**.**

3. Accessible cycle storage

   Where cycle storage is provided, accessible cycle storage shall be provided as per Section 1109.9.3 of the 2022 NYC Building Code.

   a. **Ten (**10) percent of cycle storage shall be for accessible cycles, minimum one.
   b. Minimum area for the accessible cycle storage shall be 86” long and 42” wide.
   c. Provide an accessible route to the accessible cycle storage area as per ICC/ANSI A117.1-2009.
   d. Provide turning space as per ICC/ANSI A117.1-2009 section 304.
   e. Provide clear floor space for a loading area on the long side of the accessible cycle storage as per ICC/ANSI A117.1-2009 section 305.

   While not mandatory, it is preferable for accessible cycle storage spaces to be located on the shortest accessible route to the school's accessible entrance.

D. Bicycle Parking Location

1. Zoning-required bicycle storage spaces located in the building per DR 1.3.1.12 **shall** be counted towards the required number of bicycle parking spaces **to meet GSG requirements**.

2. The **outdoor** bicycle racks shall be located on a paved area within the site and securely anchored to the pavement. A paved walkway, a minimum of 36” wide, shall be provided between the bicycle rack area and the sidewalk.

3. **Rack types**

   a. **Covered racks: Covered racks are required to meet the 2019 GSG requirements and the preferrable option is to have the racks sheltered by a building overhang or building canopy. Rack(s) with an integrated canopy shall be provided when locating the racks under the building overhang or canopy is not feasible.**

   b. **Non-covered racks: Non-covered racks for the existing building population shall be located on a paved area.**

4. Such bicycle racks shall not be located within fifteen feet of building entrances or exits.

E. Shower Facilities

A shower facility for bike users is required to meet the GSG Credit L2.2 requirement. The shower is to be accessed off the corridor. Refer to RPS 12-22. Provide additional shower(s) based on the GSG credit requirements if needed, to be accessed off the corridor.

2.4 Site Structures

2.4.1 Retaining Walls and Curbs

Description/Design Approach:

A. Retaining walls and curbs are to be typically cast-in-place concrete. The retaining walls shall be designed as per requirements of section BC **1807** of the **2022** NYC Building Code. Besides the wall thickness determined by design, walls and curbs are to have additional reinforcement at fence posts with the following minimum thickness to reduce number and width of cracks at the posts.

1. Walls and curbs supporting chain-link fences are to have a minimum of 5" concrete clear at fence sleeves each side, typically providing a width of 1'-0" for fences 10'-0" high or less and 1'-4" for fences over 10'-0".
2. Walls supporting iron fences 6-0" or less are to have a minimum width of 1'-0".

B. Provide ¾" expansion joints every 40'-0" maximum, with joints within 10 feet of corners. Expansion joint layout is to be shown on the plans. Place expansion joints a minimum of 2'-3" away from the fence posts.

C. Provide drainage mat and weep holes (or perforated drainpipe **connected** to a stone dry well at lot line condition) behind the wall to prevent saturation of the backfill.

D. If retaining wall is a large element of the site, provide special formliners to provide an architectural finish.

E. The use of modular block masonry retaining wall systems, typically comprised of a reinforced earth system and interlocking loose laid decorative blocks such as the "Versa-lok" system, is to be investigated for each project during design.

2.5 Landscaping

2.5.1 Trees, Shrubs, Ground Cover and Lawns

Description/Design Approach:

A. School Property

1. Careful consideration should be given when planning landscape arrangements and plant selections on school property. Shade, protection from the wind, and the ability to act as noise and visual buffers are just a few of the benefits provided by thoughtful landscape design leading to a less stressful, hence safer, school environment. The amount to be provided must be tempered with the need for paved play space.

2. Effective landscape design can create a noise and visual buffer that will help insulate interior spaces and outside play areas from nearby busy streets. Absorption of high decibel levels of noise before it reaches school is always a benefit.

3. For selection and planting of trees and other plantings, follow the NYC Department of Parks and Recreation "Street Tree Planting Standards for New York City" and "Native Species Planting Guide for New York City."

4. Trees shall be planted on school grounds whenever possible. However, such plantings shall not be within fifteen feet of entrances to the building or paved play areas. In addition, the tree's full-size growth shall be taken into account so that branches do not hit the building or provide access to windows or low roofs.

5. Provide trees, shrubs, and plants that are low maintenance, low water, and drought resistant. Plantings that reduce or eliminate the need for permanent irrigation **must** be selected. Temporary irrigation, if necessary, should be limited to up to one year after installation.

a. Trees

- On site trees: Minimum **2.5**" to **3.5**" caliper. Locate deciduous trees to block summer sun and allow winter solar gain. Plant coniferous trees to block prevailing winter winds. Locate trees to provide shelter from extreme weather or as a barrier from unwanted noise.

b. Plantings

- **Shrubs and ground cover selected from the Planting Guide**
- **Avoid ground cover in large areas**

c. Lawns

- Space trees 20-30 feet apart to discourage ball playing
- Avoid steep banks next to sidewalks and paved areas

B. Sidewalk

Street trees and planting strips shall be provided in accordance with sections 26-41 and 26-42 of the NYC zoning regulations. Planting strips shall be comprised of non-vegetated permeable paving system as permitted per section 26-421 of NYC zoning regulations.

1. For new buildings and additions/enlargements where the floor area on a zoning lot is increased by 20% or more:

- Street trees are required in all **residential** zoning districts
  and
- Street trees and planting strips are required in residential districts R1-R5 as per Section 23-04 of NYC zoning regulations.

a. Planting Strips

1) Planting strips shall be provided adjacent to and along the entire length of the curb of the street adjacent to the zoning lot. Planting strip shall be as wide as feasible and may typically be 5' wide (to the first score line from the curb). However, a minimum of 5' wide paved sidewalk is required along the length of the street segments along which the building fronts. For wider sidewalks, planting strip width shall be approximately 1/3 of the total sidewalk width.

2) Planting strips shall be no less than 3' wide except where necessary for compliance with the Americans with Disabilities Act, in which case the paved sidewalk shall be 5' wide and the non-vegetated permeable strip may be less than 3' wide. However, a planting strip smaller than 6" width is not required.

3) The non-vegetated permeable paving system provided per the SCA design standards does not require a 'Distinctive Sidewalk' review and a Sidewalk Curb and Roadway Application (SCARA) is not required. Designers are required to designate the Plan Type as 'A' on the Builders Pavement Plan.

b. Street Trees

1) One street tree, newly planted or pre-existing, shall be provided for every 25 feet of street frontage of the zoning lot. Trees shall be planted at approximately equal intervals along the entire length of the curb of the street adjacent to the zoning lot. Street trees shall be planted in the planting strips mentioned above if planting strips are required to be provided.

- Street trees: Minimum 2.5" to 3.5" caliper unless otherwise authorized by Department of Parks and recreation (DPR).
- Review New York City Parks and Recreation recommended tree list.
- Tree pits shall typically be 50 SF in area (5' wide x10' long) but can be smaller (4'x10') if sidewalk is narrow.
- The following DPR guidelines shall be followed for tree pit and tree location:
  20 to 30 feet between center line of trees
  25 feet center of tree to light poles
  30 feet from tree to stop signs
  6 feet from tree to other traffic signs
  5 feet from tree to parking meters

5 feet from edge of pit to hydrants
2 feet from edge of pit to utilities
7 feet from tree driveway or curb cut

2) Where street tree planting to meet the zoning requirement is infeasible on the site because of the existing infrastructures such as bus stops, hydrants, traffic signs etc. or for historic districts if determined by Landmarks preservation commission, additional street trees are to be provided off site at alternative location(s) as selected by DPR.

2. For existing buildings where work includes sidewalk improvements and when the replacement work is equal to or greater than 50% of the total linear footage (parallel to curb) or 50% of the total sidewalk area along a street frontage is disturbed and is to be replaced:

   a. Planting strips in R1-R5 districts

      - Provide a planting strip with non-vegetated permeable paving system.0

   b. Street Trees

      1) In all Districts

         - Existing trees shall remain and provide new street trees as described in subparagraph 1.b.

      2) R1-R5 Districts

         - Existing trees shall remain and shall be incorporated in the new planting strip(s). For sidewalks without street trees, new street trees as described in subparagraph 1.b shall be provided within the new planting strips.

3.1 Design

3.1.1 Guidelines for New Foundation Design - High Water Table or Surface/Perched Water

Description/Design Approach:

A. As per Section BC **1805** of the **2022**4 NYC Building Code, foundations are to be designed to take into account water conditions at the subject site. Such conditions may arise due to a high water table or from inundation from a perched or surface water condition. In order to ensure that any such conditions are adequately addressed, a dedicated meeting is to be held by the design team and the SCA structural managers on every capacity project to discuss the geotechnical findings and the site data to determine the appropriate level of water resistant design.

B. To protect the building from water infiltration due to high water table, including potential current and future fluctuations in the water table and to minimize hydrostatic pressure on the foundation, the building is to be raised above the design groundwater level unless there is no other way to facilitate the building on the site. The design groundwater elevation is to include an additional 5'-0" above the highest water table reading taken from the borings.

C. Where the foundation may be subject to a perched water or surface water condition, detailing of structure shall be such to prevent intrusion of water into building. This may entail detailing the project to include full waterproofing, or upgrading the environmental vapor barrier system typically installed on new capacity projects to a more water resistant system.

D. Where design ground water levels will be above cellar/basement slabs, the architect/engineer shall prepare cost estimates for the following foundation alternatives. Alternatives should also look at the construction methods that will be employed to ensure their feasibility:

   1. Make basement slab thick enough to counteract the uplift pressure.

   2. Design reinforced concrete slabs that are tied into the footings, walls and columns, such that the overall weight of the structure is utilized in resisting the uplift forces, or employ the use of tie downs, if feasible.

E. Structures are to be designed for hydrostatic pressure and waterproofed for a design water table elevation five feet above the highest level given on the borings, as a minimum. The intent to account for the effects of normal cyclical rising and falling of the water table as well as long term rising of the water table. The geotechnical engineer is to study the historic data for the area, make an analysis and determine if the design ground water elevation needs to be greater than five feet above the highest actual shown on the borings.

   Refer to DR 3.2.2 for guidelines for Foundation and Slab design.

F. The preferred method of waterproofing is a positive-side waterproofing applied to the outside surfaces of foundation walls and slabs. Utilities are to be designed such that they run within the building space (preferred) or are encased and placed above the waterproofing to avoid penetrations in the waterproofing to the greatest extent possible. Provide waterstop at all joints.

G. Where dewatering is likely to be required during construction activities for the foundation system, the geotechnical engineer shall determine the estimated pumping rates required. The I&EH Division is to be consulted to determine if the ground water is safe to be disposed of in the sewers

and if there is potential of bringing in contaminants to the site based on the estimated pumping rate. The capacity of the local sewers shall be evaluated to determine if the dewatering rate and disposal falls within DEP allowable range for temporary dewatering and the possible need for off-site disposal. The result of these studies is to be discussed with Construction Management and I&EH to determine what is to be included in the bid documents, which will typically involve incorporating items in Section 02200.

3.1 Design

3.1.2 Design Live Loads

Description/Design Approach:

A. Live loads used in design shall be as per the **2022** NYC Building Code required by Table BC 1607.1 (minimum), except as modified by the following table. Due to the possibility of change in the use of various areas in a school building and the increase of the student population in the future, live-load reduction as allowed by the Building Code is not to be used, except as approved by the Authority for unusual cases.

B. Structural elements shall be designed to support the uniformly distributed live load or the concentrated load, whichever produces the greater load effect.

Use Area	Design Live Load LL (PSF)
Kitchen Areas*	150****
Mechanical Spaces**	75
Roofs with water retention***	45 or $R=5.2(d_s+d_h)$... [see EQ. 16-**43**] whichever is greater. Ensure Ponding Instability is addressed as per Section BC 1611.2
Toilet Rooms	60****

The uniform distributed design live load for each floor and the equivalent uniform partition loads or actual partition load shall be tabulated and shown on the drawings.

Note that the live load in school corridors above the first floor is 80 psf.

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* The indicated live load includes most equipment loads. If a piece of equipment is in excess of this, such as the walk-in freezer, the design load shall be that of the equipment for that area. This loading shall be mapped on the floor plan.

** If a piece of equipment is in excess of this indicated live load, the design load shall be that of the equipment for that area. This loading shall be mapped on the floor plan. Note that condensing boilers vary in weight substantially depending on manufacturer and a 150 psf LL is recommended to be used to accommodate the equipment. Design the entire room for that load if it is a smaller dedicated room rather than the boilers being installed in larger mechanical room with many other lighter equipment.

*** This live load is only to be used for roofs subject to roof detention, and may be sufficient to account for some equipment loads supported on enclosed curbs weighing less than the live load. If a piece of equipment is in excess of this indicated live load, the design load shall be that of the equipment for that area.

**** ASCE Standard 7-**16**, Table **C4.3-1 of the commentary**

C. At the roof level where rooftop mounted photovoltaic (PV) solar panels are to be installed, as per Section BC 1607.13.5.1 of the 2022 NYC Building Code the roof structure shall be designed for the greater load effects from either (1) the installed PV system case, or (2) the case without the installed PV system. In the installed PV system case, the exception to item 1 of Section BC 1607.13.5.1 allows for the removal of uniform or concentrated roof live loads where PV systems are installed and the panels are less than 24 inches clear from the roof surface.

Note: As indicated in Section BC 1607.13.5.4, roof structures that provide support for ballasted PV systems shall be checked in accordance with Section BC 1604.3.6 for deflections and with Section BC 1611 for ponding. Ballasted PV systems introduce sustained dead loads that will produce long-term deflections in concrete slabs and must be considered in design of such slabs.

3.1 Design

3.1.3 Seismic Design Criteria

Description/Design Approach:

A. As per Section BC 1613 of the **2022** NYC Building Code, new school buildings and additions shall be designed and constructed to resist the effect of earthquake motions as described in ASCE 7-**16**, excluding Chapter 14 and Appendix 11A.

B. As per Table BC 1604.5, new school buildings and additions are assigned to /Risk Category III, with a seismic importance factor I = 1.25 in accordance with Table 1.5-2 of ASCE 7-16 as required by Section BC 1604.5.2. The site class shall be determined in accordance with Section BC 1613.3.4.1, Table BC 1613.3.4.1. A site-specific evaluation in accordance with ASCE 7-16 and Section BC 1815 shall be used for structures on sites classified as Site Class F, in accordance with Section BC 1613.3.4.1.1.

C. Each structure shall be assigned to a Seismic Design Category in accordance with Section BC **1613.3.5**.

D. All structures shall be separated from adjacent structures as prescribed in Section BC **1613.4**. Structural separation refers to the property line, not to an adjacent property. When a structure adjoins a property line, that structure shall be set back from the property line by at least 1 inch for each 50 feet of height. If the adjoining structure is an unreinforced masonry building, the gap is to be filled with material having a compressive strength of between 25 to 100 psi in accordance with Section BC 1613.4.1.

E. Existing structures and alterations to existing structures need to comply with the provisions of seismic design only when required by Appendix 11B of ASCE 7-**16** and NYCDOB Technical Policy and Procedure Notice (TPPN) 4/99. Section 11B.2 of ASCE 7-**16** indicates any addition that is structurally independent from an existing structure shall be designed and constructed in accordance with the seismic requirements for new structures. As per Section 11B.3 of ASCE 7-**16**, when an addition is not structurally independent from an existing structure, it shall be designed and constructed such that the entire structure conforms to the seismic force resistance requirements for new structures unless all three of the following conditions are complied with:

- The addition complies with the requirements for new structures.
- The addition does not increase the seismic forces in any structural element of the existing structure by more than 10% unless the capacity of the element subject to the increased forces is still in compliance with these provisions.
- The addition does not decrease the seismic resistance of any structural element of the existing structure unless the reduced resistance is equal to or greater than that required for new structures.

F. Section 11B.5 requires that when a change of use results in a structure being reclassified to a higher Risk Category, the structure shall comply with the seismic requirements for new construction. Refer to section 11B.5 for exceptions. This is for structures designed **starting with** the 2008 NYC Building Code and those structures required to be seismically designed under Local Law 17/1995 of the 1968 Building Code. Per Section BC 1601.2.3, the determination as to

whether seismic requirements apply to an alteration shall be made in accordance with the 1968 Building Code and interpretations by the Department of Buildings relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including for the bracing of architectural, mechanical, plumbing, fuel gas, fire suppression and electrical systems and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** code or Reference Standard RS 9-6 of the 1968 code.

G. The following information related to seismic loads shall be shown on the drawings **per Section BC1603.1.6**:

1. Risk category
2. Seismic importance factor
3. Mapped spectral response acceleration **parameters**, S_S and S_1
4. Site class
5. **Design s**pectral response accelerations **parameters,** S_{DS} and S_{D1}
6. Seismic design category
7. Basic seismic force-resisting system**(s)**
8. Design base shear**(s)**
9. Seismic response coefficient**(s)**, C_S
10. Response modification **coefficient(s),** R
11. Analysis procedure used

3.1 Design

3.1.4 Vibration Criteria for Floor Construction

Description/Design Approach:

A. A vibration analysis is to be performed to determine the sensitivity of the floor construction to motion. The design criteria for vibration shall be to limit the motion to within acceptable standards set in the AISC Steel Design Guide Series #11. This study must show compliance with all criteria for controlling annoying floor movement in all spaces in the building that are affected by walking excitation (such as classrooms and offices adjacent to a corridor) or rhythmic excitation as typically occurs in a gymnasium and/or an auditorium stage area. The analysis must also verify that there is no potential for a resonance condition.

B. In compliance with Design Requirement 3.3.1, a vibration analysis is required to be submitted along with each proposed framing layout indicating their adequacy against all walking and/or rhythmic excitations.

C. Mechanical equipment that can produce objectionable vibrations in any portion of structure utilized by students and staff shall be isolated to minimize the transmission of such vibrations to the structure in accordance with ASCE 7-**16**, Section C.1.3 **of the commentary**. Also, use the service of an acoustical consultant to investigate and make recommendation for induced vibrations/noise on the structure from exterior sources such as trains.

3.1 Design

3.1.5 Miscellaneous Structural Drawing Requirements

Description/Design Approach:

A. The following items shall be shown, coordinated with or taken into account on the Architectural Drawings as well as other trades:

1. Steel Attachments/Splices: Location and depth of walls and chases at steel cross bracing and columns needs to account for the splices/attachments and their bolt lengths with associated fireproofing, as it results in a substantially larger depth than the member measurement itself and is many times not accounted for in chase depths and needs to be coordinated with the Architect.

3.2 Foundations

3.2.1 Waterproofing Systems for Foundations

Description/Design Approach:

1. The preferred method of waterproofing for buildings subject to hydrostatic pressure is by positive-side application, consisting of a sheet membrane waterproofing system. The membrane shall extend up the entire height of the wall to just below the grade. Provide a mud-mat working surface to facilitate installation of the waterproofing at horizontal applications. Refer to Specification Section 07115 for materials. As the system must typically also act as an environmental barrier, the waterproofing details and specifications are to be given to the I&EH department to review to verify the system design is also sufficient to act as an environmental barrier.

2. All foundation construction joints (walls, slabs, etc) regardless of water conditions are to have a gasket type waterstop as a minimum and these shall be shown on the drawings. For habitable spaces (those occupied by other than maintenance personnel) subject to hydrostatic pressure, provide acrylate ester injectible hose-type waterstop system for all construction joints that are within the water table.

3. Where the building is situated such that the main portion of the building is not in the potential water table zone but deeper pits (elevator, mechanical, etc) are, a combination waterproofing and environmental barrier system by the environmental barrier manufacturer may be accepted in lieu of a full membrane waterproofing. All tie-in and overlaps between materials must be verified as compatible by the manufacturers of those materials.

4. Depending on the potential for infiltration from perched or surface water, the design team and A&E staff shall determine if waterproofing membranes or upgraded environmental barrier systems are to be used. A meeting is to be held by the 60% Construction Document specifically to review the geotechnical report and potential issues.

5. Surfaces subject to constant water, such as sump pits, are to have a waterproofing application consisting of a “crystalline” type waterproofing on the interior side. This is in addition to the positive side application required for high water table.

3.2 Foundations

3.2.2 Guidelines for Foundation and Slab Design

Description/Design Approach:

A. The building superstructure is to bear on cast-in-place concrete foundations, either footings or pile caps, with concrete walls or grade beams supporting exterior walls and retaining earth. The foundation design, including the method of support for utilities, is to be based on the recommendations of a geotechnical engineer. A geotechnical report is required to be filed and the foundation designed as per the recommendations in such report as per Section BC 1803.6.1 of the 2022 NYC Building Code.

B. Exterior foundation wall and slab protection treatment is based on the existing soil/water conditions and SCA technical requirements. For all conditions, provide a drainage panel on the exterior of all walls to the bottom of footing to reduce build-up of hydrostatic pressure from saturated soils. Where not subject to hydrostatic pressure, provide perforated pipe at the footing level connected to the storm system (through a readily accessible silt and sand interceptor and subject to DEP approval as per Section PC 1111 of the 2022 NYC Plumbing Code) or a drywell system by gravity if the existing soil at the footing level is of low permeability. Provide membrane systems as follows:

1. High Water Table/Perched Water Condition: Where the building is subject to hydrostatic head, follow DR 3.1.1, Guidelines for New Foundation Design - High Water Table or Surface/Perched Water. If the geotechnical investigation reveals the potential for perched water, the condition must be carefully studied and the design of the structure may need to be treated as a high water table condition, which could also impact the SSDS system. If there is potential for transient water to be on the site, discuss with A&E the need to upgrade the environmental barrier to a thicker placement or potentially a membrane waterproofing installation. Refer to DR 3.1.1.

2. SSDS System: For projects requiring a sub-slab depressurization system with an environmental barrier on the walls and slabs and waterproofing is not needed, the IEH department will recommend the membrane system to be utilized and provide the design documents. Careful coordination is required if both an environmental and a separate waterproof membrane are to be installed at different sections of the foundation system; in such cases the interface of the two membranes must be approved by the material manufacturers to avoid a design where two adjoining materials are incompatible. Such interfaces are to be avoided. Provide gasket type waterstops at all joints in slab and walls.

3. All other cases: Where there is no requirement for an environmental membrane on the foundation wall, utilize a sheet membrane waterproofing installed to below the slab level, typically to 1 foot below the top of footing. Regardless of water level, provide gasket type waterstops at all joints in the slabs and walls. Refer to Specification Section 07115 for materials

C. Refer to Section BC 1809 for shallow foundation and Section BC 1810 for deep foundation design and construction requirements. Foundation walls shall be designed to support the weight of the full hydrostatic pressure of un-drained backfill unless a drainage system is installed in accordance with Sections BC 1805.4.2 and 1805.4.3. Follow Section BC 1809.6 for requirements for footings and foundations of structures assigned to Seismic Design Category C. Where a structure utilizing

deep foundations is assigned to Seismic Design Category C in accordance with Section BC 1613, individual pile caps or piles shall be interconnected by ties. Refer to Section BC 1810.9.1 for seismic ties design requirements.

D. For design of the foundation walls, perform a comparison of the cost effectiveness of a deep-grade beam versus walls with continuous footings. Since the footings should rest on a suitable soil, some of the wall footings may become very deep requiring additional excavation. In this case, it may be more economical if the walls are supported by piers at the location of column footings or pile caps.

E. The decision to support slabs resting on grade structurally or to have the slab supported solely by the soil is to be based on the geotechnical report. Slabs on grade are to be designed, with the following minimum requirements:

1. Non-structurally supported slab-on-grade

   a. Basement/Cellar slabs are to be five inches minimum with a minimum reinforcement of 6x6-W2.9xW2.9 welded wire fabric, placed 1" from the surface. The reinforcement and thickness is to be increased if required by design considerations. The slab shall bear on a vapor barrier and a minimum 6" crushed stone base, or the environmental barrier over the open graded aggregate where such system is utilized per IEH requirements **(typical of most new buildings)**. Provide additional reinforcement at reentrant corners and joints as required to minimize cracking. Thicken slab at all masonry partitions. Indicate any required control joints on the Drawings.

   b. Pipe & Duct and Crawl space slabs are to be 3½" minimum with a minimum of 6x6-W2.9xW2.9 welded wire fabric. The slab shall bear on a vapor retarder and 4" crushed stone base. Provide additional reinforcement at reentrant corners and joints as required to minimize cracking. Indicate any required control joints on the Drawings.

2. Structurally supported slab-on-grade

   Slabs are to be of thickness and reinforcement as required by design considerations, with the minimum reinforcement following recommendations of ACI 318. Bottom reinforcement is to have 2" clear minimum from grade and top reinforcement 1" clear from top of slab. The slab shall bear on a vapor barrier and 6" minimum of crushed stone base, or the environmental barrier over the open graded aggregate where such system is utilized per IEH requirements. Provide additional reinforcement at reentrant corners as required to minimize cracking.

F. Coordinate with the project architect for foundation insulation to be installed below slabs placed on grade. Refer to DR 1.3.2.2.

G. When provided for the project, Foundation Drawings shall refer to the Environmental Drawings provided by the I&EH department that clearly details the passive/active vapor barrier/venting system on the Drawings. The foundation sections shall be coordinated such that the design facilitates the installation of the systems.

H. If the areas that require backfilling are narrow and will be difficult to provide proper compaction, specify backfilling with crushed stone and proofrolling.

I. Obtain utility company design requirements for vaults after providing the utility company with all required geotechnical data so the design can be incorporated into the Contract Documents.

J. The designer and geotechnical engineer are to investigate the protection of adjacent properties and structures, as well as those of the school property, to ensure that a feasible scheme is possible. The Geotechnical Engineer is required to create an Evaluation Report assessing the condition of the existing buildings and subsurface conditions of the adjoin properties and file such report as per Section BC 1817.3, which is to be included with the Contract set. Design of the Method of Support (MOS) and who is to provide such design shall be determined during the early part of the design.

1. If the Contractor is to be responsible for the final design of the underpinning/shoring/bracing scheme and for filing such as is indicated in Section 02200, a schematic scheme is to be indicated on the Drawings with adequate notes to ensure the Contractor is aware of all issues to be considered. As an example, if due to site restrictions on adjoining properties, the adjoining property cannot be excavated or accessed; or shoring can be only installed on the lot line, the Contract Documents must be clear to show the foundation is integrated into the shoring scheme. Also, schematic underpinning sections should state bracing is required if the height of such underpinning required by the project would be impractical without it and fail. The Contractor's engineer is responsible to review the Evaluation Report and if they believe it is not sufficient or want to design a different way, they are required to submit a new Evaluation Report, with back-up construction documents, as per Section BC 1817.5.3.

2. If the SCA's engineer is to be responsible for design and filing, the full set of documents based on the recommendations in the Evaluation Report are to be included with the Contract set and Section 02200 edited accordingly. If the work involves underpinning or alternate means of support, the SCA's Engineer is to develop the monitoring plan per Section BC 1817.9.

K. Since underpinning of gas utility lines will not be accepted/permitted by utility companies, it is required to investigate and coordinate excavations to be a minimum of 10' away from gas lines or arrangements must be made for their relocation.

3.2 Foundations

3.2.3 Concrete Reinforcement

Description/Design Approach:

Reinforcing bars are to conform to the requirements of ASTM A615, Grade 60, unless higher strength bars are needed by design considerations.

Wire mesh shall conform to ASTM A185.

Reinforcement to be welded shall conform to the requirements of ASTM A706.

Reinforcement for concrete exposed to the elements, such as exterior framed slabs, exposed face of retaining walls, **parapet concrete back up,** curbs, etc. are to be epoxy coated or galvanized.

3.3 Superstructure

3.3.1 Economic Analysis of Structural Framing Systems

Description/Design Approach:

A. **While structural steel-framed superstructures have been the typical system used in the SCA, the use of a concrete-framed superstructure is being used where it is an advantage to the project. The "Structural System Selection Matrix" will typically determine which system is suitable and the biggest advantage in terms of cost and constructability for a particular site**

B. After the determination of the superstructure design from the Structural System Selection Matrix, as part of the schematic design submittal the Structural Engineer shall propose and submit alternative framing layouts for a typical bay as well as for a long span bay, with discussion as to which layout is the most economical. The vibration analysis of each layout should also be submitted indicating the adequacy against walking and/or rhythmic excitations. In addition, the proposed location of the lateral load-resisting frames is to be indicated on the plans for each scheme.

C. As part of the **Design Development** submission, provide examination of alternative methods for supporting of exterior masonry, **if selected as part of the Exterior Envelope Selection matrix.** This is to avoid the need for diagonal struts to brace the wall/lintel assembly.

3.3 Superstructure

3.3.2 Structural Floor and Framing Systems

Description/Design Approach:

A. The selection of the superstructure framing systems (structural steel or reinforced concrete) will typically be determined from the use of the Structural System Selection Matrix. Refer to DR 3.3.1.

1. Structural Steel Framing

a. Depending on compatibility with architectural and engineering requirements including vibration, the structural floor system shall be a 6 1/4-inch composite slab consisting of 3" galvanized metal decking with 3 1/4" lightweight structural concrete topping to be supported on composite structural steel beams framing into steel columns. The designer shall include in the design an additional 1.5" of concrete to account for beam and deck deflections in both the steel design and design of the deck. Designer should specify the grade (minimum yield strength) of the deck and modify the specifications and drawings accordingly. Gage of metal deck shall be sufficient to sustain the wet-concrete weight and construction loads without shoring. Where small depressions are required, reducing the deck to 2" in depth should be investigated in lieu of depressing the entire slab-deck assembly. If the spacing of the filler beams allows and/or the height of the building can be reduced, the use of 2" in lieu of 3" metal deck should be considered. In compliance with Design Requirement 3.3.1, a vibration analysis is required to be submitted for each proposed steel framing layout indicating their adequacy against walking and/or rhythmic excitations.

b. The design shall also take into account the need to meet acoustic requirements, which may entail the use of thicker slabs or double slab systems. Where appropriate, the use of acoustic deck may be researched and utilized.

c. The framing is to be designed such as to reduce the steel piece count and tonnage to the greatest extent possible while complying with serviceability and vibration requirements. The spacing of the filler beams should be within the 10'± range in order to utilize a three-span condition for the deck. Where the building configuration is such that the steel cannot be reasonably spaced to that criteria, the deck may span for 12'± provided the deflection on a two-span condition does not exceed the manufacturer's recommended limits. The proposed layout shall be discussed with the A&E structural unit and DCIM Structural Reviewer, with back-up information or calculations to indicate adequacy for review and acceptance. Refer to DR 3.3.1 for requirements for alternate framing schemes. Where the metal-deck layout requires the use of a single-span, shoring should be indicated if the use of a thicker deck would have adverse cost effect or would negatively affect the progress of the construction work.

d. Obtain size and location of miscellaneous steel members such as elevator hoist beams from other disciplines and provide on the drawings. Coordinate the location and size of all openings with each trade.

e. Structural-steel members shall be Grade 50 steel conforming to ASTM A992. The use of open web joists for floor framing is not permitted.

f. The Superstructure Notes from the Standard Details specify that bolted connections are to be "Slip Critical". Connections that are not required to be slip critical shall be specifically shown on the plans as "bearing type connection".

g. The camber to be indicated on the drawings is to be 2/3 of the pre-composite dead load deflection to account for the inherent stiffness of the structural connections. The camber for members between columns or between columns and girders may be somewhat less due to greater resistance to movement by these more rigid elements. As per AISC recommendation, cambers less than ¾" are not to be specified; thus, a larger size beam might be more economical to control the deflection.

h. While columns, beams and other structural members customarily shall have sprayed fireproofing, the standard metal deck system is to meet the required fire-rating without added fire protection to the underside of the metal deck. Areas required to have a higher fire-resistance rating or areas where the thickness of the slab is reduced due to a floor depression (thus reducing the fire-resistance rating of the assembly) may have sprayed fireproofing applied to the deck. Only cementitious sprayed fireproofing shall be used to provide fireproofing of steel beams, columns, and deck. For specific areas exposed to public view where the regular cementitious sprayed fireproofing is not appropriate, a decorative intumescent fire-resistive coating is to be used.

i. The structural steel floor framing systems shall be capable of sustaining the superimposed loads with a maximum deflection of L/360. Structural systems that directly or indirectly brace or support masonry shall be capable of sustaining the masonry cladding (and other masonry exposed to view) and live loads with a maximum deflection of L/600.

2. Reinforced Concrete Framing

a. Reinforced concrete slabs shall be either one-way or two-way framed systems. One-way framed system provide more flexibility when laying out openings. Refer to DR 3.3.1 for requirements for alternate framing schemes, as an analysis to determine which method works the most economical for the design of the building is required.

b. The design shall also take into account the need to meet acoustic requirements, which may entail the use of a double slab systems.

c. The structural floor framing systems shall be capable of sustaining the superimposed loads with a maximum deflection of L/480, taking into account the long-term and creep deflection of concrete. Structural systems that directly or indirectly brace or support masonry shall be capable of sustaining the masonry cladding (and other masonry exposed to view) and live loads with a maximum deflection of L/600.

B. Buildings and other structures, including all components and cladding, shall be designed and constructed to resist the effects of wind in accordance with requirements of Section BC 1609 of the **2022** NYC Building Code. Also, every structure and portion thereof shall be designed and constructed to resist the effects of earthquake motions as required in Section BC 1613. Braced frames shall be provided for seismic and wind resistance; locations shall be coordinated with the architecture of the building. The maximum floor-to-floor drift due to wind loads is limited to 1/400 of the floor-to-floor height. The drift due to seismic loads shall be as per the building code. Structural lateral and vertical force resisting systems utilized for the project shall be indicated on construction documents, with clear indication of the design load **that** governs.

C. The following code requirements shall be evaluated and implemented where applicable:

1. Structures carrying live load that induce impact shall include allowance in accordance with Section BC **1607.10**.
2. Refer to Chapter C2 of ASCE 7-**16** for description of self-straining forces to be considered in structural design, which shall be included in load combinations required by Section BC 1605.
3. All structures shall be designed to satisfy Structural Integrity Requirements of Sections BC 1**615** through 1617.
4. Structural columns that are directly exposed to vehicular traffic shall be designed for vehicular impact based on requirements of the Section BC **1616.4**.
5. In buildings with gas piping operating at pressures in excess of 15 psi, all key elements and their connections shall be designed to resist a potential gas explosion, in accordance with requirements of the Section BC **1616.5**.

D. Refer to Sections BC 1603.1.1 through BC 1603.1.**10** for design loads and other information related to structural design, which shall be indicated on the construction documents.

3.3 Superstructure

3.3.3 Structural Framing Systems for Roof Areas

Description/Design Approach:

A. The structural framing of the roof deck will typically match that of the system selected for the floor framing. However, for spaces with long spans, a steel-framed roof will many times be utilized if feasible regardless of the remaining superstructure composition.

1. Structural Steel Roof Framing

a. Depending on compatibility with architectural and engineering requirements, the structural roof system shall be a minimum $6^1/_4$-inch composite slab consisting of 3" galvanized metal decking with $3^1/_4$" lightweight structural concrete topping supported on composite structural steel beams framing into steel columns. In addition to the structural slab and any topping slab, the designer shall include in the design an additional 1.5" of concrete to account for beam and deck deflections in both the steel design and design of the deck. Designer should specify the grade (minimum yield strength) of the deck and modify the specifications and drawings accordingly. Gage of metal deck shall be sufficient to sustain the wet-concrete weight and construction loads without shoring. If the spacing of the filler beams allows and/or the height of the building can be reduced, the use of 2" in lieu of 3" metal deck should be considered.

b. The design shall take into account the need to meet acoustic requirements, which may entail the use of thicker slabs or double slab systems. Where appropriate, the use of acoustic deck may be researched and utilized.

c. The framing is to be designed such as to reduce the steel piece count and tonnage to the greatest extent possible while complying with all serviceability requirements. The spacing of the filler beams should be within the 10'± range in order to utilize a three-span condition for the deck. Where the building configuration is such that he steel cannot be reasonably spaced to that criteria, the deck may span for 12'± provided the deflection on a two-span condition does not exceed the manufacturer's recommended limits. The proposed layout shall be discussed with the A&E structural unit, with back-up information or calculations to indicate adequacy for review and acceptance. Refer to DR 3.3.1 for requirements for alternate framing schemes. Where the metal-deck layout requires the use of a single-span, shoring should be indicated if the use of a thicker deck would have adverse cost effect or would negatively affect the progress of the construction work.

d. The camber to be indicated on the drawings is to be 2/3 of the pre-composite dead load deflection to account for the inherent stiffness of the structural connections. The camber for members between columns or between columns and girders is to be somewhat less due to greater resistance to movement by these more rigid elements. As per AISC recommendation, cambers less than 3/4" are not to be specified; thus, a larger size beam might be more economical to control the deflection.

e. Steel roof deck without concrete is acceptable for barrel roof type construction. Ensure that adequate details for attaching hung ceilings are provided.

f. While columns, beams and other structural members customarily shall have sprayed fireproofing, the standard metal deck system is to meet the required fire classification rating without added fire protection to the underside of the metal deck. Areas with higher fire-resistance rating may have sprayed fireproofing applied to the deck. Only cementitious fireproofing shall be used to provide fireproofing of steel beams, columns, and deck. For specific areas exposed to public view where the regular cementitious sprayed fireproofing is not appropriate, a decorative intumescent fire-resistive coating is to be used.

g. Structural steel members shall be Grade 50 steel conforming to ASTM A992. The use of open web joists is permitted for roofs not requiring a fire-resistance rating.

h. The roof framing systems shall be capable of sustaining the superimposed loads with a maximum deflection of L/240. Structural systems that directly or indirectly brace or support masonry cladding (and other masonry exposed to view) shall be capable of sustaining the masonry and live loads with a maximum deflection of L/600.

2. Reinforced Concrete Framing

a. Reinforced concrete slabs for the roof framing shall be either one-way or two-way framed systems and will match what was done for the floor framing.

b. The design shall take into account the need to meet acoustic requirements, which may entail the use of double slab systems.

c. For roof framing of long spans over PA spaces, a structural steel and metal deck roof system is to be used.

d. The roof framing systems shall be capable of sustaining the superimposed loads with a maximum deflection of L/240, taking into account the long-term and creep deflection of concrete. Structural systems that directly or indirectly brace or support masonry cladding (and other masonry exposed to view) shall be capable of sustaining the masonry and live loads with a maximum deflection of L/600.

B. Pitching of the roof is to be achieved by providing two pours, with the structural deck placed level and a second pour of the same structural concrete providing the required pitch. Details shall indicate the two pours and account for a minimum thickness of the roof fill required at roof drains (typically 1.5” for concrete). The plans shall show the intended finished concrete elevations at low and high spots to provide the required pitch to drain. The drawings shall indicate the use of concrete repair mortar to provide crickets where required to get the water flow around obstructions.

C. Refer to Sections BC **1607.13**, BC 1608 and BC **1609.5** of the **2022** NYC Building Code **and Chapter 7 of ASCE 7-16** for roof loads design requirements.

3.3 Superstructure

3.3.4 Exterior Masonry Support Systems

Description/Design Approach:

A. Provide relieving angles at each story height. For single multi-story spaces such as gymnasiums, supports may be provided from foundation wall up to 30 feet maximum. The design and detailing for these multiple story conditions is to be engineered to ensure masonry will not crack.

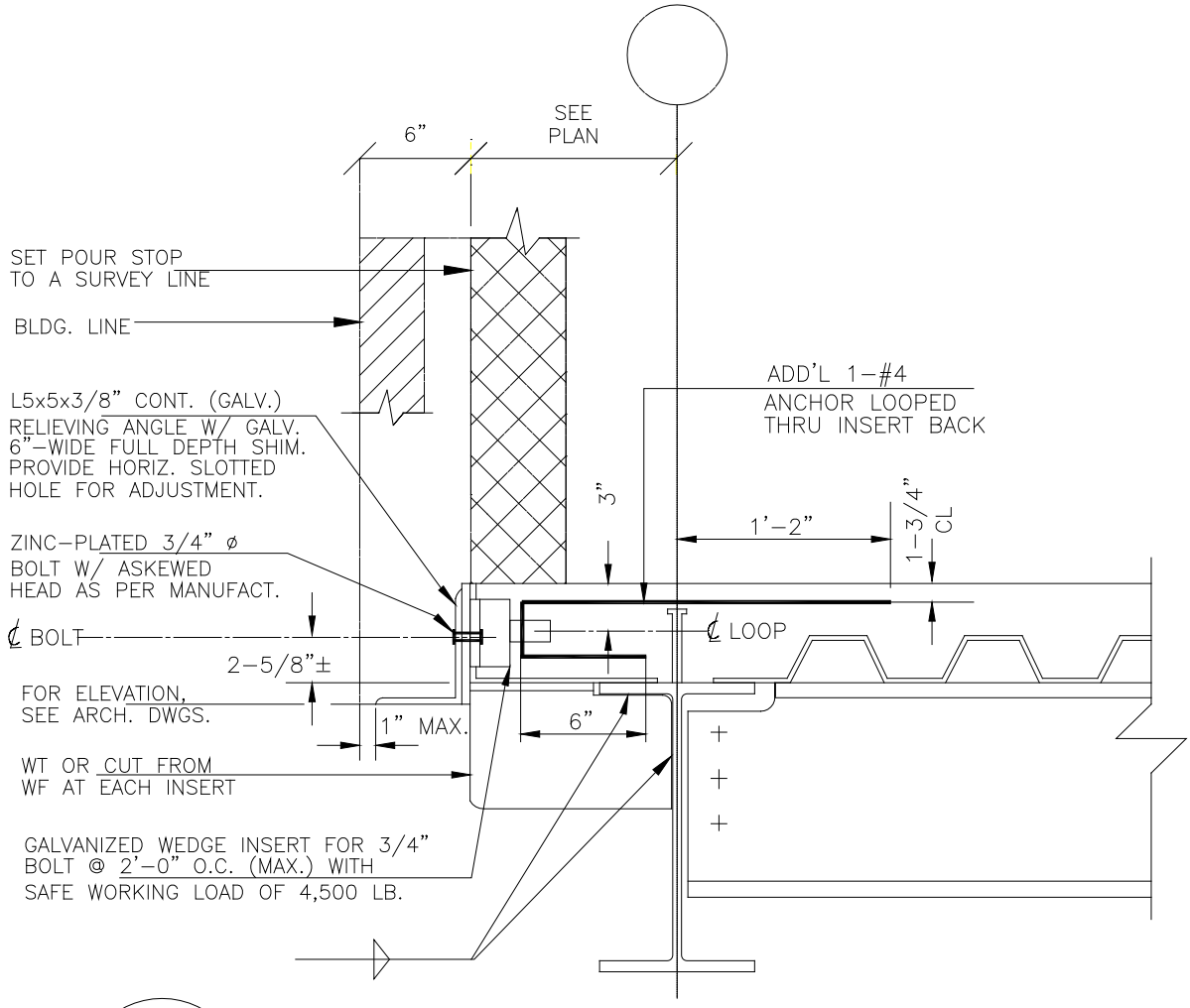
B. For walls with intermittent windows, provide a relieving angle supported at the floor level from wedge inserts cast in the floor slab. Provide a hung lintel assembly or bond beam system over the windows openings. The attached conceptual sketches provide a general guide of possible detailing. Actual conditions may allow simpler and less expensive designs depending on geometry of the construction. For walls with the majority of the length being windows, provide a continuous hung lintel support system. The jointing in the masonry shall be carefully coordinated with the relieving angle locations to ensure cracks do not develop due to irregular brick panel shapes and lengths.

C. Hung lintel assembly is to be designed such to avoid where possible the need for diagonal struts to brace the wall/lintel assembly.

D. Where the structural steel beam or wall is required to be fire protected, the **bottom flange of the lintels, shelf angles, and plates spanning less than 6'-4" is not required to be fire-protected whether part of the primary structural system or not per** Section BC 704.11 of the **2022** NYC Building Code. **The bottom flange of lintels, shelf angles, and plates not part of the structural system, such as metal lintel assembly, need not be fire protected regardless of span**.

E. Relevant Conceptual Sketches:

1. Typical Edge of Slab Detail at Relieving Angle Sketch SK1 dated 7/01/09.
2. Lintel Assembly at Wall Opening Sketch SK2 dated 7/01/09.
3. Lintel Assembly at Wall Opening Sketch SK3 dated 7/01/09.

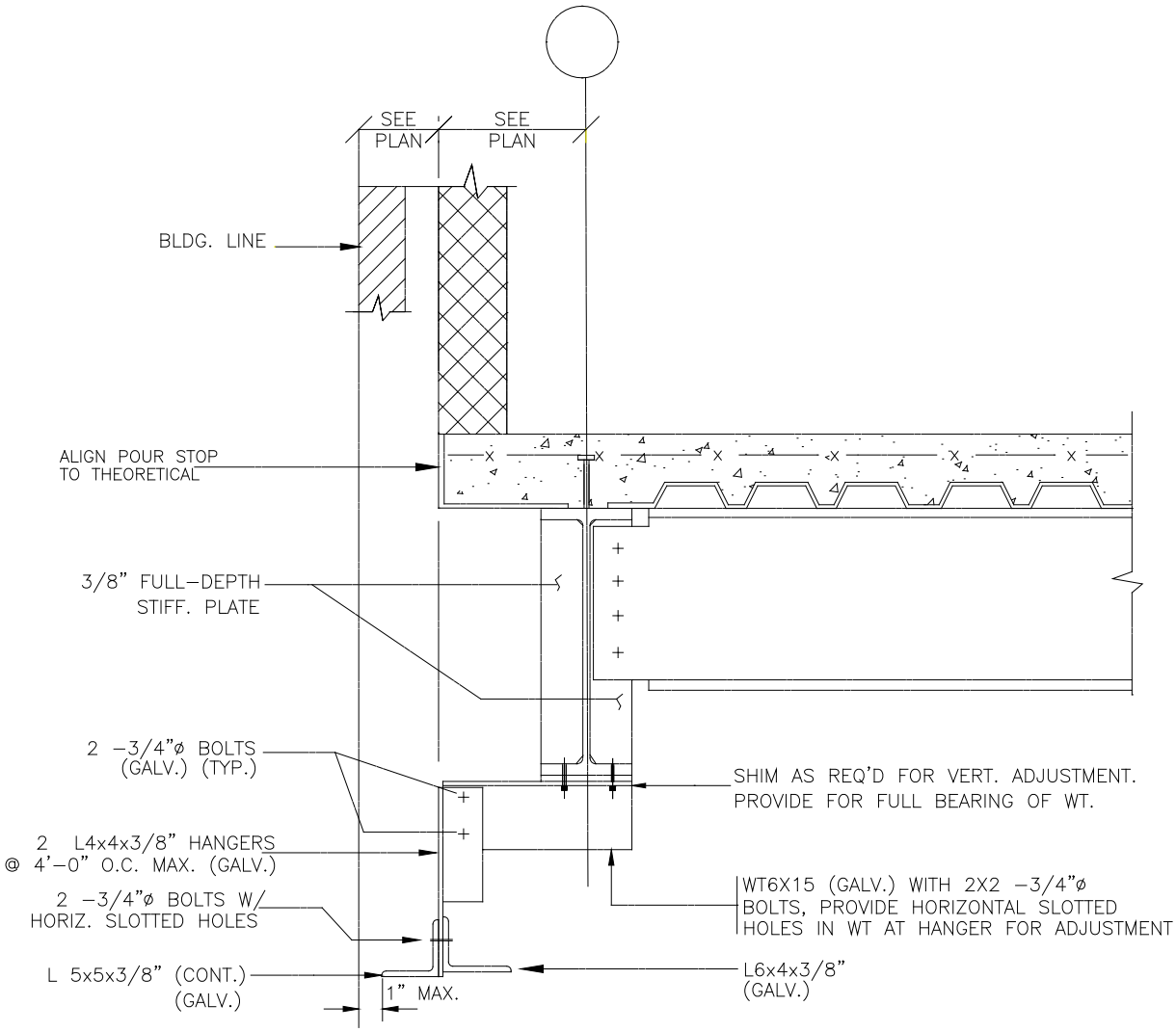


SK1 CONCEPTUAL EDGE OF SLAB DETAIL AT RELIEVING ANGLE

DATED: 07/01/09 N.T.S.

1. INSERT DIMENSIONS AND LOCATION ARE BASED ON HOHMAN AND BARNARD HW340, WITH THEORETICAL BOLT LOCATION AT THE CENTERLINE OF THE "E" DIMENSION.
2. THIS DETAIL SHOWS THE REQUIRED REBAR FOR INSERT LOCATION ONLY.
3. USE HORSESHOE SHIM OF FULL DEPTH FOR ADJUSTMENT.
4. REFER TO TYPICAL SLAB CONSTRUCTION DETAIL FOR WALL/SLAB REINFORCEMENT.
5. CANTILEVERING OF ANGLES FROM INSERT AT SPLICES, CORNERS, ENDS SHALL NOT EXCEED 1'-0". PROVIDE 1/2" CLEAR BETWEEN PIECES AT SPLICE LOCATIONS.
6. DETAIL TO BE MODIFIED BASED ON ACTUAL DIMENSIONS AND CAN BE SIMPLIFIED BASED ON ACTUAL CANTILEVERING CONDITION.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**

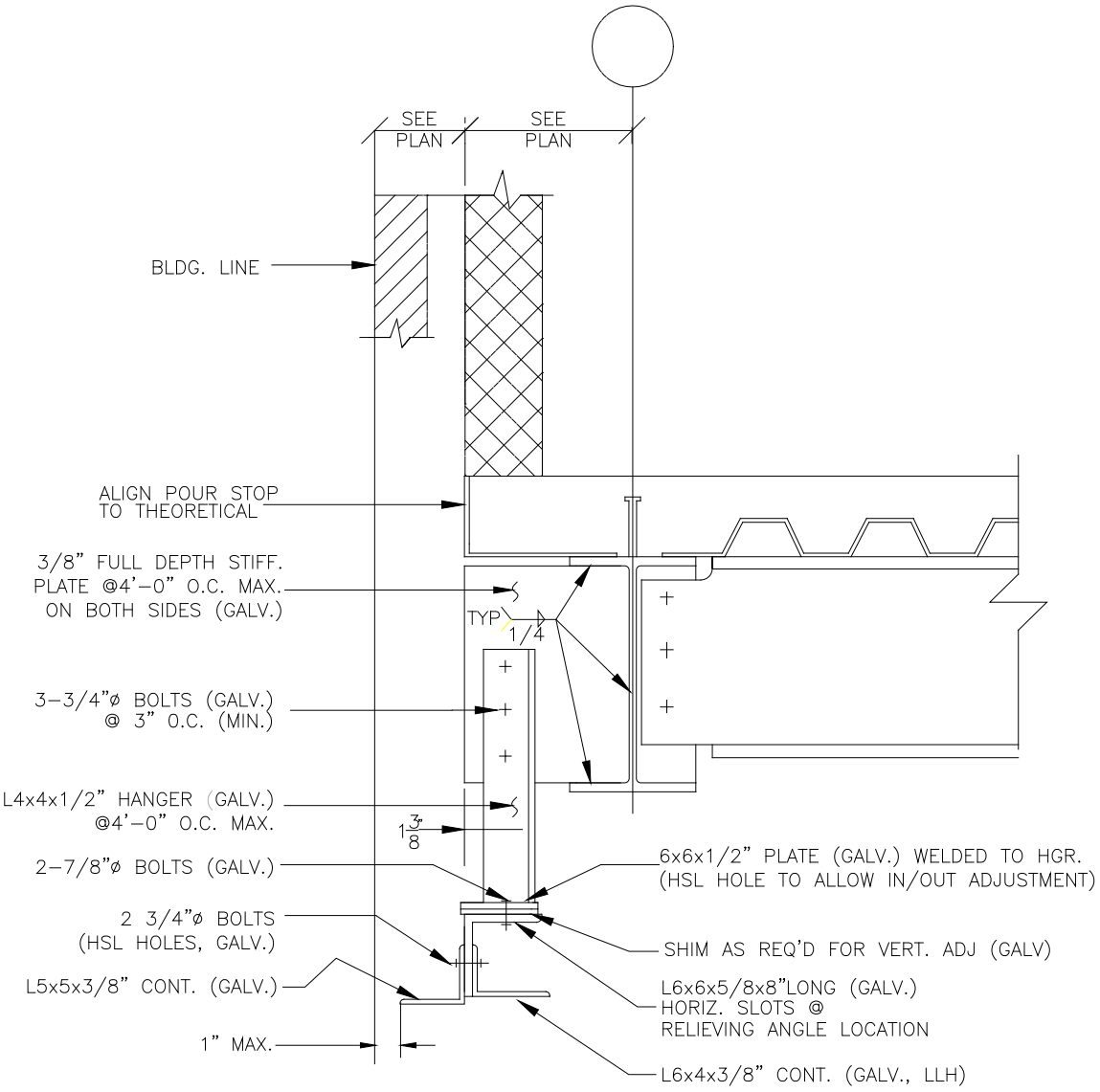


SK2 CONCEPTUAL LINTEL ASSEMBLY AT WALL OPENING

DATED: 07/01/09 N.T.S.

1. REFER TO TYPICAL SLAB CONSTRUCTION DETAIL FOR WALL/SLAB REINFORCEMENT.
2. DETAIL TO BE MODIFIED BASED ON ACTUAL DIMENSIONS AND CAN BE SIMPLIFIED BASED ON ACTUAL CONDITION.

Requirement Applies to: ✔ **New Construction** **Major Modernizations** **Capital Improvement Projects**



SK3 CONCEPTUAL LINTEL ASSEMBLY AT WALL OPENING

DATED: 07/01/09 N.T.S.

1. REFER TO TYPICAL SLAB CONSTRUCTION DETAIL FOR WALL/SLAB REINFORCEMENT.
2. DETAIL TO BE MODIFIED BASED ON ACTUAL DIMENSIONS AND CAN BE SIMPLIFIED BASED ON ACTUAL CONDITION.

4.1 Design

4.1.1 Building Façade – New Buildings and Additions

Description/Design Approach:

A. General

1. The aesthetic, scale, proportion and detail of building facades shall manifest the educational, social, cultural and civic importance of a neighborhood school, its community, and be appropriate for the age of the student population as well as the context of the site.

2. As a general rule, Designers shall conform their façade designs to the SCA Design Requirements, and if there is a compelling need to vary from the Design Requirements, approval must be obtained from the SCA through the Façade Review Process**, which shall include maintenance and longevity information as well as a cost comparison of the proposed façade versus the other SCA accepted facades**.

3. The Façade Review Process is a series of meetings to be held with the same members as the Deviation Review Process, where the Designer will present their intended façade/elevation look and proposed materials. The materials will typically be selected based on the Façade Selection Matrix. Materials associated with a funded pilot program will also be discussed as part of this process. The intent is for members of the committee to discuss any potential issues they see with the designer's proposal to ensure it is consistent with the Authority's design intent and meets its sustainability goals. The Façade Process is to start as soon as possible and no later than the middle of design development documents (Phase 1C) so as not to affect the schedule.

4. **SCA schools are required to comply with Local Law 51/23 and the 2020 NYC Energy Conservation Code. School projects shall be designed to have a source EUI of 60 kBTU/SF/yr or below. Other use buildings (field houses, maintenance buildings, other accessory uses) shall be designed to have a source EUI of 38 kBTU/SF/yr or below, as they do not have kitchen loads. SCA standards have adopted a number of approved Energy Conservation Measures (ECMs) above the energy code. The following ECMs must be considered during the façade design process as minimum or maximum values.**

   a. **Wall R-value of 30.**

   b. **Foundation wall R-value of R-15.**

   c. **Window U-value of 0.25 BTU/h·ft²·°F.**

   d. **Thermal bridges must be accounted for in models and mitigated where practicable. This includes at roof parapets, slabs on grade, window installations, canopies, roof dunnage installations, brick shelf angles, rainscreen attachments, and any other significant compromise of insulation continuity.**

   e. **Air barrier continuity and rates of leakage are becoming more stringent with each new code. As per the 2020 NYC Energy Code, design teams must prepare**

an Air Barrier Continuity Plan and identify in the plans and sections the location of air barriers, and materials identified in details and specifications.

B. Materials

Choice of materials and wall selection is to be based on the Authority's "Façade Selection Matrix", which takes into account many factors such as material longevity **and availability,** building location, constructability and project duration, building aesthetic and cost.

The materials to be used in the design and construction of the school's exterior facades shall be limited to those materials that are specified in the Authority's Standard Specifications and the parameters established herein.

All materials and systems indicated as *"subject to approval by the Authority"* must be approved by the Authority through the **Façade Review** Process prior to final acceptance of **the** Design Development documents (Phase IC).

1. Backup wall structure

a. Cold-rolled steel stud construction with gypsum sheathing is the preferred option. Installation is rapid, and it accommodates higher insulation R values, and can be used with a variety of exterior wall finish materials – brick, terracotta, and UHPC.

b. Concrete Masonry Units (CMU) is a durable option and the preferred option for challenging acoustic environments. Construction is slower, and wall thicknesses increase significantly to achieve required R values.

2. Masonry

a. Brick

Brick has been the predominant material for exterior walls of buildings and will be the preferred option for ground floor where a rainscreen (terracotta or UHPC) is used above, or to meet a required aesthetic from SHPO. Exterior masonry walls shall be as described by Design Requirement 4.2.1-Exterior Masonry Walls.

1) Brick Bond Pattern:

a) Typical brick bond pattern/coursing shall be running bond.
b) Use of other brick patterns/coursing to enhance building elements as well as the overall building aesthetic is subject to approval by the Authority.

2) Brick type:

a) Brick type shall be that which is specified by DR 4.2.1 and the Authority's Standard Specifications.
b) Color and texture is subject to approval by the Authority.
c) Standard shapes and sizes are to be used **that** meet manufacturer's standard dimensions and angles. Special sizes and shapes are subject to approval by the Authority through the Façade Review process, as shapes other than manufacturer's standards increase cost and **delivery time**.

d) 100% solid units shall be used where unsupported projection of brick is 1.25" or more and brick **voids are** visible.
e) Mortar coloring - submit to the Authority for review and acceptance as part of the brick selection.
f) Glazed units are not permitted.

3) Concrete Masonry Units

Concrete masonry units **may** be used **for** back-up walls. Concrete Masonry Units, glazed or unglazed, **shall** not be permitted for use as an exterior wythe of masonry.

4) Ground Face Masonry Unit

Ground face masonry units require an initial plus periodic application of a field applied coating; which when not done right shows drips and runs and creates random color variations that appear like patches on the wall, are subject to chipping, and are not included in the SCA standard specifications. Use of ground face masonry units for exterior wythe of masonry shall not be permitted.

5) Calcium Silicate Masonry Unit (CSMU)

Use of calcium silicate masonry units will be permitted as a material for the building base when such masonry walls are part of the project.

b. Cast Stone

Cast Stone, as specified in the **Section 04720 of the Authority's Standard Specifications**, can typically be used to accent components and features of the exterior building elevations in conjunction with brick and block cavity wall construction, such as; coping stones, cornices, bands, fasciae, windowsills, window heads and water tables.

1) Cast stone used as material for the building base can be sized up to 24"x48".

2) Cast stone used as façade material other than the building base shall be 18"x24"x4" or any size that amounts to a maximum of one cubic foot, so that units can be installed without use of mechanical lifting devices.

3) Use of cast stone and/or pre-cast panels to emphasize massing and/or volume of a building façade is subject to approval by the Authority.

c. Exterior Cut Stone

Exterior cut stone, as specified in the Authority's Standard Specifications, is typically used on existing buildings to match features of the building's exterior, such as; coping stones, cornices, bands, fasciae, windowsills, window heads and water tables.

1) Possible use of exterior cut stone on Addition Projects, to match features of the existing building, is subject to approval by the Authority.

2) Use of exterior cut stone on stand-alone new building projects is typically not to be used **except at the base of a rainscreen façade** and use of such reviewed and accepted through the Façade Review Process.

d. Terra Cotta

Architectural terra cotta, as specified in Section 04250 of the Authority's Standard Specifications, is typically used on existing buildings to match exterior building elements. As it is a long lead item and there have been issues with proper installation and manufacturer, it is only used where alternate materials cannot be properly designed into the existing system. **Note that architectural terra cotta is distinct from terra cotta rainscreen materials as indicated in 3 below.**

1) The use of terra cotta in other forms besides ornamental shapes will not be permitted except as specifically indicated elsewhere.

2) Terra cotta historically was not used at grade level as it was not considered as abuse resistant as limestone or cast stone and its use as such should be limited to areas that are more than 10' above the adjacent grade level. Special sizes and shapes may require custom anchors and/or attachment details.

e. Glass Unit Masonry

Glass masonry units may be used in locations where diffused natural light is desired and ventilation, if required, is provided by operable windows or mechanical means. Clear glass masonry units may be provided at stairs and corridors. Stipple finish glass block may be provided at swimming pools and other locations where it would be advantageous to obscure the visibility from either side of the glass masonry unit. While the SCA's standard has been solid units and is preferred, they are typically no longer manufactured and abuse resistant hollow units are to be provided.

1) Note that Glass block has a 'U' value that is extremely high compared to that of a typical brick and block cavity wall, and is much higher than a typical aluminum window with insulating glazing and is thus to be limited in area.

f. Simulated Masonry

Authority's Standard Specifications include Glass Fiber Reinforced Concrete (GFRC), and Polymer modified Glass Fiber Reinforced Concrete (P-GFRC).

GFRC is typically used as a substitute for terra cotta or cut stone in existing buildings. It is not to be used on stand-alone new buildings. In existing buildings, it is typically used for large overhanging cornices where lighter weight may be an added value and the cornice can be hung from substrate. In rare instances on an addition project where matching an ornamental cornice feature is required, GFRC or P-GFRC may be used subject to approval by the Authority.

1) The use of simulated masonry in other forms besides ornamental shapes will not be permitted.

3. Rain Screen

Rain Screen systems may be utilized for portions of the façade, subject to approval by the Authority through the Façade Review Process, unless the system is selected as the best option for the entire façade through the Façade Selection Matrix. Rain screen system shall be comprised of structural steel stud with sheathing (or concrete or masonry if dictated by design of the building) back-up wall, vapor/air barrier, insulation, thermally isolated clip and framing grid and finish material meeting an overall assembly R-value of 30.

a. Ultra-high-performance concrete (UHPC) and terracotta panels are the accepted systems, with selection based on the aesthetic of the finish and panel size. Panel size and rail systems spacing for system selected shall take into account the economy and constructability economy of the selected system (i.e., UPHC systems are to use sizes in the 5'x12' range, with panels used for returns below 16" x 5' range being uneconomical**. T**erracotta units are typically most economical in 16" x 5' range to maximize effective panel economy as well as greater support system spacing.

1) Systems are to use concealed fasteners.

2) **The system** is to be kept a minimum of 2'-0" above grade to protect against snow and equipment and **flashing be detailed.** Both UHPC and terracotta **panels a**re resistant to damage, but a graffiti-resistant coating as required by DR 4.2.2 is to be provided.

3) **For acoustically challenging sites,** a rainscreen with a **CMU backup wall may be recommended. An acoustic analysis must be performed.**

4) **Terracotta and UHPC rainscreen systems are open joint, meaning the joints between panels are not grouted, caulked or otherwise sealed. These systems typically employ metal trim pieces to close the joints to prevent UV penetration, direct precipitation, and pest infestation. Refer to manufacturer literature and details for guidance.**

b. The use of other panel materials **not in SCA standards**, such as porcelain tile, GFRC, etc. utilizing concealed fasteners shall be reviewed and accepted through the Façade Review **p**rocess.

c. Façade is to be designed to minimize field cuts for those systems not fabricated to exact sizes, as edges may fray in the future if the manufacturer's products and instructions to treat the edges are not carefully followed.

d. Colors are to be selected from the manufacturer's standard colors and be available from several manufacturers.

4. Architectural Precast Concrete Panels

Architectural Precast Wall Panels are an option for facades due to speed of construction and inherent thermal bridging reduction characteristics. Use of such depends on the availability to use a crane for installation. Precast concrete panels are not recommended for sites with limited outdoor space for cranes and staging. If proposed, the designer is to present proposed panel layouts early in the design to ensure economy and constructability. Besides durability, this type of façade will typically provide the required acoustic separation

from exterior noise sources. There are many things to consider in the design of the panels and the intent needs to be to minimize the number of joints while ensuring that the panels can be shipped, fabricated and installed economically, which includes minimizing the number of crane picks. There are also aesthetics to consider in the design. Designer is to keep in mind the following design considerations:

a. Designer to ensure that a minimum of 2" clearance is provided between the structure and the panels to allow for panel installation and firestopping.

b. Panel widths shall be selected to avoid a size that would require the use of a 10-foot-wide truck, allow for preferably 2 panels to a truck, and limit the shipping weight to 40,000 pounds. Two units typically 12 feet wide can be transported on the typical 8-foot-wide truck, while a single 15-foot unit can also be transported on such truck. During the design phase, the designer should verify that the proposed design and layout can be done by at least three manufacturers. Some precast manufacturers cannot prestress the members, which may limit the sizes available and make them less economical. The use of sizes that would require oversized trucking loads to facilitate certain design are to be discussed during the design to see if there is a cost benefit and if the site can physically receive the units.

c. Preferred location for tie-backs to the structure shall be from the top of the structural deck or from the bottom of the spandrel. Attaching to the spandrel typically requires kickers bracing the bottom flange or other means that must be shown on the drawings. Designer is to make clear the basis of design for the attachment on the structural drawings and show any required beam reinforcement for the attachment. At the roof deck, tiebacks shall be attached to the bottom of the beam as they must be accessible/allow movement and cannot be buried in the concrete fill or roof system. Designer to show any required kickers or plate stiffeners.

d. Precast panel design shall be based on what a Category AC PCI plant can produce. Category AC plants are certified produce panels that are flat with either one colored mixture and texture per panel, have a 3-D form surface with reveals and liners only and up to a single pour return. If a particular design requires a higher finish category (AA or AB), obtain acceptance through the Façade Review Process, as they will limit the amount of available plants, and revise category listed in the specification, if accepted.

e. Compositely designed insulated sandwich panels shall meet an R-value of 20. Insulation shall be shown continuous so that thermal bridging is minimized. Insulation of the sandwich panel shall be 4" with an additional 3.5" of mineral wool batt insulation within the interior stud framing cavity for an overall nominal R-value of 30. For staircase exterior walls without interior framing, 4 inches of XPS shall be provided for overall assembly R-value of 20. All panels to utilize a double-layer of sealant at all joints in the exterior wythe with preformed sealant used as the outer layer at copings. Provide a single layer of sealant at the interior side of the interior wythe.

f. Steel studs are to be used to create the interior finish, except for spaces where an interior precast look is desired. Note there will be a 2" gap between the inside of precast to the slab edge that must be considered as well as access to install firestopping in the space.

g. Fenestration in relation to the panel widths must be taken into account. A minimum of 18" is required from any edge of concrete, with 24" being preferred, to prevent concrete

from cracking at formed openings during shipping and erection or to require excess reinforcement and extra thickness of concrete that would jeopardize the edges of the panel from being insulated.

h. Load-bearing panels with bracing at each floor is the typical preference but is based on height of buildings and recommendations from the precast fabricators. Panels spanning between columns is an option where load-bearing panels will not work in the layout.

i. Panel finishes

1) Panels shall typically have a concrete or brick finish. If a typical coping or windowsill shape is desired, they shall be designed integral with the panel.

a) If panel finish is to be concrete, the typical concrete finish is a light sandblast. The use of an 'as-cast' finish is not permitted. Patterns in walls, if used, are to be repetitive to allow reuse of liners for multiple pieces.

b) If panel finish is to be brick, thin brick (0.75" max thickness) specifically fabricated for the purpose meeting PCI fabrication tolerances is to be used. Designer is to ensure the brick pattern meets typical brick coursing to avoid odd looking cuts (e.g. dimensions between windows to be 2'-7$^{5}/_{8}$", not 2'-6" which would result in odd length bricks).

2) The use of thin cut stone or terra cotta as a panel finish or for accent may be appropriate to provide a warmer feeling based on adjacent community and will need to be reviewed and accepted through the **Façade Review** Process.

j. The use of panels for a building, or the facades selected to receive panels, should only be considered if site logistics are such that a crane can effectively reach those locations.

k. Special loading/lifting consideration must be given to panels that need to be installed under an overhang or in an interior court.

l. An anti-graffiti coating applied to precast concrete will result in a slight change of appearance. Panels shall be designed to create a break at the point the coating is desired to end to avoid a change in color in the middle of a flat panel, either by being a point where a new panel starts or a reveal is installed.

5. Aluminum**-Framed Glass** Curtain Wall

Difficulties in detailing, construction and delivery, plus the initial and maintenance costs, generally preclude the use of curtain walls on additions and stand-alone new building projects as a major façade element. However, it may be used for accent locations such as over-height lobbies or to create **a s**eparation between an addition and the existing building if reviewed and accepted through the Façade Review Process. Due to constructability and scheduling concerns, the use of curtain wall/window walls in stairwells is not permitted. Layout and location of the curtain wall within the facade shall provide protection from the elements by being within a frame of the façade and shall never have an unprotected top. Note that the 'U' value of a curtain wall is higher than that of a typical brick and block cavity or precast facade wall.

a. A storefront effect with the use of curtain wall at the first floor and window wall within the allowed fenestration percentages is permitted. Storefront systems utilizing triple glazing is not available at this time for the windows to meet the target U-value of 0.25, and should only be used in a small area where it is impractical to specify curtain wall.

6. Metal Panels

In order to avoid delays in building façade enclosure, metal panels may be used in limited quantities as an accent component. It will be allowed as a cladding system only where appropriate for the aesthetics of the building. Sizes shall be such to avoid potential 'oil canning'.

7. Graffiti Control

Graffiti control shall be provided as per Design requirement 4.2.2.

C. Other Elements

1. Canopies

A canopy or a building overhang may be desired to provide a sheltered area immediately preceding the entrance doors. Such canopies, when provided, shall typically be an integral part of the building.

a. All canopy types, materials, sizes and locations are subject to approval by the Authority.

b. Canopy attachments to the building structure shall be thermally broken.

2. Windows

The arrangement and design of windows (fenestration) shall be in scale and proportion to the building's elevations, massing, and volume. The windows must be appropriate for the use of the space for which the windows are being provided.

All occupied spaces and corridors shall have windows (unless the spaces are below grade). Windows for new buildings shall typically be aluminum hopper/fixed windows (projecting inward). Additions/Adjacencies to SHPO and/or Landmark buildings may require windows other than hopper/fixed windows. Windows shall be provided as per Design Requirement 4.3.1 - Window Types.

a. Use of windows other than hopper/fixed windows for new buildings or additions must be approved by the Authority.

b. The maximum window to wall ratio shall be 20%, but as glazing has a much higher U-value than the walls and thus less energy efficient, the intent is to be effective with the glazing and not just maximize.

3. Shading Elements

   Proposed shading elements to address glare shall be discussed at the Green Schools Guide IDP meeting and included in the Façade Review Process package for review and acceptance by the Authority.

   a. Shading can have positive effects on overheating, glare, and annual energy balance. Energy and daylighting analysis must be performed to demonstrate the value of including them.

   b. Shading typically has the greatest effect on south facing elevations. East and west elevations benefit more from screening or vertical louvers. North elevations may benefit from vertical shading (to protect from morning and afternoon summer sun).

   c. Shading elements can be maintenance challenges. They can be resting places for pigeons, and adjacent to playgrounds can trap balls or be subject to damage.

4. Security Screens/Barriers/Guards

   Window/Security Screens/Barriers/Guards shall be provided as per Design Requirement 4.3.3 - Window Guards (Exterior).

5. Doors

   Exterior doors and frames shall be provided as per Design Requirement 4.6.1 - Exterior Doors.

6. Signage

   a. Building signage shall be provided on the exterior of building as per Design Requirement 1.3.1.4 - Signage.

   b. Building Cornerstone: Provide a cornerstone with the year of erection. The Architect is to determine the appropriate location, typically at the corner of the building on the front façade above the grade and obtain SCA concurrence. For masonry buildings, the cornerstone shall be a limestone block. For precast concrete facades, the cornerstone can be a either an inlaid limestone panel if it is brick faced or the date cast into the panel. For rain screen facades, which typically have masonry or concrete at the first floor, the cornerstone can be limestone or date cast into the concrete panel, or the Architect may propose another method for SCA concurrence.

7. Electrical and Low Voltage Items

   All electrical and low voltage items such as, but not limited to, horns, bells, cameras, speakers and alarms shall be located and coordinated with all building elements and features as inconspicuously as possible on exterior building elevations. Light fixture locations shall be per Design Requirement 7.2.5. - Exterior/Site/Security Lighting and coordinated with the window/door and other elements of exterior façade. Camera locations shall be per Design Requirement 7.3.11 - Video Surveillance System.

8. Louvers

   When necessary, required louvers shall be located as inconspicuously as possible on an exterior building elevation. Where possible, louvers may be coordinated and incorporated with the building's window fenestrations.

9. Wall hydrants

   Wall hydrants shall be provided on facades as per Design Requirement 6.1.7 - Wall Hydrant Requirements for Window Washing and General Maintenance.

The use of any materials and elements not identified **or in quantities above that intended** above are subject to approval by the Authority.

4.2 Walls

4.2.1 Exterior Masonry Wall

Description/Design Approach:

A. Construction

1. Typical exterior masonry wall construction shall be as follows, depending on decision during façade selection:

   a. A **brick veneer w/concrete back-up** cavity wall consisting of an exterior wythe of modular size face brick (4"x2$^{2}/_{3}$"x8" nominal) and 6" to 8" nominal concrete masonry unit back-up with a 5¼" nominal air cavity (6" actual) with 5" semi-rigid mineral wool insulation (R21.5) in the cavity over a spray/trowel applied air/vapor barrier applied to the block, and 3½" metal stud furring with 3½" mineral wool batt insulation (R13) with 1 layer(1) of 5/8" abuse-resistant gypsum board (ARGB) on the interior side. System shall be designed to incorporate thermal bridge mitigation to reduce the derating of the U-value to the largest practical extent possible, which the energy modeler is to take into account.

   b. A **brick veneer w/steel stud back-up** cavity wall consisting of an exterior wythe of modular size face brick (4"x2$^{2}/_{3}$"x8" nominal) and 6" thick metal stud back-up with a 5¼" nominal air cavity (6" actual) with 5" semi-rigid "mineral wool board insulation" (R21.5) in the cavity over a spray/trowel applied air/vapor barrier applied to the exterior gypsum board, and "mineral wool batt insulation" (for the stud thickness with 1 layer(1) of 5/8" abuse-resistant gypsum board (ARGB) on the interior side. System shall be designed to incorporate thermal bridge mitigation to reduce the derating of the U-value to the largest practical extent possible, which the energy modeler is to take into account.

   (1) Interior side of exterior walls facing circulation spaces i.e., Corridor, lobby, Vestibule shall receive double layer of 5/8" gypsum board, with outer layer being Impact Resistant board

2. The Designer is to carefully layout the brick bond patterns during the design to ensure that the patterns of the 4"x2$^{2}/_{3}$"x8" brick will be aesthetically acceptable. Note that SCA Standard details utilized for projects will need to be modified as they are currently developed around utility brick.

3. For program spaces that require exposed CMU on the interior face of the room without a metal stud furring, provide 5" semi-rigid insulation in the 5¼" nominal cavity (6" actual) cavity over a spray or trowel applied air/vapor barrier applied to the block/metal stud back-up. System shall be designed to incorporate thermal bridge mitigation to reduce the derating of the U-value to the largest practical extent possible, which the energy modeler is to take into account.

   These spaces typically include:
   a. Stairwells
   b. Gymnasiums

B. Brick Type

1. Type FBX brick has tighter tolerance requirements as compared to the type FBS brick. The specifications call for Type FBX brick for modular and utility brick due to the tighter tolerances on the size and face distortion of the individual brick. As indicated above, modular brick is to be used, unless otherwise approved by the Authority. Even being type FBX brick, the allowed dimensional and distortion tolerances permitted by ASTM C216 are exaggerated on the larger utility brick creating an undesired aesthetic look for many bricks. The designer is to carefully research the brick selected with the manufacturer to ensure that the brick selected meets the FBX requirements. If a utility brick is desired to be used, the designer must work with the manufacturer to select those that are dimensionally stable and uniform with a tighter tolerance and the use must be approved through the deviation approval process

2. Brick selected must have a wire cut face unless approved through the deviation approval process.

3. Certain bricks have a stone face or rustic appearance, which would fall in the FBA category. If the brick selected to meet a certain aesthetic is Type FBS or FBA, notify the SCA and if approved, modify the specification appropriately. Some FBS and FBA brick, depending on their qualities, may be acceptable to the SCA. This may be desirable when doing an addition project.

4. Hand molded brick, when mandated by SHPO requirements to match existing facades shall be type FBS or FBA. Use of hand molded brick must be approved through the deviation approval process.

5. If Iron spot, FBS or FBA brick is selected, provide a cost comparison between the wire cut FBX brick and the brick selected. Brick shall also be studied to ensure good laying characteristics and the verify mortar selection is appropriate for the brick.

6. Coursing shall be such that any projecting brick does not project more than 1/2” beyond the immediate course below it. Cores shall not be exposed.

C. Parapets

Parapets shall serve the purpose of being a “protective guard” at the roof and/or provide the required exterior wall fire-resistive rating. Parapets shall be provided if one or all of the following conditions are applicable.

1. Protective Guard

All new buildings greater than 22’-0” above average grade shall have a parapet that is a minimum 42” above the highest point of the finished roof at the perimeter of the building as per Section BC 1510.8 of the 2022 NYC Building Code. It is recommended to provide a 46” high parapet above adjacent finished roof to facilitate future energy code changes in insulation thickness but with a construction tolerance so not exceed the 48” max height allowed for FD roof access per FC 504.4.1 of the 2022 NYC Fire Code. Parapet construction shall consist of 4” face brick, a 5¼” nominal air cavity (5¾” actual) with 5” thick mineral wool semi-rigid board insulation (R21.5) with an 8” reinforced poured in place concrete back-up with a cast stone coping and through wall flashing. The designer is to carefully detail the

parapet and course out the brick and coping stone sizes to ensure that the minimum is met. Parapets for non-utilitarian type roofs such as; play roofs, green roofs roof terrace, or other roof areas that will be used by the building occupants, or setback roof parapets that are close to classroom or office windows shall include face brick at the interior face i.e., roof side of the parapet.

2. Fire Resistance

   A parapet is required when an exterior wall is required to provide an exterior fire-resistive rating in accordance with BC Table 602 and shall have the same fire rating as required for the supporting wall and shall be at least 30” above the point where the roof surface intersects with the wall and shall be in compliance with Section BC 705.11.1.

4.2 Walls

4.2.2 Graffiti Control

Description/Design Approach:

1. **A** graffiti-resistant coating is to be used on exposed exterior surfaces up to 10'-0" high.

2. For new construction: use clear, matte finish sacrificial coating. As the coating may discolor the basic material, the designer should provide a break in the facade such as a string course to define the area being coated.

3. For existing buildings graffiti should be removed and a sacrificial graffiti resistant coating applied. If the graffiti "shadow" cannot be removed without damage to the surface, the masonry walls should be painted and then the graffiti resistant coating should be applied.

4. For new construction, walls to receive graffiti resistant coatings should be cavity wall construction with the cavities properly vented at the bottom and at the top of area to receive coating. Vents at the top of the wall area should be below any relieving angles or other restriction to the flow of air in the cavity.

5. For existing buildings of solid masonry construction and buildings without weepholes, the bottom two brick courses should remain unpainted and uncoated to allow the wall to breathe.

4.2 NY State Historic Preservation Office (SHPO)

4.2.3 Masonry Restoration

Applicable to buildings Designated by SHPO as meeting the criteria for listing on the National Register of Historic Places and buildings classified as New York City Landmarks.

Description / Design Approach:

1. Mortar Removal

   Existing mortar is to be removed from historic masonry surfaces using hand held non-power tools for all joints or a combination of power tools/handheld-nonpower tools for horizontal joints & hand held non-power tools for vertical joints. Perimeters of brick replacement areas are to be cut in a similar manner prior to brick removal to ensure adjacent bricks to remain are not damaged. See NYCSCA Standard Specification Section 04520**A** - Masonry Restoration for specific requirements.

2. Repointing

   Repointing will be appropriate provided it occurs only where mortar is missing or deteriorated, and the new mortar matches the original in color, texture, tooling, size and profile of joint. It is most important to ensure that the work does not significantly alter the building's appearance by reversing or otherwise offsetting the visible mortar to brick ratio. This has been traditionally addressed by SHPO by limiting repointing only to areas where needed (at grade, downspouts, parapets etc.). However if total or extensive repointing is required to ensure a watertight envelope, the specifications must ensure the original appearance is maintained, and brick is not damaged.

   The original mortar should be tested to determine its composition. Historic Mortars are often soft because of their high lime content and lack of Portland Cement. New mortar should be soft enough to prevent damage to historic masonry materials. If a mortar analysis is not performed, a Type O Mortar may be used:

   - 1 part white Portland Cement
   - 2 parts Type S hydrated lime
   - 7 parts sand with no admixtures

   When repointing at parapets, at grade, or at other areas exposed to harsh weathering conditions, it may be appropriate to use a more durable new mortar. If a mortar analysis is not performed, the following mortar mix should be used:

   - 2 parts white Portland Cement
   - 3 parts Type S hydrated lime
   - 6 parts sand with no admixtures

3. Masonry Cleaning and Removal of Existing Coatings

   The goal of cleaning a historic structure is not to make it look entirely new. Removal of the last 15% of the grime or coatings will also remove masonry material.

Requirement Applies to:	New Construction	✔ Major Modernizations	✔ Capital Improvement Projects

Harsh chemicals or high pressure washing can damage historic masonry. Cleaning should remove surface dirt using the gentlest methods possible. Work will be appropriate provided only non-ionic neutral pH detergents (not chemicals), non metallic, natural bristle brushes or scrapers, and water pressures no greater than 150 psi are used. Vortex systems have been approved only for use on limestone. If proposed for use on brick, testing (with before and after microscopic surveys) would be required.

Chemical paint removal systems, particularly “peel-away” systems where lead is an issue, are acceptable. Only approved “peel-away” systems may be used and only following a procedure recommended by its manufacturer and approved by the SCA’s IE&H Division. Adequate oversight to ensure proper and prompt removal of the blanket is critical to prevent drying of the material which would then necessitate scraping and the potential to damage the brick.

4. Masonry Coatings

Use of any masonry coating must be addressed to a specific problem and material.

Moisture trapped under masonry coatings can cause excessive damage in freeze-thaw cycles. These coatings prevent the natural passage of moisture from within the wall and aggravate many existing moisture problems. Acrylic sealers, cementitious paints, and other non-breathable coatings *shall not* be applied to historic masonry surfaces.

Although a more sacrificial coating is preferred by SHPO, a breathable coating may be approved if the proposal is supported by sufficient information concerning the reason for its use and its permeability.

4.2 Walls

4.2.4 Exterior Glass Block

Description/Design Approach:

Glass bock may be used in areas where diffuse sunlight is desirable and operable windows are not required for the interior space.

Glass block shall be solid glass block within a steel frame when used.

Stipple finish glass block to be provided at locations where it would be advantageous to obscure the visibility from either side of glass masonry unit.

Thermal values: For projects that must comply with the 2020 NYCECC using the ASHRAE 90.1-16 path for compliance, the values used must be actual values (as provided by the manufacturer) or the default values as listed below.

- **'U' factor 0.6**
- **SHGC 0.56**
- **VLT 56%**

For buildings that must comply with **the 2019** GSG rating system **and LL31/16,** the area of glass block must be limited to 5% of the fenestration area.

4.3 Windows

4.3.1 Window Types

Description/Design Approach:

A. New Construction

1. Window Types:

Aluminum Fixed/Hopper Windows (projected windows pivoting about bottom edge and projecting inward). Overall Window Size – width: 3’-0” to 4’-0”, height: 7’-4” to 9’-0”. Windows taller than 9’-0” may be provided if not limited by floor-ceiling heights, but will need project specific testing that must discussed with CM to account for in the project schedule. In specialty rooms, furniture layouts may require windows less than 7”-4” in height. Window shall typically consist of one large fixed light over the hopper. This may be adjusted where Fire Department access is required (non-sprinklered buildings) or more natural ventilation is required. Where Fire Department access is required, provide a lower light glazed with an insulating glass unit that has a minimum clear glazed opening of 24” wide by 36” high. (Note: A different configuration and glazing than the other building windows may be required for this window to satisfy this requirement). See Paragraph F. below for Fire Department Requirements.

2. Sill heights:

Coordinate with adjacent furniture and equipment heights. Typical sill height is 32" from finished floor to top of masonry at sill location.

B. Replacement Installations

1. Window Types

a. Option 1 – Hopper Windows (Preferred):

Hopper windows may be used where aesthetically appropriate or as a replacement in kind. Windows in non-air-conditioned buildings must provide adequate ventilation.

b. Option 2 - Aluminum Double Hung Windows:

Aluminum double hung windows may be used where aesthetically appropriate or as a replacement in kind.

1) Operable portion of double hung windows consisting of two sashes shall be limited to a maximum size of 3'-6" wide x 7'-0" high, or equivalent area except as noted below. The minimum size for a double hung window shall be 2’-0” wide x 4’-0” high. Where required by height of opening, window assembly shall be configured with a fixed, clear glazed transom panel above the two operable sashes. Where feasible, transom shall be large enough to accommodate new or reinstalled air conditioners (minimum 28” wide by 18" high clear glazed opening).

2) Windows for SHPO projects may require the operable portion to be larger than 3'-6" wide by 7'- 0" high.

3) Muntins: In general, the number of muntins for double hung windows shall be kept to a minimum. When matching the configuration of existing windows being replaced, sashes are to be divided by applied muntins. Minimum size of individual glazed lites divided by applied muntins shall be 13" by 15" clear vision dimensions. If required by the parameters listed below sashes are to be divided by true muntins. The maximum size of the individual glazed lights within the true muntins shall be governed by the most restrictive of the following requirements:

- Design wind load specified.
- Glazing manufacturer's recommendations.

2. Windows for NYS Office of Historic Preservation (SHPO) Eligible Buildings

a. Determination of eligibility will be made through the SCA liaison to SHPO.

b. Wood Windows: Due to the difficulty in procuring appropriate wood windows, replacement wood windows are not to be used unless only a small number of windows or windows in a specific discrete location are being replaced. In such case, the designer is to review the requirements with Technical Standards Unit for final determination.

c. Double-Hung Aluminum Windows with Applied Muntins and *Without* Fixed Transom Panels are to be used for window replacement projects if all the windows in the building are being replaced. Transom panels may be considered appropriate where the original windows had transom panels. Applied (false) muntin configurations, muntin size and profile should match those of the original windows when the building was constructed.

3. Holding Room Windows

In existing Holding Rooms, listed as approved in the SCA Life Safety Planning Design Requirement 1.3.3.1
and
In newly designated holding rooms in existing non-sprinklered buildings where permitted as per DR 1.3.3.1

The windows designated for evacuation of occupants by means of Fire Department tower ladder must maintain a minimum clear opening of 48" high x 32" wide, precluding the use of a projected window. These windows are typically in-swinging casements. Double hung windows are permitted only if they can provide the required clear opening for the lower sash. For window replacement projects, Holding Room evacuation windows should be designed to match the elevation of the typical replacement window.

a. In both Fire Department approved and newly designated Holding Rooms, when a window is designated for evacuation do not provide any limit stops that would limit the opening of the designated sash.

b. Holding Rooms approved and constructed prior to 1996 will be maintained as such.

c. Maximum sill height for Holding Room evacuation window is 36" above floor.

C. Both New Construction and Replacement Installations

1. Ventilation: Windows in existing non-air-conditioned buildings must provide adequate ventilation. Article 6 and 7 of subchapter 12 of the 1968 code or Section BC 1203.5 of the 2022 NYC Building Code must be complied with. These articles define the requirements for natural ventilation or a forced ventilation system. If projected windows are used, Hoppers at both the bottom and top of the window will enhance air flow if more than one operable vent is required for ventilation. When the top of a vent is 60 inches or higher above the finished floor, the vent shall be pole operated. Note that per the 2022 NYC Mechanical Code, mechanical ventilation is required to be provided.

2. Fire-Rated Steel Windows are to be used when a protected opening is required due to proximity to a lot line (as per NYC Building Code) or other code requirements.

3. Alternate Window types other than the double hung or hopper windows as described above will be considered only case-by-case for specific areas where double hung or hopper windows might not be practical due to height, aesthetic, functional or code considerations. Alternate windows types may be used when approved by the deviation process or when authorized in writing by the Vice President or a Director of Architecture and Engineering.

4. Non-operable windows with laminated safety glass or impact resistant glass are to be used at building entrance sidelights and transoms, depending if protected by window guards as per DR 4.6.1.

5. Limit stops

   Provide removable limit stops to restrict opening of vents or sashes to 4.5". This requirement applies only to lower sashes of double hung windows or vents where top of vent is within 78" of finish floor elevation for projected windows that do not have window guards or security barriers. Holding Room evacuation windows shall not be provided with limit stops.

6. Provisions for Cleaning Windows:

   Windows will be cleaned from the exterior by use of cherry picker, scaffolding or bosun's chair. Window cleaning anchors and bolts are not to be provided.

7. Insect Screens

   Provide insect screens on exterior face of windows with operable vents/sashes in all dining areas, kitchens and food preparation areas as well as classrooms where food preparation takes place, spaces that are accessory to food preparation area, 3K, pre-kindergarten classrooms and LYFE centers. Indicate locations on drawings.

8. Operable Vents

   a. In-swing hopper vents: Shall be designed such that the hopper vent is a minimum of 18" and a maximum of 36" high.
      - For buildings with mechanical ventilation, all vents shall have custodial locks.
      - For buildings with natural ventilation, vents shall have lock with handles.

b. Double hung windows: operating hardware for lower sash shall be a maximum 46” above finish floor at locations where fin tube radiators are located under the windowsill and 48” above finish floor at windows that do not have fin tube radiators under the windowsill.

D. Glazing

1. For aluminum projected/fixed windows for capacity projects and approved CIP projects:

   Type 1a: Glaze with sealed triple-glazed, argon-filled, Insulating Glass Units (IGU) with low-e coating: Size for each insulated glass unit within window members shall be 5 SF minimum and 20 SF maximum, with no dimension smaller than 12” or greater than 8’-0”.

2. For aluminum projected/fixed windows of any size and aluminum double hung windows with a maximum operable size of 3’-6" wide by 7'-0" high and transoms of CIP projects:

   Type 1b: Glaze with sealed dual-glazed Insulating Glass Units (IGU) with low-E coating: Size for each insulated glass unit within window members shall be 5 SF minimum and 20 SF maximum, with no dimension smaller than 12” or greater than 8’-0”.

3. For aluminum double hung windows with an operable size larger than 3'-6" wide by 7'-0" high:

   Type 2a: Single glaze with laminated glass. Laminated glass: 1/8" annealed glass, 60 mil PVB interlayer and 1/8" annealed glass. Maximum size for each laminated glass unit within window members shall be no greater than 36 SF with a maximum dimension no greater than 8’-0”.

4. Toilet rooms, locker rooms and medical rooms shall be provided with translucent glazing, regardless of glazing material.

5 For Fire Department requirements for glazing, see paragraph G below.

6. For CIP projects that must comply with the 2020 NYCECC, the total fenestration area shall be limited to a maximum of 40% to meet the prescriptive requirements of the Code

E. U Values

1. Capacity Projects and selected Deep Energy Retrofit CIP Projects

   a. Whole window assembly (frame, sash, glazing) U value for projected/fixed windows with Insulating Glass Units as in glazing type 1a in Par. D.1 above shall be no greater than 0.25. For any given configuration of fixed/hopper, the overall area of operable portion of window may not exceed 60% of the window area to meet the required 0.25

   b. Whole window assembly (frame, sash, glazing) U value for replicated double-hung window look projected window with Insulating Glass Units as in glazing type 1a in Par. D.1 above shall be no greater than 0.34 for projects that have to comply with the 2020 NYCECC Green Schools Rating System and LL **51/23**, if sizes are such that the replicated double-hung windows can be fabricated.

2. CIP and leased 3K/UPK Projects - 2020 NYCECC Compliance

   Whole window assembly (frame, sash, glazing) U value for projected/fixed and double hung windows with Insulating Glass Units as in glazing type 1b in Par. D.1 above shall be no greater than 0.40 for operable windows and 0.30 for fixed windows or a weighted U-factor calculated based on the proportions of fixed and operable portion of windows for all other projects to be in compliance with the 2020 NYCECC for prescriptive compliance.

3. For any given project, weighted average U value for all windows shall be calculated based on the amount of fixed and operable areas of the windows and not exceed the maximum allowable 'U' values to meet the 2020 NYC Energy Conservation Code requirement for prescriptive compliance.

F. Bird Friendly Glazing

1. All glazing in windows that are located within 75' above grade, as well as windows adjacent to green roofs at any building height, shall meet a Threat Factor of 25 of less as per the American Bird Conservancy's Tunnel Testing Protocol to comply with the requirements of BC 1403.8 as implemented by LL15/20. Exceptions to the requirement are provided in Section BC 1403.8. Refer to Buildings Bulletin 2020-022 and https://www1.nyc.gov/assets/buildings/bldgs_bulletins/bird_friendly_guidance_document.pdf for further guidance.

2. In accordance with Section BC 107, Construction Documents, applicants are required to submit architectural plans that depict the location and type of exterior material and glazing. In order to show compliance with LL15/20 and Section BC 1403.8, such architectural plans shall delineate all locations in which bird friendly materials are required to be installed. Additionally, to assist the Department to verify compliance with the provisions of LL15/20, such plans shall include the following additional items: a material location threat factor table in which the Threat Factor for all exterior materials and glazing proposed for installation are noted, and a note on the architectural plans that states the following:
   All exterior materials and glazing have been evaluated for compliance with Section BC 1403.8. Where Exterior Wall Envelope, Bird Hazard Installations, Fly-Through Conditions, or Adjacencies to Green Roofs are present in the design, Bird Friendly Materials with a Threat Factor rating of 25 or less have been specified as indicated in the Material Location Threat Factor Table.

G. Building Code and Fire Department Requirements

1. Building Code

   a. The Fire Depart Access requirements listed below pertain only to buildings constructed under the 1968 NYC Building Code and that are not sprinklered.

   b. Buildings protected by an automatic sprinkler system are exempted from the Fire Department access requirements of Section 27-292(e) of the 1968 code or Section BC 903.2.11 of the 2022 code. Similarly, the provisions described below for window evacuation from first floor levels shall be considered as not applicable to sprinklered buildings. However, refer to item d below with regards to smoke purge.

   c. Buildings constructed under a code predating the 1938 code or the 1938 Code (Building Code effective until Dec. 6, 1968) are not required to provide Fire Department access or evacuation

at windows. When replacing windows in such buildings, follow the requirements outlined herein to the extent possible based on the spacing and location of existing windows.

d. If a mechanical smoke purge is not provided, smoke purge must be provided by breakable windows, as spaces must be within 100 feet of natural ventilation with 5% openable area. Thus windows need to be specified to be of tempered glazing only.

2. Fire Department Access:

a. Each story above the first floor

For non-sprinklered buildings, Fire Department access from the exterior is required for each 50 feet of horizontal length of wall that fronts on a street or frontage space at each story above the first floor. This can typically be achieved by providing at one window, per Section 27-292(a) of the 1968 code or Section BC 903.2.11.2 of the **2022** code in each classroom, at a maximum of 50 feet apart, with glazing of glass in the lower light that can be broken from the interior and exterior. For purposes of Fire Department access, laminated glass is not considered breakable. Glass in lower sash of window that can be broken for Fire Department Access must be non-laminated tempered glass.

b. Basement or Cellar

For non-sprinklered buildings, Fire Department access from the exterior is required for the basement or cellar for each 100 feet of horizontal length of wall that fronts on a street or frontage space. This access may be achieved by providing at least one window per Section 27-292(b) of the 1968 code or Section BC 903.2.11.3 of the 2022 code at a maximum of 100 feet apart, with glazing of glass in the lower light that can be broken from the interior and exterior. Glass in lower sash of window that can be broken for Fire Department Access must be non-laminated tempered glass.

c. If the typical window glazing is polycarbonate, laminated glass or insulated laminated glass and these access windows have non-laminated breakable glazing for the purpose of access, they shall be marked with an applied label no greater than 36 in^2 which reads “FD ACCESS”. Locate labels in lower left hand corner of access windows. Labels should not be obscured by the frames of window guards. Polycarbonate glazing is considered breakable for Fire Dept. access only when it is used in conjunction with true muntins in a double hung window.

d. The clear opening size when glazing is removed from an access window sash shall be 24 inches by 36 inches per Sections BC 903.2.11.2.1 and BC 903.2.11.3.1. If some windows of a room are less than the required minimum access dimensions, then the designated conforming access opening (window and gate) shall be identified on the interior and exterior faces with labels which read - "FD ACCESS". Locate labels in lower left hand corner of access windows. Labels should not be obscured by the frames of window guards. Window guards for the FD access windows shall be openable from both the inside and the outside and minimum size of opening shall be 32 inches wide by 48 inches high per Section BC 903.2.11.2.1.

e. Maximum sill height above floor is 36” for Fire Department access. If windowsills are higher that 36” above floor, other means of access will have to be provided (door, access panel or window with lower sill).

f. Fixed, locked, and/or unbreakable windows are acceptable for areas not normally used for access, such as Auditoriums, Gymnasiums, Kitchens, Toilet Rooms, Locker Rooms, Mechanical Rooms, Storage, Utility and Service Spaces, Stairs, Corridors, etc., but the 100-foot requirement still applies.

3. Fire Department Evacuation

a. First Floor

For non-sprinklered buildings, Fire Department evacuation to the exterior shall be provided for the first floor for each 50 feet of horizontal length of wall that fronts on a street or frontage space. This can typically be achieved by providing at one window, in each classroom, at a maximum of 50 feet apart, glazing of glass in the lower light that can be broken from the interior and exterior. For purposes of Fire Department access, laminated glass is not considered breakable. The glass in the lower sash of window must be non-laminated tempered glass so that it can be broken for Fire Department Access.
If the typical window glazing is polycarbonate, laminated glass, or laminated insulated glass and these evacuation windows have non-laminated breakable glazing for the purpose of evacuation, they shall be marked with an applied label which reads “FD ACCESS”. Locate labels in lower left hand corner of evacuation windows. Labels should not be obscured by the frames of window guards. Polycarbonate glazing is considered breakable for Fire Dept. evacuation only when it is used in conjunction with true muntins in a double hung window.

The opening size when glazing is removed from an evacuation window sash shall be at least 24 inches by 36 inches.

The evacuation window shall be marked on the interior and exterior faces with labels that read - “FD ACCESS”. Locate labels in lower left hand corner of evacuation windows. Labels should not be obscured by the frames of window guards. If the window is covered by a security gate, then the gate shall also be marked with a label which reads “FD ACCESS”.

b. Maximum sill height above floor is 36” for Fire Department evacuation. If windowsills are higher than 36” above floor, other means of evacuation will have to be provided (door, access panel or window with lower sill).

c. Fixed, locked, and/or unbreakable windows are acceptable for areas not normally used for access or evacuation, such as Auditoriums, Gymnasiums, Kitchens, Toilet Rooms, Locker Rooms, Mechanical Rooms, Storage, Utility and Service Spaces, Stairs, Corridors, etc., but the 100-foot requirement still applies.

H. Acoustic Requirement

Windows with Type 1a (sealed Insulating Glass Units 1” to 1½” thick as described in para D) achieve an Outdoor Indoor Transmission Class – (OITC) rating of 28. Windows with OITC rating of 28 or greater are required for all projects that must comply with NYC Green School Rating System. A higher OITC rating is required to mitigate noise from air traffic or vehicular traffic from highways or railroad noise. Such condition will apply to projects that are in flight path or in close proximity to a highway or train tracks or for zoning lots that require a *City Environmental Quality Review (*‘E’ designated Zoning Districts).

I. Exterior Sun Shading Devices

Vertical fins or horizontal Brise Soleil may be provided when mechanically attached to the window and supplied by the window manufacturer.

J. Mechanical Opening Devices

For openable vents 10'-6" or more above the floor (typical of a Gymnasium, Gymatorium), provide an electrically operated mechanical means of opening the windows, similar to Soon Industrial Co.

K. Related Information

1. See Design Requirement 4.3.3 – Window Guards (Exterior), Security Barrier and Security Screens for Fire Department requirements regarding access and evacuation windows. The window guards, security barriers and security screens must be coordinated with the window installation.

2. See Specification Section 10400 – Identifying Devices for label requirements for Holding Room and Fire Department access and evacuation windows.

4.3 Windows

4.3.2 Window Insect Screens

Description/Design Approach:

A. Insect Screens

Provide insect screens on exterior face of windows in all dining areas, kitchens, food preparation areas including classrooms and shops where food preparation takes place, and spaces that are accessory to food preparation area. Indicate locations on drawings.

4.3 Windows

4.3.3 Window Guards (Exterior)

Description/Design Approach:

A. Window Guards:

1. Provide hinged exterior window guards: Expanded Metal Window Guards in an angle frame, Perforated Steel Security Barriers, Security Screens or Wire Mesh Guards at all windows susceptible to intrusion or breakage, such as:

   - those on grade
   - facing playgrounds
   - facing low or accessible roofs
   - facing canopies.

a. Application:

Type of Window Guard	Type of Construction		
	Existing Buildings	Building Additions (1)	New Buildings
Wire Mesh (2)	X	X	X
Expanded Metal	X	X	
Security Barrier	X(1)	X	X
Security Screen (3)		X	X
Notes:	(1) Match existing. (2) Only at second floor or higher not susceptible to intrusion but susceptible to breakage. (locations facing playground) (3) Security Screens may be used in lieu of Security Barriers provided the Designer performs a security analysis in conjunction with the school Principal and District. The Principal and District must approve the substitution in writing to the Authority.		

b. Notes:

1) For window replacement projects, existing window guards may be reinstalled (if in good condition and if they will fit the opening with the new window and panning in place and if they are the proper types). They should only be reinstalled or replaced if they are in areas susceptible to intrusion or breakage**.**

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

2) If a window guard is provided at a Fire Department access window above the first floor, the guard shall be readily operable from the outside without the use of tools. The guard shall be identified on the outside with a sign that reads “FD Access. At locations other than the ground floor and low roofs, provide a hand hole in expanded metal window guards for Fire Department access to the release mechanism from the outside. Provide a quick release mechanism accessible from outside for perforated metal security barriers.

3) If a window guard is provided at a Fire Department evacuation window at the basement, first floor, or low roof, the guard shall be readily operable from inside without the use of tools. The guard shall be identified with a sign that reads. “FD Access”.

4) Even if polycarbonate is used as the exterior glazing material, window guards will be required at windows subject to intrusion.

4.4 Roofs

4.4.1 Roof Types

4.4.1.1 Flat Roofs

Description/Design Approach:

A. General

1. For roofs in new construction, use a hot fluid-applied rubberized asphalt, fabric reinforced roofing system in a protected membrane configuration.

2. For replacement roofs in existing construction, generally use a cold-applied SBS-modified bitumen roofing system in a built-up (membrane on top) configuration. Other types of roofs may be used upon consultation with the SCA if more appropriate for the building structure/existing conditions. This may include utilizing a protected membrane assembly or using a cold fluid-applied resin membrane (reinforced urethane/PMMA type material).

3. Minimum roof covering classification to be Class A or B per BC Table 1505.1 of the 2022 NYC Building Code.

B. New Construction

1. For new construction, roof storm water detention is typically not required. The roof is to be pitched to drain for positive roof drainage, typically 1/8" per foot. If roof detention is required, the roof is to pitch approximately 2" across the length of the roof.

2. The desired slope is to be achieved by sloping structural lightweight concrete placed on a level roof deck slab. Construct crickets behind curbs that interfere with flow towards the drain using structural repair mortar.

3. Fluid-applied protected membrane roofing system shall include:

   a. Membrane – rubberized asphalt, fully adhered to deck, minimum thickness 215 mils, including fabric reinforcing sheet. Flashings are to be cold fluid-applied membrane to a minimum of 8" above surface, with the remaining portion above modified bitumen cap sheets or uncured membrane as recommended by the manufacturer. For normal height parapets, flashing shall be brought to the top of the parapet.

   b. Separation/Protection sheet – Reinforced rubberized asphalt, minimum thickness 40 mils.

   c. Drainage Mat

   d. Insulation – Extruded polystyrene. R=40, or greater if directed by the Authority for low-energy building design.

   e. Filter fabric.

   f. Drainage Mat (If pavers loose laid on the insulation)

g. Precast pavers, 2" thick minimum to provide wind uplift resistance, of reflectance required to meet NYC Green Schools Guide credit for Heat-Island Affect – Roof and the 2022 NYC Building Code. Provide more pavers if subject to water detention based on insulation manufacturer recommendation depending on insulation thickness.

h. As an alternate to reduce weight if a ballasted PV system is being placed on the roof, tongue and groove cement bonded insulation shall be used.

4. Concrete deck shall be tested for moisture content prior to membrane installation to ensure proper adhesion **using the relative humidity test, ASTM F2170**. **Use of surface moisture meters will not provide a true indication and is not permitted.**

C. Existing Construction - Roof Replacements

1. For replacement roofs, a pitch of 1/8" per foot is desirable; if the roof is sloped below this pitch and adding concrete repair mortar to increase the pitch will increase the weight on the roof too much or cause the parapet to fall below the minimum clear height, the existing pitch may remain. In this case as long as there is a pitch to drain and low spots can be filled in with repair mortar to provide a uniform slope, the pitch may remain. If the pitch is flat or very slight and a built-up roof is to be installed, tapered insulation can be used to create a pitch. Ensure that parapet heights are adjusted to maintain code required minimum heights. All existing roofing materials are to be removed down to a clean deck; new roofing is not to be applied over existing roofing without approval of one of the Directors of SCA Dept. of Architecture and Engineering.

2. Preferred built-up roof is a cold-applied SBS-modified system

a. Vapor barrier – One ply of SBS-modified base sheet set in cold adhesive **or torched down** – Mechanically vented base sheet is to be included as an allowance to account for wet deck. Mechanically fastened at perimeter to parapets and other vertical surfaces up to cap flashing, spot mopped elsewhere. Seal all side laps and head laps with modified roofing cement.

b. Insulation – Two to three layers of polyisocyanurate and composite board with an R=**40** set in cold adhesive. If there are issues with the parapet **or mechanical equipment** heights t**hat would require them to be raised or other additional cost items**, the insulation R-value may be reduced if the overall assembly of the roof meets the **NYCECC minimum requirement of** R=33. **If installation of a roof with an R=33 insulation will still require additional cost impacts from raising parapets, etc., then R=40 is to be used.** For locations where sills and doors can't be raised **or equipment will not have to be raised if a thinner insulation can be used**, vacuum-sealed insulation (R=50/inch) for **the** majority of **the** roof in combination with polyisocyanurate may be used. Use of vacuum-sealed insulation requires approval by a director of A&E **or TSS**.

c. Membrane – One ply of SBS-modified bitumen base sheet and one ply of granule-surfaced SBS-modified bitumen cap sheet of reflectance provided in specification to meet the 2022 Building Code.

d. Walkway pads - Provide walkway pads from bulkhead doors to and all around major mechanical equipment requiring periodic maintenance; e.g., Cooling Towers, Chillers, A/C Units, Condenser, Generators.

3. Previous standard - Hot-applied asphalt: May be used for substantial repair to an existing hot-asphalt roof

    a. Vapor barrier - Two plies asphalt fiberglass felt – Mechanically vented base sheet in lieu on one ply of the vapor barrier is to be included as an allowance to account for wet deck. Mechanically fastened at perimeter to parapets and other vertical surfaces up to cap flashing, spot mopped elsewhere. Seal all side laps and head laps with modified roofing cement or hot asphalt.

    b. Insulation – Two to three layers of polyisocyanurate and composite board with an R=**40** set in cold adhesive. If there are issues with the parapet **or mechanical equipment** heights t**hat would require them to be raised or other additional cost items**, the insulation R-value may be reduced if the overall assembly of the roof meets the **code minimum requirement of** R=33. **If installation of a roof with an R=33 insulation will still require additional cost impacts from raising parapets, etc., then R=40 is to be used.** For locations where sills and doors can't be raised **or equipment will not have to be raised if thinner insulation**, vacuum-sealed insulation (R=50/inch) for **the** majority of **the** roof in combination with polyisocyanurate may be used. Use of vacuum-sealed insulation requires approval by a director of A&E **or TSS**.

    c. Membrane – Three plies asphalt fiberglass felt and a granule surfaced SBS modified bitumen cap sheet of reflectance provided in specification to meet the 2022 Building Code.

    d. Walkway pads - Provide walkway pads from bulkhead doors to and all around major mechanical equipment requiring periodic maintenance; e.g., Cooling Towers, Chillers, A/C Units, Condenser, Generators.

4. The roof deck is to be tested for moisture content using **the relative humidity test, ASTM F2170 to determine if a vent base sheet is required**. **Use of surface moisture meters will not provide a true indication and is not permitted. If hot asphalt is used,** the N.R.C.A. Deck Dryness Test may be used given the possibility of excessive moisture that would make installation of a vent base sheet with either cold-adhesive or asphalt infeasible, the designer is to specify alternative means to mechanically fasten the Vented Base Sheet to the roof deck, in consultation with a structural engineer to verify the structural integrity of the deck.

5. A cold fluid-applied resin system may also be appropriate where difficult flashing details and numerous penetrations are prevalent **and use of such is to be discussed with TSS.**

D. Green Roofs

1. Typically required in new construction to meet NYC DEP Green Infrastructure requirements or when approved for pedological requirements.

2. Refer to DR 8.2.1 for detailed requirements and discussion, but typically consists of

a. Membrane - rubberized asphalt, fully adhered to deck, minimum thickness 215 mils, including fabric reinforcing sheet.

b. Separation/Protection sheet - Reinforced rubberized asphalt, minimum thickness 40 mils.

c. Drainage Mat

d. Root barrier

e. Insulation - extruded polystyrene with R=40.

f. Drainage and water retention egg-crate type mat**, if used**

g. System filter

h. 6-8" thick substrate growing medium **or combination growing medium and needle punched mineral wool**

i. A 24" wide "vegetation-free" zone is required at the roof perimeter and at all penetrations. The vegetation-free zone to be surfaced with precast pavers. **Paver elevation to be at same level as vegetation so as not to be a tripping hazard.**

3. Green roofs installed in existing buildings requires analysis of the structural loading and then determination of what roofing system is required based on the roof slab construction

4.4 Roofs

4.4.1 Roof Types

4.4.1.2 Roof-top Play Area

Description/Design Approach:

Play area for outdoor activities is recommended for children of all ages. An accessible roof-top play area shall be incorporated in the design of the building when necessary due to on-grade site restrictions or scarcity of on-grade open area.

A. Location

1. The roof-top play area shall be accessible through the building only.

2. The roof-top play area is to be located on a lower level roof accessible from the building or on the main roof of the building where feasible.

3. The roof-top play area shall be fully accessible and connected to the building's stairs and elevators via a corridor or lobby.

4. The roof-top play area shall be located away from any roof-top mechanical equipment and separated from the mechanical equipment by a visual and/or sound barrier.

5. The roof-top play area shall be located such to avoid, if possible, the classroom windows facing the roof-top play area. Alternatively sills for windows facing the roof-top play area shall be a minimum of 96" above the surface of the play area. Doors or windows of Kindergarten/Pre-Kindergarten rooms may face Early Childhood roof-top play area if roof-top play area is used by those rooms only.

6. It is preferred that the roof-top play area be located away from adjacent properties. In a rare situation where the roof-top play area is in vicinity of the adjacent properties, it shall be separated from the adjacent property by a visual and sound barrier.

B. Safety and egress

1. Roof-top play area is an occupied space and in terms of building height is considered as one of the stories of the building. Top of the overhead enclosure to be included in the height of the building. Egress requirements shall comply with NYC building code. Exit to grade shall be provided through the building or via dedicated enclosed stairs where required due to building configuration/site constraints.

2. The roof-top play area shall have a minimum of 42" high parapet, an enclosure overhead and on all sides.

C. Construction

1. Support system for the enclosure shall be designed to comply with NYC building code.

2. The clear height between the surface of the play area and the underside of the overhead enclosure support system shall be a minimum of 16’ for a primary school and 24’ for an intermediate school.

3. Overhead enclosure shall be designed to withstand snow loads as per NYC building code.

4. Surface of enclosure shall be wire mesh, chain link fence or similar non-combustible material with a minimum open area of 90%. Unobstructed area between enclosure components shall be a maximum of four (4) square inches.

5. Finish material for the play area shall be concrete pavers.
For roof-top play area used as Early Childhood play area; safety surface shall be provided in addition to the concrete pavers.

6. Initial Solar reflectance of pavers shall be **.33**.

7. Flashing and roof membrane on the vertical surfaces shall be protected.

D. Electrical

1. Emergency lighting shall be per design requirement 7.2.3.

2. Exterior/security lighting shall be as per Design requirements 7.2.5.

3. Exit lighting shall be per electrical design requirement 7.2.4.

4. Fire Alarm requirements shall comply with NYC building code.

5. The roof-top play area is treated as an outdoor space and no additional lighting is required.

E. HVAC

1. The roof-top play area is treated as an outdoor space and no weather protection, heating or cooling is required.

4.4 Roofs

4.4.2 Roof Equipment and Accessories

4.4.2.2 Roof Equipment Service Access

Description / Design Approach:

The roof top heating and cooling units' (RTU's) serviceable elements that require maintenance must be accessible for maintenance and service.
Safe access and walking surface to maintain and service RTU's shall be detailed and shown on drawings as follows:

A. For locations that have a service vestibule within the RTU and the service vestibule can be accessed via a full height door and:

1. the door sill is less than 18" above adjacent roof surface:

   a) Access to panels/doors shall be provided via walkway pavers. Such paved walkway shall be minimum 24" wide. For roofs designed for roof top water retention, pavers shall be installed such that the walking surface, i.e. the top of pavers, is above the maximum permissible water level or a minimum 3" above the top of adjacent roof surface.
   b) At locations where access panel/door swings into the walkway, the width of the walkway shall be such that it is at least 20" in width beyond the swing of the panel/door.

2. the door sill is more than 18" above adjacent roof surface:

   Path to the RTU vestibule shall be as described in A.1.a above. Access to the vestibule shall be via a metal platform as described in B.2 below and an OSHA compliant ladder.

The service vestibule(s) in a RTU may not provide access to all serviceable elements of the RTU; for serviceable elements that are not accessible via the service vestibule, the following requirements shall apply:

B. Where serviceable elements are accessible thru access panels/doors and:

1. the sill of access panel/door is less than 18" above the adjacent roof surface and/or the top of access panels/doors is less than **7'-0"** above the adjacent roof surface:

   Access to panels/doors shall be provided as described in para A.1.above.

2. where sill of access panel/door is more than 18" above the adjacent roof surface and top of access panels/doors is more than **7'-0"** above the adjacent roof surface:

   Path to the RTU shall be provided via walkway pavers as described in para A.1.a. above. Access to panels/doors shall be provided via a metal platform. This metal platform shall be minimum 24" wide. Length of the platform shall be sufficient to serve one or multiple access panels. At locations where access panel/door swings into the platform, the width of the platform shall be such that it is at least 20" in width beyond the swing of the panel/door. Surface of the metal platform shall be non-skid with open grates. Platform shall have an OSHA compliant ladder. Platform shall be located at sill level or such that the relative height between the platform and top of access panel/door is no more than **7'-0"**. All platforms to have a 3'6" high railing system at all open sides. For platforms greater than 4' above adjacent roof, provide toe board along all open sides i.e. sides that are not against the RTU.

C. Where the top of the unit has items that must be serviced, provide an OSHA compliant ladder **to access the top of the unit**.

The platform and ladder structure shall be constructed such that it can be removed to facilitate roofing and flashing during roof replacement or any other related work that requires re-roofing.

4.4 Roofs

4.4.2 Roof Equipment and Accessories

4.4.2.3 Protection at Roof Equipment

Description/Design Approach:

A. Where roof hatch openings, mechanical equipment, fans and appliances that require service are located within 10’ (ten feet) of a roof edge or open side of a walking surface and such edge or open side is located more than 30” above the floor or roof below, 3’-6” high guards shall be provided per Section BC **1015.6** of the **2022** NYC Building Code. Such guards shall extend a minimum of 30” beyond each end of mechanical equipment, fan or appliance.

B. At exterior wall locations where a 3’-6” high parapet is provided, such guards are not required.

4.4 Roofs

4.4.2 Roof Equipment and Accessories

4.4.2.4 Green/Play Roof Equipment Storage

Description / Design Approach:

A. When incorporated in the design of a building, a roof top play area and/or a Green roof will require maintenance. A grounds equipment room, janitor closet or a similar custodial storage space can be used to store such custodial cleaning and maintanence material if they are on the same level and in the vicinity of the roof.

B For Green roofs and/or play roofs that are not located on a floor that has such storage facility, a play/green roof equipment storage room shall be provided to house the materials and equipment required for the maintanence of the roof top play area and/or green roof.

1 Location

a. The equipment storage room shall be on the same level as the roof top play area/green roof.
b. The preferred location for the roof equipment storage room is adjacent to the roof top play area/green roof with direct access to that roof.

2 Construction

a. Construction of the equipment storage room shall be similar to that of the base building and shall comply with NYC building code.
b. Interior walls shall be painted. Floor shall be finished concrete with a clear sealant or hardener.
c. Shelving and wall mounted hooks for brooms etc. shall be provided.

3 Electrical

a. Fire Alarm requirements shall comply with NYC building code.
b. Provide interior lighting as per design requirement 7.2.01.
c. Provide one 20 AMP duplex outlet within the storage room.

4 HVAC

a. The equipment storage room shall be less than 75 SF and if located on a floor that has no other program or mechanical space, it shall be treated as an unoccupied outdoor space without any heating or cooling requirements and shall be naturally ventilated.
b. Equipment storage room shall not be used to store materials that give off noxious vapors or pose a fire hazard.

5 Plumbing and Drainage

a. No plumbing shall be provided in the roof top equipment storage area.

C. A frost proof wall hydrant facing the play area/green roof shall be provided. Piping for the wall hydrant to be frost proofed if routed through a non-heated space.

4.4 Roofs

4.4.2 Roof Equipment and Accessories

4.4.2.5 Roof Equipment Installation

Description/Design Approach:

Roof top mechanical equipment shall be mounted on **steel dunnage**, concrete curb, **or** specialty prefabricated seismic/vibration isolation curbs. The criteria for mounting are as follows:

Preference **for RTUs and AHUs is steel dunnage. Steel dunnage reduces the chances for condensate leaks from units entering the building and also allows more space to place silencers and other items to meet acoustic requirements.**

- The height of the dunnage is to be such that the roof can be replaced in the future. The table below is based on the, "Guidelines for Roof Mounted Outdoor Air-Conditioner Installations", by ARI/SMACNA June 1997. The table presents guidelines for the clearances necessary to accomplish roof maintenance/replacement. However, for units 60" and wider the actual width of units and clearances around the units should be discussed with roofing manufacturers for determining the required clearance above roof surface. **For reroofing applications, 20" minimum clearance is typically sufficient to allow reroofing as long as penetrations are reachable from the side to be flashed.**

Width of Equipment	Height Above Roof Surface to Bottom of Dunnage
Up to 24"	14"
25" to 36"	22"
37" to 48"	28"
49" to 60"	36"
61" and Wider	48"

Designer shall specify on the Drawings the minimum height of the bottom of the unit relative to the finished roof. Greater heights may be utilized for acoustic reasons

- **Concrete curbs shall be used at duct penetrations.**
- **Appropriate raised walkways are to be provided.**

For small units such as fans, or if project requirements limit height of units above the roof, curb mounted equipment is to be used such that the height of the curb is 12" to 18" above the finished surface of the roof (top of paver in a protected membrane assembly).

- For air handling equipment without compressors (including units installed over occupied spaces) and for rooftop equipment with compressors over corridor and unoccupied spaces, provide concrete curb and units with internal vibration isolators.
- For rooftop units with compressors over occupied spaces, provide specialty prefabricated seismic/vibration isolation curbs and units with or without internal isolation.

- The project acoustic consultant is to determine the appropriate design. Acoustic consultant must verify that units installed as defined above do not exceed the maximum noise criteria in the occupied spaces as defined in HVAC Design Requirement 6.2.25.

For service access to the equipment, refer to DR 4.4.2.2.

4.4 Roofs

4.4.3 Roof Access

4.4.3.1 Roof Access

Description/Design Approach:

Roof access shall be provided for all new buildings and building additions to allow for maintenance and as required by code.

Access shall be provided for flat roofs and roofs that have a slope of 20° or less.

A. New Buildings

1. Access to a one story building with roof top HVAC unit (RTU) shall be provided via an enclosed stair.

2. Access to main roof for buildings that are two or more stories shall be provided via a code compliant enclosed stair.

3. Access to setback roof areas that are 4 or more stories or more than 40 feet in height above grade shall be provided by one of the following:

   a Access to setback roof areas that include a stair terminating at the level of the setback shall provide access to the setback roof area via stair as per Section BC **1011.12** of the **2022** NYC Building Code.

   b Access to setback roof areas that do not include a stair terminating at the level of the setback shall be provided by

      1) Door from a corridor or a non-instructional space

      2) At roof areas without RTU unit: Access through a casement or double hung window if the clear opening of the sash is at least 24”x36” and where the window sill is no more than 36” above the adjacent roof or floor level

4. Access to setback roof areas that are less than 40 feet in height above grade shall be provided by one of the following

   a. Roof areas that have RTU units shall be provided by a door as described in 3.b.**1** above.

   b. Roof areas without RTU units shall be provided by a door as described in 3.b.**1** above or through a casement or double hung window as described in 3.b.**2** above.

5. Access to small setback roof areas (750 SF or less in area) less than 40 feet in height above grade and without RTU units shall be provided by one of the following (listed in order of preference):

    a. Door from a corridor or a non-instructional space

    b. Access through a casement or double hung window as described in 3.b.**2** above

    c. Ladder from an adjacent accessible roof where the height difference between the two roofs that are connected by the ladder is less than 20'.

    d. Through an access hatch and ladder.

B Additions

1. For additions that include a stair and roof of the addition is same height or higher than roof of the main building, access to roof of addition shall be provided via a code compliant enclosed stair.

2. Where there is a setback roof(s) or if the roof of the addition is lower than the existing and is 4 or more stories or more than 40 feet in height above grade, access to the roof(s) of addition shall be provided as described in A.3 above.

3. Where there is a setback roof(s) or roof of the addition is less than 40 feet in height above grade, access to the roof(s) of addition shall be provided as described in A.4 above.

4. Access to small setback roof areas (750 SF or less in area) less than 40 feet in height above grade and without RTU units shall be provided as described in A.5 above.

4.5 Bulkheads

4.5.1 Stair Roof Bulkhead

Description/Design Approach:

A. The design of a new building shall provide for an enclosed weather resistant enclosure for the code required stair access to the roof of the building. The exterior walls of the stair bulkhead shall be of masonry construction. The preferred composition is brick veneer over concrete masonry units (CMU). Appropriate cavity wall insulation, flashing and parapets shall be provided.

B. The selection of the exterior masonry material for the stair roof bulkhead shall be made prior to completion of preliminary design (30% Design Submission).

C. The roof substrate of the stair bulkhead shall be a metal roof, or concrete on metal deck. The roof shall be pitched to roof drains, minimum 1/4" per foot, or to a scupper/leader to the main roof. Provide a splash block at the main roof, if the stair bulkhead leaders are designed to splash onto the main roof.

D. The roofing membrane for the stair roof bulkhead shall be same roofing membrane as specified on the building's main roof. Appropriate roofing insulation shall be provided meeting the energy code requirements. If a metal roof is provided, the metal roof shall be pitched. Appropriate drainage shall be provided with appropriate pitch to gutters, roof scuppers and leaders to interior drainage.

E. Other design considerations:

1. Provide one 8" step down from the stair roof bulkhead, (top of slab-TOS) to the top of finish of the roofing membrane.

2. If the 8" step down cannot be provided, provide an 8" high (minimum) concrete curb around the entire perimeter of the stair roof bulkhead, integrating appropriate waterproofing.

3. Provide appropriate fire rating for the exterior walls of the roof bulkhead per code.

4. Provide hollow metal doors to the roof, fire rated if needed, with appropriate hardware. Provide weather stripping all around the edges of the doors.

5. Provide an exterior access ladder to the stair roof bulkhead for maintenance and inspections. Provide a smoke hatch connected to a smoke detector or window if required to meet smoke vent requirements per Section BC **713.12.1** of the **2022** NYC Building Code. Refer to DR 6.2.10.

6. Where the stair roof bulkhead is less than 1000 square feet in floor area, provide appropriate gravel stop-curb/cap flashing at the edges the stair roof bulkhead and its exterior walls. For this type of stair roof bulkhead (edge condition), the roof bulkhead must be a minimum of 10' from any of the main roof's parapets below.

4.6 Exterior Doors

4.6.1 Exterior Doors and Frames

Description/Design Approach:

A. Main entrance to the school building or main entrance to individual schools within a complex.

The design intent is to create a friendly, welcoming entranceway while providing a measure of security. The doors should have vision lights as large as possible above and below a center bar that will permit the installation of exit devices. Side lights and transoms should be provided.

1. Construction

a. Doors with vision lights: Material shall be one of the following

i. Fiberglass reinforced polyester (FRP) flush doors - anodized or with fluoropolymer coating
ii. 14 gage galvannealed steel - painted
iii. 0.125 thick Aluminum - anodized or with fluoropolymer coating
iv. Stainless steel - satin finish

b. Frames: Doors, Sidelights and Transoms- finish to match doors

0.125" thick Tubular aluminum framing with aluminum glazing stops
or
12 gage steel, galvannealed or stainless steel to match door

c. Glazing: Vision Lights, Sidelights and Transoms

Vision Lights, Sidelights and Transoms shall be glazed with 1/4"-thick laminated glass, **impact** resistant glass **or insulated glass.**

d. Security Screens

Security screens when provided shall be placed on exterior side of glazing

i. Perforated galvanized 12 gage steel with 48% to 63% open area and a powder coat finish.
or
ii. Stainless steel woven rod and cable or woven wire mesh in pattern with 46% to 74% open area.
Minimum weight 1.5 lbs per square foot.

Security screens are not required if **impact** resistant glass is used for Vision Lights, Sidelights or Transoms.

The proposed entrance design, including door and frame material, vision panel material and size, and the type of security screen shall be finalized for the Authority's approval before the 60% submission. The entrance details shall be included in the 60% submission.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

The SCA Design Manager shall obtain the concurrence of the Division of School Facilities Director of Program Management or the designated representative from the district for the proposed entrance design.

B. Stair exit doors and all other doors

1. Construction

a. Doors:
14 gage galvannealed face sheets - painted
b. Frames:
12 gage galvannealed steel, reinforced – painted. Knock-down frames are *not* acceptable
c. Vision panels, if provided, shall be of glazing meeting the safety impact requirements of CPSC 16 CFR 1201. Provide fire resistance rated safety glazing where required for rated doors.
d. No vision panels shall be provided for doors to mechanical and/or storage spaces.

C. For kitchen service entry door, refer to Design requirement 1.3.6.3 – Delivery Areas - Kitchens.

D. All exterior door frames shall be installed such that the exterior face of the door is inset a minimum 4" from the face of the adjacent exterior wall.

5.1 Finishes

5.1.1 Typical Room Finishes

Description/Design Approach:

A. The following finishes are typically for new construction. New interior finishes adjacent to or surrounded by existing construction shall match existing. In the tables, Layout Number and Layout Name reference the SCA's ROOM PLANNING STANDARDS.

B. General Notes:

1. Except for Kitchen Spaces, Refuse and Recycling Storage and other wet areas with multiple floor drains, ceramic tile floors, when required, shall be thinset. At thinset areas with drains, drain(s) shall be set 1/4" below finish floor with a two feet swale in concrete surrounding the drain. Slab must not drain away from drain. At thick set areas (wet areas with multiple floor drains, kitchen and refuse and recycling storage), structural slab shall be depressed and the floor pitched with concrete fill or structural repair concrete to provide pitch to the drains and facilitate installation of tile with a uniform setting bed depth. Coordinate with structural for slab depression. For shower areas and refuse and recycling room, slab shall slope 1/4" per foot. Servery area shall be level with drains placed under equipment areas (not in walking paths) but shall not back pitch away from drain. In kitchens, floors shall be provided with a minimal pitch to drain since some items are on rollers.

2. Gypsum board ceilings, soffits and fascias shall be painted, and the gypsum board shall be mold & moisture resistant type.

3. Coordinate location of all wall-mounted devices.

4. All surfaces to receive painted finishes shall be painted with semi-gloss paint. Block filler shall be used on all concrete block prior to painting

5. Avoid use of white or light color VCT, which causes maintenance problems. See Specifications for maximum light reflectivity values.

6. Except for Administrative spaces, all spaces that have Acoustical Tile Ceilings shall have "hold-down clips". Hold-down clips for wood fiber composition panels (Tectum) shall be impact type.

7. Metal Panel ceilings shall be non-perforated.

8. Terrazzo Tile flooring and base shall be precast cementitious type.

9. Wainscot finish material shall be applied to partitions, extending from base to height indicated herein or shown on Drawings.

10. Stainless steel corner guards 5' high shall be provided at all external partition corners in the kitchen and shall be used for tiled freestanding columns within the cafeteria.

C. The following Legend identifies typical room finishes and is used throughout the "Table of Typical Spaces and Finishes".

Legend of Finishes and Finished Materials		
Floor		
Cpt - Carpet	**PT** - Porcelain Tile	**CT** - Ceramic Tile
SC - Sealed Concrete	**RW** - Resilient Wood	**TT** - Terrazzo Tile
PC - Painted Concrete	**QT** - Quarry Tile	**VCT** - Vinyl Composition Tile
PE - Poured Epoxy	**SV** - Sheet Vinyl	**SRVT** - Slip-retardant Vinyl Tile
FAF - Fluid-Applied Eqpt. Rm. Flooring	**IRF** - Interlocking Rubber flooring	**RAF** - Resilient Athletic flooring
GPWF - GreenPlay Wood Floor	**PEF** - Point Elastic Synthetic floor	**IPF** - Interlocking Polymer Flooring
AWF - Anchored Wood Floor	**AEF** - Area Elastic Synthetic Floor	**IDF** - Interlocking Dance Floor
NAWF - Non-anchored Wood Floor	**IRF** - Interlocking Rubber flooring	**VSAF** - Vinyl Sheet Athletic Flooring
SRSV - Slip Resistant Sheet Vinyl	**MPT - Mosaic Porcelain Tile**	
Base		
IE - Integral Epoxy	**VRB - Vented Resilient Base (Vinyl or Rubber)**	**RB** – Resilient Base (Vinyl or Rubber)
Wall		
GCT - **Glazed Ceramic Tile** Glazed Ceramic Tile	**SG-P** - Semi-Gloss Paint	
Ceiling		
AcT - Acoustical Tile	**Gyp Bd -** Gypsum Board	**MP** - Metal Pan**el Tile**
TcT - Tectum (Wood Fiber Composition Panel)	**MFT –** Mineral Fiber Tile	
Miscellaneous		
IP - Intumescent Paint		
NA - Not applicable		

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
Group 1	**Instruction**						
1-10	Typical Pre-Kindergarten	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
1-11	Typical Kindergarten	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
1-12	Classroom, Grades 1-2 w/ Toilet	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
1-13	Learning Classroom, Grades 1-2 w/Toilet	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
1-14	Typical Classroom, Grade 3	VCT	RB	SG-P	---	AcT	
1-15	Typical Classrooms, Grades 4-5	VCT	RB	SG-P	---	AcT	
1-16	Typical Classrooms, Grades 6-8	VCT	RB	SG-P	---	AcT	
1-17	Typ. Classroom Grades 6-8 Alt 1	VCT	RB	SG-P	---	AcT	
1-18	Typical Kindergarten Alt 1	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
1-19	Typ. Classroom Grades 6-8 Alt 2	VCT	RB	SG-P	---	AcT	
1-20	Typical Classroom Grades 9-12	VCT	RB	SG-P	---	AcT	
1-22	Classroom w/ Operable Wall	VCT	RB	SG-P	---	AcT	
1-23	Small Group Instruction Room	VCT	RB	SG-P	---	AcT	
1-25	Typical Classroom Grades 1-2	VCT	RB	SG-P	---	AcT	
NA	Speech classroom and Health Exam	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
NA	Flexible Classroom Complex	VCT	RB	SG-P	---	AcT	
NA	Double Classroom	VCT	RB	SG-P	---	AcT	
	Special Instruction						
1-30	Special Education Classroom	VCT	RB	SG-P	---	AcT	
1-31	Reading Resource Room	VCT	RB	SG-P	---	AcT	
1-32	Speech Resource Room	VCT	RB	SG-P	---	AcT	
1-33	Special Ed. L.D. Resource Room	VCT	RB	SG-P	---	AcT	
1-34	Resource Room with Operable Wall	VCT	RB	SG-P	---	AcT	
NA	Word Processing Lab	VCT	RB	SG-P	---	AcT	
1-40	Speech Workshop w/ Operable Wall	VCT	RB	SG-P	----	AcT	
1-41	Reading Resource Room	VCT	RB	SG-P	----	AcT	
1-42	Special Ed. Resource Room	VCT	RB	SG-P	----	AcT	
Group 2	**Specialized Instruction**						
	Art						
2-10	Art Classroom	VCT	RB	SG-P	---	AcT	
2-11	Art Storeroom	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
2-20	Art Classroom w/ Storage	VCT	RB	SG-P	---	AcT	
2-21	Art Studio w/ Storage	SC	RB	SG-P	---	AcT	
2-23	Project Room	VCT	RB	SG-P	---	AcT	
2-24	Project Room	VCT	RB	SG-P	---	AcT	
2-25	Art Classroom with Storage	VCT	RB	SG-P	---	AcT	
	Music						
2-30	Music Suite	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-30.1	Music Classroom	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-30.2	Small Practice Cubicle	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-30.3	Large Practice Cubicle	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-30.4	Instrument Storeroom	VCT	RB	SG-P	---	AcT	
2-31	Music Classroom w/ Storeroom	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-32	Choral Music Classroom	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-40	Instrument Practice Room	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-42	Orchestral Room w/ Local Sound System	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals
2-43	Choral Room w/ Music Storage & Local Sound System	VCT	RB	SG-P	---	AcT	• Additional acoustical consideration - Floating conc. slab • Acoustic doors with seals

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
2-44	Music Instrument Storage	VCT	RB	SG-P	---	AcT	
	Technology						
2-50	Wireless Language Lab	VCT	RB	SG-P	---	AcT	
2-51	Materials Processing Lab and Storeroom	VCT	RB	SG-P	---	AcT	
2-52	Electronics Lab	VCT	RB	SG-P	---	AcT	
2-53	Culinary Arts Classroom	VCT	RB	SG-P	---	AcT	
2-54	Culinary Arts Storeroom	VCT	RB	SG-P	---	AcT	
NA	Wireless Language Lab	VCT	RB	SG-P	---	AcT	
NA	Special Ed Computer lab	VCT	RB	SG-P	---	AcT	
NA	Computer Classroom	VCT	RB	SG-P	---	AcT	
2-60	Programmed instruction/ Language Lab	VCT	RB	SG-P	---	AcT	
NA	Perimeter Computer Classroom	VCT	RB	SG-P	---	AcT	
NA	Cluster Computer Classroom	VCT	RB	SG-P	---	AcT	
2-61	Distance Learning Classroom	VCT	RB	SG-P	---	AcT	
NA	Adjoining Technology Lecture Room	VCT	RB	SG-P	---	AcT	
2-62	Transportation Lab	SC	RB	SG-P		AcT	
2-63	Communication Technology Lab	VCT	RB	SG-P	---	AcT	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
2-64	Material Processing Lab	VCT	RB	SG-P	---	AcT	
2-65	Electronics Lab	VCT	RB	SG-P	---	AcT	
2-66	CADD/Drafting Lab	VCT	RB	SG-P	---	AcT	
2-67	CADD/Hand Drafting Lab	VCT	RB	SG-P	---	AcT	
2-68	Mechanical Drafting Lab	VCT	RB	SG-P	---	AcT	
2-69	Virtual Enterprise Lab	VCT	RB	SG-P	---	AcT	
2-80	Stagecraft Lab	VCT	RB	SG-P	---	AcT	
2-81	Culinary Arts Lab	QT	QT	GCT	Full height	AcT	Wall tile shall extend a minimum of 4-inches above ceiling
2-82	Photography Lab	VCT	RB	SG-P	---	AcT	
2-83	Technology Store Room	VCT	RB	SG-P	---	AcT	
Group 3	**Science**						
3-10	Science Resource Room	VCT	RB	SG-P	---	AcT	
3-11	Science Resource Prep Room and Storage	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-12	Science Resource Room with Storage	VCT	RB	SG-P	---	AcT	
3-13	Science Resource Room – Option 1	VCT	RB	SG-P	---	AcT	
3-14	Science Laboratory/Demo	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
3-15	Science Project Prep Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
NA	Standard Perimeter Laboratory	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
NA	Standard Perimeter Laboratory – Biology	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-20	Standard Trifacial Laboratory	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-21	Standard Trifacial Laboratory Biology	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-22	Biology Project Preparation Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-23	Chemistry/Physics Project Prep Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions. Soap stone floor, wainscot and shelving in acid storage room
NA	Combined Science Project Preparation	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions. Soap stone floor, wainscot and shelving in acid storage room
3-24	Science Demonstration Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-25	Science Lecture Room	VCT	RB	SG-P	---	AcT	
3-26	Science Lecture Room	VCT	RB	SG-P	---	AcT	
NA	Science Perimeter Lab. Demonstration	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-27	Trifacial Lab Demonstration	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-28	Standard Physics Laboratory	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-29	Standard Chemistry Laboratory	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-40	Double Quad Laboratory	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
3-41	Plant Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions
3-42	Science Prep Room	QT (or) PE	QT (or) IE	SG-P	---	AcT	Poured epoxy preferred for new buildings/additions. Soap stone floor, wainscot and shelving in acid storage room
NA	Science Storage	QT (or) PE	QT (or) IE	SG-P	---	AcT	
Group 4	**Physical Education**						
4-10	Gymnasium (Small)	AW Refer to DR 5.3.1, See notes	VRB or RB	SG-P, See Notes	Removable Protective Padding	See Notes	• Acoustic CMU to be used above height of wall padding. • No suspended ceiling required. Designer's option to use Tectum ceiling. • If fireproofing of steel is required, sprayed fireproofing shall not be left exposed to view. If steel is exposed and painted, and a fire rating is required, intumescent fireproofing shall be used. • Exposed ductwork shall be round and painted. • Ceramic tile at DF alcove
4-11	Auxiliary Gym and Storeroom	AW Refer to DR 5.3.1, See Notes	VRB or RB see Notes	SG-P	---	AcT	Storeroom shall have VCT floor and Resilient base
4-12	Gymnasium	AW Refer to DR 5.3.1, See notes	VRB or RB	SG-P	Removable Protective Padding	See Notes	• Acoustic CMU to be used above height of wall padding. • No suspended ceiling required. Designer's option to use Tectum ceiling • If fireproofing of steel is required, sprayed fireproofing shall not be left exposed to view. If steel is exposed and painted, and a fire rating is required, intumescent fireproofing shall be used • Exposed ductwork shall be round and painted. • Ceramic tile at DF alcove

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
4-20	Competition Gymnasium	AW Refer to DR 5.3.1, See notes	VRB or RB	SG-P, See Notes	Removable Protective Padding	See Notes	• Acoustic CMU to be used above height of wall padding. • No suspended ceiling required. Designer's option to use Tectum (Tct) ceiling • If fireproofing of steel is required, sprayed fireproofing shall not be left exposed to view. If steel is exposed and painted, and a fire rating is required, intumescent fireproofing shall be used • Exposed ductwork shall be round and painted • Ceramic tile at DF alcove
4-21	Practice Gymnasium	AW Refer to DR 5.3.1, See Notes	VRB or RB	SG-P, See Notes	Removable Protective Padding	See Notes	See Notes for Competition Gym
4-22	Auxiliary Gymnasium	AW Refer to DR 5.3.1	VRB or RB	SG-P, See Notes	Removable Protective Padding	See Notes	See Notes for Competition Gym
4-23	Dance Studio	AW Refer to DR 5.3.1	VRB or RB	SG-P	---	Tct	
4-24	Weight Training	IRF	RB	SG-P	---	Tct	
4-25	Wrestling Gymnasium	AW Refer to DR 5.3.1	VRB or RB	SG-P	Removable Protective Padding	Tct	
4-26	Gymnastics Gymnasium	AW Refer to DR 5.3.1	VRB or RB	SG-P, See Notes	Removable Protective Padding	See Notes	See Notes for Competition Gym
4-27	Competition Pool	CT	GCT	GCT	---	---	
4-30	Locker Room	VCT	RB	SG-P	---	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
4-31	Student Locker Room – M/F w/ Toilets	MPT/VCT	GCT	SG-P/ GCT	GCT	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board • VCT floor and GCT wainscot (align with top of doorframe) in locker area • CT floor and full height GCT in toilet area
4-40	Student Locker Room w/ Shower, Toilets – M/F	MPT	GCT	GCT	--	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board
4-41	Locker Room w/ Showers – Visiting Team	MPT	GCT	SG-P, See Notes	GCT	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board • GCT wainscot to align with top of doorframe in locker area • Full height GCT in shower and toilet area
4-42	Pool Locker Rooms	MPT	GCT	SG-P	--	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board
4-43	Shower Room	MPT	GCT	SG-P	--	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board
4-50	Health Instructor's Office (Small)	VCT/MPT, See Notes	RB/GCT, See Notes	SG-P	GCT, See Notes	AcT	• Ceiling material shall be mold & moisture resistant gypsum board in toilet/shower area • Toilet and shower area shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
4-51	Health Instructor's Office w/ Storage	VCT/MPT, See Notes	RB/GCT, See Notes	SG-P	GCT, See Notes	AcT	• Ceiling material shall be mold & moisture resistant gypsum board in toilet/shower area • Toilet and shower area shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
4-52	Health Instructor's Office	VCT/MPT, See Notes	RB/GCT, See Notes	SG-P	GCT, See Notes	AcT	• Ceiling material shall be mold & moisture resistant gypsum board in toilet/shower area • Toilet and shower area shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
4-53	Gym Storeroom (Small)	VCT	RB	SG-P	---	AcT	
4-54	Gym Storeroom	VCT	RB	SG-P	-----	AcT	
4-55	Health Instructor's Office w/o Shower	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
4-60	Competition Gymatorium w/ Telescoping Seating	RW Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	• Acoustic CMU to be used above height of wall padding. • Tectum ceiling is preferred for auditorium function w/ platform. • If fireproofing of steel is required, sprayed fireproofing shall not be left exposed to view. (If steel is exposed and painted, and a fire rating is required, intumescent fireproofing shall be used.) • Exposed ductwork shall be round and painted. • No ceiling required at platform/performance area. All elements shall be painted "Black" except as follow; (For any exposed duct with insulation on platform shall not be painted black unless recommended by manufacturer. Black liners to be provided if available.) • Ceramic wall tile at DF alcove. • Full height CMU block behind telescoping seating
4-70	Gymatorium	**A**W Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	See notes for layout 4-60
4-71	Gymatorium	RW Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	See notes for layout 4-60
4-80	Gymatorium (Small) with Telescoping Seating	RW Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	See notes for layout 4-**6**0
4-84	Gymatorium (Large) with Telescoping Seating	RW Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	See notes for layout 4-**6**0
4-90	Gymatorium	RW Refer to DR 5.3.1	RB	SG-P	Removable Protective Padding	See Notes	See notes for layout 4-**6**0

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
Group 5	**Assembly areas**						
5-10	Assembly Area Design Concept - Stage/Platform	NWF, VCT, See Notes	RB	SG-P	---	See Notes	• No ceiling required. All elements shall be painted "Black" except as follow; Any exposed duct with fire wraps on platform/stage shall not be painted black. Provide fire wrap with "black" liner. • Refer to DR 5.3.1. for wood floor system. Non-anchored wood floor (NWF) for new buildings/additions. If existing stage/platform is resilient floor, replace with VCT to avoid elevation changes due to the thickness of the wood floor system.
5-11	Assembly Area Design Concept	See Notes	RB	SG-P	---	See Notes	• Architectural Treatment for Acoustics. Materials subject to approval by SCA. • Seating area shall be painted concrete (PC). • Areas outside the seating areas shall be Sheet Vinyl (SV) or vinyl composition tile (VCT). Slip retardant sheet vinyl (SRSV) or slip retardant vinyl tile (SRVT) required on sloping floors. However, tile is generally preferred due to relative ease of replacement.
5-12	Dressing Room	VCT, See Notes	RB, See Notes	SG-P	GCT, See Notes	AcT	• Ceiling material shall be mold & moisture resistant gypsum board in toilets • Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
5-13	Assembly Storeroom	VCT	RB	SG-P	---	AcT	
5-20	Assembly Area 300 Seats	PC, VCT, SRVT, See Notes	RB	SG-P, See Notes	---	See Notes	• VCT floor in storage, projection and utility rooms • AcT ceiling in storage, projection and utility rooms • Acoustical wall panels on seating area. • Refer to DR 5.3.1. for Auditorium floor system.
5-30	Assembly Area 300 Seats	PC, VCT, SRVT, See Notes	RB	SG-P, See Notes	---	See Notes	• VCT floor in storage, projection and utility rooms • AcT ceiling in storage, projection and utility rooms • Acoustical wall panels on seating area. • Refer to DR 5.3.1. for Auditorium floor system.

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
5-40	Assembly Area 300 seats (w/ Student Dressing Rooms)	PC, VCT, SRVT, See Notes	RB, See Notes	SG-P, See Notes	See Notes	See Notes	• Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • VCT floor in storage, projection and utility rooms • AcT ceiling in toilets, storage, projection and coat rooms • Acoustical wall panels on seating area. • Refer to DR 5.3.1. for Auditorium floor system.
5-50	Auditorium 550 Seats	PC, VCT, SRVT, See Notes	RB, See Notes	SG-P, See Notes	---	See Notes	• Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • VCT floor in storage, projection and utility rooms • AcT ceiling in, storage, projection and utility rooms • Acoustical wall panels on seating area. • Refer to DR 5.3.1. for Auditorium floor system.
5-60	Assembly Area 550 Seats-Stadium Layout	PC, VCT, SRVT, See Notes	RB, See Notes	SG-P, See Notes	See Notes	See Notes	• Toilet rooms shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • VCT floor in storage, projection and utility rooms • AcT ceiling in toilets, storage, projection and coat rooms • Acoustical wall panels on seating area. • Refer to DR 5.3.1. for Auditorium floor system.
Group 6	**Libraries**						
6-10	Early Childhood Library	VCT	RB	SG-P	---	AcT	
6-13	Library (PS)	VCT	RB	SG-P	---	AcT	
6-14	Library (PS) All tables/Chair Seating	VCT	RB	SG-P	---	AcT	
6-15	Library- PS, PS/IS	VCT	RB	SG-P	---	AcT	
6-16	Library (For PS, PS/IS, IS, IS/HS, HS)	VCT	RB	SG-P	---	AcT	
6-17	Library Large PS PS/IS	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
6-18	Library **(For** IS, IS/HS**)**	VCT	RB	SG-P	---	AcT	
6-20	Library/Media Center	VCT	RB	SG-P	---	AcT	
6-21	Library/Media Center & AV Storage	VCT	RB	SG-P	---	AcT	
Group 7	**Circulation**						
7-10	Lobby Design Criteria	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	AcT, Gyp Bd	Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
NA	Entry Corridors, Exit Passageways	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	AcT,	• These are finishes at high traffic areas and exits • Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
NA	Vestibules	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	SG-P	• Ceiling material shall be mold & moisture resistant gypsum board with SG-P paint • Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
NA	Stairs	See Notes	---	SG-P	---	---	Refer to DR 1.3.4.4.
7-20	Play Yard Entrance/Exit	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	AcT, Tct, Gyp Bd	Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
7-21	Lobby w/ Cycle Parking & Security Station	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	AcT, Tct, Gyp Bd	Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
NA	Lobby Security Room	TT, QT, PT	TT, QT, PT, GCT	SG-P	GCT	Tct	
NA	Corridor- Primary School	VCT	GCT	SG-P	GCT	AcT	Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling
7-40	Typical Corridor w/ Lockers (For IS, IS/HS, HS)	VCT	GCT	SG-P	GCT	Tct	• Top of wall tile wainscot shall align with top of doorframes or 4-inches above ceiling • No wainscot required behind lockers

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
Group 8	**Pupil Personnel Services**						
8-10	Guidance Suite - Small	---	---	---	---	---	
8-10.1	Guidance Offices	VCT	RB	SG-P	---	AcT	
8-10.2	Guidance Conference Room	VCT	RB	SG-P	---	AcT	
8-10.3	Guidance Storeroom	VCT	RB	SG-P	---	AcT	
8-10.4	Guidance Waiting Room	VCT	RB	SG-P	---	AcT	
8-11	Guidance Suite - Medium	---	---	---	---	---	
8-11.1	Guidance Offices	VCT	RB	SG-P	---	AcT	
8-11.2	Guidance Conference Room	VCT	RB	SG-P	---	AcT	
8-11.3	Guidance Closet	VCT	RB	SG-P	---	AcT	
8-11.4	Guidance Waiting Room	VCT	RB	SG-P	---	AcT	
8-12	Guidance Suite - Large	---	---	---	---	---	
8-12.1	Guidance Offices	VCT	RB	SG-P	---	AcT	
8-12.2	Guidance Conference Room	VCT	RB	SG-P	---	AcT	
8-12.3	Guidance Storeroom	VCT	RB	SG-P	---	AcT	
8-12.4	Guidance Waiting Room	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
8-13	Guidance Office	VCT	RB	SG-P	---	AcT	
8-20	Guidance House	VCT	RB	SG-P	---	AcT	
8-21	Guidance Suite	VCT	RB	SG-P	---	AcT	
8-22	College & Vocational Guidance Office	VCT	RB	SG-P	---	AcT	
8-30	School Base Support Team Suite-Small	---	---	---	---	---	
8-30.1	School Base Support Team Office	VCT	RB	SG-P	---	AcT	
8-30.2	School Base Support Team Conference Room	VCT	RB	SG-P	---	AcT	
8-30.3	School Base Support Team Waiting Room	VCT	RB	SG-P	---	AcT	
8-31	School Base Support Team Suite w/o Storage	---	---	---	---	---	
8-31.1	School Base Support Team Office	VCT	RB	SG-P	---	AcT	
8-31.2	School Base Support Team Conference Room	VCT	RB	SG-P	---	AcT	
8-31.3	School Base Support Team Waiting Room	VCT	RB	SG-P	---	AcT	
8-32	School Base Support Team Suite with Storage	---	---	---	---	---	
8-32.1	School Base Support Team Office	VCT	RB	SG-P	---	AcT	
8-32.2	School Base Support Team Conference Room	VCT	RB	SG-P	---	AcT	
8-32.3	School Base Support Team Storeroom	VCT	RB	SG-P	---	AcT	
8-32.4	School Base Support Team Waiting Room	VCT	RB	SG-P	---	AcT	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
8-40	School Based Support Team Suite (Medium)	VCT	RB	SG-P	---	AcT	
8-41	School Based Support Team Suite (Large)	VCT	RB	SG-P	---	AcT	
8-42	LYFE Center Suite	VCT	RB	SG-P	---	AcT	
8-43	Government & Club House	VCT	RB	SG-P	---	AcT	
NA	Publications Office	VCT	RB	SG-P	---	AcT	
8-44	Records Room	VCT	RB	SG-P	---	AcT	
8-45	Student Store	VCT	RB	SG-P	---	AcT	
8-46	Student Services Suite	VCT	RB	SG-P	---	AcT	
8-47	Lateness and Attendance Office	VCT	RB	SG-P	---	AcT	
8-48	Assistant Principal's Guidance Office	VCT	RB	SG-P	---	AcT	
8-49	A.P. Guidance Secretary	VCT	RB	SG-P	---	AcT	
08-50	Medical Suite - Small	**VCT, See Notes**	**RB, See Notes**	SG-P	**See Notes**	**AcT**	**Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base**
08-51	Medical Suite	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	• Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
8-61	School Based Health Clinic	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	• Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
Group 9	**Storage**						
NA	Multipurpose Storeroom	VCT	RB	SG-P	---	---	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
9-10	Book Storeroom (Small)	VCT	RB	SG-P	---	---	
9-11	Book Storeroom (Large)	VCT	RB	SG-P	---	---	
9-12	Large Book Storeroom	VCT	RB	SG-P	---	---	
9-13	Small Book Storeroom	VCT	RB	SG-P	---	---	
9-14	Furniture Storeroom	VCT	RB	SG-P	---	---	
9-15	Furniture Storeroom (Large)	VCT	RB	SG-P	---	---	
9-16	Receiving and General Supply	VCT	RB	SG-P	---	---	
9-17	Receiving and General Storage	VCT	RB	SG-P	---	---	
9-18	Year Round Storeroom	VCT	RB	SG-P	---	---	
9-19	Grounds Equipment Storeroom	SC	RB	SG-P	---	---	
9-20	Grounds Equipment Storeroom (Large)	SC	RB	SG-P	---	---	
9-21	Audio Visual/Secure Storeroom	VCT	RB	SG-P	---	AcT	
9-22	“Vault”	VCT	RB	SG-P, See Notes	---	---	Block filler shall be used on concrete block prior to painting
9-23	“Vault” w/ Anteroom	VCT	RB	SG-P, See Notes	---	---	Block filler shall be used on concrete block prior to painting
9-24	Refuse and Recycling Storage	QT	QT	GCT	---	MP	GCT wainscot to top of door frame
9-25	Computer/AV Storeroom	VCT	VB	SG-P	---	---	

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	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
Group 10	**Administration**						
10-10	General Office/Waiting/Mail/Duplicating	VCT	RB	SG-P	---	AcT	
10-11	General Office and Waiting Area	VCT	RB	SG-P	---	AcT	
10-12	Principal's Office	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base.
10-13	Principal's Office w/o Toilet	VCT	RB	SG-P	See Notes	AcT	
10-14	Records Room	VCT	RB	SG-P	---	AcT	
10-15	Principal's Office w/ Toilet	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
10-16	Duplicating Room w/ Lockers	VCT	RB	SG-P	---	AcT	
10-17	Duplicating Room	VCT	RB	SG-P	---	AcT	
10-18	Supervisory Office with Storeroom	VCT	RB	SG-P	---	AcT	
10-19	Administration Office w/Storage	VCT	RB	SG-P	---	AcT	
10-20	Supervisor's Office w/ Conference & Storage	VCT	RB	SG-P	---	AcT	
10-21	Program Office	VCT	RB	SG-P	---	AcT	
10-22	Teachers Mail & Time Room	VCT	RB	SG-P	---	AcT	
NA	Staff Workroom	VCT	RB	SG-P	---	AcT	
10-23	Treasurer's Office	VCT	RB	SG-P	---	AcT	
10-24	Teacher's/Aide's Workroom w/ Toilet	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base

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	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
10-25	Community Activities/Parents' Room	VCT	RB	SG-P	---	AcT	
10-26	Parent/Community Office	VCT	RB	SG-P	---	AcT	
Group 11	**Cafeteria/lunch**						
11-10	Students' Cafeteria/Multipurpose Room	VCT, See Notes	GCT	SG-P	GCT	AcT	• Top of GCT wainscot shall align with top of doorframes. • Use resilient athletic flooring only when cafeteria is also used for athletics, calisthenics or games
11-11	Staff Lunch/Conference Room (Small)	VCT	RB	SG-P	---	AcT	
11-12	Staff Lunch/Conference Room (Large)	VCT	RB	SG-P	---	AcT	
11-13	Staff Lunch Room **W/Out Servery**	VCT	RB	SG-P	---	AcT	
11-20	Staff Dining w/ Servery	QT,	QT,	GCT	---	AcT/MP	• Floor in Dining area shall be VCT, with vinyl base. QT floor and base in Servery. Metal pan ceiling in servery area only • QT floor shall be thickset and have epoxy grout. Top of QT in Servery shall align with top of VCT in dining area
11-41	Cafeteria Seating	VCT	GCT	SG-P	GCT	AcT	Top of GCT wainscot shall align with top of doorframes
Group 12	**Custodial**						
12-11	Custodian's Office	VCT	RB	SG-P	---	AcT	
12-12	Custodian's Office w/ Storage	VCT	RB	SG-P	---	AcT	
12-13	Custodian's Storeroom (Small)	VCT	RB	SG-P	---	---	
12-14	Custodian's Storeroom (Medium)	VCT	RB	SG-P	---	---	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
12-15	Custodian's Storeroom (Large)	VCT	RB	SG-P	---	---	
12-16	Custodian's Workshop	VCT	RB	SG-P	---	---	
12-17	Janitor's Sink Closet	MPT	GCT	SG-P	GCT	---	Top of GCT wainscot shall align with top of doorframe
NA	MEP Service and Mechanical Rooms, including fire pump area, boiler room, gas meter room	SC or FAF, See Notes	RB or FAF, See Notes	SG-P			Use fluid-applied equipment room flooring for rooms containing mechanical equipment subject to leaks, such as boilers, water heaters, oil tanks
12-18	Girls' Restroom and Boys' Restroom	MPT	GCT	GCT	---	SG-P	Ceiling material shall be mold & moisture resistant gypsum board
12-20	Custodian's Locker Room w/ Toilet & Shower	VCT/MPT, See Notes	VB, See Notes	SG-P, See Notes	See Notes	AcT, see Notes	Toilet & shower room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT Base and SG-P on mold & moisture resistant gypsum board ceiling
12-21	Security Officers Changing Room M/F	VCT	RB	SG-P	---	AcT	
12-22	Shower and Changing Room w/ Lockers	VCT/MPT See Notes	RB /GCT, See Notes	SG-P	See Notes	AcT	Toilet & shower area shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT Base and SG-P on mold & moisture resistant gypsum board ceiling
12-23	Custodian's Locker room	VCT	RB	SG-P	---	AcT	
12-25	DIIT Large School Main Telecommunication Room	PC	RB	SG-P	---	---	
12-26	Telecommunications Closet	PC	RB	SG-P	---	---	
12-27	Staff All Gender Toilet	MPT	GCT	SG-P	GCT	SG-P	• Top of GCT wainscot shall align with top of doorframe. • Ceiling material shall be mold & moisture resistant gypsum board.
12-28	School Safety Adm'n (SSA) Office and Locker Rooms	VCT	RB	SG-P	---	AcT	
NA	Bicycle storage/ Interior Cycle Parking Area	SC, See Notes	RB, See Notes	SG-P, See Notes	See Notes	See Notes	Floor, wall and ceiling finishes to match adjacent finishes for bicycle storage/parking located on building entrance vestibule

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
12-29	All Gender Access Toilet	MPT	GCT	SG-P	GCT	AcT	Top of GCT wainscot shall align with top of doorframe
12-30	Student All Gender Toilet	MPT	GCT	SG-P	GCT	SG-P	• Top of GCT wainscot shall align with top of doorframe. • Ceiling material shall be mold & moisture resistant gypsum board.
12-31	DIIT Medium School Main Telecommunication Room	PC	RB	SG-P	---	---	
Group CW	**Citywide Special Education**						
CW10-10	Special Education Classroom	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
CW10-11	Special Education Classroom (Large)	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
CW10-12	Special Education Classroom alt1	VCT	RB	SG-P	---	AcT	
CW10-13	Special Education Classroom w/ Lockers (IS/HS Program)	VCT	RB	SG-P	---	AcT	
CW10-14	Special Education Classroom w/o Toilets (IS/HS Program)	VCT	RB	SG-P	---	AcT	
CW10-15	Special Education Classroom (IS/HS Program)	VCT	RB	SG-P	---	AcT	
CW12-10	Changing Room	MPT	GCT	SG-P	GCT, See Notes	AcT	Top of GCT wainscot shall align with top of doorframe
CW16-30	Activities for Daily Living	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe)F, GCT base
CW17-12	Speech Room	VCT	RB	SG-P	---	AcT	
CW30-00	Guidance Office	VCT	RB	SG-P	---	AcT	
CW30-80	Guidance Storeroom	VCT	RB	SG-P	---	AcT	
CW34-00	Occupational Therapy/Physical Therapy	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
CW40-70	Administration Office and Storage	VCT	RB	SG-P	---	AcT	
CW80-00	Storage Room	VCT	RB	SG-P	---	AcT	
Group K	**Kitchen / Food Services**						
K2	Kitchen: Including Receiving Area, Cooking, and Preparation Area, Pot Wash Areas	QT	QT	GCT	Full height	MP	• Metal panel ceiling shall be non-perforated • Wall Tile shall extend a minimum of 4-inches above ceiling • Epoxy grout shall be used with quarry tile floors and base • Marble saddle shall be provided at all changes of flooring material • Provide flush saddle between VCT floor in food storage area and QT floor in kitchen
K2	Can Wash/Mop room	QT	QT	GCT	Full height	MP	• Wall tile shall extend a minimum of 4-inches above ceiling.
K3	Student Servery Layout and Schedule	QT	QT	GCT	Full height	MP	• Wall tile shall extend a minimum of 4-inches above ceiling • Provide flush saddle between VCT floor in dining area and QT floor in servery when there is no demising wall separating the spaces
K4	Temporary Kitchen	QT	QT	GCT	Full height	MP	Wall Tile shall extend a minimum of 4-inches above ceiling
K5	Warming/Therm Hold Kitchen Layout and Schedule	QT	QT	GCT	Full height	MP	Wall Tile shall extend a minimum of 4-inches above ceiling
NA	Food Storage	VCT	RB	SG-P	---	AcT	Provide flush saddle between VCT floor in food storage area and QT floor in kitchen
NA	Non-food storage	VCT	RB	SG-P	---	AcT	Provide flush saddle between VCT floor in food storage area and QT floor in kitchen
K6	Dietician's/Manager's Office	VCT	RB	SG-P	---	AcT	
NA	Walk –in Refrigerator and Freezer	QT	--	--	--	--	
NA	Compressor room	SC	RB	SG-P	--	SG-P	Ceiling material shall be mold & moisture resistant gypsum board

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
K8	Kitchen Staff Locker room	VCT	RB	SG-P	---	AcT	
NA	Detergent Storage	VCT	RB	SG-P	---	AcT	
Group 3K	**3K**						
3K 1-10	3k Typical Classroom	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	• Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • Ceiling in toilet shall be lay-in MFT
3K 4-10	3K Exercise room	VSAF, See Notes	RB, See Notes	SG-P, See Notes	Removable protective padding	See Notes	• Where ceiling is not provided, exposed ductwork shall be round and painted. • AcT ceiling where provided to have Impact clips • Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • Ceiling in toilet shall be lay-in MFT
3K 7-10	3K Lobby	VCT	RB	SG-P	---	AcT	
3K 8-52	3K Nurse's Office	VCT	RB	SG-P	---	AcT	
3K 8-53	3K Medical Office	VCT	RB	SG-P	---	AcT	
3K 9-19	3K Grounds Equipment Storage	SC	RB	SG-P	---	---	
3K10-11	3K General office/Mail/Time/ Duplicating	VCT	RB	SG-P	---	AcT	
3K 10-13	3K Principal's Office	VCT	RB	SG-P	---	AcT	
3K10-15	3K Principal's Office w/ Conf Area	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
3K 10-25	3K Parents/Community Room	VCT	RB	SG-P	---	AcT	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
3K 10-27	3K Staff Room	VCT	RB	SG-P	---	AcT	
3K K2	3K Warming Pantry	QT	QT	GCT - See Notes	See Notes	See Notes	6”x6” QT, thinset mortar w/ transition saddle; GCT in pantry area shall extend a minimum of 4-inches above ceiling. VCT in staff locker room and storage room. MP in pantry area. AcT in locker and storage area
3K 12-11	3K Custodian’s Office	VCT	RB	SG-P	---	AcT	
3K 12-25	3K Telecommunications Closet	PC	RB	SG-P	---	---	
Group UPK	**UPK**						
UPK 1-10	Typical UPK Classroom	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	• Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • Ceiling in toilet shall be lay-in MFT
(Similar to 3K 4-10)	Exercise Room	VSAF, See Notes	RB, See Notes	SG-P, See Notes	Removable protective padding	See Notes	• Where ceiling is not provided, exposed ductwork shall be round and painted • AcT ceiling where provided to have Impact clips • Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base • Ceiling in toilet shall be lay-in MFT
UPK 7-10	UPK Lobby Design Criteria	VCT	RB	SG-P	---	AcT	
UPK 8-53	UPK Medical office	VCT	RB	SG-P	---	AcT	
UPK 9-16	Receiving and General Supply Room	VCT	RB	SG-P	---	AcT	
UPK 9-19	UPK Grounds Equipment Closet	SC	RB	SG-P	---	---	
UPK 9-24	Refuse and Recycling Storage	SC	RB	SG-P	---	---	

	Table of Typical Spaces and Finishes						
Layout Number	**Layout Name**	**Floor**	**Base**	**Wall**	**Wainscot**	**Ceiling**	**Notes**
UPK 10-11	UPK General office/Waiting Room	VCT	RB	SG-P	---	AcT	
UPK 10-13	UPK Principal's Office	VCT	RB	SG-P	---	AcT	
UPK 10-15	UPK Principal's Office w/ Conf Area	VCT, See Notes	RB, See Notes	SG-P	See Notes	AcT	Toilet room shall have MPT flooring, GCT wainscot (align with top of doorframe), GCT base
UPK 10-25	UPK Community Activities/Parents room	VCT	RB	SG-P	---	AcT	
UPK 10-27	UPK Staff Room	VCT	RB	SG-P	---	AcT	
UPK 12-11	UPK Custodian's Workshop/office	VCT	RB	SG-P	---	AcT	
UPK 12-25	UPK Telecommunications	PC	RB	SG-P	---	---	
UPK K2	UPK Warming Pantry	QT	QT	GCT See notes	See notes	See notes	6"x6" QT, thinset mortar w/ transition saddle; GCT in pantry area shall extend a minimum of 4-inches above ceiling. VCT in staff locker room and storage room. MP in pantry area. AcT in locker and storage area

5.2 Partitions

5.2.1 Concrete Masonry Units

Description / Design Approach:

Concrete Masonry Units (CMU) are typically provided as back up for exterior walls, as partitions for Gymnasiums and Stair Shafts or where otherwise indicated by plans for specific conditions.

1. When CMU is used and exposed to view they shall be filled and painted. CMU walls shall have a minimum thickness of six inches.

2. When acoustical CMU block is required it shall have a minimum thickness of eight inches so to accommodate seismic and acoustical requirements. The eight-inch block is the minimum thickness for a CMU for this type of condition. This block provides separate cells within the block for seismic bracing and acoustical treatment.

3. When external CMU corners meet edge to edge with Gypsum partition walls “bullnosed” CMU should not be installed.

5.2 Partitions

5.2.2 Interior Partitions

Description/Design Approach:

The following assemblies and materials shall be acceptable for interior partitions in the rooms and spaces indicated; steel stud thickness minimum 20 gauge unless otherwise noted.

Rooms	Assembly	Material
Administration, Staff Offices, Support Rooms and classroom partitions at corridor walls and classroom specific toilets	Single layer of wallboard on one side of studs, and double layer on opposite side of studs. Additional layers as required to achieve fire ratings, extending to slab above.	Face layers: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Classroom partitions where rear walls of classrooms are back to back	Double layer of wallboard extending to slab above, on each side of studs Additional layers as required to achieve fire ratings, extending to slab above. 6” runner with staggered studs.	Face layers: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Partitions between classrooms and spaces other than toilets, corridors or spaces with a higher STC or ICC requirement	Single layer of wallboard on one side of studs, and double layer on opposite side of studs. The gypsum board at one side must be supported on resilient clips – this face of the partition cannot support shelving and counters. Additional layers as required to achieve fire ratings, extending to slab above.	Face layers: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Corridors, Lobbies, and Vestibules	Single layer of wallboard on room side of studs. Double layer on corridor side of studs.	Face layers: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.

Rooms	Assembly	Material
Auditorium and Library	Perimeter of area: double layer of wallboard on both sides of studs, all layers extending to slab above. Partitions within area: 1 layer on one side, 2 layers on opposite side.	Face layers: 5/8" thick abuse **and impact** resistant gypsum board. Concealed layers: 5/8" thick, mold & moisture resistant gypsum wallboard.
Partitions separating High Noise spaces such as Cafeteria, Music Rooms, Dance Classrooms and Lunchrooms from instructional spaces	Perimeter of area: Masonry partitions or 6-inch deep, 25 gauge studs with three layers of 5/8-inch gypsum board on both sides. Partitions within area: 1 layer on one side, 2 layers on opposite side.	Face layers: 5/8" thick abuse and impact resistant gypsum board. Concealed layers: 5/8" thick, mold & moisture resistant gypsum wallboard.
MEP Rooms and Storage Rooms	Single layer of wallboard on one side of studs, and double layer on opposite side of studs. Additional layers to achieve fire rating.	Face layer: 5/8” thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Ganged Toilets, Gym Locker, Gym Showers, Gym Toilets.	Double layer on toilet room side, including chase wall. Single layer on side facing classroom, office, etc.	Face layer on toilet room side: 5/8" thick tile backer board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard. Classroom side: 5/8" thick reinforced abuse resistant gypsum board.
Classroom Toilets	Double layer on toilet room side. Single layer on side facing classroom.	Concealed and face layers in toilet room: 5/8" thick, mold & moisture resistant gypsum wallboard. Classroom side: 5/8" thick abuse and impact resistant gypsum board.
Janitor's Sink Closet	Single layer on side facing Closet	5/8" thick, mold & moisture resistant gypsum wallboard
Kitchen and Servery	Single layer within kitchen. Double layer for partition at perimeter of kitchen area. 2-hour fire rating where required. All layers extend to slab above.	Face layer 5/8" thick tile backer board. Concealed layer 5/8" thick, mold & moisture resistant gypsum wallboard.

Rooms	Assembly	Material
MEP shafts (2-hour rated)	Gypsum liner panels on shaft side of C-H studs. Double layer wallboard on room/ corridor side.	1" thick mold and moisture resistant gypsum liner panels on shaft side. Face layer on room side: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Elevator shafts (2-hour rated)	**Corridor Wall with the elevator doors: Gypsum liner panels on shaft side of C-H studs. Double layer wallboard on corridor side.** **Remaining Walls:** Wallboard on furring channels and concrete block. Double layer wallboard **for other** corridor side **(if any).**	Face layer: 5/8" thick abuse and impact resistant gypsum board. Concealed layer: 5/8" thick, mold & moisture resistant gypsum wallboard.
Exterior wall (Interior face)	Single layer of wallboard on studs and block back-up	5/8" thick abuse and impact resistant gypsum board.
Exterior Precast Concrete Panel Wall (interior face inside building)	Single layer of wallboard on $3^{5}/_{8}$" studs. Studs shall not be connected to concrete panels	5/8" thick abuse and impact resistant gypsum board.
Fuel oil tank room and shafts for fuel oil piping, fire pump room	Concrete block.	6" thick concrete masonry units
Fascias and Soffits	Single layer wallboard.	5/8" thick, mold & moisture resistant gypsum board.
Stairs – Concrete frame building with concrete shear wall	Concrete shear wall portion	Patched with structural repair mortar and painted
Stairs – Concrete frame building with concrete shear wall	Concrete block portion	Skim coat of repair mortar and painted
Stairs- Concrete frame building without concrete shear wall or steel frame building	Concrete block	Painted

Rooms	Assembly	Material
Gymnasiums, Gymatoriums, Shafts, Vault Room, Trade Shops.	Concrete block	6" thick concrete masonry units. 8" thick units where acoustical block is required (for seismic reinforcement). Acoustical units in gym, above height of wall padding.

Partition types are developed based on acoustical considerations outlined in DR 1.3.1.9 Architectural Acoustic standards and shall be reviewed by design team acoustical consultant.

1. Partitions in Early Childhood Centers, 3K and UPK centers shall be constructed as described in the table above except that abuse resistant gypsum board as specified in Note to Specifier 4 of Section 09260 shall be used in lieu of abuse and impact resistant gypsum board.

2. Abuse and impact resistant gypsum board shall be reinforced with fiberglass mesh or polycarbonate sheet, manufactured with the reinforcing bonded to the back of the board.

3. Drywall partitions shall be constructed as follows, unless noted otherwise:

    a. Framing members shall be $3^{5}/_{8}$" metal studs @ 16" on center, extending from floor to underside of deck above. Size and spacing of studs may vary as required for height of partition and other special conditions.

        The above is a minimum requirement. Actual gauge, height and spacing of metal studs shall be as determined to meet structural and seismic loads. Partition deflection shall be limited to L/240 for painted walls and L/360 for walls with ceramic tile wainscot, designed for a minimum lateral load of 5 psf. Horizontal framing for mold & moisture resistant board soffits shall be spaced no more than 12" on center.

    b. Provide $3^{1}/_{2}$" fiberglass or mineral fiber sound attenuating blanket insulation between metal studs. At sound isolating partitions at back-to-back classrooms with staggered studs, 2" fiberglass or mineral fiber sound attenuating blanket insulation may be used.

    c. Above suspended ceilings, provide one layer 5/8" thick, mold & moisture resistant gypsum wallboard on each side of studs, unpainted, extending to slab above. Provide additional layers where indicated, for fire resistance and sound attenuation. Classroom partitions must extend to slab above.

    d. Corridor/lobby/vestibule side of partition shall receive double-layer wallboard in all cases. Face layer shall be reinforced abuse and impact resistant gypsum board.

    e. Ceramic tile shall be thin-set on drywall partitions, and thick-set when applied to masonry. Refer to Room Finish schedules **in DR 5.1.1** for ceramic tile locations.

    f. Paint sheen shall be semi-gloss unless noted otherwise. Refer to Room Finish schedules **in DR 5.1.1**.

g. In potentially wet areas, the floor track and bottom portion of studs shall receive a protective bituminous coating.

h. The bottom edge of wallboard shall be raised 1/2" above concrete slab in corridors, lobbies, vestibules, and potentially wet areas. Finish bottom edge of wallboard with L-shaped galvanized metal trim. Fill gap with non-shrink material.

i. All exposed gypsum board shall be skim coated with joint compound over the entire surface for an ASTM C840 Level 5 finish.

4. Concrete block partitions shall conform to fire separation and seismic requirements in accordance with the NYC Building Code. Acoustic block shall have a double row of cells to accommodate vertical reinforcing. Vertical reinforcing rods are not permitted within acoustical cells.

5. Fire rated separations:

   a. One-hour fire rating is typically required for non-load bearing corridor walls for existing buildings under Section 27-369 (h) of the 1968 NYC Code. Under the **2022 NYC** Building Code, non-load bearing corridor walls for new buildings are not required to be fire-rated for schools (Occupancy type E) as they are required to be sprinklered (Table BC **1020.1.1**).

   b. Two-hour fire rating is typically required for offices, shops, kitchens, shafts, vertical exits, exit passageways, safe area, fire rescue area and other locations as required for existing buildings under the 1968 NYC Building Code and other applicable codes.

   c. For buildings designed under the **2022** code:
      i) A two-hour fire rating is required for vertical exits (BC **1023.2**) shafts (BC **713.4**) elevator hoistways (BC **713.14**) and safe areas (BC **1029.19.3**)

      ii) A one-hour fire rating is required for sprinklered mechanical rooms (Table BC 509), and for shafts that penetrate fewer than three stories (BC **713.4**), **though as per Table BC 601 shaft enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours**.

      iii) Spaces that are accessory to 'E' occupancy and occupy a floor area not more than 10% of the area of the story in which they are located do not require a fire separation (BC **508.2.3**, BC 508.2.4).

      iv) Assembly spaces that are accessory to 'E' occupancy do not require a fire separation (BC **508.2.3** exception 1.2, BC 508.2.4)

6. It is preferred that the 2-hour wall in the non-sprinklered Kitchen be located to separate the Kitchen spaces from the following: Students' Servery, the A La Carte Room and the Teachers' Servery. If this is not possible, the 2-hour wall shall be located to separate the Cafeteria's seating area from the following: Students' Servery, A La Carte Room and Teachers' Servery. (Use of these 2-hour walls located strategically should eliminate the use of fire rated roll down shutters between seating area and Servery).

   a. The wall between the Servery and Cafeterias (non-rated walls only) may be constructed of hollow metal frames and "tempered glass" Vision Panels. Height shall be restricted to the overall height of doorframes.

b. For new buildings, Section BC 508.4.4 requires a rated separation between occupancies, which now applies between commercial kitchens, which are in occupancy Group F-2, and the servery and or cafeteria. Section BC 508.1, exception 5, provides the requirements for which a rated partition is not required, which is the cooking equipment is vented to the exterior, a draft curtain at least 24" down from the ceiling is provided and either of the fire protection systems of exceptions 5.1 or 5.2 are provided. Otherwise for a sprinklered building, a 1-hour fire separation is required as per Table 508.4, footnote f.

7. Trade shops requiring concrete block partitions include carpentry, metal, electric, plumbing, automotive, welding, and stagecraft. Drywall partitions are permitted for photography, graphics, mechanical drafting, home economics, cosmetology, robotics, and plastics shops.

8. Wardrobe and material supply closets within all classrooms, including special education classrooms, and offices are to be constructed of single layer of gypsum board each side (unless required otherwise for fire rating). Refer to DR 1.3.2.3 for other detailed requirements.

5.2 Partitions

5.2.3 Glazed Concrete Masonry Units and Structural Glazed Facing Tile

Description/Design Approach:

***** Glazed masonry shall be used only when required to match existing partition construction."***

Requirement Applies to:	New Construction	✔	Major Modernizations	✔	Capital Improvement Projects

5.2 Partitions

5.2.4 Folding Panel Partitions

Description/Design Approach:

Provide motorized folding panel partitions for use in large spaces such as gymnasiums and auditoriums.

Provide manually operated folding panel partitions for smaller spaces such as classrooms and other areas of instruction.

A Sound Transmission Coefficient of 46 is required for both partition types (motorized and manual). Both types shall have automatic acoustic seals at the top of panels, between panels and between the panels and the floor.

The State Education Department has issued regulations requiring safety features for motorized folding panel partitions. These safety requirements are:

1. The electrical device controlling the operation of the partition shall be capable of being reversed at any point in the stack travel cycle.

2. A leading edge sensor which will stop the partition if it strikes an object in its path is required.

3. Devices are required to be provided for all electrically operated partitions that will stop the forward or backward motion of the partition and stop the stacking motion when a body or object passes between the leading panel of such partitions and a wall or other termination point, or when a body or object is in the stacking area of such partitions (by means of a stacking area safety mat. with safety key switches are required to operate the motorized partition: Locate one on each side of the partition, one at the stack end and one opposite the stack end of the partition, both in full view of the partition. A constant contact tamper proof button, activated by a key, shall be required to operate each switch. The switches shall be wired in series. Simultaneous operation of both switches shall be required to operate the partition.

4. Warning signs are required to be posted which designate the safe and proper operation and supervision of the electrical device operating the partition. Signs shall be adjacent to each key activated safety switch and securely fastened to the wall 5'-0 above the finished floor.

5.3 Flooring

5.3.1 Floor Types

Description/Design Approach:

The following is a detailed description of the various floor finishes/types that are used throughout a typical school building. For typical application in schools by room type (Standard Room Layout), see Design Requirement 5.1.1 - Typical Room Finishes. At the end of this section is a floor system matrix that will guide the selection of athletic flooring types/systems for specific locations and cases. In addition, see Specifications for more detailed information.

A. General Flooring

1. Carpet (Cpt): Broadloom or Tile Carpeting

   The use of carpet in schools is typically limited to **match existing and per school's request.** Its use is **for** aesthetic as well as functional.
   Tile carpeting is generally preferred to broadloom due to relative ease of replacement. It also provides for design freedom to create a wide variety of patterns, textures and colors.

2. Ceramic Tile (CT) **& Mosaic Porcelain Tile (MPT)**:

   a. Glazed ceramic tile (GCT) is typically used on walls such as at corridors.

   b. Unglazed **mosaic porcelain floor** tile is typically used in Toilet Rooms, Shower Rooms and Janitor Sink Closets where moisture may be present.

   Notes:

   a. Generally, the thinset method of floor tile installation shall be used in new and existing construction. For wet areas with more than one floor drain, provide structural repair concrete fill to provide pitch to drain and thickset installation to allow installation of a sheet membrane waterproofing.

   b. Thickset method can be specified in existing buildings to match existing or if existing non-structural fill on top of structural slab can be removed to allow for depth of mortar bed specified for the thickset and allow installation of a sheet membrane waterproofing. Under no conditions shall the existing structural slab be removed or disturbed unless the slab is subject to structural failure.

   c. Cold applied liquid waterproof membrane shall be provided for thinset floor tile installations.

   d. Sheet membrane waterproofing shall be provided in areas that have thickset floor tile.

3. Porcelain Tile (PT):

   Porcelain Tile provides a material that is colorful, clear and luminous. It is installed in a thinset application. The use of this material is typically limited to the "Main Lobby" of the school, and other high traffic areas such as stair landings, vestibules, entry corridors, and exit passageways.

4. Terrazzo Tile (TT):

   Provide precast cementitious type. Terrazzo tile is installed in a thinset application. May be used in high traffic areas such as lobby, vestibules, entry corridors, and exit passageways.

5. Poured Epoxy (PE):

   Also known as “Resinous Flooring”. This type of floor is typically used in areas where resistance to acids, chemicals, solvents and reagents is necessary.

6. Quarry Tile (QT):

   In addition to being used in high traffic areas, quarry tile is to be used in all kitchens. As it is resistant to acid and other chemicals, it may also be used for science labs in existing buildings.

   Notes:

   a. Epoxy grout is to be used for quarry tile in Kitchens and science labs. Epoxy grout is non-porous and is resistant to many acids and chemicals found in food products and strong cleaning detergents; it also resists staining and does not support the growth of bacteria. The formulation specified is high temperature resistant and will not soften when exposed to hot liquids or steam.

   b. Quarry tile in kitchens is to be a thickset application utilizing sheet membrane waterproofing.

   c. For other locations, provide thin set application. For areas with drains, provide cold applied liquid waterproof membrane.

7. Vinyl Composition Tile (VCT):

   Classified as ‘Resilient Flooring,’ this material is the most widely used flooring material in the school building, typically used in classrooms, typical corridors, offices, libraries**, Principal’s office** and other spaces.

B. Auditorium Flooring

1. Painted Concrete (PC):

   Typically only used in the seating areas for Auditoriums. Color to be coordinated with interior finishes.

2. Vinyl Composition Tile (VCT):

   Used for non-sloped areas of the Auditorium floor, including the orchestra and back-of-house areas and any non-sloped aisles and must be carefully planned out at the change in slope.

3. Sheet Vinyl (SV):

   May be used for non-sloped areas of the Auditorium floor, including the orchestra and back-of-house areas and any non-sloped aisles. However, tile is generally preferred due to relative ease of replacement.

4. Slip Retardant Sheet Vinyl (SRSV):

   May be used for the sloped aisles of auditorium floor. However, tile is generally preferred due to relative ease of replacement.

5. Slip Retardant Vinyl Tile (SRVT):

   Used on sloping portions of the Auditorium aisles unless school is requesting sheet vinyl to be installed.

6. Non-anchored wood floor (NWF):

   Used for auditorium stage**/gymatorium platform**. If existing stage is resilient floor, replace with VCT to avoid elevation changes due to the thickness of the wood floor system.

C. Athletic Flooring

1. **Athletic** Wood **Floors (AW)**:

   This type of floor is a "flooring system" consisting of multiple elements, typically provided in areas of physical activity that require an ability to absorb as well as minimize impact on the user. Activities include, but are not limited to, basketball, volleyball, calisthenics, and dance. Typical rooms are gymnasiums, gymatoriums, wrestling gymnasium, dance classrooms and stages/platforms. Various systems using wood as the finish material are available. Application of the appropriate system is a function of location of the floor, performance requirements, acoustical requirements, available slab depression-for existing buildings etc. Refer to the matrix on last page for various athletic floor systems and their respective applications. **Vented Resilient Base (VRB) to be provided.**

   a. Anchored Wood Floor (AWF)

      This system provides a hardwood gym floor with a solid dimensional lumber sub-floor, mechanically fastened to the concrete floor. This installation is for dry areas not subject to water inundation.

   b. Non-anchored Wood Floor (NWF)

      This system, commonly known as a "floating floor", provides a hardwood gym floor with a plywood sub-floor. It must be fire-blocked as per code. This flooring system is to be used for all new Auditorium Stage floors.

   c. "Greenplay" Wood Floor (GPWF)

      This system provides a hardwood gym floor with plastic pedestal panel supports, and plastic wood slat attachment substrate. It can be used in a situation with potential for some moisture infiltration because the wood materials do not come into direct contact with the concrete slab. (made by Connor Sports floor and to be used in Change Order Only)

2. Synthetic and Flood Resistant Athletic Floors:

   Synthetic, flood-resistant flooring systems are recommended for locations within school buildings where there is a potential for flooding; either due to a high-water table, the building is in a FEMA

flood zone, or it is subject to other potential flooding from other sources. These systems require minimal installation time (as compared to the wood floor systems) and have fewer restrictions for indoor temperature conditions for installation and can be used where the existing slab depression is inadequate for a resilient wood floor. Among this floor category are the following:

- Resilient “pad and pour” synthetic floors (ranging in thickness from 1/4” to 5/8”) which have a seamless rubber surface consisting of a rubber pad/base and poured polyurethane layers.
- Modular Interlocking floors
- Vinyl Sheet Athletic Flooring

Use of these synthetic flooring types must be discussed with the SCA’s TSS unit during the scoping and/or design phase. Refer to the matrix on last page for application criteria.

a. Resilient Athletic Flooring (RAF):

i. “Point-elastic” Synthetic Floor (PEF):

A synthetic floor surface that bends at the point of pressure and absorbs energy. This type of synthetic surface floor is typically provided in areas of multi-purpose rooms that include physical activity. Due to its ability to give with pressure and provide cushioning but absorb energy, it would be appropriate in a play area for young children, but not for a basketball court.

ii. “Area-elastic” Synthetic Floor (AEF)

Area-elastic floors have a rigid, non-bending surface that yields gradually to pressure and can return energy, similar to a resilient wood flooring system. They don't give at a point, with immediate pressure, but bend slightly over a wide area and provide energy return. These flooring systems are well-suited to high school gymnasiums and are a good choice where the floor may be subject to flooding because of a high water table or Flood Zone. Use of this flooring must be discussed with the SCA’s TSS unit during the scoping and/or design phase.

b. Modular Interlocking Flooring:

i. Interlocking Polymer Floor (IPF):

This type of high-impact flooring absorbs and minimizes impact on the user. It is a quick-install modular flooring system consisting of 12” x12” interlocking panels less than one inch thick, most appropriate to primary school use. Polymer floor with shock deflectors such as ‘Maple Shocktower’ by ‘Snapsports’ is recommended.

ii. Interlocking Dance Floor System (IDF):

This is a sprung type modular flooring system with an overall thickness of 2” to 2½” consisting of 1” thick 4’x4’ or 4’x8’ interlocking panels with 3/4” elastomer blocks and a seamless vinyl overlay. Polypropylene core floor such as ‘Harlequin Aerodeck’ by ‘Harlequin’ is recommended.

iii. Interlocking Rubber Flooring (IRF):

Used for all weight rooms in High Schools, regardless of water issues. The interlocking tiles with rubber surface are laid directly on the concrete floor slab, and are not glued or fastened down.

c. Vinyl Sheet Athletic Flooring (VSAF):

Vinyl Sheet Athletic Flooring with integral closed cell foam backing may be used for existing Gymnasiums and/or Multipurpose rooms where the floor slab is on grade and such slab is in high water table or has other potential or history of water infiltration. Use of this flooring must be discussed with the SCA's TSS unit during the scoping and/or design phase.

D. Service and Equipment Rooms

1. Sealed Concrete (SC):

Typically used in outdoor equipment rooms and MEP Service and Equipment Rooms that do not contain equipment subject to leakage. Concrete sealers provide improved resistance to rain, sun, freezing temperatures, stains, abrasive cleaners, petroleum, and deicing salts. Concrete sealers make cleanup easier.

2. Fluid-applied Equipment Room Flooring (FAF):

This type of flooring is typically provided in rooms containing mechanical equipment subject to leaks, such as boilers, water heaters, and oil tanks.

E. Acoustical Requirements:

"Floating" or double slab construction with the preferred flooring system shall be specified for rooms that are located above spaces sensitive to noise such as instructional spaces, libraries or auditoriums in new buildings or new additions. In existing buildings, applied acoustical separation can be utilized depending on floor type (non-anchored wood floor or interlocking dance floor) and if there is space.

F. Athletic Floor System Matrix

Space Type	Water and Noise Issues/Parameters			
	No Water Issues/ No Noise Issues	Water Issue: Flood Zone (floor is below DFE)	Water Issue: High Water Table or other potential flooding Issue	NOISE: Acoustical Separation from Room(s) Below (on double slab or with acoustical separation)
Gymnasium	Anchored Wood Floor	Area Elastic Synthetic Floor, or Interlocking Polymer Floor (for expedited installation in PS/IS)	Area Elastic Synthetic Floor, Greenplay Wood Floor, or Interlocking Polymer Floor (for expedited installation in PS/IS)	Non-anchored Wood Floor
Gymatorium	NC: Anchored Wood Floor	Area Elastic Synthetic Floor	Area Elastic Synthetic Floor or Greenplay Wood Floor	Non-anchored Wood Floor
Multi-Purpose Room	NC: Point Elastic Synthetic Floor EB: Vinyl Sheet Athletic Floor or Point Elastic Synthetic Floor	NC: Point Elastic Synthetic Floor EB: Vinyl Sheet Athletic Floor or Point Elastic Synthetic Floor	NC: Point Elastic Synthetic Floor EB: Vinyl Sheet Athletic Floor or Point Elastic Synthetic Floor	NC: Point Elastic Synthetic Floor EB: Vinyl Sheet Athletic Floor or Point Elastic Synthetic Floor
Wrestling Room	Anchored Wood Floor	NC: Area Elastic Synthetic Floor EB: Area Elastic Synthetic Floor or Vinyl Sheet Athletic Floor	NC: Area Elastic Synthetic Floor EB: Area Elastic Synthetic Floor or Vinyl Sheet Athletic Floor	NC: Non-anchored Wood Floor EB: Non-anchored Wood Floor or Area Elastic Synthetic Floor
Dance Room	Anchored Wood Floor	Interlocking Dance Floor	Interlocking Dance Floor	NC: Non-anchored Wood Floor EB: Non-anchored Wood Floor or Interlocking Dance Floor

DFE Design Flood Elevation (ABFE {Advisory Base Flood Elevation} + 1'-0")
NC New Construction
EB Existing Building

5.4 Ceiling Systems

5.4.1 Suspended Ceilings

Description/Design Approach:

Ceiling Heights

Minimum ceiling heights for suspended ceilings are indicated in the table below.

Location	Early Childhood Center	Primary School	Intermediate School	High School
Corridors	10’ - 0”	10’ - 0”	10’ - 0”	10’ - 0”
Classrooms	9’ - 4”	9’ - 4”	10’ - 0”	10’ - 0”
Offices	9’ - 4”	9’ - 4”	10’ - 0”	10’ - 0”
Lunchrooms	10’ - 0”	10’ - 0”	10’- 0”	10’ - 0”
Gymnasium *	16’ - 0”	**20**’ - 0”	24’ - 0”	24’ - 0”
Gymatorium *	16’ - 0”	**20**’ - 0”	24’ - 0”	24’ - 0”
Kitchen	9’ - 4”	9’ - 4”	9’ - 4”	9’ - 4”
Toilets	9’ - 0”	9’ - 0”	10’ - 0”	10’ - 0”
Storage	---	---	---	---

* To closest obstruction.

A. Fire Rating

Required fire ratings and separations are to be provided by the floor/roof assembly independent of the ceiling construction.

B. Ceiling Types

1. Typical ceiling shall be 2’ x 4’ lay-in acoustical tile with hold down clips. Exceptions noted below, and in Design Requirement 5.1.1, Typical Room Finishes.

2. Ceilings in corridors in High Schools shall be “Tectum” (wood fiber composition) panels. Ceiling materials for lobby ceilings may be lay-in acoustical tile with hold down clips, mold & moisture resistant gypsum board or any other material that works with the ceiling suspension system, such as metal slats, etc. Use of other ceiling material to enhance the lobby aesthetic is subject to approval by the Authority.

3. Soffits and ceilings shall be mold & moisture resistant gypsum board. Framing for attachment of the gypsum board shall be spaced 12" on center.

4. Kitchen ceilings shall be 2’ x 2’ lay-in metal panels, non-perforated.

5. Gymnasium does not require a ceiling. If a ceiling is provided, use “Tectum” with a minimum of 4 impact clips, or more if recommended by manufacturer.

If a ceiling is not provided, Designers are to ensure that duct work, MEP lines and construction elements are designed for exposure and in addition do not provide areas to trap or damage balls and other equipment (e.g. use round ducts) and are protected from damage themselves.

6. Cafeteria ceilings shall be comprised of the following, depending on the space above:

   a. Where there is no classroom of office space above the cafeteria, provide ceiling tile with an NRC of 0.90.

   b. Where there is classroom or office space above, provide high CAC ceiling tile with an NRC of 0.90 and a minimum CAC of 40. Ceiling grid will need to be 2x2. In addition, provide 3½" of mineral wool insulation loose laid over the top of the ceiling. Difficulties in installing the insulation based on the BIM model are to be brought to A&E's attention for discussion.

   c. Where the space above may be a combination of the above, utilize the high CAC tile and loose laid insulation for the whole ceiling.

7. Mechanical Equipment rooms do not require ceilings.

C. Suspension System

1. Ceilings are to be suspended using flat metal bars bolted to angles secured to underside of floor construction. "GAT" system with 1/4" diameter galvanized steel rods are acceptable for support of ceilings with ceiling panels weighing less than 4 pounds per square foot, and where the total load on each GAT clip is within its allowable load limit. Carrying channels shall be 1½" deep, 0.457 lb/lf minimum.

2. Use of wire hangers is not permitted. Appendix R of the 2022 NYC Building Code governs the construction of suspended ceilings.

3. School Buildings and additions are designed for seismic forces as per the 2022 NYC Building Code and as such, suspended ceilings shall meet the requirements of Section BC 1613 and ASCE 7-16. Ceilings shall be designed to meet seismic force requirements of Section 13.5.6 of ASCE 7-16 where required based on Seismic Design Category. The Seismic Design Category shall be determined by the project structural engineer. Importance Factor (I_p) shall be 1.0.

   a. Seismic design for suspended ceilings is not required for Seismic Design Categories A or B per Section 13.1.4.

   b. For Seismic Design Category "C", seismic requirements for suspended ceilings shall be designed and installed in accordance with ASTM E580, Section 4 as per Section 13.5.6.2.1.

      1) Provide a 7/8" support angle at the perimeter. Terminal ends of suspension members shall have 3/8" clearance.

      2) Sprinkler heads and other penetrations shall have 3/8" clearance on all sides.

3) Drawings shall show bracings, separation joint (when required as above), clearance around sprinkler heads and other penetrations, positive bracing where ceiling elevations change.

4. Isolation hangers shall be used for ceilings designed to be 'sound barrier ceiling' to achieve airborne sound isolation, i.e. required STC rating.

D. Support of MEP Equipment & Light Fixtures:

1. All mechanical equipment ducts, pipes, etc. regardless of weight, and all light fixtures (recessed, surface or pendant) weighing more than 80 lbs.:

   Shall be directly supported by the building structure, independent of the ceiling suspension system (carrying channels or runners).

2. Recessed light fixtures weighing more than 50 lbs. and up to 80 lbs., and surface or pendant type light fixtures weighing less than 80 lbs.:

   Shall not be supported by ceiling runners, ("T's" or "Z's"). Such fixtures shall be supported from the carrying channels ("black iron") or the building structure. The carrying channels shall be the size, weight & spacing as required by the NYC Building Code. The weight of the fixture shall not be imposed on the ceiling grid.

3. Recessed fixtures weighing less than 50 lbs.:

   May be supported by the main ceiling runners (T's or Z's) provided that the total weight of a light fixture and other equipment and ceiling material supported by a "T" or "Z" bar does not exceed the allowable deflection in accordance with the Appendix R of the 2022 NYC Building Code. Secondary support such as chains or aircraft cable is to be provided. Cross runners shall not be used to support fixtures.

4. MC cable may be clipped to the steel rod or bar hangers.

5.5 Doors

5.5.1 Interior Doors and Frames

Description/Design Approach:

A. Types

1. Under the 1968 NYC Code for existing buildings, doors that provide access to interior corridors required to have a one-hour fire resistance rating from spaces devoted to non-hazardous uses (i.e., classrooms, offices, toilets etc.) shall be 1¾" solid core wood doors without a fire rating (per Section 27-371(b)).

   Under the 2022 NYC Code for new buildings and additions, interior corridors are not required to be fire rated in sprinklered schools (Group E) per Table BC 1020.1.1. Therefore, no fire rating is required for corridor doors. Doors to classrooms and offices shall be 1¾" solid core wood doors without a fire rating.

2. Doors within rooms (e.g., kindergarten toilets, inner offices, etc.) shall be wood.

3. Doors for wardrobes and closets within rooms shall be wood.

4. Doors to Kitchen and spaces within the kitchen (e.g., food storage, can wash, Dieticians office, kitchen help locker rooms etc.) shall be galvanized hollow metal.

5. All other doors not mentioned above shall be galvanized hollow metal doors, except in an existing school where wood doors can be utilized to match the existing wood doors (as long as they comply with NYC Building Code requirements). All stair doors shall be steel with the fire-rating required by code. Fire rated doors shall have the appropriate BSA, MEA or other entity accepted by the Code or OTCR label installed at the factory.

B. Construction

1. Interior wood doors shall comply with Architectural Woodwork Institute's (AWI) Architectural Woodwork Standards (AWS). Doors shall be constructed of structural composite lumber core, 1¾" thick 5-ply construction. Half-surface mounted ball bearing hinges shall be used on all wood doors with the exception of wardrobe and closet doors.

   Wood doors with mineral cores or any other door types not described above are ***not*** acceptable.

2. Reinforcing for steel doors shall be as indicated in the specifications and standard details. UL approved insulation shall be used in the core of the doors for sound deadening.

3. All doors, inclusive of sidelites or transoms, shall have 14 gage steel frames reinforced as indicated in the specifications and standard details. Knock-down frames are ***not*** acceptable.

4. Hardware

   - Existing buildings where the 1968 NYC Code is applicable: Positive latching per Section 27-371 (j) (1) is not required for stair doors. Push/pull hardware is allowed.

   - New buildings and additions where the 2022 NYC Code is applicable: All fire-rated doors require positive latching per Section BC 716.5.9.1, which will require stair doors to have panic hardware.

C. Vision Panels

1. Glazing type

   - In buildings where the 2022 NYC Code is applicable, vision panels in fire-rated doors shall be fire rated glazing per Section BC 716.
   - In buildings where the 1968 NYC Code is applicable, vision panels in fire-rated doors and non fire-rated wood doors to classrooms and other instructional spaces shall be 1/4" wired glass.
   - Vision panels in non fire-rated doors shall be minimum 1/4" thick laminated safety glass.

2. Glazing area

   - Fire-rated doors**:** Area of vision panels in fire-rated doors shall be maximized to the extent allowable by the NYC building code.
   - Non fire-rated doors
     - Existing buildings where the 1968 NYC Code is applicable**:** Area of vision panels in non fire-rated wood doors to classrooms and other instructional spaces shall be maximized to 720 square inches.
     - In new buildings and additions: Vision panels in non fire-rated doors to classrooms and other instructional spaces shall be 12" wide x 30" high.

3. Indicate glazing type, size and location on contract documents.

All interior doors typically require a vision panel. Doors that shall ***not*** have a vision panel are as follows:

• Auditoriums and Coat Check Room	• Preparation Rooms
• Can Wash and Mop Rooms	• Refuse and Compactor Rooms
• Custodial and Security Rooms	• Storage Room and Closets
• Dressing Rooms	• Toilets, Showers and Locker Rooms
• Duplicating and Record Rooms	• Utility, Equipment and Service Rooms
• Janitor's Sink Closet	• Vault Rooms
• Medical Examination Rooms	• Sound Control Room
• Photography Projection and Rooms	

D. Sidelites and Transoms in Non Fire-rated Hollow Metal Frames.

Sidelites, as per Room Planning Standard, or transom lites above doors are to be part of the door assembly and glazing shall be 1/4" thick laminated safety glass.

E. Screens for Door Sidelites and Door Vision Panels

DoE mandated 'Lock down drills' require that occupants within the classrooms, offices and any occupied rooms including public assembly spaces are in an area that is not visible from the corridor. Elements to block vision into these rooms for use during such drills are required for sidelites and vision panels from corridors.

- Sidelites shall be provided with a chain and clutch operated opaque shade or manufactured spring-operated opaque screens on the room side of the sidelites.
- Door vision panels shall be provided with a manufactured door-mounted sliding panel or spring-operated opaque screens on the room side of door.

5.5 Doors

5.5.2 Rolling Grilles and Shutters in the Kitchen Areas (or Warming Pantries)

Description/Design Approach:

Roll**ing Grilles and** Shutters shall be provided with locks. The locks shall be on the kitchen side and easily accessible to **the** Department of Education - Office of School Food and Nutrition Services (OSFNS) personnel. **The kitchen equipment shall be laid out such that s**taff shall not have to move any equipment to reach the locking mechanism **of the grille or shutter**.

Roll**ing** Shutters shall be manually operated push-up type **for smaller units** up to 40 sq. ft. **in area and** crank type **for larger units** up to 12 feet **in length**. Roll**ing** Shutters **of** greater size**s** shall be provided with electric motors and manual override. If shutter is located in a fire-rated wall, provide fire-rated shutter as required by the New York City Building Code.

Rolling Grilles up to 12 feet in length shall be crank type. Rolling Grilles with lengths greater than 12 feet shall be provided with electric motors and manual override.

Rolling Grilles at serving lines **with low wall-mounted fixed tray slides** are to extend from the ceiling to the tray slide except at the milk dispenser, where **the grille** must extend from **the** ceiling to **the** floor.

Rolling Grilles at serving lines with equipment-mounted tray slides are to extend from the ceiling to the floor.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

5.6 Casework

5.6.1 Custom and Manufactured Casework

Description/Design Approach:

The following assemblies and materials shall be acceptable for casework in the rooms and spaces indicated. The Room Planning Standards indicate the required custom and manufactured casework for the different room types.

Rooms	Casework Item	Material
Classrooms, including special education classrooms, Occupational therapy/Physical therapy room, activity for daily living room, small group instruction room, reading resource room, Administration staff offices and support rooms	Wood Cabinets and Shelving.	All casework shall have wood finish except where laminate cladding is indicated on the drawings. For Students' Wardrobes, Teacher's Wardrobes and Materials Supply Closet, follow Design Requirement Section 5.2.2 for Interior Partitions.
Library	Wood Cabinets, Shelving and Rolling Trucks.	All casework shall have wood finish except where laminate cladding is indicated on the drawings.
Home Economics Room, Culinary Arts Classroom and Art Room Cabinets	Wall cabinets, base cabinets, countertops and utility cabinets.	Provide wood casework as per Standard Specifications Section 12302 – Manufactured Wood Casework. For Teacher's Wardrobes and Materials Supply Closet, follow Design Requirement Section 5.2.2 for Interior Partitions.
Science Rooms	Wall cabinets, shelving and base cabinets.	Provide Manufactured wood casework as per Standard Specifications Section 11600 – Laboratory Equipment.

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Rooms	Casework Item	Material
Shop Rooms	Base cabinets, shelving and utility cabinets.	Provide Manufactured wood or steel casework as per Standard Specifications Section 11500 – Shop Equipment. For Teacher's Wardrobes and Materials Supply Closet, follow Design Requirement Section 5.2.2 for Interior Partitions.
Music, Choral Music, Classrooms, Wireless Language Lab, Word Processing Lab, Language Lab, Distance Learning, CADD/Drafting Lab, Mechanical Drafting Lab, Hand Drafting Lab	Wood cabinets and shelving	All casework shall have wood finish except where laminate cladding is indicated on the drawings. For Teacher's Wardrobes and Materials Supply Closet, follow Design Requirement Section 5.2.2 for Interior Partitions.
Electronics lab	Storage cabinets	For storage cabinets follow Design Requirement Section 5.2.2 for Interior Partitions.
Music Instrument Storage and Practice Rooms	Instrument storage cabinets, utility cabinets and shelving.	Provide manufactured casework similar to that manufactured by 'Wenger'
Design Requirements to continue ... (Other specialty classroom requirements under investigation.)		

1. Partitions in Students' Wardrobes, Teacher's Wardrobes and Materials Supply Closet to comply with Design Requirements 5.2.2 and 1.3.2.3**.**

2. Doors to Students' Wardrobes, Teacher's Wardrobes and Materials Supply Closet to comply with Design Requirements for Interior Doors and Frames.

3. Interior of Students' Wardrobes, Teacher's Wardrobes and Materials Supply Closet to comply with specification section 06410, 05700.

4. Residential type cabinets will NOT be accepted.

5. **All projects which must comply with the NYC Green Schools Rating System must use composite wood products that contain no added urea formaldehyde, and no urea**

formaldehyde may be used in laminating adhesives used to fabricate on-site and shop-applied composite wood assemblies.

5.7 Windows

5.7.1 Window Shades and Draperies

Description/Design Approach:

A. Window Shades

Window shades are typically either single or double roller type shades made of shade cloth that is a close woven fiberglass fabric with double-coated vinyl plastic.
Single or double roller type shades operated with side cords are typically provided for double hung windows and Chain operated single roller type shades are typically provided for project in hopper windows.

As is typical of any window-shading device the purpose of the window shade is to provide privacy, darken a room, or to reduce sunlight, glare and heat transmission into the space.

Note: For specific detail of type and construction see Specifications.

1. Locations:

Window shades are typically provided for all interior spaces *except as follows*:

- Auditoriums
- Gymnasiums
- Kitchens (as well as other areas involving the preparation of food – *NYC Health Code*)
- Lobbies, Vestibules, Corridors and Stairs
- Natatoriums (pool areas)
- Toilets and Shower Rooms

B. Window Draperies (Principal's Office)

In addition to window shades, window draperies are typically provided in the Principal's Office to provide privacy, darken a room, or to reduce sunlight, glare and heat transmission into the space.

Provide one pair of window draperies and valances for each window opening.

Note: For specific detail of type and construction see Specifications.

C. Window draperies (Auditoriums)

As is typical of any window-shading device the purpose of the window curtain is to darken a room, or to reduce sunlight, glare and heat transmission into the space.

Provide one pair of window draperies and valances for each window opening.

Note: For specific detail of type and construction see Specifications.

5.7 Windows

5.7.2 Window Guards (Interior)

Description/Design Approach:

A. Provide interior wire mesh guards at the following locations:

1. Stairways
2. Corridors
3. Toilets
4. Gymnasiums/Gymatoriums

B. Interior window guards at an interior window must be placed so that there is sufficient clearance to operate the window (allowing room for operation of the window).

C. Wire mesh guards are not required for corridor windows with key operated custodial locks **nor at fixed/inoperable stair windows**.

D. For protection of glazing from ball playing, interior window guards shall be provided for all gymnasium/gymatorium windows.

E. If exterior window guards are provided at the locations mentioned above for intrusion/protection of glazing from ball playing activities in play yards, additional interior guards might not be required. However, the followings are the exceptions;

1. Any unsupervised areas subject to vandalism within the building will require interior window guards for protection of glazing on windows.

2. Any areas with ball playing activities can happen will require interior window guards for protection of glazing on windows.

5.8 Information Specialties

5.8.1 Interactive Whiteboards

Description/Design Approach:

A. General

1. For new buildings and additions, Interactive Whiteboards (IWB) are to be provided in rooms of instruction including typical classrooms, **3-K,** pre-K and kindergarten classrooms, special education classrooms, Occupational Training and Physical Training (OTPT) room, specialty rooms i.e. art, music and science rooms, shops, labs, lecture rooms, libraries and resource rooms. For CIP projects**,** IWBs are to be provided for rooms created or remodeled that require such board per the Room Planning Standards.

2. The Interactive Whiteboards will be supplied by the SCA and will be installed by the General Contractor. The type of IWB is to be shown on the drawings and submitted to FF&E for their review and use**.**

B. Types Available for wall mounted IWB and sizes, based on current models

- Adjustable-height monitor (by Promethean) - 75” diagonal
- Adjustable-height monitor (by Smart) – 75” diagonal
- Fixed-height monitor (by Promethean) – 70” diagonal

C. Selection Criteria

1. Capacity Projects

- Rooms of Instruction: A wall-mounted adjustable-height monitor is to be provided in each room of instruction for new stand-alone Capacity Projects and Capital Improvement Projects (CIP).

- Library: An adjustable-height wall-mounted monitor is typically to be provided for the library.

- Cafeteria: A fixed-height monitor (70**”** by Promethean) is to be provided**.**

2. CIP Projects/Addition Projects

Generally, an adjustable-height monitor (by Promethean) is to be provided in Rooms of Instruction and the Library. However, since schools likely have fixed-height IWB (by Smart) in existing classrooms, selection of the type of IWB, adjustable (Promethean) or adjustable (Smart), is to be based on the Principal’s preference, as Smart software will be familiar to the current users.

3. 3-K and UPK Center Projects

3-K and Pre-Kindergarten classrooms in **3-K and** UPK center projects: A fixed-height monitor (70**”** by Promethean) is to be provided.

D. **Location**

For all rooms of instruction, the Interactive Whiteboard is to be located along the front/teaching wall and shall be wall mounted.

E. Electrical Requirements

One quad receptacle is required

- For adjustable-height**,** refer to Standard Detail 1677101a for outlet type and location.
- For fixed-height with projector, refer to Standard Detail 1677101b for outlet type and location
- For fixed-height in **3-K and** UPK center projects, refer to Standard Detail 1677101c for outlet type and location.

F. **Exclusion**

Interactive Whiteboards are not required in:

- Places of assembly, i.e. auditoriums, gymatoriums and multi-purpose rooms.
- Physical education rooms, i.e. gymnasiums, dance classrooms, weight-training rooms, etc.
- Culinary art rooms, stagecraft labs, science prep rooms, plant rooms, LYFE Centers and activity for daily living**.**
- Administrative, student support, custodial, food service and storage areas.

6.1 Plumbing and Drainage

6.1.1 Kitchen Indirect Waste Piping

Description/Design Approach:

A. Kitchen sink waste shall be disposed **of in**to the building sanitary drainage system via an indirect waste line fitted with a 10" deep sanitary receptor that has a dome and strainer. To achieve this, an air gap**,** that is at a minimum twice the diameter of the effective opening of the indirect waste pipe, shall be maintained between the bottom of the sink outlet pipe and the top (rim) of the sanitary receptor. In addition, the rim of the sanitary receptor shall be set one (1) inch above the kitchen finished floor level. Also, the sanitary receptor shall be placed below the sink in such a way that it does not become a tripping hazard. **The drainage pipe connection from each basin of a multiple compartment fixture shall be routed and discharged independently to a sanitary floor receptor as per Section PC 802.1.1 of the 2022 NYC Plumbing Code.**

B. The size of the outlet pipe plus the trapping requirements for the floor receptor shall correspond to the pipe and trap sizes that are equivalent to the drainage fixture unit value outlined in Tables PC 709.1 & 709.2 of the **2022** NYC Plumbing Code**.** The minimum size for the outlet pipe and trap to the floor receptor shall be 3".

C. Each sanitary receptor shall be individually trapped, vented and made accessible**.**

D. **The above requirement for indirect waste piping for kitchen sinks applies to all kitchens, including warming pantries typically used in 3K centers. However, grease removal and grease trapping requirements do <u>not</u> apply to the floor drain located in the warming pantries of 3K facilities as these facilities only use food-heating cabinets and no cooking is involved. The DEP has granted an exemption to the SCA allowing the floor drain in a 3K warm-up kitchen to by-pass the grease interceptor.**

E. Relevant Documents

- **Letter from NYC Department of Environmental Protection outlining requirements for waiving of floor drains in warming pantries being connected to a grease interceptor, dated 6/16/2022.**

Environmental Protection

Rohit T. Aggarwala
Commissioner

Pam Elardo, P.E.
Deputy Commissioner
Bureau of Wastewater Treatment

96-05 Horace Harding Expressway
Corona, NY 11368

June 16, 2022

New York City School
Construction Authority
Standards & Technical Studio
Manager for Plumbing & Drainage
30-30 Thomson Avenue
Long Island City, NY 11101
Attn: Mr. Harry Cethoute, P.E.

Re: **Warm Up Kitchens in 3-K School Facilities**

Dear Mr. Cethoute,

We are in receipt of your request for a review of grease interceptor installation requirements for what you have designated as "warm up kitchens in 3-K school facilities," all of which are to be of the same standard design and operating procedures. The New York City Department of Environmental Protection (DEP) is providing conditional grease interceptor approval for said design and procedures as described herein provided that these kitchens are found in conformity thereto upon inspection.

The standard design and operating procedures for said kitchens as described by you in your letter dated May 4, 2022, and your email dated May 17, 2022 (see attached) include the following:

- No ovens will be provided. There is no cooking at these premises. Meals are prepared off-site and will be brought-in for later distribution during lunch periods. The meals will be kept in heated stainless steel cabinets that are mobile. The food transport cabinet will be similar to a product made by Carter Hoffman, is electrical and operates on 120 volts. Typical cabinet size is 30 1/2" H x 30 5/8" W

- Hoods are not required and will not be installed.

- Only pre-cooked foods will come into the school in metal trays. Those trays will be washed in the single 2-compartment sink that is also provided. There will be no dishwasher.

- The only sink that will be installed will be a one two-compartment sink within the volume range of 1,540 to 21,560 cubic inches and will be connected to a 35gpm/ 70 lbs. capacity grease interceptor in accordance with 15 RCNY §19-11 *Best Management Practices (BMPs) for All Non-Residential Dischargers of Fat, Oil, and Grease to the Public Sewer System*, and Table I therein.

A conditional waiver of the grease interceptor installation requirement for a single floor drain in said warm up kitchens is also granted provided that the

kitchen conforms to the standard design and operating procedures listed above.

The DEP may, at any time, order that different or additional grease interceptors be installed in accordance with 15 RCNY §19-11 if determined upon inspection that said standard design and operating procedures are not being adhered to, or other noncompliance with the applicable regulations is observed, including but not limited to floor spillage indicative of a potential for fat, oil, or grease to enter a floor drain that is not connected to a grease interceptor.

The applicant bears full responsibility for ensuring compliance. The Department, by this letter, shall not incur any liabilities or obligations for the failure of the effluent to comply with the Rules of the City of New York (Use of the Public Sewers) or any other laws, regulations, the Administrative Code, or any other document, and the applicant bears full responsibility for ensuring compliance thereto.

Submissions for each individual warm up kitchen must be in narrative form (diagrams are not required), and include at a minimum:

1. The designer's official business name and address.
2. The school name, address, zip code, and block and lot number.
3. The size of the sink in inches as length x width x height = cubic inches.
4. The selected grease interceptor's make, model, minimum flow rate in gallons per minute (gpm), and minimum grease retention capacity in pounds (lbs).
5. A statement indicating compliance with the standard design and operating conditions described above, and referring back to this letter (identifying it by date and subject matter), as DEP will not be providing separate responses for each submission.

If you have any questions regarding this matter, please contact Ms. Sophia Rabich by phone at (718) 595-4707 or email at *sophiar@dep.nyc.gov*.

Sincerely,

DocuSigned by:
Frances Leung
4A1BEC2E952A40B...

Frances Leung, P.E., Chief
Division of Pollution Prevention and Monitoring
Bureau of Wastewater Treatment

enc: Letter from Harry Cethoute to Sophia Rabich dated May 4, 2022
Email from Harry Cethoute to Sophia Rabich dated May 17, 2022

6.1 Plumbing and Drainage

6.1.2 Acid Waste System – pH Neutralization

Description/Design Approach:

A. New Construction and Major Modernization

Acid waste disposal shall conform to an agreement between the SCA and **the NYC Department of Environmental Protection (**DEP), which provides the following:

1. When the total number of acid using sinks in a school is twenty**-five (25)** or less, each sink's waste may clear into an under-the-counter acid neutralization tank filled with limestone chips. Each sink is required to have a five-gallon acid neutralization tank**.** Every six (6) months, the limestone chips must be replenished to ensure that the pH value of the neutralized effluent from the tank remains within the approved limits. A maintenance log is required to be kept by the DOE for recording the dates of re-filling the tank with limestone chips, which must be made available at all times for inspection by the DEP.

   a. Waste water from emergency showers and eyewash basins need not be connected to the acid neutralizing system and may discharge directly into the sanitary system.

   b. Tri-facial sinks shall be considered as three (3) separate fixtures and thus the minimum volume of a stand-alone neutralizing tank that can treat wastewater from a tri-facial sink is 15 gallons.

2. If the total number of sinks in a school exceeds twenty**- five (25)** :

   a. The acid drainage system shall consist of a common acid neutralization tank, a sampling tank, an alarm and a monitoring station, located at the lowest story above the house drains.

   b. The system is to be sized in accordance with DEP guidelines for **acid neutralization requirements for** schools **as outlined in Table 1 below:**

Table 1

Number of sinks	pH Neutralization Tank Capacity* (gal)
26-35	150
36-50	200
51-70	250
71-90	300

*Overall tank capacity without limestone chips.

   c. The tank shall be filled with limestone chips to maintain the neutralized effluent pH within the approved limits. A replenishment of the limestone chips, every six months, is also required.

   d. An independent 4" acid vent line is required for the system.

e. The acid neutralization tank shall be installed on a 3" high concrete pad and shall be placed in a room built with walls on 3" containment curb. Accidental spill during routine maintenance or tank replacement must be contained within the tank room. A water leak detection system installed in the room shall provide sounding alarms that a spill has occurred**.** Mechanical ventilation into the room shall be provided if a window is not available.

f. Table 1 was formulated for sinks equipped with a single faucet, and it provides a corresponding tank size for such a scenario. When sinks are equipped with two (2) or three (3) faucets, they must respectively be counted as two (2) or three (3) sinks, resulting in the appropriate tank size being selected.

g. A cup sink under a hood vent shall be counted as a single sink.

h. Floor drains must not be included in the neutralization tank capacity.

3. The plans for acid waste management shall be submitted for review and approval by the NYC DEP, Bureau of Wastewater Treatment (BWT).

4. Dark Room sinks are equipped with an under the counter neutralizing tank. As a result, conveyance of the wastewater from that fixture need not be tied into the acid waste system.

B. Capital Improvement **Program** (CIP) Projects

1. **If the total number of acid using sinks remaining after a renovation or the total number of additional acid using sinks is twenty-five (25) or less, an individual neutralization unit containing limestone chips may be installed under each sink. The school may continue to operate its existing pH system in parallel with the new individual neutralization units (s) if and only if one the following conditions is met:**

   a. **The existing system was installed on or after January 1, 1993 and is operated and maintained in accordance with the pH neutralization standard outlined in Table 1.**

   b. **The existing system was installed before January 1, 1993 and is operated and maintained in accordance with the manufacturer's specifications. In such a case, the existing system does not need to comply with the pH neutralization standard summarized in Table 1. However, the existing system must be upgraded to include a control panel, a pH meter and audio/visual alarms. In addition, only in-kind replacements of acid using tanks discharging into such an existing system will be permitted, provided that the sink locations remain the same**

   c. **The limestone chips must be replaced at least every 6 months. DSF must maintain** a **log must be established and maintained for each acid-using sink to record the date of each chips replacement. Such log shall be available for inspection by the DEP at all times.**

   d. **Tri-facial sinks shall be counted as three (3) separate sinks and shall require pH neutralization treating devices that are equivalent to 15 gallons.**

2. **The SCA does not need to submit plans or obtain approval from the DEP/BWT if the remaining and/or added sinks after a renovation is twenty-five (25) or less. The SCA must submit a detailed and written narrative to the DEP/BWT. The narrative shall at a minimum include: the number of existing acid using sinks; a description of the pH**

treatment system; an evaluation of the existing system; a description of the proposed modification; a description of proposed pH treatment system.

a. If the existing system described in the narrative was installed prior to January 1, 1993, and it does not comply with the pH neutralization standard outlined in Table 1, the narrative must also contain a statement from the design professional certifying that the system was installed, is operating and is maintained in accordance with the manufacturer's specifications

3. **If the total number of acid using sinks exceeds twenty-five (25), the sinks must discharge into either the existing centralized pH neutralization system, if such system was installed on or after January 1, 1993; or to a newly installed centralized pH neutralization system. The new centralized pH treatment system must be designed, installed, operated and maintained in accordance with the pH neutralization standard outlined in Table 1.**

4. Discharge from Dark Room sinks may flow directly into the sanitary system, as that fixture comes equipped with an under-the-counter neutralizing tank, and thus connection to the acid waste system is not needed.

C. Neutralization of Acidic Condensate from Condensing Boilers and Flue Exhaust Vents Connected Thereto **(Note that the Authority's new HVAC standards are to use heat pump systems and this requirement will not likely apply to many projects)**.

1. Filing with the DEP is not required for the **pH** neutralization **device(s) or** system **required for** condensate coming from condensing boilers and **for** the flue gas vent **connections** to these boilers. The **pH treatment** system shall consist of**: acid** neutralizing tubes filled with calcium carbonate aggregates; floor-mounted support**s**, unions and traps. In addition, the system shall include trap-primer valves and pH sensors that are supplied and installed by the plumbing contractor. Neutralization system for condensing boilers shall be integrated with the building management system.

2. Selection of the appropriate neutralizing tube**(s)** size shall be based on manufacturers' suggestions and shall take into account the expected condensing rate of boilers. A separate neutralizing device shall be provided for each boiler. Likewise, flue exhaust vent **connector(s) attached** to condensing boilers shall require its**/their** own neutralizing tube**.**

D. Relevant Documents

- **Letter from NYC Department of Environmental Protection outlining requirements acid waste systems, dated 12/21/22**

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Environmental Protection

Vincent Sapienza, P.E.
Commissioner

Pam Elardo, P.E.
Deputy Commissioner

Bureau of Wastewater Treatment
96-05 Horace Harding Expressway – 2nd Floor
Corona, NY 11368

December 21, 2021

New York City School
Construction Authority
Standards & Technical Studio
Manager for Plumbing & Drainage
30-30 Thomson Avenue
Long Island City, NY 11101
Attn: Mr. Harry Cethoute, P.E.

Re: Amendment to DEP's Acid Neutralization System Guidelines for New York City Public Schools

Dear Mr. Cethoute:

This letter is an amendment to the New York City Department of Environmental Protection's guidelines regarding acid neutralization requirements for New York City public schools. It supersedes the letter dated February 5, 2007.

Effective March 21, 2022, the acid neutralization requirements for New York City public schools are as follows:

A. For new school designs submitted after effective date:

1. If the total number of laboratory sinks is twenty-five or less, an individual neutralization unit containing limestone chips may be installed under each sink rather than a centralized pH neutralization system.

2. The limestone chips must be replaced at least once every 6 months, or more frequently if required by the manufacturer's instructions. A paper or electronic logbook must be established and maintained for each laboratory sink to record the date of each replacement. Such logbooks shall be available for inspection by the Department of Environmental Protection (DEP) at all times.

3. If the total number of laboratory sinks is twenty-five or less, the School Construction Authority (SCA) is not required to submit plans to or obtain approval from DEP's Bureau of Wastewater Treatment (BWT). However, SCA must submit a detailed written narrative to BWT. Each narrative shall include, at a minimum, the number and location of laboratory sinks and a detailed description of the proposed pH neutralization units including but not limited to manufacturer, model number, and size.

4. If the total number of laboratory sinks exceeds twenty-five, a centralized pH neutralization system must be installed. The system must be installed, operated and maintained in accordance with the attached summary of the pH neutralization requirements, and sized in accordance with Table 1 below:

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Table 1	
Number of sinks	pH Neutralization Tank Capacity* (gal)
26-35	150
36-50	200
51-70	250
71-90	300

*Overall tank capacity without limestone chips.

5. The changes in the tank sizes reflected in Table 1 compared with previous requirements are based on a decreased faucet flow rates in recent years.

6. The number of sinks in Table 1 represents sinks with a single faucet. However, double-faucet sinks should be counted as two sinks, and triple-faucet sinks should be counted as three sinks. The requirement of counting faucets, and not drains, remains unchanged. A cup sink under the vent hood should continue to be counted as a single sink. Floor drains will continue to be excluded from the count.

7. If the total number of laboratory sinks exceeds twenty-five, SCA is required to submit plans, prepared by a licensed New York State Professional Engineer or Registered Architect, and obtain approval from BWT.

B. For existing schools, the requirements are as stated below:

1. If the total number of laboratory sinks remaining after a renovation or the total number of additional laboratory sinks is twenty-five or less, individual neutralization units containing limestone chips may be installed under each sink. The school may continue to operate its existing centralized pH neutralization system in parallel with the new individual neutralization units if the existing system is installed prior to March 21, 2022 and is operated and maintained in accordance with the pH Neutralization Requirements Summary included in the letter dated February 5, 2007.

2. The limestone chips must be replaced at least once every 6 months, or more frequently if required by the manufacturer's instructions. A paper or electronic logbook must be established and maintained for each laboratory sink to record the date of each replacement. Such logbooks must be available for inspection by DEP at all times.

3. If the total number of laboratory sinks remaining after a renovation or the number of additional laboratory sinks is twenty-five or less, SCA is not required to submit plans to or obtain approval from BWT. However, SCA must submit to BWT a detailed written narrative. Each narrative shall include, at a minimum, the number of existing laboratory sinks, a description of the existing pH neutralization system, a description of proposed modifications, and a description of proposed additional pretreatment systems and/or proposed modifications to the existing system.

4. If the total number of additional laboratory sinks exceeds twenty-five, the sinks must discharge into either the school's existing centralized pH neutralization system or a newly installed centralized pH neutralization system. Any such centralized system must be properly sized,

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installed, operated and maintained in accordance with the attached pH Neutralization Requirements Summary.

5. If the total number of additional laboratory sinks exceeds twenty-five, SCA is required to submit plans and obtain approval from BWT.

The filing exemptions as described above only apply to fixtures within school laboratories. SCA may be required to submit plans and obtain approval from BWT for other types of renovation or capital improvement projects of existing schools.

New York State Licensed Professional Engineers and New York State Registered Architects may petition the Department in writing for acceptance of an alternative pretreatment device, technology, equipment or procedures varying from, but equivalent to, those described in this letter. Such a petition must contain detailed documentation and calculations substantiating their equivalency. In no event shall any alternative pretreatment device, technology, equipment or procedures be less effective than those described in this letter.

If you have any questions regarding this matter, please contact Ms. Sophia Rabich, Industrial Resource Management and Permitting Section, by phone at (718) 595-4707, or by email at sophiar@dep.nyc.gov.

Sincerely,

DocuSigned by:
Frances Leung
4A1BEC2E952A40B

Frances Leung, P.E., Chief,
Division of Pollution Prevention and Monitoring

Enclosed:

1. pH Neutralization Requirements Summary
2. Letter dated February 5, 2007 Re: Amendment to DEP's Acid Neutralization System Guidelines for New York City Public Schools

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February 5, 2007

Mr. Harry Cethoute, P.E.
Standards & Technical Studio
Manager for Plumbing & Drainage
New York City School
Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101

Re: **Amendment to DEP's Acid Neutralization System Guidelines for New York City Public Schools**

Dear Mr. Cethoute:

This letter is an amendment to the New York City Department of Environmental Protection's guidelines regarding acid neutralization requirements for New York City public schools. It shall supersede the letter dated August 2, 2004.

Effective immediately, the acid neutralization requirements for New York City public schools are as follows:

A. For new schools:

1. If the total number of acid using sinks is twenty or less, an individual neutralization unit containing limestone chips may be installed under each sink rather than a centralized pH neutralization system.

2. The limestone chips must be replaced at least once every 6 months. A log must be established and maintained for each acid-using sink to record the date of each replacement. Such log shall be available for inspection by the Department of Environmental Protection (DEP) at all times.

3. If the total number of acid using sinks is twenty or less, the School Construction Authority (SCA) is not required to submit plans to or obtain approval from DEP's Bureau of Wastewater Treatment (BWT). However, SCA must submit to BWT a detailed written narrative. Each narrative shall include, at a minimum, the number of acid using sinks and a detailed description of the proposed pH pretreatment system.

4. If the total number of acid using sinks exceeds twenty, a centralized pH neutralization system must be installed. The system must be installed, operated and maintained in accordance with the attached summary of the pH neutralization requirements.

5. If the total number of acid using sinks exceeds twenty, SCA is required to

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submit plans, prepared by a licensed New York State Professional Engineer or Registered Architect, to and obtain approval from BWT.

B. For existing schools:

1. If the total number of acid using sinks remaining after a renovation or the total number of additional acid using sinks is twenty or less, an individual neutralization unit containing limestone chips may be installed under each sink. The school may continue to operate its existing pH system in parallel with the new individual neutralization unit(s) if and only if one of the following conditions is met:

   a) The existing system is installed on or after January 1, 1993 and is operated and maintained in accordance with the attached summary of pH neutralization requirements.

   b) The existing system is installed before January 1, 1993 and is operated and maintained in accordance with the manufacturer's specifications. In such case, the existing system does not need to comply with the attached summary of pH neutralization requirements. However, the existing system must be upgraded to include a control panel, a pH meter and audio/visual alarms. In addition, only in-kind replacements of acid using sinks discharging into such an existing system will be permitted, provided that the sink locations remain the same.

2. The limestone chips must be replaced at least once every 6 months. A log must be established and maintained for each acid-using sink to record the date of each replacement. Such log shall be available for inspection by DEP at all times.

3. If the total number of acid using sinks remaining after a renovation or the number of additional acid using sinks is twenty or less, SCA is not required to submit plans to or obtain approval from BWT. However, SCA must submit to BWT a detailed written narrative. Each narrative shall include, at a minimum, the number of existing acid using sinks, a description of the existing pH pretreatment system, an evaluation of the existing system, a description of proposed modification, a description of proposed additional pretreatment system(s) and/or proposed modification to the existing system. If the existing system described in the narrative is installed prior to January 1, 1993 and it does not comply with the attached summary of pH neutralization requirements, the narrative must also contain a statement certifying that the system has been installed, operated and maintained in accordance to manufacturer's specifications.

4. If the total number of additional acid using sinks exceeds twenty, the sinks must discharge into either the school's existing centralized pH neutralization system that is installed on or after January 1, 1993, if any; or a newly installed centralized pH neutralization system. Any such centralized system must be installed, operated and maintained in accordance with the attached summary of pH neutralization requirements.

5. If the total number of additional acid using sinks exceeds twenty, SCA is required to submit plans to and obtain approval from BWT.

The filing exemptions as described above only apply to fixtures within school laboratories. SCA may be

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required to submit plans to and obtain approval from BWT for other types of renovation or capital improvement projects of existing schools.

Attached is a table summarizing the pH neutralization requirements.

If you have any questions regarding this matter, please telephone Ms. Frances Leung, P.E., Chief, IPP Inspection and Permit Section at (718) 595-4763.

Sincerely,

Leslie Lipton, Esq.: Chief
Division of Pollution Control
and Monitoring

FL/fl

Enc: pH Neutralization Requirements
Figure 1: pH Neutralization Tank Capacity Requirements

cc: Lipton/Leung/Islam/Castro

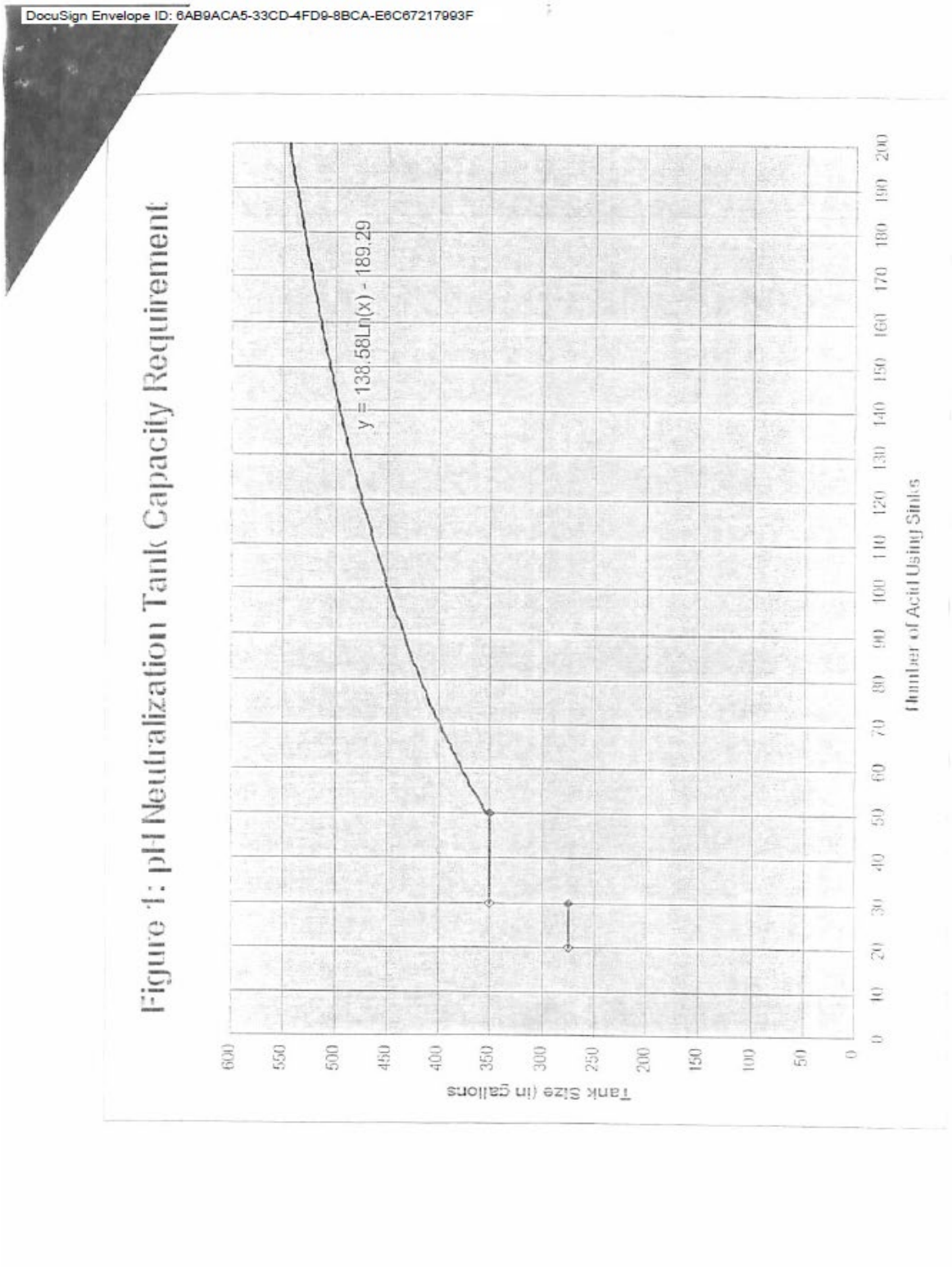
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pH Neutralization Requirements

School Construction Authority Projects

1. If the total number of acid using sinks is twenty or less, an individual neutralization unit containing limestone chips may be installed under each sink.
2. Applicant must determine the adequate capacity for the centralized system from Figure 1 when there are over 20 laboratory sinks.
3. Centralized pH tank capacity is calculated without any limestone chips added to the tank.
4. The volume of limestone chips shall not occupy more than a third of the total overall tank volume.
5. Centralized system must have a control panel, a pH meter and audio/visual alarms.
6. The above requirements may not necessarily apply to laboratories that may be used for research or commercial purposes, or for college level courses. In such cases, DEP's approval of the pH neutralization system is required.
7. The limestone chips must be replaced at least once every 6 months. A log must be established and maintained to record the date of each replacement. Such log shall be available for inspection by the DEP at all times.
8. All pH neutralization tanks must be designed in accordance with the New York City Building Code.

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6.1 Plumbing and Drainage

6.1.3 Piping Materials

Description/Design Approach:

A. Piping - General

Provide piping materials per the following Plumbing Pipe Schedule. For combined systems, the most restrictive requirement for pipe materials for a given system governs. Ensure that drawings and specifications match piping material called for and that shop drawing approvals are clear as to where a piping material is to be used and that its use conforms to the specifications.

B. Cast Iron Piping Connections

1. Service weight cast iron is allowed in either above or underground applications for sanitary and storm piping within the site/building.

2. All underground joint connections shall be cast iron bell and spigot with lead and oakum. **The use of "push-on joint" (neoprene gasket seal), in underground applications is not permitted. However, for very specific project related conditions discuss with the SCA where lead and oakum may not be feasible.**

3. Above ground joint connections within the building shall have mechanical stainless steel couplings.

C. Identification of Gas Piping per Section FGC 401.5 of the **2022** NYC Fuel Gas Code:

1. **Gas** piping installed in new school projects as well as new gas piping installed in existing schools is to be identified by a yellow label marked "GAS" written in black letters. Labeling of gas piping is mandatory even if the installation will remain enclosed or concealed after completion of the work. Ensure **that this** requirement is included in project specifications. Per SCA requirements, the gas pressure **must be indicated on** the label or adjacent to the label **placed on gas piping installation**.

2. The integrity of installed gas pipe shall be **verified** after the pipe is labeled. In addition, the labels shall be placed at 5-foot intervals on the gas lines. While the code exempts labeling for gas distribution pipe installed in the same room with the appliance that it supports, the SCA, **requires that the gas pressure be indicated on** the labels **for ease of maintenance**.

Piping System	Location	Requirement
Storm piping	Interior (above ground)	**S**ervice Weight Cast Iron (SVCI) No-Hub with mechanical stainless steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" dia. and smaller.
	Interior (Underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (Yard drainage)	1. Service Weight Cast Iron (SVCI) bell and spigot with lead & oakum joints. 2. Ductile Iron (DI) Class 51 for all sizes with push-on joints. 3. Precast Reinforced Concrete Pipe with rubber gasket watertight joint. 4. High Density Polyethylene (HDPE) piping, bell and spigot, watertight joints.
	Exterior (house drain & house sewer)	Service Weight Cast Iron **(SVCI)** bell and spigot with lead & oakum joints, Ductile Iron Class 51 for all sizes with push-on joints.
Sanitary piping (waste & vent)	Interior (above ground and house drain lines)	Service Weight Cast Iron **(SVCI)** No-Hub with mechanical stainless steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" diameter and smaller.
	Interior (pump discharge)	Galvanized steel pipe schedule 40, with threaded drainage fittings, Victaulic fitting in conjunction with groove pipe, 2"and larger is permitted.
	Interior (Underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (House sewer / underground)	Ductile iron Pipe Class 56 with push-on joint
ACID WASTE/ VENT	Interior	Polypropylene Plastic Pipe, drum trap and fittings, flame retardant, schedule 40 with electrical fusion coils joint. Silicon Iron Pipe, bell & spigot with caulked joint will be used for acid vent extensions above roof. **Polyvinylidene Difluoride (PVDF)**
Domestic Water [Hot & Cold]	Interior (above ground)	Copper tubing, Type L (blue color bar), with wrought copper solder joint fittings suitable for soft soldering. Brass, seamless drawn pipe, regular weight with cast Bronze fitting. Chrome plating for exposed piping or traps in kitchen area. Groove copper pipe with Victaulic fitting is allowed for 2" and larger diameter piping. Copper tubing for short branch connection to plumbing fixture.
	Interior (underground)	Copper tubing, Type K (green color bar), with cast bronze solder joints fittings (150 psi) suitable for lead free soldering.
	Exterior (Service/ underground)	Ductile Iron, Class 52 for 3" & 4" pipe diameter and Class 56 for 6" & larger pipe sizes. Fitted with mechanical joints. The use of Brass, seamless drawn pipe threaded fittings and Type K Copper tubing is allowed for services up to 3" in size.
Vacuum & Compressed Air Piping	Interior	Black steel pipe with malleable iron fittings, type L copper tubing with wrought copper solder joint fittings.

Piping System	Location	Requirement
Gas Piping	Interior (above ground)	Standard weight, Schedule 40, Black Steel pipe: a) Threaded or welded joint – for pipe dia. 4" and under if gas service line pressure is 1/2" psig or (14" w.c) b) Welded joints – over 4" pipe dia. if gas service line pressure is 1/2" psig or (14" w.c) c) Threaded or welded joints – for pipe dia. under 3" if gas service line pressure is over ½" psig but less than **5 psig** d) Welded joints – for pipe dia. 3" and over if gas service line pressure is over 1/2" psig but less than **5 psig** e) Welded joints – All pipe dia. if the gas service line pressure is over **5 psig**
	Exterior (above & below grade)	Standard weight, Schedule 40, Black Steel Pipe.
	Building Expansion Joint & Foundation Wall	Braided Stainless Steel Flexible Multi-Legs Hose Pipe Assembly that is listed and labeled to UL 536-2003

6.1 Plumbing and Drainage

6. 1. 4 Water Services for Domestic, Sprinkler and Standpipe Systems

Description/Design Approach:

A. Services Required - General

1. For school buildings with a combination manual wet standpipe and sprinkler system, or sprinkler system alone, two (2) water services shall be brought into the building The services shall consist of one dedicated to domestic use and one for the fire protection system. A secondary/back-up domestic water supply drawn from a combined water service can no longer be provided since the DEP has changed the rule that previously permitted for interconnecting and tapping off water services for the fire protection system that provided a secondary water source for domestic need.

2. For school buildings with a combination automatic wet standpipe and sprinkler system, three (3) water services must be brought into such buildings The water services shall be as follows: one dedicated to domestic use and two (2) that are strictly for the fire protection system. The DEP no longer allows for provision of a secondary domestic water service.

3. **Prior to submitting a request for new water services for domestic and fire protection and before filing the Application for Approval of Backflow Prevention Assemblies, the EOR shall be in advance communication with the DEP Cross-Connection Control Unit in regards to proposed wet tap service connections into existing street water mains and the construction pipe material of such mains. The intent of this pre-design interaction with the DEP is to help in identifying at an early stage cast iron water mains and dead-end connections, which are to be avoided and from which the proposed and new water service connections shall <u>not</u> be made. In addition, the aim behind this intervention is to provide early notification to the DEP about the imminent construction of a new school and to give time to that agency to develop and to implement any plan of its own to replace or to build new water mains in the adjoining streets to the new school.**

B. Domestic Water Service

1. Generally, the service pipe size for the domestic water system shall be a 4” diameter pipe. However, water pipe sizing shall be based upon water demand load, friction losses, the desired and the available street water pressures. Calculations for water service pipe sizing shall follow the procedure outlined in Appendix E of the 2022 NYC Plumbing code.

2. Provide a building-wide water filtration system as per Section 15419. The filtration system shall be located downstream of the backflow prevention device fitted into the domestic water service.

C. Water Service to Combination Manual Wet Standpipe & Sprinkler Systems or Sprinkler System with or without a Sprinkler Booster Pump

1. Per Appendix Q, Section Q102 (NFPA 13-16), of the 2022 NYC Building Code, stand-alone sprinkler systems installed in occupancy group E (schools), and not categorized as high-

rise building, shall require one (1) automatic source of water. A water service for the fire system shall supply water for sprinklers.

2. After calculating the water demand for the fire protection system, the designer shall consult Table #3 in Chapter 20 of the DEP Rules Governing and Restricting the Use and Supply of Water to determine the appropriate size of the corporation stop or wet connection (aka tap) as well as that of the service pipe that can supply the system water demand. The designer shall be mindful that sizes for a water tap may differ from that of the service pipe. Sizes for a tap or a wet connection to the city water main and the service pipe size shall be specifically indicated in the design documents. The designer is to also note that the minimum pipe size for the main of a sprinkler system is 6" pipe diameter.

3. There are instances when water supply for sprinklers might have **to** come from gravity tanks or a pressure tank. The following restrictions to the water supply shall apply in such cases:

    a. The domestic water supply line from a tank or street supply shall be at least the size of the sprinkler line and the capacity available shall be at least equal to the capacity required for the sprinklers (i.e., Water Demand Requirements for Hydraulically Calculated System Design):

        1) Light hazard – total combined inside & outside hose (100 gpm); duration (30 min)
        2) Ordinary hazard – total combined inside & outside hose (250 gpm); duration (60-90 min)
        3) Extra hazard – total combined inside & outside hose (500 gpm); duration (90-120 min)

    b. The domestic water supply line from a tank or street shall have the required pressure as provided in NFPA 13-16 (i.e., the minimum operating of any sprinkler shall be 7 psi for Hydraulically Calculated System Design and 15 psi for Pipe Schedule sprinkler system. Note the SCA standard is for a hydraulically calculated system).

    c. The domestic water supply line shall be of nonferrous material except when the domestic water supply is 4" or more.

    d. An O.S & Y valve or other listed valve having visual indication and sealed open shall be installed in the sprinkler supply branch, or such other valve arrangement as may be provided in NFPA 13-16 as modified per Section Q102, as applicable.

    e. The number of limited area sprinkler heads in each fire section shall not exceed 6, when connected to a domestic water riser.

    f. The connection shall be made at the supply or riser side of any domestic branch control valve.

    g. A check valve shall be installed on the sprinkler supply branch.

4. In addition to the above, electrical devices supervising the operation of valves controlling the water supply to the sprinkler system shall be provided and a signal shall be transmitted to the fire alarm system.

5. Sprinkler systems installed in high-rise buildings sited in Seismic Design category C as defined in the NYC Building Code, or in any high-rise building with occupied floors located more than 500 feet above the lowest level of fire department vehicle access**,** shall require a secondary on-site water source. A holding tank, which is seismically restrained and having a storage capacity that, at a minimum, is equivalent to 30 minutes worth of the hydraulically calculated sprinkler water demand as determined by the occupancy hazard and in accordance with NFPA 13-16, shall constitute the secondary on-site water source. The tank shall be supplied from the domestic service.

D. Water Services to Combination Automatic Wet Standpipe & Sprinkler System with Fire Pumps

1. When a**n** automatic fire pump is required to enhance the water pressure to **a** standpipe or a combination automatic wet standpipe and sprinkler system, it shall connect to two (2) dedicated fire service**s**. The two (2) services shall draw water from two (2) different street water mains.

2. Should the two (2) different street water mains lack the required capacity or not be available, a suction tank shall be provided. The storage capacity of the suction tank shall be equivalent to 30 minutes worth of the calculated water demand for the fire pump based on the pump's rated capacity.

3. A minimum 6-inch line shall connect the suction tank to the street water supply. Emergency drains, overflow pipe and protection agaisnt freezing or means for heating up the water inside the tank shall also be provided.

4. After calculating the water demand for the fire protection system, the designer shall consult Table #3 in Chapter 20 of the DEP Rules Governing and Restricting the Use and Supply of Water to determine the appropriate size of the corporation stop or wet connection (aka tap) as well as that of the service pipe that can supply the system water demand. The designer shall take note that sizes for the tap and the service pipe may differ. Sizes for the tap or wet connection to the city water main and the service pipe shall be specifically indicated in the design documents.

5. Valves controlling the water supply to the fire protection system shall be electrically supervised and a signal shall be transferred to the fire alarm system in case of tampering with valve's open position.

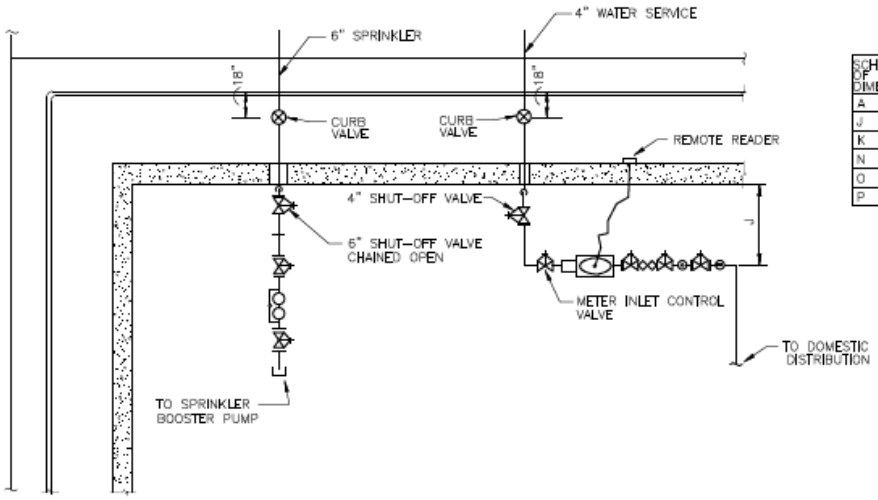
6. If due to siting conditions a secondary on-site water source is required for the sprinkler system (See item C.5 above), the designer is to determine the more economical way of providing either tank(s) to satisfy both the standpipe and sprinkler demands or in the alternative by calling for two (2) water services for the fire pump and a tank sized strictly for the sprinkler demand.

F. Relevant Documents

- Header Schematic for Domestic and Sprinkler Services Requiring a Sprinkler Booster Pump

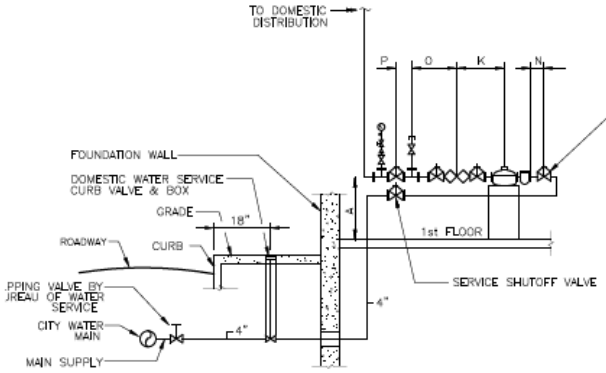
- Header Schematic for Domestic and Fire Services Requiring a Fire Pump

Header Schematic for Domestic and Sprinkler Services Requiring a Sprinkler Booster Pump



PLAN VIEW

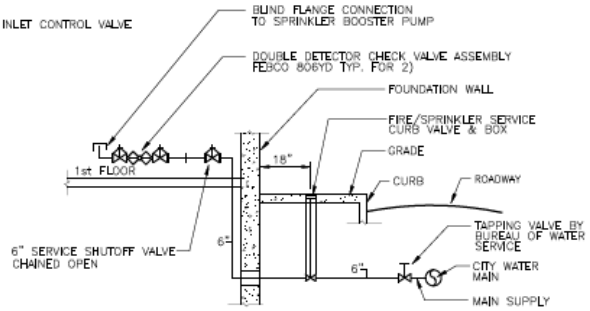
SCHEDULE OF DIMENSIONS		REMARKS BASED ON FEBCO 825YD
A	2'-6"	DEP PREFERED ELEVATION
J	3'-0"	MAXIMUM, BUILDING CODE, RS 16, P107.3, b
K	10'-0"	MAXIMUM PERMITTED HORIZONTAL DISTANCE
N	2'-10"	BASED ON 4" WATER SERVICE
O	4'-0"	AS REQUIRED FOR INSTALLATION
P	1'-1"	AS REQUIRED FOR INSTALLATION



ELEVATION

HEADER SCHEMATIC OF DOMESTIC WATER SERVICE

NOT TO SCALE



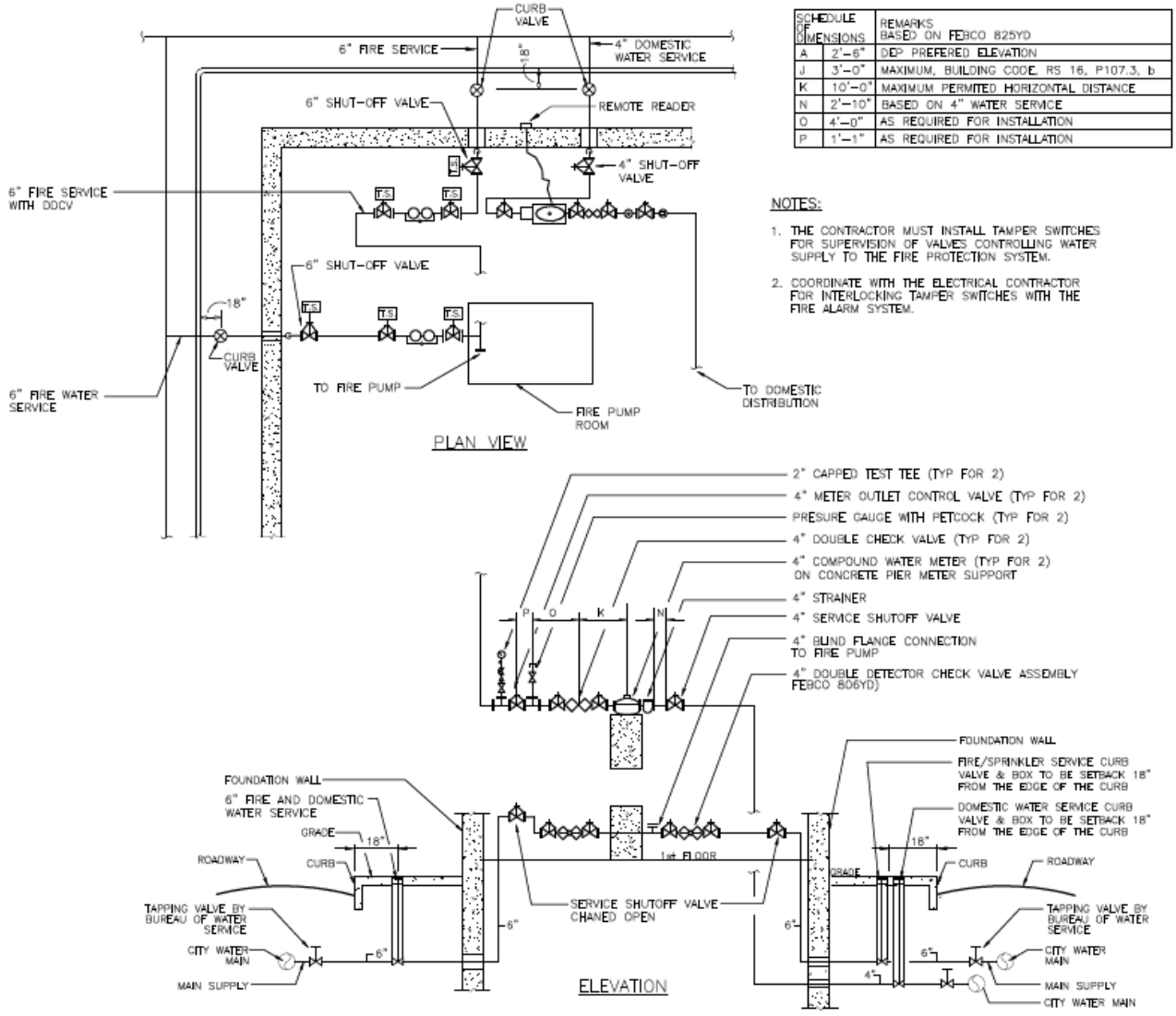
ELEVATION

HEADER SCHEMATIC OF WATER SERVICE FOR SPRINKLER SYSTEM WITH A BOOSTER PUMP

NOT TO SCALE

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

Header Schematic for Domestic and Fire Services Requiring a Fire Pump



SCHEDULE OF DIMENSIONS		REMARKS BASED ON FEBCO 825YD
A	2'-6"	DEP PREFERED ELEVATION
J	3'-0"	MAXIMUM, BUILDING CODE, RS 16, P107.3, b
K	10'-0"	MAXIMUM PERMITED HORIZONTAL DISTANCE
N	2'-10"	BASED ON 4" WATER SERVICE
O	4'-0"	AS REQUIRED FOR INSTALLATION
P	1'-1"	AS REQUIRED FOR INSTALLATION

NOTES:

1. THE CONTRACTOR MUST INSTALL TAMPER SWITCHES FOR SUPERVISION OF VALVES CONTROLLING WATER SUPPLY TO THE FIRE PROTECTION SYSTEM.
2. COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR INTERLOCKING TAMPER SWITCHES WITH THE FIRE ALARM SYSTEM.

6.1 Plumbing and Drainage

6.1.5 Water Heaters

Description/Design Approach:

A. New Construction, Existing Construction Major Modernization **and CIP Projects**

1. Domestic hot water (DHW) shall be provided to the designated areas as per the schedule in part C. DHW is to be generated from either a central unit or a number of integrated heat pump domestic water heaters per Design Requirement 6.1.23, **except when approved otherwise as indicated in Section B below**.

2. The water heater equipment is to supply hot water at 140°F. Hot water distributed to the kitchen and appliances is to be drawn from the heater at the 140°F temperature.

3. A master thermostatic mixing valve that complies with ASSE 1017 and installed near the heater shall be employed for supplying and distributing 120°F hot water to the domestic hot water system except for the kitchen as mentioned in item 2 above. As per Sections PC 607.1, PC 424.3 & PC 424.4 of the 2022 NYC Plumbing Code, tempered water for hand-washing, cleansing and building maintenance shall be delivered via a thermostatic point-of-use mixing valve that conforms to ASSE 1070, which is to be 90°F for most applications. Refer to schedule in part C.

4. For compliance with Sections PC 607.3 and PC 607.3.2, an expansion tank must be provided to manage thermal expansion and pressure increase in the heated water vessel.

5. Sizing of heat pump water heaters is to be as per DR 6.1.23.

6 Point-of use instantaneous electrical units shall be provided for delivering DHW to remote plumbing fixtures that require excessive runs of piping from a central water heater.

7. Point-of-use electric water heaters if proposed and accepted by the Authority, must be strategically located under the lavatories in order to comply with maximum allowable pipe length rules as outlined in Section C404.5.1 and Table C404.5.1 of the 2020 NYC Energy Conservation Code. If rules relating to maximum allowable pipe length are not adhered to, a temperature maintenance system will be required.

B. Capital Improvement Program (CIP) Projects

1. Existing gas-fired domestic water heaters that require replacement **are to** be replaced with heat pump water heaters **(Refer to DR 6.1.23)**, unless **the Authority approves, due to unusual circumstances, installation of a gas-fired water heater** for boiler replacement projects and for existing water heaters that are beyond repair and **must be** replaced. **If approved, provide** a gas-fired unit consisting of a separate storage tank and heater assembly on a skid, typically vented through the existing chimney. Units are to be the conventional type if placed in the same existing room. If a new room is being provided, a condensing type may be more appropriate as it allows for direct intake of combustion and exhaust air. This shall be discussed with the Authority prior to design.

2. For compliance with Sections PC 607.3 and PC 607.3.2, an expansion tank must be provided to manage thermal expansion and pressure increase in the heated water vessel.

3. The gas fired-heater, the circulating pump as well as the near-piping between the storage tank and the heating coils shall be pre-assembled and shall come from a single manufacturer. The heater section and the storage tank need not be located on the same floor. If project field conditions do not allow, the units may need to be installed in separate sections but all components shall be from one manufacturer.

4. Determination of the size of the gas-fired heater and the storage tank for CIP projects shall not be based on ASHRAE sizing guideline, but must adhere strictly to the empirical design information that the Authority has collected over the years. Sizing of the heater and the storage tank shall be based on the following:

   a. For all schools with a full cooking-kitchen (not a warming pantry), the capacity (recovery) of the heater is to be based on 70% of the total hot water load for the plumbing fixtures installed in the kitchen only.

   b. The size of the storage tank shall be 200 gallons

   Exceptions:

   a. In schools with warming pantries, a heater with a recovery of 100 gallon per hour (gph) and a 100-gallon storage tank shall be provided.

   b. Additional allowances shall be made in the recovery rate for the water heater in schools with gang-showers (typically high schools and schools with natatoriums). The hot water load for gang-showers must be added to that of the cooking-kitchen. The storage tank size shall be based on 70% of the recovery, with a maximum tank size of 400 gallons.

C. Schedule

HOT WATER REQUIREMENTS SCHEDULE

Location	Temperature Requirement
Storage Tank	140°F water from water heater.
Kitchen - 3-compartment sanitizing sink	Sanitizing/Rinsing - Water supplied at 140°F. Temperature in sterilizing compartment is raised to 180°F by means of a booster heater element within the sink compartment.
All plumbing fixtures	Central mixing valve to deliver 120°F hot water for distribution to the domestic hot water system and thermostatic point-of-use mixing valve to supply 90°F tempered water to faucets.
Science Labs	Central mixing valve to deliver 120°F hot water for distribution to the domestic hot water system and thermostatic point-of-use mixing valve to supply 85°F–90°F tepid water to sinks, eye wash, and shower.

Showers	Central mixing valve to deliver 120°F hot water for distribution to the domestic hot water system and thermostatic point-of-use mixing valve to supply 110°F tempered water to showers.

6.1 Plumbing and Drainage

6.1.6 Backflow Prevention Devices - Reduced Pressure Zone (RPZ)

Description/Design Approach:

A. General

1. A backflow prevention device selected from a list of approved cross-containment devices published by the NY State Dept. of Health shall be installed into the header service piping for the domestic water system. The installed device shall be a Reduced Pressure Zone type (RPZ).

2. Where it is challenging to comply with the DEP regulation requiring an 8-hour containment for the water discharged from a RPZ device installed below grade, the design shall provide for a double check valve in conjunction with local RPZs as a means for preventing cross-contamination in the potable water system. This arrangement is only permitted for schools with a warming pantry and no science rooms.

B. Location

1. Where the water meter assembly is located above grade in a room with at least one exterior wall, a regular RPZ device without an integral water shut-off means shall be provided**.** The relief port of the RPZ shall convey its emergency water discharge through an opening in the exterior wall and out to grade. **A floor drain shall also be provided.** For aesthetic and for pest control reasons, the drainage pipe protruding through the wall shall be provided with a perforated cover.

2. Where the water meter assembly is located above grade in an interior room, the RPZ device shall be of a type that includes integral water management capability for emergency discharge. The unique feature of this type of RPZ device is that it will turn off the water supply in case of a catastrophic discharge and water accumulation. In addition, a floor drain shall be provided

3. Where the water meter assembly is located below grade, the RPZ device shall be of a type that includes integral water management capability for emergency discharge. In addition, DEP rules require that there be 8-hour containment provided for protection against submerging the relief port of the RPZ. If the floor drains in the room with an RPZ conveys water to a sump pit for discharge, the sump pump(s) must be connected to an emergency power source.

4. As per appendix G of the **2022** NYC Building Code, water service piping including the RPZ must be located above the Design Flood Elevation (DFE).

C. Documents to be Filed

1. Drawings that must be filed with the SCA's Building Code Compliance Division (BCC) or DOB as well as DEP shall include elevation and plan views for the installation of the backflow prevention devices. In addition, details and notes on the drawings shall show: the water meter, the house control valve, the meter inlet control valve, the backflow prevention

device, a test tee, and the required clearances between exterior walls and valves or between the device and any obstruction or walls. All required distances shall be as per DEP's recommendations.

2. Forms GEN 236 and NYC GEN 215B must be filed with the DEP and a copy of the document with an approved DEP seal must be submitted for Building Department filing before final approval can be given.

D. Inspection

A New York State certified tester employed by a New York City licensed plumber, which is the responsibility of the Department of Education to arrange, must test RPZ devices annually.

E. Relevant Documents - None

6.1 Plumbing and Drainage

6.1.7 Wall Hydrant Requirements for Window Washing and General Maintenance

Description/Design Approach:

A frost-proof wall hydrant shall be provided every 100 feet length of the building façade so that hoses, with maximum length of 50 feet, can service the entire facility. Provide a minimum of one frost-**proof** wall hydrant on each wall façade.

For roofs that house mechanical equipment, provide at least one frost-proof wall hydrant to wash-down condensers to DX units and/or air-cooled chillers.

The wall hydrant shall be located on an outside wall to the roof bulkhead and its water supply outlet shall terminate at a minimum 18 inches above the roof.

6.1 Plumbing and Drainage

6.1.8 Gas Service/Gas Meter Piping and Gas Sub-Metering

Description/Design Approach:

A. Applicability: The new SCA standard for both heating and domestic hot water is the use of electric heat pumps. This Design Requirement would only be applicable where there is a reason that such electrification cannot occur and the SCA has approved the use of gas.

B. Design of the gas service and associated meter piping shall be based upon the following criteria:

1. As a general rule, the gas meter, regulator, and gas booster pump (if required) shall be located outside the building in keeping with the utility company requirements. The meter assembly and other ancillaries shall be housed in a **chainlink** fenced enclosure **with 1" mesh** to prevent vandalism. For existing building and additions, ensure that during scoping that the school is made aware of the gas meter location.

2. For existing buildings with zero-lot-line or if the serving utility company imposes a customer service fee that is attributable to an outdoor meter assembly, or if due to site constraints or proximity to windows of an adjoining building, which makes an exterior gas meter assembly not feasible, the design shall provide for an interior gas meter room. The layout for an interior gas meter room must be reviewed early in the project with the utility company. If the utility does not approve of an interior installation, alternate means must be found to address the design-related issues.

a. Access to an interior gas meter room is not permitted through rooms housing a fire pump in accordance with Section FGC 404.3.3 of the 2022 NYC Fuel Gas Code. In addition, the gas meter room cannot be within the boiler room as per Section E.3.2 of Appendix E of the Fuel Gas Code, and must have a separate egress without having to go through a boiler room. Ensure that layouts for interior meter rooms comply with the aforementioned code provisions.

C. Whole building energy monitoring of gas consumption is required by Section C405.11 of the 2020 NYC Energy Code. In addition, the NYC Green Schools Rating System credit, Measurement and Verification, requires metering in general plus sub-metering of natural fuel gas used during domestic hot water production. The sub-meters used to monitor gas consumed for domestic hot water generation must be separate from those utilized for boilers and gas-fired RTU's. Subject to the utility company rules (company may reject request for separate meters based on the gas load) and depending on the type of gas-fired appliances (i.e. water heater, Bunsen burners, cooking equipment etc.), design for gas metering and gas sub-metering shall be as follows:

1. Gas pressure greater than 1/2 psig (high-pressure gas service) in serving utility's street piping network:

a. If project includes no gas-fired water heater or kitchen/science lab equipment, request for service shall be for one (1) utility meter. Provide one gas sub-meter directly after the utility meter for whole building energy monitoring purposes.

b. If project includes either a gas-fired water heater or kitchen/science lab appliances, the request for service shall be for two (2) utility meters.

1) One utility meter dedicated strictly for gas distribution to boilers and roof top units. Provide one gas submeter directly after the utility meter to monitor gas usage by boilers and rooftop units.

2) One utility meter with other ancillaries such as gas pressure regulator and gas overpressure protecting device dedicated to water heater and/or kitchen/science lab equipment. Provide a gas sub-meter for gas-fired water heaters and a separate gas sub-meter for gas-using appliances in the kitchen/science lab.

2. Gas pressure less than 1/2" (low-pressure gas service) in the serving utility's street piping network

   For all projects, the request for service shall be for one (1) utility gas meter. Typically, a low-pressure gas service requires the installation of a gas booster pump to supply the appropriate gas pressure to operate boilers and gas-fired rooftop units, which will provide the whole building gas usage monitoring. Provide separate gas sub-meters to monitor gas usage by water heaters and kitchen/science lab appliances.

D. Integration with Building Management System (BMS)

   Gas sub-meters and counter integral to the gas booster pump control panel (if applicable) must be connected to the BMS. Readings obtained from sub-meters and counter from the booster shall be totaled for determining building wide gas usage.

E. The designer shall file with the DOB (BCC) gas sub-meter(s) that are included in the project. The filed schedule B and the plumbing drawings shall show a gas riser diagram that indicates all gas submeters.

   1. An attachment to the schedule B shall document, through calculations, the gas-carrying capacity and the required gas pressure to supply to equipment. Pressure loss in the gas distribution piping shall be based upon pressure drops established in Tables FGC 402.4(1) and 402.4(2). In addition, the designer shall also account for the pressure drop across the sub-meter(s).

   2. The designer shall ensure that utility gas meter rooms comply with Appendix E of the NYC Fuel Gas Code i.e. provide a minimum 3 feet distance between sub-meter and heating boiler or any other source of ignition or ventilation. Provide a minimum 50-square inch duct for room ventilation purposes in the utility meter room or provide a louvered opening to the outside air in the exterior wall with a minimum free area of not less than 30 square inches per Section E.4 of the Appendix. Due to untampered air entering the room, walls to an interior gas meter room must be insulated to keep the meter room outside the thermal boundary as per the 2020 NYC Energy Code.

F. When the gas pressure in the utility's street piping network is greater than 1/2 psig, the utility company will determine and make available a service pressure regulator at each meter. Selection of each service regulator is based on the specified gas pressure(s) and gas flow requirements outlined in the gas load letter.

   1. The joints of all gas distribution pipe 3" dia. or greater shall be welded. All applicable SCA requirements related to welded gas pipe shall apply. All piping within chases shall be welded regardless of diameter.

2. The service regulator controlling gas distribution lines supplying HVAC equipment (boilers, RTUs and air handling units) is to be set generally for 1/2 psig (14" w.c.) maximum. However, per Section FGC 402.6, a maximum of five psig is allowed if the fuel requirements for commercial appliances exceed 4,000 cubic feet per hour and such large volume use is supplied through separate gas distribution piping. The service regulator associated with gas supply lines to the gas-fired water heater (if provided), gas kitchen appliances (if provided) and science lab equipment (if provided) is to be set for 7" w.c.

3. To protect HVAC equipment (boilers, RTUs and any gas fired air handling units) against elevated gas pressure, the design shall provide for a line pressure gas regulator fitted in the near-by gas supply piping to each appliance. This regulator shall be rated for emergency gas exposure of at least two psig. Outlet pressure from the gas regulator shall be set at 14" w.c. (or as permitted above by Section FGC 402.6).

4. Interior mounted gas regulators require vent piping routed to the outside as well as isolation valves for service and maintenance of the regulators. These ancillary items as well as the regulators shall be shown on the gas riser diagram and plans.

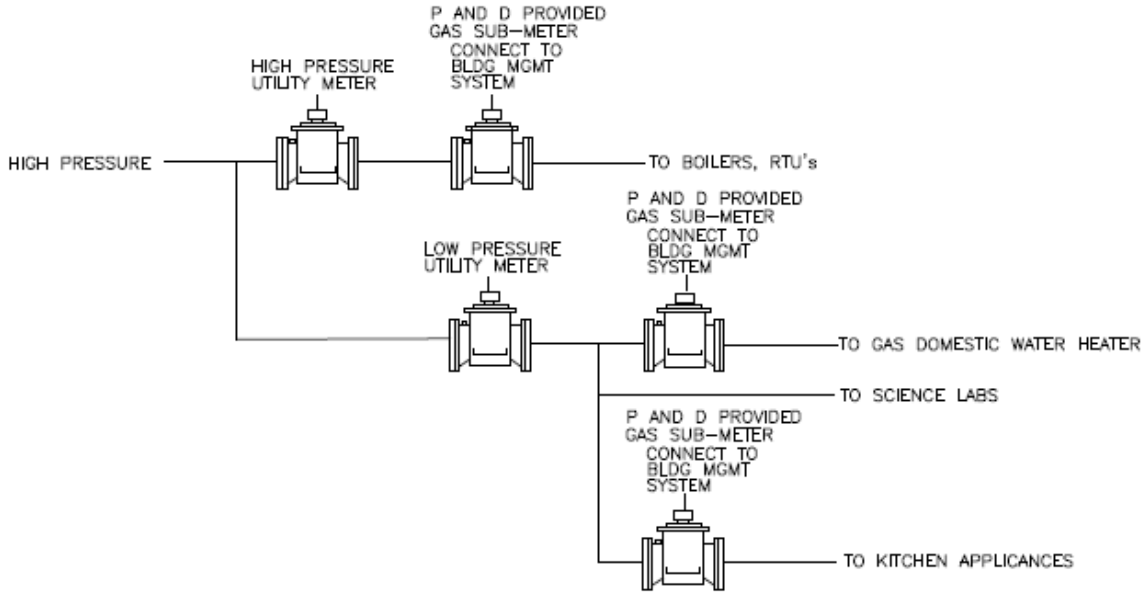
5. Selection of the appropriate line pressure regulators shall be based on the device performance rating and the required outlet gas pressure and BTU requirements for the appliance connected thereafter.

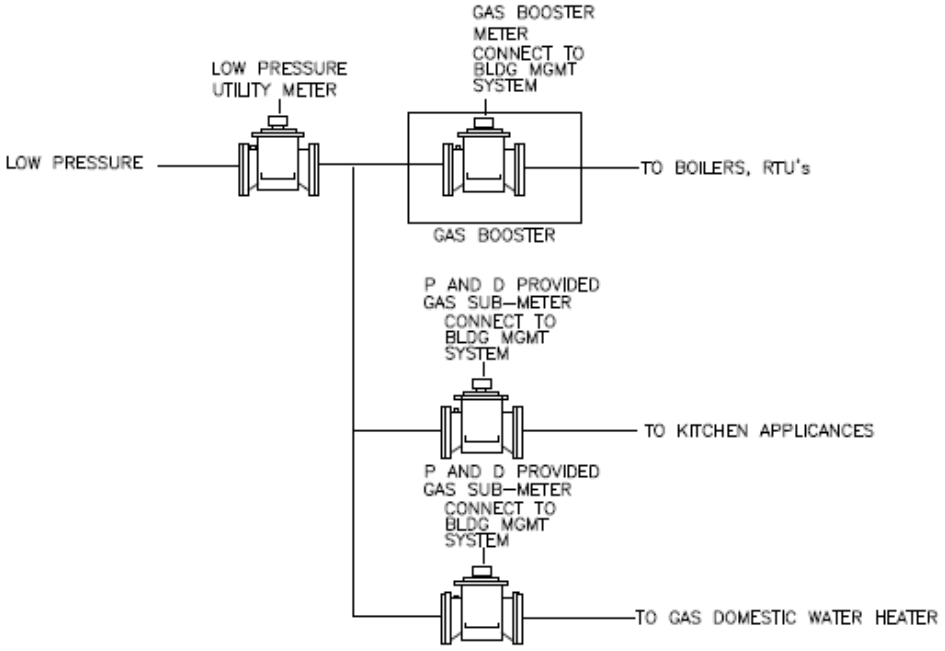
G. The point of entry of gas service inside the building shall be designed as close as possible to the street gas main to minimize connection charges assessed by the utility company.

1. When gas pressure in the utility company's street piping network is less than or equal to 1/2 psig and thus a gas booster pump is required, it shall be installed on a concrete pad, outside the building, with a NEMA 4X control panel enclosure. Gas booster can only be installed inside the building if the building is on a lot line and if so installed, utilize a NEMA 7 for the control panel enclosure. Refer to DR 6.1.15 for gas booster system requirements.

H. Relevant Documents

- Gas Submetering Schematic Diagram





* METERS ARE SHOWN FOR BUILDING MANAGEMENT INTERFACE. FOR SCHEMATIC REFERENCE ONLY. REGULATORS AND OTHER PIPING SPECIALTIES HAVE BEEN REMOVED FOR CLARITY DESIGNER SHOULD CONSULT THE CONTRACT PIPING AND SCHEMATICS PROVIDED BY THE UTILITY FOR A COMPLETE BILL OF MATERIALS NECESSARY FOR INSTALLATION

6.1 Plumbing and Drainage

6.1.9 Gas Valves/Master Gas Control Valve

Description/Design Approach:

A. Applicability: The new SCA standard for both heating and domestic hot water is the use of electric heat pumps, as well as the use of electric kitchen equipment and lab equipment. This Design Requirement would only be applicable where there is a reason that such electrification cannot occur and the SCA has approved the use of gas for the system.

B. General

1. Gas valves shall include, but not be limited to the following:

   - Master Gas Control Valves (MGCV) - for shutting down of gas supply in the kitchen and culinary arts room(s). If gas is provided in specialty shops and/or in science labs that have received project specific approval by the Department of Education for gas use, a MGCV is to be provided in those spaces.
   - Lubricated Plug Valve – associated with gas service, meter and distribution piping
   - Gas Cock – used for manual isolation of gas-burning equipment
   - Safety Shut-Off Valve – electrically operated and used for turning off gas service to the building.
   - Mechanically operated valve tied to kitchen exhaust hood fire suppression system.

2. Gas valves shall be installed in wall enclosures, pipe spaces or other recesses. The enclosure and spaces must be vented to an adjoining ventilated area.

3. Gas valves shall not be installed above ceilings or be concealed.

C. Master Gas Control Valve

1. A Master Gas Control Valve (MGCV) apparatus, consisting of solenoid valves, a relay control panel/master control station, and remote control station(s) with mushroom pushbutton and the words ‘Emergency Stop’, is required for controlling gas supply to gas-fired appliances in kitchens, culinary arts rooms, and other designated locations.

2. Location - One MGCV must be provided in the following areas:

   a. Kitchens - The Relay Control Panel shall be AC type since there is no concern over AC humming. The Relay Control Panel shall be placed underneath the MGCV. A Master Control Station shall be located near the kitchen entrance door (door from corridor to kitchen) Remote Control Stations shall be placed on interior walls leading to other entrance(s) or exit(s) to the kitchen.

   b. Culinary Art Rooms - The Relay Control Panel shall be DC type to avoid the concern of humming of an AC type. The Relay Control Panel with its key-operated switch and

pushbuttons shall be placed underneath the MGCV. Remote Control Station(s) shall be placed on interior walls leading to entrance(s) or exit(s) to the room.

c. Science Rooms - While science prep, demonstration and labs are currently being equipped with electrically operated Bunsen burners per SCA and DOE standards, a MGCV is be provided if the Department of Education grants authorization for the use of gas in such rooms due to a school's special focus on science subjects. The Relay Control Panel shall be DC type to avoid the concern of humming of an AC type. The Relay Control Panel with its key-operated switch and pushbuttons shall be placed underneath the MGCV.

1) Laboratory: Provide a remote control station with the words "Emergency Stop" on each of the other three walls not including the wall that has the Relay Control Panel.

2) Demonstration Room: Provide a remote control station on each of the other three walls not including the wall that has the Relay Control Panel.

3) Preparation Room: Provide a remote control station near the door(s).

d. Shops - The Relay Control Panel shall be DC type to avoid the concern of humming of an AC type. The Relay Control Panel with its key-operated switch and pushbuttons shall be placed underneath the MGCV. Provide a remote control station on each of the three walls not including the wall that has the Relay Control Panel.

3. The solenoid valves, relay control panel, master control stations and remote control stations will be wired by the electrical contractor but must be furnished as part of the plumbing work. The wiring for the relay panel, master control and remote stations shall be shown on the electrical drawings.

4. The MGCV shall be normally closed and shall provide automatic shut-off of gas supply in the event of a power failure. The MGCV shall function as a manually operated emergency gas shut-off, and shall not be interlocked with other systems.

5. Provide a vented cabinet or ventilated enclosure for the MGCV. Locating the valve inside a hung ceiling is not permitted. Ideally, the valve cabinet shall be set at 5 ft. or more above the finished floor in a recessed ventilated cabinet. An exception to the above-described location for the valve cabinet will be made if accommodation can only be provided in a nearby room in the floor below.

6. When a surface mounted cabinet is used (renovations only), the enclosure shall be mounted at approximately 8 feet above the floor within the room it is serving.

6.1 Plumbing and Drainage

6.1.10 Plumbing Fixture Mounting Heights

Description/Design Approach:

A. The mounting height for plumbing fixtures shall adhere to the schedule listed below and shall be shown on the Drawings. The final installation height shall be taken from the finish floor to the rim of the fixture, unless otherwise noted.

B. Where a fixture type indicates only an accessible fixture with no non-accessible corresponding fixture, the intent is for that fixture type to be mounted at that **accessible** height for all applications for that grade level.

C. Mounting heights of accessible fixtures must meet the requirements of ICC A117.1-2009 and ADA 2010.

1. Mounting heights for fixtures within rooms of instruction to be based on grade level of users.

2. Mounting heights for fixtures in common areas to be based on grade level of the pre-dominant users of that space.

3. For a school **that is a** PS/IS **(PreK through 8th or 9th)**:

a. Mounting height for accessible WC's located in multi-stall toilets located on floors that include public assembly spaces (i.e. cafeteria, cafetorium, gymnasium, gymatorium or auditorium) shall be 18" **to top of seat** (6th – 12th grade height).

b. Mounting heights for non-accessible WC's located in multi-stall toilets located on floors that include public assembly spaces (i.e. cafeteria, cafetorium, gymnasium, gymatorium or auditorium) shall be 16" **to top of seat** (6th – 12th grade height).

c. Countertop heights for lavatories located in multi-stall toilets located on floors that include public assembly spaces (i.e. cafeteria, cafetorium, gymnasium, gymatorium or auditorium) shall be as follows:

1) Provide 50% of lavatories at accessible height of 29" and the other at 50% at accessible height of 33"

2) For an odd number of lavatories, provide the extra lavatory at the accessible height of 33"

Note that this will require that the countertops be at two different heights.

D. Fixture Mounting Height Schedule

Fixture Type	**3K & PK**	**K**	1st & 2nd	3rd - 5th	6th-12th and Adult
Lavatories, non-accessible	**24**"	27"	27"	27"	31"
Lavatories, accessible (hgt to rim/knee clearance)	**24"/NA**	29"/24"	29"/24"	29"/24"	33"/**28**"
Drinking Fountain, accessible – standing (hgt to spout)	**40"**	**40"**	**40"**	**40"**	40"
Drinking Fountain, accessible wheelchair - side approach (hgt to spout)	****29**	****29**	****29**	****29**	---
Drinking Fountains with Bottle Filler, accessible wheelchair - front approach (hgt to spout/knee clearance)	**34"/28**"	**34"/28**"	**34"/28**"	**34"/28**"	34"/**28**"
Standalone Bottle Filler, accessible (ht to activation sensor)	33"	33"	---	---	---
Electric Water Cooler, accessible - standing	---	---	---	---	40"
Electric Water Cooler, accessible - wheelchair	---	---	---	---	34"/ 28"
Combination Sink & **Bubbler** accessible (hgt to counter top/knee clearance)	**24"/NA**	29"/24"	29"/24"	29"/24"	---
Washfountain, accessible (hgt to rim/knee clearance)	30"/24"	30"/24"	30"/24"	30"/24"	---
Sinks, non-accessible	**24"**	28"	28"	30"	36
Sinks, accessible (hgt to rim/knee clearance)	**24"/NA**	29"/24"	29"/24"	29"/24"	33"/28"
Art Room Trough Sink, non-accessible	---	---	30"	30"	36"
Sink in Culinary Arts Classroom, non-accessible	---	---	---	---	34"
Sink in Culinary Arts Classroom, accessible (hgt to rim/knee clearance)	---	---	---	---	34"/28"
Water Closet, non-accessible (hgt to top of seat)	---	---	---	---	16"
Water Closet, accessible (hgt to top of seat)	**12**"	15"	15"	15"	18"
Urinals, non-accessible	---	---	---	---	24"
Urinals, accessible	---	---	16"	16"	16"
Shower, Seat Changing Bench in D75 toilet, accessible	---	---	18"	18"	18"
Shower, Seat, at accessible stalls only	---	---	---	---	18"
Shower head discharge height, non-accessible*	---	---	---	---	6'-0"
Shower, Bottom of Controls, accessible*	---	---	---	---	38" min
Shower, Top of Controls, accessible*	---	---	---	---	48" max

Notes:

* Shower head and shower controls are all part of a singular panel. For accessible stalls, the control mounting heights govern.

6.1 Plumbing and Drainage

6.1.11 Storm Water Management

Description/Design Approach:

A. On-site storm water management must meet the NYC DEP requirements for both storm water quantity and storm water quality as mandated by the Unified Storm Water Rule (USWR). As installation of photovoltaics onto roofs has first priority and given that the Authority is still investigating design strategies that would combine installation of green roofs with roof-mounted solar panels, the designer is to consider green infrastructures drainage solutions plus on-site detention system as first option for storm water management, and if necessary, to look at providing for a green roof in conjunction with roof detention to meet the USWR requirements.

B. **Rooftop Detention**

1. Where rooftop detention is utilized, the following guidelines are to be followed, while adhering to the allowable storm flow rate set by DEP.

- Containment of an average of 3" of storm water build-up, with a maximum 4" at the drain for a roof with a 2" rise, shall be by means of roof drains fitted with control flow devices. The 2" rise is to provide a minimal pitch to the drain and is to avoid water stagnating on the roof.

- The exact number of control flow devices that are to be provided shall be based upon a drain down time of less than 24 hours. For design purposes, the drain down time is the time required for the complete removal of storm water off the roof following a rain event that has a 100-year return period and a 3" rainfall intensity per hour. The final storm drainage calculation shall include controlled as well as uncontrolled flow contributions. (See equation used for calculating uncontrolled flow through seepage holes provided in the extended ring of the drain assembly).

- The structural integrity of the roof shall not be compromised due to the temporary **d**etention of the rainwater being held thereon. To that end, the roof structural design shall include an increased live load as specified in D.R 3.1.2, which is equivalent, in depth, to 9" inches of water. **P**avers shall be such as to keep the insulation from floating, weighing 5 lbs per inch of insulation with an additional 10% safety.

- The placement of drains from the roof's edge shall not exceed 50 ft. travel distance and the spacing between drains shall not be more than 200 ft.

- To augment bonding between the waterproof liquid membrane and the drains, the selected drain shall be equipped with a wide body flange. The enlarged portion of the drain body provides a greater area for application of the rubberized liquid membrane material.

- The structural roof deck will expand and contract. As a result, the drains including the piping connected therefrom will shift. A design allowance to compensate for the movement of the drainage piping shall include horizontal offsets between the drain outlet

and the vertical leader. If provision of the horizontal offset is impractical, then a flexible connection shall be placed between the drain outlet and the leader.

- If trapezoidal weirs are selected as control flow devices, and a PRMA roofing system is employed, the weir's bottom shall coincide with the top level of the insulation and the amount of uncontrolled flow shall be accounted for in the final calculation for storm drainage using:

$$Q = 450\ C_d A\sqrt{2gh}$$

where: Q = the flow rate in gpm
C_d = .513 (a constant)
A = total area of all holes in square feet (24 holes with 0.25" in diameter)
G = 32.2 ft/sec^2 (gravity)
H = head in feet (4" or .33 ft)

Refer to SCA Standard Details for 'Type – D' control flow drain.

2. In addition **to primary roof drains**, a relief system consisting of scupper **or secondary roof drains** shall be provided. The preferred option is to provide roof scuppers of 4" minimum diameter. If the building is **sited in such a way** that scuppers would discharge directly onto **an** adjoining property, a secondary roof drain system shall be installed, with the piping system combined and sized accordingly as per PC **1108.3**

3. Invert of scupper shall be placed 1" above the average water level, which will meet the 2" or 4" above low point of adjacent surface as per PC **1108.1** For Protected Membrane Roofing Assembly, the top of insulation (or paver if ballasts with all pavers) is considered the top of roof surface.

4. The storm run-off contribution from the relief system shall <u>not</u> be included in the site connection proposal that is filed with the DEP.

6.1 Plumbing and Drainage

6.1.12 Gas Load Letter

Description/Design Approach:

A. Applicability: The new SCA standard for both heating and domestic hot water is the use of electric heat pumps, as well as the use of electric kitchen equipment and lab equipment. This Design Requirement would only be applicable where there is a reason that such electrification cannot occur and the SCA has approved the use of gas for the system.

B. Upon approval of a building scheme, the designer shall issue a load letter to the utility company outlining the gas requirements for the school. The letter is to include the following:

1. The location of the school including a site plan.
2. Proposed exterior location for the gas meter and appurtenances
3. The gas input per unit of equipment
4. Operating hours and mode of operation
5. Firm gas requirements
6. Low/High fire rate of modulating equipment
7. Pilot gas requirements
8. Gas pressure requirements
9. Miscellaneous (e.g. SCA responsibilities vs. the utility company's obligations, gas pipe sizing, etc.)
10. Request utility company charges, if any, for providing service.
11. Ensure that the load letter written and transmitted to the utility company clearly establishes that this will be a public school project that belongs to the SCA. In addition, the name of the CPO for the borough in which the project is located as well as DM and DPM shall appear in the cc list.

C. Relevant Conceptual Sketches:

See next page for sample Load Letter.

NEW YORK CITY SCHOOL
CONSTRUCTION AUTHORITY

ARCHITECTURE & ENGINEERING

February 12, 2001

Mr. John Knuth
Major Account Energy Services Manager
Consolidated Edison of New York
118-29 Queens Blvd
Queens, N.Y. 11375

Re: Gas Service
PS 122 Queens New Addition
21-21 Ditmars Blvd. L.I.C.
Queens, NY 11105

Dear Mr. XXXX:

The NYC School Construction Authority, on the behalf of the NYC Department of Education, is in the process of preparing plans and specifications for a new one-story kitchen addition to the existing NYC public school at the referenced address.

The gas requirement for the existing building includes two boiler burners with a 5:1 turn down ratio, designed for interruptible gas service with No. 2 oil backup. These burners need a minimum of 14" W.C. at the inlet to the gas train. During the heating season, all boilers operate at their maximum output.
The existing 8" LP gas service to the building (installed a few years ago during a boiler plant upgrade project) fully satisfies the latest SCA/Code requirements.
After the header service valve, the 8" LP line is reduced to a 6" pipe, from which firm gas is supplied to the water heater, boiler pilots and kitchen appliances. In addition, interruptible gas to run the boiler is also provided from the 6" gas line.

The total gas load demand of 22,800 CFH for both new & existing buildings is as follows:

Existing building cellar - Two Boiler Burners to remain		21,000 CFH
Existing building cellar - Two Boiler Pilots to remain		00,180 CFH
Existing building cellar - One Water Heater to remain		00,400 CFH
Existing building 1st floor - One gas range to be removed		00,100 CFH
New addition 1st floor - Kitchen Equipment		01,200 CFH
	Total	22,800 CFH

Please advise on the adequacy of the existing gas service, or any modification that may be required due to the increase in the gas load. Also, please inform about first-time costs that must be paid by the Authority.

We have attached for your information and use, a plot plan that shows the proposed location for the new addition as well as the location of the existing gas service to the current building.

I would like to thank you in advance for your prompt attention to this request. Should you have any questions, please contact Mr. XXX at (718) XXX - XXXX.

Sincerely,

XXXXXXX

cc: SCA DPM
SCA DM
SCA CPO

6.1 Plumbing and Drainage

6.1.13 P&D Seismic Design Criteria

Description/Design Approach:

A. As per Section BC 1613.1 of the **2022** NYC Building Code, every new school building structure, and portions thereof, including nonstructural components (architectural, MEP, fire protection) along with their permanent attachments and supports to the structure, shall be designed and constructed to resist the ground motion resulting from earthquake events in accordance with ASCE 7–**16**, excluding Chapter 14 and appendix 11A. The Seismic Design Category will be determined by the structural Engineer of Record and indicated on the structural drawings.

B. Per Section BC 1601.2.3, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 NYC Building Code and interpretations by the Department of Buildings relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including for the bracing of plumbing and fuel gas systems and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** NYC Building Code or reference standard RS 9-6 of the 1968 NYC Building Code.

1. If an existing building is required to meet seismic requirements as per the criteria described in DR 3.1.3 and a waiver from the Department of Buildings (DOB) cannot be obtained, the Plumbing and Drainage retrofit work must then meet such requirements.

C. For new addition projects, any plumbing/drainage item in the existing building that is integrated with the systems in the new addition that is required to function after an earthquake shall also meet the seismic requirements of the addition. All systems (equipment and distribution lines) in the existing building utilizing gas shall be seismically braced. This includes gas meter room and gas booster pump room equipment and piping, water heaters etc. Existing bolting of equipment to its pad and doweling of pad to floor slab shall be analyzed. Kitchen equipment and Science Lab gas equipment are not mandated to be braced.

D. New School Buildings and Additions constructed after LL17/1995 went into effect are subject to the seismic requirements of the New York City Construction Codes and are considered /Risk Category III, “Buildings and other structures that represent a substantial hazard to human life in the event of failure” for seismic design as per BC Table 1604.5.

1. Seismic Design Category shall be determined by the project structural engineer. The Seismic Design Category for a structure is determined in accordance with Section BC 1613. The Seismic Design Category is to be indicated on the Structural Drawings (Refer to Detail 0100054a) and Component Importance Factors related to P&D shall be indicated on the P&D drawings. (Refer to Standard Detail 1540301a).

2. Component Importance Factors (I_p) are prescribed in **Chapter 13 of** ASCE 7-16. The default value for typical components in normal service is I_p=1.0. The following components have I_p=1.5 (Refer to Standard Details 1540301a for a specific listing of common items):

   a. Life safety components required to function after an earthquake. This includes the water supply for the fire protection systems, etc. Functioning after an earthquake means just

long enough to evacuate the building as opposed to functioning as a disaster relief center. Per Section 13.2.2, **of ASCE7-16,** active plumbing equipment that must remain operable following the design earthquake ground motion shall be certified by the manufacturer as operable whereby active parts or energized components shall be certified exclusively on the basis of approved shake table testing in accordance with Section 13.2.5, analysis or experience data in accordance with Section 13.2.6, unless it can be shown that the component is inherently rugged by comparison with similar seismically qualified components. Evidence demonstrating compliance with this requirement shall be submitted for approval by the SCA after review and acceptance by the Contractor's registered design professional.

b. Components with hazardous content. This includes materials that are highly toxic or potentially explosive and in sufficient quantity to pose a significant life safety threat to the general public if uncontrolled release were to occur. Schools typically do not contain these materials, but for seismic purpose (calculation of the seismic design force, restraint and anchorage design) natural gas, acid waste system, water heaters etc., are to be designed as such.

c. Components containing hazardous or flammable materials in excess of the maximum allowable quantities for open systems listed in Section BC 307.

d. Components with I_p=1.0 located above or in proximity to components of MEP items with I_p=1.5 which could damage the I_p=1.5 equipment shall be braced.

3. For Seismic Design Category B, all plumbing & drainage components are exempt from the seismic requirements.

4. For Seismic Design Category C, all plumbing &drainage components with I_p=1.0 are exempt from the seismic requirements.

5. For Seismic Design Category C, all plumbing & drainage components with I_p=1.5 shall be designed and constructed to the seismic requirements.

6. Appropriate seismic coefficients to be utilized in the design of seismic resistance for the plumbing/drainage system shall be those listed in Table 13.6-1 of ASCE 7-**16**.

8. Piping systems components like plumbing & drainage along with their attachments or supports to the structure shall be designed in accordance with Section 13.4 of ASCE 7-**16**. They shall be bolted, welded or otherwise positively fastened without consideration of the frictional resistance produced by the effects of gravity. A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be provided. The component forces shall be those as determined by the calculations outlined in Section 13.3.1.

9. Piping systems components of plumbing &drainage shall be designed as per Section 13.6.**7 of ASCE 7-16** in that the seismic resistance force for the plumbing/drainage system component shall match the seismic forces and the relative displacement as prescribed by the calculations outlined in Section 13.3.

10. For pressure piping systems, including their supports, the force and displacement requirements of Section 13.3 of ASCE 7-**16** shall be used. Materials meeting the toughness

requirements of ASME B31 shall be considered high-deformability materials (Section 13.6.**7**.1).

11. Piping support components shall be designed by either load rating (i.e. testing) or for the calculated seismic forces (Section 13.6.**4**.1 **of ASCE 7-16**). In addition, the stiffness of the support, where appropriate, shall be designed such that the seismic load path for the component performs its intended function.

12. When seismic design is required, generic seismic restraint details shall be shown on the contract drawing bid set. A note shall be added stating, “Details are shown to illustrate the scope of work. Contractor’s registered professional engineer shall provide calculations and be responsible for providing signed/sealed coordinated shop drawings indicating locations of seismic restraints and the required connection details to file with the DOB/BCC”.

13. All bracing devices shall be qualified either through analysis or be tested and certified in accordance with ICC-ES AC 156. Local NYC accelerations are to be used when computing seismic inertia forces. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to seismic bracing designs must be stamped by the Contractor’s Registered Professional Engineer with at least five years of seismic design experience in non-structural building components in New York State.

14. All attachments of hangers and bracing shall be positive attachments that shall be cast-in-place anchors, drill-in wedge anchors, or a welded or bolted connection to structure. Drill-in wedge anchors shall be epoxy adhesive base and shall have an evaluation report number from ICC-ES verifying their allowable loads. Anchors must be certified for use in cracked concrete.

E. The following note is to be included on the plumbing & drainage drawings:

"For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a Professional Engineer licensed in the State of New York engaged by the Contractor. The Engineer shall provide installation supervision of all seismic supports and restraints. The Contractor’s Registered Professional Engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings."

6.1 Plumbing and Drainage

6.1.14 Grease Interceptors and Oil Separators

Description/Design Approach:

A. Grease Interceptors

1. In accordance with DEP's *Sewer Use Regulations*, a grease interceptor or automatic grease removal device shall be provided for the disposal of wastewater from plumbing fixtures that may carry fats, oil and grease to the sanitary sewer system. The SCA/DOE standard is to use a manufactured grease interceptor**.** These fixtures include, but are not limited to, cooking sinks (including the 3rd compartment sterilization sink of a 3-compartment sink), can wash area drains, floor drains, tilting braising pan trough, milk disposal sinks, etc.

2. Selected grease interceptors shall comply with Best Management Practice (BMP) regulations that are enforced by the Industrial & Acid Waste Unit at the DEP, and shall also conform to code provisions laid out in Section PC 1003 of the **2022** NYC Plumbing Code. The code requirements as well as guidelines from the *Sewer Use Regulations* address referencing standards for the design and the testing of grease interceptors that are consistent with PDI G101, ASME A112.14.3 and/or ASME A112.14.4.

3. Sizing of grease interceptors must comply with Table I or II contained in DEP guidelines published for *Sewer Use Regulations*. Tables I & II outline the aggregate volume in cubic inches of sinks and the corresponding flow rate in gallons per minute (gpm) for a suitable grease interceptor and the retention grease capacity in lbs.

4. The grease interceptor shall be located as close as possible to the fixture(s) that it serves. A drainage pipe run from the fixtures' tail waste to interceptor's inlet that exceeds 25 linear feet shall not be permitted.

5. Grease removal and grease trapping requirements do not apply to the floor drain located in warming pantries such as those typically provided in 3-K facilities, as these facilities only use food-heating cabinets and no cooking is involved. This is all pursuant to an exemption that the DEP has granted to the SCA. The sink in warming pantries are required to be connected to a surface installed grease trap

B. Oil Separators

Oil separators shall be provided as per **Section** PC 1003.4 to prevent the discharge of oil into the building drainage system. An oil separator is not required for hydraulic elevator **sumps**, as a submersible sump pump equipped with oil monitoring probes, which shut down the pump when oil is detected, and convey**s** wastewater to the sanitary system via an air break shall be installed. **Operation/functionality of the oil monitoring system shall not interfere with the readiness of pumps utilized for operating elevators used by fire fighters during emergencies.**

C. Relevant Documents

- **Letter from NYC Department of Environmental Protection outlining requirements for waiving of floor drains in warming pantries being connected to a grease interceptor, dated 6/16/2022.**

Environmental Protection

Rohit T. Aggarwala
Commissioner

Pam Elardo, P.E.
Deputy Commissioner
Bureau of Wastewater Treatment

96-05 Horace Harding Expressway
Corona, NY 11368

June 16, 2022

New York City School
Construction Authority
Standards & Technical Studio
Manager for Plumbing & Drainage
30-30 Thomson Avenue
Long Island City, NY 11101
Attn: Mr. Harry Cethoute, P.E.

Re: **Warm Up Kitchens in 3-K School Facilities**

Dear Mr. Cethoute,

We are in receipt of your request for a review of grease interceptor installation requirements for what you have designated as "warm up kitchens in 3-K school facilities," all of which are to be of the same standard design and operating procedures. The New York City Department of Environmental Protection (DEP) is providing conditional grease interceptor approval for said design and procedures as described herein provided that these kitchens are found in conformity thereto upon inspection.

The standard design and operating procedures for said kitchens as described by you in your letter dated May 4, 2022, and your email dated May 17, 2022 (see attached) include the following:

- No ovens will be provided. There is no cooking at these premises. Meals are prepared off-site and will be brought-in for later distribution during lunch periods. The meals will be kept in heated stainless steel cabinets that are mobile. The food transport cabinet will be similar to a product made by Carter Hoffman, is electrical and operates on 120 volts. Typical cabinet size is 30 1/2" H x 30 5/8" W

- Hoods are not required and will not be installed.

- Only pre-cooked foods will come into the school in metal trays. Those trays will be washed in the single 2-compartment sink that is also provided. There will be no dishwasher.

- The only sink that will be installed will be a one two-compartment sink within the volume range of 1,540 to 21,560 cubic inches and will be connected to a 35gpm/ 70 lbs. capacity grease interceptor in accordance with 15 RCNY §19-11 *Best Management Practices (BMPs) for All Non-Residential Dischargers of Fat, Oil, and Grease to the Public Sewer System*, and Table I therein.

A conditional waiver of the grease interceptor installation requirement for a single floor drain in said warm up kitchens is also granted provided that the

kitchen conforms to the standard design and operating procedures listed above.

The DEP may, at any time, order that different or additional grease interceptors be installed in accordance with 15 RCNY §19-11 if determined upon inspection that said standard design and operating procedures are not being adhered to, or other noncompliance with the applicable regulations is observed, including but not limited to floor spillage indicative of a potential for fat, oil, or grease to enter a floor drain that is not connected to a grease interceptor.

The applicant bears full responsibility for ensuring compliance. The Department, by this letter, shall not incur any liabilities or obligations for the failure of the effluent to comply with the Rules of the City of New York (Use of the Public Sewers) or any other laws, regulations, the Administrative Code, or any other document, and the applicant bears full responsibility for ensuring compliance thereto.

Submissions for each individual warm up kitchen must be in narrative form (diagrams are not required), and include at a minimum:

1. The designer's official business name and address.
2. The school name, address, zip code, and block and lot number.
3. The size of the sink in inches as length x width x height = cubic inches.
4. The selected grease interceptor's make, model, minimum flow rate in gallons per minute (gpm), and minimum grease retention capacity in pounds (lbs).
5. A statement indicating compliance with the standard design and operating conditions described above, and referring back to this letter (identifying it by date and subject matter), as DEP will not be providing separate responses for each submission.

If you have any questions regarding this matter, please contact Ms. Sophia Rabich by phone at (718) 595-4707 or email at *sophiar@dep.nyc.gov*.

Sincerely,

DocuSigned by:
Frances Leung
4A1BEC2E952A40B

Frances Leung, P.E., Chief
Division of Pollution Prevention and Monitoring
Bureau of Wastewater Treatment

enc: Letter from Harry Cethoute to Sophia Rabich dated May 4, 2022
Email from Harry Cethoute to Sophia Rabich dated May 17, 2022

6.1 Plumbing and Drainage

6.1.15 Gas Boosting System

Description/Design Approach:

A. Applicability: This Design Requirement would apply only to those cases where new gas-fired equipment has been approved for use by the SCA, as the SCA standard is to employ air source heat pumps systems for heating and domestic hot water.

B. When the gas utility company supplies low-pressure gas to a school and a commitment is made to guarantee only 4 inches w.c. of gas pressure at the head of service valve, the gas distribution system shall be designed with booster pumps, regulators and other accessories.

C. The boosting system shall provide for the required gas pressure and volume that all gas-burning equipment and appliances, including Bunsen burners (when approved for use as the SCA standard is to use electric units), **need to operate**. In schools designed **with gas-fired** rooftop units and boilers that are used for space heating, the boosting system shall consist of duplex pumps, heat exchanger, re-circulation loop piping and other accessories. The duplex pumps shall alternate and shall sequence based on time of operation, **the** temperature of gas flowing through the system and **a** failure mode.

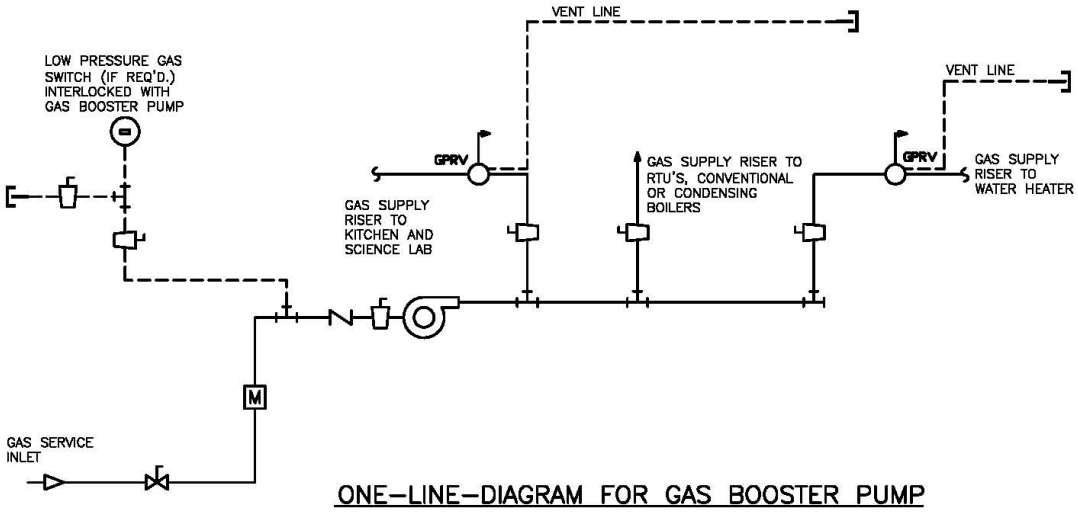
D. The gas-riser diagram **for typical gas-fired appliances** shall indicate three (3) separate **risers**: one for the boilers and rooftop units, a second for the water heater and a third for cooking appliances **(if used, as the SCA's standard is the use of electric kitchen equipment)** and the science labs. **To avoid gas pressure creep from affecting the normal operation of mechanical equipment, appliance pressure regulators shall be provided for each individual appliance.** Line pressure regulator**s shall be vented and the vent piping** extended to the building exterior (see attached one-line-diagram).

E. The **designer shall determine the capacity and size of gas pressure regulators based on gas input requirements** f**or the appliances connected thereto.**

F. Metering equipment, including the actual number of required gas meters, and the associated piping that relates to the gas boosting system shall be based on the gas load letter and the requirements of the serving utility company.

G. Relevant Documents

Gas Booster Pump One-line Diagram



ONE–LINE–DIAGRAM FOR GAS BOOSTER PUMP

EQUIPMENT LIST

LEGEND:

- M — METER ASSEMBLY WITH PROPER SUPPORTS
- CHECK VALVE
- RISER VALVE/ LUBRICATED PLUG TYPE
- LOW PRESSURE GAS SWITCH
- PLUGGED CONNECTION
- GPRV — GAS PRESSURE REGULATOR VALVE (GPRV)
- GAS BOOSTER PUMP
- SERVICE HEAD VALVE

6.1 Plumbing and Drainage

6.1.16 Potable Water Reduction – Compliance with LL51/23

Description/Design Approach:

A. The design of plumbing and drainage systems in all new capacity **projects** and CIP projects that involve the installation or replacement of plumbing systems that include the replacement of fixtures shall achieve potable water savings as legislated by Local Law **51/23**.

B. The law requires that construction projects with an estimated cost of two million ($2,000,000.00) dollars and above involving the construction of new buildings, additions to existing buildings, and capital improvement projects involving the installation or replacement of plumbing fixtures with an estimated construction cost of five hundred thousand ($500,000.00) dollars or more, **must** be designed and constructed in such a way that potable water consumption is reduced. The legislation mandates, at a minimum, 30% water savings. The methodology for determining potable water reduction shall not be less stringent than that prescribed by LEED (Leadership in Energy and Environmental Design). Water performance ratings for plumbing fixtures that were established by the Energy Policy Act of 1992 (EPAct 1992, and as amended), and the later EPAct of 2005 shall be incorporated into the methodology used to determine potable water estimated usage.

C. The designer shall utilize the "Water Use Reduction Form" that is found in the "NYC Green Schools Guide" to demonstrate compliance in the design case with the minimum 30% water saving. For Capacity projects other than 3K and UPK projects, which don't utilize many urinals, the water savings will typically be at 35%. The calculations used to document reduction in the volume of potable water consumed in schools shall take into account the following: number of male and female occupants, frequency of daily usage for relevant plumbing fixtures by male and female occupants, duration of use, volume of water per use, number of school days in one year and water performance rating for flush and flow types fixtures. The designer shall further assume in his/or her "Water Use Calculations" that male occupants use water closets once and urinals twice daily. The "Water Use Calculations" shall also be based on the assumption that female occupants use water closets three times daily.

6.1 Plumbing and Drainage

6.1.17 Conveyance of Sanitary Waste from Plumbing Fixtures and Drains Located in Basement or Cellar Floors

Description/Design Approach:

A. Intent

To reduce or eliminate the risks of public sewage backing up into a school and overflowing from plumbing fixtures or drains onto basement or cellar floors.

B. Design Approach

1. Elevating drainage lines associated with plumbing fixtures installed in a basement or cellar and using mechanical means to pump the sanitary waste shall be the design solution for conveying sewage from the basement **or cellar** into the building drain pipe. Duplex type sewer ejector pumps, in conjunction with a receiving tank, shall be included in the drainage plan for discharging the sanitary waste from the basement or cellar. The selection of the sewer ejector pumps shall be based upon the number of water closets that a single pump can support (**see table below**), while sizing of the receiving tank shall be formulated on the basis of one fixture unit (FU) for each gpm.

Number of water closets handled	Pump capacity (gpm)
1	50
2 or 3	75
4 or 5	100
6 or 7	125
8 to 10	150
11 to 15	200
16 to 20	250
21 to 25	300

2. Where appropriate, a sizing method for sewage or ejector pump that is based on the diameter of the discharge pipe, and is consistent with Section **PC 712.4.1 of the 2022 NYC plumbing Code, shall be employed. The selected pump capacity shall not be less than that indicated below:**

Minimum Capacity of Sewage Pump or Sewage Ejector	
Diameter of the discharge pipe (inches)	**Capacity of Pump or Ejector (gpm)**
2	**21**
2½	**30**
3	**46**

3. **As per NY City Plumbing Code, tying of the elevated drainage line from the sewer ejector pumps into the building drain pipe shall be made after the house trap or on the street side of the sewer pipe joining the building drain to the public sewer. Conveyance of sanitary waste from plumbing fixtures located on floors above the basement level shall follow a gravity flow drainage design.**

6.1 Plumbing and Drainage

6.1.18 Potable Water Sub-Metering

Description/Design Approach:

A. Water sub-meters shall be fitted onto potable water **supply lines to:** kitchens (**including warming pantries),** boilers, water heaters, cooling towers and swimming pools **as a means** to provide water flow measurement. The following are typical locations for **placing the water sub-meter device in** most schools:

1. A water sub-meter shall be placed on both the hot and cold **water supply lines to** kitchen**s, including warming pantries.** The sub-meters are to be provided **in kitchens** in accordance with Section **PC 606.8 of the 2022 NYC Plumbing code. The sub-metering devices must also be installed in warming pantries for potable water management purposes.**

2. A water sub-meter shall be placed in the make-up water line supplying boilers in schools. **The** water sub-meter for boilers is for satisfying the 2019 Green School Guide (GSG) credit requirement for **E**nhanced **W**ater **Metering as well as** for compliance with Section PC **606.8.**

   - For Capacity projects, the water sub-meter is to be provided for all projects irrespective of the boiler(s) capacity **(if boilers are approved for use, as typical design will use heat pump systems)**.
   - For CIP projects, the water sub-meter is to be provided for boilers having at a minimum 2.8 MBTUH capacity as required by **Section** PC **606.8 (if boilers are approved for use, as typical design will either be burner retrofit or replacement with heat pump systems).**

3. A water sub-meter shall be placed on the cold water line to water heaters hat generates **domestic** hot water for indoor plumbing fixtures and fittings. This sub-meter is for satisfying the 2019 GSG credit for **E**nhanced **W**ater **M**etering **that mandates metering for** a minimum of 80% of **the** hot water usage **in a building** (for most **school projects, the typical hot usage will** be **100 %**).

B. Water sub-meters must be the type that are approved for billing and shall conform to the specifications " Guide for water-sub-meters" developed by the New York City Department of Environmental Protection (DEP).

C. Water sub-meters must be readily accessible to the building staff and their location(s) must be shown in the drawings.

6.1 Plumbing and Drainage

6.1.19 Management of Silver Halide Discharged from Plumbing Fixtures Located in Dark Rooms

Description/Design Approach:

Silver halide recovery units shall be provided in Dark Rooms where film developing, photo finishing and printing are conducted. The photographic wastes discharged from sinks, tables and processors used during picture developing contain silver halide, the release of which is governed by an understanding between the DEP and the SCA. The agreement letter dated 5/22/2013 between the Authority and the DEP calls for harvesting silver halide in the following manner:

1. The SCA design strategy to capture silver halide must follow the criteria laid out in Use of Public Sewers for discharges of less than 100 gallons per day of total silver halide in process wastewater. A silver recovery unit capable of removing 90% of silver salts shall be fitted in the sanitary waste piping to tables, sinks and processors. The silver recovery device must be placed upstream of an acid neutralizing tank.

2. The designer of a silver halide control system must submit to the DEP a letter of intention indicating that proposed recovery units satisfy the requirements for mitigation of silver halide release as laid out in the DEP letter to the SCA dated 5/22/2013 (the “agreement”). The letter of intention must be signed and sealed by the designer (EOR). It must indicate the following.

    a. The influent and effluent from the silver recovery unit will be tested by the Department of Education. Every 3-month interval, the test will be conducted on a day that is representative of normal operation of film development or photo finishing.

    b. Maintenance and replacement of the silver recovery unit will be done in accordance with an established protocol requiring the vendor to re-claim the unit when the filter is full. The filter must not be changed nor be replaced in the field.

    c. Daily measurement of the quantity of total silver halide process wastewater discharged to the public sewer will be performed

    d. Records will be kept to document when silver recovery units are either installed or replaced. These records will remain at the school site for at least one (1) year.

3. Relevant Documents

    Department of Environmental Protection letter of 5/22/2013

NYC Environmental Protection

Carter H. Strickland, Jr.
Commissioner

Vincent Sapienza
Deputy Commissioner
Bureau of Wastewater Treatment
vsapienza@dep.nyc.gov

96-05 Horace Harding Expressway
Corona, NY 11368
T: (718) 595-4906
F: (718) 595-6950

May 22, 2013

New York City School
Construction Authority
30-30 Thomson Avenue
Long Island City, NY 11101
Attn: Mr. Harry Cethoute, P.E., LEED AP BD+C
Managing Engineer

Re: Silver Halide Process Wastewater Discharge
NYC Public Schools

Dear Mr. Cethoute:

Please be advised that the Silver Halide Process Wastewater discharge from NYC Public Schools must fully comply with New York City Sewer Use Regulations which include but not limited to RCNY Title 15, §19-07, Best Managing Practices Plans (BMPPs) for Persons Discharging Total Silver Halide Process Wastewater to the Public Sewer System.

In lieu of submitting engineering drawings for new construction, renovation or capital improvement projects, the applicant may submit a letter (signed and sealed by Professional Engineer or Registered Architect licensed in the State of New York) indicating that the proposed school will comply with the above mentioned BMPPs as outlined in your letter dated May 4, 2013 (attached).

The filing exemption as described above applies only to silver halide discharges from NYC public schools. SCA may be required to submit plans to and obtain approval from DEP Bureau of Wastewater Treatment for other types of renovation or capital improvement projects.

If you have any questions regarding this matter, please contact Ms. Sophia Rabich, Associate Project Manager, by phone (718) 595-4707 or by email srabich@dep.nyc.gov.

Sincerely,

Frances Leung

Frances Leung, P.E., Chief
Industrial Inspections &
Permitting Section

enc: Letter dated 05/06/2013 from Mr. Harry Cethoute, P.E.

6.1 Plumbing and Drainage

6.1.20 Overpressure Protection Devices Stemming from Elevated Gas Pressure by the Serving Utility

Description/Design Approach:

A. Applicability: This Design Requirement would apply only to those cases where new gas-fired equipment has been approved for use by the SCA, as the SCA standard is to employ air source heat pumps systems for space heating and domestic hot water production.

B. In accordance with Section FGC 416 of **the 2022** NYC Fuel Gas Code, the design of gas systems shall provide for overpressure protection in the piping **system for** prevent**ing** gas pressure **from** exceeding a pressure that would cause **the** unsafe operation of any appliance connected to the system. **Besides the service or line pressure gas regulators, protection devices intended for controlling gas pressure creep in the down fed gas-fired appliances shall be provided and shall do the following:**

1. Each device **shall** limit the **gas** pressure to a value that does not exceed the maximum working pressure of the downstream system

2. The individual failure of either device shall not result in the over-pressurization of the downstream system.

C. Provision of the overpressure protection device is required **by the 2022 NYC Fuel Gas Code** for **cases where the serving utility delivers gas at a pressure greater than 2 psig. However, t**he overprotection device **must be provided whether the appliances are operating with inlet gas pressure at 14" w.c. or less or at a pressure greater than 14" w.c. While many manufacturers have internal overpressure protection devices for their equipment, some do not guarantee their performance and thus for added safety the overpressure protection device is to be provided regardless of individual manufacturer's recommendations to not require such.**

D. The gas overpressure protection device shall be a monitoring **gas** regulator installed in series with a service or line pressure regulator and set to shutoff when the pressure on the downstream piping system reaches the maximum working pressure or some other pre-determined pressure less than the maximum working pressure.

E. Vent piping for overpressure protection devices shall be directed to the outside. Designers shall show overpressure protection devices in the gas riser diagram and include in the drawings notes asking the Contractor to exercise care and to protect vent piping against water entry or blockage by insects or other foreign materials.

F. Overpressure protecting devices are required to be maintained and inspected every 2 years by a Licensed Master Plumber, with the inspection records kept by the Department of Education and made available to the DOB. If the gas pressure is 15 psig or more, the maintenance and inspection requirements are for once a year.

6.1 Plumbing and Drainage

6.1.21 Miscellaneous P&D Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the P&D Drawings:

1. Ensure that sanitary lines are not shown being routed over the kitchen. If there is no other option, obtain approval from the SCA to utilize panning and other means to collect drips from the piping. When checking shop drawings, ensure the Contractor does not route such lines over the kitchen.

2. Per Section 110.26(E) of the NYC Electrical Code and the Building Code, ensure that plumbing and sanitary/storm lines are not shown being routed over electrical/ telecommunication rooms and closets as well as elevator machine rooms. When reviewing coordination and shop drawings, ensure the Contractor does not route such lines over the spaces.

3. Avoid routing water pipe risers and sanitary/storm water pipe risers in the demising wall between electrical/telecommunication/elevator machine rooms and other rooms.

4. Ensure that a floor drain is provided under the mobile hot food counter and the mobile counter/table in the server area. Ensure the drain lines for the mobile counters are placed such that they will not be in walkways, as well as condensate lines that shall be placed so as to not create a tripping hazard. Coordinate all drain line locations with the Kitchen Consultant and Architect.

5. In boiler rooms, locate the RPZ device and the drainage line from the discharge port of the RPZ away from electrical panels.

6. Do not provide a floor drain in the acid storage room, except for acid drainage piping that discharges into centralized acid tanks. A centralized acid neutralization system is typically provided in high schools where the number of acid sinks exceeds 25, and the installation of a centralized system must facilitate easy routing for piping and connection to floor drainage pipe. The local acid neutralizing canister is not appropriate for connection of floor drainage pipe to the device.

7. The cable actuated gas valve shutoff (when electric cooking equipment is not used, which is the SCA standard) for the kitchen hood fire suppression system is provided in Section 11400 and the Kitchen Contractor is required to file the plumbing work type for the valve as part of the overall fire suppression system filing. The Engineer of Record is to show the valve on the Drawings and provide a note that says, “Refer to Section 11400 for fire suppression system gas shut off valve.” For CIP projects, the plumbing engineer is to investigate the gas system piping and include a plumbing work type, as testing of the gas system will be needed as well as piping installation.

8. Ensure that power to the Maxon valve has been coordinated with the electrical designer and the required wiring and relays are included on the electrical drawings.

9. Ensure that the pit for the house trap has been dimensioned on the Contract Drawings and is of a size to allow working access to the trap and will fit in the required location.

10. Ensure that floor drains and floor sinks are not in circulating pathways in kitchens. Graphically, floor drains and floor sinks shall be layered onto the kitchen drawings from the plumbing drawings so they are coordinated. Coordinate with the Kitchen Consultant and Architect. With Section PC 802.1.1 of the 2022 NYC Plumbing Code prohibiting the manifolding of waste piping below multiple compartment fixtures and thus the requirement for independent waste pipe connection for each sink, ensure that the tie-in with a floor waste receptor and a grease interceptor is coordinated.

11. Graphically, grease traps shall be layered onto the kitchen layout drawings from the plumbing drawings, so they are coordinated. Coordinate with the Kitchen Consultant and Architect.

12. Provide a separate floor sink for the sanitizing sink compartment of the pot sink that bypasses the grease interceptor. Coordinate with the Kitchen Consultant and Architect.

13. Provide shut-off valves for the can wash/mop sink unit in the Can Wash Room of the Kitchen recessed in the wall at 48" above finished floor, with an access door for easier shut off of the water feeding the can wash/mop sink unit.

14. Ensure that BMS control diagrams show the connection to the dry contacts of the potable water filtration system control panel (as defined in Sections 15419 and 15970) as well as all connections to all gas submeters (as applicable) as defined in Section 15970.

15. Ensure that the drainage line running from the Con Edison electric vault to the street sewer is shown on the Drawings. The installation of this drainage pipe will be done either by the General Contractor or by Con Edison. At the beginning of design, the CPO/SPO will determine, based on the proposed location for the vault, if the installation of the electrical vault and the storm line from the vault to the sewer is to be installed by the SCA Contractor or by Con Edison. In either case, Con Edison will file the SD1 and SD2 application with DEP for the drainage work related to the electrical vault. Storm lines should <u>not</u> be shown in the sewer application proposal submitted to the DEP or on the DOB filed drawings, but they are to be shown connected directly to the street sewer on the Contract Documents as follows:

    a. If the vault and storm line is to be installed by the SCA's Contractor, CM will pursue a Developers Agreement with Con Edison and the Contract Drawings shall show the storm line pipe size, corresponding to that shown on the SD1 & SD2, on the separate drawing indicating the storm line to be installed by the Contractor, with final location based on DEP approval obtained by Con Edison.

    b. If the vault is to be installed by Con Edison, show the storm line on the separate drawing with a note that states the installation of the storm line is not in contract and will be installed by Con Edison.

16. Designers must be aware that many older schools have cinder concrete framed slabs and this is to be investigated with the structural engineer. It is not permitted to use post-installed anchors in cinder concrete, and thus drawings should clearly take into account that support of piping, etc. is to be from the structural beams either by direct connection to the beams or

from installation of 'unistrut' type supports running between beams. Indicate removal and repair of the beam encasement to facilitate the attachment.

17. Water sub-meters provided for Kitchens shall be located up high against the finished ceiling in the Dietician's office. This specific location for the sub-meters was requested by OSFNS for ease of activities within their control and operation.

18. Ensure that both a vacuum breaker and a check valve downstream of the vacuum breaker are provided for each of the combi ovens in the kitchen. In addition, each combi oven gets a filtered and unfiltered water connection.

19. Locate gas meter rig and main gas pipe such that pipe is a minimum of 2'-0" from any wall.

20. A milk sink is not considered a food preparation sink and thus does not require an indirect connection, which causes odor concerns in a cafeteria.

21. Athletic Fieldhouse Concession Stand:

a. Concession stand is open to the outdoors, so when the Athletic Fieldhouse building is fully sprinklered, the Concession Stand interior area can be protected by a dry sprinkler head. Otherwise, provide a suitable (ABC, K) portable fire extinguisher(s) in the Concession Stand.

b. Provide a hose bib and floor drain equipped with a trap primer. Provide a hand washing sink dispensing both hot and cold potable water.

6.1 Plumbing and Drainage

6.1.22 Domestic Hot Water Supply Piping - Maximum Length Requirements

Description/Design Approach:

Hot water supply pipe that connects a plumbing fixture to a "*heated water source"* shall be designed and installed as per the limits placed on the length of such piping in accordance with Section C404.5.1 and Table C404.5.1 of the **2020** NYC Energy Conservation Code (NYCECC). Pipe with heat-tracing cable, hot water return system (heated water circulating system) and water heaters are regarded as "*heated water source"*.

The designer shall consider either extending the hot water return pipe loop or heat tracing a hot water supply branch pipe in situations where the location of public lavatories or other plumbing fixtures makes it a challenge for complying with the maximum allowable length of the hot water supply pipe as measured from a fixture's terminating water supply pipe (fixture's angle stop valve to faucet water inlet) to a *"heated water source"*. Extending the hot water return pipe is the SCA preferred design option. The engineer is to discuss with A&E cases on the project where pipe heat tracing might be the most viable option and obtain approval from A&E for utilizing heat tracing-cable.

As a quick reference to Table C404.5.1, which outlines the maximum allowed pipe lengths, the acceptable pipe run-out for the typical 1/2" and 3/4" pipe diameters that connect a public lavatory faucet to a heated source are 2 feet and 0.5 foot respectively. For other fixtures and plumbing appliances, the maximum pipe lengths are 43 feet for 1/2" and 21 feet for 3/4" pipe sizes.

6.1 Plumbing and Drainage

6.1.23 Heat Pump Water Heaters

Description/Design Approach:

A. Generation of domestic hot water in school designs shall transition from using gas-fired water heaters and shall be electrified by providing integrated heat pump water heaters (HPWH) or central air-source HPWHs backed up by a supplemental electric water heater, **unless there are stated conditions that a gas-fired water heater is specifically approved for use by the SCA.**

B. Selection of either integrated heat pump water heaters or central air-source heat pump units with auxiliary back-up electric water heaters shall be contingent upon, among other factors, the total domestic hot water demand (aka peak load, the number of peak loads, and the first-hour rating or the first-hour delivery). Use the following formulas:

1. Total Peak Load (Total Hot Water Demand) in GPH (gallons/hour) = [estimated hot water demand for hand-washing X Diversity Factor + estimated hot water demand for kitchen appliances X Diversity Factor + estimated hot water demand for showers X Diversity Factor + estimated hot water demand for Janitor Sink Closet X Diversity Factor], with diversity factor considering the number of peak loads.
2. Diversity Factor = 0.4 for classroom sinks and lavatories, 0.5 for showers, .4 for Janitor Sink Closet (JSC) and 0.70 for kitchen fixtures.
3. Estimated hot water demand for hand-washing in GPH = estimated hot water demand of sinks/lavatories X number of sinks/lavatories.
4. Estimated hot water demand for kitchen appliances in GPH = estimated hot water demand for pot sinks, pre-rinse, triple & double compartments sinks etc. x number of appliances.
5. Estimated hot water demand for showers in GPH = estimated hot water demand (gpm) X 10 minutes (duration) X number of showers.
6. Estimated hot water demand for JSC in GPH = estimated hot water demand for JSC x number of appliances.
7. Assume one (1) peak unless an available data profile of hot water usage in schools reveals more than one peak.

C. Determination of the total and hourly hot water demand shall be based on the estimated hot water demand of each plumbing fixture or device and kitchen appliances that utilize hot water and showers, and by summing up the estimated partial hot water load of all fixtures based on the hourly flow rate (GPH) of each fixture as follows:

Fixture	Flow Rate	Delivered Water Temp.
Lavatory:	5 GPH	Tempered 90°F
Classroom Sink	5 GPH	Tempered 90°F

Janitors Sink Closet	15 GPH	Hot 120°F
Shower	18 GPH	Tempered 110°F
Kitchen Hand Sink	5 GPH	Tempered 90°F
Kitchen Single Compartment Sink	15 GPH	Hot 140°F
Kitchen Double Compartment Sink	30 GPH	Hot 140°F
Kitchen Three Compartment Sink	30 GPH	Hot 140°F
Kitchen Can Wash	30 GPH	Hot 140°F

For schools with a calculated domestic hot water load of 150 MBH and below and a 200 gallons storage tank or smaller, the most suitable and preferred HPWH is integrated heat pump water heaters assembled in a maximum combination of up to two separate units.

Use the following formulas to determine required energy and storage capacity:

1. Energy input @ various temperatures in BTU/H or MBH = Energy input for hand-washing @ 90°F degree + energy input for kitchen @ 140°F degree + energy input for showers @ 110°F degree + energy input for Janitor sink closet @ 120°F.

2. Assume cold water temperature @ 50°F.

3. Energy input for hand-washing in BTU/H = estimated hot water demand for hand-washing (gph $_{\text{(hot at 90°F)}}$ X (90-50) X (8.33 lbm/US gallon). See step B.3 above for estimated hot demand for hand- washing

4. Energy input for kitchen in BTU/H = estimated hot water demand for kitchen (gph $_{\text{(hot at 140°F)}}$ X (140-50) X (8.33 lbm/US gallon). See step B.4 above for estimated hot water demand for kitchen.

5. Energy input for showers in BTU/H = estimated hot water demand for showers (gph $_{\text{(hot at 110°F)}}$ X (110-50) X (8.33lbm/US gallon). See step B.5 above for estimated hot water demand for showers

6. Energy input for JSC in BTU/H = estimated hot water demand for JSC (gph $_{\text{(hot at 120°F)}}$ X (120-50) X (8.33lbm/US gallon). See step B.6 above for estimated hot water demand for JSC.

7. Energy input for storage in BTU/H = Mixing Factor X Energy input @ various temperatures.

   Mixing Factor is 0.3, which means that:

   Energy input for storage in BTU/H = 0.3 X energy input @ various temperatures. See Step 1 above (C.1) for energy input @ various temperatures.

8. Required Storage Tank in GPH = energy input for storage/[(140- 50) X 8.33]. See Step 7 above (C.7) for energy input for storage.

9. Remaining energy input = energy input @ various temperatures – energy input for storage

OR

Remaining energy input (i.e. required of heater) = 0.7 X energy input @ various temperatures*

* Note

- For central heat pump units, the nominal remaining energy input (i.e. required of heater) is 70% of the energy input @ various temperatures and that energy input for storage is 30% of the energy input @ various temperatures. The Designer is to confer with the equipment manufacturer for verification that the ratios of 0.70 and 0.30 respectively between the heat pump remaining energy and the storage tank do not need to be revisited given the inherent slower recovery rate of heat pumps.

- For integrated heat pumps, the percentage of the energy input at various temperatures that is provided by the heater and the percentage of energy input provided by storage tank is fixed, given the unique design feature of a self-contained storage tank that the integrated unit comes equipped with.

10. Where calculations reveal that the required energy input @ various temperatures is above 150 MBH and that the required storage tank capacity is above 200 gallons, utilize central air-source heat pump water heaters in conjunction with auxiliary back-up electric water heaters. For maximum system design efficiency and better energy savings, designers should size the central HWHPs in such a way that the equipment compressor alone can provide the recovery needed for storing the required amount of domestic hot water during OFF-PEAK hours for the next peak. The electric resistance heaters of the central units are for backup only in the event the heat pump compressors fail. Designers are to size the electric resistance heaters in the central unit tank to provide a capacity closest to the heat pump compressor capacity by defining the number of electric heating elements. This is to guarantee that the electric resistance heaters of the central units provide a true 100% backup.

11. All heat pump compressor heating capacity and COP for <u>both</u> the central units and integrated units shall be determined at 60°F ambient air temperature. HVAC space heating units will be provided to guarantee at least a 60°F ambient air temperature. Designers are to “derate” the heating capacity of the equipment compressor that is usually listed for a rating corresponding to 75°F or 80°F ambient conditions. Use a capacity and COP that are based at 60°F ambient air temperature by consulting the manufacturers’ performance curves of compressor heating capacity and COP versus ambient space temperature.

12. The integrated units experience a further reduction in COP (in addition to the loss of COP when the ambient temperature is colder than the “rated” temperature) as the unit operates in a hybrid mode and at any one time the hybrid COP is a combination of the heat pump compressor COP and the electrical resistance COP (nominally 1.0). For the integrated units, energy modelers are to establish what the hybrid COP is at various percentage loads by computing a weighted average of the heat pump compressors’ COP and the electrical resistance COP (nominally 1.0). Energy modelers are to input a blended average hybrid integrated COP based on an anticipated load cycle (i.e. an assumed given number of hours at a given percentage loading).

13. The combination central air-source heat pumps, and the added back-up electric water heaters for enhancing and for ensuring the reliability of recovery, shall be installed in schools where hot lunches are served over repeated periods and the cooking is done at the premises.

14. It is also anticipated that the designs for schools with a large student populations and with showering facilities shall call for the combination central air-source heat pump assemblies that include electric water heaters.

15. The other parameter that shall be factored into HPWH selection is the First-Hour Delivery or First-Hour Rating. The amount of fully heated hot water that is available for distribution in the first hour period is known as the First-Hour Delivery or First-Hour Rating. Use the below formulas to determine the First-Hour Rating:

    First- Hour Delivery or Rating = Required Storage Tank Capacity + Recovery Rate of Heater

    Recovery in GPH= Remaining energy input /[(Delta T for water distributed @ 140F) X 8.33]. See step C.9 above for the remaining energy input, thus:

    Recovery in GPH = Remaining energy input/[(140-50) X 8.33]

    The HPWH that is ultimately selected shall closely match the calculated First-Hour Rating.

    Note that the Recovery in GPH is NOT to be added to Required Storage Tank in GPH as determined above in Step C.8 for storage tank sizing. The tank storage volume shall be the numerical value of Required Storage Tank in GPH expressed in units of gallons.

16. HPWHs shall be located in a mechanical or boiler room where free heat to draw from the surrounding air is available for the heater's operation. The boiler or mechanical room is a conditioned space and it is anticipated that placing the HPWH inside these rooms will put an extra heating load burden on the space heating system to maintain a space temperature of 60°F. Other possible locations for integrated units include an alcove off of the Main Telecom Room (subject to approval by DIIT) and an alcove off of the Kitchen (subject to OSFNS approval). Alcove shall be provided with a dedicated corridor door for access and an open fence between the alcove and the room that allows air to freely circulate between the alcove and the room. MTR alcove shall be provided with protective pipe shrouds that would prevent any water from entering the MTR in the event of a pressurized pipe leak. Additionally, all alcoves shall be provided with a floor drain, corridor door saddle and saddle at the threshold of the fence separating the alcove from the room to contain any possible leaks.

6.1 Plumbing and Drainage

6.1.24 Thermal Bridges & Heated-Water Circulating Systems

Description/Design Approach:

A. When filing and seeking approval for construction documents that list work types in drainage and domestic water heating systems, the designer shall demonstrate compliance with provisions of the 2020 NYC Energy Conservation Code (NYCECC) that relate to thermal bridging and the correct selection of features for controls that must be provided for the heated-water circulating systems that are employed. The two types of heated-water circulating systems are a circulation system and a heat trace system.

B. Heated-water Circulating and Temperature Maintenance Systems

1. A circulation-type system is the SCA's preferred method for providing a heater-water circulating and temperature maintenance system. As is prescribed in Section C404.6.1 **of the 2020 NYCECC**, a circulation pump shall be employed for this system type. The system return pipe shall be a dedicated return pipe. Controls for the circulation pumps shall start the pumps based on the identification of a demand for hot water within the school. Note that the SCA standard design for a heated-water circulation system features two (2) circulation pumps; one circulation pump for tempered water supplied at 90°F and another pump for hot water delivered at 140°F to the kitchen. Pump controls shall automatically turn off the pump when water in the circulation loop is at the desired temperature and when there is no demand for heated water.

2. A heat trace system, the other type of heated-water circulating system, is only to be used for a remote plumbing fixture when installation of a dedicated return line is impractical and requires SCA approval, as a point of use water heater would typically be the preferred means of providing heated water to a remote fixture. As per Section C404.6.2, controls for the heat tracing system shall be able to automatically adjust the energy input to the system so as to maintain the desired water temperature in the piping based on the need for heated water in the school. Heat tracing shall be arranged to be turned off automatically when there is no demand for hot water. Instantaneous water heaters are the other option for remote fixtures.

C. Thermal Bridging

1. For drainage and vent pipes passing through roofs, floor assembly, walls etc. as required by Section C402.6.1, special attention shall be paid to "clear field thermal bridges**".** When the impact of clear field thermal bridges is not accounted for in U-factors, C-factors, or F-factors as outlined in Appendix A of ASHRAE 90.1-2016, a note on the drawings shall indicate the effects of clear field thermal bridges on roofs, walls and floor assemblies.

2. As per Section C402.6.3, the designer shall put notes on the drawings to document linear thermal bridges situations in a tabular format for the linear thermal bridges listed in Table C402.6.1. The documentation presented in the tabular format shall highlight the following:

   a. Linear thermal bridge

b. Aggregate length of each type of linear thermal bridge.

c. Relevant detail in the drawings showing a cross-section through the thermal bridge.

d. The Ψ-values for each thermal bridge from Table C402.6.

6.2 Heating, Ventilation & Air Conditioning

6.2.0 General Overview of Heating, Ventilation & Air Conditioning (HVAC) Systems

Description/Design Approach:

A. Heat Pump Type Selection Criteria: Various heat pump options are covered in this Design Requirement. With ample Classroom ceiling heights, rooftop packaged DX heat pump units where Classrooms utilize VAV boxes with electric baseboard and PA spaces utilize electric terminal units (recessed electric convectors), are the preferred option based on the following:

1. Major control components are provided by the OEM with the rooftop packaged DX heat pump units, thus requiring less field coordination with the Temperature Controls Contractor's (TCC) controlled ancillary systems, such as pumps and bypass valves associated with air to water heat pump chiller/heater systems.

2. Rooftop packaged DX heat pump systems historically have had lower construction costs as compared to air to water heat pump chiller/heater systems serving dual temperature air handling units. Designer is to consider present market conditions for the costs of the air to water heat pump chiller/heaters (and associated dual temperature water piping and air handling unit costs) when comparing the cost of packaged DX systems versus the cost of chiller/heater dual temperature systems.

3. All heat pump systems require emergency back-up redundant heating system to provide 75% capacity of the heat pump system. This entails utilizing simple electric resistance coils in the air handling units (**and also assumes that the energy recovery wheels are still functioning but at 50% effectiveness since they are fouled due to a lack of maintenance).** When air to water heat pump chiller/heaters are utilized, electric boilers must be provided in the secondary loop of a primary/secondary system, which makes the back-up redundant heating system more complex than just having simpler electric resistance coils in the air handling units when DX units are used. Refer to Design Requirement 6.2.40 for the Air to Water Heat Pump Chiller/Heaters.

4. Rooftop packaged DX heat pump systems with factory packaged refrigerant lines/fittings avoids the necessity of having to provide field refrigerant lines with brazed fittings for associated with split DX systems, thus minimizing the likelihood of leakage from the refrigerant lines/fittings.

5. Roof units (DX or dual temperature water) provide as much program space as possible inside the building for educational instruction. This must be moderated with:

   a. The aesthetics of having units on a low roof might be objectionable when viewed from higher portions of the building (e.g., on a Developer project).
   b. Low roof located rooftop units might obstruct the views from the school to the surroundings when viewed from other sections of the building.
   c. The need for site specific PV and green roofs.
   d. If the rooftop unit design results in units having very high external static pressure requirements and hence very high brake horsepower requirements resulting in non-compliance with the energy codes and standards (ASHRAE 90.1-2016, the 2020

NYCECC and LL **51/23**). The design of the roof-mounted system and duct layout must be optimized to keep the external static pressure to a minimum.

e. For existing buildings, if indoor reusable Mechanical Equipment Rooms (MERs) already exist

The above might then justify indoor MERs for the air handling units in lieu of rooftop units.

6. Note that utilizing air to water heat pump chiller/heater systems is a possible solution but not optimal per paragraphs A1, A2 and A3 as stated above. Packaged rooftop DX systems are optimal. Note however for CIP projects, if existing chilled water piping system is in good salvageable condition, then dual temperature chiller/heaters become a more feasible option.

7. Energy modeling was performed on several new school designs with various HVAC systems to ensure school buildings would meet the energy performance requirements of Local Laws LL 31/16 and LL 32/16 (**subsequently replaced by LL51/23)**, the Green Schools Guide and LL97/19 mandated carbon dioxide reductions and to see where the design is in relation to the 2030 requirements. Based on the results of that energy modeling, and where ample interstitial space exists to install VAV boxes, all school HVAC systems for non-assembly spaces for Capacity project new stand-alone buildings, additions and major modification/substantial reconstruction projects that also involve substantial work to the building envelope shall be Multi-Zone Variable Air Volume (MZVAV) systems. These systems tend to use the least amount of energy when utilizing custom MZVAV DX heat pump units or utilizing custom MZVAV air handlers served by chiller/heater plants. However, meeting the maximum energy usage requirements of LL**51/23** is highly dependent on the amount of fenestration and lighting and must be modeled for each school. Capacity projects with major modification/substantial reconstruction that do not involve substantial work to the building envelope must meet the energy cost saving requirements of LL **51/23** but are not required to meet the maximum energy usage requirements of LL 51/23. Capital Improvement Program projects not in Environmental Justice Areas involving biodiesel B100 Ready burner retrofits or replacements ($2,000,000 or more project cost) and HVAC systems ($2,000,000 or more project cost) must meet the energy cost savings requirements of LL**51/23**. For LL**51/23** to be applicable to burner retrofit or replacement projects, the cost of the project must equal or exceed 50 percent of the cost of replacing the heating distribution system of the building.

8. For existing building CIP projects, Designers are to present their proposed heat pump systems to replace existing equipment in a Building Electrification Project Field Report (template located on www.nycsca.org). Field Report shall describe all existing HVAC, P&D and Electrical systems with justification for Designer's preference for specific heat pump system candidates. Electrification Field Report is subject to review/approval by the Authority. Following the Authority's review of the Building Electrification Project Field Report and to narrow down the list of candidate systems, designers shall complete the CIP Carbon Reduction Electrification Equipment Selection Matrix (template located on www.nycsca.org) for which HVAC systems are optimal (rated "1"), possible but not optimal (rated "0"), and which systems are not an option for given existing building parameters (rated "T" for terminal non-feasible system selection). Subsequent to the Authority's review of the CIP Carbon Reduction Electrification Equipment Selection Matrix where the most promising candidate heat pump system will be selected, Designers are to complete the Draft, then Final Scope Report.

B. General Building HVAC Design

1. All DX heat pump units or dual temperature air handling units served by chiller/heaters for non-assembly spaces and PA spaces may be roof mounted (preferred per above Heat Pump Type Selection Criteria) or located in a Mechanical Equipment Room (MER) for the situations noted in Section A.5 above. The Mechanical Designer shall coordinate with the Architect.

2. All DX heat pump units or dual temperature air handling units served by chiller/heaters shall have nominally 55°F air discharge (out of the unit and into the supply duct) in the cooling mode and shall be equipped with airfoil plenum type or fan array supply and exhaust fans. Return fans are not to be used even when an energy recovery wheel is not used. This is because better exhaust flow modulation can be achieved with exhaust fan VFD as compared to a return fan with a damper throttling the exhaust flow.

3. The DX heat pump units or dual temperature air handling units served by chiller/heater plants shall have pre-filters with a minimum efficiency reporting value of MERV 7 and final filters with a minimum efficiency reporting value of MERV 13. Additional filtering systems may be required if air testing in the building area during the SEQRA investigation or if the ASHRAE Outdoor Air Analysis and Computational Fluid Dynamics (CFD) modeling indicate that ambient contaminants are to be mitigated and moving the units to another location on the building (preferred option) is not possible or will not mitigate the issue. MERV filters are required on both sides of the energy recovery wheel.

4. All central supply heat pump units shall be equipped with DX coils and all central supply air handling units shall be equipped with dual temperature coils that provide both heating and cooling capacity. Capacity and CIP projects are not authorized to proceed with a design based on providing new fossil fueled boilers unless approval is granted by the Authority. Capital Improvement Projects (CIP) not located in Environmental Justice Areas may have a system based on utilizing new or retrofitted existing biodiesel “B100 Ready” burners where existing boilers can be salvaged if they have a future expected service life of at least 15 years.

5. Heat pump DX units and dual temperature air handling units served by chiller/heater plants shall be provided with OEM controls, which will simplify the field commissioning and simplify the coordination of the controls for the units. All OEM controls must be native BACnet or be provided with communication cards that allow integration of the new central units into the DOE’s standard BACnet network.

6. When central DX MZVAV heat pump units are utilized, electric baseboard mounted 4” above finished floor shall be provided for the Classrooms, Offices, and other non-assembly areas for perimeter heating. When central DX DOAS heat pump units are utilized, ceiling (if less than 20,000 SF) or floor mounted VRF units shall be provided for the Classrooms, Offices, and other non-assembly areas for perimeter heating/cooling.

7. When central dual temperature MZVAV air handling units served by chiller/heater plants are utilized, hydronic hot water fin tube radiation mounted 4” above finished floor shall be provided for the Classrooms, Offices and other non-assembly areas for perimeter heating. When central dual temperature DOAS air handling units served by chiller/heater plants are utilized, hydronic dual temperature fan coil units with ECM fan motors shall be provided for the Classrooms, Offices and other non-assembly areas for perimeter heating/cooling. When

utilizing chiller/heater plants, hydronic dual temperature vertical unit ventilators (VUVs) may also be provided. Refer to Paragraphs B, C and D below for the selection criteria.

8. When central DX heat pump units are utilized, special spaces such as Science Labs, Libraries, Music Rooms, and other spaces where shelving would interfere with the functioning of the electric baseboard, shall be equipped with fan powered VAV boxes that have electric reheat coils. When central DX heat pump units are utilized, Toilets and Stairways shall utilize electric cabinet heaters. Toilet electric cabinet heaters shall be ceiling-mounted fully recessed units. Stairway electric cabinet heaters shall be fully recessed and mounted 4" above floor, or ceiling mounted. Alternately, recessed electric convectors mounted 4" above floor may be used in the stairways. When chiller/heater heat pump plants are utilized, Toilets and Stairways shall utilize hot water cabinet heaters. Toilet hot water cabinet heaters shall be ceiling-mounted fully recessed units or recessed behind the wall, 4" above the floor. Stairway hot water cabinet heaters shall be fully recessed and mounted 4" above the floor, or ceiling mounted. Alternately, recessed hot water convectors mounted 4" above the floor may be used in the stairways.

9. New Construction (Stand-alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Capacity Projects (in which the scope of work includes rehabilitation work in at least two of the three major systems of the building (electrical, HVAC and plumbing), and where construction work affects at least 50 percent of the building's floor area):

    a. The baseline for comparative regulated site energy use shall comply with Local Law **51/23**. The baseline for comparative total source energy use to show compliance with LL**51/23** is 70 kBTU/SF/yr. This is 50% of the median source energy use intensity (140 kBTU/SF/yr) for buildings designed and constructed for similar uses according to the 2015 benchmarking data. Note however per Design Requirement 1.3.1.10, the source energy target is presently 60 kBTU/SF/yr or below, though may vary slightly above based on the project. Projects that modeling demonstrates the EUI is in the high 60's are to be discussed with the Design and Resiliency team to determine potential reasons, such as different assumptions made, modeled occupant density and schedules, a high window to opaque wall ratio, or a large kitchen load due to serving more than just the building. The Authority may provide direction (through the subsequent standards revisions) to meet more aggressive targets to meet the City's 2030 source energy use intensity target. The baseline for comparative energy use to show compliance with the Authority's Green Schools Guide is ASHRAE 90.1-2010 Performance Rating Method (PRM).

    b. In general for the custom DX heat pump units and custom dual temperature air handling units served by chiller/heater plants, designers are to utilize both energy recovery wheels (the Cafeteria/Kitchen combination unit being the exception) and demand controlled ventilation. (Commercial multi-zone units may eliminate demand controlled ventilation when they are equipped with energy recovery wheels).

        1) Energy recovery wheels (ERW) (prescriptive in ASHRAE 90.1-2016) can only be eliminated on Capacity projects upon approval of the Authority's TSS Unit if the designer demonstrates that flow rate of the exhaust air is significantly less than the outside air intake flow rate (due to remote exhausts) and the energy loss associated with static pressure drop through the wheel exceeds the potential energy savings that the wheel could otherwise generate. To demonstrate this, designer will need to

perform two energy modeling analyses (one with the ERW and one without the ERW) or provide equivalent analysis.

2) Demand controlled ventilation (mandatory in ASHRAE 90.1-2016) can only be eliminated on Capacity projects upon approval of the Authority's TSS Unit if the design meets the Exceptions of Section 6.4.3.8, and if energy modeling demonstrates that the design meets LL**51/23**.

10. Capital Improvement Projects (CIP) utilizing commercial units not required to comply with LL**51/23** based on the estimated construction cost and which follow the requirements of the 2020 NYCECC instead of ASHRAE 90.1, may only eliminate the mandatory energy recovery wheel upon approval from the Authority's TSS Unit if the design meets the Exceptions of Section C403.7.4.

11. Capital Improvement Projects (CIP) utilizing commercial units not required to comply with LL**51/23** based on the estimated construction cost and which follow the requirements of the 2020 NYCECC instead of ASHRAE 90.1 may only eliminate the mandatory demand controlled ventilation upon approval of the Authority's TSS Studio if the design meets the Exceptions of Section C403.7.1.

12. Deviation from these standards when justified by project specific modeling and approved by the Authority's TSS Unit may require alternate solutions. Note that all heat pump systems utilizing A1 refrigerants (DX or dual temperature chiller/heater systems) are to be limited to 15 HP max per refrigerant circuit when the aggregate HP of all the units adds up to more than 100 HP to avoid the need for the Department of Education to provide a Refrigerating System Operating Engineer. Refer to Table FC 606.1.1 of the 2022 NYC Fire Code. Refer to Design Requirement 6.2.36 based on ASHRAE 15-2022 for the measures to be taken on A2L systems to avoid the need for a Refrigerating System Operating Engineer that otherwise would be required per the NYC Fire Code.

C. Capacity Project New Construction (Stand-alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Capacity Projects with Adequate Slab-to-Slab Heights in the Classrooms, Offices, Non-Assembly Areas and Corridor:

1. Non-Public Assembly Spaces (Classrooms, Office, other Non-Assembly Areas, and Corridors):

a. Spaces shall be served by custom multi-zone variable air volume (MZVAV) DX heat pump units (preferred) or dual temperature MZVAV air handling units served by chiller/heater plants. DX MZVAV central units shall be equipped with hot gas reheat that provides reheat to avoid overcooling (as monitored by the return duct air temperature sensor) while the discharge air off of the cooling coil remains at a maximum of 55ºF for indirect dehumidification purposes. All MZVAV central air handlers shall provide tempering of ventilation air in the winter.

b. Classroom, Offices and other non-assembly spaces shall be served by non-fan powered VAV boxes for cooling. When DX heat pump units are utilized, perimeter heating shall be provided by electric baseboard mounted 4" above finished floor. Science Labs, Music Rooms, Libraries and other special spaces where the usage of shelving would impact the functioning of electric baseboard, shall be served by fan powered VAV boxes with electric

reheat. When dual temperature MZVAV air handling units served by chiller/heater plants are utilized, perimeter heating shall be provided by hydronic fin tube radiation units mounted 4" above finished floor.

c. The Corridors shall also be served by the central MZVAV unit that also serves the Classrooms. Each Corridor shall be provided with a Constant Air Volume (CAV) box or VAV box per floor. Corridor VAV boxes shall be controlled from a temperature sensor located in the most remote part of the Corridor. Refer to Design Requirement 6.2.07 for details. The minimum box setting for the Corridor boxes shall never to be less than 0.06 cfm/SF per Table MC 403.3.1.1 of the 2022 NYC Mechanical Code. In addition, the minimum setting for the Corridor boxes shall be such that any transfer air from the Corridor to the adjacent Toilets and Electrical Closets shall always be maintained.

d. Terminal Design

See Design Requirement 6.2.3 for details.

2. Public Assembly Spaces

a. Gymnasiums, Gymatoriums, Auditoriums and Cafeterias/Kitchens shall be served by custom Single Zone Variable Air Volume (SZVAV) DX heat pump units (preferred) or custom dual temperature SZVAV air handling units served by chiller/heater plants. PA spaces with room dividing foldable partitions shall utilize Multi-zone Variable Air Volume (MZVAV) units. Transferring otherwise wasted exhaust air from the Cafeteria/Cafetorium to the Kitchen for Kitchen hood make up air is very energy efficient. When DX SZVAV heat pump units are utilized, PA spaces shall utilize recessed electric convectors mounted 4" above the floor. When dual temperature SZVAV air handling units served by chiller/heater plants are utilized, PA spaces shall utilize recessed hydronic hot water convectors mounted 4" above the floor.

D. Capacity Project New Additions with Slab-to-Slab Height of Nominally 12' (where New Addition Floors are to Match Existing Building Floors) and Major Modification/Substantial Reconstruction of Existing Buildings with Limited Slab-to-Slab Heights for Classrooms, Offices, Non-assembly Areas and Corridors (after determining that VAV box ceiling soffits are not an option):

1. General Selection Criteria: Options include DX Vertical Unit Ventilators (VUVs), DX custom DOAS/VRF units and DX custom SZVAV heat pump units or dual temperature Vertical Unit Ventilators (VUVs), dual temperature custom DOAS/FCUs and dual temperature custom SZVAV units served by chiller/heater plants. (Per above Heat Pump Type Selection Criteria, DX is preferred over dual temperature units served by chiller/heaters).

a. When DX vertical unit ventilators (VUVs) are utilized and a maximum acoustic level of NC35, (40 dBA) must be adhered to in order to comply with the NYC Green Schools Guide based on LEED v4, compressorized VUVs may have to be further enclosed in a closet or custom enclosure.

b. DX VUV design is preferred over DX custom DOAS/VRF design in order to avoid field refrigerant brazed VRF joints and to take advantage of factory DX piping in the VUV. Note that per Section 7.5.1.2 of ASHRAE 15-2022, split/VRF piping is not allowed in Corridors and Corridors must be served by "unit" systems, which ASHRAE 15-2022

defines to be the same as self-contained systems that are packaged systems. ASHRAE 15-2022 defines self-contained systems as “a complete factory assembled and factory tested system that is shipped in one or more sections and has no refrigerant containing parts that are joined in the field by other than companion flanges or block valves”. Refer to Design Requirement 6.2.36.

2. Non-Public Assembly Spaces (Classrooms, Office, other Non-Assembly Areas, and Corridors)

   a. Spaces are to be served by VUVs (either DX packaged (preferred if acoustics are not an issue) or DX split or dual temperature VUVs served by chiller/heater plant). Other option is to utilize custom 100% dedicated outside air system (DOAS) constant volume DX heat pump units with VRF terminal units, or DOAS constant volume dual temperature units (served by chiller/heater plant) with fan coil terminal units that utilize ECM fan motors. The central DOAS units need only provide decoupled tempering of the ventilation air in both the summer and the winter. The selection of using VUV or DOAS/associated terminal units (VRF or dual temperature hydronic fan coil units) is to be discussed with the Authority. Each system has pros/cons. For DX units, the refrigerant leakage associated with VUVs having factory packaged refrigerant piping would be less of an issue as compared to multiple indoor VRF units connected to one outdoor air-cooled condensing unit. VUVs also eliminate balancing concerns associated with a central air system such as the DOAS units. Should a VUV fail, it only would affect the space that it is serving unlike a failure of the central DOAS unit. DOAS/associated terminal units (VRF or dual temperature hydronic fan coil units) however avoid the need to make multiple penetrations of the envelope otherwise required for the VUVs. Should a VUV fail, the space served by the VUV would lose both the ventilation capability and heating/cooling capability. Should the DOAS unit fail, only the ability to ventilate would be lost since the terminal units (VRF or FCU) units could continue to provide space cooling and space heating. Demand Controlled Ventilation (DCV) is more easily accomplished with the VUV units compared to DOAS units, which would otherwise require VAV boxes in the DOAS supply ductwork responding to CO_2 sensors. Acoustics are less of a concern with dual temperature VUVs as compared to packaged DX VUVs considering the compressor generated noise.

      1) DX DOAS central units shall be equipped with hot gas reheat that provides reheat to avoid overcooling while the discharge air off of the cooling coil remains at a maximum of 55ºF for indirect dehumidification purposes.

      2) Both the floor mounted DX VUVs and floor-mounted multi-positional VRF units might have to be further enclosed in a sound attenuating closet or enclosure. Designer to verify. This is required to guarantee that the sound pressure levels do not exceed 40 dBA/NC 35 as required by the 2019 Green Schools Guide Acoustical prerequisite. Floor mounted VRF units are required in lieu of ceiling VRF units for buildings exceeding 20,000 SF due to the need to avoid having to use ladders for maintenance.

      3) For Demand Controlled Ventilation (DCV) with the VUVs, the quantity of ventilation air shall be varied to each non-assembly space by employing CO_2 sensors. VUV manufacturers offer DCV as a standard option. With DX systems, there are limitations how low the flow over the DX coils could be to avoid coil freezing. In

addition, there are limitations for how low the flow could become considering that the fans must remain stable. Considering the added expense of having to provide VAV boxes and the fact that the flow can only be minimally lowered below the full ventilation airflow, DCV is not warranted with DOAS systems.

4) For acoustical benefits, the discharge air from the VUVs or floor mounted VRF units should be ducted. Return air from the space would be drawn back to the vertical unit ventilator or floor mounted VRF unit (or enclosure/closet if required) return grille without the usage of return ductwork.

5) The VUVs or floor mounted VRF units are to be provided with a hard-piped condensation drainage system.

6) In the heating mode, the VUVs or floor mounted VRF units should be sized for the skin load plus the pickup load associated with the heating up of the ventilation air.

3. Public Assembly Spaces

Gyms, Auditoriums, Gymatoriums and Cafeteria/Cafetorium/Kitchens, shall be served by SZVAV or MZVAV custom air handling heat pump units per above as described in paragraph B.2.a.

E. Capital Improvement Projects (CIP) on Existing Buildings Undergoing Electrification:

1. HVAC options are based on several parameters of the existing building including:

a. If age of roof is more than 15 years old nominally, rooftop DX or rooftop dual temperature air handling units should be avoided as much as possible in favor of classroom/office VUVs and SZVAV indoor units located in MERs. Existing dunnage/curbs might have to be elevated to allow future re-roofing.

b. If utilization rate exceeds 80% and hence Classroom swing space is not available to relocate the students while working in one selected area, VUVs are preferred.

c. If MER is located in a flood plain, lower elevation MERs below the flood plain are to be avoided but higher floor MERs are an option.

d. VAV boxes are not an option if the structural floor to ceiling height is below 9 ft. Ideally for acoustical benefits, the discharge air from the VUVs or floor mounted VRF units should be ducted. If the ceiling height in existing building precludes the usage of ducted supply, then VUVs/floor mounted VRF units may be ductless with free-delivery supply (but still maintaining NC40, 45 dBA).

e. If building has cinder concrete slabs/clay tile arches, supplemental steel will be required. Lighter dual temperature VUVs are preferred over heavier compressorized VUVs.

f. If building is SHPO eligible, new or enlarged envelope penetrations by VUVs are discouraged. Maintaining existing louver size is the preferred option when utilizing VUVs. Dual temperature VUVs or split VUVs are preferred over packaged compressorized VUVs due to their smaller required louver size.

g. If existing unit ventilators are to be removed, existing window louvers might be reusable or replaced in kind. This might require a plenum be built behind the VUV. Designer to verify VUV does not protrude too much into the Classroom. Existing envelope masonry openings for the original louvers of former horizontal unit ventilators would have to be modified to accommodate the vertical unit ventilators.

h. If existing chilled water piping system is in good salvageable condition, dual temperature chiller/heaters are more feasible.

i. If windows are BCAS rated at 4 or 5, single pane or more than 35 years old, VUVs are a more appealing option since exterior façade should also be altered by a window replacement. Note if otherwise acceptable condition ribbon windows are in existing building instead of punched windows and a window replacement is not planned and individual ribbon window lite removal for new louvers compromises the structural stability of the ribbon windows, design shall incorporate measures to reinforce ribbon window frames used by the new louvers or replacement should be considered.

j. If windows have narrow width or classrooms only have a few windows, central systems are a better option since VUVs would subtract from the already limited window openings.

k. If the roofs are pitched, roof located central units are less desirable as they can only be placed on flat roofs sections, which may be limited. Classroom/Offices VUVs and PA space SZVAV central units located in interior mechanical equipment rooms are more optimal. MER central DX units with smaller roof mounted outdoor units would be preferable over MER dual temperature central units since the associated large roof mounted chiller/heater plant would not be optimal with pitched roofs.

l. If Auditoriums have ornate and/or historic ceilings: Lower floor MER located indoor central units are preferred in lieu of rooftop units to be able to salvage existing wall register design and avoid having to provide new overhead ductwork which would interfere with ornate and/or historic ceiling. Existing lower bottom register supply diffusers are optimal for heating, but not for cooling. Investigate the possibility of providing ceiling VRF units (for lower ceiling heights that still allow for VRF maintenance) or wall VRF units (with additional wall hung HEPA units to account for the fact that wall hung VRF units can't be used with MERV 13 filters).

m. If Gymnasium is on the top floor: Roof top units are preferred. DX units are preferred over dual temperature hydronic units.

n. When air to water heat pump chiller/heaters are the basis of design, to address the need for emergency back-up redundancy heating, for schools not located in Environmental Justice Areas, utilizing new secondary loop gas condensing boiler plant in lieu of new secondary loop electric boiler plant is a possibility if there is an existing gas service able to serve new gas fired condensing boilers (two, each at 37.5%, 75% total capacity) to reduce the size of the new required electrical service. Other option for schools not located in Environmental Justice Areas could be to utilize new secondary loop biodiesel hot water boiler plant if existing building was oil-fired and oil tank is salvageable to store biodiesel fuel. The idea of utilizing new gas or new biodiesel boilers to downsize the new electric service must be moderated with the preference to only use new electric boilers

when new boilers are required as backup for the chiller/heater system. Discuss with the Authority. If an option, replace references to electric boilers with gas condensing boilers or biodiesel hot water boilers on detail 1598510e. In addition, revise the Sequence of Operation to refer to utilizing gas condensing boilers or biodiesel hot water boilers instead of electric boilers.

o. For the rare case when a Public Assembly space only has a 12' slab to ceiling height and there is no room to run large cooling coupled ducts associated with SZVAV units, then DOAS system (with smaller ducts) driving VRF cassette terminal units is an option.

p. The relative cost differential between various options is to be considered when deciding upon which system should be the basis of design. The relative costs are to be highlighted in the Pre-Scope Electrification Field Report.

2. For carbon dioxide reductions, if it is determined that the existing boilers have less than 15 years of future life and hence biodiesel B100 Ready burner retrofits or replacements are not warranted, then the existing HVAC systems are to be replaced with heat pump systems. The heat pump systems are to be the same as described above in Cases B and C except CIP projects shall utilize central commercial heat pump units in lieu of the central custom heat pump units used on Capacity projects. When the slab-to-slab heights do not permit usage of VAV boxes and ceiling soffits are not an option, VUVs or DOAS/associated terminal systems (VRF or dual temperature fan coil units with ECM fan motors) may be used in accordance with above paragraph C. Note that the units could be floor mounted without being located in closets or having enclosures. The CIP projects are not bound to follow the 2019 Green Schools Guide, which has the 40 dBA/NC35 acoustical prerequisite. For the CIP projects, it is acceptable to have sound pressure levels not exceeding the prior 2009 Green Schools Guide based on LEED Version 3 prerequisites of 45 dBA/NC40.

F. Central Station Monitoring for Systems Using A2L Refrigerant

1. In addition to mechanical designer determining per ASHRAE 15-2022 if continuous ventilation is required when the Effective Dispersal Volume Charge (EDVC) for an A2L independent refrigerant coil leak is exceeded, mechanical designer is to determine if the A2L refrigerant charge in an independent HVAC coil circuit if leaked into the space(s), could equal or exceed the 25% Lower Flammability Limit (LFL) in the event of a continuous ventilation system failure. If so, since the ASHRAE 15-2022 required air handler OEM integral detectors would be rendered useless should the fans fail, HVAC controller shall close dry contacts upon fan failure that in turn are wired by Div. 16 Contractor back to the Div 16 systems for central station monitoring. Mechanical designers are to edit the HVAC Specification Sections (according to the Notes to Specifier) to delete the need for central station monitoring if an A2L refrigerant leak would always be less than the 25% LFL threshold. When required, the continuous ventilation system fans should be designed such that when working properly, the 25% LFL threshold should not be exceeded. Refrigerant dispersal volumetric flow rate may be inadequate should the VFDs not modulate the fan speed as required, or a damper should hang up, etc. In the case where the fans are working, where the required integral OEM leak detectors are functional, should the 25% LFL be equaled or exceeded, central station monitoring signal would also have to be sent by closing HVAC controller dry contacts and Div 16 Contractor would have to wire from the dry contacts to Div 16 central station monitoring systems per Section BC 918 of the 2022 NYC Building Code.

2. Designer is to also identify any space where an A2L refrigerant leak from the A2L refrigerant piping in the space not enclosed in gas-tight fire resistive ducts could equal or exceed 25% of the Lower Flammability Limit (LFL) and which is not served by an HVAC unit with integral OEM leak detectors providing the continuous code required refrigerant dispersal volumetric flow and having lower edges of the return openings less than or equal to 12" AFF. Such identified spaces will require area refrigerant leak detectors as specified in Section 15997. Designer is to indicate such spaces on the Drawings. Upon area detectors sensing a concentration equaling or exceeding the 25% LFL level, Section 15997 refrigerant leak detector control panel shall close dry contacts that in turn are wired by Div. 16 Contractor back to the Div 16 central station monitoring systems. Note that spaces served by HVAC units providing the code required refrigerant dispersal volumetric flow, having lower edges of the return openings less than or equal to 12" AFF and equipped with OEM integral leak detectors, do not require area detectors.

3. In general, designers shall strive to design A2L systems where the refrigerant charge per circuit is less than the EDVC value and that would not exceed 25% LFL in the event of an independent circuit refrigerant leak. In so doing, central station monitoring would not be required.

G. Dampers/Detectors:

1. Fire Dampers, Smoke Dampers, Combination Fire/Smoke Dampers and Smoke Detectors shall be provided for duct and air transfer openings in accordance with the Section BC 717 of the 2022 NYC Building Code. Refer to Table 6.2.0 below. Supply duct and recirculation duct penetrations of the 2-hour rated partitions at Fire Rescue Areas shall be equipped with combination fire/smoke dampers and shall be further equipped with local duct smoke detectors for control of the fire/smoke dampers. Verify the location of all fire rated construction and smoke barriers/partitions (if any) with the Architect.

2. Note that per Section MC 102.4.2.1 of the 2022 NYC Mechanical Code, in cases where the building's passive fire-resistance protection design, including rated construction, corridors and fire separations, complies with 1968 or prior codes, the determination as to whether a fire or smoke damper is required shall be permitted to be made pursuant to the 1968 Building Code, or at the election of the applicant, the 2022 New York City Mechanical Code.

3. Ventilating systems for safe areas shall not be connected to systems serving any other spaces, unless separated from such systems by fire/smoke dampers actuated by smoke detectors per Section BC 1029.19.3.2(4).

TABLE 6.2.0
Fire and Smoke Damper Requirements[24]

ASSEMBLY TYPE	FIRE DAMPER	SMOKE DAMPER	NOTES
Fire Wall BC 717.5.1	Y	Y	1, 20, 31
Fire Barrier BC 717.5.2	Y	N	2, 3, 4, 5, 10a,19, 29, 30, 34, 35, 37, 39, 42, 43 (for related combustion damper)
Shaft Enclosure BC 717.5.3	Y	Y	2, 7, 8, 9, 10a, 11, 12, 19, 23, 25, 32, 34, 35, 37, 39, 40
Fire Partitions BC 717.5.4	Y	N	2, 3, 13, 14, 19, 29, 35, 37, 39, 42
Smoke Barriers BC 717.5.5	(See Note 21)	Y	10b, 15, 21, 26, 34, 35, 39, 42
Smoke Partitions BC 717.5.7	(See Note 21)	Y	10c, 15, 21, 26, 27, 28, 33, 35
Supply Air Handling Systems MC 607.2.3	N	Y	16, 17, 18, 23, 25

NOTES:

1. Penetrations by ducts and air transfer openings are permitted only for fire walls that are not on a lot line per Section BC 706.11. The size and aggregate width of all openings shall not exceed the limitations of Section BC 706.8. Provide fire dampers and smoke dampers for allowed penetrations per Section MC 607.5.1. Exception per Sections BC 717.5.1 and MC 607.5.1: Smoke dampers shall not be required in ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency condition. Per Section BC 717.5.1, the air-handling system shall be continuously monitored to ensure continuous airflow at a constantly attended location and be inspected and maintained in accordance with the system manufacturer's instructions. Per Section MC 607.5.1, a standby generator would be required in case of a loss of normal power in accordance with Chapter 27 of the New York City Building Code if the smoke damper is to be eliminated. In order to avoid the necessary connection to the standby generator, provide the smoke dampers at penetrations of fire walls.

2. Fire dampers and smoke dampers are not required where ducts are used as part of an approved smoke control system in accordance with Section BC 909 (BC 717.2.1) (BC 717.5.3 Exception 1.3) (BC 717.5.3 Exception 4).

3. Per Sections BC 717.5.2 (Fire Barriers) and BC 717.5.4 (Fire Partitions): Ducts and air transfer openings that penetrate fire barriers or fire partitions shall be protected with listed fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate exit enclosures and exit passageways (ref Section MC 607.5.2) except as

permitted by Sections BC 1023.5 and BC 1024.6, respectively. Fire dampers are not required where walls are penetrated by a ducted HVAC system, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system. Such a duct system shall be constructed of sheet steel not less than 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals (BC 717.5.2 Exception 3).

4. A smoke damper shall be provided at each point a duct or air transfer opening penetrates a horizontal exit constructed as a fire barrier per Sections BC 717.5.2.1 and MC 607.5.2.1.

5. For Group E occupancies, per the definitions in Section BC 202, corridors serving only one institution are deemed interior corridors and are not public corridors and thus the provisions of Sections BC 717.5.2.2 and MC 607.5.2.2, Public Corridors, would not apply. If there is a condition where a school shares occupancy on a floor with another entity, the provisions of those Sections requires a listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a public corridor wall constructed as a fire barrier. Exception: Smoke dampers shall not be required in ducts where the air continues to move and the air handling system is arranged to prevent recirculation of exhaust or return air under fire emergency conditions. The air-handling system would have to be continuously monitored to ensure continuous airflow at a constantly attended location and be inspected and maintained in accordance with the system manufacturer's instructions. A standby generator would be required in case of a loss of normal power in accordance with Chapter 27 of the New York City Building Code if the smoke damper is to be eliminated. In order to avoid the necessary connection to the standby generator, provide smoke dampers at penetrations of Public Corridor fire barriers. Smoke dampers are not required in public corridor penetrations where the building is equipped throughout with an approved smoke control system and smoke dampers are not necessary for the operation and control of the system (BC 717.5.2.2). Smoke dampers are not required in public corridor penetrations (BC 717.5.2.2) or horizontal exit penetrations (BC 717.5.2.1) where the duct is constructed of steel not less than 0.019-inch in thickness and there are no openings serving the corridor.

6. Not used.

7. Ducts and air transfer openings shall not penetrate a shaft serving as an exit enclosure except as permitted by Section BC 1023.5.

8. Fire dampers and smoke dampers are not required where the penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction (BC 717.5.3 Exception 1.4).

9. Fire dampers and smoke dampers shall not be required at a shaft where the shaft is acting as an extension of the mechanical equipment room that it serves and the shaft and mechanical equipment room maintain fire and smoke separation required by the greater of the two spaces from the occupied portions of the building and meet the requirements of Sections BC 713.11 and BC 713.12.

10a. Smoke dampers shall not be required in ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions (BC 717.5.2.2 Public Corridors, & BC 717.5.3 Exception 7 Shafts). To not require smoke dampers at Public Corridors (As indicated in Note 5, would not apply to

schools) and shaft penetrations, the fans would have to be provided with standby power in accordance with Chapter 27. In order to avoid the necessary connections to the standby generator, provide smoke dampers at penetrations of Public Corridors and shafts.

10b. Per BC 717.5.5, Smoke Barriers, smoke dampers shall not be required in ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions.

10c. Per BC 717.5.7, Smoke Partitions, a listed smoke damper designed to resist the passage of smoke shall be provided at each point that an air transfer opening penetrates a smoke partition. Smoke dampers and smoke damper actuation methods shall comply with Section BC 717.3.3.2. Note that unlike Section BC 717.5.5 for smoke barriers, smoke partitions do not have the exception to be able to eliminate the smoke damper if the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions.

An exception for where smoke damper can be eliminated in smoke partition penetration is where the installation of a smoke damper will interfere with the operation of a required smoke control system in accordance with Section BC 909, for which an approved alternative protection shall be utilized.

11. Smoke dampers shall not be required in exhaust ducts or shafts where the exhaust fan is maintained in operation during occupancy, such as in bathroom and toilet room exhausts (BC 717.5.3 Exception 2).

12. A duct constructed of approved materials in accordance with the 2022 New York City Mechanical Code that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided a fire damper is installed at the floor line and the penetration is fire blocked in accordance with Section BC 718.2.5 (BC 717.6.1) or the duct is protected in accordance with Section BC 713.4. For air transfer openings, see Sections BC 712.1.9 and 717.6.

13. Fire dampers are not required at interior corridor walls in other than Group H occupancy in buildings equipped throughout with an automatic sprinkler system and the duct is protected as a through penetration (BC 717.5.4 Exception.1). This does not apply to rated corridors serving as Areas of Refuge or Exit Passageways.

14. Per Sections BC 717.5.4, Exception 3, and MC 607.5.3, fire dampers are not required at fire partition wall penetrations (such as corridor walls) for duct systems meeting all of the following minimum requirements (even if not equipped throughout with an automatic sprinkler system in accordance with Sections BC 903.3.1.1 or 903.3.1.2):

    a. The duct shall not exceed 100 sq. in.
    b. The duct shall be constructed of steel a minimum of 0.0217 in. in thickness.
    c. The duct shall not have openings that communicate the corridor with adjacent rooms or space.
    d. The duct shall be installed above a ceiling.
    e. The duct shall not terminate at a wall register in the rated wall.
    f. A minimum 12-inch-long by 0.060-inch-thick steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the

sleeve with minimum 1½-inch by 1½-inch by 0.060- inch steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 screws. The annular space between the steel sleeve and the wall opening shall be filled with wool batting or approved equivalent on all sides.

Per Sections BC 717.5.4, Exception 3, and MC 607.5.3, fire dampers are not required at fire partition wall penetrations (such as corridor walls) if equipped throughout with an automatic sprinkler system in accordance with Sections BC 903.3.1.1 or 903.3.1.2 and partitions are penetrated by "ducted" HVAC systems, have a required fire-resistance rating of 1 hour or less, and are in areas of other than Group H. For the purposes of this exception, a "ducted" HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage in thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

15. Per Sections BC 717.5.5 and MC 607.5.4 (Smoke Barriers) and Sections BC 717.5.7 and MC 607.5.7 (Smoke Partitions), a listed smoke damper designed to resist the passage of smoke shall be provided at each point a duct or air transfer opening penetrates a smoke barrier or smoke partition. Smoke dampers are not required where the smoke barrier openings in ducts are limited to a single smoke compartment and the ducts are constructed of steel. (BC 717.5.5 Exception.1.). Smoke dampers are not required in ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions. Per Section MC 607.5.7, where the installation of a smoke damper will interfere with the operation of a required smoke control system in accordance with Section MC 513, approved alternate protection shall be used.

16. Smoke dampers shall be installed both upstream and downstream of filters and ahead of any branch connections in supply air-handling apparatus and systems having a capacity equal to or greater than 15,000 cfm per MC 607.2.3.

17. Smoke dampers are not required where the air-handling unit is located on the floor that it serves and serves only that floor. (MC 607.2.3 Exception1)

18. Smoke dampers are not required where the air-handling unit is located on the roof and serves only the floor immediately below the roof. (MC 607.2.3 Exception.2)

19. Penetrations by hazardous exhaust systems shall be in accordance with Section MC 510.7. (BC 717.2.2)

20. Per MC 502.10.2, hazardous exhaust ducts may not penetrate building separation fire walls.

21. Smoke barriers have a one-hour fire resistance rating per Section BC 709.3 and require fire dampers (unless not required by Note 3 above). Smoke partitions are not required to have a fire resistance rating per Section BC 710.3 and do not require fire dampers.

22. Division 16 Fire Alarm Contractor shall furnish fire alarm system compliant smoke detectors to the Mechanical Contractor who shall in turn furnish them to the central rooftop unit or central air handling unit manufacturer for factory installation or to the Sheet Metal Contractor for field ductwork installation as applicable. Division 16 Contractor shall provide all signal and control power wiring. Mechanical Designer shall show location of all duct mounted smoke

detectors on the plan and riser drawings and shall coordinate with the Electrical Designer to verify that all wiring of all detectors (both factory and field installed) is shown on the Electrical drawings.

23. Per Section MC 607.5 Exception 2, smoke dampers shall not be required to be located within a prescribed distance of a fire-rated enclosure where isolation smoke dampers are used in air-handling equipment. Shaft enclosures shall be protected with approved fire and smoke dampers but per Section MC 607.5.5 Exception 6, smoke dampers shall not be required at shaft penetrations when isolation smoke dampers are used in air-handling equipment. Note that the DOB Code Committee per Section BC 717.5.3 Exception 6 interprets this as only being applicable for supply and return duct shaft penetrations where the ductwork continues on to an air handling unit that is itself equipped with smoke dampers. This would only be applicable for fan mechanical equipment rooms. All supply duct shaft penetrations and return duct shaft penetrations with the exception of the supply and return duct shaft penetrations in fan mechanical equipment rooms as noted above shall be equipped with smoke dampers (in addition to fire dampers). Provide combination smoke-fire damper at these locations. Non-recirculating exhaust duct shaft penetrations could not be provided with smoke dampers where the air continues to move and where the exhaust fan is maintained in operation during occupancy per Section~~s~~ BC 717.5.3, Exception 7. Per that Exception 7, such fans would have to be provided with standby power in accordance with Chapter 27. In order to avoid the necessary connections to the standby generator, provide the smoke dampers at shaft penetrations.

24. This table is a summary of fire damper and smoke damper requirements applicable to school construction. For complete requirements refer to Sections BC 717 and the MC 607.

25. The DOB Code Committee has determined that the “total-coverage smoke detector system” of Section MC 607.3.3.2 Method 5 is an area smoke detection system and that the smoke detectors in the central air handling or air conditioning units do not constitute a “total-coverage smoke detector system”.

26. Per Section BC 509.4.2, where BC Table 509 permits an automatic sprinkler system without a fire barrier, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor assembly below to the underside of the ceiling that is a component of a fire-resistance-rated floor assembly or roof assembly above or to the underside of the floor or roof sheathing, desk or slab above. Doors shall be self- or automatic-closing upon detection of smoke in accordance with Section BC 716.5.98.3. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80. Walls surrounding the incidental use shall not have air transfer openings unless provided with smoke dampers in accordance with Section BC 709.7.

27. Elevator Lobbies per Section BC 3006.1.1 and BC 3006.1.2: Except as provided by Sections BC 403.6.1 and BC 403.6.2, an enclosed elevator lobby shall be provided in high rise buildings opening onto a fire-resistance-rated corridor, in all occupancy groups. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by smoke partitions. Penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected in accordance with Section BC 710.8. Refer to Design Requirement 6.2.10 for the elevator hoistway pressurization option in lieu of providing enclosed elevator lobbies for high rise buildings.

28. Per Section BC 710.8 Ducts and air transfer openings: The space around a duct penetrating a smoke partition shall be filled with an approved material to limit the free passage of smoke. Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section BC 717.3.2.2, Exception: See Note 33.

29. Per Sections BC 714.1.1 and MC 607.1.1, ducts and air transfer openings: Penetrations of fire-resistance-rated walls by ducts that are not protected with dampers shall comply with Sections BC 714.2 through BC 714.3.3. Penetrations of horizontal assemblies not protected with a shaft as permitted by Exception 4 of Section BC 712.1.7, and not required to be protected with fire dampers by other sections (other than BC 714.1.1) shall comply with Sections BC 714.4.1 through BC 714.4.2.2. Ducts and air transfer openings that are protected with dampers shall comply with Section BC 717.

30. Per Section BC 717.5.6 and MC 607.5.6, exterior walls, ducts and air transfer openings in fire-resistance-rated exterior walls required to have protected openings in accordance with Section BC 705.10 shall be protected with listed fire dampers installed in accordance with their listing.

31. Per Section BC 717.5.2.1 and MC 607.5.1.1 horizontal exits: A listed smoke damper designed to resist the passage of smoke shall be provided at each point that a duct or air transfer opening penetrates a fire wall that serves as a horizontal exit. Exception: Smoke dampers shall not be required in ducts where the air continues to move and the air-handling system installed is arranged to prevent recirculation of exhaust or return air under fire emergency conditions or loss of normal power by provision of standby power in accordance with Chapter 27 of the New York City Building Code. In order to avoid the necessary connections to the standby generator, provide smoke dampers at duct or air transfer opening penetrations of a fire wall that serves as a horizontal exit.

32. Per Section BC 717.5.3, fire dampers are not required at penetrations of shafts where steel exhaust sub-ducts are extended at least 22 inches vertically in exhaust shafts provided there is a continuous airflow upward to the outside.

33. Per Section BC 717.5.7 Exception 1, where the installation of a smoke damper at a smoke partition penetration will interfere with the operation of a required smoke control system in accordance with BC 909, approved alternative protection shall be utilized.

34. Per Section MC 607.5.6.1, for fire-resistance-rated exterior walls, an outdoor air intake opening with gross area of more than 144 square inches shall be provided with fire dampers and smoke dampers, or combined fire and smoke dampers when such opening is located as follows:

    a. Less than 30 feet above grade in rated walls. Per DOB Code interpretation, unrated walls need not be provided with fire dampers or smoke dampers for penetrations less than 30 feet above grade.
    b. Less than 30 feet in any direction from any opening in another building.
    c. Less than 15 feet from a lot line.
    d. Less than 50 feet above and less than 50 feet in any direction from a roof constructed of combustible material or a building in which the exterior walls are constructed wholly or partly of wood.

e. Where fire dampers are required by Section MC 607.5.6.
Exceptions:

1) Smoke dampers shall not be required for outdoor air intake openings of systems greater than 15,000 cfm that are provided with smoke dampers in accordance with Chapter 6 and arranged so as to not introduce smoke into the building or space in which the equipment is located.
2) A damper is not required where the combustion air intake duct, boiler room, and combustion air intake louver for such boiler room are enclosed with construction having a fire-resistance rating not less than the rating of the exterior wall, boiler room and any intervening space.

35. Per Section MC 510.7.1, fire dampers and smoke dampers are prohibited in hazardous exhaust ducts.

36. Per Section MC 607.1.2.1, the space around a duct penetrating a non-fire resistance-rated floor assembly shall comply with Section BC 717.6.3.

37. Per Section MC 607.2.1, where the installation of a fire damper will interfere with the operation of a required smoke control system in accordance with BC 909, approved alternative protection shall be used. Where mechanical systems including ducts and dampers used for normal building ventilation serve as part of the smoke control system, the expected performance of these systems in smoke control mode shall be addressed in the rational analysis required by Section BC 909.4.

38. Per Section MC 607.3.3.2.6, smoke dampers that are part of an engineered smoke control system shall be capable of being positioned manually from a command station. Such positioning devices shall be provided for supply and return/exhaust dampers grouped by floor and by type. Damper switch positions shall indicate whether the related dampers are commanded to be either open or closed. Smoke damper positioning switches shall be located at the Fire Command Station, or in a Mechanical Control Center in buildings without a Fire Command Station.

39. Per Section MC 607.5, ducts 20 square inches or less passing through fire-resistance rated assemblies (other than firewalls) shall not require fire dampers or smoke dampers.

40. Per Section MC 607.5.5 Exception 4, smoke dampers are not required at penetrations of shafts where ducts are used as part of an engineered mechanical smoke control system designed in accordance with Section BC 909 and where the smoke damper will interfere with the operation of the smoke control system.

41. Per Section MC 607.6.2, ducts and air transfer openings constructed of approved materials, in accordance with Section MC 603, that penetrate the ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with one of the following:

a. A shaft enclosure in accordance with Section BC 713.
b. A listed ceiling radiation damper and firestopping installed at the ceiling line where a duct penetrates the ceiling of a fire resistance-rated floor/ceiling or roof/ceiling assembly.

c. A listed ceiling radiation damper and firestopping installed at the ceiling line where a diffuser with no duct attached penetrates the ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly.

42. Per Section MC 709.2, where the combustion air openings are provided with automatic, smoke or fire dampers, the dampers shall be electrically interlocked with the appliances served, so as to prevent operation of any appliance when any of the dampers are closed. Manually operated dampers shall not be installed in combustion air openings. The damper opening shall be proven prior to burner operation. Per Section MC 710.1, combustion air openings to the outdoors shall comply with the location and protection provisions applicable to outside air intake openings of Sections MC 401.5 and MC 401.6.

43. Per the DOB Boiler Division, a required combustion air intake damper for boiler combustion air intake or gas hot water heater combustion air intake must be visible for an operator standing anywhere in the mechanical room. Typically, a combustion air intake damper located in the mechanical room perimeter wall louver complies. When space is limited on the perimeter wall of the mechanical room and thus the combustion air intake louver is located in an adjacent room not within the line of sight of the operator, the combustion air intake damper shall be located in the transfer duct running from the adjacent room to the mechanical room. The location of the combustion air intake damper must be in the section of the transfer duct that is in the mechanical room, so an operator has visible verification of the damper status. Note that if the adjacent room perimeter wall is rated and requires a fire damper, that fire damper would still be located in the adjacent room perimeter wall.

F. Smoke Detector/Damper Requirements

Per Section MC 607.3.3.2, Smoke damper actuation, the smoke damper shall close upon actuation of a listed smoke detector or detectors installed in accordance with Section MC 606 and Section BC 907.3 and one of the following methods, as applicable:

1. Where a smoke damper is installed within a duct, a smoke detector shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes within the duct shall be within 5 feet of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.

   Exception: Duct smoke detectors will not be required at each smoke or combination fire smoke damper provided:

   a. The supply fan shall shut down and all the smoke and combination fire smoke dampers associated with the supply system automatically close upon actuation of any automatic alarm initiating device on the floor(s).

   b. Non-ducted return air systems shall have a smoke detector located within 5 feet upstream of each return air or transfer opening in a fire barrier rated 2-hour or greater.

c. Ducted return air systems shall have a duct smoke detector located within 5 feet of a smoke damper; additional smoke detectors are not required at smoke and combination fire smoke dampers located downstream where there are no additional return air inlets.

2. Where a smoke damper is installed above smoke barrier doors in a smoke barrier, a spot-type detector shall be installed on either side of the smoke barrier door opening. The detector shall be listed for releasing service if used for direct interface with the damper.

3. Where a smoke damper is installed within an un-ducted opening in a wall, a spot-type detector shall be installed within 5 feet horizontally of the damper. The detector shall be listed for releasing service if used for direct interface with the damper.

4. Where a smoke damper is installed in a corridor wall or ceiling, the damper shall be permitted to be controlled by a smoke detection system installed in the corridor.

5. Where a smoke detection system is installed in all areas served by the duct in which the damper will be located, the smoke dampers shall be permitted to be controlled by the smoke detection system.

6. Smoke dampers that are part of an engineered smoke control system shall be capable of being positioned manually from a command station. Such positioning devices shall be provided for supply and return/exhaust dampers grouped by floor and by type. Damper switch positions shall indicate whether the related dampers are commanded to be either open or closed. Smoke damper positioning switches shall be located at the Fire Command Station, or in a Mechanical Control Center in buildings without a Fire Command Station.

6.2 Heating, Ventilation & Air Conditioning

6.2.1 HVAC Unit Centralization and Coordination

Description/Design Approach:

A. HVAC heat pump units **and dual temperature air handling units served by air to water heat pump chiller/heaters,** shall be centralized (i.e., combined) as much as possible to minimize the total number of units. The initial Architectural layout shall be planned so that one unit can serve multiple spaces. **Refer to Design Requirement 6.2.0 that indicates the preference for heat pump units over dual temperature air handling units served by air to water heat pump chiller/heaters.**

1. The Gymnasiums, Gymatoriums and Auditoriums shall each **be** served by their own dedicated Single Zone Variable Air Volume (SZVAV) heat pump **or dual temperature air handling** unit. Refer to DR 6.2.0. **Additionally**, the Kitchen and Cafeteria may be served by one (1) combination Single Zone Variable Air Volume (SZVAV) heat pump **or dual temperature air handling** unit. Refer to Design Requirement 6.2.22.

2. Corridors, Classrooms, Offices and other non-assembly areas in new schools (standalone and new Additions) and Major Modifications where the existing envelope is modified shall be served by **multi-zone** variable air volume (VAV) heat pump **or dual temperature air handling** units that provide tempered ventilation air in the heating season and provide all space cooling and ventilation air in the cooling season.

3. Provide **c**entral VAV heat pump **or dual temperature air handling** units (as above for new schools) for existing buildings where the existing envelope is not to be altered and there is ample ceiling height. **Multi-zone** VAV heat pump **or dual temperature air handling** units should serve the Classrooms, Offices, other non-assembly areas and Corridors.

B. The same central heat pump **or dual temperature air handling** unit is to serve the Library and Classrooms since both spaces have the same Occupancy Class E.

C. Mixed SZVAV heat pump **or dual temperature air handling** unit that serves the Gymnasium are desired to serve locker rooms, if feasible. If combined with Gymnasium, the air from the locker rooms may not be recirculated. In all cases, locker rooms are to be negatively pressurized.

6.2 Heating, Ventilation & Air Conditioning

6.2.2 Ductwork and Shafts

Description/Design Approach:

A. The distribution ductwork from any roof-mounted DX heat pump units or roof mounted air handling units served by air to water heat pump chiller/heaters shall have multiple supply and return risers in multiple two-hour rated shafts. Horizontal distribution ductwork shall be headered in the space above the top floor suspended ceiling for distribution to the risers, as providing multiple supply and return risers enables the downsizing of the horizontal ductwork of the lower floors and allows a shallower slab-to-slab height for those floors. To accomplish this intent, the top floor slab-to-slab height can vary up to two feet higher than the remainder of the floors to provide room for the ductwork distribution header. During the preliminary phase of the Project, the Engineer shall advise Architect to stack classrooms above each other as much as possible to be able to take advantage of this ductwork distribution scheme.

B. If the above scheme results in units having very high external static pressure requirements and hence very high brake horsepower requirements resulting in non-compliance with the energy codes and standards (ASHRAE 90.1-2016, the 2020 NYCECC and LL **51/23**), the designer shall investigate providing split DX heat pump units or air handling units served by air to water heat pump chiller/heaters within mechanical equipment rooms (MER) located within the building. Air-cooled condensing units associated with the interior DX split units shall be located outdoors. Possible scenarios include providing a MER on each floor to serve that floor, or, providing MERs on every other floor to serve the floor that the MER is located on and an adjacent floor. Designer is to verify if using rooftop mounted DX heat pump units or roof mounted air handling units served by air to water heat pump chiller/heaters complies with the energy codes as this is the SCA preference since it maximizes the amount of floor space available for instruction.

C. Refer to DR 6.2.00 for additional justification why interior located air handling units in Mechanical Equipment Rooms (MERs) might be preferred over rooftop units.

6.2 Heating, Ventilation & Air Conditioning

6.2.3 Non-Assembly Spaces (Classrooms, Offices, Corridors, etc.)

Description/Design Approach:

A. **Capacity Projects:** New Construction (Stand-alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Projects with Adequate Slab-to-Slab Heights

Classrooms, Offices, other non-assembly areas and Corridors shall be provided with supply air from custom Multi-zone Variable Air Volume (MZVAV) central recirculating DX heat pump or dual temperature hot water/chilled water air handling units. Refer to Design Requirement 6.2.0, which defines when air to water heat pump chiller/heater plants may be utilized. Additionally, refer to Design Requirement 6.2.40 for the considerations that must be accounted for after it has been elected to use chiller/heaters. The MZVAV units' role is to temper the heating season ventilation air and provide all space cooling capacity. Spaces shall utilize Variable Air Volume (VAV) boxes with conventional ceiling mounted air diffusers. Achieving 40 dBA (NC35) in the Classrooms, Offices and other non-assembly spaces is required and should be accomplished since there are no fans located in these spaces when non-fan powered VAV boxes are used.

1. The supply branch into each Classroom, Office and other non-assembly space shall be equipped with a conventional (non-fan powered) VAV box. VAV box shall be provided with integral sound attenuator. (Refer to HVAC Design Requirement 6.2.25, Acoustical Standards, which defines when acoustical lining downstream of the VAV box may be used.) The box shall throttle down the supply air under low load conditions.

2. Pre-K, 3K, Kindergarten, 1st and 2nd grade classrooms that have adjoining toilets may exhaust a portion of the outside air component through the toilet exhaust fan.

3. For the central MZVAV units, the Engineer of Record shall calculate the fully occupied minimum outdoor air flow and standby minimum outdoor air flow (used in Demand Controlled Ventilation (DCV) for resetting of the cumulative central unit outdoor air). Engineer of Record shall also indicate the maximum air flows required for each space and shall provide these values on the contract drawings in the form of a Ventilation schedule. The schedules shall also contain an entry for each space VAV box indicating its required fully occupied minimum flow and maximum air flow values. The maximum air flow shall be that required to satisfy the thermal loads during the occupied scheduled time periods at the adjustable space temperature setpoint. For the custom MZVAV units, DCV for each space is to be provided in addition to utilizing an energy recovery wheel (ERW) in the central air handling unit. Per DR 6.2.36, EDVC allowable refrigerant charge calculations shall comply with ASHRAE 15-2022. Further note for cases when the charge per independent A2L circuit exceeds the EDVC value as calculated per Equation 7-8 of ASHRAE 15-2022, the minimum outdoor air flow rate can never be lowered to be below that required per Equation 7-10 of ASHRAE 15-2022 to provide continuous ventilation to disperse any leaked A2L refrigerant. Designer is to reflect appropriate minimum flows considering ventilation and refrigerant leak dispersal on the Drawing schedules.

4. The following required DCV logic shall be utilized: For the non-assembly spaces, when fully or partially occupied during scheduled occupied hours as indicated by a space CO_2 sensor, the minimum outdoor air ventilation rate shall be the sum of the space ventilation rate (cfm/SF * SF) plus the occupant ventilation rate (cfm/p * instantaneous population), and when

vacant during scheduled occupied hours as indicated by a space CO_2 sensor, the minimum outdoor air ventilation rate shall be the space ventilation rate (cfm/SF * SF) (subject to maintaining continuous ventilation to disperse any leaked A2L refrigerant). In order to avoid motor overheating at excessive turndowns, maintain fan stability, and maintain sensor functionality, the minimum flow provided to a space shall be the fully occupied rate (whether or not actually fully occupied). The space ventilation rate (cfm/SF) and occupancy ventilation rate (cfm/p) shall be determined from the 2022 NYC MC Table 403.3.1.1. Refer to Section 6.4.3.8 of ASHRAE 90.1-2016 for Demand Controlled Ventilation (DCV) for Classrooms equipped with VAV boxes. Although the minimum flow to a space is to never be reduced below the fully occupied rate, the central heat pump unit outdoor air flow ratio will be adjusted based upon the cumulative instantaneous outdoor air flows required in each space (subject to maintaining continuous ventilation to disperse any leaked A2L refrigerant). As the central heat pump unit outdoor air damper modulates, the central heat pump unit return damper shall also modulate in a reverse fashion.

5. Supply outlets shall be spaced so as to avoid air stagnation and stratification and to provide a maximum forty (40) feet per minute air impingement velocity when the air moves past occupants in order to comply with ASHRAE 55-10.

6. Classrooms, Offices, non-assembly areas and Corridor return ducts shall be hard ducted, as ceilings will not be used as return plenums. This is in keeping with the desire to have improved indoor air quality and to avoid circulating any ceiling plenum dust and debris.

    a. For A1 refrigerant systems, since ceiling return plenums create negatively pressurized spaces for those spaces near the unit main return, ceiling return plenums for A1 refrigerant systems may only be used with the permission of the Authority if there are space constraints where hard-ducted ceiling returns cannot be utilized.

    b. For A2L applications, note that per Section 7.6.4.c of ASHRAE 15-2022, inlets for exhaust air and inlets used to mechanically transfer air to a separate indoor space, shall be located such that the bottom of the inlet is within 12” of the lowest elevation in the space where leaked refrigerant would be expected to accumulate. Per ASHRAE 15-2022, all commonly used refrigerants except ammonia (R-717) and water (R-718) are heavier than air when at room temperature. Hence, all A2L system return/exhaust/transfer inlets shall be located at the bottom of the wall within 12” of the lowest elevation in the space.

7. In general, top floor Corridors having a summer thermal load are to be provided with a VAV box controlled by a temperature sensor located in the most remote part of the Corridor. If the roof is well insulated and there is no appreciable summer thermal load, constant volume box may be used. Intermediate floor core Corridors and bottom floor Corridors with no appreciable thermal load may use constant air volume boxes (CAV). The minimum ventilation rate for the Corridor VAV and CAV boxes must be no less than 0.06 cfm/SF as defined in the Table MC 403.3.1.1 of the 2022 NYC Mechanical Code and the minimum setting of the Corridor VAV and CAV boxes shall be such that all Toilets and Electrical Closets that draw air from the Corridor shall be provided with ample make up air.

8. For terminal heating, a perimeter electric baseboard system (when the central MZVAV unit has DX coils) or perimeter hot water baseboard system (when the central MZVAV unit has dual temperature water coils) mounted 4” above finished floor shall be provided for each Classroom, Office and other non-assembly areas. The baseboard units located in each Classroom, Office and other non-assembly areas shall provide the space heating capacity

and shall temper the ventilation air from the 65°F supply air temperature to the 72°F occupied space setpoint. Refer to DR 6.2.7 for terminal heating in corridors.

9. When the central MZVAV units have DX coils, all specialty spaces (Science rooms, Art rooms, Music rooms and Libraries) shall use fan powered VAV boxes with electric reheat coils that provide all winter space heating since the floor mounted electric baseboard units might interfere with bookshelves/equipment (electric baseboard units require a certain distance from bookshelves/equipment). When the central MZVAV units have dual temperature water coils and the perimeter spaces have hot water fin tube radiation, interference with bookshelves/equipment will not be an issue and the fin tube radiation can use the bottom of the bookshelves as a path for convection air to flow back to the fin tube radiation units.

10. Custom rooftop units shall provide a maximum of 55ºF discharge air temperature off the cooling coil, thus providing indirect dehumidification.

11. In the cooling mode, the custom MZVAV units shall maintain maximum 78ºF dry bulb space conditions during occupied periods and no more than 85ºF dry bulb conditions during unoccupied periods. Return duct humidity sensors shall monitor overall relative humidity during occupied periods. A space temperature sensor (located in a north non-assembly space as determined by the Engineer of Record) shall be utilized during unoccupied periods.

12. Local ceiling soffits may be utilized to be able to use VAV box system, i.e., the entire ceiling of the space need not be at all one ceiling height.

13. Final energy code compliance, LL **51/23** compliance and compliance with the NYC Green Schools Guide shall be demonstrated by project specific modeling.

B. **Capacity Projects**: Major Modification/Substantial Reconstruction of Existing Buildings and New Additions Where Slab-to-Slab Heights are to Match Existing Building with Limited Slab-to-Slab Heights and Where It Has Been Determined that Local Ceiling Soffits Can Not Be Utilized for VAV System

1. When slab-to-slab heights are restrictive, the following may be provided:

   a. Vertical Unit Ventilators (DX or dual temperature water from air to water heat pump chiller/heater plant) or

   b. Custom Dedicated Outside Air System (DOAS-DX) units with floor mounted VRF units or

   c. Custom Dedicated Outside Air System (DOAS - dual temperature) units with dual temperature fan coil units utilizing ECM fan motors (all units utilize dual temperature water from air to water heat pump chiller/heater plant)

2. Vertical Unit Ventilators provide all ventilation and provide all space heating with integral DX or integral dual temperature coil (when the space heating load does not exceed 450 BTUH/LF). When the heating load is less than or equal to 250 BTUH/LF, conventional ceiling diffusers may be used. When the heating load exceeds 250 BTUH/LF but is less than or equal to 450 BTUH/LF, adjustable linear diffusers are required. Should the space heating load exceed 450 BTUH/LF, electric baseboard is to be used with DX Vertical Unit Ventilators and hot water fin tube radiation is to be used with dual temperature Vertical Unit Ventilators.

Vertical Unit Ventilators provide all cooling. DOAS units only temper the ventilation air and space heating/cooling is provided by VRF or fan coil units with ECM fans .

3. Floor mounted VRF units are required for buildings exceeding 20,000 SF to avoid the need to use ladders to perform maintenance on ceiling VRF units.

4. Vertical unit ventilators and floor mounted VRF units shall be provided with supply ductwork with acoustical duct lining or sound traps.

5. New Construction/Major Modernization projects must comply with the 2019 Green Schools Guide (which is based on LEED v4) and shall have a sound pressure levels not exceeding 40 dBA (NC35). If required, locate the vertical unit ventilator units and floor mounted VRF units in an enclosure or closet to comply with the 40 dBA requirement.

6. Indirect dehumidification shall be provided by the DOAS units. Vertical Unit Ventilators shall have a dehumidification sequence of operation and shall utilize integral relative humidity sensors.

7. Supply outlets should be spaced to avoid air stagnation and stratification and to provide a maximum forty (40) feet per minute air impingement velocity when the air moves past occupants to comply with ASHRAE 55-10. See Design Requirement 6.2.0 for more details.

8. Final energy code compliance, LL **51/23** compliance and compliance with the NYC Green Schools Guide shall be demonstrated by project specific modeling.

C. Capital Improvement Projects (CIP):

For CIP projects, commercial units may be used instead of custom units. For Electrification projects, Designer shall refer to the Building Electrification Project Field Report and CIP Carbon Reduction Electrification Equipment Selection Matrix (templates on www.nycsca.org) for which HVAC systems are optimal (rated “1”), possible but not optimal (rated “0”), and which systems are not an option for given existing building parameters (rated “T” for terminal non-feasible system selection).

Equipment selection options for CIP projects are the same as those listed above for Capacity Projects.

6.2 Heating, Ventilation & Air Conditioning

6.2.4 Public Assembly Spaces

Description/Design Approach:

A. New Schools (Stand-Alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Capacity Projects: Public Assembly (PA) spaces (Auditoriums, Gymnasiums, Gymatoriums, Cafeterias and Cafetoriums) shall be served by custom Single Zone Variable Air Volume (SZVAV)** rooftop heat pump units or dual temperature air handling units served by air to water chiller/heaters. Variable volume units are required per Section 6.5.3.2 of ASHRAE 90.1-2016, since the mechanical DX cooling capacity will exceed 65,000 BTU/hr and the fans of the dual temperature air handling units will exceed 1/4 hp. Constant volume units may be used for Historic Building PA spaces where ASHRAE 90.1-2016 need not apply per Section 4.2.1.3 of NYCECC Appendix CA changes to ASHRAE 90.1-2016. Additionally, compliance with ASHRAE 90.1-2016 shall not be required per Section 6.1.1.3 Exceptions of ASHRAE 90.1-2016 for repairs, where replacement or alteration of equipment requires extensive revisions to other systems, refrigerant changes of existing equipment, relocation of existing equipment or cases where there exists insufficient space. Hence, for these cases constant volume systems may be used. However, to meet New York City's energy saving mandates more efficient systems are to be utilized if technically feasible.

B. Refer to Design Requirement 6.2.0 that indicates the preference for heat pump units over dual temperature air handling units served by air to water chiller/heaters.

C. Capital Improvement Projects (CIP): Public Assembly (PA) spaces (Auditoriums, Gymnasiums, Gymatoriums, Cafeterias and Cafetoriums) shall be served by commercial Single Zone Variable Air Volume (SZVAV)** rooftop heat pump units.

D. Assembly areas (Auditoriums, Gymnasiums, Gymatoriums, Cafeterias and Cafetoriums) provided with a SZVAV** system shall have a decoupled heating system where the SZVAV** units provide nominally 65°F ventilation air during the heating mode and the PA spaces are equipped with terminal heating capability (recessed electric convectors for DX applications or recessed hot water convectors for dual temperature air handling unit applications mounted 4" above finished floor). Kitchen terminal heating shall be accomplished by a reheat electric coil (for DX applications) or hot water coil (for dual temperature air handling unit applications) located in the duct that serves the Kitchen. Units shall be coupled in cooling with a mixed variable air volume system (SZVAV)**.

   ** Public Assembly spaces utilizing partitions where each sub-divided space can be used independently shall be served by Multiple Zone VAV (MZVAV) heat pump or dual temperature air handling units instead of Single Zone VAV (SZVAV) units. Each sub-divided space shall be equipped with multiple VAV boxes and a temperature sensor.

E. For units serving PA spaces (Gym, Auditorium, etc.), energy modeling performed as the basis for the SCA Standards indicates that both the Energy Recovery Wheel (ERW) (See Section 6.5.6 of ASHRAE 90.1-2016, prescriptive requirement and Section C403.7.4 of the 2020 NYCECC, mandatory requirement) and Demand Controlled Ventilation (DCV) (See Section 6.4.3.8 of ASHRAE 90.1-2016, mandatory requirement and Section C403.7.1 of the 2020 NYCECC, mandatory requirement) are to be employed in the design.

1. Energy recovery wheels (prescriptive in ASHRAE 90.1-2016, mandatory in the 2020 NYCECC) can only be eliminated upon approval of the Authority's TSS Unit if the designer demonstrates that flow rate of the exhaust air is significantly less than the outside air intake flow rate (due to remote exhausts) and the energy loss associated with static pressure drop through the wheel exceeds the potential energy savings that the wheel could otherwise generate. Designer will have to verify by running two energy models: one with the energy recovery wheel and one without. Designs not required to comply with LL **51/23** based on the estimated construction cost and which follow the requirements of the 2020 NYCECC instead of ASHRAE 90.1, may only eliminate the mandatory energy recovery wheel if the design meets the Exceptions of C403.7.4.

2. Demand controlled ventilation (mandatory in both ASHRAE 90.1-2016, and the 2020 NYCECC) can only be eliminated upon approval of the Authority's TSS Unit if the design follows the requirements of ASHRAE 90.1-2016 and meets the Exceptions of Section 6.4.3.8 and if energy modeling demonstrates that the design meets LL **51/23** Energy Use Intensity (EUI). Designs not required to comply with LL **51/23** based on the estimated construction cost and which follow the requirements of the 2020 NYCECC instead of ASHRAE 90.1, may only eliminate demand controlled ventilation upon approval of the Authority's TSS Unit if the design meets the Exceptions of C403.7.1.

F. Energy modeling performed as the basis for the SCA Standards indicates that SZVAV** units that serve the Cafeteria/Cafetorium PA space and Kitchen and only employ Cafeteria/Cafetorium DCV without the use of an energy recovery wheel will be compliant with ASHRAE 90.1-2016 **and** LL **51/23**.

G. When DCV is employed, carbon dioxide sensors shall be located in each PA space to reduce the outdoor air intake when the spaces are not occupied.

1. For Auditoriums, Gymnasiums and Gymatoriums, the minimum <u>total</u> supply rate is the fully occupied ventilation requirements as defined in Table MC 403.3.1.1 of the 2022 NYC Mechanical Code, to preserve fan stability, avoid motor overheating and provide enough flow for the sensors to function properly. <u>Outdoor</u> air at the central unit is modulated and shall be based on instantaneous occupancy.

2. Cafeteria/Cafetorium and Kitchen are to be served by a combination unit The minimum outdoor air intake ventilation rate that the Cafeteria/Cafetorium carbon dioxide sensors can throttle the central unit outside air intake rate down to in the non-cooking mode is the Cafeteria/Cafetorium specific cfm per square foot requirements as defined in Table MC 403.3.1.1 times the Cafeteria/Cafetorium square footage plus the cumulative Kitchen General Exhaust, Can Wash Room and Staff Toilet exhaust make up requirements considering that ample make up air must always be provided for the Kitchen General Exhaust, Can Wash Room and Staff Toilet. The space specific cfm/SF requirements are established in order to maintain the minimum Indoor Air Quality (i.e., to account for VOC outgassing of carpets, adhesives, paints etc.) even if the space is unoccupied. Refer to Design Requirement 6.2.9 to determine the ventilation rates. Avoiding motor overheating at excessive turndowns, maintaining fan stability, and maintaining sensor functionality are addressed by limiting the minimum supply flow to the fully occupied ventilation rate.

3. Note that for all Public Assembly spaces, when the charge per independent A2L circuit exceeds the EDVC value as calculated per Equation 7-8 of ASHRAE 15-2022, the minimum

outdoor air flow rate can never be lowered to be below that required per Equation 7-10 of ASHRAE 15-2022 to provide continuous ventilation to disperse any leaked A2L refrigerant. Designer is to reflect appropriate minimum flows considering ventilation and refrigerant leak dispersal on the Drawing schedules.

H. Ceiling diffusers and wall grilles shall be spaced so as to avoid air stagnation and stratification and to provide a maximum forty (40) feet per minute air impingement velocity when the air moves past occupants in order to comply with ASHRAE 55-10.

1. For A1 refrigerant applications, high ceiling spaces (i.e., Gymnasium, Auditorium, Gymatorium, etc.) shall be provided with a mixture of higher elevation and lower elevation return grilles/ductwork to achieve better air distribution.

2. For A2L applications, per Section 7.6.4.c of ASHRAE 15-2022 inlets for exhaust air and inlets used to mechanically transfer air to a separate indoor space, shall be located such that the bottom of the inlet is within 12” of the lowest elevation in the space where leaked refrigerant would be expected to accumulate. Per ASHRAE 15-2022, all commonly used refrigerants except ammonia (R-717) and water (R-718) are heavier than air when at room temperature. Hence, all A2L system return/exhaust/transfer inlets shall be located at the bottom of the wall within 12” of the lowest elevation in the space. Ceiling returns are not allowed in A2L applications.

3. Exposed Gymnasium ductwork shall be round, insulated double wall, and have a spiral seam.

I. Central units shall maintain 78°F dry bulb space conditions during occupied periods when the outside air conditions are 89°F DB and 73°F WB per Chapter 12 of the 2022 NYC Building Code and no more than 85ºF unoccupied setup conditions. Return duct humidity sensors shall monitor relative humidity during occupied periods. A PA space temperature sensor shall be utilized during unoccupied periods.

J. Refer to Design Requirement 6.2.22, “Kitchen Ventilation” that defines the functionality of the combination Kitchen/Cafeteria unit**(s)**.

6.2 Heating & Ventilation

6.2.5 Considerations for Pre- Kindergarten, Kindergarten, 1st and 2nd Grade Classrooms

Description/Design Approach:

The provisions of Design Requirement 6.2.3 apply to Pre-Kindergartens, Kindergartens, 1st and 2nd grade classrooms.

However, in facilities with crawl spaces and basements, provide heaters in the crawl spaces and basements to avoid cold slabs as those grades many times sit on the floor. In facilities with Pre-Kindergarten and Kindergarten classrooms situated on a slab on grade**, slabs are to be insulated as per DR 1.3.2.2.**

6.2 Heating, Ventilation & Air Conditioning

6.2.6 Convectors and Enclosures

Description/Design Approach:

A. Fully recessed electric convectors mounted 4" above finished floor may be used in the corridors/stairway landings. **When dual temperature air to water heat pump chiller/heaters are utilized, fully recessed hot water convectors mounted 4" above finished floor may be used in the corridors/stairway landings.** Alternately, fully recessed electric cabinet heaters **(or fully recessed hot water cabinet heaters when dual temperature chiller/heaters are utilized)** mounted 4" above finished floor may be used in corridors/stairway landings. Ceiling hung fully recessed electric cabinet heaters (**or hot water heaters in the case chiller/heaters are utilized)** may be used in lieu of recessed wall mounted units in the corridors/stairway landings. Corridors may also be provided with electric baseboard **(or hot water baseboard when chiller/heaters are utilized) when space is available. When chiller/heaters are utilized, all terminal units (door air curtains, cabinet unit heaters, convectors) located in areas where doors frequently open/close shall be supplied with 30% propylene glycol water mixture from the primary dual temperature water loop.**

B. All toilets that are located on the perimeter of the building or any toilet room (interior or perimeter located) that is located on the top floor or on a slab on grade, shall be provided with terminal heating capacity. Toilets shall be provided with fully recessed ceiling-mounted electric cabinet heaters. **For chiller/heater applications where the heat pump units generate hot water, Toilets may utilize fully recessed ceiling mounted hot water cabinet heaters. Toilets may also use fully recessed hot water convectors (mounted 4" AFF).**

C. Recessed perimeter electric convectors (wall mounted 4" above finished floor) (**or recessed perimeter hot water convectors when chiller/heaters are provided)** shall serve Public Assembly spaces equipped with single zone variable air volume (SZVAV) units.

D. Floor mounted units shall not be used in the Kitchen. Kitchens shall have their terminal heating provided by electric heater **(or hot water coil when chiller/heaters are provided)** located in the duct that serves the Kitchen.

6.2 Heating, Ventilation & Air Conditioning

6.2.7 Corridor HVAC Units

Description/Design Approach:

A. New Construction (Stand-alone Buildings and Addition Projects) and Major Modification/Substantial Reconstruction Capacity Projects with Adequate Slab-to-Slab Heights

1. Corridors shall be served by the custom multi-zone Classroom variable air volume MZVAV heat pump unit(s) **or, when approved, the Classroom dual temperature MZVAV air handling units served by air to water heat pump chiller heater systems. Usage of air to water heat pump chiller heater systems is subject to review and approval by the Authority, which should be during the Schematic phase or early in Design Development.**

   a) The Classroom/Corridor variable volume **unit** shall provide

   b) **Top floor** Corridors where a **cooling** load exists shall be provided with VAV boxes controlled by temperature sensors located in the most remote parts of the Corridors. The minimum VAV box setting for the Corridor VAV boxes shall never to be less than 0.06 cfm/SF per Table MC 403.3.1.1 of the 2022 NYC Mechanical Code. In addition, the minimum setting for the Corridor VAV boxes shall be such that any transfer air from the Corridor to the adjacent Toilets and Electrical Closets shall always be maintained. Core Corridors without significant loads can be equipped with constant air volume boxes with the flow set to the maximum of 0.06 cfm/SF versus the transfer air requirements.

2. For terminal heating, electric baseboard **(or hot water fin tube radiation for the case when chiller/heaters are provided)** may need to be provided (space permitting) **for top floor Corridors, slab-on-grade Corridors or Corridors located over unheated basements**. If the Corridor layout or location of the Corridor within the building precludes electric baseboard **or hot water fin tube radiation** being an appropriate design, alternates to be investigated include fully recessed electric **or hot water** wall mounted 4" above finished floor convectors or electric **or hot water** recessed cabinet unit heaters mounted 4" above finished floor, or ceiling-mounted recessed electric **or hot water** cabinet unit heaters. Designer is to determine the best effective design approach.

B. Major Modification/Substantial Reconstruction **Capacity Projects** of Existing Buildings with Limited Slab-to-Slab Heights:

1. Where limited ceiling height Classrooms are served by **DX** vertical unit ventilators or VRF units and decoupled custom **DX** DOAS central heat pump units, the Corridors shall be served by **dedicated DX Multiple Zone Variable Air Volume (MZVAV)** system **(if top floor Corridor has VAV box) or dedicated Single Zone Constant Air Volume (SZCAV) unit (if top floor does not have considerable load and hence no variable volume or constant volume boxes need to be used on any Corridor floor). Note that having the Corridors served by Classroom** decoupled custom **DX** DOAS central units and utilizing Corridor **A1 or A2L VRF units is disallowed by Section 7.5.1.2 of ASHRAE 15-2022, which requires that refrigeration systems in Corridors be "unit systems" which are packaged systems.**

a. Per Section 7.5.1.2 of ASHRAE 15-2022, no split A1 or A2L refrigerant piping is allowed in Corridors as such systems do not meet the definition of "unit systems", which ASHRAE defines to be equivalent to self-contained packaged systems.

b. Dual temperature DOAS units that serve the Classrooms (where Classrooms are served by ECM fan coil units) may also serve the Corridors (where Corridors would also be served by ECM fan coil units).

2. The flow to the Corridor should never to be less than 0.06 cfm/SF per Table MC 403.3.1.1. In addition, the flow to the Corridor should be such that any transfer air from the Corridor to the adjacent Toilets and Electrical Closets will always be maintained.

C. **Capital Improvement Projects (CIP)**

Corridor HVAC systems being upgraded in an existing building are to be provided with the same HVAC systems as Corridors in Capacity projects as described in paragraphs A and B above. Note that usage of air to water heat pump chiller/heaters would require Authority approval after reviewing the CIP Pre-Scope Electrification Report.

D. Corridor Exhaust

1. For all projects (Capacity or CIP), the outside air supplied to the Corridors shall be exhausted by the Toilet exhaust fans, Janitor's Closet exhaust fans and by the combined central Classroom/Corridor Multi-zone Variable Air Volume (MZVAV) heat pump units (or dual temperature MZVAV units served by air to water heat pump chiller/heaters if approved by the Authority) for stand-alone new schools, new Additions and Major Modification projects. Note that the Toilet exhaust system and Janitor's Closet exhaust system may be combined with each other. For mixed air MZVAV units, the component of the total air supplied to the Corridor that is not exhausted shall be recirculated back to the central mixed air MZVAV unit.

2. Stand-alone new schools, new Additions and Major Modification projects where the Classrooms are served by VAV boxes or existing building limited slab to slab height Classrooms (served by DX DOAS/VRF systems or dual temperature DOAS/ECM fan coil units) shall have all of the Classroom exhaust air returned to the central unit to be able to utilize total enthalpy energy recovery wheels that recover both sensible and latent energy.

3. For CIP project, buildings built to the 1968 code and before required mechanical locker exhaust, which may be maintained when upgrading the HVAC system.

6.2 Heating, Ventilation & Air Conditioning

6.2.8 Wardrobe/Locker Ventilation

Description/Design Approach:

A. Mechanical exhaust ventilation is not required for wardrobe closets and/or locker areas in Classrooms and Corridors.

B. Wardrobe closets inside each Primary School and Intermediate School Classroom shall be provided with bottom louvers to provide natural ventilation.

C. Corridor lockers shall be provided with top and bottom louvers for natural ventilation.

6.2 Heating, Ventilation & Air Conditioning

6.2.9 Heating and Cooling Design Parameters (Load Calculations)

Description/Design Approach:

Heating and Cooling Systems shall be designed in accordance with Section MC 312 of the 2022 NYC Mechanical Code, Heating and Cooling Load Calculations, and shall be in accordance with ANSI/ASHRAE/ACCA 183-2007 per Section C403.1.1 of the 2020 New York City Energy Conservation Code (NYCECC) and Section 6.4.2.1 of ASHRAE 90.1-2016. Per Section C403.1.1 of the 2020 NYCECC, heating and cooling loads shall be adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE Handbook - HVAC Systems and Equipment. Use the following criteria:

A. Heating for New Construction, Major Modification/Substantial Reconstruction Capacity Projects **and Capital Improvement (CIP) Projects**: The fresh air requirements shall be in accordance with Section MC 403.3.1.1, Ventilation Requirements.

1. Per Section MC 401.2 of the 2022 NYC Mechanical Code, relying on natural ventilation only without the usage of fans is not allowed.

    a. Every occupiable space shall be naturally ventilated in accordance with Section MC 402 and mechanically exhausted in accordance with Table MC 403.3.1.1 of the 2022 NYC Mechanical Code; or mechanically ventilated in accordance with Section MC 403.

    b. All occupiable spaces provided with air conditioning shall be mechanically ventilated in accordance with Section MC 403.

2. Occupant load for ventilation requirements shall be calculated as follows:

    a. **Ventilation occupancy for a given space shall be the minimum of the UFT contract maximum occupancy (*prior* to the enactment of the reduced class size law on 9/7/2023) versus Table BC 1004.1.3, Egress Occupant Density.**

    b. For typical size classrooms, the UFT maximum will typically govern, while for smaller half-size rooms egress will typically govern. Note the occupancy (egress or UFT contract) to calculate the required ventilation rates depends on the grade level and size of the Classroom.

    UFT contract maximum occupancies are as follows:

Pre-K and K:	**27 occupants**
PS/IS Grades 1 through 8:	**33 occupants**
HS Grades 9 through 12:	**34 occupants**

    The UFT contract occupancies represent the maximum number of students the teachers can effectively educate.

Ventilation calculations for any space that does not have a defined occupancy per UFT contract as defined above shall be based on the default occupant density per Table BC 1004.1.3, Egress Occupant Density.

c. Ventilation **occupancy** for PA, Administrative and other miscellaneous spaces shall be based on the default occupant density per Table BC 1004.1.3, Egress Occupant Density, since a Program of Requirements reflecting the UFT contract maximum occupancy does not exist for those spaces.

3. The minimum central unit outdoor air intake ventilation rate that the PA space (Gymnasium, Auditorium, Gymatorium) CO_2 sensors can throttle down to for a space that is vacant during scheduled occupied hours is the space specific cfm per square foot requirements defined in Table MC 403.3.1.1 times the space square footage. The minimum central unit outdoor ventilation rate for the units serving multi-zone spaces (Classrooms, Offices, etc.) is the sum of each space's cfm per square foot per Table MC 403.3.1.1 times each space's square footage.

a. The minimum vacant ventilation rate is established in order to maintain the minimum Indoor Air Quality (i.e., to account for the VOC outgassing of carpets, adhesives, paints etc.) even if the space is unoccupied.

b. The total supply air provided by recirculating unit (multi-zone or single zone) shall never be less than the fully occupied ventilation rate. Demand Control Ventilation (DCV) shall only modulate the central unit outdoor air intake rate and the amount of central unit recirculated air shall vary to provide at least the fully occupied total ventilation supply flow as the instantaneous outdoor air intake rate varies. As DCV modulates the rate of central unit outdoor air taken in, the central outdoor air ratio shall vary.

c. The minimum central unit outdoor air intake ventilation rate that the Cafeteria/Cafetorium carbon dioxide sensors can throttle the outside air intake rate down to for a vacant Cafeteria/Cafetorium during non-cooking scheduled occupied hours is the Cafeteria/Cafetorium cfm per square foot requirements as defined in Table MC 403.3.1.1 times the Cafeteria/Cafetorium square footage plus the amount of air required for makeup of the General Kitchen exhaust fan, Staff Toilet exhaust fan and Can Wash Room exhaust fan. This is due to the fact that the Cafeteria/Cafetorium and Kitchen are to be served by a combination central unit.

4. The required ventilation rates for dual function spaces (such as a Gymatorium or Gymnasium) are to be calculated considering each mode of operation (example when Gymatorium is used as a Gymnasium, and when Gymatorium is used as an Auditorium). Gymatoriums have a staged area to function in the Auditorium mode. Spaces denoted as "Gymnasium" (which would not have a stage) must still consider all possible modes of operation (such as when used for Gymnasium sporting events and when used for assembly gatherings).

5. The above central unit outdoor ventilation airflow rates might have to be further adjusted when A2L refrigerants are used in the air handling units. The continuous ventilation option of Section 7.6.1.1.b of ASHRAE 15-2022 is to be employed when A2L refrigerants are used and the refrigerant charge per circuit <u>exceeds</u> the EDVC value as calculated in Equation 7-8 of ASHRAE 15-2022. The central unit outdoor air intake rate shall be the maximum of the required ventilation rate as calculated in accordance with

Chapter 4 of the NYC Mechanical Code as compared to the outdoor air flow rate required to disperse any leaked A2L refrigerant in accordance with Equation 7-10 of ASHRAE 15-2022. If A2L refrigerants are used but the refrigerant charge per independent circuit is less than the EDVC value as calculated in Equation 7-8 of ASHRAE 15-2022, then the central unit outdoor ventilation airflow rates are to be solely based on the required ventilation rates as calculated in accordance with Chapter 4 of the NYC Mechanical Code.

6. Note that calculations are to be based on NET floor area.

7. Inside ambient design parameters:

   72°F DB (in accordance with NYC Health Code and the Department of Education)

8. Outside ambient design parameters:

   The Heating Design Temperature shall be 12.8ºF with 99.6% weather data (NY Kennedy Airport) per Annex 1 Table B-1 of ASHRAE 90.1-2016 with reference to ASHRAE Standard 169-2013.

9. Heating load to include:

   a. Transmission losses through exterior envelope

   b. Ventilation outside air intake load

   c. Miscellaneous transmission losses through basement floor

   d. Infiltration losses (include the effects of pressurization)

   e. Include heat transfer through piping and ductwork walls, duct leakage and inherent system inefficiencies such as damper leakage.

B. Cooling **for New Construction and Major Modification/Substantial Reconstruction Capacity Projects and Capital Improvement Projects**:

1. The fresh air requirements for all spaces shall be the same as defined above for heating.

2. Note that calculations are to be based on NET floor area.

3. VAV Case (present SCA Standard):

   In accordance with Section BC 1204.2 of the 2022 NYC Building Code, the inside ambient design parameters is 78°F DB at an outside ambient design maximum dry bulb condition of 89°F DB. Cooling Tower (if used) shall be designed for 78°F WB. Note that the spaces served by VAV boxes shall utilize CO_2 sensors to reset the minimum central unit ventilation airflow as defined above in Paragraph **A.3.**

4. Cooling load to include:

   a. Transmission and Solar heat gain through exterior envelope.

b. Ventilation outside air intake load.

c. Sensible and latent heat gain per space based on the occupancy per NET floor area of occupied space as determined above.

d. Interior heat gains (i.e., lights, equipment, etc.) Watts per NET square foot

e. Infiltration losses (include the effects of pressurization)

f. Fan heat

g. Include heat transfer through piping and ductwork walls, duct leakage and inherent system inefficiencies such as damper leakage.

C. General Design and Construction Submissions

1. Refer to Design Requirement 6.2.28, HVAC Design Requirements for Special Spaces, for temperature and other design parameters that differ from the above standards for those particular spaces.

2. Refer to Design Requirement 6.2.34, Verification of HVAC System Design.

6.2 Heating & Ventilation

6.2.10 Smoke Control, Smoke Venting and Post-Fire Smoke Purge Systems

Description/Design Approach:

A. Post-Fire Smoke Purge Systems

Per Section BC **917.1** of the **2022** NYC Building Code, post-fire smoke purge systems are intended for the timely restoration of operations and overhaul activities once a fire is extinguished. Post-fire smoke purge systems are not intended or designed as life safety systems and are not required to meet the provisions of Section BC 909.

1. Designers shall refer to and comply with the requirements of Section BC **917** for rules pertaining to the function, capacity and operation of building Post-Fire Smoke Purge Systems. Post-fire smoke purge systems shall be required in:

    a. High-rise buildings per Section BC 403.
    b. Buildings with any story exceeding 50,000 square feet in floor area.
    c. Buildings with spaces exceeding 100 feet from natural ventilation openings. Natural ventilation openings shall consist of operable windows and doors of at least five percent of the floor area or roof vents per Section BC 910. Note that consequently, basements will typically require post fire smoke purge systems.

    Per Section BC **917.2.2,** provisions shall be made for sufficient make-up air. The provisions may include operable windows, doors or mechanical systems. In buildings having occupied floors located less than 75 feet above the lowest level of fire department vehicle access, breakable windows may be utilized.

    Makeup air for basement post-fire smoke purge systems shall be provided by a dedicated header duct (or multiple header ducts as required based on providing a nominal velocity of 300 FPM) that serves all basement spaces. The header duct(s) in turn shall get its (their) outside air makeup from an areaway louver or ductwork terminating in a gooseneck shaped arrangement with an outside air intake Class 1 motorized leakage rated damper interlocked with a dedicated basement post-fire smoke purge fan. In locations where there is insufficient space to allow for a gravity make-up air system, provide make-up air fan connected to duct header and louvers. As an alternate to a dedicated header duct(s), transfer grilles may be provided between the basement spaces. Fire dampers that can be overridden at the firefighter's panel shall be provided at all basement fire rated duct penetrations and/or transfer grilles. This supply arrangement will be similar for high-rise buildings if the operable windows do not provide the required five percent floor area (considering the limitations of the window stops) and can not supply the make-up air (and low-rise buildings in the unusual case the breakable window area does not provide the required five percent floor area). In this case, a wall louver equipped with an interlocked outside air intake Class 1 motorized leakage rated damper shall be provided to provide makeup air to the dedicated header duct(s) or transfer grilles between the spaces.

2. A dedicated post-fire smoke purge system (i.e. one that purges the non-assembly spaces through the corridors) is preferred to one that is integrated with the HVAC units for the non-assembly spaces. Where HVAC units serving non-assembly spaces are utilized for post-fire

smoke purge, return fans shall be oversized to accommodate the additional CFM. The smoke purge system shall be sized to exhaust six (6) air changes per hour (or 1 cfm per sq.ft. of floor area whichever is greater) one zone at a time. Public assembly spaces may be purged separately and independently from each other and from classroom/office spaces in order to downsize the dedicated purge ductwork and dedicated purge exhaust fan. If the Public Assembly spaces are separately purged, they may be purged by using the return fans of the Public Assembly **heat pump** or air conditioning unit or by using separate Public Assembly purge fans. Provision shall be made for sufficient make-up air per Section BC **917.2.2.**

3. The fire dampers and combination fire-smoke dampers necessary for operation of the purge system shall be provided with a manual override feature, which shall be activated by the NYC Fire Department at the post-fire smoke purge panel.

4. Post-fire smoke purge fans are not required to be connected to an emergency power source.

5. Smokeproof Enclosures: Per Section BC **917**.1, a post-fire smoke purge system is not required where all exits are constructed as smokeproof enclosures in accordance with Section BC **1023.11**.

6. **Per Section BC 917.2.4, interior exit stairways or ramps or exit passageways shall not be used as a portion of the post-fire smoke purge system. Doors in interior exit stairways or ramps or exit passageways shall not be permitted to be used as a portion of the post-fire smoke purge system. Air transfer and duct openings associated with the post-fire smoke purge system shall not be permitted in the interior exit stairways or ramps or exit passageways.**

B. Smoke Control Systems

1. Per Section BC 909.4.6, Duration of Operation, all portions of active or passive smoke control systems shall be capable of continued operation after detection of the fire event for a period of not less than 20 minutes or 1.5 times the calculated egress time, whichever is more.

2. Per Section BC 909.10.6, Seismic Requirements, smoke control systems covered by Section BC 909 are required to function after an earthquake. Hence, smoke control fans must be seismically rated. Such smoke control systems must be seismically designed in accordance with Section BC 1613 and ASCE 7-**16**. The component importance factor, Ip, must be taken as 1.5 in accordance with ASCE 7-**16**, section 13.1.3. The smoke control system includes all components required for its operation, including but not limited to fans, ducts, electrical power, switchboards, motor control centers, starters, and controls. In addition, emergency or standby generators, depending on what is used for the project, must be seismically rated.

Exception: Smoke control systems in structures classified in Seismic Design Category B **are exempt from seismic requirements per Section 13.1.4 of ASCE 7-16**.

3. Per BC 909.11, Power Systems, the smoke control system must be supplied with two sources of power. Primary power must be from the normal building power systems. Secondary power must be from an emergency or standby source complying with Sections BC 2702. Ensure the electrical designers account for these connections in their design.

4. Stage Emergency Ventilation

a. Section **BC 202** defines a stage as **a space within a building utilized for entertainment or presentations, which includes overhead hanging curtains, drops, scenery or stage effects other than lighting and sound. Section BC 410 defines a platform as, a raised area within a building used for worship, the presentation of music, plays or other entertainment; the head table for special guests; the raised area for lecturers and speakers; boxing and wrestling rings; theater-in-the-round stages; and similar purposes wherein, other than horizontal sliding curtains, there are no overhead hanging curtains, drops, scenery or stage effects other than lighting and sound. A temporary platform is one installed for not more than 30 days.**

b. Verify with the Architect whether a stage or a platform is being provided prior to design. Most SCA projects utilize platforms per the definition in Section BC 410, as they typically utilize only horizontal sliding curtains unless they are a specialty performing arts platform.

c. **Stages require** an emergency ventilation system **if greater than** 1,000 sq. ft. **in floor area** or **with a stage height** higher than 40 ft. Reference Section BC 410.3.7.1 for roof vent requirements (preferred) or Section BC 410.3.7.2 for smoke **venting** requirements. Smoke **venting** systems shall be automatically activated by heat detector, smoke detector, sprinkler flow, etc. and supplemental manual activation.

d. Stages under 1,000 sq. ft. **in floor area** or **less than** 40 ft **in height and platforms do not require a stage emergency ventilation system.**

5. Atrium Smoke Control Systems

a. Per **Section BC 202**, an Atrium is defined as, a**n opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or any other vertical openings that are not required to be enclosed by other provisions of this code, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.**

b. As per Section BC 404.5, a smoke control system designed in accordance with Section BC 909 shall be provided for atriums, **but as per the exception for most building occupancies including Class E, smoke control is not required for atriums that connect only two stories.**

6. Smoke Venting of all Closed Shafts and all Stairways

Per Section **BC 713.12.1, all closed shafts, including vertical exit enclosures, having a floor area exceeding 4 square feet shall be provided with a smoke vent in accordance with Sections 713.12.1.1 through 713.12.1.3. Interior vertical exit shaft enclosures shall also comply with BC Chapter 10.**

a. Smoke vent construction

Smoke vents may be constructed as windows, louvers with smoke dampers, skylights, vent ducts with smoke dampers, trap door hatches, or similar devices per Code. The SCA preference is to utilize trap door hatches that provide the most access to the area smoke detectors, as the area smoke detectors are integral parts of the trap door hatches. Louvers and vent ducts, if used**,** shall be provided with Class 1 motorized leakage rated smoke dampers that open upon sensing of smoke by area smoke detectors located at the top of the shaft. Architect/Engineer of Record shall obtain Authority approval to use louvers/vent ducts and must demonstrate that the associated area smoke detector is accessible. Skylights and trap door hatches shall be spring-loaded and shall be automatically opened by integral area smoke detectors and the trap door hatches shall be located at the top of the shaft. Where a vent duct is installed, such vent ducts shall be enclosed by construction having the same fire-resistance rating as required for the shaft enclosure.

b. Smoke vent dimensions

The effective venting area shall not be less than 3½ percent of the maximum shaft area at any floor, but in no event less than 72 square inches.

c. Smoke vent location

1) Smoke vents located above the roof line:

Where a closed shaft or smoke vent duct penetrates through the roof of the building, the vent shall be located as follows:

a) The vent shall be located at least 8 inches above a noncombustible roof assembly or at least 36 inches above a combustible roof assembly.

b) The vent shall be located at least 10 feet from any window, door, exterior stairway, or interior lot line. The vent may be located no less than 5 feet from any window or door if the vent is located at a point higher than the top of such window or door.

c) Where the vent is constructed as a window or louver, the sill of the window or louver shall be located at least 36 inches above the roof assembly.

2) Smoke vents located in an exterior wall:

Where the exterior wall serves as part of a shaft enclosure or where a smoke vent duct penetrates the exterior wall of the building, no openings shall be located in the wall within a distance of 30 feet vertically above the vent opening, nor within 5 feet on either side of the vent opening.

7. High-Rise Buildings Stairway Smoke Control System

In addition to the requirements of **Section BC 713.12.1** (See Item B.**6** above), per Section BC 403.5.4 and Section BC **1023.11**, every required **interior exit stairway~~s~~ and ramp~~s~~**

serving occupied floors more than 75 feet above the lowest level of fire department vertical access shall be provided with smoke-proof enclosures or pressurized stairway.

a. Definition

Per Section **BC 202**, a Smokeproof Enclosure is defined as, **"An exit stairway, ramp or passageway designed and constructed so that the movement of the products of combustion produced by a fire occurring in any part of the building into the enclosure is limited."**

b. **Per Section BC 909.20**, smokeproof enclosures shall be designed with one of the following:

1) The stairway shall be accessed through an open exterior balcony or

2) The stairway shall be accessed through a naturally ventilated vestibule when the vestibule enclosure is part of the building envelope i.e. when the vestibule is located on the perimeter of the building.

a) Per Section BC 909.20.3.3, each vestibule shall have a minimum net area of 16 square feet of opening (windows; louvers and vent ducts with Class 1 motorized leakage rated smoke dampers that open upon sensing of smoke by smoke detectors located at the floor-side entrance to each vestibule or similar devices) in a wall facing an outer court, yard or public way that is at least 20 feet in width; or top floor vestibules shall be equipped with trap door hatches/skylights that open upon sensing of smoke by smoke detectors located at the floor side entrance to each vestibule or,

3) The stairway shall be accessed through a mechanically ventilated vestibule when the vestibule is not located on the perimeter of the building (i.e. when the vestibule is a core space).

a) Per Section BC 909.20.4.2, the vestibule shall be supplied with not less than one air change per minute and the exhaust shall not be less than 150 percent of supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate, tightly constructed ducts used only for that purpose. Supply air shall enter the vestibule within 6 inches of the floor level. The top of the exhaust register shall be located at the top of the smoke trap but not more than 6 inches down from the top of the trap, and shall be entirely within the smoke trap area. Doors in the open position shall not obstruct duct openings. Duct openings with controlling dampers are permitted where necessary to meet the design requirements, but dampers are not otherwise required at the vestibule penetrations if the vestibule enclosure is not part of the building envelope.

b) Per Section BC 909.20.4.2.1, where a specially engineered system is used, the system shall exhaust a quantity of air equal to not less than 90 air changes per hour from any vestibule in the emergency operation mode and shall be sized to handle three vestibules simultaneously.

c) Smoke detectors shall be located at the floor-side entrance to each vestibule and shall activate the system for the affected vestibule. Supply air and exhaust air

ducts penetrating the building envelope shall be equipped with interlocked Class 1 motorized leakage rated dampers that open only when the system is activated by the smoke detectors located at the floor-side entrance to each vestibule. Smoke detectors shall be installed in accordance with Section BC 907.3. The vestibule ceiling shall be at least 20 inches higher than the door opening into the vestibule to serve as a smoke and heat trap and to provide an upward-moving air column. The height shall not be decreased unless approved and justified by design and test.

d) Per Section BC 909.20.4.4, the stair shaft shall be provided with an interlocked Class 1 motorized leakage rated dampered relief opening if the opening vents directly to the exterior and the stair shaft shall be supplied with sufficient air to maintain a minimum positive pressure of 0.10 inch of water in the shaft relative to the vestibule with all doors closed. The system shall maintain a maximum of 0.35 inch of water in the shaft relative to the building measured with all stairway doors closed under maximum anticipated stack pressures. Relief opening interlocked Class 1 motorized leakage rated damper shall open only when the system is activated by the smoke detectors located at the floor-side entrance to each vestibule. Per Section BC 909.20.4.5, the door opening force shall not exceed limits in Section BC **1010.1.3** or

4) A pressurized interior exit stairway shall be constructed in accordance with Section BC **1023.1.**

a) Per Section BC 909.20.5, where the building is equipped throughout with an automatic sprinkler system in accordance with Section BC 903.3.1.1, the vestibule is not required, provided that interior exit stairways are pressurized to a minimum of 0.10 inches of water and a maximum of 0.35 inches of water in the shaft relative to the building measured with all stairway doors closed under maximum anticipated conditions of stack effect and wind effect. The stair shaft shall be provided with an interlocked Class 1 motorized leakage rated dampered relief opening if the opening vents directly to the exterior that shall only open when the system is activated by the smoke detectors located at the entrance to the smokeproof enclosure.

Where access to the roof is required by the **2022** New York City Fire Code, such access shall be from the smoke proof enclosure where a smoke proof enclosure is required.

c. Smokeproof Enclosure Door Closers

Per Section BC 909.20.2.1, doors in a smoke proof enclosure shall be self- or automatic-closing by actuation of a smoke detector in accordance with Section BC **716.5.9.3** and shall be installed at the floor-side entrance to the smoke proof enclosure. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the smoke proof enclosure at all levels. Smoke detectors shall be installed in accordance with Section BC 907.3.

d. Ventilating Equipment Activation

Per Section BC 909.20.6, the activation of ventilating/pressurization equipment shall be by smoke detectors installed at each floor level at an approved location at the entrance to the smokeproof enclosure. When the closing device for the stair shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section BC 907.3.

e. Independent Ventilation Systems

Per Section BC 909.20.6.1, ventilation systems shall be independent of other building ventilation systems.

f. Smoke Control System Power

Per Section BC 2702.2.2, standby power shall be provided for smoke control systems in accordance with Section BC 909.11.

g. Smokeproof enclosures

Per Section 2702.2.19, standby power shall be provided for smokeproof enclosures as required by Section BC 909.20.6.2.

h. Acceptance and Testing

Per Section BC 909.20.6.3, before the mechanical equipment is approved, the system shall be tested in the presence of the Department or approved agency to confirm that the system is operating in compliance with these requirements.

8. Underground Building Smoke Control System

Provide if required in accordance with Section BC 405.5 for underground buildings with spaces having a floor level used for human occupancy more than 30 feet below the finished floor of the lowest level of exit discharge.

9. Smoke Protected Assembly Seating

If aisle widths are reduced per BC Table **1029.6.2,** provide smoke control per Section BC **1029.6.2.1** by providing either a smoke control system complying with Section BC 909 or natural ventilation designed to maintain the smoke level at least 6 feet above the floor of the means of egress.

10. Elevator Hoistway Smoke **Venting is no longer required per the 2022 NYC Building Code.**

6.2 Heating & Ventilation

6.2.12 Unit Ventilators (Existing School Buildings Only)

Description/Design Approach:

A. Existing Classrooms, Offices and similarly sized exterior rooms shall be provided with acoustically lined vertical unit ventilators for ventilation capability if it is determined that providing a new central system is not a cost effective option. If the existing unit ventilators are of the two-pipe, hot/chilled water dual temperature type and require repair/replacement, they shall be repaired/replaced in kind. If the existing building has a functioning central heating and ventilation system (without air conditioning) together with a functioning perimeter heating system, and air conditioning is to be added and it has been determined that the central system can not be retrofitted with a DX coil and remote air cooled condenser (or a chilled water coil with associated chiller) to provide air conditioning, cooling only vertical chilled water coil type unit ventilators may be provided driven by roof mounted air cooled packaged chillers If a new perimeter heating system is required and air conditioning is also to be added, chilled water coil type unit ventilators equipped with steam coils or heat pump vertical unit ventilators shall be provided. Connect outside air ventilation connection on each unit ventilator to a modified double hung window sash fitted with a new storm proof aluminum louver. Investigate the possibility of optionally providing new masonry openings (with associated loose lintels) in order to bring in outside air.

B. Large corridors, large lobbies, assembly areas, cafeterias, and other large interior or exterior rooms shall be provided with a central ducted ventilation system.

C. Unit ventilator fans and coils shall be sized to satisfy the loads using a combination of fresh air and recirculated air. Fresh air ventilation requirements shall be calculated in accordance with Design Requirement 6.2.9.

D. Architect/Engineer of Record shall secure the services of an acoustical consultant to minimize the noise experienced in the classrooms. Possibly, the unit ventilators will have to be enclosed in an acoustically lined closet. **It is intended that the maximum acceptable sound pressure level be 45 dBA/NC40 in keeping with the 2016 version of the Green Schools Guide, which was based on version of LEED V3.**

E. The other option other than unit ventilators using chilled water cooling coils is to utilize DX self-contained unit ventilators where the self contained units are equipped with integral compressors and air cooled condensers. The usage of chilled water for unit ventilator cooling is preferred to using DX coils considering acoustics and the maintenance issue associated with multiple unit ventilator compressors.

F. Refer to HVAC Design Requirement 6.2.11, Air Conditioning Existing School Buildings.

6.2 Heating, Ventilation & Air Conditioning

6.2.13 Arrangement and Sizing of Equipment

Description/Design Approach:

Heat pump units **(both DX and, if approved by the Authority, dual temperature units served by air to water heat pump chiller/heaters)** shall be provided for all spaces according to Design Requirement 6.2.0.

The heating loads and cooling loads shall be calculated as per Design Requirement 6.2.9.

A. Heating Capacity

1. Projects based on providing new boilers are not authorized to proceed without Authority approval. All heat pump units in the heating mode are to be sized based on being able to provide the required capacity at outdoor air design conditions (12.8ºF). Designers are cautioned to not select heat pumps based on the AHRI heating rating condition of 47ºF outdoor air temperature.

2. Separate detailed calculations for Capital Improvement Program (CIP) projects are to be submitted for review with the design submission at 50% (if project has such submission) and again at 100% and 60% and again at 100% for Capacity projects. Submit a separate set of detailed calculations to Building Code Compliance (BCC) unit for review when the project is filed. Detailed calculations are to include:

    a. Heating load calculations indicating transmission, infiltration and ventilation loads as well as assumed safety factors.

3. HVAC Schedules on the filed drawing set shall include summary schedules indicating:

    a. Total transmission load, total infiltration load, total ventilation load, safety factors and selected heat pump capacity (with required auxiliary supplemental/back-up redundancy electric heating).

4. For existing schools undergoing Capital Improvement (CIP) Projects, heat pump capacity is to be based on current envelope U-value as best as can be determined. The U-value may be better than at the time of original construction, as the original windows have probably been replaced with better windows such as dual glazed insulated windows.

5. For new buildings and existing buildings undergoing Major Modernization projects that require new HVAC systems**,** refer to Design Requirements 6.2.0, 6.2.3 and 6.2.4 for heat pumps.

B. Cooling Capacity

1. Cooling loads shall include the sensible loads and the latent dehumidification loads (refer to Design Requirements 6.2.3 and 6.2.4). Design shall maintain comfort levels during transition seasons (such as humid, cool days in the spring) as well as peak load days.

2. The ventilation calculations for New Construction and Major Modernization Capacity Projects and Capital Improvement Projects shall be calculated in accordance with Design Requirement 6.2.9.

C. Designing for the Most Restrictive Conditions

The designer shall review all of the characteristics associated with all of the approved equipment manufacturers. The design should be able to accommodate any of the approved equipment manufacturers in terms of mechanical equipment room sizing, electrical power feeds, noise characteristics, slab openings, roof access, catwalks, vibration isolation/seismic restraints, New York City Fire Code requirements regarding rooftop access and obstructions, etc.

6.2 Heating, Ventilation & Air Conditioning

6.2.14 Fuel Oil Storage Tanks: Capacity and Room/Vault Ventilation

Description/Design Approach:

Provide oil tanks on CIP projects for burner retrofit or replacement from No. 2 or No. 4 oil to biodiesel B100 Ready burners when existing above ground (not directly encased in the soil) tanks are leaking but the boiler itself is to be salvaged and has an anticipated service life of at least 15 years as follows:

A. Tank Capacity

1. **For** CIP Project single fuel source systems, oil storage tanks for B20/B100 heating oil shall at least be sized as follows:

   - Schools less than 110,000 SF……Two (2) ea. 7,500-gallon tanks
   - Schools greater than or equal to 110,000 SF but less than or equal to 130,000 SF……Two (2) ea. 10,000-gallon tanks
   - Schools greater than 130,000 SF……..Two (2) ea. 15,000-gallon tanks

2. Fuel oil tanks shall not be buried but shall be located inside the **building or in a vaulted tank chamber.**

3. Fuel oil tanks shall be designed for the maximum static head that will be imposed with the normal vent piping filled with oil in accordance with Section MC 1305.7.4 of the 2022 NYC Mechanical Code.

Note that existing tanks associated with existing dual fuel gas/No 2 oil typically are only sized for 10 hours of operation per day for 10 days and hence will not meet the above single oil fuel tank sizes and there might be space constraints against installing larger tanks to replace existing leaking tanks. **Refer to Design Requirement 6.2.16 Fuel Burning Equipment which addresses dual fuel and straight gas burner retrofits/replacement.**

Note that **Capacity Projects** (New Schools and Schools undergoing Major Modernization projects**)** shall be equipped with heat pump systems **(DX or dual temperature water generated from air to water heat pump chiller/heaters**). Refer to Design Requirements 6.2.0, 6.2.3, 6.2.4, 6.2.39 **and 6.2.40.**

B. Tank Room/Vault Ventilation

Rooms containing fuel oil tanks located above ground (not directly buried in soil) shall be ventilated to limit the concentration of vapors in the room at or below 25% of the Lower Flammability Limit (LFL) of the oil being used per Sections MC 1305.13.2.3 and MC 1305.13.3.4. Per Section MC 1305.16**,** the tank room exhaust fans shall run continuously at two air changes per hour to guarantee the concentration will be at or below 25% of the Lower Flammability Limit (LFL). Multiple tank rooms may be served by a shared exhaust system. Make-up air shall be

provided via a ducted building ventilation system. All dampers, including smoke dampers, shall be interlocked with the exhaust air system.

Per Section MC 1305.16.1, replacement of tanks in prior code buildings may utilize an existing gravity ventilation system complying with the following:

1. The total net free area of supply and exhaust openings shall be equal to at least 1 percent of the floor area of the room, equally divided between the supply and exhaust; and

2. Independent supply and exhaust openings to the outside; or

3. Independent supply and exhaust ducts to the outside.

6.2 Heating, Ventilation & Air Conditioning

6.2.15 Cleaning and Inspection Requirements for Boilers and Chimneys

Description/Design Approach:

A. Contract specifications for B100 burner retrofit or replacement projects shall set forth cleaning and inspection requirements for boiler, boiler breeching and chimney. **Reference Section MC 801.18.2 of the 2022 NYC Mechanical Code for the requirement to clean, repair and reline flue gas passages.**

B. No boiler/burner (or vent from a gas appliance) shall be connected to an unlined chimney or to a chimney having a damaged lining. **Reference Section MC 801.16 for the requirement to line masonry chimneys.** Contract specifications shall set forth lining installation and repair requirements, as appropriate.

C. Contract specifications for burner retrofit or replacement projects shall include soot cleaning of boiler firetubes.

D. Required smoke test per Section MC 810**: All** new and altered chimneys, and chimneys to which a new appliance has been connected, shall be test run under operating conditions to demonstrate fire safety and the complete exhausting of smoke and the products of combustion to the outer air. Designer is to call out required smoke test in the contract documents as required.

E. In order to avoid the potential of change orders where a stainless steel lining is determined to be needed based on a failed field smoke test, designer is to inspect existing chimney. Previously, when converting to gas burners, a chimney liner was automatically added due to the lower flue temperatures of gas burners as compared to oil burners and the tendency for any flue condensation to react with existing sulfur deposits in the chimney. When retrofitting existing No 2 or No 4 burner to burn biodiesel B20/B100 fuel or replacing with B100 ready burners, the stack temperatures will be such that a liner is not automatically **needed**. Hence, designer is to check existing condition of the firebrick and existing mortar joints before deciding to reuse existing chimney and not install a stainless steel liner for B20/B100 retrofit/replacement burner projects.

6.2 Heating, Ventilation & Air Conditioning

6.2.16 Fuel Burning Equipment

Description/Design Approach:

A. New Construction/Existing Buildings Undergoing Major Modernization **Capacity** Projects

New construction/existing buildings undergoing Major Modernization shall utilize **DX** rooftop **heat pump** unit**s**, **DX heat pump** vertical unit ventilators or VRF heat pump systems as detailed in Design Requirements 6.2.0, 6.2.3, 6.2.4 and 6.2.39. **Other option (subject to approval by the Authority) is to utilize Dual Temperature (DT) rooftop units, DT vertical unit ventilators or DT DOAS/DT fan coil units having ECM fan motors. In general, for indoor MERs, split DX systems or indoor DT air handling units may be used instead of rooftop units. Refer to Design Requirement 6.2.40 for air to water heat pump chiller/heaters.**

B. Existing Construction (No. 2 or No 4 Fuel Oil Burner Replacement or Retrofit to B100 Burner, Possible Fuel Tank Replacement) Capital Improvement Projects (CIP)

1. Directly buried tanks shall not be reused and shall either be left in place and filled with inert foam or removed if a soil study indicates that **soil** remediation is required.

2. Burners shall be biodiesel B100 Ready burners if the boiler has an anticipated future service life of at least 15 years. If the existing tanks are not directly buried and are located in **the basement/cellar or in** a concrete vault and if they are not leaking, the tanks may be salvaged for storage of B100 fuel oil. Tanks located in **the basement/cellar or in** a concrete vault that are leaking shall be replaced if the boiler has an anticipated future service life of at least 15 years. **Refer to related Design Requirement 6.2.14.**

3. Possible chimney lining with stainless steel liner must be considered in the cost analysis. Replacement or retrofit of #2 or #4 oil burners to B100 fuel oil burners may or may not require a new stainless steel liner depending on the integrity of the existing stack as determined by Designer's investigation. On the Drawings, Designer is to call out the need for a smoke test according to Section MC 810 of the 2022 NYC Mechanical Code. See related Design Requirement 6.2.15.

C. Existing Construction (Dual Fuel Gas/No. 2 Oil or Straight Gas) Burner Replacement or Retrofit Capital Improvement Projects (CIP) Not in Environmental Justice Areas

1. For the dual fuel case where gas is the primary fuel and No. 2 oil is the secondary fuel, retrofit or replace with burners that have gas as the primary fuel and B100 as the secondary fuel. Straight gas burners are to be retrofitted or replaced in kind.

2. The justification to continue to use natural gas is based on the below information of the CO_2 generation per the 2016 NYC Green House Inventory Report and NOx and SO_2 generation based on the statewide electricity profile for NYS in 2021. The source emissions of CO_2, NOx and SO_2 for gas as compared to electric power generation are lower as shown in the below table:

POLLUTANT	NO. 2 FUEL OIL	NO. 4 FUEL OIL	NATURAL GAS	ELECTRICITY	B20	B99.9
Carbon Dioxide CO_2 (tCO_2e/MMBtu)	0.07414	0.07617	0.05	0.07632	0.05799	0.01118
Nitrogen Oxides NO_x (kg/MMBtu)	0.0783[37]	0.172[37]	0.0445	0.0665	0.0674	0.0206[38]
Sulfur Dioxide SO_2 (kg/MMBtu)	0.000695[37]	0.1408	0.0002538	0.01329	0.000563 - 0.000695	0[38] - 0.000695

Over time, the electric grid will improve and there will be a disadvantage against using gas as the primary fuel. This future grid improvement is expected to occur nominally within the next 15 years, at which point the boilers would have no remaining useful life and the future design to address the failing boilers would be based on full electrification. Until electric power generation emits less gaseous pollutants as compared to utilizing gas burners, it will be beneficial to use natural gas as the primary fuel in a dual fuel gas/B100 system and in straight gas burners. Areas declared to be Environmental Justice Areas shall not have any burners that burn fossil fuels and are most likely candidates for full electrification. Discuss with the Authority.

6.2 Heating, Ventilation & Air Conditioning

6.2.17 Gas Leak Detection and Alarm Systems

Description/Design Approach:

A. Applicability: This Design Requirement is applicable to the following projects:

1. Retrofit/replacement of burners for steam boilers **having at least 15 years of remaining boiler service life** that burn natural gas or that are dual fuel natural gas/No.2 oil **converted to dual fuel natural gas/B100 biodiesel oil.**

2. New steam boilers are provided with burners that burn natural gas or dual fuel natural gas**/B100 biodiesel oil.**

3. New condensing hot water boilers are provided that burn natural gas.

All **the** above noted work would require Authority approval, as the Authority's standard is to employ heat pumps **and in particular, designs based on providing new boilers are discouraged.**

4. The case when the existing gas burner/boiler are to remain but work is required on the ancillary systems (such as a Climate Control upgrade, etc.) where the existing gas leak detection and alarm system requires retrofit or replacement.

5. Replacement of existing fire alarm systems where **existing gas** detection system is now required to be connected to the Fire Alarm System.

B. Gas detection systems designed to detect flammable gases required by the 2022 New York City Construction Codes or the New York City Fire Code shall comply with Sections BC 918.2 through 918.10 of the 2022 NYC Building Code.

C. For Schools with Authority Approval to Proceed with Burners that Burn Gas

1. Installation in Unoccupied Spaces: Natural gas leak detection and alarm system shall be installed with detectors provided in unoccupied spaces as follows where and when applicable:

a. For schools not employing heat pump domestic hot water heaters: Natural gas detectors adjacent to gas fired hot water heater (18 inches below ceiling, above the vent of the gas fired water heater in the vicinity of the barometric damper).

b. Natural gas detectors between the boilers (18" below ceiling above the breeching of the boilers).

c. Natural gas detector in Gas Meter Room and Gas Booster Room, if separate room is provided (18" below ceiling).

d. Natural gas detectors adjacent to gas-fired equipment (unit heaters, duct furnaces, etc.) located within the building. Install detectors 18" below the above ceiling, in the vicinity of the exhaust flue).

2. Operation of Unoccupied Leak Detection and Alarm System: Upon detection of combustible gas at a concentration exceeding 25 percent of the lower flammability limit (LFL) per Section BC 918.8.1, the individual leak detector shall signal the alarm control panel. The alarm control panel shall then institute the following:

    a. Close the firm gas valve on the gas service per Section BC 918.8.3.

    b. Electrically shut down all equipment including (but not limited to) the boilers, gas-fired hot water heaters and gas-fired rooftop equipment.

    c. Start the explosion proof exhaust fan in the Gas Meter Room (if any).

    d. Activate the audio/visual alarms in the Boiler Room (or Gas-Fired Hot Water Heater Room for projects without boilers) and in the Custodian's Office and send a dry contact to the Fire Alarm system per Section BC 918.10**. Mechanical designer to ensure the electrical designer indicates on the Div.16 Drawings the wiring between the Gas Leak Detection and Alarm system to the Fire Alarm system.**

3. Per Section BC 918.5, the emergency generator, in the event of a loss of utility power, shall power the natural gas leak detection and alarm system, including exhaust fan in the gas meter room.

4. The natural gas leak detection and alarm control panel shall contain power supplies to feed the gas leak detectors and the audio/visual alarms.

5. A digital output natural gas alarm signal shall be sent from the leak detection and alarm system to the School Operating Console (SOC) if a **Section 15970** BMS/DDC **or Section 15971 Local BACnet** system is provided. **For BMS/DDC applications, a** wide area network (WAN) broadband signal shall be sent to the Central Host Control Station if the alarm signal is unanswered at the School Operating Console.

6. The natural gas leak detection and alarm system control panel shall be located in the Boiler Room (or Gas-Fired Hot Water Heater Room for projects without boilers).

D. General

1. When provided, Gas Meter Room shall have an explosion proof fan, explosion proof lights and sealed penetrations. It shall also be provided with an outside air intake wall louver if above grade. If new Gas Meter Room is below grade, provide an 8-inch diameter outside air intake pipe terminating in a reverse bend two feet above grade level maximum length of 15 feet as per Appendix E.4 of the 2022 NYC Fuel Gas Code.

2. Engineer of Record must edit the Contract documents to cover the retrofit case where new gas leak detection and alarm equipment is to be provided for existing dual fuel boilers. In that case, references must be made to two gas safety shut-off valves (Maxon valves), one for the firm gas line and one for the interruptible gas line. This Design Requirement is written for the case when a single firm gas service is being provided for single fuel gas burners.

3. Per Section BC 918.2.1, construction documents for gas detection systems shall be submitted for review and approval to the Fire Department prior to system installation. Construction documents shall include, but not be limited to, the following:

a. Gas detection system devices and equipment.

b. Engineering evaluation.

c. Items required by Section BC 907.1.1, fire alarm system construction document requirements, as applicable.

6.2 Heating & Ventilation

6.2.19 Boiler Burner Safety Considerations for Non-Condensing Boilers

Description/Design Approach:

A. General

1. Operation

a. Operation: Fire-tube boilers and flexible bent tube water-tube boilers shall have the Burner Management System (Flame Safeguard System) programmed to provide the number of pre-purge period air changes as required by ASME CSD-1-2011. The sequential draft damper shall be proven to be 100 % opened (with end-switch) prior to the forced draft fan operation, i.e. prior to and during the pre-purge period. For forced draft fan operation only, the sequential draft damper shall also be proven to be 100% open prior to ignition (light-off). Pointer shall be provided at indicated damper position.

b. During burner idle periods (between load cycles), the sequential draft damper shall be at the "safe-closed" position (70° closed out of a possible 90° travel.)

c. The post purge cycle shall have a duration as required by ASME CSD-1-2011. A safety shutdown shall have the sequential draft damper at proven 100% opened position. Smoke alarm shutdown shall be wired into the safe shutdown circuit.

2. **Clearances**

Clearances from the tops of boilers to the ceiling or other overhead obstruction shall be in accordance with Table MC 1004.3.1 of the 2022 NYC Mechanical Code. Show platform/ladder details on the Drawings. Where the required clearances cannot be provided due to physical limitations, file a reconsideration request (Form **CCD-1**) during the filing process demonstrating the physical limitations. Edit specification references to ladders/platforms if not required.

B. Oil Burning Equipment (**When existing No 2 or No 4 burners are retrofitted or replaced with biodiesel B100 Ready burners, the below shall apply)**

1. Each boiler shall have its own oil burner pump. The oil transfer pump shall not be used as a burner pump.

2. **For replacement burners**, provide one (1) 2 way direct acting normally closed fuel oil safety solenoid shut-off valve, one (1) 2 way normally closed fuel oil hydramotor safety shut-off valve with one (1) FM proof of closure switch similar to ASCO/General Controls HOV1A safety shut-off valve and one (1) normally open recirculation valve in burner oil piping layout. Provide Y-type strainer in burner oil piping upstream of the two (2) safety shut-off valves. Provide in line check valve in burner oil piping downstream of both fuel oil safety shut-off valves. Recirculation valve shall open when safety valves are closed. Hydramotor safety shut-off valve shall be installed downstream of the safety solenoid shut-off valve (closest to the burner). Provide two tee fittings between the solenoid oil safety valve and hydramotor oil

safety valve. Branch leg of the first tee fitting shall be equipped with a test port that can be used to verify that the upstream solenoid safety valve has properly closed. Branch leg of the second tee fitting shall be equipped with a relief valve that in turn connects to the oil return lines.

3. Provide a low-pressure oil recirculation loop from transfer pump to oil storage tank. Branch takeoffs from this loop shall convey oil to suction side of the burner oil pumps. Oil discharged from relief valves and from the recirculation valve(s), upstream of the safety shut-off valves, shall be returned to the loop. Transfer oil pumps shall be sized in excess of heating plant maximum fuel consumption requirements to ensure that oil return flow to tank is maintained for all operating conditions. Each burner booster pump is nominally sized by the burner manufacturer to draw 1.5 times the burner oil consumption rate. The transfer pumps are to be sized at 1.5 times the cumulative draw of all booster pumps. Overall sizing factor for the transfer oil pump is 2.25 times the cumulative burner consumption. All burner oil consumption rates are based on providing the boiler nameplate horsepower using the manufacturer's stack loss.

4. All **replacement** oil burner assemblies shall be fitted with anti-drip nozzles, or equivalent devices, to prevent oil dripping into furnace following closure of the main shut-off and safety shut-off valves.

5. Provide 100 mesh strainer baskets in strainers serving burner oil pumps, strainer serving transfer oil pumps, and strainers serving burner safety shut-off valves. Oil tank and oil piping shall be thoroughly cleaned, flushed, tested, etc., before being placed in operation.

6. Each burner oil pump shall be interlocked with fuel valve circuit to shut-off when burner shut-off valves close.

7. Fuel oil transfer pumps shall be wired to burner panel so that when boiler is operating on oil, the transfer pump shall start automatically except where a day tank is provided where the day tank float switch cycles the transfer pumps as required.

8. If ceiling height in boiler room precludes the installation of the 180-degree bend as shown in the Oil Piping Schematic, then a manufacturer approved back pressure regulator may be used. The fuel oil return piping from each burner oil pump shall connect directly back to the fuel oil return header as shown on the attached Oil Piping Schematic. The burner oil pump fuel oil return lines must connect downstream of the back pressure regulator to guard against the condition of the back pressure regulator being erroneously closed.

9. Per Section MC 1305.6.2 of the **2022** NYC Mechanical Code, the fuel oil fill lines must be located a minimum of 2 feet laterally from any building opening and 5 feet away from any subway grating. Per Section MC 1305.7.2, fuel oil vent lines shall terminate outside of buildings not less than 2 feet from any building opening and not less than two feet or more than 12 feet above the fill pipe terminal. Emergency relief venting shall comply with Section MC 1305.8. Tanks designed in accordance with Section MC 1305.14 shall not require emergency relief vent piping. Thus select tank meeting such requirements when feasible. Show the fill and vent locations on the Contract Drawings. **Per Section MC 1305.14, the use of a self-closing manway cover, a manway cover provided with long bolts that permit the cover to lift under internal pressure, or other type of emergency relief vent device inside the building, shall be prohibited.**

10. Fuel oil piping and storage shall comply with Chapter 13 of the **2022** NYC Mechanical Code and NFPA 31**-12**. Fuel oil tanks (day tanks) shall not be located above the lowest floor unless required by existing conditions.

11. Two-Pipe System

    Per Buildings Bulletin 2018-010, UL 142 day tanks not designed in accordance with Section MC 1305.14 and installed inside of buildings above the lowest floor, where the day tank normal and emergency vents are vented to an exterior termination point above the level at which the day tank is located, shall have the day tank overflow piped into the top of tank of the lowest floor storage tank that supplies the fuel to such tank. UL 80 day tanks, ASME BPVC day tanks and NYC-approved day tanks per Section MC1305.14 installed inside of buildings above the lowest floor, where the day tank normal vent is vented to an exterior termination point above the level at which the day tank is located, shall have the day tank overflow piped into the top of tank of the lowest floor storage tank that supplies the fuel to such tank.

    Per Section MC 1305.7.9, Tanks Served by Pumps: Tanks on any floor served by pumps require the normal vent to be connected to the overflow pipe and shall be piped a minimum of 8 feet above the overflow pipe and terminated directly to the outdoors. A liquid sensor shall be installed in the vent of the remotely served tank in order to shut down oil supply in the event of an overflow. Per Section MC 1305.8, for tanks also having emergency vents, the design and installation of the combined normal and emergency relief vent shall be in accordance with Section MC 1305.7.

    Refer to Figures C101.1(1), C101.1(2) and C101.1(3) of Appendix C of the 2022 NYC Mechanical code for the piping diagrams. Show all vent pipes and overflow pipe routing on the Drawings.

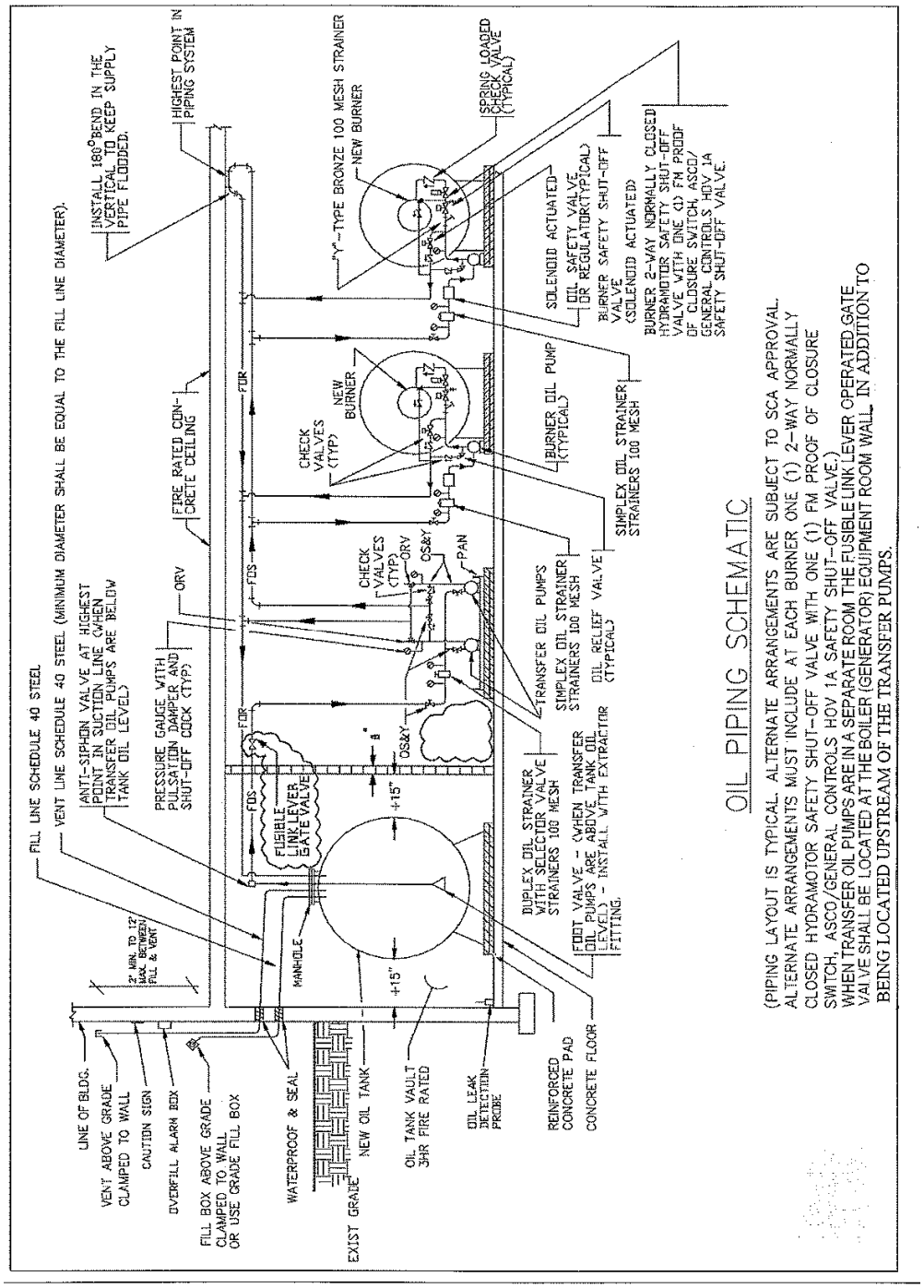
12. Per Section MC 1305.8.4, construction documents shall include calculations demonstrating that the extension of the normal and emergency vent piping is adequately sized to provide the required emergency vent flow while limiting the backpressure to less than the maximum pressure permitted by the design of the tank. Submit all calculations with the final design according to NFPA 30-**12.**

13. Per Section MC 1305.9.4, **Drain pan at base of shafts with leak detection, a metal drain pan shall be installed at the base of every vertical shaft enclosing the fuel-oil piping. Where the bottom of the shaft is located outside the fuel oil storage tank room, the drain pan shall be connected to and drained into a containment enclosure at the horizontal offset of fuel-oil piping. On the lowest level in the building, the outer containment of horizontal offsets shall be terminated inside the main storage tank room or transfer pump room. A drain pipe shall be provided from the lowest point in the containment enclosure to a minimum 55-gallon container with a leak detection alarm, arranged so as to sound an alarm and stop the transfer pump. Show all details on the Drawings.**

14. Per Section MC 1305.10, a remote control shall be provided to stop the flow of oil to any oil burner wherever located and to any oil-burning **appliances** located above the lowest floor in a building **as well as the fuel oil transfer pumps**. **Such control shall be located outside the entrance to the room in which the burner is located and as close to such entrance as practicable, except that when an outside location is impracticable, such control**

may be located immediately inside the room in which the burner is located, provided such location is accessible at all times. Per Section MC 1305.3.4, Safeties and heat detectors, appropriate safeties shall be provided so that detection of heat within the generator or equipment room shall prevent additional fuel oil from being pumped into the piping system within such room, including fusible link operated valves in the supply pipe at the suction side of the fuel oil transfer pump and in the supply pipe entering the generator, fuel oil burning equipment room or rooftop equipment enclosure. Per Section MC 1305.13.3.3, rooms containing fuel-oil tanks and fuel-oil-burning appliances shall be equipped with automatic smoke detection in accordance with Section 907 of the New York City Building Code, except that heat detectors may be utilized where, during normal operation, products of combustion are present in sufficient quantity to actuate a smoke detector. Provide multiple fusible link operated valves (in the equipment room and in the transfer pump room) to protect in case a fire develops in a remote equipment room that is not located close to the transfer pumps**. Show all remote controls, fusible links, heat detectors and smoke detectors on the Drawings.**

Relevant Conceptual Sketch for Oil Piping Schematic for Replacement Burners (to be shown on the Contract Drawings).
Note: This sketch is for the case of single fuel **biodiesel B100 Ready** oil burner.



Requirement Applies to:	New Construction	Major Modernizations	✔ Capital Improvement Projects

C. **Gas Burning Equipment (When existing gas burners or existing dual fuel gas/oil burners are retrofitted or replaced with Authority approval, the below shall apply)**

1. **Gas Meter Room, if provided, shall have explosion-proof exhaust fan, light fixtures, switches, relays and accessories.**

2. **A gas leak detection and alarm system shall be provided as detailed in Design Requirement 6.2.17.**

3. **Provide gas safety shut-off valve(s) on the gas main(s) and locate gas safety shut-off valve(s) in the gas meter room (if provided).**

6.2 Heating, Ventilation & Air Conditioning

6.2.20 Building Management System/Direct Digital Control BMS/DDC, BACnet DDC with Local BACnet Network and DDC Only Systems

Description/Design Approach:

A. Case A: Full BMS/DDC BACnet Network Connected to Central Station for New Construction (Stand-alone Buildings and Addition Projects**) and Major Modification/Substantial Reconstruction Projects

** DOE owned (non-leased) new 3K/Pre-K schools shall be connected to Central Host Control Station (CHCS).

1. Designer shall design a BMS/DDC system with a connection to the Central Host Control Station (CHCS) at Two Metro Tech Center, Brooklyn, NY. BMS/DDC system shall consist of terminal controllers, central unit controllers, network cabling, routers, BACnet servers, Cisco switches; BACnet control cabinet and wall enclosures; Portable Operator's Terminal and School Operating Console. All scheduling shall be accomplished with central BACnet based scheduler for full BMS/DDC Systems. All graphics shall be Tridium Niagara based and are to be provided by Temperature Controls Contractor (TCC). Refer to Section 15970. The bid documents **are to** utilize Section 15973.

2. BMS/DDC digital control systems shall utilize the native BACnet protocol (or be equipped with network communication modules) where applicable as defined in each of the Specification Sections. The network operating system shall be the BACnet Network Protocol. All controllers that are native BACnet (or equipped with network communication modules) that drive the valves, dampers, etc. shall be interchangeable.

3. For projects with VAV boxes in the Classrooms, design shall indicate usage of return duct monitoring relative humidity sensors and monitoring/discharge air temperature reset controlling temperature sensors to be used in the cooling mode. Per BC 1204.2, all spaces shall be maintained at 78ºF during occupied periods when the outside air conditions are at the maximum dry bulb design temperature (89ºF dry bulb, 73ºF wet bulb).

4. Designer shall design control systems that utilize night setback settings. Winter temperature setpoints shall be reset to 55°F from the 72°F day setting. For projects with VAV boxes in the Classrooms, design shall provide maximum unoccupied space temperature control to 85ºF when controlling from the north-most representative room. Single Zone Variable Air Volume (SZVAV) heat pump systems serving PA spaces shall also utilize an unoccupied space temperature control algorithm that maintains a maximum of 85ºF.

5. Designer shall design a control system with morning start up cycles that shall close the outside air intake dampers during the winter morning warm up period. Summer morning cycles and nighttime purge cycles shall purge the building with dry cooler outside ambient air before the initiation of the air-conditioning cycle if outside conditions are favorable. Summer morning purge cycle shall be followed by a recirculation only pull-down cycle.

6. The School Construction Authority will use the services of a Facility Management Systems Integrator (FMSI) for projects equipped with a full BMS/DDC network system. The FMSI for Case A projects will have the following responsibilities:

   a. Evaluate the control submissions made by the HVAC Contractor's Temperature Control Contractor (TCC) and Original Equipment Manufacturer (OEM). The FMSI will prepare a report for submission to the Architect/Engineer of Record if the **control** submission is recommended for rejection by the FMSI. The FMSI only makes recommendations. Final approval or disapproval of the submittal is made by the Architect/Engineer of Record.

   b. Attend factory inspection of central units.

   c. Oversee the installation of the field level controls and Supervisory Control and Data Acquisition (SCADA)/Human Machine Interface (HMI) System by the TCC.

   d. Oversee the commissioning of the field level controls as installed and commissioned by the TCC and the Original Equipment Manufacturer (OEM) controls as installed and commissioned by the OEM (or authorized OEM service representative).

   e. Turn over all software routines, operation manuals and access codes for the system that connects a given school to the CHCS.

   f. Connect the project school to the Department of Education Centralized Host Control Station located at Two Metro Tech Center, Brooklyn, NY.

B. Case B: <u>BACnet DDC with Local BACnet Network for small Capacity Lease and Special Program Projects and larger CIP Projects (other than small scope CIP projects that may use DDC Only systems)</u>

1. Larger CIP projects, (e.g., air conditioning for an existing school under a Noise Abatement Project, replacement/retrofit of No 2 or No 4 burner to biodiesel B100 Ready burner and replacement of terminal unit controllers in parallel, etc.) and Capacity Lease and Special Projects (Leased 3K & Leased Pre-K Program, etc.), shall be designed with a BACnet DDC with Local BACnet Network as defined in Section 15971. The central units may be equipped with non-native BACnet controllers providing that there is a gateway (communication cards) to BACnet. The terminal unit DDC controllers must be integrated into the network and shall communicate with the central equipment.

2. Central equipment (rooftop heat pump units, etc.) shall be designed with a Human Machine Interface (HMI) that can display diagnostic error codes and system information. The bid documents shall define a Portable Operator's Terminal which functions as the School Operating Console (POT/SOC) to permit operator interface to facilitate terminal controller management (and central unit controller management in addition to the central unit controller Human Machine Interface (HMI) interface), commissioning, diagnostics and general operator interface with the installed control system. The POT shall be able to connect directly to all controllers. All graphics shall be Tridium Niagara based and are to be provided by Temperature Controls Contractor (TCC). The bid documents **are to** utilize Section 15973**A**.

3. Per LL32/16, each capital project that includes the replacement/retrofit of a burner from No 2 or No 4 to biodiesel B100 Ready burners at an estimated construction cost for such replacement/retrofit of $2,000,000 or more, shall be designed and constructed to reduce

energy cost by a minimum of ten percent, as determined by the methodology prescribed in LEED v4 Energy and Atmosphere Optimize Energy Performance credit for LL32/16 projects or the New York City Energy Conservation Code, whichever is more stringent; provided that compliance with this paragraph shall not be required for LL32/16 capital projects that would be subject to this paragraph solely because such project involves replacement**/retrofit of a burner,** unless the cost of such project equals or exceeds 50 percent of the cost of replacing the heating distribution system of such building.

- Per LL32/16, each capital project that involves the installation or replacement of HVAC comfort controls systems (including repair/replacement of the central ventilation units) at an estimated construction cost for such installation or replacement of $2,000,000 or more, shall be designed and constructed to reduce energy cost by a minimum of five percent (5%) as determined by the methodology described in LEED v4 Energy and Atmospheric Optimize Energy Performance credit for LL32/16 projects or the New York City Energy Conservation Code, whichever is more stringent.

4. For BACnet DDC with local BACnet network projects, all scheduling shall be accomplished with central BACnet based scheduler.

5. There shall be no connection to the Central Host Control Station at Two Metro Tech Center, Brooklyn, NY.

6. The Authority's Facilities Management Systems Integrator (FMSI) shall be involved in the construction process.

7. The School Construction Authority will use the services of a Facility Management Systems Integrator (FMSI) for projects equipped with a BACnet DDC with Local BACnet Network. The FMSI for Case B projects will have the following responsibilities:

   a. Evaluate the control submissions made by the HVAC Contractor's Temperature Control Contractor (TCC**)** and the Original Equipment Manufacturer (OEM). The FMSI will prepare a report for submission to the Architect/Engineer of Record if the controls submission is recommended for rejection by the FMSI. The FMSI only makes recommendations. Final approval or disapproval of the submittal is made by the Architect/Engineer of Record.

   b. Unlike Capacity projects, the FMSI need not attend factory inspections for CIP projects.

   c. Oversee the installation of the field level controls and Supervisory Control and Data Acquisition (SCADA)/Human Machine Interface (HMI) System by the TCC.

   d. Oversee the commissioning of the field level controls as installed and commissioned by the TCC and the Original Equipment Manufacturer (OEM) controls as installed and commissioned by the OEM (or authorized OEM service representative).

   e. Turn over all software routines, operation manuals and access codes for the system.

C. Case C: DDC Only System without Network for Small Scope Capital Improvement Program (CIP) Projects

1. Small scope projects that will not be designed with a network shall be approved by the Authority on a project-by-project basis (e.g., replace Auditorium rooftop unit, stand-alone gym program, etc.). Refer to Section 15975.

2. Scheduling of equipment is determined by the stand-alone DDC controllers with scheduling function or through the use of time clocks as digital input into the DDC controller when the controller is an application specific controller without scheduling function.

3. Design shall not call for the installation of any Ethernet/twisted pair cables or routers, BACnet servers, Cisco switches, Cat 6 backbone risers; BACnet control cabinet or wall enclosures; or School Operating Console (SOC).

4. There shall be no graphics software installed that does trending and LAN/WAN alarming at the SOC and CHCS.

5. There shall be no connection to the Central Host Control Station at Two Metro Tech Center, Brooklyn, NY.

6. The Authority's Facilities Management Systems Integrator (FMSI) for these Case C projects will not be involved in the construction process (although they will continue to perform design reviews). The DCIM Department will assign a Commissioning Authority to oversee the commissioning of the controls. The bid documents will not utilize Section 15973 **or 15973A**.

D. General

1. Some Case B and Case C projects involve replacing essentially all of the HVAC equipment and may qualify for a full BMS/DDC system as defined above in Case A per Section 15970 under special conditions. **CIP projects involving replacement of existing BMS system are to use Section 15970.** Consult with the A&E Design Manager to verify if the specific project warrants a full BMS/DDC system.

2. Architect/Engineer of Record shall edit all associated project Specification Sections as required to be consistent with the above. Refer to Specification Sections 15970 and 15973 and Standard Detail 1598502a for full BMS/DDC Projects. Refer to Specification Section 15971 for BACnet DDC with local BACnet network and 15973**A** and Standard Detail 1598502e for local BACnet projects.

Notes:

1. According to Title 43 Chapter 10, Capital Projects for the replacement/retrofit of burners from No 2 or No 4 to biodiesel B100 Ready burners at an estimated construction cost of 2 million dollars or more are not required to also comply with the energy reduction requirements for the installation of HVAC comfort controls.

6.2 Heating & Ventilation

6.2.21 Emergency Generator and Fuel Tank

Description/Design Approach:

New Construction projects and designated Major Modernization projects shall be provided with base diesel oil storage tanks **not exceeding 330 gallons** that are integral with the electric generator. The new generator/base storage tank assemblies shall be located outdoors within close proximity to the Electrical Service Room, in a suitable enclosure.

Existing basement mounted No. 2 diesel oil storage tanks **(not exceeding 330 gallons)** and diesel oil transfer pumps (which pump up to higher floor level day tanks/generators) shall be repaired/replaced in kind for Capital Improvement projects.

For repairs/replacements to the above defined CIP project generator systems and for any New Construction project or Major Modernization project where limited site space exists for grade mounted generators with integral base tanks and where transfer pumps are used to pump up to higher floor level day tanks/generators, the following Code requirements shall apply:

1. For projects with basement mounted No. 2 diesel oil storage tanks **not exceeding 330 gallons**, per Section MC 1305.6.2 of the **2022** NYC Mechanical Code the diesel fuel oil fill lines must be located a minimum of 2 feet laterally from any building opening and 5 feet away from any subway grating. Per Section MC 1305.7.2, diesel fuel oil vent lines shall terminate outside of buildings not less than 2 feet from any building opening and not less than two feet or more than 12 feet above the fill pipe terminal**.** UL 142 tank emergency relief venting shall comply with Section MC 1305.8. Show the fill, vent and overflow piping on the Contract Drawings.

2. Diesel fuel oil piping and storage shall comply with Chapter 13 of the **2022** NYC Mechanical Code and NFPA 31.

3. Venting and Overflow Piping shall be a Two-Pipe System:

    a. Per Buildings Bulletin 2018-010, UL 142 day tanks not designed in accordance with Section MC 1305.14 and installed inside of buildings above the lowest floor (or outside on the roof), where the day tank normal and emergency vents are vented to an exterior termination point above the level at which the day tank is located, shall have the day tank overflow piped into the top of tank of the lowest floor storage tank that supplies the fuel to such tank.

    b. Per Section MC 1305.7.9, Tanks served by pumps, for tanks on any floor served by pumps, the normal vent shall be connected to the overflow pipe, shall be piped a minimum of 8 feet above the overflow pipe and terminated directly to the outdoors. A liquid sensor shall be installed in the vent of the remotely served tank in order to shut down oil supply in the event of an overflow. Per Section MC 1305.8, for tanks also having emergency vents, the design and installation of the combined normal and emergency relief vent shall be in accordance with Section MC 1305.7.

    c. Refer to Figures C101.1(1), C101.1(2) and C101.1(3) of Appendix C of the 2022 NYC Mechanical Code for the piping diagrams.

4. Per Section MC 1305.8.4, construction documents shall include calculations demonstrating that the extension of the normal and emergency vent piping is adequately sized to provide the required emergency vent flow while limiting the back pressure to less than the maximum pressure permitted by the design of the tank. Submit all calculations with the final design according to NFPA 30**-12. Note that calculations for the normal venting of UL 142 tanks are also governed by Section MC 1305.8.4 per Table MC 1305.7(2).**

5. Per Section MC 1305.9.4, **Drain pan at base of shafts with leak detection, a metal drain pan shall be installed at the base of every vertical shaft enclosing the fuel-oil piping. Where the bottom of the shaft is located outside the fuel oil storage tank room, the drain pan shall be connected to and drained into a containment enclosure at the horizontal offset of fuel-oil piping. On the lowest level in the building, the outer containment of horizontal offsets shall be terminated inside the main storage tank room or transfer pump room. A drain pipe shall be provided from the lowest point in the containment enclosure to a minimum 55-gallon container with a leak detection alarm, arranged so as to sound an alarm and stop the transfer pump. Show all details on the Drawings.**

6. Per Section MC 1305.10, a remote control shall be provided to stop the flow of oil to any oil burner wherever located and to any oil-burning **appliances** located above the lowest floor in a building **as well as the fuel oil transfer pumps. Such control shall be located outside the entrance to the room in which the burner is located and as close to such entrance as practicable, except that when an outside location is impracticable, such control may be located immediately inside the room in which the burner is located, provided such location is accessible at all times. Per Section MC 1305.3.4, Safeties and heat detectors, appropriate safeties shall be provided so that detection of heat within the generator or equipment room shall prevent additional fuel oil from being pumped into the piping system within such room, including fusible link operated valves in the supply pipe at the suction side of the fuel oil transfer pump and in the supply pipe entering the generator, fuel oil burning equipment room or rooftop equipment enclosure. Per Section MC 1305.13.3.3, rooms containing fuel-oil tanks and fuel-oil-burning appliances shall be equipped with automatic smoke detection in accordance with Section BC 907 of the New York City Building Code, except that heat detectors may be utilized where, during normal operation, products of combustion are present in sufficient quantity to actuate a smoke detector**. Provide multiple fusible link operated valves (in the equipment room and in the transfer pump room) to protect in case a fire develops in a remote equipment room that is not located close to the transfer pumps. **Show all remote controls, heat detectors, smoke detectors and fusible links on the Drawings.**

7. For ventilation of fuel oil storage rooms, see Design Requirement 6.2.14.

8. Per Section MC 1305.13.4, storage tanks with a capacity of not more than 330 gallons shall be not less than 5 feet from the tax lot line, the nearest neighboring building or other fuel oil storage tank. Designer is to show the required separation distance of the tanks from other buildings, other tanks and lot lines on the Drawings.

9. Generator Location: The 2022 Mechanical Code defines appliances as follows, "APPLIANCE, FUEL-FIRED. An appliance that burns solid, liquid and/or gaseous fuel, including but not limited to wood stoves, household cooking ranges, furnaces, boilers, water heaters, clothes dryers and gas-fired refrigerators."

a. **Emergency generators are not considered appliances but rather are internal combustion engines; hence the appliance outlet termination requirements of Section MC 801.21 do not apply to emergency generators.**

b. **For the exhaust from internal combustion engines (not appliances) per Section MC 811.2, the location of discharge outlets for emergency and standby internal combustion engines shall comply with the requirements of NFPA 37 so that the flue gases are not directed to jeopardize the health or safety of people, overheat combustible structures, nor enter building openings in the vicinity of the outlet, nor shall the location of such openings cause the condensate leaving the outlet to come into contact with people.**

   1) **Per Section MC 811.2.1, Interference, no discharge opening shall be located and constructed so as to interfere with the proper functioning of other openings in the same building or adjoining buildings, to interfere unreasonably with the occupants of the same building or adjoining buildings, or with the general public, or to create a fire or health hazard.**

   2) **Per Section MC 811.2.2, Chimneys, the exhaust pipe may be connected to a chimney used for other equipment, provided that the operation of the engine does not adversely affect the operation of the other equipment so that it is in violation of the New York City Air Pollution Control Code.**

c. **Designer is to layout the location of the generator exhaust to be in compliance with Section MC 811.2.**

d. **Refer to Electrical Design Requirement 7.1.2 for the noxious generator outlet termination requirements that must be in accordance with Section MC 501.3.1.**

6.2 Heating & Ventilation

6.2.22 Kitchen Ventilation

Description/Design Approach:

A. General

1, Note that the term 'Kitchen' as used in this Design Requirement applies to full cooking Kitchens, Therm and Hold Kitchens and Warming Pantries and the requirements indicated generally apply to all those spaces, except where specific requirements for the Therm and Hold Kitchen and Warming Pantry are so indicated. This Design Requirement also applies to Cafetorium spaces (very rarely used) and thus references to Cafeteria throughout this document would apply to both spaces.

2. This Design Requirement addresses two different design approaches:

Case 1: A combination Cafeteria heat pump unit or combination dual temperature (DT) unit served by air to water heat pump chiller/heater where the combination unit also serves the Kitchen for general Kitchen HVAC and provides makeup air for the Kitchen hood. Designs based on air to water chiller/heater usage require Authority approval considering the costs and additional complexity of the controls.

Case 2: A dedicated separate heat pump unit or combination dual temperature (DT) unit is provided for the Cafeteria and a dedicated makeup unit is provided for the Kitchen.

3. Case 1 is the SCA's preferred design approach **at this time, as it is slightly less expensive**. Case 2 **is the** more suitable design approach for **when** certain projects **are likely to exceed 70 kBTU/SF, as there is a substantial EUI savings,** and is subject to approval by the Authority. For addition projects when the Kitchen serves the existing building population as well as that of the new Addition, **Case 2 shall be implemented, as past projects have demonstrated the 70 kBTU/SF will be exceeded.** The Case 2 separate units is **slightly** more expensive as compared to the combination Cafeteria/Kitchen units used in Case 1, as there are two units instead of one (though smaller), two required electrical feeder sets, two dunnages, etc.

B. Design Features Common to Both Case 1 and Case 2:

1. Cafeteria Single Zone Variable Air Volume (SZVAV) heat pump units or DT units are required per Section 6.5.3.2 of ASHRAE 90.1-2016 when capacity of the DX heat pump system exceeds 65,000 BTUH and when the fans of the DT air handling units exceed 1/4hp.

2. Demand Controlled Ventilation (DCV) is to be employed in both cases and is addressed in Section 6.4.3.8 of ASHRAE 90.1-2016 and Section C403.7.1 of the 2020 NYCECC.

3. The Cafeteria unit shall be provided with supply and exhaust fans; outside air intake, exhaust and recirculation dampers; heat pump DX or DT cooling coils **that also function as** heat pump DX or DT coils for tempering in the heating season. Additionally, electric resistance coils shall be provided in the DX heat pump and DT unit. Note that the Kitchen hood exhaust

air and general Kitchen exhaust air shall not be returned to the Cafeteria DX heat pump or DT unit.

4. The Cafeteria SZVAV DX heat pump or DT unit provides Cafeteria cooling and ventilation. In the heating mode, the SZVAV unit is decoupled. The Cafeteria space heating loads are met by a recessed convector terminal heating system (recessed electric convectors for DX SZVAV applications or recessed hot water convectors for DT SZVAV air handling unit applications).

5. Air is exhausted from the Kitchen via various dedicated exhaust fans. The Can Washroom is served by a constant-speed exhaust fan that is scheduled to operate in the occupied mode and disabled during the unoccupied mode. The HVAC Designer shall size Can Washroom exhaust for 10 ACH (nominally 250 cfm). The Staff Toilet is served by a constant-speed exhaust fan that operates intermittently from a DDC schedule (ON during occupied hours and OFF during unoccupied hours). The Kitchen is served by the Kitchen General Exhaust Fan (KGEF) that operates from the same DDC schedule controlling the operation of the combined Cafeteria/Kitchen SZVAV unit or DDC schedule controlling the operation of the dedicated makeup unit. The Hood Exhaust Fan is manually operated through a local switch mounted in the Kitchen and is designated as the Dietician's Switch. Whenever the Kitchen is performing cooking-related activities, the Hood EF must be activated. When the Hood EF is activated, the KGEF is de-activated and electrically interlocked main gas valves (when electric induction cooking, the SCA standard, is not utilized) are opened to allow cooking. When the Dieticians switch in the OFF position, the main gas solenoids of the Kitchen equipment burners (when electric induction cooking is not utilized) shall be de-energized (via hard wired interlock between the solenoids and the Hood exhaust fan). A method of interlocking between an exhaust hood system and appliances equipped with standing pilot burners shall not cause the pilot burners to be extinguished. When electric induction cooking is utilized, cooking appliances shall be de-energized until the hood exhaust is proven and then cooking shall be permitted.

6. Heat from the compressors of the various Kitchen reach-in equipment is produced twenty-four hours a day, seven-days a week. In addition to functioning in the Occupied modes, the General Kitchen exhaust fan with exhaust grilles located above or in the vicinity of the heat-producing equipment shall be provided for air exhaust during the unoccupied mode of the Case 1 combined Cafeteria/Kitchen SZVAV unit and for the unoccupied mode of the Case 2 separate units should the dedicated makeup air unit fail and the Kitchen space temperature rise. This KGEF shall be equipped with a motorized back-draft damper and shall be thermostatically controlled from the DDC system as sensed by the Kitchen temperature sensor. The KGEF shall operate in the unoccupied mode when the room temperature exceeds 87°F (adjustable). Makeup air for this exhaust fan shall be drawn from the Kitchen by infiltration.

7. The Case 1 combined Cafeteria/Kitchen unit and Case 2 dedicated SZVAV unit for the Cafeteria and dedicated makeup unit for the Kitchen sequence of operation is defined in Standard Specification 15985.

8. During the unoccupied period, the Cafeteria SZVAV units will utilize 85ºF temperature setup. The Cafeteria shall be provided with space monitoring relative humidity sensor(s) and a hardwired space temperature sensor. The space temperature sensor shall control the Cafeteria SZVAV unit during unoccupied time periods. The Cafeteria SZVAV unit shall be provided with a return air duct monitoring relative humidity sensor and return air duct

mounted temperature sensor. The return duct temperature sensor shall control the unit during occupied time periods.

9. In the non-cooking mode, the Kitchen general exhaust fan plus Can Washroom exhaust fan plus Staff Toilet exhaust fan shall exhaust all the air provided to the Kitchen, plus 10% more to provide negative Kitchen pressurization. In the cooking mode, the Kitchen hood exhaust fan plus Can Washroom exhaust fan plus Staff Toilet exhaust fan shall exhaust all the air provided to the Kitchen plus 10% more to provide negative Kitchen pressurization. Refer to Table MC 403.3.1.1 of the 2022 NYC Mechanical Code and provide a minimum of 0.7 cfm/sf. The Kitchen exhaust hood shall exhaust all cooking grease laden vapors/odors. At any given time, the Kitchen ventilation requirements will be the sum of the general Kitchen exhaust fan (or Kitchen hood exhaust fan) plus the Can Washroom exhaust fan plus the Staff Toilet exhaust fan.

10. Ceiling diffusers and wall grilles shall be spaced to avoid air stagnation and stratification and to provide a maximum forty (40) feet per minute air impingement velocity when the air moves past occupants to comply with ASHRAE 55-10. A displacement ventilation air system shall be used for hood makeup in that remote supply diffusers (and for the case of the combined Cafeteria/Kitchen unit, the transfer duct from the Servery area of the Cafeteria to the Kitchen) shall provide the makeup air for the hood. Hoods that have integrated supply ducts shall not be used. Diffusers shall be selected and located to achieve a maximum terminal velocity of 50 fpm at the hood. Standard diffusers shall not be used in the immediate area of the hood to maximize the capture and containment of cooking grease laden vapors/odors and minimize effluent spillage. Refer to Section 6.5.7.2 of ASHRAE 90.1-2016.

11. Final LL**51**/**23** energy code compliance and compliance with the NYC Green Schools Guide shall be demonstrated by project specific energy modeling.

12. Temperature Set Points:

    a. Inside Occupied Kitchen design temperatures: 72°F Winter, 82°F Summer for Case 1 combined Cafeteria/Kitchen unit case; 78°F Summer for Case 2 dedicated Kitchen makeup unit case.

    b. Inside Occupied Cafeteria design temperatures: 72°F Winter, 78°F Summer.

13. Floor mounted exposed cabinet heaters and fan coil units shall not be installed inside the Kitchen area.

14. Kitchen grilles, diffusers and any other devices and apparatus used for air distribution must be flush and compatible with the panel ceiling.

15. Commercial Kitchen hoods are subject to the Special Inspection as defined in Section BC 1705.21 of the 2022 NYC Building Code (Special Inspection for Mechanical Systems) and Section MC 507.

16. Per Section MC 507.6, a performance test shall be conducted upon completion and witnessed by a representative of the Fire Department before final approval of the installation of a ventilation system serving commercial cooking appliances.

17. Per Section MC 506.3.13.3, exhaust outlets serving Type I hoods (Kitchen hoods for collecting and removing grease vapors and smoke) shall be located not less than 10 feet horizontally from parts of the same or contiguous buildings, adjacent buildings and adjacent property lines and shall be located not less than 10 feet above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet horizontally from and not less than 3 feet above air intake openings into any building. Exception: Exhaust outlets shall terminate not less than 5 feet horizontally from parts of the same or contiguous building, an adjacent building, adjacent property line and air intake openings into a building where air from the exhaust outlet discharges away from such locations. The Designer is to verify that the location of the Kitchen exhaust outlets on the bid drawings complies with the above.

18. For schools of less than 300 students (typical of 3K and Pre-K projects), a Warming Pantry that utilizes commercial mobile heated carts that hold flat aluminum food trays for food cooked off-site are used. The general HVAC system serving the Warming Pantry is to be sized to remove the heat/moisture from the mobile carts.

19. For schools of 300 or more but less than 400 students, a Kitchen that utilizes fixed commercial Therm and Hold units that hold flat aluminum food trays are used. Provide commercial Type II condensate hoods ducted to the outdoors over the Therm and Hold units.

20. Air balance per Section MC 508.1.2 requires design plans for a commercial Kitchen ventilation system that include a schedule or diagram indicating the design air balance of the Kitchen and all communicating spaces clearly indicating makeup, transfer, exhaust, and infiltration airflow rates. Negative pressurization caused by the Kitchen exhaust system shall not cause improper operation of systems in communicating spaces or cause door opening forces in the building to exceed the limits set forth in Chapter 10 of the 2022 NYC Building Code.

C. Unique Design Features for Case 1:

1. Per the energy modeling performed as the basis for the SCA Standards, the combination unit utilizes Demand Controlled Ventilation (DCV) but only in the non-cooking mode. In the cooking mode, the amount of outdoor air delivered to the Cafeteria may not be reduced even if the Cafeteria is vacant since that Cafeteria air must be transferred to the Kitchen.

2. The Kitchen hood exhaust fan shall be a constant volume unit.

3. The Cafeteria unit does not employ an energy recovery wheel since the amount of air transferred to the Kitchen and not returned to the Cafeteria unit is significant and hence usage of an energy recovery wheel is not justified.

4. The Kitchen is cooled by hard ducting supply air from the combination Cafeteria/Kitchen unit to the Kitchen and transferring air from the Cafeteria to the Kitchen.

5. The Kitchen space heating capacity is to be provided by a duct-mounted hot water heating coil in the duct serving the Kitchen for DT SZVAV air handling unit applications. For DX SZVAV applications, Kitchen space heating shall be provided by flush ceiling mounted electric cabinet unit heater.

6. During the occupied modes, air is returned to the combined Cafeteria/Kitchen SZVAV unit solely from the Cafeteria area, while air from the Kitchen is vented outside through various

exhaust fans serving the Kitchen area. Makeup air for the exhaust fans is supplied by the combined Cafeteria/Kitchen SZVAV unit via supply air diffusers and a transfer grille in the wall between the Cafeteria Servery and Kitchen.

7. The details of the control hardware required are contained in Standard Specifications 15970/15971 and are shown on standard detail control drawings 1598512k and 159858l, which also contains the DDC point lists.

8. Table 6.5.7.2.2 of ASHRAE 90.1-2016 (more conservative than Section MC 507.5) shall be followed if hood exhaust exceeds 5,000 cfm when determining the Kitchen hood maximum allowable net exhaust flow rate. The Exception where Table 6.5.7.2.2 does not apply is if 75% or more of the total makeup replacement air is transferred to the Kitchen from otherwise exhausted Cafeteria air. The Designer is to check the ratio of what is transferred to the Kitchen compared to the total of the air hard ducted to the Kitchen plus the air transferred to the Kitchen.

D. Unique Design Features for Case 2:

1. The dedicated Cafeteria unit utilizes Demand Controlled Ventilation (DCV) always regardless of if cooking is being done in the Kitchen or not since makeup air need not be transferred to the Kitchen and the makeup unit provides 100% of the makeup air requirements for the various exhaust fans serving the Kitchen area.
2. The Kitchen hood exhaust fan shall be a variable volume unit.
3. The Cafeteria unit employs an energy recovery wheel since air need not to be transferred to the Kitchen and air is exhausted by the Cafeteria unit.
4. The Kitchen is cooled by dedicated Kitchen makeup unit.
5. The Kitchen is heated by an all-air system where the makeup unit provides warm air to meet the Kitchen space heating loads.
6. During the occupied heating and cooling modes, the makeup unit provides 100% outdoor air and in the unoccupied heating and cooling modes, the makeup unit is a 100% recirculating unit. The Kitchen makeup unit is coupled both in cooling and heating and employs supply air temperature reset when at partial load conditions.
7. The details of the control hardware required are contained in Standard Specifications 15970/15971 and are shown on the standard detail control drawing 1598512o, which also contains the DDC point lists. Refer to Section 15860 for the variable volume hood controller and Section 15943 for the dedicated makeup unit.
8. Table 6.5.7.2.2 of ASHRAE 90.1-2016 (more conservative than the Section MC 507.5) shall be followed if hood exhaust exceeds 5,000 cfm when determining the Kitchen hood maximum allowable net exhaust flow rate.

6.2 Heating & Ventilation

6.2.23 Ventilation Requirements for the Compressor Room of the Kitchen Walk-In Units

Description/Design Approach:

The Compressor Room (if any) for the Kitchen Walk-in Refrigeration Equipment shall be provided with a ventilation system to control the room temperature. The ventilation system shall be designed to mechanically exhaust at least 1100 CFM per remote condensing unit horsepower. In Kitchens, where the Compressor Room is located in the central area of the Kitchen, the ventilation system shall include but not be limited to exhaust ductwork, exhaust louver on an exterior wall or goose neck on roof, motorized backdraft damper, exhaust fan and adjustable control thermostat. Makeup air for the Compressor Room shall not be drawn from the Kitchen. Makeup air must be available 24/7 and shall be drawn from the ambient.

The preferred alternate (other than the Compressor Room location) is to locate the air-cooled condensing units on a slab on grade or roof mounted in a secured (caged) location. A secondary preferred alternate (other than the Compressor Room location) is to locate the air-cooled condensing units for the walk-in units above the walk-in units themselves at the ceiling level. This ceiling space in turn must be ventilated.

6.2 Heating & Ventilation

6.2.24 Kitchen Storeroom HVAC Requirements

Description/Design Approach:

A temperature of between 50°F - 70°F shall be maintained inside the food storage rooms by using an electrical heat pump system with the outdoor unit located next to the walk-ins air cooled condensing units, if the walk-ins condensing units are mounted outside in a caged (secured) location. If not, the electric heat pump outdoor unit shall be in a separately secured location. **For projects equipped with BMS/DDC system, Temperature Controls Contractor (TCC) shall provide both space temperature sensor and space relative humidity sensor and TCC shall integrate sensors into the BMS/DDC network.**

6.2 Heating, Ventilation & Air Conditioning

6.2.25 HVAC Acoustical Standards

Description/Design Approach:

A. The following are the maximum background sound level criteria to be produced by HVAC systems, expressed in terms of A-weighted sound levels.

LOCATION	A-WEIGHTED SOUND LEVEL (dBA)	APPROXIMATE NOISE CRITERION (NC) EQUIVALENT
General Circulation/Lobby Areas	50	45
Principal's Office (Private Offices)	40	35
General Office (Open-Plan Areas)	45	40
Cafeteria	50	45
Cafetorium	35	30
Toilets	55	50
Storage/Work Rooms	55	50
Music Teaching Studios	30	25
Music Practice Rooms	40	35
Classroom Grades 3K through 12*	40	35
Gymnasium	45	40
Gymatorium	35	30
Kitchen**	55	50
Auditorium	30	25
Staff Cafeteria	45	40
Library	45	40
Conference Rooms	40	35
TV Studios	30	25
Labs	45	40

* NC-35 (40 dBA) may not be achievable with ducted floor mounted VRF units and ducted vertical unit ventilators employed in buildings with limited slab-to-slab heights. Designer to investigate locating the units in acoustically lined closets/enclosures and utilizing sound attenuators or duct lining for the supply air. NC-35 (40 dBA) is required for projects required to comply with the 2019 NYC Green Schools Guide. For projects not required to comply with the NYC Green Schools Guide, (Refer to DR 1.3.1.10), the maximum acceptable sound power levels are NC-40 (45 dBA), consistent with the prior GSG version based on LEED Version 3.

** NC Level for kitchen is to be attempted but may not be achieved due to kitchen hood.

B. In general, noise is generated by mechanical equipment that serves the space as well as intruding noise that originates from adjacent spaces due to other mechanical equipment, vehicles, rail and aircraft sources. The above noise criteria values are the standards to be met when continuous background HVAC noise is present. Transient noise generated from traffic and aircraft sources are not included in the above noise criteria.

C. Duct and terminal velocities shall not exceed the following in feet per minute, based on rectangular ductwork(2).

	Max Terminal Velocity At Grille(1)	Velocity10' Upstream(2)	Velocity20' Upstream(2)	Velocity30' Upstream(2)
NC-25 Supply	350	425	550	700
NC-25 Return	425	500	650	800
NC-30 Supply	425	500	700	850
NC-30 Return	500	600	800	950
NC-35 Supply	500	600	800	1000
NC-35 Return	600	700	900	1150
NC-40 Supply	600	720	960	1200
NC-40 Return	720	840	1080	1380

(1) All grilles, registers, and diffusers shall be selected according to the manufacturer's published ratings for 10 points less than the established room background noise criteria.

(2) Velocities are based on rectangular ductwork located within the space. Velocities for round ductwork can be increased by a factor of approximately 1.7. Ductwork velocities when above lay-in ceilings can be increased by a factor of approximately 1.2. Final velocities are to be as recommended by acoustical consultant.

D. All noise sources and construction types shall be considered in determining the composite background noise in a space. Noise from fans, ducts, multiple diffusers/registers, VAV boxes, and duct fittings shall be considered. Structure-borne noise resulting from isolator transmissibility shall also be considered.

E. Where possible, all volume dampers and all VAV boxes shall be provided 5 to 10 duct diameters upstream of the terminal inlets and outlets. The duct length between the supply duct and volume damper or VAV box shall be 4 duct diameters in length where possible. The minimum length of this portion of ductwork shall be 2 feet.

F. Ceiling diffusers and ceiling return grilles shall not be provided with opposed blade dampers when a lay-in acoustical ceiling or gypsum ceiling equipped with access doors is provided. Each ceiling diffuser and ceiling return grille shall have a dedicated accessible volume damper installed in its branch. Ceiling diffusers and ceiling return grilles shall only be equipped with opposed blade dampers (in lieu of branch volume dampers) when it can be demonstrated that space constraints preclude the installation of branch volume dampers. Wall supply and return registers may be equipped with opposed blade dampers in lieu of branch volume dampers if access cannot be provided for branch volume dampers.

G. Sound traps (duct silencers) shall be specified for all VAV boxes in order to meet the noise criteria. Sound traps shall have double wall construction with perforations on the inner wall. Tedlar lining shall be loosely applied over the perforations to guarantee that the acoustical lining in between the double walls of the sound trap does not become airborne. An alternate to the Tedlar lining is to have the acoustical insulation sealed in poly plastic bags so that it cannot become airborne. Architect/Engineer of Record's Acoustical Consultant shall determine what the maximum cfm can be for non-fan powered boxes. When VAV boxes are utilized, non-fan powered boxes (conventional) shall be utilized in lieu of fan powered boxes. If fan powered boxes are used in special cases, (e.g., HS Science Labs, HS Prep Rooms, IS Prep Rooms, Music Rooms***, Libraries***) the maximum cfm delivered from any one fan powered VAV box shall not exceed 1200 cfm. If fan powered boxes are used in special cases, multiple fan-powered VAV boxes shall be used for spaces requiring more than 1200 cfm.

*** Fan powered VAV boxes with electric reheat coils shall be used in lieu of electric baseboard in spaces equipped with bookshelves/furniture that impede the functioning of electric baseboard.

H. Heat pump central units **or, when approved by the Authority, Dual Temperature (DT) air handling units served by air to water heat pump chiller heaters,** shall be provided with integral acoustically lined plenums (only if recommended by Acoustical Consultant) on the return and supply sides. Plenums shall be double walled and lined with rigid fiberglass boards that shall not erode. Inner walls shall have perforations to absorb the sound energy.

I. Duct acoustical lining may only be used (in addition to duct silencers) if the usage of duct silencers alone fails to provide acceptable noise levels, if space constraints preclude the sizing of the ducts to provide the low velocity levels as specified above or if the unit does not have enough static pressure capability to supply the air through the duct silencer.

1. If any fiberglass duct lining is used, it shall be covered with a matte-faced neoprene covering and sealed with an acrylic polymer. Surface burning characteristics shall have a flame spread index less than 25 and smoke developed index less than 50 per ASTM E84. Lining shall be secured with adhesive and pins or mechanical fasteners. Lining that is secured with adhesive only is not acceptable. Fiberglass lining shall conform to the erosion test method described in UL Publication No. 181. The fiberglass lining shall not support fungi or bacterial growth as per ASTM C1338, ASTM G21, and ASTM G22.

J. Conventional ceiling diffusers shall be employed as the standard diffusers (for projects using VAV boxes in Classrooms). If linear supply diffusers are used in special cases **(when the heating load exceeds 250 BTUH/LF but is less than or equal to 450 BTUH/LF and Vertical Unit Ventilators or split/VRF units are used that are floor mounted or ducted above the ceiling units)**, their integral plenums shall be provided with factory applied internal acoustical lining.

K. VAV boxes may be lined with fiberglass providing the fiberglass is covered with a matte facing and sealed with an acrylic coating.

L. All equipment subject to vibration shall be mounted on vibration isolators. Architect/Engineer of Record shall determine if the factory provided isolators sufficiently attenuate the vibration considering the flexibility and nature of the floor or structural roof (beam frame spacing, deck construction, etc.). If it is determined that the factory provided isolators are insufficient, equipment shall be provided without factory vibration isolators (or shipping hold down bolts shall remain secured, thus defeating the factory isolators). Architect/Engineer of Record shall define the required field erected vibration isolators (stiffness, static deflection, etc.) and reflect the field erected isolators on the Schedule of Equipment on the Drawings. Architect/Engineer of Record's vibration analysis shall be submitted to their acoustical sub-consultant for review.

M. Contractor's registered professional engineer shall be responsible for the seismic restraints of all equipment. Contractor's registered professional engineer may elect to provide the equivalent vibration isolators in combined vibration isolator/seismic restraint supports.

N. If determined as needed by the Acoustical consultant**,** the design package shall call out for the isolation of ducts using spring and/or neoprene hangers for at least fifty feet from the vibration isolated equipment.

O. The design package shall call out for airtight fabric necks at the inlet and at the outlet connections of all heat pump **and DT** units, supply fans and exhaust fans and where ductwork connects to vibration isolation equipment.

P. Mechanical equipment located outside of the building in a yard, court, on a roof, or where the equipment opens to the exterior of the building, shall be subject to the noise output limitations defined in Section MC 313.2.1 of the 2022 NYC Mechanical Code. The designer shall select and design any such exterior mechanical equipment in order to achieve compliance with the applicable requirements of Sections 24-218, 24-227, 24-228 and 24-232 of the Administrative Code, also known as the New York City Noise Control Code, in accordance with generally acceptable engineering practices. Per Section MC 313.2.2, the operation of such exterior mechanical equipment shall comply with any applicable requirements of Sections 24-218, 24-227, 24-228 and 24-232 of the New York City Noise Control Code, as enforced by the Department of Environmental Protection..

Q. Per Section MC 313.3, minimum structure-borne noise and vibration isolation requirements, all isolators shall comply with the requirements of Sections MC 313.3.1 through 313.3.10. Where vibration isolation of equipment and appliances is employed, supplemental restraint shall be used to accomplish the support and restraint.

Exception: When specified by the registered design professional, the requirements of Sections MC 313.3.1 through 313.3.10 may be modified provided that the equipment, appliances, and supports shall be designed and installed so that continuous or intermittent vibration transmitted to structural slabs shall not exceed 5,600 micro-inches per second for frequencies between 8 Hz and 80 Hz in the affected Group E occupancy space.

For the purposes of this exception, transmitted vibration shall be in accordance with the following parameters:
1. The peak third-octave band RMS velocity measurements.
2. The method shall be in accordance with ANSI/ASA S2.71-1983.

Designer of Record's Drawings shall refer to Section BC 1705.21.3, Item 8.4, for the Vibration Isolation Installation Special Inspection requirements for exterior mechanical equipment.

R. Architect/Engineer of Record shall engage the services of an acoustical consultant during the design of the project. The report findings of the acoustical consultant shall be submitted to the Authority. Acoustical consultant shall address the <u>possible</u> need for the following (including but not limited to):

- The need for sound traps or acoustical lining upstream and downstream of the heat pump **or DT** units
- The need to utilize integral elbow type sound attenuators in the supply and return air plenums of the heat pump **and DT** units
- The need to utilize elbow type sound attenuators connected to the return grilles
- Locating the units over non-critical spaces where possible (e.g., corridors, storage spaces)
- Usage of 16-gauge steel ductwork both upstream and downstream of the heat pump and air conditioning units
- Usage of 2-inch thick acoustical lining in lieu of 1-inch thick lining
- The need to run unit ductwork externally on the roof
- The need to enclose the ducts within gypsum construction
- The need to provide acoustic noise barrier walls around the rooftop units in special circumstances
- The need to provide floating slabs
- The need to lower the nominal maximum flow of 1200 cfm per fan-powered VAV box based on the box location
- The possible acceptability of exceeding the nominal maximum flow of 1200 cfm per fan-powered VAV box.
- The need to use gypsum suspended ceilings with adhesively applied acoustical ceiling tiles in lieu of lay-in suspended ceilings
- The need to use double layer gypsum suspended ceilings in lieu of lay-in suspended ceilings

The Architect/Engineer of Record (through Acoustical Sub-Consultant) shall also define the maximum permissible sound power levels for the outdoor units by specifying the radiated, supply discharge, and return inlet noise levels and reflecting those values in the unit specifications for the project. The maximum permissible sound power levels shall be based on specific project

conditions (nature of unit mounting, deck construction, presence of suspended ceiling, ceiling attenuation class of suspended ceiling, ductwork routing, possible ductwork acoustical lining, sound trap attenuation characteristics, etc.).

S. Heat pump units shall be provided with the following (if required as determined by the Architect's/Engineer's Acoustical Consultant):

- Condenser fans with variable frequency drives and/or fan staging
- Internal isolation of all rotating components if acceptable considering the floor or roof flexibility
- Insulation of void spaces within roof curbs (where curbs are used in lieu of dunnage)
- Condenser fan casings
- Acoustically lined double walled outdoor air intake, condenser air intake, and exhaust air hoods
- Individual acoustical jackets for each compressor

6.2 Heating & Ventilation

6.2.26 HVAC Seismic Design Criteria

Description/Design Approach:

A. As per Section BC 1613.1 of the **2022** NYC Building Code, every new school building structure, and portions thereof, including nonstructural components (architectural, MEP, fire protection) that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with **ASCE 7-2016**, excluding Chapter 14 and Appendix 11A. The Seismic Design Category will be determined by the structural Engineer of Record and indicated on the structural drawings.

B. Per Section BC 1601.2.3, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 NYC Building Code and interpretations by the Department of Buildings relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including for the bracing of mechanical systems and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** NYC Building Code or reference standard RS 9-6 of the 1968 NYC Building Code.

1. If an existing building is required to meet seismic requirements as per the criteria described in DR 3.1.3 and a waiver from the Department of Buildings (DOB) cannot be obtained, the HVAC retrofit work must then meet such requirements.

C. For new addition projects, any items in the existing building shall also meet the seismic requirements of the addition if they are integrated with systems in the new addition that are required to function after an earthquake. All equipment in the existing building utilizing gas shall be seismically braced. This includes boilers, rooftop units etc. Existing bolting of equipment to its pad and doweling of pad to floor slab shall be analyzed. Coordinate with Plumbing and Drainage Design Requirement 6.1.13. Note that Kitchen equipment and Science Lab gas equipment are not mandated to be braced.

D. New School Buildings and Additions constructed after LL17/1995 went into effect are subject to the seismic requirements of the New York City Construction Codes and are considered Risk Category III, “Buildings and other structures that represent a substantial hazard to human life in the event of failure” for seismic design as per BC Table 1604.5.

1. Seismic Design Category shall be determined by the project structural engineer. The Seismic Design Category for a structure is determined in accordance with Section BC 1613. The Seismic Design Category is to be indicated on the Structural Drawings (Refer to Detail 0100054a) and Component Importance Factors related to HVAC shall be indicated on the Mechanical drawings. (Refer to Standard Detail 1550301a).

2. Component Importance Factors (I_p) are prescribed in **Chapter 13 of** ASCE 7**-16**. The default value for typical components in normal service is I_p=1.0. The following components have I_p=1.5 (Refer to Standard Details 1550301a for a specific listing of common items):

a. Life safety components required to function after an earthquake. Per Section BC 909.10.6, this includes emergency generator/standby generator systems connected to a smoke control system, smoke control fans, **ducts, motor control centers, starters, controls**, etc. Functioning after an earthquake means just long enough to evacuate the building as opposed to functioning as a disaster relief center. **Per** Section 13.2.2 **of ASCE 7-16**, active mechanical and electrical equipment that must remain operable following the design earthquake ground motion shall be certified by the manufacturer as operable whereby active parts or energized components shall be certified exclusively on the basis of approved shake table testing in accordance with Section 13.2.5, analysis or experience data in accordance with Section 13.2.6, unless it can be shown that the component is inherently rugged by comparison with similar seismically qualified components. Evidence demonstrating compliance with this requirement shall be submitted for approval to the Authority after review and acceptance by the Contractor's registered design professional.

b. Components with hazardous content. This includes materials that are highly toxic or potentially explosive and in sufficient quantity to pose a significant life safety threat to the general public if uncontrolled release were to occur. Schools typically do not contain these materials, but for seismic purposes (calculation of the seismic design force, restraint and anchorage design) fuel oil, steam piping and connected appliances such as boilers and rooftop units are to be designed as such. Note that equipment such as boilers and rooftop units need not function after an earthquake. Laboratory exhaust systems need not function after an earthquake since the Labs are rated as Occupancy E (Occupancy B if exceed 10% of the story area) and not Occupancy H spaces (unless the maximum allowed storage quantities as defined in Section **BC 427.7** are exceeded). Acid Storage Room exhaust fans need not function after an earthquake since the Acid Storage Rooms are rated as Occupancy S-1 if all of the conditions of Section **BC 427.9** are met. Per Section **BC 427.8**, Acid Storage Rooms not in compliance with the provisions of Section BC **427.9** for the laboratory chemical quantity limitations shall be classified as Group H (hazardous) occupancy and would then be assigned an Importance Factor of I_p=1.5.

c. Components containing hazardous or flammable materials in excess of the maximum allowable quantities for open systems listed in Section BC 307.

d. Components with I_p=1.0 located above or in proximity to components with I_p=1.5 which could damage the I_p=1.5 equipment shall be braced.

3. For Seismic Design Category B, all mechanical components are exempt from seismic requirements.

4. For Seismic Design Category C, all mechanical components with I_p=1.0 are exempt from seismic requirements.

5. For Seismic Design Category C, all mechanical components with I_p=1.5 shall be designed and constructed to seismic requirements.

6. As per paragraph **13.6.6** of ASCE 7-**16,** all ductwork in Seismic Design Category C with I_p=1.5 shall be seismically braced.

Per Section 13.4.6, C-type beam and large flange clamps are permitted for hangers provided they are equipped with restraining straps equivalent to those specified in NFPA 13, Section 9.3.7.

7. Appropriate seismic coefficients to be utilized in the design of seismic resistance for the mechanical system shall be those listed in Table 13.6-1 of ASCE **7-16**.

8. When seismic design is required, generic seismic bracing details shall be shown on the Contract Drawing bid set. A note shall be added stating, “Details are shown to illustrate the scope of work. Contractor’s registered professional engineer shall provide calculations and be responsible for providing signed/sealed coordinated shop drawings indicating locations of seismic braces and the required connection details to file with the DOB/BCC”.

9. All bracing devices shall be qualified either through analysis **or** be tested and certified in accordance with ICC-ES AC 156. Local NYC accelerations are to be used when computing seismic inertia forces. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to seismic bracing designs must be stamped by the Contractor’s Registered Professional Engineer with at least five years of seismic design experience in non-structural building components in New York State.

10. All attachments of hangers and bracing shall be positive attachments that shall be cast in place anchors, drill in wedge anchors, or a welded or bolted connection to structure. Drill in wedge anchors shall be epoxy adhesive based and shall have an evaluation report number from ICC-ES verifying their allowable loads. Anchors must be certified for use in cracked concrete.

E. The following note is to be included on the HVAC drawings in relation to HVAC items:

"For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a Professional Engineer licensed in the State of New York engaged by the Contractor. The Engineer shall provide installation supervision of all seismic supports and restraints. The Contractor’s Registered Professional Engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings."

6.2 Heating & Ventilation

6.2.28 HVAC Design Requirements for Special Spaces

Description/Design Approach:

A. Main Telecom Room and Intermediate Telecommunications Closets

1. Provide a dedicated ductless VRF heat pump system that shall maintain a 75°F space temperature, and a maximum of 55% relative humidity, 24 hours a day, 7 days a week in accordance with ANSI/TIA/EIA – 569 - A.

    a. When a full BMS/DDC system is provided per Section 15970 or when a local BACnet/DDC system is provided per Section 15971, space temperature sensors and space relative humidity sensors (which only monitor) shall be located in the Main Telecom Room, and in all Intermediate Telecom Closets. Space temperature sensors and space relative humidity sensors shall be integrated into the BMS/DDC system and BACnet DDC with Local BACnet Network. In those cases where the allowable elevation difference between the air-cooled condenser unit and most remote DX fan coil unit exceeds the manufacturer's limitations, a rooftop packaged unit or indoor water-cooled packaged air conditioning units (with dry cooler, one packaged unit per space) may be considered as acceptable alternate designs. Refer to Specification Sections 15781 and 15783.

    b. The Engineer of Record (EOR) shall submit cost analysis during the schematic phase of the design to justify their choice of the HVAC system when a dedicated ductless VRF system is not the basis of the design.

2. Per NYC DOE DIIT School Standards dated 10/11/23, large schools with more than 1500 students shall have the air conditioning equipment capacity for the Main Telecom Room sized to handle a load of 34,000 BTUH. For medium-sized schools with 40 to 1500 students, the air conditioning equipment capacity for the Main Telecom Room shall be sized to handle a load of 24,000 BTUH. These capacities shall account for the following loads:

    a. Equipment located in the Project Connect Rack
    b. Content Delivery Network
    c. Internet Protocol Digital Video Surveillance (IPDVS)
    d. BACnet Building Management System
    e. IP TV (IP Broadcast Server, Program Manager, and switches)
    f. IP Telephony
    g. Clock system

3. EOR shall also include the loads associated with the Sound System Cabinet (designed by the EOR).

4. Consider any transmission loads, infiltration loads, loads from the lighting system and solar loads when sizing the capacity of the air conditioning equipment for the Main Telecom Room.

5. The air conditioning equipment capacity for the Intermediate Telecom Closets shall be able to handle a load of 7,000 BTUH per closet per NYC DOE DIIT School Standards dated 10/11/23. The equipment shall account for the following loads:

    a. Core Network (Wireless Switch and Layer Switch)
    b. IPDVS Equipment
    c. BACnet Building Management System

6. Include the loads associated with the Fire Alarm Multi-Function Cabinet (designed by AEOR), transmission loads, infiltration loads, loads from the lighting system, and solar loads when sizing the capacity of the air conditioning equipment for the Intermediate Telecommunications Closets.

B. Automatic Transfer Switch (ATS) Room, UPS Room and Elevator Machine Rooms (EMR)

1. Per Section BC 3005.4 of the 2022 NYC Building Code and Section 15783, provide a dedicated independent ductless split heat pump system for each space that shall maintain the space temperatures (24 hours a day, 7 days a week) in accordance with the equipment manufacturer's recommendations. Elevator controllers typically require an air-conditioned environment. Refer to DR 6.4.1 for temperature and humidity requirements for the elevator machine room (ambient temperature between 50°F and 90°F and relative humidity of no greater than 95%). If a full BMS/DDC network system is provided per Section 15970 or if a local BACnet/DDC system is provided per Section 15971, provide space temperature sensor and space relative humidity sensor for the Elevator Machine Room EMR, ATS Room, and UPS Room and integrate the sensors into the network.

2. Hydraulic Elevator Machine Rooms and machinery spaces shall be designed to be vented to the outside air mechanically as the Authority's preference in order to minimize odors associated with hydraulic oil. Refer to Section 3.7 of Appendix K of the 2022 NYC Building Code. Makeup air shall be provided and ventilation loads shall be considered when sizing the dedicated split system for the Hydraulic Elevator Machine Room. Mechanical ventilation system shall provide a minimum of six air changes per hour.

C. Electrical Distribution Room (EDR) that Encloses the Main Switchboard per Section 16425 and Rooms/Closets Enclosing Panelboards per Section 16470

Provide a system that maintains the space temperatures (24 hours a day, 7 days a week) in accordance with the equipment manufacturer's recommendations. Designer shall evaluate if a split system is required or if thermostatically controlled exhaust fans will provide the conditions in accordance with the equipment manufacturer's recommendations. If a full BMS/DDC network system is provided per Section 15970 or if a local BACnet/DDC system is provided per Section 15971, provide space temperature sensor and space relative humidity sensor for the EDR and for rooms/closets enclosing panelboards and integrate the sensors into the network.

D. Kitchen Food Storage Rooms

Per DR 1.3.6.2, the acceptable temperature range for Kitchen Food Storage rooms is 50°F - 70°F. Provide a dedicated split system for the Kitchen Food Storage rooms.

E. Other Spaces

1. Provide electric unit heater in the Water Meter Room and Crawl Spaces to maintain a minimum 50°F space temperature.

2. Sloping top convectors shall be used in Janitor's Closets that are located at the perimeter of the building or mounted on the top floor or building slab. Provide electric convectors. Provide exhaust airflow of 5 minutes per change in Janitors' Closets.

3. Entrance Vestibules and Main Entrances shall be provided with floor mounted (4" above finished floor) recessed cabinet heaters. Flush ceiling hung cabinet heaters may be used in Entrance Vestibules and Main Entrances if floor space is limited. Cabinet heaters shall be provided with electric heat or hot water fortified with 30% propylene glycol from the primary loop of an air to water heat pump chiller/heater system (when approved by the Authority). Entrance Vestibules and Main Entrances shall also be equipped with electric door air curtains to provide a pressurized curtain to keep out warm humid outdoor air during the cooling season and cold outdoor air during the heating season as doors are typically left open during arrival and departure times. An alternate is to provide 30% propylene glycol hot water door air curtains when air to water heat pump chiller/heaters are used. Door air curtains shall be equipped with heating capacity used during the heating season to temper any outdoor air that infiltrates through the pressurized curtain. The open door heating setpoint to be used with door air curtains that are not to be on the full BMS/DDC network or BACnet DDC with local BACnet network shall be 45°F in accordance with Section 6.4.3.9 of ASHRAE 90.1-2016. Networks are not required for historic buildings and buildings undergoing repairs, where changes would cause extensive revisions to other systems, and where space is limited. Refer to Section 4.2.1.3 of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC and Exceptions to Section 6.1.1.3 of ASHRAE 90.1-2016.

4. HS and IS Science Labs and Prep Rooms; Science Demonstration and Science Lecture Rooms

   a. HVAC for Science Rooms with fixed fume hoods (HS Science Labs/HS Prep Rooms and IS Prep Rooms)

      1) Existing Building Major Modernization and New School projects

         Science Rooms shall have terminal units that are fan powered VAV boxes with electric reheat coils. The minimum supply flow allowed to be provided to the HS Science Labs/HS Prep Rooms and IS Prep Rooms shall be nominally 100 cfm less than the fixed fume hood exhaust cfm requirements in order to guarantee negative pressurization. The electric reheat coil of the fan powered VAV supply box shall reheat the supply air in order to avoid overcooling in those cases where the loads are minimal and the VAV supply box is not permitted to supply less than the hood exhaust requirements (minus 100 cfm for infiltration). In the cooling mode, electric reheat shall only be allowed after the fan powered VAV box has throttled down to its minimum allowable primary air capacity. In the heating mode, the electric reheat in the fan-powered box shall provide all terminal heating capacity.

      2) The same multi-zone VAV heat pump or Dual Temperature (DT) central units that serve the classrooms may also serve the Science Labs/Prep rooms that have fixed

fume hoods provided that air delivered to the HS Science Labs/HS Prep Rooms and IS Prep Rooms is not recirculated.

b. Fume Hoods: HS Science Labs, HS Prep Rooms and IS Prep Rooms shall be equipped with fixed fume hoods only. IS Labs shall be equipped with ductless portable fume hoods only. IS Prep Rooms shall be equipped with a combination unit (fixed fume hood on top, acid storage cabinet on the bottom). IS Acid Storage cabinet section shall be ventilated 24 hours a day, 7 days a week. All Science Demonstration and Science Lecture Rooms shall be equipped with only ductless portable fume hoods. Fixed fume hoods shall have ducted exhausts and shall use either rooftop exhaust or sidewall exhaust. Rooftop exhaust shall be terminated a minimum of 10 feet above the roof. All sidewall exhausts shall be located 10 feet from entrances/exits, windows, intake ducts, and high traffic areas.

5. HS Acid Storage Rooms

   HS Acid Storage Rooms shall be exhausted 24 hours a day, 7 days a week. Makeup air for the HS Acid Storage Room exhaust fan shall be provided. Provide a minimum of six air changes per hour in accordance with Section BC 427.9, Paragraph 4.

6. District 75 Special Education spaces shall be designed to be maintained at 75°F (compliant with the Section C302.1 of the 2020 NYCECC) during the cooling season during occupied periods (in lieu of the standard 78°F provided in other spaces).

7. Rooms used for high volume duplicating/copying shall be negatively pressurized and shall be provided with dedicated exhaust fans sized at minimum 0.50 cfm per square foot. This requirement is not applicable for small convenience copiers and printers.

8. Usage of domestic cooking appliances in other than Group R occupancies (example home economics room and other spaces)

   Per Section MC 505.4 of the 2022 NYC Mechanical Code, all domestic cooking appliances in occupancies other than R occupancies, shall be provided with hoods and exhaust systems as required for the type of appliances and processes in accordance with Sections MC 506 and 507. Domestic appliances may be provided with domestic kitchen exhaust systems ducted to outdoors provided that the installation complies with all of the following:

   a. Each appliance shall have electric or gas connections and nameplate ratings not to exceed 10kW for electric appliances or 75,000 Btu/h for gas appliances. Branch gas connections shall not be larger than 3/4" pipe.

   b. The appliances shall not include open top broilers or fryers; and

   c. The appliances may be used for periodic, non-commercial, non-revenue generating purposes.

9. **Athletic Fieldhouse and Grandstand Spaces**

   Administrative spaces serving special functions supporting school physical education and team sport programs can include one or more of the following 'Special Spaces':

~~a.~~ The Medical Office, located in the fieldhouse, shall follow the same requirements as the medical office of the school, though will have less spaces than the 'suite'.

b. The Ticket Booth area is open to the outdoors when in use and relies on natural ventilation. Cooling is not required, and minimal heating shall be provided by thermostatically controlled, fully recessed wall mounted electric fan coil heaters, or ceiling-mounted units when a finished ceiling is provided. Air recirculation within the interior shall be provided by ceiling/wall fans arranged to cool occupants.

c. The Concession Stand does not require appliance hood exhaust since there is no food cooking. The Concession Stand area is open to the outdoors when in use and relies on natural ventilation. The removal of excess appliance heat, vapor and odors from the interior of this space shall be provided by a general exhaust fan. The arrangement of Concession Stand exhaust fan discharge shall minimize the transport of food odor, vapor and heat to the interior of the rest of the fieldhouse/school buildings and outdoor public areas. The air balance between the interior of the Concession Stand and adjacent accessible building spaces and/or outdoors shall achieve a neutral or slightly negative pressure relationship (airflow into Concession Stand interior). Cooling is not required. Minimal heating shall be provided by thermostatically controlled, fully recessed electric wall mounted fan coil units, or ceiling-mounted units when a finished ceiling is provided. Air recirculation within the interior shall be provided by ceiling/wall fans arranged to cool occupants.

d. The Press Box is provided with operable openings for natural ventilation and does not require any permanent means of heating or cooling.

6.2 Heating, Ventilation & Air Conditioning

6.2.30 A2L Area Refrigeration Leak Detection and Ventilation System

Description/Design Approach:

A. Applicability: Provide an A2L area refrigeration leak detection system per Section 15597 when leakage of the A2L refrigerant would exceed the EDVC values of ASHRAE 15-2022 and would exceed 25% Lower Flammability Level (LFL) as follows:

1. **For occupied spaces with A2L utilizing refrigeration systems whereby the air handling unit's A2L integral refrigerant leak detector would not sense a space refrigerant leak since the returns are not 12" AFF. (Air handling unit's A2L integral refrigerant leak detector would only sense leak of DX coil itself).**

2. **For unoccupied indoor mechanical equipment room (MER) with A2L DX central air handling unit split heat pumps to address MER accumulated leaked refrigerant (in addition to central unit leak detector that monitors the spaces served by the central unit).**

3. **For unoccupied indoor MER with A2L heat pump domestic water heaters.**

4. **For unoccupied indoor MER with A2L refrigeration systems (chillers, air to water heat pump chiller/heaters).**

5. **For spaces with refrigerant piping utilizing A2L type refrigerants that are not enclosed in gas-tight fire resistive enclosures in the event of a leak.**

B. Operation of A2L Area Refrigerant Leak Detection and Alarm System: Upon detection of a refrigerant leak, each individual area leak detector shall signal the MER located multi-channel refrigerant controller alarm panel. The alarm control panel shall then institute the following:

1. **Shutdown the compressors located in the machinery room through relay output dry contact as required by Section 8.11.6.2 of ASHRAE 15-2022 (Note the air handling unit compressors would be shut down by the air handling unit controller).**

2. **Activate the audio/visual alarms of the multi-channel refrigerant controller in the mechanical rooms and in the Custodian's Office.**

3. **Close the dry contacts of the multi-channel refrigerant controller. Per Section BC 918 of the 2022 NYC Building Code, central station monitoring is required upon closure of the dry contacts of the multi-channel refrigerant controller. The Division 16 Contractor shall wire the dry contacts to the Fire Alarm system per Section 16720, or Refrigerant Detection and Alarm System with Central Office Connection per Section 16731 as applicable. Mechanical designer to ensure the electrical designer indicates on the Div. 16 Drawings the wiring between the refrigerant leak detection and alarm system dry contacts to the fire alarm system.**

4. **Increase the ventilation rate from Level 1 normal ventilation rate to Level 2 emergency ventilation rate to disperse leaked refrigerants in Mechanical Equipment Rooms (MERs).**

5. **A digital signal alarm output from the refrigerant leak detection multi-channel controller shall also be sent to the School Operating Console (SOC) if a Section 15970 BMS/DDC or Section 15971 Local BACnet system is provided. For BMS/DDC applications, a wide area network (WAN) broadband signal shall be sent to the Central Host Control Station if the alarm signal is unanswered at the School Operating Console.**

6. Refrigeration Machinery Rooms **shall comply with Sections 8.9, 8.10 and 8.11 of ASHRAE 15-2022 and** shall contain a refrigerant detector with an audible and visual alarm. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. **Per Section 8.11.6.2, the alarm shall be actuated at a measured concentration level exceeding 25% of the Lower Flammability Limit (LFL) as defined in ASHRAE 34-2022.** The mechanical ventilation system shall exhaust air from the refrigeration machinery room at a volumetric rate as defined in **Section 8.11.11 of ASHRAE 15-2022** upon activation of the required refrigerant detector. Exhaust registers or outlets capable of exhausting the amount required shall be located near the floor unless a lighter than air refrigerant is used. When a lighter than air refrigerant is used, the exhaust registers or outlets shall be located near the ceiling.

    a. The discharge of air shall be to the outdoors and shall be discharged not less than 20 feet from an outdoor intake or opening into buildings and 10 feet from an exterior fire escape or stair (Per Section MC 1105.6.1 **of the 2022 NYC Mechanical Code**).

    b. Relief device from refrigeration machines shall terminate outside of the structure at a location not less than 15 feet above adjoining grade level and not less than 20 feet from any window, ventilation opening or exit. (Per Section MC 1105.7)

    c. Provide separate break-glass switches for off-only control of compressors and on-only control of machinery room ventilation fans outside each entrance to the machinery room (Per Section MC 1105.10 **and Sections 8.10.g and 8.11.7 of ASHRAE 15-2022**).

    d. Refer to related Design Requirement DR 6.2.36, Construction Document Requirements for Refrigeration Systems, for design document requirements.

6.2 **Heating & Ventilation**

6.2.31 Capital Improvement Program (CIP) Climate Control/Ventilation Upgrades to Steam Heating and Ventilation (H&V) Units *

*** Repairs/Replacements/Retrofit work shall not proceed on the steam heating system if it has been determined that there is less than 15 years of anticipated future service life for the boilers and those projects shall be designed with heat pump units as defined in Design Requirements 6.2.0, 6.2.3, 6.2.4 and 6.2.39.**

Description/Design Approach:

A. New York City Local Law 32/16 requires that each capital project involving the installation or replacement of HVAC comfort controls systems (thermostats, control valves) and involving the repair/replacement of the central ventilation units at an estimated construction cost for such installation or replacement of two million ($2,000,000) dollars or more shall be designed and constructed to reduce energy cost by a minimum of five percent (5%). The baseline datum is the annual energy consumption before the replacement of the comfort controls and before repair/replacement of the central ventilation units. The case considered here are schools that have a steam perimeter heating system controlled by pneumatic controls without Classroom central ventilation units and which rely on open windows and exhaust fans to provide ventilation. Those schools do however have central H&V Public Assembly (PA) space air handling units. In order to comply with the NYC Local Law 32/16, the dedicated PA space heating and ventilation units shall be replaced or retrofitted and may have to operate with additional energy conservation measures. If it is not cost effective to salvage the existing PA space H&V air handling units; they shall be replaced in lieu of being retrofitted. Single Zone Variable Air Volume (SZVAV) units are not applicable for these cases **(unless replaced with new heat pump units) since existing units** are only H&V units without provisions for air conditioning.

B. **P**rovide Demand Controlled Ventilation (DCV) per Section 6.4.3.8 of ASHRAE 90.1-2016 and Section C403.7.1 of the 2020 NYCECC based on occupant density or provide an Energy Recovery Wheel (ERW) to minimize heating requirements per Section 6.5.6.1 of ASHRAE 90.1-2016 and Section C403.7.4 of the 2020 NYCECC based on total airflow and the percentage of total airflow that is outside air flow. DCV is not required for systems with ERW.

C. Constant volume units may be used for Historic Building PA spaces where ASHRAE 90.1-2016 need not apply per Section 4.2.1.3 of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC**.** Additionally, compliance with ASHRAE shall not be required per the Exceptions to Section 6.1.1.3 of ASHRAE 90.1-2016 for repairs, where replacement or alteration of equipment requires extensive revisions to other systems, relocation of existing equipment or cases where there exists insufficient space. Hence, for these cases constant volume systems may be used. Designer is to present their case to A&E if they determine that Demand Controlled Ventilation (DCV) and Energy Recovery Wheels (ERW) otherwise required will not be included in the design package based on the code sections above.

D. Even though DCV and ERW might not be required either by not meeting the requirement thresholds or in consideration of the above Exceptions, they may be elected to be employed as energy conservation measures to meet the 5% required annual energy cost savings required by LL32/16.

E. Designer is to submit annual energy cost savings calculations to the Authority to demonstrate that the cumulative energy savings of the steam perimeter digital comfort control upgrades, repair/replacement/upgrade of PA space units achieves the requisite 5% annual energy cost savings.

F. If the PA space air handling units are retrofitted, the existing controls (typically pneumatic) will be replaced[1] with stand-alone "DDC-Only" direct digital (DDC) controllers with integral operator display device. The specifications shall require the Temperature Controls Contractor (TCC) to furnish and field-install the controls. The operator will be able to locally change setpoints, set schedules of operation (occupied on/occupied off), and make other such adjustments. Possible PA space H&V air handling unit upgrades include the following:

1. New Direct Digital Controller (DDC) with I/O for the control described herein
2. Integral operator display device (Human Machine Interface)
3. New room temperature sensor with setpoint and occupancy override
4. Room and outside air CO_2 sensors if DCV is to be employed
5. Tamper proof thermostat guard for room temperature and CO_2 sensor
6. Heating coil averaging discharge air temperature sensor completely covering the area of the active coil
7. For recirculation units, possibly replace the outside air, recirculation and spill/exhaust pneumatic damper actuators with modulating spring return electric actuators if DCV is to be employed. For 100% outside air units possibly replace existing electric or existing electric/pneumatic actuators with new spring return two-position normally closed electric actuators to guarantee full closure when system is not being used in the unoccupied and morning modes.
8. Investigate replacing the steam heating coil valve actuator(s) with modulating, spring return, normally-open electric actuator(s). Typically there are two or more steam control valves on each unit.

G. Controls

1. It is preferable to provide native BACnet controls for retrofitted units and replaced units. If provided controls are not native BACnet, a gateway/communication card to BACnet must be available for integration into a possible future local BMS/DDC BACnet network. Gateway/communication card will not be provided at the time of project construction. A network free DDC Only system should be provided as it is not required to provide the BACnet DDC with local BACnet network due to the limited scope of work.
2. Refer to Specification Section 15985, Sequence of Operations, for details of the control sequence. Also refer to Standard Details 1598508c and 1598508d and Planning Design Requirement 1.3.1.10.

H. Recirculating Heating and Ventilating Units for PA Spaces

Carbon dioxide (CO_2) sensors for demand controlled ventilation[1] shall be provided as described above for H&V units that recirculate air. CO_2 sensors shall control the normally closed modulating outside air dampers, normally closed modulating spill exhaust dampers and normally open modulating recirculating dampers. Replace existing manual start/stop switch of each motor starter with new variable frequency drive with manual bypass and circuit breaker for each fan. VFDs will be used for air balancing.

I. 100% Outside Air Heating and Ventilating Units for PA Spaces

1. In addition to possible CO_2 controls for demand controlled ventilation[1], investigate providing variable frequency drives (VFDs) [1] for H&V units that are 100% outside air. Provide variable frequency drives (VFDs) for supply and remote exhaust fans. Synchronize operation of the H&V unit with the supply and remote exhaust fan and operation of the dampers.

2. For the coupled case where there is no perimeter heating system in the PA space, the CO_2 sensors shall control the supply fan VFD and remote exhaust fan VFD and the space temperature sensor shall control the steam throttling valve. The system will be a variable volume, variable temperature system. The CO_2 signals will be overridden if the minimum flow can not maintain the thermal setpoint.

3. For the decoupled case where the PA space has a perimeter heating system, discharge duct temperature sensors shall control the steam heating valve to provide a “neutral” space discharge air temperature (nominally 60 to 65°F). CO_2 sensors shall control the supply fan and remote exhaust fan VFDs.

4. If replacing an existing 100% outside air H&V unit, investigate if a recirculating unit can be provided while maintaining the budget limitations of the project. If not, replace with new 100% outside air H&V unit with CO_2 and VFDs as defined above.

Notes:

1. According to Title 43 Chapter 10, Capital Projects for the **replacement/retrofit of No. 2 or No. 4 burners to biodiesel B100 Ready burners** at an estimated construction cost of 2 million dollars or more are not required to also comply with the energy reduction requirements for the installation of HVAC comfort controls.

6.2 Heating & Ventilation

6.2.32 Condensing Boiler Burner Safety and Operating Considerations

Description/Design Approach:

A. Applicability: This Design Requirement is only for existing heating systems utilizing condensing hot water boilers that require gas burner retrofit/replacement. Design Requirement is also applicable when the condensing hot water boilers are to be replaced in kind. Such work requires Authority approval as the HVAC standard is to employ air source heat pumps.

B. Requirements

1. Each boiler shall be arranged for single fuel operation with firm gas. All boilers shall utilize linkage-less burners.

2. Gas Meter Room, if provided, shall have explosion-proof exhaust fan, light fixtures, switches, relays and accessories.

3. Provide gas safety shut-off valve on the firm gas main and locate gas safety shut-off valve in the gas meter room (if provided).

4. A gas leak detection and alarm system shall be provided as detailed in Design Requirement 6.2.17.

5. The condensing boiler shall have a thermal efficiency of 88% at full rated input with 130°F return water temperature.

6. Each condensing boiler shall be provided with an integral gas valve train. Gas valve train shall be ASME CSD-1-**2011** compliant.

7. A balanced-flow hot water distribution piping design must be used. Reverse return piping shall be used as much as possible in multiple condensing boiler systems.

8. Fin-tube radiation perimeter hot water heating system shall be designed for approximately 140°F boiler supply water temperature and approximately 120°F return water temperature to allow the boilers to function in the condensing mode. Fin-tube radiation shall have two rows or extended length to account for the loss of equivalent direct radiation (EDR) experienced with 140°F hot water supply temperature. Tube diameter shall be sized to maintain adequate minimum velocity to promote turbulent heat transfer. If any terminal units with coils are utilized, (ex. unit heaters, cabinet heaters, unit ventilators, etc.) they shall be designed with multiple row coils to account for the loss of EDR. The hot water heating system for terminal units shall be provided with secondary hot water supply temperature that is reset as the primary loop hot water temperature is reset based on outside air temperature. Designer is to insert a reheat schedule into Section 15985, Sequence of Operation, to define how both the primary and secondary hot water temperatures are reset based on changes to the outside air temperature. Lead/lag system shall also be designed to take advantage of the higher efficiencies attainable with greater turn down ratios.

9. Each boiler shall have separate, indirect condensate drains piped from each condensate drain pan, stack, and stack y-connection to a neutralization tank and then to a floor drain. (Refer to Design Requirement 6.1.2 – Acid Waste System).

10. Provide prefabricated double-wall metal vents suitable for use with natural gas fired hot water condensing boilers. Refer to Specification Section 15575 for wall thicknesses.

11. **Per Section MC 1004.3.1 of the 2022 NYC Mechanical Code, clearances from the tops of boilers to the ceiling or other overhead obstruction shall be in accordance with Table MC 1004.3.1**. Access Platforms over boilers are required where the distance from the floor to the top of the boiler or boiler setting exceeds eight (8) feet per the New York State Industrial Code Rules. Show platform/ladder details on the Drawings. Where the required clearances cannot be provided due to physical limitations, file a reconsideration request (form **CCD-1**) during the filing process demonstrating the physical limitations. Edit specification references to ladders/platforms if not required.

6.2 Heating & Ventilation

6.2.33 General Freeze Protection

Description/Design Approach:

A. Avoidance of Freezing Hydronic Lines on Capital Improvement Program (CIP) Projects with Retrofit Work in Existing Buildings **and Capacity Projects Utilizing Air to Water Heat Pump Chiller Heaters (if Approved by the Authority).**

1. Hydronic hot water and chilled water lines that are not located on the exterior of the building and that do not serve units that take in outside air shall be pure water without glycol in order to minimize the energy efficiency losses experienced with the usage of glycol/water mixtures. Hydronic hot water and chilled water lines that are located on the exterior of the building or that serve units that take in outside air shall be a mixture of 30% propylene glycol and water.

2. Any existing building project whereby the interior air handlers or interior unit ventilators take in outside air or any project where the piping runs external to the building envelope, shall be equipped with 30% propylene glycol/water mixture.

3. In facilities with crawl spaces and basements, provide heaters in the crawl spaces and basements to minimize the potential freezing of the water lines. If the boilers are turned off at night, such as in older existing schools with older burners not equipped with a remote annunciation system for after-hours safe-shutdown notification, the heaters must be electrical. For schools equipped with a remote annunciation system for after-hours safe-shutdown notification where the boilers are not planned to be shut down in the evening, the heaters may be steam or hydronic.

6.2 Heating & Ventilation

6.2.34 Verification of HVAC System Design

Description/Design Approach:

A. The Architect/Engineer of Record shall submit separate detailed calculations for review with the design submission at 50% (if project has such submission; otherwise at 100%) for CIP and 60% for Capacity projects. Additional Capacity project submissions required at the 100% design stage are noted below. All calculations noted below are to be submitted to the Design and Construction Innovation Management (DCIM) Department. Submit a separate set of detailed calculations to Building Code Compliance (BCC) group for review when the project is filed. BCC required submissions (which are also to be submitted to DCIM) are highlighted below by the *Italics* font and underlined. Detailed calculations to be submitted include:

1. *Heating load calculations indicating transmission, infiltration and ventilation loads and, for retrofit work on existing buildings, assumed piping and pickup safety factors. Calculations shall indicate outside and inside design dry bulb temperature conditions (ºF).*

2. Cooling block load calculations indicating outdoor design dry bulb and wet bulb temperatures (ºF) and inside design dry bulb temperature (ºF), and inside design relative humidity (%).

3. Fan static pressure requirement calculations at 100% design stage for the design duct routes based on using loss coefficients for all fittings (in accordance with ASHRAE and SMACNA standards). Engineer of Record to provide marked-up design drawings indicating the specific routes which have the highest pressure drops that were used to compute the static pressure losses. The reduction of the central unit fan static pressure capacities due to the effects of wet cooling coils, turbulence at potential congested duct drops below the unit and dirty filters shall be included in the calculations.

4. Diversity utilized for variable volume applications with justification for having a diversity other than nominally 85% based on block load calculations.

5. Verification that the airflow velocity through the cooling coils does not exceed 450 fpm at maximum design flow (to minimize condensate carryover)

6. The HVAC Standard system for non-assembly spaces (Classrooms, Offices, etc.) is a Variable Air Volume (VAV) system where each non-assembly space is provided with a VAV box and electric baseboard **when central DX units are used or hot water baseboard when central Dual Temperature (DT) units are used**. **The DT units would be served by air to water heat pump chiller heaters (with Authority approval).** Submit calculations showing that each VAV box can provide all required cooling capacity and that each baseboard can provide all required heating capacity.

7. For special case projects with limited slab-to-slab heights utilizing Dedicated Outside Air System (DOAS) heat pump units **or DOAS DT units** serving VRF **terminal** units **or fan coil terminal units with ECC fan motors respectively**, the Architect/Engineer of Record shall provide calculations showing space latent loads and shall show that the DOAS air handling units together with the **terminal** units will provide all of the required latent capacity to meet the space latent loads based on the DOAS primary air flow (cfm) and DOAS primary air

absolute humidity supplied. The other option for special case projects with limited slab-to-slab heights is to utilize Vertical Unit Ventilators (VUV). For that case also submit calculations indicating the cfm selected and required tonnage will meet the space latent loads.

8. For special case projects with limited slab-to-slab heights utilizing **DOAS** heat pump and VRF units **or DOAS DT and fan coil units with ECC fan motors**, **or** Vertical Unit Ventilators (VUV), the Architect/Engineer of Record shall provide calculations showing space sensible loads and shall show that the Classroom terminal units will provide all of the required sensible capacity to meet the space sensible loads.

9. For DOAS **heat pump**/VRF, **DOAS DT/fan coil unit** and VUV designs, submit calculations verifying that **the** DOAS **together with the terminal units** and VUV units will provide the required heating capacity.

10. *Draft calculations for No 2 or No 4 retrofit or replacement biodiesel B100 Ready burners justifying any possible need for induced draft fans**.*

11. *Calculations for the sizing of the air intake louvers for the No 2 or No 4 retrofit or replacement biodiesel B100 Ready burners***

12. *HVAC Schedules on the filed drawing set shall include summary schedules indicating:*

    a. *Calculated heating total transmission load, total infiltration load, total ventilation load, and for No 2 or No 4 retrofit or replacement biodiesel B100 Ready burners pickup and piping safety factors**.*
    b. *Air intake sizing for No 2 or No 4 retrofit or replacement biodiesel B100 Ready burners indicating each units' fuel input, required louver minimum free area and each units' provided louver size considering the net louver free area.***
    c. *Stack effect for No 2 or No 4 retrofit or replacement biodiesel B100 Ready burners indicating average chimney temperature, maximum chimney exhaust mass flow rate and volumetric flow rate, chimney cross sectional dimensions and usable height, flue gas velocity, actual pressure loss (in. wc), theoretical draft (in. wc) and excess theoretical draft (in. wc) equaling theoretical draft minus actual pressure loss.***

13. *CIP project design is to be based on* **the actual** *envelope U-value as best as can be determined. The U-value may be better than at the time of original construction, as the original windows have probably been replaced with better windows such as dual glazed insulated windows. The designer is not to just use existing burner nameplate to size replacement burners.***

14. Ventilation calculations are to be submitted showing:

    a. Occupant density utilized in the calculations (minimum of the 2022 NYC Building Code Chapter 10 Egress Occupancy vs UFT Contract Maximum as defined in DR 6.2.9)
    b. Required Outdoor air flow cfm/person and cfm/ft^2
    c. Required Exhaust air flow cfm/ft^2
    d. Required Volume of Air to the Breathing Zone V_{bz}
    e. Zone Air Distribution Effectiveness E_z
    f. Required Zone Outdoor Airflow V_{oz}
    g. Maximum Primary Outdoor Air Fraction Z_p
    h. System Ventilation Efficiency E_v

i. Assumed Occupant Diversity D
j. Required Uncorrected Outdoor Air Intake Rate V_{ou} and Required Total Outdoor Air Intake Flow Rate V_{ot}
k. Actual Design Outdoor and Exhaust Flow Rates

15. Provide documentation that the ventilation rates shown in the ventilation calculations are used in the project specific energy modeling and shown on the Mechanical Drawing Schedules.

16. Provide calculations that show the **EDVC** refrigerant **charge** limit **per independent circuit per ASHRAE 15-2022** for any refrigerating system that contains more than 6.6 pounds of refrigerant. Designer to submit the refrigerant calculations and show on the plans. Refer to DR 6.2.36.

17. Air balance per Section MC 508.1.2 of the 2022 NYC Mechanical Code: Design plans for a commercial kitchen ventilation system shall include a schedule or diagram indicating the design air balance of the kitchen and all communicating spaces clearly indicating makeup, transfer, exhaust and infiltration airflow rates. Negative pressurization caused by the kitchen exhaust system shall not cause improper operation of systems in communicating spaces or cause door opening forces in the building to exceed the limits set forth in Chapter 10 of the 2022 New York City Building Code. Designer to show information on the Construction Documents.

18. Per Section MC 401.2, relying on natural ventilation only without the usage of fans is not allowed.

    a. Every occupiable space shall be naturally ventilated in accordance with Section MC 402 and mechanically exhausted in accordance with Table MC 403.3.1.1; or mechanically ventilated in accordance with Section MC 403.

    b. All occupiable spaces provided with air conditioning shall be mechanically ventilated in accordance with Section MC 403.

19. Per Section MC 1305.8.4, construction documents shall include calculations demonstrating that the extension of the normal and emergency vent piping is adequately sized to provide the required emergency vent flow while limiting the backpressure to less than the maximum pressure permitted by the design of the tank. Per Table MC 1305.7(2), calculations also must be included in construction documents for the normal venting of UL 142 tanks. Submit all calculations with the final design according to NFPA 30-12.

B. During the construction phase, the Architect/Engineer of Record shall provide verification that the as-designed central unit fan static pressure capacities are adequate considering the approved shop drawing routes and fitting losses based on using loss coefficients for all fittings (in accordance with ASHRAE and SMACNA standards). The Engineer of Record **is** to provide calculations based on shop drawing routes and copies of marked-up shop drawings indicating the specific routes that have the highest pressure drops that were used to verify the static pressure capacities of the central unit fans.

C. Verify that intake openings are compliant with Section MC 401.4. Ventilation air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet from lot lines or buildings on the same lot. For buildings on lots measuring less than 20 feet in width, intake openings shall be located at the centerline between lot lines. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.

2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet horizontally from any hazardous or noxious contaminant source, such as vents, exhausts (including but not limited to exhaust from dry cleaning establishments, spray booths, and cooling towers), streets, alleys, parking lots and loading docks, except as specified in Item 3 of Section MC 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.

3. Where the requirements of Item 2 above cannot be achieved, intake openings shall be located not less than 3 feet below contaminant sources where such sources are located within 10 feet of the opening.

4. Intake openings on structures in flood hazard areas shall comply with the additional requirements of Appendix G of the 2022 New York City Building Code.

D. Verify that exhaust openings are compliant with Section MC 501.3

1. Section MC 501.3, Exhaust Discharge, states that the air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and the air shaft will be located not less than the distances specified in Section MC 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic or crawl space.

Exceptions:

a. Commercial cooking recirculating systems.

b. Where installed in accordance with the manufacturer's instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4 of the 2022 NYC Mechanical Code, listed and labeled domestic ductless range hoods shall not be required to discharge to the outdoors.

2. Section MC 501.3.1, Location of exhaust outlets, requires the termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the minimum distances of separation specified below. Separation shall not be required between an air intake and the discharge air from non-evaporative heat rejection or heat absorption appliances such as air-cooled condensers, dry coolers, or heat pump evaporators; such air is not exhaust. The inlet and discharge of the appliance shall not reduce the effective separation of other exhausts from ventilation intakes to less than the required minimums.

a. For ducts conveying noxious, toxic, explosive or flammable vapors, fumes or dusts (including but not limited to exhaust from Science Labs, Gas Meter Room Exhausts (if any), shops): 30 feet from property lines; 10 feet from operable openings into buildings; 6 feet from exterior walls and roofs; 30 feet from combustible walls and operable openings

into buildings which are in the direction of the exhaust discharge; 10 feet above adjoining grade. Additional requirements may apply to Hazardous Exhaust Systems; see Section 510.

b. For other product-conveying outlets: 10 feet from the property lines; 3 feet from exterior walls and roofs; 10 feet from operable openings into buildings; 10 feet above adjoining grade; 10 feet from any exterior fire escape, stair, or balcony.

c. For all environmental air exhaust outlets: 3 feet from property lines separating lots; 3 feet from operable openings into buildings, and 10 feet from mechanical air intakes. Such exhaust outlets shall not be considered hazardous or noxious.

Exception: A 10-foot separation is not required between a mechanical air intake and an exhaust outlet for a single room with less than 750 cfm Class 1 exhaust air.

For this exception, the sum of any energy recovery device cross contamination and any re-entrainment of exhaust through the intake shall be less than 10% of the intake airflow as established by the manufacturer. The distance requirements from property lines and operable openings shall be maintained. Air Class shall be determined in accordance with ASHRAE Standard 62.1.

d. Exhaust outlets and openings serving structures in flood hazard areas shall comply with the additional requirements of Appendix G of the 2022 New York City Building Code.

e. For specific systems, see the following code sections:

Kitchen hoods and other kitchen exhaust equipment, Sections MC 506.3.13, 506.4 and 506.5.
Dust stock and refuse conveying systems, Section MC 511 (Shop exhaust, Can Wash Room exhaust)
Subslab soil exhaust systems, Section MC 512.4.
Smoke control systems, Section BC 909.10.3 of the 2022 NYC Building Code.
Refrigerant discharge, Section MC 1105.7.
Machinery room discharge, Section MC 1105.6.1.

E. The Authority standard is to utilize hard-ducted returns since plenum returns result in negatively pressurized spaces that are close to the main return stub. In addition, the 2022 NYC Mechanical Code requires special and periodic inspections as noted below. Designer is to justify any proposed design that utilizes plenum returns (possibly due to limited interstitial space above the suspended ceiling). If return plenums are authorized, they must be checked for a possible contamination condition. Per Section MC 601.4, Contamination Prevention, verify that exhaust ducts under positive pressure (exhaust fan upstream of exhaust ductwork), chimneys and vents do not extend into or pass through ducts or plenums unless the following Exceptions are met:

1. Exhaust systems conveying Class 1 or Class 2 air in accordance with ASHRAE 62.1-2016, located in return air plenums and that have exhaust duct joints, seams and connections that comply with Section MC 603.9 without taking any exceptions. Such exhaust system and plenum shall be subject to special inspection in accordance with Section BC 1705.39 and shall be subject to periodic inspection in accordance with MC Section 602.6.

2. Section MC 601.4 shall not apply to chimneys and vents for appliances with a heat input not greater than 350,000 Btu/hr that pass through plenums provided that such venting systems are subject to special inspection in accordance with Section BC 1705.39 and shall be subject to periodic inspection in accordance with Section MC 602.6 and comply with one of the following requirements:

    a. The venting system shall be listed for positive pressure applications and shall be sealed in accordance with the vent manufacturer's instructions.
    b. The venting system shall be installed such that fittings and joints between sections are not installed in the above ceiling space.
    c. The venting system shall be installed in a conduit or enclosure with sealed joints separating the interior of the conduit or enclosure from the ceiling space.

Designer is to verify that if plenum returns were approved by the Authority, that the routing of exhaust ducts under positive pressure (exhaust fan upstream of exhaust ductwork), and chimney and vent exhausts through any approved plenum complies with Section MC 601.4, Contamination Prevention.

F. Per Section MC 701.2, the room or space containing fuel-burning appliances shall comply with the requirements of Section C402.5.3 of the 2020 New York City Energy Conservation Code (NYCECC) and Section MC 1012 (maximum indoor temperature in spaces surrounding boilers, water heaters, and pressure vessels shall not exceed the operational temperature of the installed equipment or 104°F). Section C402.5.3 requires rooms containing fuel-burning appliances, where combustion air is supplied through openings in an exterior wall to a room or space containing a space-conditioning fuel-burning appliance, that one of the following shall apply:

    1. The room or space containing the appliance shall be located outside of the building thermal envelope.

    2. The room or space containing the appliance shall be enclosed and isolated from conditioned spaces inside the building thermal envelope. Such rooms shall comply with all of the following:

        a. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be insulated to be not less than equivalent to the insulation requirement of below-grade walls as specified in Table C402.1.3 or C402.1.4.
        b. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be sealed in accordance with Section C402.5.1.1.
        c. The doors into the enclosed room or space shall be fully gasketed.
        d. Water lines and ducts in the enclosed room or space shall be insulated in accordance with Section C403.

When the retrofit/replacement of No. 2 or No. 4 burners to biodiesel B100 Ready burners** cannot be direct vented (sealed combustion) and the 2020 NYCECC must be followed, designer shall define the required insulation, sealing and gasketting on the Drawings as noted above. Exceptions to when the 2020 NYCECC would not apply include historic buildings per Section 4.2.1.3 of the Appendix CA changes to ASHRAE 90.1-2016 of the 2020 NYCECC. Additionally, compliance with ASHRAE 90.1-2016 shall not be required per the Section 6.1.1.3 Exceptions of ASHRAE 90.1-2016 for repairs, where replacement or alteration of equipment requires extensive revisions to other systems, refrigerant changes of existing equipment, relocation of existing equipment or cases where there exists insufficient space.

G. Per Section MC 801.16.1, existing firebrick chimneys may be used to vent appliances if the firebrick is acid resistant and lab tested. Designer is to inspect the existing chimney before deciding to reuse and to not install a liner. Note that after the completion of the construction, the brick and mortar must be inspected in accordance with Section BC 1705.32.1, Reuse of existing chimneys. Section BC 1705.32.1 states when a new heating system appliance is installed, the special inspector shall verify the condition of the existing chimney lining and breeching. Deficiencies shall be reported as required by Section BC 1704.1.1.2.

During the design phase of a No. 2 or No. 4 burner retrofit/replacement to biodiesel B100 Ready burner**, Designer shall determine the condition of the existing breeching/chimney lining and design documents shall call for the required smoke test per Section MC 810.1.

H. Per Section MC 802.9, appliance and equipment vent terminals shall be located such that doors cannot swing within 12 inches horizontally of the vent terminals. Doorstops or closers shall not be installed to obtain this clearance. Designer to consider when defining the location of the vent terminals.

I. Per Section MC 1305.13 regarding installation of tanks, tanks shall be installed in accordance with the provisions of Sections MC 1305.13.1 through 1305.13.4. Fuel oil stored on roofs shall be deemed inside of buildings. At least 15 inches clearance shall be provided over tanks and on all sides between the tanks and the enclosure, embankment or dike or greater clearance as required by the manufacturer's instructions. Designer shall account for the for code required clearances on the Drawings.

J. Per Section MC 1305.13.3 regarding above ground tanks and appliances above the lowest floor inside a building, regardless of capacity, fuel-oil tanks and fuel-oil-burning appliances shall comply with the following requirements:

1. Enclosure of room: Fuel-oil tanks and fuel-oil-burning appliances shall be located in a dedicated room or enclosure, having a fire-resistance rating of at least 2 hours. Designer shall indicate the required fire resistance rating on the Drawings.

   Rooftop tanks need not be enclosed provided that all exterior walls and roofs within 10 feet horizontally and 20 feet vertically have a fire-resistance rating of at least 2 hours or are otherwise separated by a constructed assembly with a fire-resistance rating of at least 2 hours. Designer shall account for the above when locating any rooftop tanks.

2. Transfer pumps: Fuel-oil tanks that are filled by means of a transfer pump supplied from a primary storage tank where the transfer pump is located on the lowest floor, shall have the transfer pump located above the tank secondary containment level or outside the tank containment area. Designer shall ensure that the transfer pump is located compliant with the above.

K. Per Section BC 913.2.1, verify that refrigerants, gas piping, gas consumption devices, gas meters or any other gas equipment and fuel storage or fuel consuming appliances are not installed in any space housing a fire pump.

L. For cases where slab-to-slab heights are limited and Vertical Unit Ventilators (VUVs) or floor mounted VRF units are elected to be used, designer is to determine the possible need for the units to be located in closets or have enclosures and if so, closets/enclosures are indicated on the

Drawings. Projects requiring compliance with the Green Schools Guide shall have maximum noise levels of NC 35, 40 dBA.

** Note that this Design Requirement is based on the retrofit or replacement of No. 2 or No. 4 burners to biodiesel B100 Ready burners. In special cases, with Authority approval, gas burners or dual fuel gas/oil burners may be retrofitted or replaced and boiler vessels may be retrofitted/replaced.

6.2 Heating & Ventilation

6.2.35 Ducts Requiring Dedicated Shafts

Description/Design Approach:

A. **Per** Section MC 607.5.5.2 of the **2022** NYC Mechanical Code and RS 13-1A Section 3-3.4.3 **of** the 1968 Building Code, shafts that constitute air ducts or that enclose air ducts used for the movement of environmental air shall not enclose:

1. Exhaust ducts used for the removal of smoke and grease-laden vapors from cooking equipment (also refer to Section MC **506.3.11**);
2. Ducts used for removal of flammable vapors (also refer to Section MC 510.4);
3. Ducts used for moving, conveying, or transporting stock, vapor or dust;
4. Ducts used for the removal of nonflammable corrosive fumes and vapors;
5. Refuse and linen chutes (also refer to Section BC **713.13.1** of the **2022** NYC Building Code); or
6. Piping.

Exception: Shafts that constitute air ducts or that enclose air ducts used for the movement of environmental air may enclose noncombustible piping conveying water or other non-hazardous or nontoxic materials.

B. Per **paragraph A** above, the following (including but not limited to) ducts shall be run in dedicated shafts:
Kitchen exhaust ducts, Gas Meter Room exhaust ducts, Science Lab or Prep Room fixed fume hood exhausts, sub-slab soil exhaust systems and Oil Tank Room/Vault ventilation ducts (Refer to DR 6.2.14).

Note that per Section MC **506.3.11**, Grease Duct Enclosures, **a commercial kitchen grease duct serving a Type I hood that penetrates a ceiling, wall, floor or any concealed space shall be enclosed from the first point of penetration to the outlet terminal. In-line exhaust fans not located outdoors shall be enclosed as required for grease ducts. Per Section MC 506.5.1.2 where enclosed duct systems are connected to in-line fans not located outdoors, the fan shall be located in a room or enclosure having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of fan components. Such rooms or enclosures shall be ventilated in accordance with the fan manufacturer's instructions. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the New York City Building Code. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be a shaft enclosure in accordance with Section MC 506.3.11.1, a field-applied enclosure assembly in accordance with Section MC 506.3.11.2 or a factory-built enclosure assembly in accordance with Section MC 506.3.11.3. Duct enclosures shall have a fire-resistance rating of not less than that of the fire-resistance-**

rated assembly penetrated and not less than 1 hour. Fire dampers and smoke dampers shall not be installed in grease ducts.

Exception: A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

C. If the Designer elects the shaft enclosure option, a dedicated shaft enclosure is to be shown on the Drawings. This is the preferred option as it removes any workmanship issues when using the magnesium or calcium silicate insulation or duct wrap or factory-built systems. Designer to note that if non-shaft options are to be the basis of design, they are to be clearly indicated on the Drawings and the specifications shall be edited to remove the systems not used.

6.2 Heating, Ventilation & Air Conditioning

6.2.36 Construction Document Requirements and Design Criteria for Refrigeration Systems

Description/Design Approach:

A. General: ASHRAE 15-2022 defines the term EDVC, which is the effective dispersal volume charge (lb.) that ideally is the maximum pounds of refrigerant in an independent circuit such that if a leak were to occur and all the independent circuit refrigerant were to leak into the space(s), an unsafe condition would not occur. Should the pounds of refrigerant in an independent circuit for A2L refrigerants exceed the EDVC charge, then actions need to be taken. For simplicity, the standard is to employ continuous ventilation in lieu of energizing the ventilation system in response to a leak detector signal. Note that the EDVC calculations for A1 refrigerants are based on the Refrigerant Concentration Limit (RCL), but the EDVC calculations for A2L refrigerants are based on Lower Flammability Limit (LFL) due to the mildly flammable nature of A2L refrigerants.

For completeness, this Design Requirement addresses A1 refrigerants to clarify the ASHRAE 15-2022 A1 requirements. However, all refrigeration systems are to be designed with A2L refrigerants due to the phase down of A1 refrigerants by EPA and NYS DEC.

B. Construction Documents: Per Section MC 107.9 of the 2022 NYC Mechanical Code, construction documents for refrigerating systems shall contain plans that include the following data and information:

1. The location of all machinery; the horsepower of compressors; the type and number of pounds of refrigerant to be used; and the air quantities for, and means of, ventilating the machinery space.

2. The location of refrigerant detectors and emergency switches for compressors and for ventilation in the machinery rooms.

3. The location of pressure relief piping and any city water connections and water-saving devices.

4. The tonnage capacity of the machine and the suction and discharge pressures at which the machine is rated.

5. The operating weight of the equipment.

6. The safety group classification of refrigerant utilized.

7. The refrigerant concentration limit calculations and routing of all refrigerant piping for any refrigerating system that contains more than 6.6 pounds of refrigerant. Refer to Chapter 11 of the 2022 NYC Mechanical Code for refrigerant piping requirements. Additionally, refer to ASHRAE 15-2022 for refrigerant piping requirements and refrigerant charge limit calculations.

C. Protection of Refrigerant Piping Inside Building: Per Section MC 1107.1.1 and Sections 9.12.1.1, 9.12.1.2 and 9.12.1.3 of ASHRAE 15-2022, all refrigerant piping and fittings installed at a height less than 7'-3" above the floor shall be concealed or otherwise protected from mechanical damage except at the point of connection to terminal equipment. Show routing of refrigerant

piping as concealed or show refrigerant pipe protection on the Drawings. Per Section MC 1107.2, place a note on the Drawings that states, "Refrigerant piping that crosses an open space that affords passageway in any building shall be not less than 7 feet 3 inches above the floor unless the piping is located against the ceiling of such space". Designer to note that refrigerant piping shall not be placed in any elevator, dumbwaiter or other shaft containing a moving object or in any shaft that has openings to means of egress. Refrigerant piping shall not be installed in an enclosed public stairway, stairway landing or an exit.

D. Piping in Corridors/Lobbies:

1. While public corridors as defined by the NYC Building Code do not typically apply to schools as they are considered one occupancy and have interior corridors, refrigerant piping in school interior corridors are to be treated the same as public corridors. (Note that public corridors may occur on an unusual school project with multiple tenants).

2. Refrigeration for Corridors/Lobbies per Section 7.5.1.2 of ASHRAE 15-2022:

   a. Refrigeration systems shall be limited to "unit systems". Note that ASHRAE 15-2022 defines a "unit system" to be the same as a "self-contained system" that ASHRAE 15-2022 defines as "a complete factory-assembled and factory tested system that is shipped in one or more sections and has no refrigerant containing parts that are joined in the field by other than companion flanges or block valves." This means that A1 or A2L split central unit piping or split terminal unit piping or VRF unit piping is not allowed to be located in Corridors/Lobbies.

   b. Per Section 7.5.1.2.b, the A1 refrigerant charge of an independent circuit shall be less than or equal to the refrigerant charge quantity as specified in Section 7.3, which defines EDVC in Equation 7-3a as follows:

      $EDVC = RCL * V_{eff} * F_{occ}$

      where EDVC is the effective dispersal volume charge (lb.), RCL is the refrigeration concentration limit as listed in Table MC 1103.1 of the 2022 NYC Mechanical Code, V_{eff} is effective dispersal volume (ft^3) established using Sections 7.2.1 through 7.2.3, and F_{occ} is the occupancy adjustment factor that equals 1 for schools. Should the initial design refrigerant charge in an independent circuit exceed the EDVC value, the design shall be revised to employ more circuits in the central air handling unit with a lower refrigerant charge per circuit less than or equal to the EDVC value.

   c. Usage of A2L refrigerants in Corridors/Lobbies is governed by Section 7.5.1.2.c. Refrigerant systems containing Class 2L refrigerants shall be listed and the refrigerant charge per circuit in the "unit system" shall be less than or equal to the following:

      $M_s = 0.106 * LFL$ where M_s is the system refrigerant charge per circuit (lb.) and LFL is the Lower Flammability Limit per ASHRAE 34-2022 (lb./1000 ft^3).

E. A1 Refrigerant Piping in Occupied/Unoccupied Spaces: In general, piping containing Group A1 refrigerant may be located in occupied/unoccupied spaces provided that the complete discharge of the circuit refrigerant system into the space will not result in a refrigerant charge greater than the EDVC effective dispersal volume charge (lb.) as calculated in accordance with Equation 7-3a of ASHRAE 15-2022 (defined above) and the refrigerant piping and fittings are concealed or

otherwise protected from mechanical damage and either are installed with brazed joints or in refrigerant equipment manufacturer provided pre-charged tubing systems installed in accordance with the refrigerant equipment manufacturer's instructions.

F. A2L Refrigerant Piping in Occupied/Unoccupied Spaces:

1. Piping containing Group A2L refrigerant may be located in the occupied/unoccupied spaces if the refrigerant charge of a circuit that could leak is less than or equal to the EDVC value as calculated for A2L refrigerants per Equation 7-8 of ASHRAE 15-2022. Should the refrigerant charge of a circuit that could leak exceed the EDVC value, piping containing Group A2L refrigerant may be located in occupied/unoccupied spaces if they have continuous air circulation that will disperse the leaked refrigerant. Note that for simplicity, the continuous ventilation option of Section 7.6.1.1.b is preferable to the Section 7.6.1.1.a option where air circulation is initiated by a refrigerant detector.

   Equation 7-8 is as follows:

   $EDVC = V_{eff} * LFL * CF * F_{occ}$

   where EDVC, V_{eff}, and F_{occ} are as defined above and LFL is the Lower Flammability Limit ($lb./ft^3$) determined from ASHRAE 34-2022, and CF is the concentration factor with a value of 0.5.

2. For A2L systems, the continuous ventilation option defines a ventilation level required to disperse any leaked refrigerant and it depends on how much the amount of refrigerant charge in an independent circuit exceeds the A2L EDVC level.

   The level of the required ventilation is defined in Equation 7-10 of ASHRAE 15-2022 as follows:

   $Q_{min} = Q_{req}/C_{LFL}$

   where Q_{min} is the minimum mechanical ventilation airflow rate, ft^3/min; Q_{req} is the required ventilation as determined from Table 7-4 of ASHRAE 15-2022 and C_{LFL} is the Lower Flammability Limit conversion factor as determined from Table 7-5.

3. Similar to A1 refrigerant piping, the A2L refrigerant piping and fittings shall be concealed or otherwise protected from mechanical damage and either are installed with brazed joints or in refrigerant equipment manufacturer, provided pre-charged tubing systems installed in accordance with the refrigerant equipment manufacturer's instructions.

4. Occupied/unoccupied spaces served by A2L systems not having air circulation that will disperse any leaked refrigerant shall have an EDVC value as calculated in accordance with Equation 7-9.

G. Refrigerant Piping Installed in Concrete Floors: Per Section MC 1107.2.2 and Section 9.12.1.4 of ASHRAE 15-2022, A1 and A2L refrigerant piping installed in concrete floors shall be encased in pipe ducts. The piping shall be isolated and supported to prevent damaging vibration, stress and corrosion. If routing is such that refrigerant piping must be routed in concrete floors, designer shall show encasing pipe ducts.

H. Refrigerant Piping Penetrations: Per Section MC 1107.2.3, Refrigerant Piping Penetrations, and ASHRAE 15-2022, A1 and A2L, refrigerant piping shall not penetrate floors, ceilings or roofs. Designer shall note Exceptions below. Refrigerant piping penetrations shall be protected as required, consistent with the stipulations noted below:

Exceptions:

1. A1 and A2L penetrations connecting the basement and the first floor.

2. A1 and A2L penetrations connecting the top floor and a machinery penthouse or roof installation.

3. A1 and A2L penetrations connecting adjacent floors served by the refrigeration system.

4. A1 and A2L penetrations by piping in a direct system where the refrigerant quantity does not exceed the EDVC value for the smallest occupied space through which the piping passes.

I. A1 and A2L Refrigeration Concentration Exceedance Remedial Options: Per Section MC 1107.2.3.1 and ASHRAE 15-2022 for direct systems, piping containing a quantity of refrigerant in excess of the EDVC value for the smallest occupied space through which the piping passes may comply with Section MC 1107.9 and ASHRAE 15-2022, which defines the alternative refrigerant piping safety requirements. Refer to ASHRAE 15-2022 sections as follows:

1. Section 7.2.3.2, Connected Spaces via Natural Ventilation: Connected spaces shall be on the same floor and be provided with permanent natural ventilation openings. The lower edge of the natural ventilation opening between rooms shall be located a maximum of 12” above the finished floor. The area of any openings above 12” from the floor shall not be considered. For spaces served by A1 refrigerants, the required size of the openings shall be in accordance with Equation 7-1a. For spaces served by A2L refrigerants, the required size of the openings shall be in accordance with Equation 7-2a. Note however that adjacent classrooms should not have connected natural ventilation openings to avoid noise transmission between the classrooms.

2. Section 7.2.3.3.2, Plenums: The volume of an air ceiling plenum shall be included when calculating the effective dispersal volume where the plenum space is part of the refrigeration system air distribution system. Note that since the Authority requires hard ducted returns, the space above the suspended ceiling should not be included in the effective dispersal volume calculations.

3. Section 7.2.3.4, Connected Spaces via Mechanical Ventilation: Where two or more spaces are connected by a mechanical ventilation system complying with the requirements of Section 7.6.4, the volume of all such connected spaces shall be included in the effective dispersal volume used to calculate EDVC. This will be beneficial for spaces served by Multizone VAV (MZVAV) systems and Dedicated Outdoor Air Systems (DOAS) systems.

4. Section 7.3.4.4 Release Mitigation Controls: Mitigation controls are provided to limit a release by automatically isolating leaking piping or equipment by the usage of solenoid valves driven by refrigerant leak detectors in each space. The releasable refrigerant charge shall be determined based on a release of the volume of refrigerant that will occur prior to operation of the release mitigation control (solenoid valve) plus the volume of refrigerant contained

downstream of a release mitigation control (solenoid valve). The calculations for the releasable refrigerant charge when mitigation is used are to be per Equation 7-4a. Mitigation control is an ASHRAE 15-2022 option; however, based on the required detailed calculations, other options as noted herein are preferred.

a. Employ more circuits in the central air handling unit with a lower refrigerant charge per circuit less than the EDVC value.

b. In the case of A2L refrigerants, employ continuous refrigerant dispersing ventilation as defined in Paragraph F above.

5. Per Section MC 1107.2. and Section 9.12.1.5 of ASHRAE 15-2022, in other than industrial occupancies (applicable to Group E Educational Occupancy Classification) where the A1 and A2L refrigerant quantity exceeds the EDVC value for the smallest space, A1 and A2L penetrations for piping that connects separate pieces of equipment shall be either enclosed by an approved gas-tight, fire-resistive duct or shaft with openings to those floors served by the refrigeration system or located on the exterior of the building where vented to the outdoors or to the space served by the system and not used as an air shaft, closed court or similar space.

6. Per Section 9.12.2.2 of ASHRAE 15-2022, Shaft Ventilation, refrigerant pipe shafts with systems using Group A2L refrigerants shall be naturally or mechanically ventilated.

a. Below are the ASHRAE 15-2022 options:

Option a: Naturally ventilated shafts shall have a minimum of a 4.0 in. diameter pipe, duct, or conduit that connects at the lowest point of the shaft and connects to the outdoors. The pipe, duct, or conduit shall be level or pitched down to the outdoors. A makeup air opening shall be provided at the top of the shaft. (See the below for the preferred natural ventilation amendments to Option a of Section 9.12.2.2 of ASHRAE 15-2022).

Option b: When activated, mechanically ventilated shafts shall have a minimum air velocity in accordance with Table 9-12 of ASHRAE 15-2022. Makeup air shall be provided at the inlet to the shaft for mechanically ventilated shafts. Per ASHRAE 15-2022, the mechanical ventilation shall either be continuously operated or, for pipe shafts containing systems using Group A2L, activated by a refrigerant detector. Should this Option b be selected, in consideration of the 2020 NYC Energy Conservation Code, a refrigerant detector is to be utilized instead of continuous operation. Refrigerant pipe shafts utilizing a refrigerant detector shall have a set point not exceeding the occupational exposure limit (OEL) of the refrigerant. The detector shall be located in an area where refrigerant from a leak will concentrate.

Option c: The shaft shall not be required to be ventilated for double-wall refrigerant pipe where the interstitial space of the double-wall pipe is vented to the outdoors in accordance with the discharge location requirements specified in Section 9.7.8.2.

b. In consideration of the ASHRAE 15-2022 and the 2020 NYC Energy Conservation Code requirements, Option a, naturally ventilated shafts, is the preferred option.

However, designers are to determine if a different option is more appropriate for their particular design.

c. For Option a, natural ventilation, provide a refrigerant leak detector in the lower part of the shaft for the heavier than air A2L refrigerant and hard-wire the refrigerant leak detector back to the Fire Alarm system.

d. When the Fire Alarm system is energized, the Fire Alarm programming shall release the roof hatch latches, thus opening the roof hatches to provide fresh air makeup air paths. For shafts located in the interior of the building, provide interconnecting ducts running from the lowest point of the shafts to exterior façade louvers equipped with Class 1 dampers (leakage rate 4 cfm/SF at 1" w.c.). Each interconnecting duct shall be rectangular and pitched down to the outdoors with a minimum area equal to what would be provided with a 4" diameter pipe (i.e., 12.6 square inches). For shafts located at the exterior of the building, interconnecting ducts are not required and only louver/Class 1 damper combinations are required at the exterior façades. Each louver/damper combination shall provide a minimum free area equal to 12.6 square inches. When the fire alarm system is activated, in addition to opening up the roof hatches, the fire alarm system shall also open the dampers in the façade louvers to provide paths for the leaked refrigerant to escape from the shaft interiors.

7. For VRF systems, connect less indoor units to a given outdoor unit.

J. Disabling of Compressors/BMS Notification for A2L Applications

1. Per Section 7.6.4.b.3 and Informative Appendix A Section 7.6.1.1 of ASHRAE 15-2022, when the allowable EDVC pounds of an A2L refrigerant is exceeded per circuit on a MZVAV or SZVAV A2L air handling unit, upon detection of a ventilation system failure (within 10 seconds of failure) or detection of leaked refrigerant equal to or exceeding 25% LFL, air handling unit compressor operation shall be stopped by OEM controls and a notification shall be provided to the BMS system.

2. On detection of an A2L DOAS ventilation system failure (within 10 seconds of failure) or detection of leaked refrigerant equal to or exceeding 25% LFL, DOAS air handling unit compressor operation shall be stopped by OEM controls and a notification shall be provided to the BMS system and compressor operation in each associated split or VRF outdoor unit shall be stopped by TCC and a notification shall be provided to the BMS system.

K. Central Station Monitoring to Avoid the Need for Refrigerating System Operating Engineer (reference Table FC 606.1 of the 2022 NYC Fire Code and Section BC 918 of the 2022 NYC Building Code)

1. If the A2L air handling unit manufacturer's integral refrigerant leak detection system or VRF indoor unit manufacturer's integral refrigerant leak detection system required by Sections 7.6.2.3 and 7.6.2.4 of ASHRAE 15-2022 or if any area refrigerant leak detection system (as determined by the Mechanical designer for the spaces associated with the field refrigerant piping not enclosed in gas-tight fire resistive enclosures or run outdoors) is triggered by equaling or exceeding a refrigerant concentration of 25% LFL, all electric resistance heaters shall be de-energized as required by Section 7.6.2.5.d. The air handling unit controllers shall close dry contacts, VRF system master controller shall close dry contacts, and additionally

the refrigerant leak detection equipment for any area detectors per Section 15997 shall close dry contacts. The Division 16 contractor shall in turn wire all dry contacts to the Fire Alarm system per Section 16720 for central station monitoring if the Fire Alarm system is new or expandable and has unused input/output capability or to the Refrigerant Detection and Alarm System with Central Office Connection, Section 16731, for central station monitoring if the existing Fire Alarm system is not expandable.

2. In addition to central station monitoring being required should the 25% LFL be exceeded as measured by OEM integral refrigerant leak detectors or area detectors, fan failure of the units, **which would disable the ability of the fans to disperse any leaked refrigerant**, also requires closure of unit controller dry contacts and wiring by Div 16 Contractor to the Division 16 system equipment.

3. In general, designers shall strive to design A2L systems where refrigerant piping leaks or coil leaks would be less than the EDVC value and that would not exceed 25% LFL in the event of a refrigerant leak. Designers are to calculate if a circuit refrigerant leak or refrigerant pipe leak could equal or exceed 25% of the refrigerant LFL level. If so, central station monitoring (as defined in the specification sections) is to be provided. If not, designer is to delete references to the need for central station monitoring in the specification sections. Refer to each specification section Notes to Specifier.

L. Exhaust Air and Transfer Air Inlets: For A2L applications, note that per Section 7.6.4.c of ASHRAE 15-2022, inlets for exhaust air and inlets used to mechanically transfer air to a separate indoor space, shall be located such that the bottom of the inlet is within 12” of the lowest elevation in the space where leaked refrigerant would be expected to accumulate. Per ASHRAE 15-2022, all commonly used refrigerants except ammonia (R-717) and water (R-718) are heavier than air when at room temperature. Hence, all A2L system return/exhaust/transfer inlets shall be located at the bottom of the wall within 12” of the lowest elevation in the space.

M. Machinery Rooms: Per Section 7.4 of ASHRAE 15-2022, machinery rooms are required for indoor chillers, indoor chiller/heaters and indoor split central air handling units if the charge per independent circuit exceeds the EDVC values (not required if the pounds of refrigerant per independent circuit is less than the EDVC value). Equipment using A1 refrigerants must be compliant with Section 8.9 of ASHRAE 15-2022. Equipment using A2L refrigerants must be compliant with Sections 8.9.1 through 8.9.4 and Section 8.11. Exception: listed self-contained (packaged) systems are permitted outside of a machinery room, provided that such systems are not located in corridors or lobbies and are limited to 22 lbs. of refrigerant where located in commercial occupancies. This exception applies to packaged vertical unit ventilators.

N. Outdoor Located Refrigeration Equipment: Per Section 8.12 of ASHRAE 15-2022, when a refrigerating system is located outdoors more than 20 ft. from building openings and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided. The free-aperture cross section for the ventilation of the machinery room shall be in accordance with Equation 8-2a.

O. Continuous Ventilation: For A2L applications where the charge per independent circuit (lbs. of refrigerant) exceeds the EDVC value as calculated by Equation 7-8 of ASHRAE 15-2022 and hence continuous ventilation is required, the outdoor air intake rate at all central units shall be the maximum of the ventilation rate required for the instantaneous occupancy per Chapter 4 of the 2022 NYC Mechanical Code versus the Q_{min} value for leaked refrigerant dispersal as calculated

by Equation 7-10 of ASHRAE 15-2022. Designer shall indicate the required minimum outdoor air intake rates on the Drawing Schedules.

6.2 Heating, Ventilation & Air Conditioning

6.2.38 Miscellaneous HVAC Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the HVAC Drawings:

1. For Capital Improvement Program (CIP) projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind, the Designer is to show on the Drawing Details the required strainers for all devices as defined in Section 15510 HVAC Piping (upstream of control valves/coils for cabinet unit heaters, unit ventilators, fan coil units, etc.; pumps; reducing/regulating valves; steam traps serving steam main drips; etc.) as well as other pieces of equipment that require such strainers. Terminal strainers are to be provided even if the central combination air and dirt coalescing separators are provided according to Section 15515, Hydronic Specialties.

2. Specification Section 15514, Ductwork Insulation, calls for insulation to be applied to the ductwork and assumes that the temperature difference between the air inside the duct and the air outside of the duct is greater than 15°F (which mandates that insulation be applied per Section C40311.1 of the 2020 NYCECC). This will typically not be the case for return ducts on most projects within the building, except for shafts where it may be more likely to exceed the temperature gradient since they are not conditioned spaces. Per Table 6.8.2 of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC, return ducts in indirectly conditioned spaces (i.e., space above suspended ceiling) do not require insulation. Note that even if the temperature difference is equal to or less than 15°F, there still may be a need for insulation on the ducts to prevent condensation problems. Section MC 603.12 of the 2022 NYC Mechanical Code states that, “Provisions shall be made to prevent the formation of condensation on the exterior of any duct”. The Designer is to verify that the dewpoint of the air exterior to the duct is lower than the temperature of the air inside the duct. The Designer is to note on the Drawings any ductwork that need not be insulated if the temperature difference between the air inside the duct and the air outside of the duct is less than or equal to 15°F and if the temperature of the air inside the duct is greater than the dew point of the air outside of the duct. It is the SCA’s intent not to insulate ducts if not required.

3. All pipe diameters, duct dimensions and associated operating temperatures are to be shown on the Drawings and in the Schedules so that the Contractor can select the appropriate piping insulation thickness and ductwork vapor retardant coating (Refer to Table C403.11.3 of the 2020 NYCECC, Tables 6.8.3-1 and 6.8.3-2 of ASHRAE 90.1-2016, Specification Section 15512 Piping Insulation (HVAC) and Specification Section 15514 Ductwork Insulation).

4. Designer is to show the diameter of all pipes on both the plan Drawings and the riser Drawings.

5. DR 6.2.25 states all volume dampers and all VAV boxes shall be provided 5 to 10 duct diameters upstream of the terminal inlets and outlets. The upstream duct length of the supply duct serving the VAV boxes and volume dampers shall be 4 duct diameters in length where possible. The minimum length of this portion of ductwork shall be 2 feet. Designer is to show all volume dampers such as those required for constant volume units and downstream of

VAV boxes on the Drawings. For constant volume systems (allowed for historical buildings and for those existing schools meeting the Exceptions to Section 6.1.1.3 of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC, provide main duct volume dampers on every floor off the risers and sub-main volume dampers on each branch in addition to providing volume dampers upstream of the terminal inlets and outlets.

6. Construction documents for HVAC systems shall include the temperature to be maintained in every room and the total required output capacity in Btu/h required by the spaces served by the HVAC system. For cooling systems, the total required output capacity shall be differentiated between the sensible and latent capacities.

7. Construction documents shall indicate the procedure used to calculate the loads in accordance with Section MC 312 per ANSI/ASHRAE/ACCA 183 and Section C403.1.1 of the 2020 NYCECC. Construction documents shall show the results of peak load calculations and total design output of the HVAC system. Refer to Design Requirement 6.2.9 regarding the possible need to increase the ventilation outdoor air flow to disperse any leaked A2L refrigerant.

8. Sizing of air-cooled condensing units for walk-in refrigerators/freezers will be provided by the Kitchen Consultant and shown on the Kitchen Drawings, as are the piping runs. Coordinate location of units and piping to avoid interference with HVAC units and piping and the required shaft size with Architect. Verify that the Kitchen Consultant has not exceeded the pipe run distance recommended by the condensing unit manufacturer.

9. Designer is to show on the Schedule not only the total external static pressure (summation of the external static pressure on the suction side of supply fan plus external static pressure on the discharge side of supply fan) that the supply fan must provide, but also must show what the individual external static pressure is on the discharge side of the supply fan. Additionally, the designer shall indicate what the suction pressure is on the suction side of the exhaust fan when in the economizer mode. This is required so the Contractor can determine what Duct Pressure Class the supply and return ductwork should be constructed to and what the Duct Leakage Class should be. Designer is to note that Pressure Class 3-inch WC or higher equipment external static pressure and Leakage Class 4 is required for outdoor ductwork and shall indicate same on the Drawings.

10. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind, the Designer shall indicate isolation valves on Drawings for all waterlines (hot and chilled water, if any) at each floor and at each riser, which will facilitate testing and leak repairs.

11. For CIP Projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind and when project entails retrofitting/ replacing No 2 or No 4 oil burners with biodiesel B100 Ready burners, ensure the architect provides 2 means of egress for boiler rooms greater than 300 SF per Rule §4-6.8 of the NYS Industrial Code (NYC Mechanical Code requires such at 500 SF).

12. Ensure that condensate lines are coordinated with the layout of other equipment and the length of runs at 1/8” per foot are not excessive to affect ceiling heights or cause other coordination issues. Coordinate with Plumbing designer to ensure plumbing risers are located to receive the condensate lines. Note that the outdoor units for some heat pumps

require condensate lines and condensate pans that must be heated to avoid freezing if the outdoor unit heat pump operates at a coil temperature below the outdoor air dew point. Show the outdoor condensate pans and drain lines on the Drawings.

13. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind and when project entails retrofitting/ replacing No 2 or No 4 oil burners with biodiesel B100 Ready burners, ensure that fuel oil pipe shafts are of sufficient size to accommodate piping and required code clearances and not interfere with building structure.

14. Ensure that shafts in general are not designed to such exact clearances that construction deviations can't be accommodated. Coordinate with the Architect to ensure space is adequate.

15. Ensure drawings do not show ductwork running directly on top of and in same direction as partitions, as the partition cannot be framed.

16. If a gravity vent is being replaced and thus requires a damper to meet the energy code, ensure the power to the damper is indicated on the electrical drawings.

17. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind and when project entails retrofitting/ replacing No 2 or No 4 oil burners with biodiesel B100 Ready burners, Designer is to show blade-indicating whisker switches on the Drawings for all appliances that require outside air dampers to be proven open before combustion. End switches are not acceptable for this per the DOB Boiler Division preference.

18. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind and when project entails retrofitting/ replacing No 2 or No 4 oil burners with biodiesel B100 Ready burners, per the DOB Boiler division preference, combustion air dampers shall be visible at all times to the boiler operator. A visible outside air intake damper located in an exterior wall is acceptable but a remote exterior wall mounted combustion air intake damper that is not in the line of sight of the boiler operator is not acceptable and for such cases, the combustion air damper is to be located in outside intake ductwork within the boiler room. For compliance with the energy codes, provide duct insulation consistent with the 2020 NYCECC and ASHRAE 90.1-2016 that can be applied to the ductwork upstream of where the combustion air damper is located. Such insulation shall extend up to the envelope penetration, thus effectively bringing the envelope boundary to the combustion air damper and shall be R-10 minimum for CIP projects (meeting the envelope requirements for mass building envelope – modify as required if other type of wall). Note that if the exterior wall is fire-rated and thus requires a fire or fire/smoke damper, the additional fire and smoke damper is still required to be located at the exterior wall.

19. As per the Note to Specifier in Section 15891, aluminum ductwork is to be provided at locations subject to moisture such as for shower exhausts, locker rooms associated with shower exhausts, can washing room exhausts, steam service room exhausts and swimming pool area exhausts. Aluminum ductwork runs shall be specifically indicated on the risers and plans. If the majority of the multiple spaces are wet areas, then the horizontal exhausts and risers shall be fabricated from aluminum. If the majority of multiple spaces connected to the riser are dry areas, the riser may be fabricated from galvanized steel with the local space

exhausts from the dry areas fabricated from galvanized steel and local space exhausts from the wet areas fabricated from aluminum.

20. Per Section MC 107.9, Construction Documents for refrigerating systems shall contain plans that show the refrigerant concentration limit calculations (EDVC calculations of ASHRAE 15-2022) and routing of all refrigerant piping for any refrigerating system that contains more than 6.6 pounds of refrigerant. Refer to DR 6.2.36.

21. For filing purposes and as required to facilitate plan review, Drawings shall clearly document the appropriate items of the 2020 NYCECC as per the Department of Buildings Document "2020 NYECC – How-to Guide – Mechanical Systems".

22. As per Section 110.26(E) of the NYC Electrical Code, ensure that no HVAC ductwork, piping or equipment is run in the dedicated electrical space above switchboards, panelboards and motor control centers, as a structural ceiling above those items would then be required or a means to collect water from the condensate or leaks that may be produced from the system. In general, avoid running any items other than what is required to service the room.

23. Designers must be aware that many older schools have cinder concrete framed slabs and this is to be investigated with the structural engineer. It is not permitted to use post-installed anchors in cinder concrete, and thus drawings should clearly take into account that support of piping, ductwork, etc. is to be from the structural beams either by direct connection to the beams or from installation of 'unistrut' type supports running between beams. Indicate removal and repair of the beam encasement to facilitate the attachment.

24. Science labs in high schools with an AP program have a drying oven that as per Section 11600 requires ventilation to the exterior. Ensure that the drawings show the ductwork, and fan if required. Note that the drying ovens for IS schools are non-venting and thus do not require a ventilation system.

25. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind, during replacement of existing rooftop mounted HVAC units, the dunnage is to be replaced to meet the height requirements, as well as any other requirement of DR 4.4.2.5 to permit reroofing in the future without requiring the removal of equipment, unless the dunnage is already of adequate height.

26. If heating for transmission skin loads is required in the Cafeteria Servery and floor-mounted convectors are proposed, the location of the convectors and the outlets for the plug-in Servery equipment must be coordinated with the Architect and Electrical Designer to avoid cords for the servery equipment potentially draping over the convectors.

27. For CIP projects when existing systems are to be salvaged but require repair/retrofit/replacement in-kind and when chilled water systems are utilized, per Section 6.5.4 of ASHRAE 90.1-2016 as modified by Appendix CA, chilled water coils shall be selected to provide a 15ºF or higher temperature difference between leaving and entering water temperatures and a minimum of 57ºF leaving water temperature at design conditions.

Exceptions are as follows:

1. Chilled-water cooling coils that have an air-side pressure drop exceeding 0.70 in. of water when rated at 500 fpm face velocity and dry conditions (no condensation).
2. Individual fan-cooling units with a design supply airflow rate 5000 cfm and less.
3. Constant air-volume systems.
4. Coils selected at the maximum temperature difference allowed by the chiller.
5. Passive coils (no mechanically supplied airflow).
6. Coils with design entering chilled-water temperatures of 50°F and higher.
7. Coils with design entering air dry-bulb temperatures of 65°F and lower

28. Mechanical Designer to coordinate with the Architect to avoid fire smoke damper (FSD) access issues when the branch duct serving a floor connects to the riser above a closet. If access through the closet is not possible, Architect is to determine options such as not providing a closet next to the shaft or providing a shaft extension above the closet ceiling with the shaft rating to be in line with the closet wall, moving the FSD to be in line with the closet wall and providing an access door in the soffit.

29. When a branch duct serving a floor is connected to a riser duct in the shaft to allow for smooth airflow, the connection needs to be made using a 45 degrees angle fitting. However, the shaft construction must allow sufficient space to allow for the 45 degrees fitting while maintaining the FSD sleeve inside the rated shaft wall, so if the shaft wall is too close to the riser to allow this, the Mechanical Designer shall coordinate with the Architect for the Architect to provide a detail showing the extension of the shaft above the ceiling.

30. Shafts usually do not go below the lowest framed slab, so that opening must be firestopped to close off the shaft. When a shaft encloses more than one duct, there are many times issues of firestopping since two ducts with a space between them cannot be fire-separated. The Mechanical Designer is to discuss with the Architect as they will either need to make sure there is space to provide slab between the ducts, frame the opening using studs and sheet rock around the slab penetration, or call for shaft extension with the ceiling of the lowest floor. If a shaft extension is provided, the FSD needs to be installed on the horizontal penetration to the shaft extension and not at the slab.

31. At HVAC equipment and louver flashing, the Mechanical Designer shall provide a note on the Mechanical detail to refer to the Architectural Drawings for flashing details and discuss with Architect for them to provide the details on their documents.

32. The Mechanical Designer to coordinate with the Architect to ensure that the distance between the shaft opening and the shaft wall is a minimum of 3” to allow the Contractor to support the ductwork with angles or determine a cost-effective method to determine the duct support.

33. Ensure that height of dunnage for roof top equipment in new or replacement installation follows DR 4.4.2.5 to allow for roof to be replaced in the future. Height shall take into account for a future insulation thickness of 8”. For curbs, top of curb, should be set 18” above the roof, accounting for an 8” future insulation thickness.

34. The Mechanical Designer shall coordinate to ensure there is a means of shut-off and isolation of the radiator steam traps and control valves without having to shut down

the entire steam distribution system or boilers. The Mechanical Designer, when doing a climate control project with steam radiators, shall show shut off valves as per Standard Detail 1551002a. The preferred means is to provide valves for each trap and radiator. If space does not permit installation at each trap and radiator, the Mechanical Designer shall show shut-off valves for each of the risers.

6.2 Heating, Ventilation & Air Conditioning

6.2.39 Split Heat Pumps, Packaged Heat Pump Vertical Unit Ventilators and Variable Refrigerant Flow (VRF) Systems for Occupied Spaces

Description/Design Approach:

A. Definitions

1. For terminal heat pump systems, Auxiliary Supplemental Heating is defined as the additional terminal heating capacity provided by electrical resistance heating when the outside air-cooled condensing unit(s) are functioning but cannot meet the heating load due to cold ambient temperatures.

   a. For split heat pumps (one indoor unit and one outdoor unit) and VRF heat pump systems (multiple indoor units and one outdoor unit) serving spaces with less than or equal to 450 BTUH/LF heating load, Auxiliary Supplemental Heating is to be provided by:

   1) electric baseboard for ceiling cassette units
   2) integral electric resistance coils for above the ceiling ducted units
   3) integral electric resistance coils for floor mounted VRF units.

   For the above cases 2) and 3), if the heating load is less than or equal to 250 BTUH/LF, then standard ceiling diffusers may be employed. If the heating load is greater than 250 BTUH/LF but less than or equal to 450 BTUH/LF, then fully adjustable ceiling linear diffusers must be employed to be able to direct the discharge air against the perimeter fenestration during the heating season to counter cold downdrafts.

   b. For all above split heat pump and VRF heat pump system types (cassette units, above the ceiling ducted units and floor mounted VRF units) serving spaces exceeding 450 BTUH/LF heating load, provide electric baseboard in each of the spaces for Auxiliary Supplemental Heating.

   c. For vertical unit ventilators serving spaces with less than or equal to 450 BTUH/LF heating load, Auxiliary Supplemental Heating is to be provided by integral electric heaters located inside the vertical unit ventilators. **If the heating load is less than or equal to 250 BTUH/LF, then standard ceiling diffusers may be employed. If the heating load is greater than 250 BTUH/LF but less than or equal to 450 BTUH/LF, then fully adjustable ceiling linear diffusers must be employed to be able to direct the discharge air against the perimeter fenestration during the heating season to counter cold downdrafts.**

   d. For vertical unit ventilators serving spaces exceeding 450 BTUH/LF heating load, provide electric baseboard in each of the spaces for Auxiliary Supplemental Heating.

2. For terminal heat pump systems, Back-up Redundancy Heating is defined as the electrical heating capacity required that is energized upon a failure of the outdoor air-cooled condensing

unit (due to refrigerant leak, compressor failure, etc.) and thus the terminal heat pumps cannot deliver any heating capacity.

a. Back-up redundancy electric heating is required for DOAS units to guarantee at least 65°F tempered ventilation air can be provided in the event of a failure of the DOAS heat pumps.

b. For split heat pumps, VRF heat pump systems and vertical unit ventilators, provide back-up redundancy heating the same as defined above for auxiliary supplemental heating. Note that the back-up redundancy heating capability will envelope the case of auxiliary supplemental heating and will be the determining factor in sizing the electrical resistance heaters.

B. General HVAC Design

1. Split heat pumps, packaged heat pump vertical unit ventilators and Variable Refrigerant Flow (VRF) systems may be used in certain projects as addressed in Design Requirements 6.2.0, 6.2.3 and 6.2.4.

2. For occupied spaces, the following heating/cooling systems may be used (subject to meeting the space acoustical requirements):

   a. One to one (one indoor unit to one outdoor unit) split heat pumps

   b. VRF systems (several indoor units to one outdoor unit)

   c. Packaged vertical unit ventilator heat pumps that draw in outdoor ventilation air and exhaust relief air from occupied spaces by utilizing a perimeter wall louver equipped with splitter plate.

   Refer to Design Requirements 6.2.0, 6.2.3 and 6.2.4 for further clarification of when each type of system may be used.

   The constant volume heat pump Dedicated Outside Air System (DOAS) units providing ventilation air to non-assembly spaces may be packaged roof mounted units or be split type units located in a Mechanical Equipment Room (MER) depending on available roof space, height of the building, aesthetics (if developer is involved) and available space inside the building. The Mechanical Designer shall coordinate with the Architect. Roof mounted units are preferred to provide as much space as possible inside the building for educational purposes. **This must be tempered with the need for site specific PV and green roofs, which might then require interior Mechanical Equipment Rooms (MERs) to be utilized for the air handling units.**

3. Where a central DOAS unit may not be appropriate due to ceiling heights, a local Energy Recovery Ventilator (ERV) may be considered. Local ERV has its own outside air intake and exhaust louvers. **Since the ERV does not have any cooling coil, the terminal systems must provide latent cooling as well as sensible cooling. Designer is to verify that the terminal systems have enough latent heat removal capacity.**

4. Allowable refrigerant concentration levels:

   Systems shall be designed with the intent that the maximum developed refrigeration concentration will not exceed **the EDVC values calculated in accordance with ASHRAE 15-2022.** Refer to Design Requirement 6.2.36.

5. All A1 **and A2L** refrigerant tubing joints are to be brazed. Flared compression fittings may be used only at the terminal equipment connections. Manufacturer provided flexible annealed pre-insulated tubing systems may be utilized. Mechanical press fittings for refrigerant lines are not allowed.

6. Provide local condensate pumps and condensate drain piping for all inside split heat pumps or inside VRF units and vertical unit ventilators.

7. If a VRF system is selected for the project for buildings less than or equal to 20,000 SF, the preference is to provide closet mounted MERV 13 equipped floor mounted multi-position ducted VRF units in each space if closets can be utilized **(for ease of maintenance).** If utilization of closets is not an option, provide MERV 13 equipped ceiling hung cassette or above the ceiling ducted VRF heat pump system indoor air handling units (2-4 tons) in each space and VRF condensing unit located on the roof. The 20,000 SF limitation for ceiling units is enforced because filter maintenance must be performed using a ladder to access the 10' high ceiling hung units. For buildings not exceeding 20,000SF, where the interstitial space between the suspended ceiling and above floor structural members precludes the use of ceiling hung units, provide closet located floor mounted ducted units. Closet located floor mounted ducted VRF units are to be provided for buildings with more than 20,000 SF to avoid an excessive number of spaces requiring filter maintenance utilizing ladders.

8. Designer shall reject any split heat pump or VRF submittals made by non-OEM Certified Installers. Submittals for refrigerant tubing, fittings, and equipment must be by OEM Certified Installers.

9. The terminal heating capacity of the split heat pump units, VRF units and packaged heat pump vertical unit ventilators must be determined without taking credit for intermittent capacity (passive solar heating, heat from lights, heat from equipment and body heat from occupants). The unit terminal heating capacity must be able to maintain an occupied space setpoint of 72°F and heat up the 65°F decoupled ventilation air to 72°F. Terminal units must also have extra reserve capacity to heat up the space from an unoccupied 55°F setback temperature to an occupied 72°F setpoint (while at the ASHRAE design winter outside air temperature of 13°F).

10. All auxiliary supplemental/back-up redundant electric resistance heating is to be controlled by the heat pump controller such that the resistance heating is last on, first off and DX heat pump heating is the primary heating mode.

11. Consideration should be given to the limited space latent load removal capacity of the **split/VRF** terminal units due to their limited coil sizing. Therefore, the **DOAS** ventilation units should be designed to provide the latent load removal capacity to supplement the latent removal capacity of the **split/VRF** terminal units so that a maximum 50% relative humidity (at 78°F) can be maintained in the occupied spaces.

12. The design of all heat pump units (DOAS, VRF, split units, vertical unit ventilators) must take into account the reduced heating capacity of the heat pumps during the heating season when the outside air temperature is 13°F (not 47°F which is the standard AHRI rating temperature of heat pump units) by providing auxiliary supplemental electric heating capacity **as required.**

C. Special Capacity Projects (3K, Pre-K) Classrooms and Offices, Exercise Rooms (Playrooms), Regardless of Ceiling Height: Refer to 3K/Pre-K HVAC System Selection Matrix.

1. Where standard SCA systems are not feasible, more costly to install, or project duration is **short**, provide Classrooms, Offices and Exercise Playrooms with either split heat pumps, Variable Refrigerant Flow (VRF) systems or packaged vertical unit ventilator heat pumps.

2. Provide stair towers, toilets, and janitors closets with electric heaters if perimeter located.

3. If a DOAS unit is not appropriate due to ceiling heights, a local Energy Recovery Ventilator (ERV) may be considered. **Refer to paragraph B.3 above.**

4. For packaged heat pump vertical unit ventilators, utilize local outside air intakes/exhausts for each unit to provide ventilation air.

D. For special CIP projects similar to library upgrades, health clinics, etc. where standard SCA systems are not feasible, more costly to install, project duration is **short**, or the Authority has chosen the project for a Deep Energy retrofit**,** use of the above systems may be considered and is to be discussed with the Authority.

6.2 Heating, Ventilation & Air Conditioning

6.2.40 Air to Water Heat Pumps (Chiller/Heaters)

Description/Design Approach:

A. Utilizing rooftop packaged DX heat pump systems with factory provided refrigerant lines/fittings and all controls by OEM is the preferred heat pump option per Design Requirement 6.2.0. Utilizing air to water heat pump chiller/heaters might be justified for a given project depending on site specific conditions and designer is to justify that selection during the Schematic phase for Capacity projects. For existing building CIP projects, Designers are to present their proposed heat pump systems to replace existing equipment in a Building Electrification Project Field Report (template located on www.nycsca.org). Field Report shall describe all existing HVAC, P&D and Electrical systems with justification for Designer's preference for an air to water chiller/heater system as a candidate system. Electrification Field Report is subject to review/approval by the Authority. Following the Authority's review of the Building Electrification Project Field Report and to narrow down the list of candidate systems, designers shall complete the CIP Carbon Reduction Electrification Equipment Selection Matrix (template located on www.nycsca.org) for which HVAC systems are optimal (rated "1"), possible but not optimal (rated "0"), and which systems are not an option for given existing building parameters (rated "T" for terminal non-feasible system selection). Subsequent to the Authority's review of the CIP Carbon Reduction Electrification Equipment Selection Matrix, should the air to water heat pump chiller/heater system be identified as the heat pump system to be used, Designers are to complete the Draft and then Final Scope Report.

B. This Design Requirement covers the considerations that must be accounted for after it has been decided by the above process to use the chiller/heaters. Note that air to water heat pump chiller/heater systems might have higher construction costs as compared to other DX heat pump options when considering the cost of the air to water heat pump chiller/heaters themselves and the costs of providing the associated dual temperature water piping/air handlers. Further note that rooftop DX packaged heat pumps are preferred over air to water chiller/heaters due to the fact that all controls are provided by the OEM, thus requiring less field coordination with Temperature Controls Contractor (TCC) controlled ancillary systems such as pumps and bypass valves associated with air to water heat pump chiller/heater systems.

C. Designer shall note that no equipment submittals are to be approved prior to approval of the controls submittals which must demonstrate coordination between the chiller/heater OEM and the Temperature Controls Contractor (TCC) who most probably will control the dual temperature pumps and bypass valves (OEM could elect to also control all bypass valves and adjust pump flow based on load; however, most OEMs prefer the TCCs to control the pumps and bypass valves).

D. Auxiliary supplemental heating is required when the heat pumps are functioning but can't meet the load. In that case, both the heat pump plant and auxiliary supplemental heating system shall both function simultaneously in a hybrid mode. Emergency back-up redundancy heating is required in the event of a failure of the heat pump plant. In that case, the emergency heating system shall function on its own. For the chiller/heater design, as is required for all heat pump systems, auxiliary supplemental heating and emergency back-up redundancy heating is to be provided. Emergency back-up redundancy heating shall be sized at 75% of the heating

capacity provided by the heat pump plant should the chiller/heaters fail (to achieve the same redundancy that the former fossil fuel boiler plants provided). For backup redundancy heating, provide two electric boilers each at 37.5% capacity for a total of 75% backup capacity.

E. Air to water heat pump chiller/heaters shall have a capacity that is the maximum of the heating load as compared to the cooling load. Chiller/heaters are not to be sized based on just the cooling load whereby the boilers would then be expected to make up any shortfall of chiller/heater heating capacity. This requirement is to be able to use the chiller/heaters as much as possible to meet the heating load and rely less on usage of the electric boilers.

F. For the chiller/heater design, the electric boilers shall be provided in the secondary loop of a primary glycol water/secondary water (no glycol) loop system. Secondary loop boilers are to be utilized when the secondary loop utilizes hot water fin tube radiation units (or convectors or cabinet unit heaters), or dual temperature fan coil units with ECM fan motors. Refer to Standard Detail 1598510e.

G. When fin tube radiation (or convectors or cabinet unit heaters) are provided in the secondary loop, the temperature of the secondary loop hot water supply discharging from the primary/secondary loop heat exchanger is increased to nominally 135°F (when the outdoor temperature is nominally 13°F) by the secondary loop hot water boiler acting in an auxiliary supplemental heating mode. The discharge water temperature being supplied by the electric boilers is reset to be cooler than 135°F based on current outdoor air temperature if warmer than 13°F. In this arrangement, the secondary loop electric boilers also provide emergency back-up redundant heating at 75% of the secondary loop heating needs should the primary loop air to water heat pump chiller/heater plant fail.

H. When dual temperature fan coil units with ECM fan motors are provided in the secondary loop, it is anticipated that the water temperature being discharged from the primary/secondary loop heat exchanger will be nominally 120°F at 13°F outdoor air temp which represents a 5°F approach relative to the nominal 125°F chiller/heater plant discharge temperature (at 13°F outdoor air temperature). It is not anticipated that the heat exchanger discharge water temperature will need to be further boosted. This is because the dual temperature fan coil units are sized based on the cooling load and the fan coil units have active fans to assist in the heat transfer process (unlike the fin tube radiation/convectors without fans where the heating surface area is just sized for only the heating load).

I. Note that the air handlers and vertical unit ventilators in the primary loop require electrical resistance heaters for auxiliary supplemental/back-up redundancy heating since the secondary loop electric boilers do not provide any auxiliary supplemental/back-up redundancy heating capacity for the primary loop.

J. All approved chiller/heater plant manufacturers listed in Section 15661 can provide 125°F hot water at 13°F outdoor air temperature and this performance should be assumed in the basis of design. Some chiller/heater manufacturers provide even better performance and hence would rely less on the electric boiler plant to boost the heat exchanger discharge water temperature; however, the designs shall be based on common ground that all approved manufacturers can meet. Designer is to select the air handling unit coils and primary/secondary heat exchanger design (and hence secondary loop hot water supply temperature) considering the minimum performance requirements of 125°F supply water from the chiller/heaters at 13°F outdoor air temperature.

K. When the electric boilers are in the secondary loop and the secondary loop utilizes hot water fin tube radiation, hot water convectors, or dual temperature fan coil units with ECM fan motors, the primary loop supply water temperature to the primary loop air handing units and heat exchanger must be greater than the secondary supply water temperature to the secondary loop terminal units (determined by the approach of the heat exchanger). The primary loop return water temperature from the heat exchanger must be greater than the secondary loop return water temperature to the heat exchanger. Designer shall verify that the heat exchanger has the proper primary and secondary supply and return water temperatures.

L. For chiller/heater plant primary loop design, Designer is to consult the air to water heat pump chiller/heater manufacturer to verify that the primary loop has the required minimum water volume from the piping and air handling unit coils/heat exchanger. If necessary, provide a thermal storage tank to supplement the piping and air handling unit coils/heat exchanger water volume to provide the manufacturer required minimum volume of water.

M. Per Section 6.5.4.7 of ASHRAE 90.1-16 (Appendix CA of the 2020 NYC ECC), dual temperature coils (when utilizing chilled water) shall be selected to provide a 15ºF or higher temperature difference between leaving and entering water temperatures across the air handling unit coils and a minimum of 57ºF leaving water temperature from the air handling unit coils at design conditions.

Energy Code Exceptions are as follows:

1. Chilled-water cooling coils that have an air-side pressure drop exceeding 0.70 in. of water when rated at 500 fpm face velocity and dry conditions (no condensation).
2. Individual fan-cooling units with a design supply airflow rate 5,000 cfm and less.
3. Constant-air-volume systems.
4. Coils selected at the maximum temperature difference allowed by the chiller.
5. Passive coils (no mechanically supplied airflow).
6. Coils with design entering chilled-water temperatures of 50°F and higher.
7. Coils with design entering air dry-bulb temperatures of 65°F and lower.

N. For the Basis of Design, Designer may select a manufacturer that uses a step/stage control system where each module has its own isolation valve or select a manufacturer that modulates all modules in unison without the need to have each module have its own isolation valve. Schedule of Equipment and Drawings will show either control scheme, but Designer need not edit specification to only show their basis of design control scheme. Should the contractor submit an alternate manufacturer other than the basis of design that uses a different control scheme, designer shall evaluate that as a possible alternative to the basis of design.

O. Refrigeration equipment such as air to water heat pumps shall be listed and labeled to UL 1995-2011 for A1 refrigerants. As per ASHRAE 15-2022, air to water heat pumps shall be listed and labeled to UL 60335-2-40 for A2L refrigerants (or ETL equivalent listed/labeled). During design, chiller heaters are to be selected utilizing A2L refrigerants such as R32 and R454B, for as of January 1, 2024, such units are not permitted to be manufactured for use in NY State utilizing A1 refrigerants. Designer must verify that the appropriate listing is indicated on the Shop Drawings. If during construction a proposed unit was manufactured prior to the cut-off date, the unit may utilize A1 refrigerants (R410A, R134a or R407C).

4. For packaged heat pump vertical unit ventilators, utilize local outside air intakes/exhausts for each unit to provide ventilation air.

D. For Capacity projects where gas service is not available, use of closet located floor mounted ducted VRF units with DOAS units or vertical UV system may be considered and is to be discussed with the Authority/DOE.

E. For special CIP projects similar to library upgrades, health clinics, etc. where standard SCA systems are not feasible, more costly to install, project duration is very short, or the Authority has chosen the project for a Deep Energy retrofit**,** use of the above systems may be considered and is to be discussed with the Authority.

6.3 Fire Protection

6.3.1 Sprinkler System Design

Description/Design Approach:

A. Sprinkler System Requirements for New Buildings, Additions & Major Modernizations

1. Per Design Requirement 1.3.3.2 "Life Safety for **Non-Ambulatory** Persons – **Use of** Sprinkler Systems" and considering the **reach limitations of the** FDNY equipment for a window rescue, provide wet pipe automatic sprinklers throughout **the school** building except **in** those areas specifically exempted by the NYC Building Code, such as: electrical equipment rooms, **elevator machine rooms, main telecom room and Intermediate Telecom Closets (Sections** BC 903.1.1, **BC** 903.2 **Exceptions**, **BC** 903.3.1.1.1, **and BC** 904.2)**.**

2. As per Section BC 903.2.3 of the 2014 NYC Building Code, an automatic sprinkler system shall be included in the design of new school buildings with the following conditions:

- **Throughout all school facilities with a fire area greater than 20,000 sq. ft. If a building area is below the 20,000 SF, the Authority must be involved in any decision to omit provision of the sprinkler system, as other requirements may compel the use of sprinklers.**
- **Throughout every portion of the school below the level of exit discharge**
  Exception: the automatic sprinkler is not required in any fire area or area below the level of exit discharge if every classroom in the school has at least one exterior door at ground level without intervening corridors, passage-ways or exit enclosures.

a. As per Section BC 903.2.11.2, an automatic sprinkler system shall be installed throughout every above-grade level story of buildings/ schools below a height of 100 ft., other than the first story or ground floor, on which access is not provided directly from the outdoors by at least one window or readily identifiable access panel within each 50 ft. or fraction thereof of horizontal length of every wall that fronts on a street or a frontage space required pursuant to Section 501.3.1 of the 2014 Building Code

b. As per Section BC 903.2.11.3, an automatic sprinkler system shall be installed throughout every first basement or cellar story below grade of buildings on which access is not provided directly from the outdoors within 100 ft. or fraction thereof of horizontal length of every wall that fronts on a street or frontage space required pursuant to Section 503.3.1 of the Building Code.

c. As per Section BC 903.2.11.7, an automatic sprinkler system shall also be provided throughout schools with a floor level having an occupant load of 30 or more that is located 55 ft. or more above the lowest level of Fire Dept. vehicle access.

d. Per Section FC 503.8.2 of the 2014 NYC Fire Code, an automatic sprinkler system shall be provided for in building designs regardless of limitations indicated above

where the building lies on public streets that have an obstructed width of less than 38 feet

3. **The design of an automatic sprinkler system shall be in accordance with Section BC 903 of the Building Code, NFPA 13-2007 as amended in Appendix Q and the Fire Code**

4. **In accordance with Article 8.15.5.1 of NFPA 13-07**, sidewall spray sprinklers shall be installed at the bottom of each elevator hoistway, not more than 2 feet above the floor of the pit. The sprinklers at the bottom of the hoistway required by the above shall not be **installed** for enclosed non-combustible elevator shafts that do not contain combustible hydraulic fluids (i.e. geared traction elevators).

5. **As per Article 8.15.5.4 of NFPA 13-07, o**rdinary or intermediate temperature rated, upright or pendant spray, sprinklers shall also be provided at the top of elevator hoistways unless the hoistway for the passenger elevators is non-combustible and the car enclosure materials meet the requirements of ASME A17.1, Safety Code for Elevators and Escalators. **A policy of no use of combustible materials in the car enclosure is a feature among others required by the Authority in Division 14, Conveying Systems.**

6. Sprinklers shall be provided in all Classroom/Office Wardrobes and Material Supply Closets.

7. Per **Section 8.15.2.3 of** NFPA 13-**2007**, where accessible vertical shafts have noncombustible surfaces, one sprinkler shall be installed near the bottom. Per **Section** 8.15.2.2.1 **of NFPA 13-2007, where vertical shafts have combustible surfaces, one sprinkler shall be installed at each alternate floor level. If the shaft having the combustible surfaces is trapped**, **an additional sprinkler shall be installed at the top of each trapped section.**

8. Per NFPA **13-2007, Article 8.15.3.2**, in noncombustible stair shafts with noncombustible stairs, sprinklers shall be installed at the top of the shaft and under the first landing above the bottom of the shaft. Where noncombustible stair shafts are divided by walls or doors, sprinklers shall be provided on each side of the separation. Sprinklers shall **also** be installed beneath landings or stairways where the area beneath is used for storage.

9. Refer to Design Requirement DR 6.**3**.**5** for seismic requirements for sprinkler and standpipe systems. **In addition, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 Building Code and interpretations by the DOB relating to such determination. Any applicable seismic loads and requirements shall be permitted to be determined in accordance with Chapter 16 of the 2014 Building Code or the 1968 Building Code and Reference Standard RS-9-6 of such code.**

10. **Additions/Major Modernizations**

    a. **As per Section BC 901.9.3, fire protection system shall be provided in enlarged portions of schools and where the fire protection provisions of Section BC 901 would require a sprinkler system in new construction for a space or building.**

    b. **As per Section BC 901.9.4.1, if the value of alterations to a school equals or exceeds 60% of the value of the existing school, the entire school shall be made to comply with the fire protection requirements of the Section BC 901 as if the school were hereafter erected.**

c. As per Section BC 901.9.4.2, if the value of alterations of a space is between 30% and 60% of the value of the existing school those portions of the school being altered shall be made to comply with the fire protection requirements of Section BC 901.

d. As per Section BC 901.9.2, where a change is made in the main use or dominant occupancy in a building, the entire building shall be provided with a sprinkler system as if the building were hereafter erected. A change in the occupancy group classification, or usage of a space/ room, shall also trigger sprinkler requirement for the space.

f. Sprinklers required due to a change in use of a space(s) or room(s) may <u>not</u> be needed if the space(s) or room(s) were built and classified as "G Occupancy" per the 1968 Building Code and can now be classified as "E Occupancy", the equivalent of the retired "G Occupancy". Refer to DR 1.3.2.1 – Occupancy Classifications for Rooms and Spaces in School Buildings.

B. Sprinkler Requirements for Capital Improvement Projects (CIP)

1. As per Section BC 901.9.1, additions, alterations, or renovations to an existing sprinkler system shall conform to that required for a new sprinkler system without requiring the existing system to comply with all of the requirements of the 2014 Building Code, except as otherwise required in Sections BC 901.9.2 through BC 901.9.6. Additions, alterations or repairs shall not cause an existing installation to become unsafe, hazardous or overloaded.

2. Minor additions, alterations, renovations and repairs to existing sprinkler system shall meet the provisions for new construction unless such work is done in the same manner and arrangement as was in the existing system, is not hazardous and is approved. Refer to Section BC 901.9.1.1.

3. Sprinkler requirements listed in this section for CIP projects also apply to Section A for New Buildings, Additions and Major Modernization projects.

4. As per Section BC 901.9.2, a change in the occupancy group classification, or in the usage of a space or rooms, shall trigger sprinkler requirement for the entire space if required by the code (refer to paragraphs below, which apply when changing the space or occupancy). However, the sprinkler requirement due to a change in the use of a space or rooms does not apply to spaces or rooms built and classified as "G Occupancy" per the 68 code and which may now be classified as "E Occupancy", the equivalent of the retired "G Occupancy". Refer to DR 1.3.2.1 – Occupancy Classifications for Rooms and Spaces in School Buildings.

5. An automatic sprinkler shall be installed in the following areas:

a. **In assembly spaces as per Section BC 903.2 for the conditions listed in BC 903.2 for each assembly group. The automatic sprinkler shall be provided throughout the floor area where the Group occupancy is located, and in all floors between the Group A occupancy and the level of exit discharge.**

b. As per Sections BC 903.2.9 and BC 903.2.9.1, in Storage Group S-1 occupancies and subject to the following conditions:

- **The fire area of the S-1 occupancy exceeds 500 sq. ft.**

- **The Group S-1 fire area is located more than 3 stories above grade plane. Group S-1 storage occupancies include: Workshops, Central Book Storeroom, Central Shop Storeroom, Custodian's Supply Storeroom, Custodian's Workshop, Duplicating Room, Engineer's Closet, Furniture Storeroom, Receiving –General Supply Room, Wood-working Shop and Storeroom, Ceramics Shop and Storeroom, Library Stacks, Graphics Arts and Storeroom, Home Economics and Storeroom, Kitchen Storeroom, Paint Storage, Spray Booths, Wardrobe areas, etc.**

c. As per Section BC 903.2.10.2, in S-2 occupancies such as: Refuse Collection and Disposal Areas, Walk-in Trash Refrigerator

6. As per Section BC 410.6, **sprinklers shall be provided in: Dressing rooms, Performer Lounges, Workshops, and Storerooms accessory to a stage; under the roof, gridiron, catwalks and the galleries over a stage. Automatic sprinklers shall also be required above rigging lofts; and above all stage areas other than those portions of stage areas specifically designated on approved plans as performing areas that do not have rigging lofts above and that are not at any time used for storage purposes.**

In addition, provide sprinklers**, spaced 5 feet on centers,** at the ceilings below stage trap doors, stage stairs and stage lifts.

7. An approved stage water curtain, as per Section BC 410.3.5, shall be provided over a proscenium curtain to activate automatic deluge sprinklers **that are** driven by a "**rate of rise system" and "fixed temperature"** system. **The deluge system shall be required where the stage height is greater than 40 ft. as measured from the lowest point on the stage floor to the highest point of the roof or floor deck above the stage.**

8. As per Section BC 424.6.1, Science Labs and Prep Rooms shall be provided with automatic sprinklers**. As per** Section BC **424.8**, Acid Storage Rooms shall be classified in occupancy group S-1 if all of the conditions of **Section** BC **424.9** are met. S-1 spaces shall be provided with one sprinkler every 90 square feet per BC **424.9.7.**

9. As per MC 1305.13.3. 2, provide sprinklers in **Fuel-oil tank and Fuel-oil-burning equipment, Emergency Diesel Generator tank rooms, that are** above ground and above the lowest floor inside a building.,

10. As per **Section** BC 404.3, Atriums shall have an automatic sprinkler system installed throughout (building wide). Exception 1: That area of the building adjacent to or above the atrium need not be sprinklered provided that portion of the building is separated from the atrium portion by **not less than** 2-hour fire barrier**s constructed in accordance with Section 712** . Exception 2: Where the ceiling of the Atrium is more than 55' above the floor, sprinkler protection at the ceiling of the atrium is not required.

10. The Designer shall identify all concealed spaces requiring sprinkler protection per Section 8.15.1 of NFPA 13- **2007** (concealed spaces enclosed wholly or partly by exposed combustible construction or used for the storage of combustible materials or contain combustibles associated with building system features such as large bundles of computer

wiring, large quantities of non-metallic piping, etc). Sprinklers need not be provided in concealed spaces if the conditions defined in Sections **8.15.1.2.1** through **8.15.1.2.16 and 8.15.6** are met.

C. General Design

1. Sprinkler layout drawings shall be dimensioned, including pipe sizes, distance between heads, and distances to walls, and shall include standard sprinkler notes as required by the NYC **Building** Code.

2. An alarm valve shall be installed on the **water** service**s supplying water to the sprinkler system**. Flow switches shall be installed on upper floor branches. System shall produce a waterflow alarm and shall be capable of indicating **the** floor where **the** sprinkler **head** was activated. Sprinkler alarm bell and sign associated with flow switches shall be provided under Electrical.

3. **The** system shall be hydraulically designed utilizing the most cost effective of the "tree" type or "loop" type configuration. Minor alterations to an existing pipe schedule system may be done by the pipe schedule method that conforms to water requirements listed in Table 11.2.2.1 of NFPA 13**- 07.** Whether hydraulically designed or designed by the pipe schedule method, the system shall comply with the requirements of NFPA-13 **2007** as modified by the New York City Construction Code Appendix Q. A sprinkler booster pump or fire pump system shall be provided if the hydraulic calculations indicate that the street pressure is inadequate to properly pressurize the highest floor sprinkler heads. The engineer shall submit the hydraulic calculations complete with the DEP hydrant flow test letter. A **ten** (**10**) psi safety factor shall be used in the calculations.

4. During review of the design and shop drawings **submitted** by the Contractor's engineer during the construction phase, **the Engineer of Record (EOR) shall** not **approve** reduction in size of risers, mains, and sub-mains. Only branch piping may be revised by the Contractor to accommodate the need for additional sprinkler heads or the rerouting of piping due to interferences. **The EOR shall** ensure that hydraulic calculations required to be submitted by the Contractor's engineer provide for the minimum ten (10) psi safety factor as per the original design. As per **a** decision **made** by the Authority and as included in the specifications **for the project,** the Contractor's engineer **shall supersede the original applicant and shall** become the Engineer of Record for the Fire Protection system and will be responsible for all **subsequent** filings with BCC.

5. Per **Section** BC 903.1.2.4, in buildings where a new separate fire sprinkler system is required, the available water pressure at the top and bottom floors of each zone shall be shown on the riser diagram.

6. Installation of automatic sprinkler systems shall comply with the Special Inspection requirements of the Building Code, Chapter 17

7. Note for cases where a fire standpipe system is required, it is preferred to combine the standpipe system with the sprinkler system.

8. Quick Response Sprinklers: This type of sprinkler head shall be utilized for light hazard occupancies only as per **Section** BC 903.3.2.

9. Sidewall Horizontal Quick–Response Extended Coverage: To maximize the coverage area, horizontal sidewall quick-response extended coverage sprinklers in lieu of the standard type may be used for light hazard occupancies in the following scenarios:

    - Unobstructed construction consisting of flat, smooth ceilings with a slope not exceeding a pitch of one in six (a rise of two units in a run of 12 units, a roof slope of 16.7 percent)

    - Unobstructed or noncombustible obstructed construction, where specifically listed for such use

    - Within trusses or bar joists having web members not greater than 1 in. maximum dimension or where trusses are spaced greater than 7 ½ ft on center and where the ceiling slope does not exceed a pitch of one in six (a rise of two units in a run of 12 units, a roof slope of 16.7 percent)

    - Under smooth, flat ceiling that have slopes not exceeding a pitch of one in three (a rise of four units in a run of 12 units, a roof slope of 33.3 percent), where specifically listed for such use.

6.3 Fire Protection

6.3.2 Fire Standpipe and Hose System Design

Description/Design Approach:

A. Standpipe System Requirements for New Buildings, Additions and Major Modernizations

1. Standpipe and hose systems, where required by the **2022** NYC Building Code, shall be installed in accordance with NFPA 14-20**16**, Standard for the Installation of Standpipe and Hose Systems, as modified in Appendix Q, **Section Q**105, of the **2022 NYC** Building Code. **Where both a standpipe and an automatic sprinkler system must be provided, the designer shall design a combination manual wet standpipe and automatic sprinkler system for low-rise school buildings and a combination automatic wet standpipe and automatic sprinkler system for high-rise school facilities.**

2. Standpipe systems shall be installed where required by Section BC 905.3.1 (Applicability) and Section BC 905.3.5 (Underground Buildings) **of the 2022 NYC Building Code** and in the locations indicated in Section BC 905.4. Standpipe systems are permitted to be combined with automatic sprinkler systems per Section BC 905.3**; and as indicated above, combining the standpipe and the sprinkler system must be considered first, whenever possible.**

   a. **A class I standpipe shall be installed as is permitted by BC 905.3.1, and provided that the conditions relating to the requisite number of storage cabinets plus tools for combatting a fire, and signage, as outlined in the exception provision of Section BC 905.3.1, are complied with. A class I standpipe shall be installed in the following buildings:**

      1) In buildings two stories or more in height with floor area of 10,000 square or greater on any story;

      2) In buildings 3 stories or more in height with floor area of 7,500 square feet or greater on any story;

      3) In buildings of any area with a floor level having an occupant load of 30 or more that is located 55 feet or more above the lowest level of fire department vehicle access.

      4) In buildings of any area, constructed in accordance with Section BC 403 (high-rise buildings), with occupied floors located 75 feet or more above the lowest level of fire department vehicle access.

   b. As per Section BC 905.3.8, buildings with a rooftop garden, landscaped roof, green roof or roof used for any purpose other than weather protection or maintenance that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the rooftop garden, landscaped roof, green roof or roof used for any purpose other than weather protection or maintenance.

c. As per Section BC 905.3.5, underground buildings shall be equipped throughout with a class I automatic wet or manual wet standpipe system.

1) **Where an automatic wet standpipe system is provided in a high-rise school, such automatic wet standpipe system shall be extended to portion of the building that is located below grade.**

3. Additions/Major Modernizations/Capital Improvement Projects

a. As per Section BC 901.9.3, fire protection system shall be provided in enlarged portions of schools and where the fire protection provisions of Section BC 901 would require a standpipe system for a space or building.

b. As per Section BC 901.9.4.1, if the value of alterations to a school equals or exceeds 60% of the value of the existing school, the entire school shall be made to comply with the fire protection requirements of Section BC 901 as if the school were hereafter erected.

c. As per Section BC 901.9.4.2, if the value of alterations of a space is between 30% and 60% of the value of the existing school, those portions of the school being altered shall be made to comply with the fire protection requirements of Section BC 901

d. As per Section BC 901.9.2, where a change is made in the main use or dominant occupancy in a building, the entire school shall be provided with a standpipe system as if the building were hereafter erected.

e. Per Section BC 901.9.5.2, where an alteration includes the addition or replacement of an entire exit stair shaft that is a required means of egress, the entire shaft shall be equipped with a standpipe in accordance with Section BC 905.

f. Per Section BC 901.9.5.3, where the alteration involves the addition of stories to a school with an existing standpipe system, and one or more stair shafts are not currently equipped with standpipes, standpipes shall be provided to all stair shafts in accordance with Section BC 901.

Exception: additional standpipes are not required where:

1) The alteration involves the addition of only one (1) story.

2) Existing standpipe in existing stair shafts are extended in accordance with Section BC 901.

3) Standpipe hose connections are provided in compliance with Section BC 905.4 Item 6; and

4) The demand on the standpipe system, including any additional demand, with respect to flow and pressure does not exceed the capacity of the existing approved system

g. As per Section BC 901.9.5.4, where an alteration involves the addition of stories to a school with no existing standpipe system, standpipes shall be provided to all stair shafts in accordance with Section BC 901.

Exception: standpipes are not required where:

1) The alteration involves the addition of only one (1) story

2) The completed building does not exceed 7 stories; and

3) The completed building does not exceed 85 ft. in height

4. Dry standpipes shall not be installed except where subject to freezing and in accordance with NFPA 14**-16** as per Section BC 905.8.

5. Hydraulically designed standpipe system shall be designed to provide a minimum residual pressure of 65 psi (per **Section** Q105 modifications to NFPA 14**-16** Section 7.8.1).

6. As per Section BC 905.3.4, stages greater than 1,000 square feet in area and any assembly occupancy with a stage and an occupant load of 1,000.00 or greater shall be equipped with a Class III wet standpipe system with **a hose station (with a** 1.5-inch and 2.5-inch hose connections **per Section BC 905.6)** on each side of the stage.

B. General Design

1. Construction documents for standpipe systems (per Section BC 905.1.1) shall contain plans that include at least the following data and information:

a. The locations and sizes of all risers, cross-connections, hose racks, valves, hose connections, Fire Department connections, sources of water supply, piping, and other essential features of the system. As per Section 7.3.1.2 of NFPA 14**-16,** hose connections shall not be obstructed by the closed or open door or other objects on the stair landing. Size and location of cabinet must also take into account the likelihood that a pressure restricting device might be required for limiting the residual pressure at the hose connection. Coordinate location with Project Architect.

b. A floor plan for each group of floors that have typical riser locations and no special features within such group of floor levels, with the indication in title block of such plan indicating clearly the floors to which the arrangement is applicable.

c. A riser diagram showing the essential features of the system, including the risers, cross-connections, valves, Fire Department connections, tanks, pumps, sources of water supply, pipe sizes, capacities, floor heights, zone pressures, and other essential data and features of the system.

d. The available water pressure at the top and bottom floors of each zone, and at each floor where the weight pipe fittings change, shall be shown on the riser diagram.

e. For street pressure-fed systems and fire/sprinkler booster pumps, a statement from the New York City Department of Environmental Protection, giving the minimum water pressure in the main serving the building.

2. Installation of Fire Standpipe Systems shall comply with the Special Inspection requirements of Section BC **1705.30.**

3. Refer to the Design Requirement, DR 6.3.5 for Seismic Requirements for Sprinkler and Standpipe Systems. In addition, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 Building Code and interpretations by the DOB relating to such determination. Any applicable seismic loads and requirements shall be permitted to be determined in accordance with Chapter 16 of the **2022 NYC** Building Code or Reference Standard RS-9-6 of the 1968 NYC Building Code.

6.3 Fire Protection

6.3.3 Sprinkler Floor Control Valve Assembly Location

Description/Design Approach:

A. **The** preferred location for the floor control valve assembly for the sprinkler system is in a janitorial closet space. If the layout of the system piping **will not facilitate placing the valve assembly in the janitor closet**, **it** shall be located in a stairwell and enclosed in a recessed cabinet. **Construction documents shall show the recessed cabinet. The floor control valve assembly is required for low-rise as well as high-rise buildings.**

B. The floor control valve and its related piping, including the drainage pipe, shall run exposed when placed inside a janitorial closet.

C. When placed in the stairwell, the valve assembly mounted **inside** the cabinet shall be so arranged as to provide for proper clearance for valve operation. The cabinet shall be a lockable type with door and handle. It shall be labeled with permanently affixed white letters not less than 2 inches high on **a** red background that reads “Floor Control Valve”. The Contractor has **the option of creating** a recessed panel **instead of providing a recessed** cabinet, **but accessing the inside of the recessed panel shall be via** custodial type tools and the **wall** fire rating **in the stairwell must** be maintained.

6.3 Fire Protection

6.3.4 Hydrant Flow Test

Description/Design Approach:

A. The water demand of the fire protection system shall be met by water supplied by the DEP. To ensure that the city water mains can deliver the necessary flow to the school's fire protection system, the Engineer of Record shall petition the DEP for a hydrant flow test for each water service that will support the fire protection system. Test reports are required to document that the city water infrastructure can provide the system's water demand.

B. The hydrant flow test results shall be requested to meet the greater of 100% system water demand or 150% of the fire/sprinkler booster pump rated capacity. Should the hydrant test reports indicate that the system water demand or the fire/sprinkler booster pump rated capacity cannot be met), the design must incorporate an additional means for the water source, such as a suction tank, in order to satisfy that demand.

C. However, if the hydrant test reports indicate that the city water mains can supply 100% of the system's water demand and the fire/sprinkler booster pump rated capacity, but not the 150% of the fire/sprinkler booster pump rated capacity, no additional step is required in order to increase the water supply. The hydrant flow test result shall be used as supporting documentation to justify why the 150% point in the fire/sprinkler booster pump **curve** cannot be achieved. The system demand shall be indicated on the filing documents that are submitted to the Authority's Building Code Compliance (BCC) unit.

D. The hydrant flow test shall be conducted not more than 9 months prior to design completion. The hydrant flow test results shall be included in the filing documents for the fire protection system that are submitted to the Authority's Building Code Compliance (BCC) unit.

6.3 Fire Protection

6.3.5 Fire Protection Seismic Design Criteria

Description/Design Approach:

A. As per Section BC 1613.1 of the **2022** NYC Building Code, every new school building structure, and portions thereof, including nonstructural components (architectural, MEP, fire protection) that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-**16**, excluding Chapter 14 and Appendix 11A. The Seismic Design Category will be determined by the structural Engineer of Record and indicated on the structural drawings.

B. Per Section BC 1601.2.3, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 NYC Building Code and interpretations by the DOB relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including the bracing of the fire protection system and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** NYC Building Code or reference standard RS 9-6 of the 1968 NYC Building Code.

1. If an existing building is required to meet seismic requirements as per the criteria described in DR 3.1.3 and a waiver from the Department of Buildings (DOB) cannot be obtained, the fire protection retrofit work must then meet such requirements.

C. For new additions, any fire protection related item in the existing building that is integrated with the system in the new addition that is required to function after an earthquake shall also meet the seismic requirements of the addition. Existing bolting of equipment to its pad and doweling of pad to floor slab shall be analyzed.

D. New School Buildings and Additions constructed after LL17/1995 went into effect are subject to the seismic requirements of the New York City Construction Codes and are considered Structural Occupancy/Risk Category III, “Buildings and other structures that represent a substantial hazard to human life in the event of failure” for seismic design as per BC Table 1604.5.

1. Seismic Design Category shall be determined by the project structural engineer. The Seismic Design Category for a structure is determined in accordance with Section BC 1613. The Seismic Design Category is to be indicated on the Structural Drawings (Refer to Detail 0100054a) and Component Importance Factors related to fire protection shall be indicated on the Fire Protection drawings. (Refer to Standard Detail 1530301a).

2. Component Importance Factors (I_p) are prescribed in **Chapter 13 of** ASCE 7-**16**. The following components have I_p=1.5 (Refer to Standard Details 1550301a for a specific listing of common items):

   a. Life safety components required to function after an earthquake. This includes emergency generator systems/standby generators connected to fire pumps/sprinkler booster pumps, fire pumps, sprinkler booster pumps, jockey pumps, gravity storage tank, all piping, etc. Functioning after an earthquake means just long enough to evacuate the building as opposed to functioning as a disaster relief center. Per Section 13.2.2 **of ASCE 7-16**, these items to remain operable following the design earthquake ground

motion shall be certified by the manufacturer as operable whereby active parts or energized components shall be certified exclusively on the basis of approved shake table testing in accordance with Section 13.2.5, analysis or experience data in accordance with Section 13.2.6, unless it can be shown that the component is inherently rugged by comparison with similar seismically qualified components. Evidence demonstrating compliance with this requirement shall be submitted for approval by the SCA after review and acceptance by the Contractor's registered design professional.

b. Components with I_p=1.0 located above or in proximity to components with I_p=1.5 which could damage the I_p=1.5 equipment shall be braced.

3. For Seismic Design Category B, all fire protection components are exempt from seismic requirements.

4. For Seismic Design Category C, all fire protection components have an I_p=1.5 and shall be designed and constructed to seismic requirements.

5. Appropriate seismic coefficients to be utilized in the design of seismic resistance for the fire protection system shall be those listed in Table 13.6-1 of ASCE 7-16.

6. Fire protection components like pumps, control panels, etc. along with their attachments or supports to the structure shall be designed in accordance with Section 13.4 of ASCE 7-**16**. They shall be bolted, welded or otherwise positively fastened without consideration of the frictional resistance produced by the effects of gravity. A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be provided. The component forces shall be those as determined by the calculations outlined in Section 13.3.1.

7. As per Section 13.6.**7**.2 **of ASCE 7-16**, sprinkler and standpipe piping, pipe hangers, and bracing designed and constructed in accordance with NFPA 13 shall be deemed to meet the force and displacement requirements of Section 13.6.**7**. The exceptions listed in Section 13.6.**7**.3 do not apply.

8. When seismic design is required, generic seismic restraint details shall be shown on the contract drawing bid set. A note shall be added stating, "Details are shown to illustrate the scope of work. Contractor's registered professional engineer shall provide calculations and be responsible for providing signed/sealed coordinated shop drawings indicating locations of seismic restraints and the required connection details to file with the DOB/BCC".

9. All bracing devices shall be qualified through either analysis or be tested and certified in accordance with ICC-ES AC 156. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to seismic bracing designs must be stamped by the Contractor's Registered Professional Engineer with at least five years of seismic design experience in non-structural building components in New York State.

10. All attachments of hangers and bracing shall be positive attachments that shall be cast-in-place anchors, drill-in wedge anchors, or a welded or bolted connection to structure. Drill-in wedge anchors shall be epoxy adhesive base and shall have an evaluation report number

from ICC-ES verifying their allowable loads. Anchors must be certified for use in cracked concrete.

E. The following note is to be included on the fire protection drawings:

"For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a Professional Engineer licensed in the State of New York engaged by the Contractor. The Engineer shall provide installation supervision of all seismic supports and restraints. The Contractor's Registered Professional Engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings."

6.3 Fire Protection

6.3.6 Fire Protection Pump Selection

Description/Design Approach:

A. General

Fire protection for schools shall be by either a combined manual wet standpipe and **automatic** sprinkler system or a combined automatic wet standpipe and sprinkler system, depending on whether the structure is a low-rise or high-rise building. The capacity and the type of pump selected for boosting the pressure in a fire protection system **will** depend on the system that is chosen.

B. Low-Rise Buildings

1. For low-rise buildings, provide a **combination** manual wet standpipe and sprinkler system, **in which case the system relies on the** fire department pumper for (aka FDNY fire truck) **providing** the water flow rate and **the** pressure **necessary** for **operating** the standpipe portion of the system. The manual wet standpipe **and automatic wet sprinkler** system allows the designer to **select** a pump that only needs to meet the demands of the sprinkler portion of the fire protection system.

2. **Where** all of the conditions laid out in Appendix Q, **Section Q**102, of the **2022** NYC Building Code for an accepted use of a sprinkler booster pump are complied with, increasing the water pressure for the fire protection system **shall** in most cases be done using a sprinkler booster pump as is **intended** in Section **9.1.4** of NFPA 14-**16**. **The designer shall pay a special attention to ensure that if a sprinkler booster pump is selected that the water pressure from the city water mains can provide 5 psi at the most remote sprinkler head.** The 5 psi pressure requirement can be omitted if a secondary power supply is provided to drive the sprinkler booster pump and such power is controlled by automatic switching.

3. Determination of the water demand requirements for a sprinkler system shall be done as per the hydraulic calculation methods as outlined in Section 11.2.3 of NFPA 13-**16**. As per**mitted by Section 24.2.3.4** of **Section** Q102, a sprinkler booster pump shall require only one (1) water service. However, **there shall be a secondary/back-up water source to the sprinkler system consisting of** a connection taken from the domestic water service **as described in** DR 6.1.4.

C. High-Rise Building

1. For high-rise buildings, a combination automatic wet standpipe and sprinkler system shall be provided. The high water flow and pressure demands of a combination automatic wet standpipe and sprinkler system are associated with the building height**, and when the water and pressure needs of the automatic standpipe system are factored into the hydraulic calculations, the pump choice shall be** a fire pump. The fire pump selection shall be made so as to account for the water demand and the residual pressure requirements for the standpipe system as outlined respectively in the hydraulic calculation requirements and the minimum/maximum pressure limits of Sections 7.10 & 7.8 of NFPA 14**-16 as amended by Appendix Q, Section Q105, of the 2022 NYC Building Code.**

2. The reliability and **the** adequacy of two (2) water services from two (2) different streets **for** supplyin**g water to** the fire pump in a high-rise building shall be investigated during the design, **as two separate sources are required by Section 9.1.4 of Section Q105**. Where **either** two water services are not available or if **one or both** of the two water services lack the capacity to supply the **required** system water flow rate demand, the design shall provide for suction tank(s) capable of storing sufficient volume of water for 1/2-hour worth of the rated capacity of the fire pump.

6.3 Fire Protection

6.3.7 Miscellaneous Fire Protection Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the Fire Protection Drawings:

1. While the POR provides for a room size for the fire pump room, it is intended as a place holder. Additional equipment, size of the pump, and required clearances may require the space to be larger. Designer is to determine what is needed to be placed in the space and pump size early in the project to determine if a larger room is needed.

2. MEP equipment and systems not related to the fire pump shall not enter or transverse a fire pump room, which per Section **4.13.1.1.5 o**f NFPA 20-**16** states that fire pump rooms shall be free from storage and penetrations not essential to the operation of the pump and related components. Sprinkler booster bumps may be located in mechanical rooms that have a 2-hour enclosure as per exception 3 of BC 913.2.1 of the **2022** NYC Building Code.

3. As per Section 110.26(E) of the NYC Electrical Code, ensure that no fire protection piping or equipment is run in the dedicated electrical space above switchboards, panelboards and motor control centers, as a structural ceiling above those items would then be required or a means to collect water from the condensate or leaks that may be produced from the system. In general, avoid running any items other than what is required to service the room. If the space is required to be sprinklered, provide a pan protection system under all piping to keep area protected from condensate and leaks.

4. Designers must be aware that many older schools have cinder concrete framed slabs and this is to be investigated with the structural engineer. It is not permitted to use post-installed anchors in cinder concrete, and thus drawings should clearly take into account that support of piping, etc. is to be from the structural beams either by direct connection to the beams or from installation of ‘unistrut’ type supports running between beams. Indicate removal and repair of the beam encasement to facilitate the attachment.

6.4 Elevators

6.4.1 Elevator Design

Description/Design Approach:

A. New Construction

1. General Background

a. Traction and hydraulic drives represent the two basic types of passenger/service elevator applications currently acceptable for Authority projects, though for most applications traction elevators are to be utilized.

b. With respect to the hydraulic application, both the in-ground and holeless type have acceptable track records though both types are very dependent on a plumb installation to prevent leaking of hydraulic fluid. The troublesome well drilling for the jack and the potentially negative environmental impact associated with the in-ground type has contributed to a decline in its popularity. Additionally, watertight casings and PVC liners are required for all in-ground applications and the assurance that the pits are located above the current or anticipated water tables. For new construction, in-ground applications are not to be used. Eclipsing the in-ground is the holeless type with all jacking equipment located above ground, thereby eliminating well drilling and contributing to a more “green” product.

c. In its simplest form, a single stage holeless is limited to a travel distance of approximately 13’-0”, with a second stage added to the jacking system to extend the travel to approximately 22’-0”. However, additional stages are not recommended. Higher travel distances using hydraulic types are typically achieved through the use of a dual roped hydraulic unit, a variant of the holeless type. Roped hydraulic elevators were developed to expand the travel of hydraulic elevators to approximately 60’-0” of travel. Another version of the roped hydraulic is the counterweighted roped hydraulic, which utilizes a counterweight mounted on top of the jack assembly. The introduction of a counterweight reduces the overall power requirement of the unit and makes the system more economical, but due to the limited number of manufacturers they are not widespread and thus the counterweighted roped hydraulic elevators are not to be considered for Authority projects.

d. Holeless applications employing a cantilever design create considerable torque upon the guide rails, necessitating supplemental structural supports and are not considered for Authority Projects.

e. Most elevator travel distances for SCA projects are expressed in the number of floors based on the 14 to 15 feet of travel. Thus specific selection at the limits of the elevators is to be discussed and actual travel distance in feet determined.

2. Elevator Selection Criteria

All proposed application designs shall be submitted to the Authority for review during the Design Development Phase. The Consultant is required to obtain the services of an elevator

consultant to recommend the selection and provide the Contract Documents for the elevator, as well as provide the other required design data to the other trades.

a. For travel distances of one floor, provide a direct acting holeless hydraulic elevator with a rated speed of 125 fpm.

b. For travel distances of two floors or greater, provide an overhead gearless traction 1:1 roped unit (with regenerative drive) with a rated speed of 200 fpm. As an alternate in existing or new schools, if the design does not lend itself to an overhead traction, a roped hydraulic elevator may be used for up to five floors of travel with a rated speed of 125 fpm.

c. For travel distances of greater than five floors where the general school population must be moved utilizing the elevators, provide an overhead gearless traction 1:1 roped unit (with regenerative drive) with a rated speed of 350 fpm.

3. Elevator Cab Size and Capacity

a. For all buildings, except those serving a high population of limited mobility students where a larger elevator may be required, elevators are to be of 3500 lb capacity with a clear cab size of 6'-8" wide x 5'-4" deep (38 SF maximum inside area) and designed to accommodate a 24" by 84" ambulance stretcher (as required by Section BC 3002.4.2 of the 2022 NYC Building Code) in the horizontal, open position. Door must be a 3'-6" side slide door, with single-speed being preferable. Indicate in documents for contractor to provide international symbol for emergency medical services (star of life) for such cabs. All cabs shall have rigidized stainless panels and VCT flooring that complies with Sections 302 and 407.4.2 of ICC 117.1-2009. Elevators sharing a shaft shall be of the same size and capacity regardless of whether they serve a different number of floors and could be of different sizes.

b. For schools serving a high population of limited mobility students, or where the general student population must be moved to upper floors, elevators are to have a 6,000 lb capacity with a cab size of approximately 6'-0" wide by 9'-8" deep (58 SF maximum inside area) with a preferred 4'-0" single-speed center-opening door. All efforts are to be made to assure the proposed elevator will accommodate three wheel chairs and attendants (if center-opening will not work, provide a 4'-0" two-speed side-slide door).

c. For 3K and Pre-K leased spaces, which are typically only 2 or 3 stories, elevators are to be if 2100 lb. capacity meeting ADA requirements with a clear cab size of 6-8" x 4'-3" with single speed side opening door.

d. Where a dedicated elevator is required to serve the kitchen, provide a 3500 lb. capacity elevator with 4'-0" center opening door.

4. Elevator Quantity

Refer to SCA Design Requirement 1.3.4.5. If building design is such that it will require substantial use of vertical transportation to move students, a written traffic analysis is to be performed by the Architect/Elevator consultant indicating how the population will be moved within a class change period. This may require banks of elevators or elevators of different sizes.

5. Codes

   ASME A17.1, A17.2, A17.3 (for year referenced per Appendix K of the 2022 NYC Building Code and as modified per Appendix K, Chapters K1 and K3) and the 2022 NYC Building Code are the governing codes.

6. Design Criteria

   a. Elevator Machine Room

      1) For hydraulic elevators, the machine room shall be located adjacent to the hoistway at the lowest landing. For overhead traction elevators, the machine room shall be located directly over the hoistway. In all cases, the machine room shall be sized to accommodate maintenance and replacement of equipment. Provide a minimum of 3'-6" clearance around or in front of equipment as required by the electrical code. Provide 3'-0" minimum clearance above gear housing in traction elevator machine rooms to allow removal. Position vent duct to avoid interferences and maintain appropriate clearance depending on equipment. Coordinate with the electrical engineer to provide adequate power for the elevator, including all auxiliary equipment such as oil heaters, oil coolers, control equipment, etc.

      2) Notify the design team of the following:

         - Machine room must have the same rating as the hoistway as per Section BC 3005.4.
         - Machine rooms shall not be sprinklered or have such piping in the room as per Section BC 3005.5.
         - Plumbing systems not related to the elevator machinery shall not enter or traverse the room as per Section BC 3005.6.
         - MEP systems not related to the elevator machinery or elevator machine room shall not enter or traverse the room as per ASME A17.1-2013.

   b. Fixtures and Entrances

      The Authority uses vandal-proof fixtures and standard entrances. They are described in each section of the specifications as well as shown on design details. Approval from the Authority must be obtained prior to any deviation from these details.

         - To assist emergency personnel, all elevators shall be provided with digital position indicators located on the car operating panel and in all hall call stations.
         - The car-operating panel shall be provided with engraving indicating the "Elevator Inspection Certificate is on file in the Custodial Engineer's Office".
         - A master push button/card operated keyswitch shall be integral with the main floor hall fixture. This keyswitch will permit the selection of the access control feature for the elevators.
         - If all elevators connected to the emergency generator can run simultaneously (typically for high-rise buildings with three or less elevators), provide an indicator light with the wording "Elevator Emergency Power" on the hall push button station.

c. Controls

Gearless traction elevators shall use a permanent magnet alternating current (PMAC) gearless traction machine. Motor controls for all hydraulic operations shall have solid state starting. Geared traction elevators shall use AC Variable Voltage Variable Frequency drives. Signal controllers shall be solid-state microprocessors.

d. Machine Room Heating/Ventilation

An ambient temperature between 50°F and 90°F and relative humidity of no greater than 95% is to be always maintained in the Elevator Machine Room (EMR). Additionally, hydraulic elevator machine rooms must be vented directly to outside air. Mechanical ventilation is the Authority's preference in order to minimize odors associated with hydraulic oil. Refer to HVAC Design Requirement DR 6.2.28.

e. Generic Equipment

Use only "generic" type equipment in nature and design. This means that the equipment is manufactured by an independent supplier that will sell to any installer and will support any maintenance contractor of the equipment. This applies to, but not limited to, controllers, pump units complete, motor drives, car and hoistway door operating equipment including interlocks and door operators and fixtures. Refer to the specifications for approved manufacturers.

All solid-state signal control equipment must be furnished with complete diagnostic kits and full maintenance information including passwords and codes.

f. Rope Grippers

Rope grippers shall be provided on all new traction elevators. Rope grippers may also be provided on modernized elevators, depending on the scope of upgrading.

g. Hydraulic Elevator Power Unit Design Requirement

For hydraulic elevators, do not use submersible pump motors. Pump motor shall be external w/ v-belt drive or vertical mounted. Hydraulic elevators are to be designed for 120 starts per hour regardless of intended usage in order to provide a factor of safety for future performance. This is typically accomplished by providing more oil in tank and using an oil cooler and is intended to keep the oil viscosity constant.

h. Roped Hydraulic Elevator Overspeed Governor

The governor shall be pit mounted and must be provided with NEMA 4 governor switches and protective cage. Remote set/reset governors are not permitted.

i. Hydraulic Elevator Pits

The pit shall be a minimum of 5'-0" deep and provided with a 2'-0" X 2'-0" X 2'-0" deep bucket sump pit covered with flush-mounted steel grating. All pits are to be equipped with a hard-piped sump pump. An Oil Minder sump pump, or equivalent, shall be provided with an alarm system to prevent the possibility of hydraulic fluid being pumped into the sewer. Provide a dedicated non-GFCI outlet for the sump pump at 4'-0" above

elevator pit floor and provide power and control wiring for the oil minder control panel. If for any reason the sump pit will be within the design water table, an alternate system including separators is to be discussed with the Authority. Provide a scavenger pump for each elevator. Provide one dedicated GFCI duplex outlet for each scavenger pump so they are within 6 feet of the pumps, which are plug in type units. Each elevator pit is to have lights and a GFCI outlet. For a double pit, provide switch on each side for the lighting near each entry ladder and a receptacle for each elevator. Coordinate with the electrical designer to ensure these items are shown on the drawings.

Hydraulic elevator pits shall be provided with sidewall spray sprinklers located within two feet of the pit floor (As the elevator cabs are noncombustible, a sprinkler at the top of the shaft is not required.). All elevator electrical devices within four feet of the pit floor must be NEMA4.

j. Traction Elevator Pits (Overhead geared and gearless traction)

All pits shall be a minimum of 6'-0" deep. In all elevator pits, provide a 2'-0" X 2'-0" X 2'-0" deep bucket sump pit covered with flush-mounted steel checkered plate. All pits are to be equipped with a hard-piped sump pump. Provide a dedicated non-GFCI outlet for the sump pump at 4'0" above elevator pit floor. Each elevator pit is to have lights and a GFCI outlet. For a double pit, provide switch on each side for the lighting and a receptacle for each elevator. Coordinate with the electrical designer to ensure these items are shown on the drawings.

k. Elevator Master Control Proximity Card Reader System

Elevator Master Control system shall be of the proximity card activation type to register an elevator call when elevator is secured. The proximity card readers shall be incorporated into the hall call stations and car operating panel. Type and code of cards shall be uniform throughout the school system and determined by the Department of Education. A keyed Master Control switch shall be incorporated into the Main Floor hall station and shall select the elevator call buttons to operate normally or by proximity card activation. Keying shall be Chicago #2136. The machine room access shall also be controlled with the card reader system. The control panel for the system is to be located in the machine/control room, with the programming terminal in the custodian's office. Ensure the electrical drawings show the cabling between the two spaces.

l. Fireman's Service

A Phase I, two-position keyswitch shall be provided at the designated level with a visual indicator. A Phase II three-position key switch shall be mounted in each main car operating panel. All keyswitches shall accommodate standard NYFD keys (Yale 2642 and 1620).

m. Communications System

1) All elevators shall be provided with automatic self-dialing phone system, equipped with a feature that will identify the location of where the call has originated. The phone shall be programmed to dial DOE Central Station. (718) 730-8580. Two-way voice communication shall also be provided between the cab, the machine room, Security Desk, General office, and for high rise buildings the Fire Command Center.

2) A means to display video to observe passengers at any location on the car floor to authorized personnel for entrapment assessment shall be provided as per Section 2.271.1.3(k) of Appendix K, Chapter K1. The location shall be at the same location as the two-way communication systems.

n. Guide Rail Systems

Provide rail backing as required. With respect to 6,000-pound capacity elevators, verify and if necessary coordinate the need for structural supports for the guide rail system, if rail backing is inadequate. For dual roped hydraulics, the designer is to provide to the structural engineer the guide rail forces to be withstood by the guide track, which is required to maintain the plumbness of the pistons. The guide rail track may be attached to the guide rail, and thus supplementary supports are to be indicated on the structural drawings. The guide tracks are a different entity than the guide rails.

o. Miscellaneous Steel Members and Structural Work

Provide the structural engineer with size and location of hoist beams and other miscellaneous steel members required so they are indicated on the structural drawings. Provide size of openings and locations for smoke vents and hatches, etc.

p. Fire Command Center (Applicable to High-Rise Buildings Only)

Provide at the Fire Command Center a digital position indicator, visual “in-use” indicator, elevator emergency power selector switches and two-way communication and visual communication for each elevator in the school.

q. Cab Lighting (Normal and Emergency)

1) Cab light energy usage shall comply with the 2020 NYC Energy Conservation Code (NYCECC).

2) A battery operated emergency lighting system shall be provided for the elevator car if there is no emergency generator provided to the building. The system shall have the capacity to meet code requirements with respect to lighting and emergency signaling. A minimum of two of the existing cab light fixtures shall be used to provide adequate lighting of the car station.

r. Emergency Power

1) The elevator control system shall be designed to interface with existing or future emergency power operation. The emergency power system shall comply with Section 2.27.2 of ASME A17.1-2013 as modified by Chapter K1. Signal wiring from the ATS must be provided to each controller.

2) For hydraulic elevators, provide a battery operated auto-lowering device to allow the elevators to descend in case of power failure even if the building has emergency power, as the emergency power will be shut down prior to activation of the sprinkler in the elevator pit. Coordinate with the Electrical Engineer to provide a microswitch for the elevator disconnect switch. Batteries are to be located in the elevator machine room.

3) For traction elevators where emergency power is not provided to the building, provide a battery operated auto-lowering device to allow for lowering the elevator to the next lower floor. Batteries are to be located in the elevator machine room.

4) Standby power shall be provided for elevators that are part of an accessible means of egress in accordance with Section BC 1009.4.

s. Floor Designations

On elevators with front and rear entrances, the landings served by the rear opening shall have the standard floor designation followed by an "R" to indicate a rear opening. This designation shall be used on the call buttons, Braille plates and position indicators. Elevator landings below grade shall be designated "C" for cellar or "B" for Basement depending on the height of the space above grade.

t. Cab Heater

On elevators with an exterior wall, a cab heater shall be installed. The heater must be powered by an isolated single phase 120VAC electrical feed protected by a NYC approved, fused and lockable disconnect switch. Suitable wiring must be provided in the traveler and hoistway wiring. The cab heater must be designed for elevator use, thermostatically controlled, and provide thermal protection to prevent overheating. Coordinate with the electrical engineer to provide the required power and control systems on the Contract Documents.

u. High-rise Requirements

For buildings with an occupied floor greater than 120 feet above grade, as per Section BC 403.6.1 a minimum of one Fire Access elevator is required to be provided in accordance with Section BC 3007.

v. Signage

Elevators shall have numeric designations. The designation shall be posted at the designated level above or adjacent to the elevator entrance and be a minimum of 2" in height. Each bank of elevators shall be identified by an alphabetic letter. A permanently secured sign indicating the letter of identification shall be posted at each elevator landing. The letter on the sign shall be bold font, minimum of three inches in height and of contrasting color from the background. The sign shall also read "IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE THE EXIT STAIRS" in one-half inch red lettering on white background. The sign shall include a diagram showing location where it is posted and the location and letter identification of the exit stairs on that floor.

w. Other Standards

Refer to other Design Requirements for such items as emergency recall, smoke detection, intercom requirements, etc.

B. Modernizations

1. Modernization of elevators should retain the original application type and consist of component replacement in kind, though gearless traction elevators are to be used in lieu of

geared traction. Should alterations to the hoistway be required for the purpose of enlargement or extensions, alternative application types could be considered. All modernized components should conform to the guidelines for a new elevator.

2. With respect to existing in-ground hydraulic applications where single bottom cylinders are provided or believed to be provided, new double bottom cylinders with PVC linings shall be furnished if the elevator is being replaced with an in-ground hydraulic. As an alternative, other approved means of protection may be considered, i.e. plunger gripper. The roped hydraulic elevator and abandonment of the existing casing is the preferred replacement application if the elevator capacity will not be reduced. If an existing in-ground hydraulic elevator is subject to groundwater, the roped hydraulic is recommended to be installed even with a potential reduction in elevator capacity, but this should be done only after consultation with the Technical Standards and Support Unit.

3. Geared/gearless traction hoist machines that exhibit lost motion, excessive wear of main components and leaks should be considered for replacement in their entirety. All possible efforts should be made to retain gearless hoist machines, including comprehensive overhauling.

4. Rope grippers shall be provided on all modernizations of traction elevators, subject to the scope of the modernization.

5. Existing hoistways and machine rooms, which are not subject to upgrading should be retained as is and considered “grandfathered”.

C. Seismic Considerations

New elevators installed in new buildings must conform to seismic requirements. Refer to DR 6.4.3 and Section 8.4 of ASME A17.1-2013 as modified by Chapter K1. Regarding new elevators installed in new hoistways in existing buildings, the Architect of Record should consult with the DOB and make appropriate recommendations with respect to seismic conformance of the elevator.

D. ADA Requirements

All new elevators must conform to ADA requirements. Every effort should be made to assure that modernized elevators would also conform to ADA requirements.

E. Contract Documents

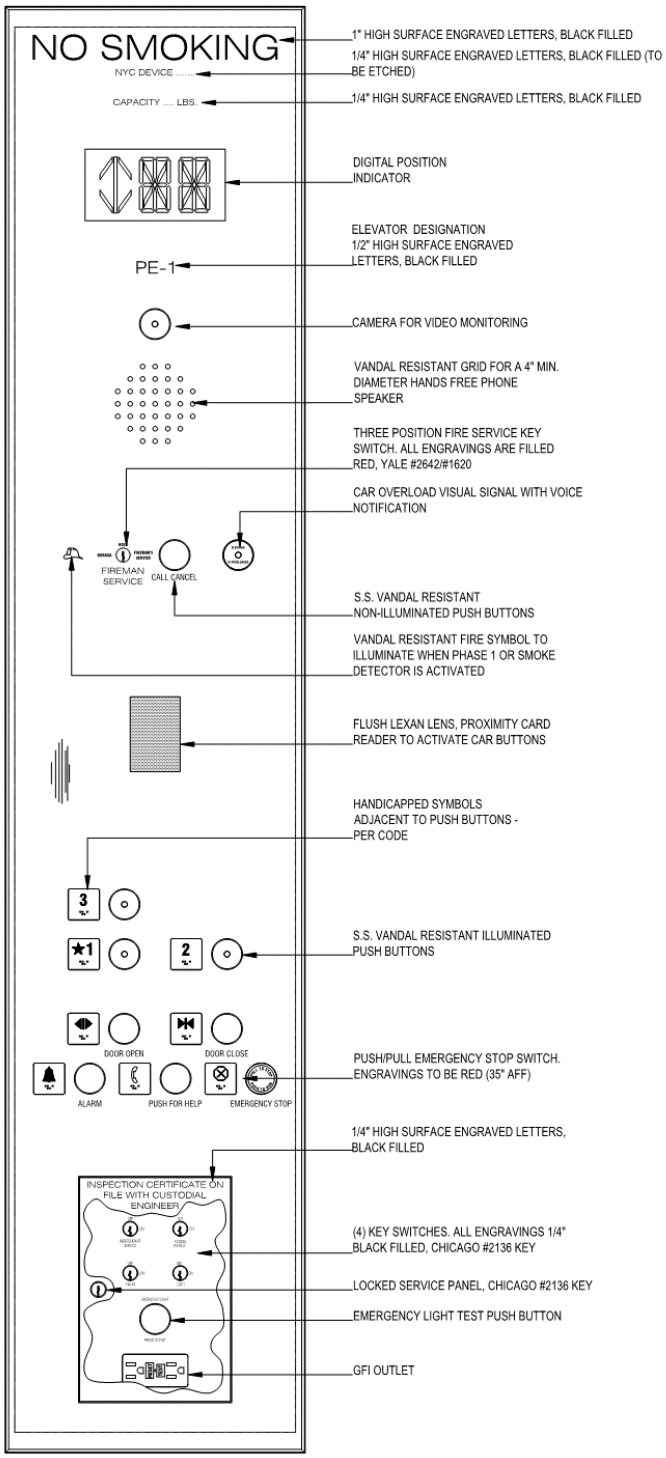
Following the acceptance of the elevator design criteria, contract drawings and specifications should be developed for both new and modernized elevators from the SCA standards. All drawing should be developed in accordance with Elevator Industry standards, showing all code required data and details including calculations. Architectural type drawings are not acceptable. As part of the contract document package, the related electrical and mechanical requirements of the elevator should be provided.

F. Relevant Conceptual Sketches for New and Modernization Elevator Projects

- Dwg No. 1 - Typical Car Operating Panel
- Dwg. No. 2 - Typical Hall Push Button Stations (Simplex)

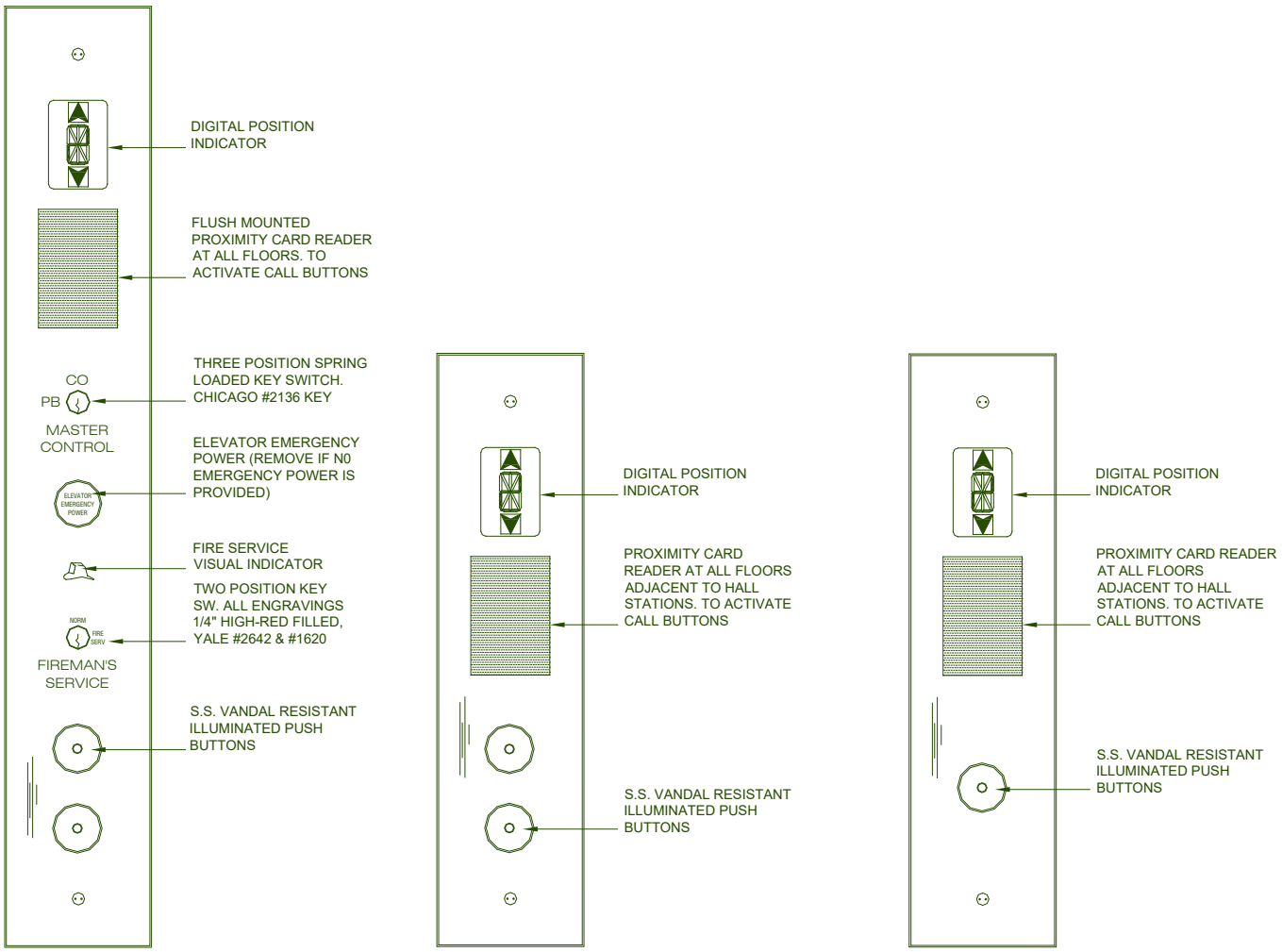
- Dwg. No. 3 - Typical Hall Push Button Stations (Duplex)
- Dwg. No. 4 - Typical Access Stations
- Dwg No. 5- Typical Car Direction Lanterns
- Dwg No. 6 - Typical Fire Service Panel (Simplex and Duplex)
- Dwg No. 7 - Typical Cab Front Center-Opening Enclosure (Top View)
- Dwg No. 8 - Typical Cab Front Center-Opening Enclosure (Elevation)
- Dwg No. 9 - Typical Cab Front & Rear Center Opening Enclosure (Top View)
- Dwg No. 10 - Typical Cab Front & Rear Center Opening Enclosure (Elevation)
- Dwg No. 11 - Typical Cab Single Speed Side Slide Opening Enclosure (Top View)
- Dwg No. 12 - Typical Cab Single Speed Slide Opening Enclosure (Elevation)
- Dwg No. 13 - Typical Cab Deep Enclosure (Top View)
- Dwg No. 14 - Typical Cab Deep Enclosure (Elevation)
- Dwg No. 15 - Typical Center-Opening Elevator Entrance (Top View)
- Dwg No. 16 - Typical Center-Opening Elevator Entrance (Elevation)
- Dwg No. 17 - Typical Single-Speed Side Opening Entrance (Top View)
- Dwg No. 18 - Typical Single-Speed Side Opening Entrance (Elevation)
- Dwg No. 19 - Typical Well Casing Construction for In-Ground Direct Acting Hydraulic Elevators Only
- Dwg No. 20 - Emergency Power Panel (Duplex)

DRAWING No. 1 – TYPICAL CAR OPERATING PANEL



Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

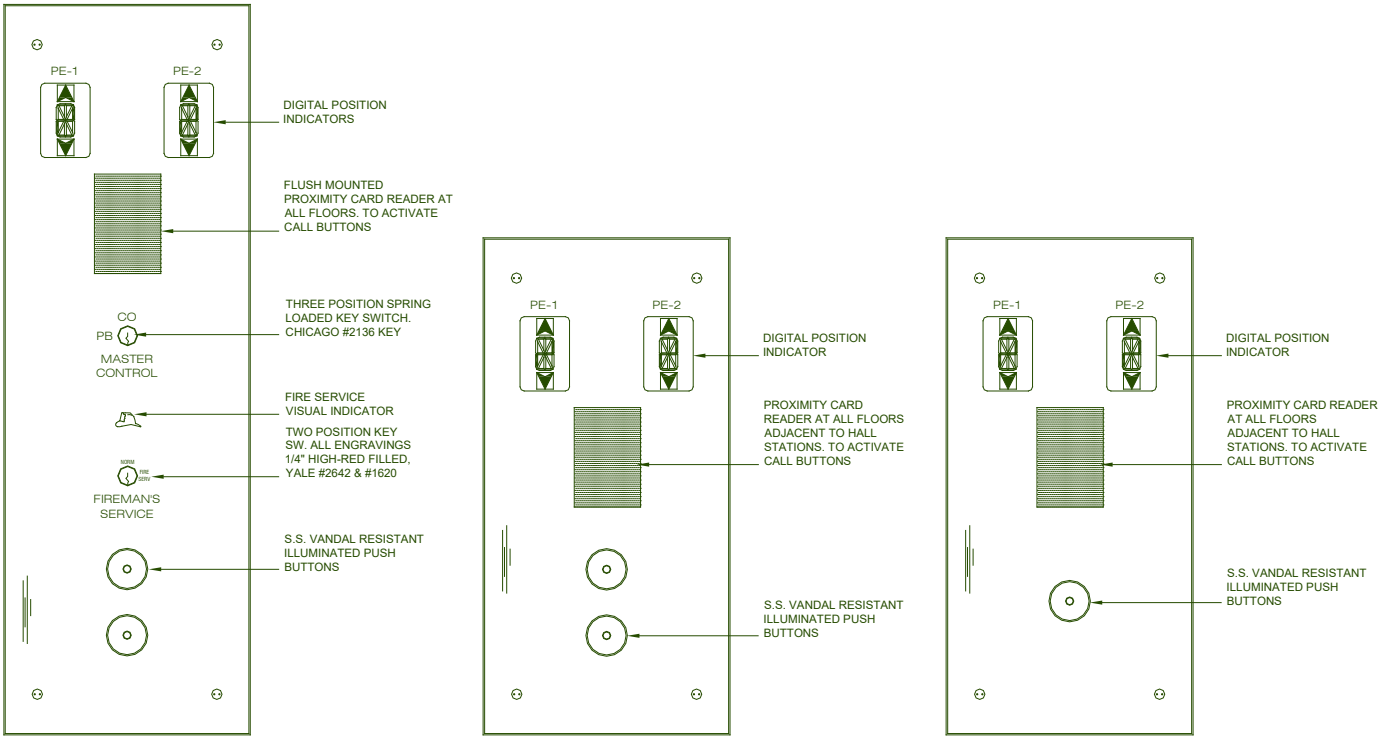
DRAWING No. 2 – TYPICAL HALL PUSH BUTTON STATIONS (SIMPLEX)



MAIN FLOOR **INTERMEDIATE FLOORS** **TERMINAL FLOOR**

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

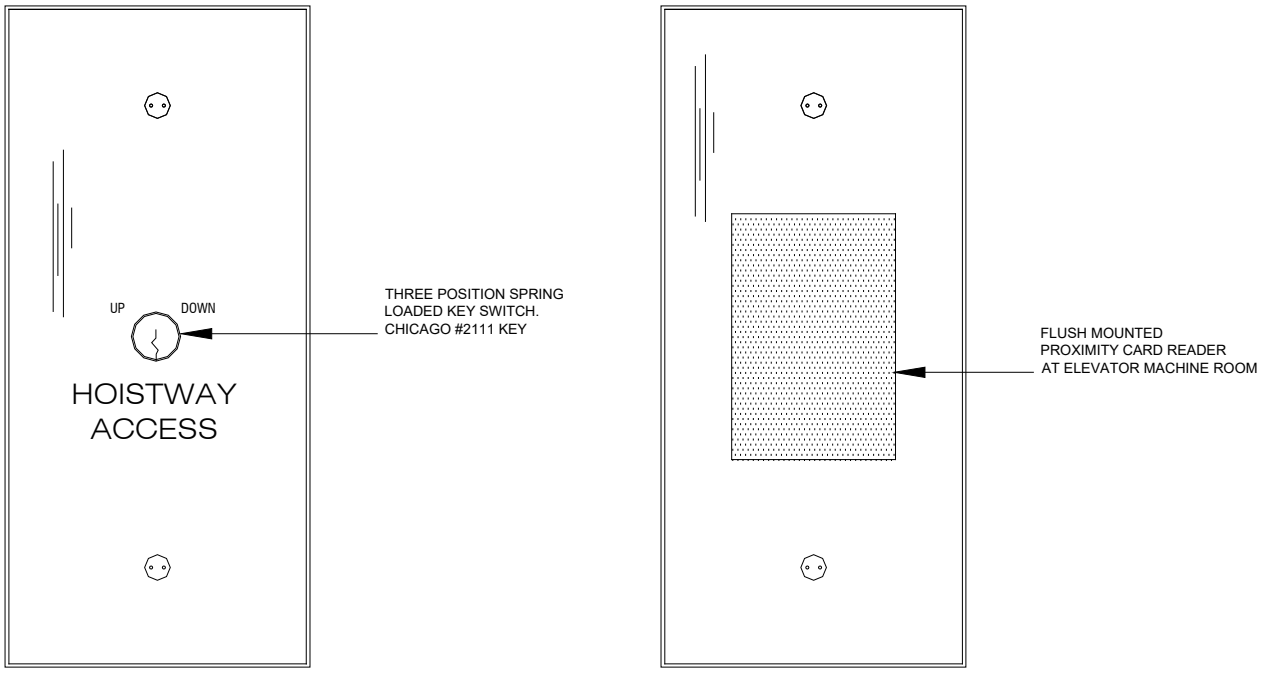
DRAWING No. 3 – TYPICAL HALL PUSH BUTTON STATIONS (DUPLEX)



MAIN FLOOR **INTERMEDIATE FLOOR** **TERMINAL FLOOR**

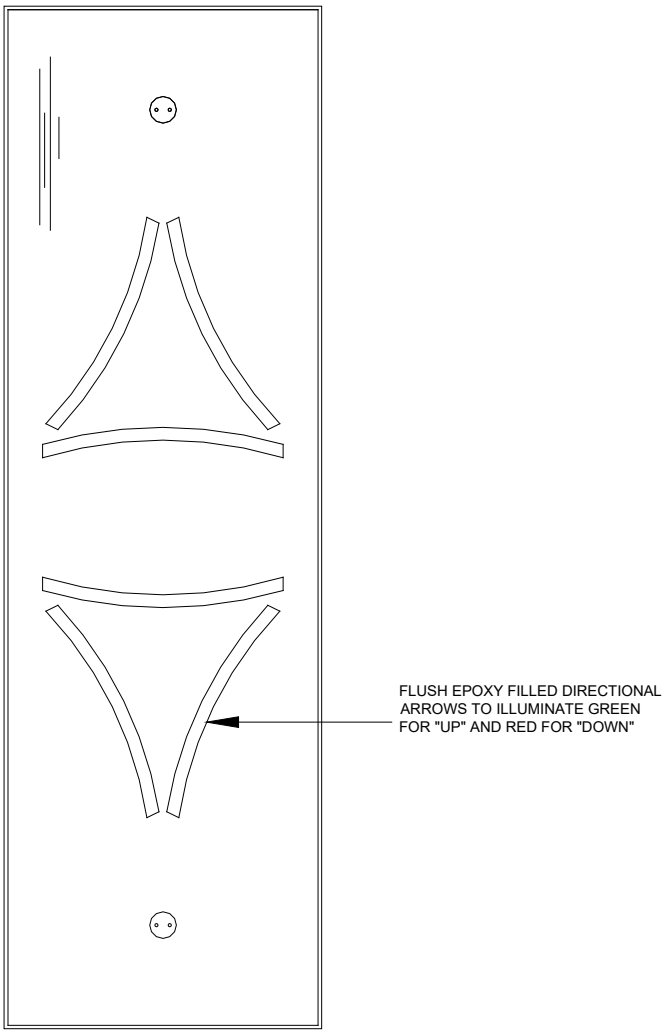
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 4 – TYPICAL ACCESS STATIONS

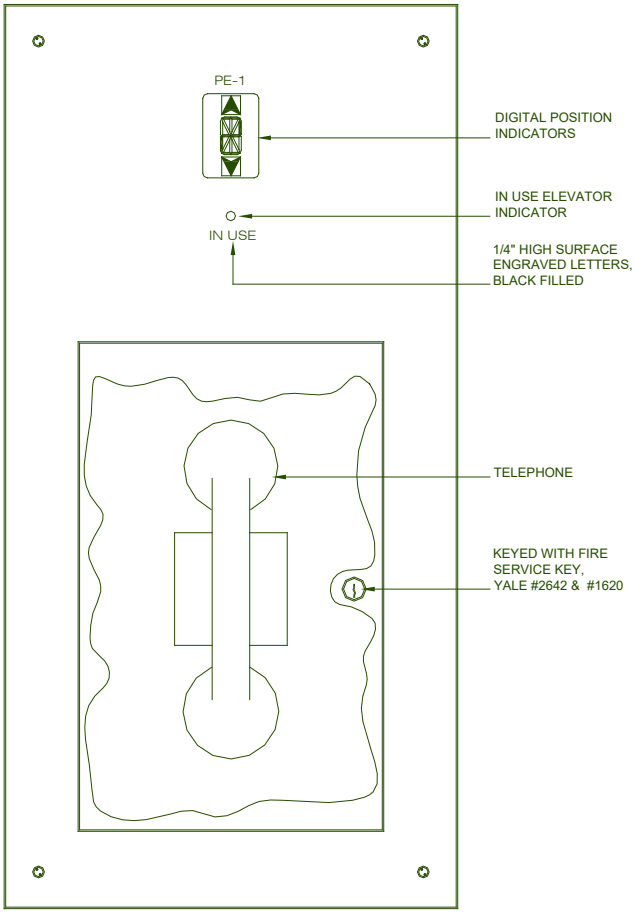


HOISTWAY **MACHINE ROOM**

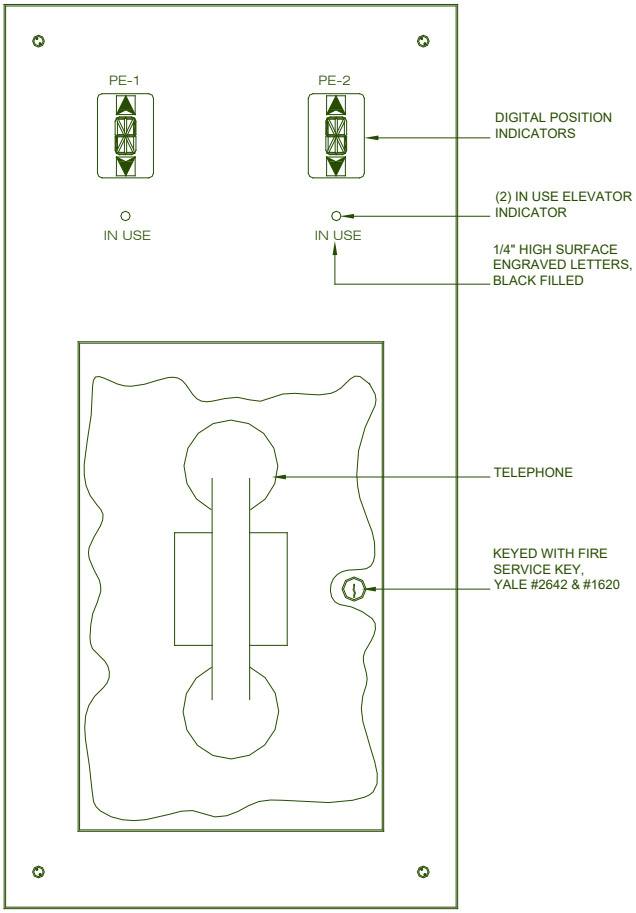
DRAWING No. 5 – TYPICAL DIRECTIONAL LANTERNS



DRAWING No. 6 – TYPICAL FIRE SERVICE PANEL @ FIRE COMMAND CENTER (SIMPLEX AND DUPLEX)

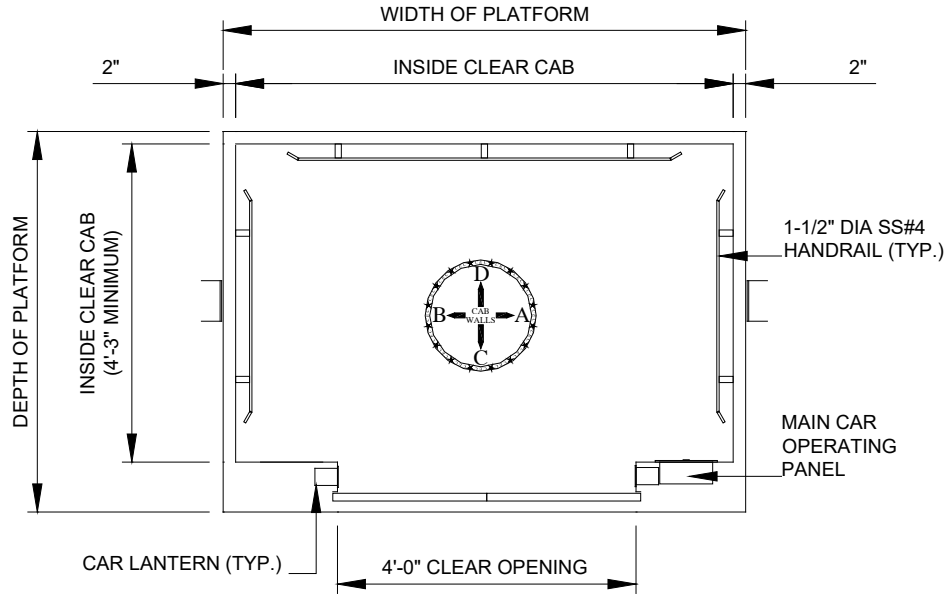


FIRE SERVICE PANEL (SIMPLEX SERVICE)

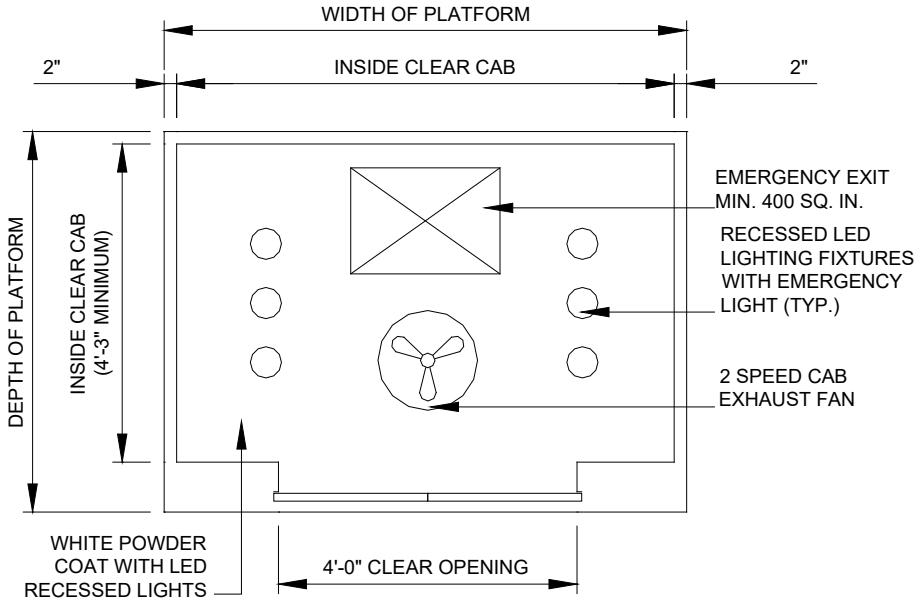


FIRE SERVICE PANEL (DUPLEX SERVICE)

DRAWING No. 7 – TYPICAL CAB FRONT CENTER-OPENING ENCLOSURE (TOP VIEW)

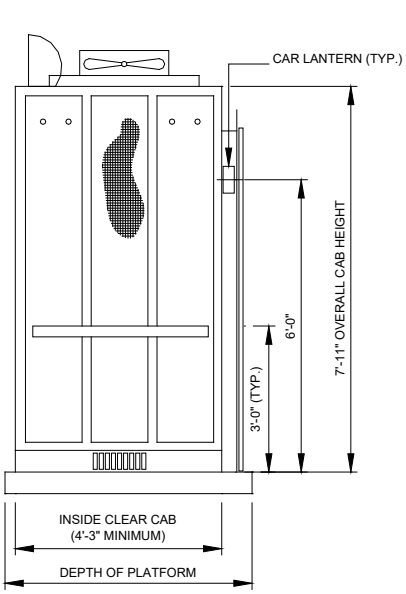


PLAN VIEW

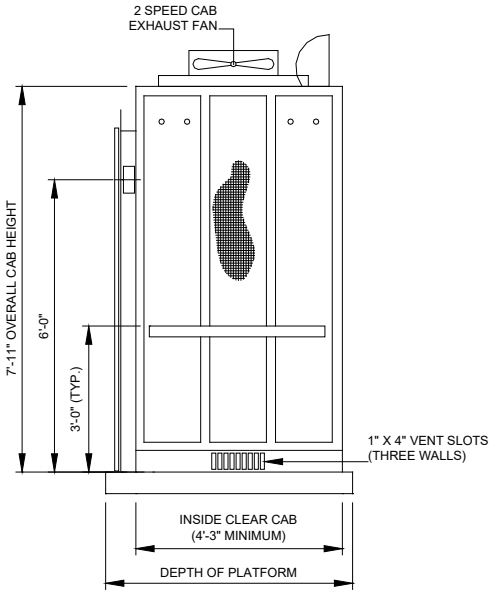


REFLECTED CEILING PLAN

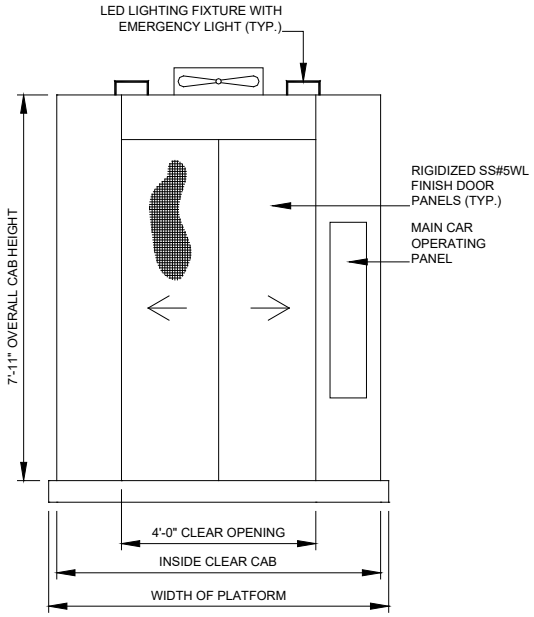
DRAWING No. 8 – TYPICAL CAB FRONT CENTER-OPENING ENCLOSURE (ELEVATION)



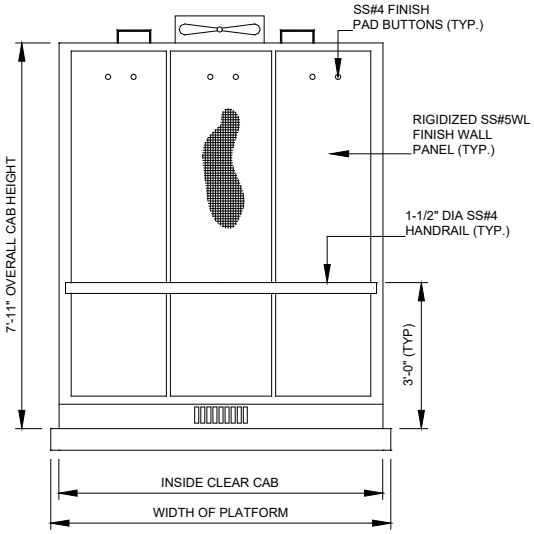
SIDE "A"



SIDE "B"

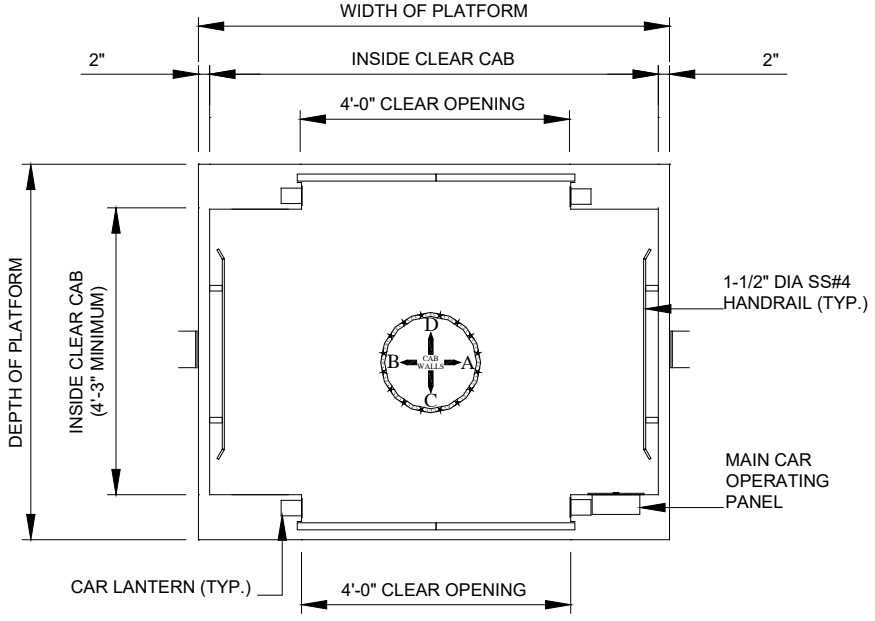


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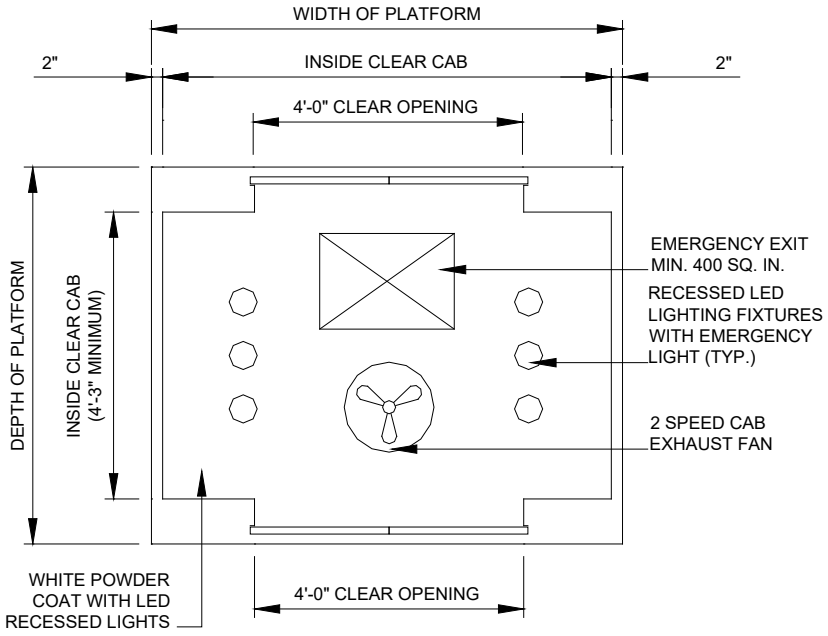


SIDE "D"

DRAWING No. 9 – TYPICAL CAB FRONT & REAR CENTER OPENING ENCLOSURE (TOP VIEW)

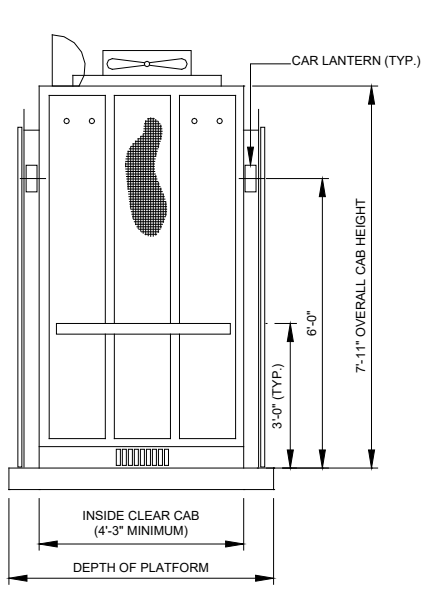


PLAN VIEW

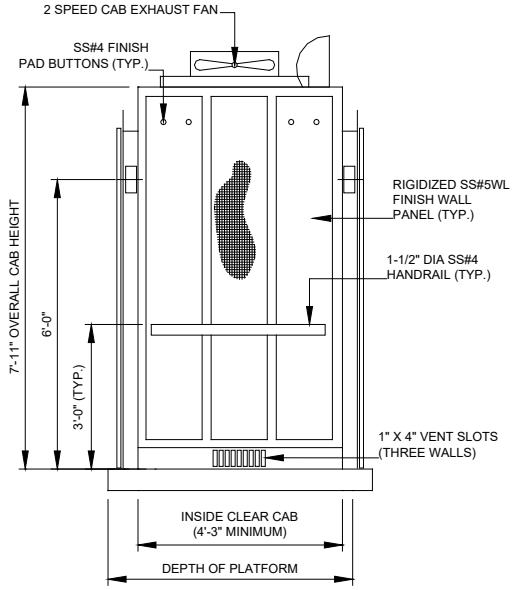


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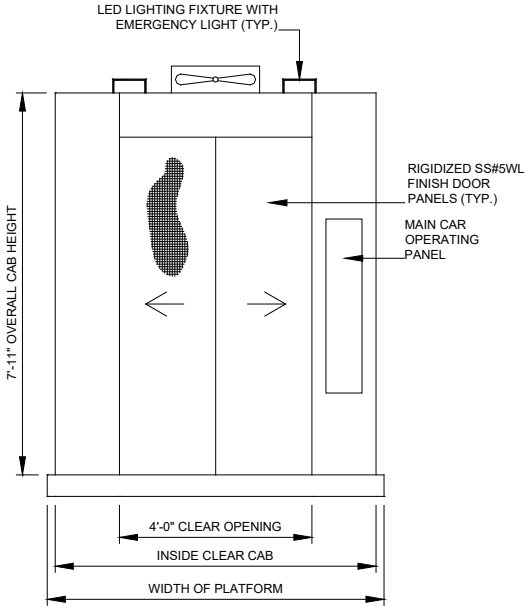
DRAWING No. 10 – TYPICAL CAB FRONT & REAR OPENING ENCLOSURE (ELEVATION)



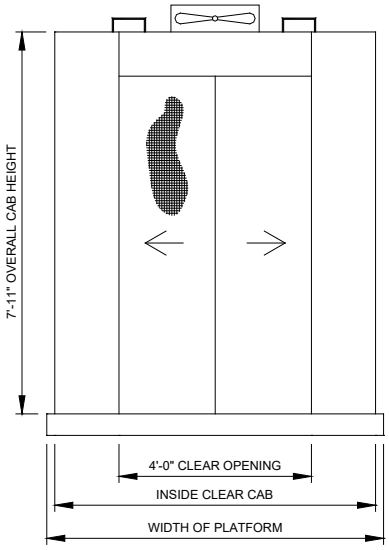
SIDE "A"



SIDE "B"

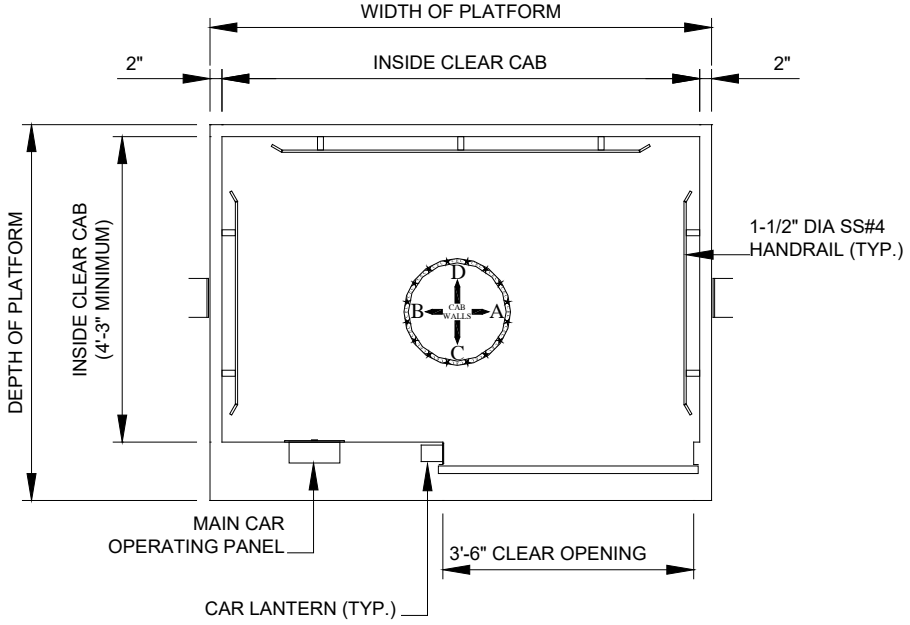


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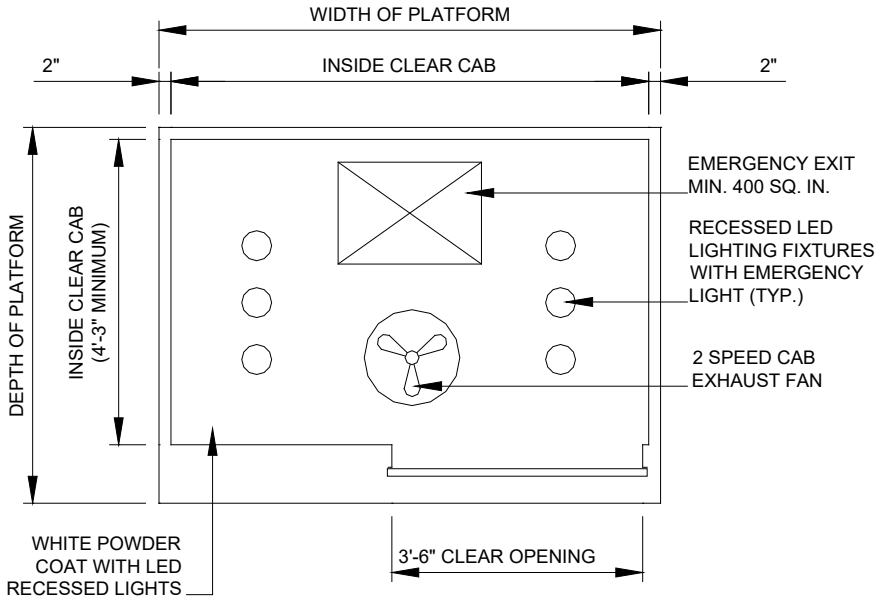


SIDE "D"

DRAWING No. 11 – TYPICAL SINGLE SPEED SIDE SLIDE ENCLOSURE (TOP VIEW)

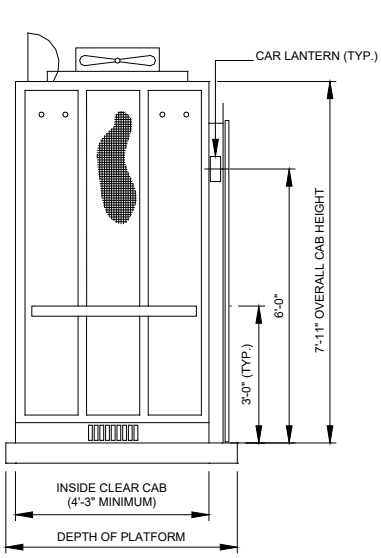


PLAN VIEW

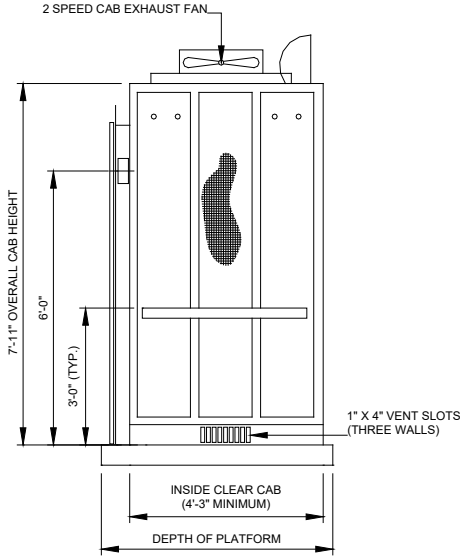


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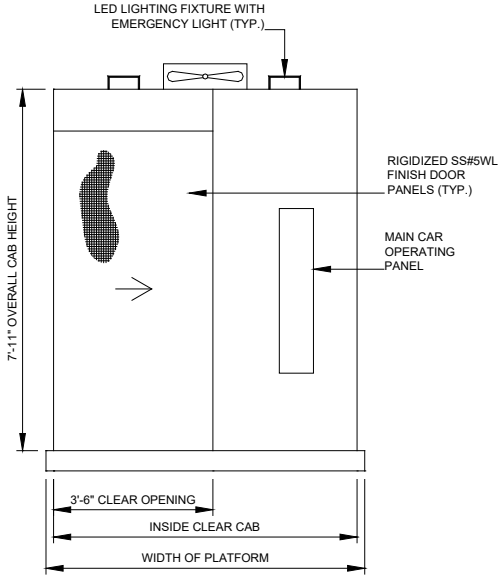
DRAWING No.12 – TYPICAL CAB SINGLE SPEED SIDE SLIDE OPENING ENCLOSURE (ELEVATION)



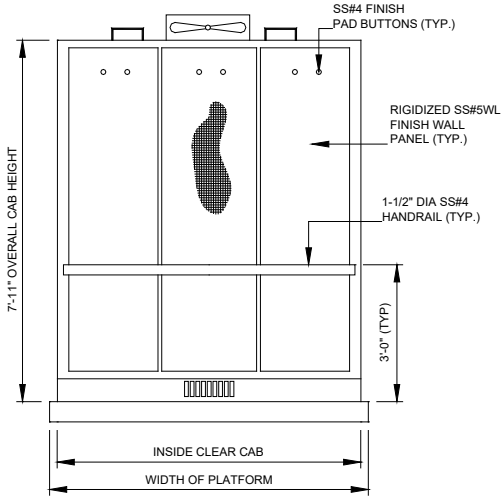
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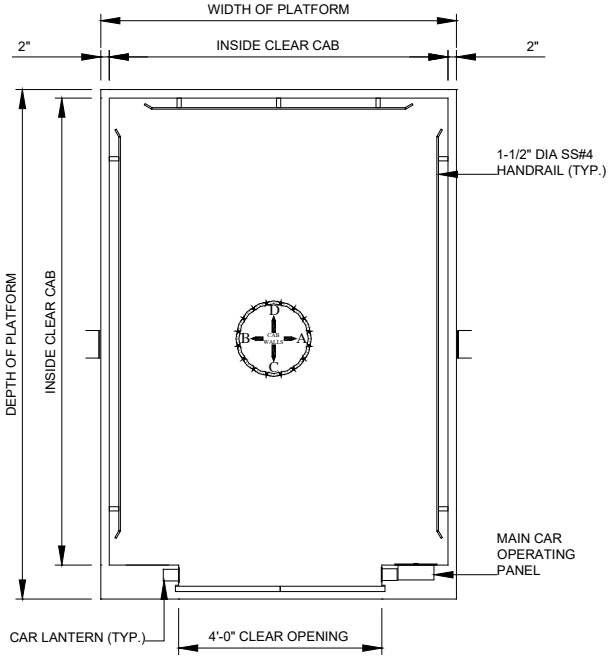


SIDE "C"

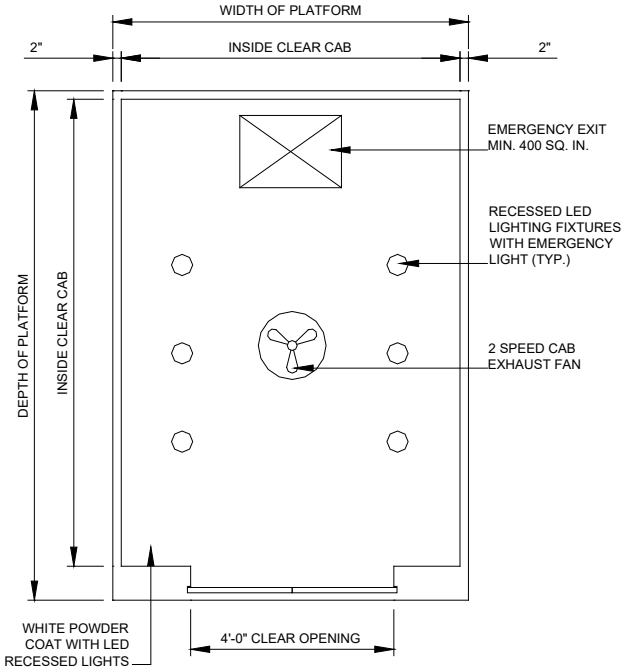


SIDE "D"

DRAWING No. 13 – TYPICAL DEEP CAB ENCLOSURE (TOP VIEW)



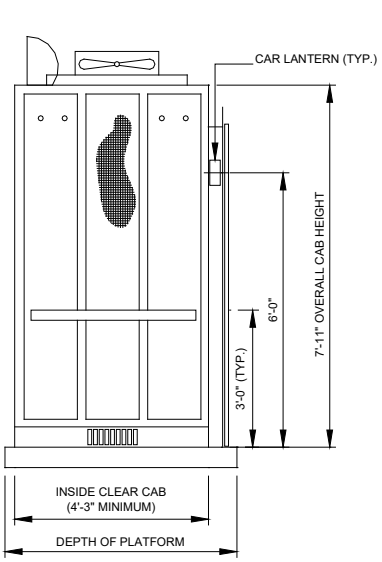
PLAN VIEW



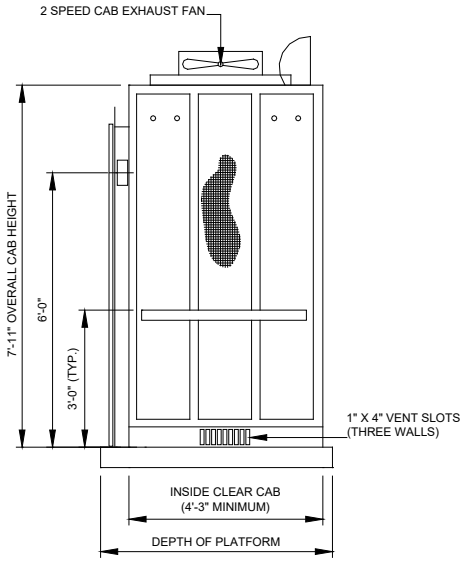
REFLECTED CEILING PLAN

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

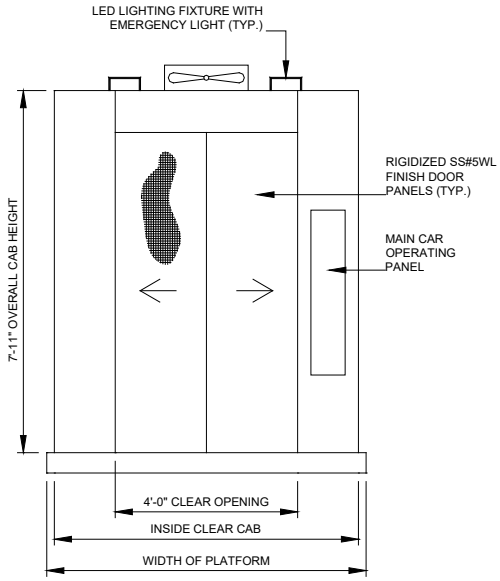
DRAWING No. 14 – TYPICAL DEEP CAB ENCLOSURE (ELEVATION)



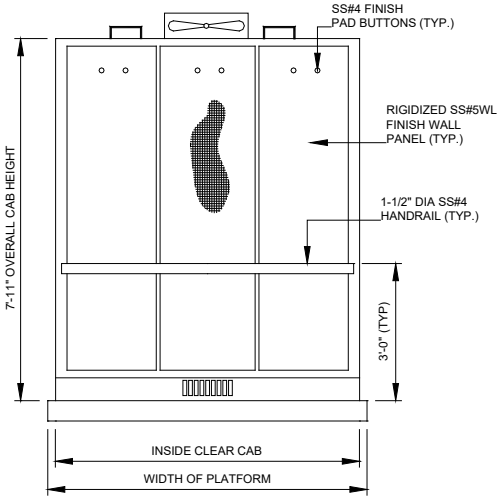
SIDE "A"



SIDE "B"



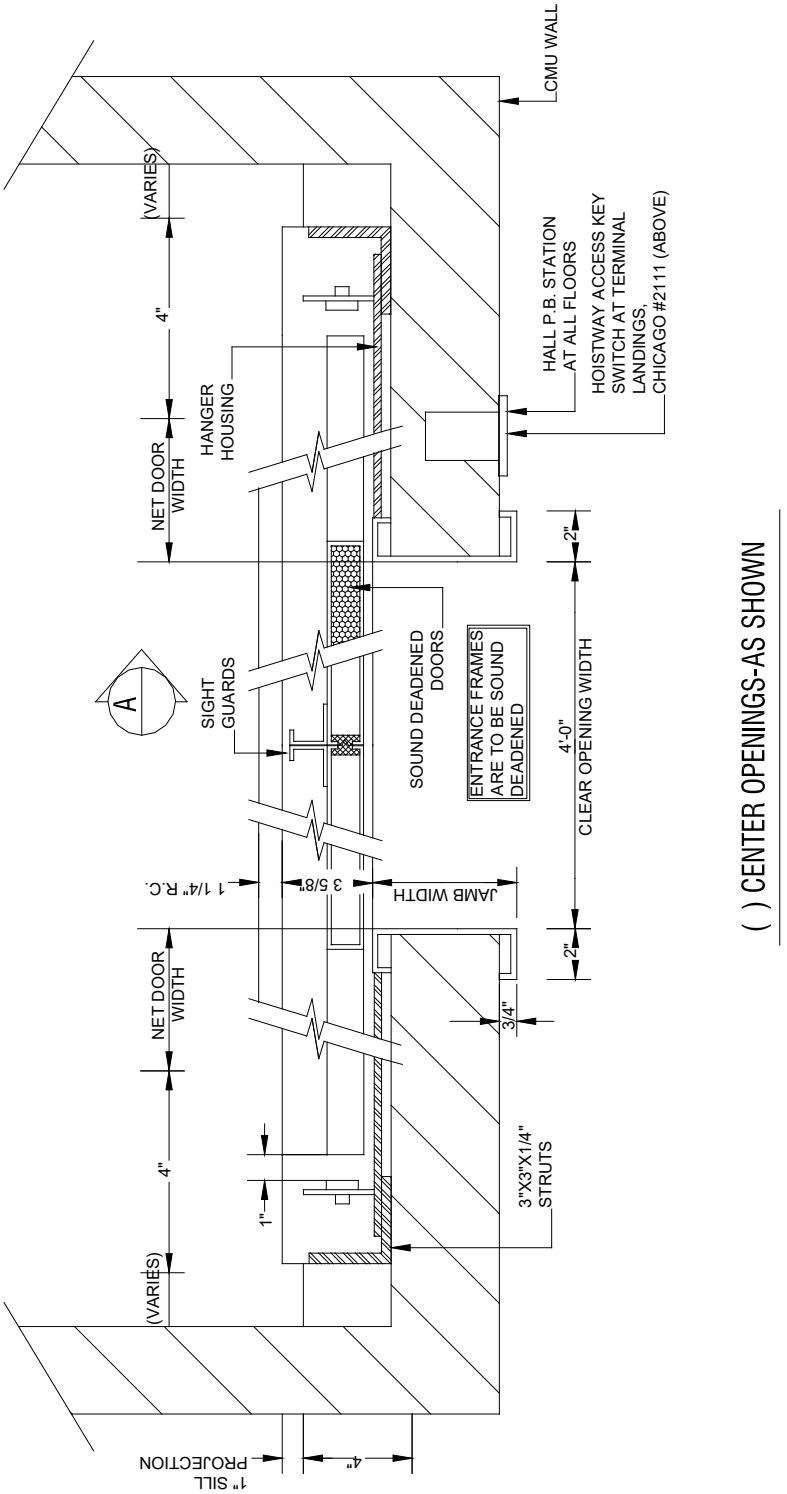
SIDE "C"



SIDE "D"

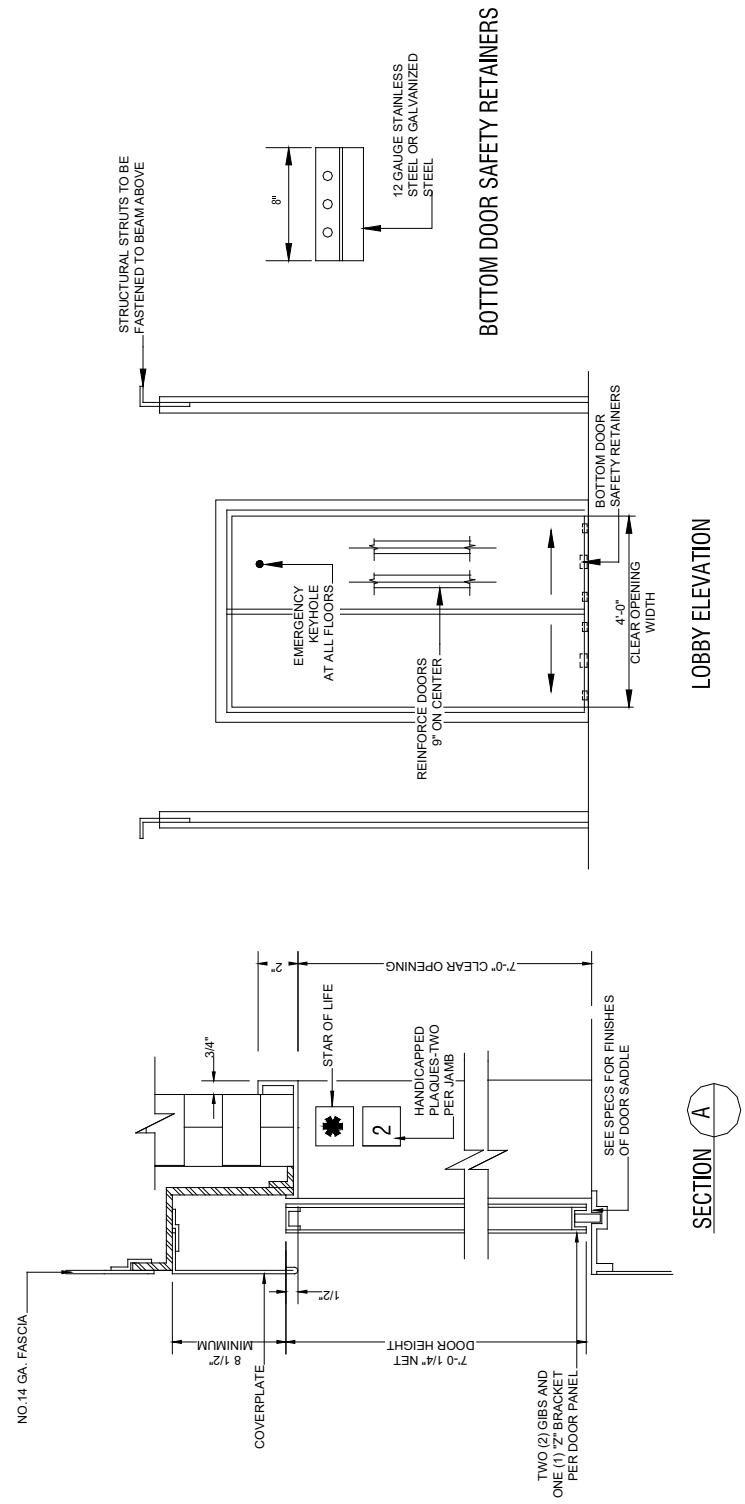
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 15 – TYPICAL CENTER OPENING ENTRANCE (TOP VIEW) – Refer to DR 5.2.2 for wall make-up.



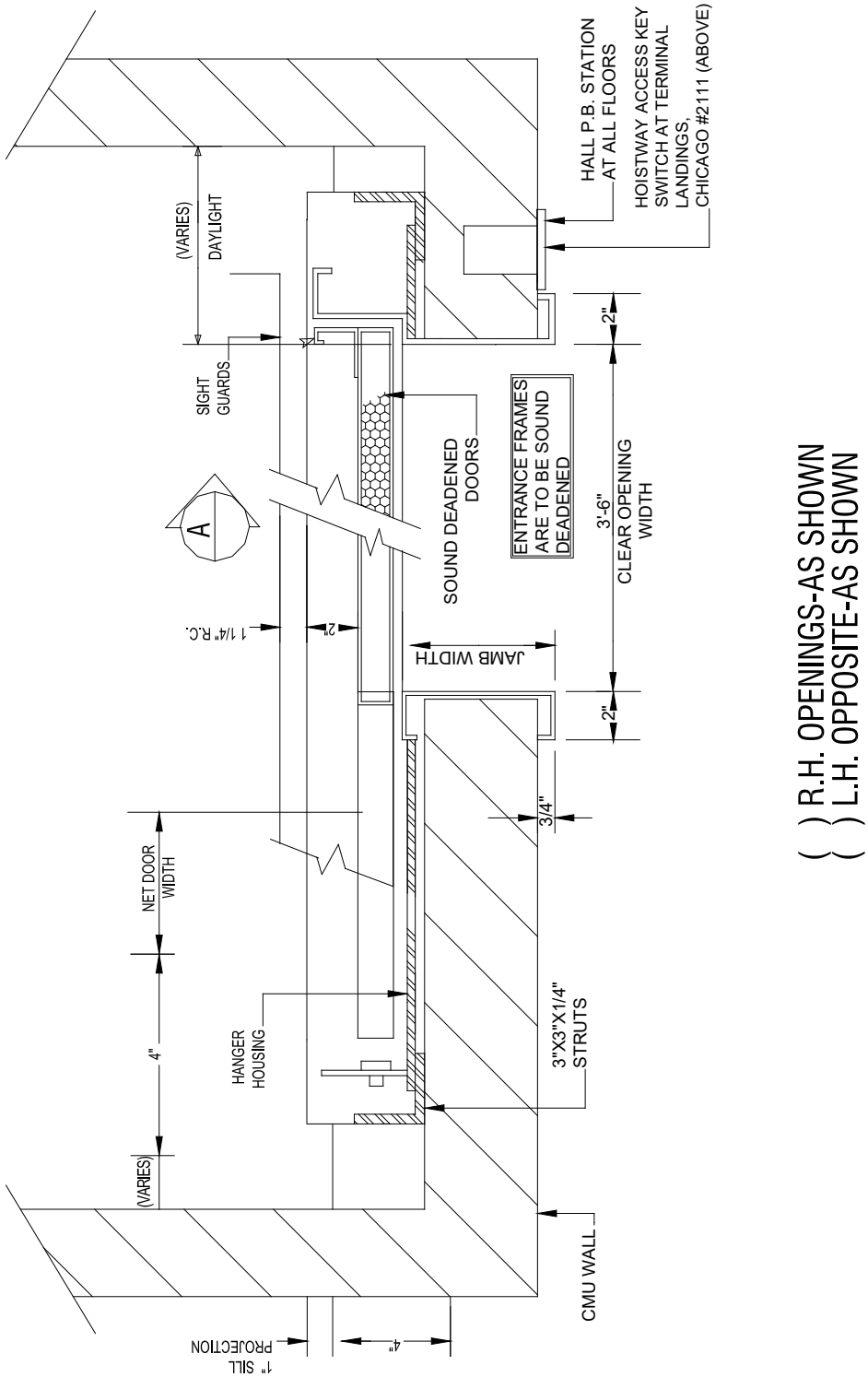
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 16 – TYPICAL CENTER OPENING ENTRANCE (ELEVATION)



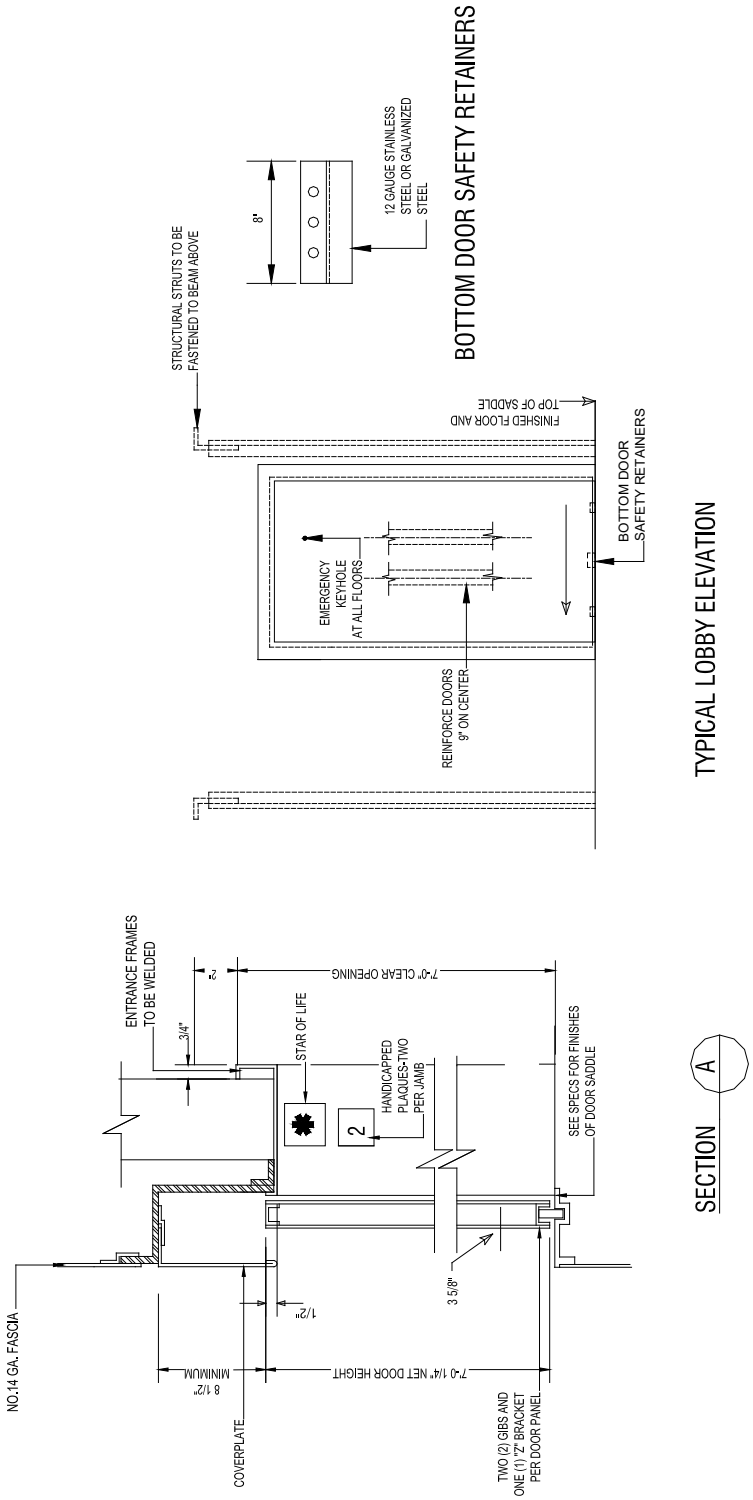
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 17 – TYPICAL SINGLE SPEED SIDE OPENING ENTRANCE (TOP VIEW) – Refer to DR 5.2.2 for wall make-up.



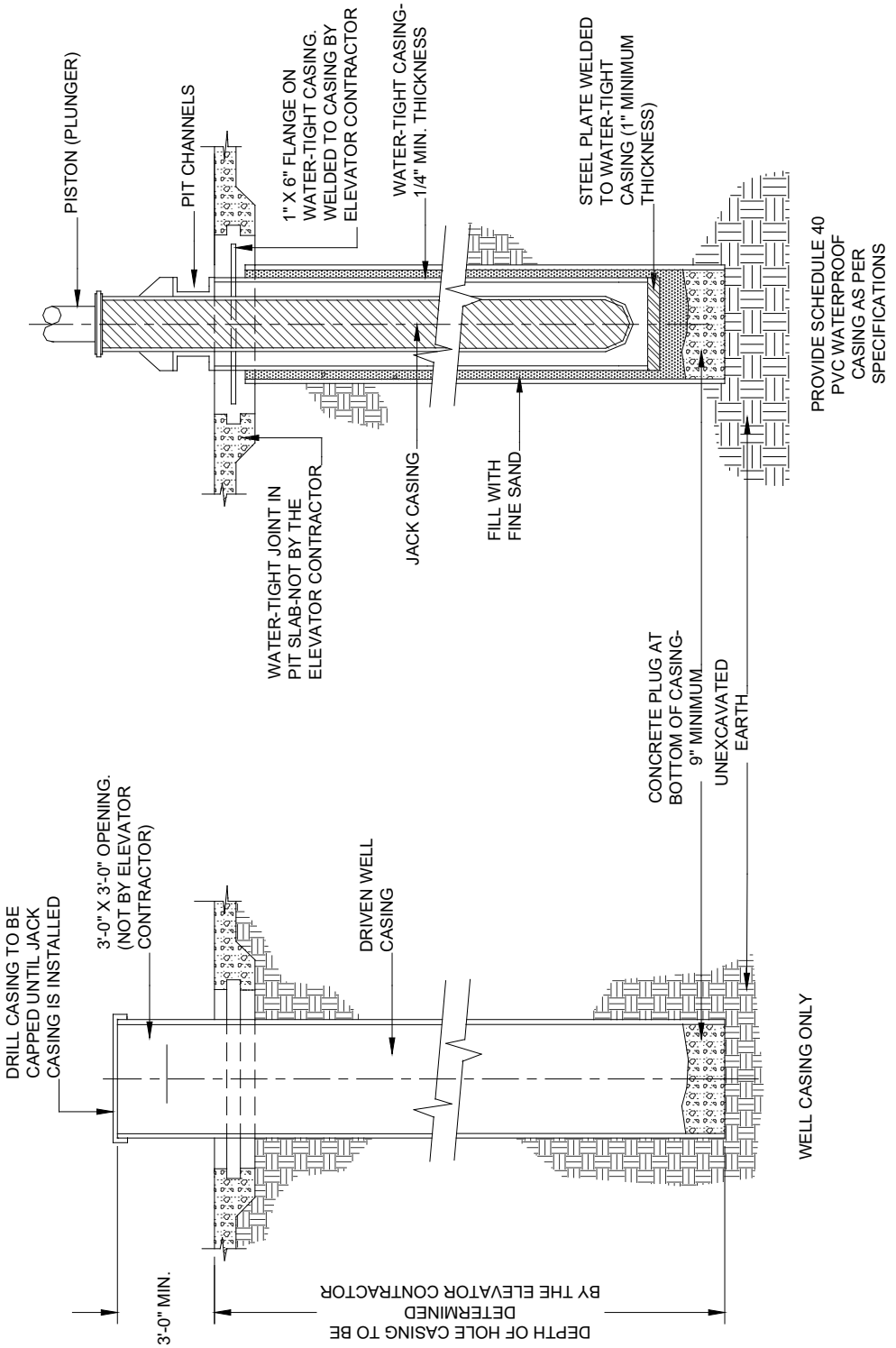
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 18 – TYPICAL SINGLE SPEED SIDE OPENING ENTRANCE (ELEVATION)



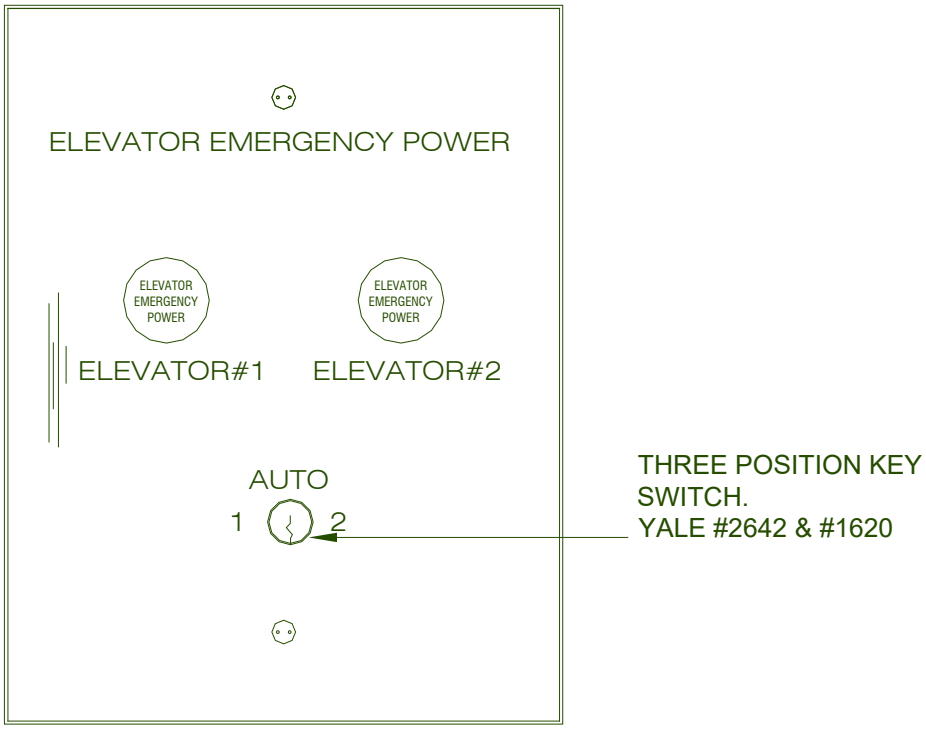
Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 19 – TYPICAL WELL CASING CONSTRUCTION FOR IN-GROUND DIRECT-ACTING HYDRAULIC ELEVATORS ONLY



Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

DRAWING No. 20 – EMERGENCY POWER PANEL (DUPLEX)



6.4 Elevators

6.4.2 Wheelchair Lift Design

Description/Design Approach:

A. Typically a wheelchair lift is utilized for stage access in the Auditorium or Gymatorium. In retrofit accessibility projects, a lift may also be used to bridge the difference in elevation from the Gymnasium to the floor level when two 1 ½ height Gyms are stacked spanning three floor levels or if there are multiple landings of several stairs at an entrance that must be accessible.

B. Determine the type of wheelchair lift appropriate to the space. It is preferable that a standard vertical lift be used for stage access and is to be located so it is not directly visible to the audience, but at the same time be easily accessible. A small vestibule along with the lift itself, located behind and to one side of the proscenium, can achieve this. This should be achievable for all new projects. The use of an inclined lift as part of the stair to the stage apron may be acceptable where a standard vertical lift is not practical or possible.

C. Ensure that required power is provided to the unit. **Provide battery back-up system to operate the lift for a minimum of 5 cycles.** Provide a dedicated phone line to the unit's auto dialer, which will meet the requirements of Section 2.11.2 of ASME 18.1-**2014**. Coordinate with the project electrical engineer to ensure it is indicated on the Contract Drawings.

6.3 Elevators

6.4.3 Elevator Seismic Design Criteria

Description/Design Approach:

A. As per Section BC 1613.1 of the **2022** NYC Building Code, every new school building structure, and portions thereof, including nonstructural components (architectural, MEP, fire protection) that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-**16**, excluding Chapter 14 and Appendix 11A. The Seismic Design Category will be determined by the structural Engineer of Record and indicated on the structural drawings.

B. Per Section BC 1601.2.3, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 NYC Building Code and interpretations by the DOB relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including the bracing of the fire protection system and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** NYC Building Code or reference standard RS 9-6 of the 1968 NYC Building Code.

1. If an existing building is required to meet seismic requirements as per the criteria described in DR 3.1.3 and a waiver from the Department of Buildings (DOB) cannot be obtained, the elevator retrofit work must then meet such requirements.

C. For new additions, any elevator related item in the existing building that is integrated with the system in the new addition that is required to function after an earthquake shall also meet the seismic requirements of the addition. Existing bolting of equipment to its pad and doweling of pad to floor slab shall be analyzed.

D. New School Buildings and Additions constructed after LL17/1995 went into effect are subject to the seismic requirements of the New York City Construction Codes and are considered Risk Category III, “Buildings and other structures that represent a substantial hazard to human life in the event of failure” for seismic design as per Table BC 1604.5.

1. Seismic Design Category shall be determined by the project structural engineer. The Seismic Design Category for a structure is determined in accordance with Section BC 1613. The Seismic Design Category is to be indicated on the Structural Drawings (Refer to Detail 0100054a) and Component Importance Factors related to elevators shall be indicated on the Elevator drawings.

2. Component Importance Factors (I_p) are prescribed in **Chapter 13 of** ASCE 7-**16**. The following components have I_p=1.5:

   a. Life safety components required to function after an earthquake. This includes elevators designated as a required means of egress, which would not be typical on many school projects. Functioning after an earthquake means just long enough to evacuate the building as opposed to functioning as a disaster relief center. Per Section 13.2.2, these items to remain operable following the design earthquake ground motion shall be certified by the manufacturer as operable whereby active parts or energized components shall be certified exclusively on the basis of approved shake table testing in accordance with

Section 13.2.5, analysis or experience data in accordance with Section 13.2.6, unless it can be shown that the component is inherently rugged by comparison with similar seismically qualified components. Evidence demonstrating compliance with this requirement shall be submitted for approval by the SCA after review and acceptance by the Contractor's registered design professional.

b. Components with I_p=1.0 located above or in proximity to components with I_p=1.5 which could damage the I_p=1.5 equipment shall be braced.

3. For Seismic Design Category B, all elevator components are exempt from seismic requirements. **For Seismic Design Category C**, unless elevator is part of a required means of egress **(i.e. Ip=1,5), all elevator components are also exempt from seismic requirements**.

4. For Seismic Design Category C if part of a required means of egress **(i.e. Ip=1.5)**, elevator is to be designed for seismic requirements.

5. Elevator and escalators designed and constructed in accordance with the seismic requirements of ASME A17.1-20**13** shall be deemed to meet the force and displacement requirements of Section 13.6 of ASCE 7-**16**. The exemptions listed in Section 13.6.**7**.3 do not apply for elevator piping. As per Section 13.6.**11**.2, escalator, elevator, and hoistway structural systems shall be designed to meet the force and displacement requirements of Section 13.3. Coordinate with the project structural engineer. As per Section 13.6.**11**.3, elevator equipment and controller supports and attachments shall be designed to meet the force and displacement requirements of Section 13.3.

6. Appropriate seismic coefficients to be utilized in the design of seismic resistance for the elevator shall be those listed in Table 13.6-1 of ASCE 7**-16**.

7. Elevator components along with their attachments or supports to the structure shall be designed in accordance with Section 13.4 of ASCE 7**-16**. They shall be bolted, welded or otherwise positively fastened without consideration of the frictional resistance produced by the effects of gravity. A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be provided. The component forces shall be those as determined by the calculations outlined in Section 13.3.1.

8. As per Section 13.6.**11**.3 of ASCE 7-**16**, any elevator travelling over 150 ft/min must be provided with seismic switches. Provide for all elevators in Seismic Zone C. Seismic switches in accordance with Section 8.4.10.1.2 of ASME A17.1**-2013** shall be deemed to meet the requirements of Section 13.6.11.3 of ASCE 7**-16**.

9. When seismic design is required, generic seismic restraint details shall be shown on the contract drawing bid set. A note shall be added stating, "Details are shown to illustrate the scope of work. Contractor's registered professional engineer shall provide calculations and be responsible for providing signed/sealed coordinated shop drawings indicating locations of seismic restraints and the required connection details to file with the DOB/BCC".

10. All bracing devices shall be qualified through either analysis or be tested and certified in accordance with ICC-ES AC 156. Use ASME 17.1-**2013** to compute seismic forces. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on

independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to seismic bracing designs must be stamped by the Contractor's Registered Professional Engineer with at least five years of seismic design experience in non-structural building components in New York State.

11. All attachments of hangers and bracing shall be positive attachments that shall be cast-in-place anchors, drill-in wedge anchors, or a welded or bolted connection to structure. Drill-in wedge anchors shall be epoxy adhesive base and shall have an evaluation report number from ICC-ES verifying their allowable loads. Anchors must be certified for use in cracked concrete.

E. The following note is to be included on the elevator drawings:

"For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a Professional Engineer licensed in the State of New York engaged by the Contractor. The Engineer shall provide installation supervision of all seismic supports and restraints. The Contractor's Registered Professional Engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings."

7.1 Power Distribution

7.1.1 Electric Service

Description/Design Approach:

A. General

1. At the Schematic Design Phase, the design engineer shall submit a service request/load letter to the utility company. This request shall inquire about the available service voltage, utility short circuit current and impedance, charges and any other requirements. The request shall also indicate the desired voltage and point of entry. Also, the engineer should transmit a copy of the site plan with all available geotechnical, architectural and structural information including the following documentation. Drawings should also be submitted in AutoCAD format and when available copies of the approved drawings by the Department of Buildings.

    a. Legal Survey of Property (and/or with sidewalk elevations in the area of proposed vaults)
    b. Builder's Paving plan
    c. Environmental Study for the site
    d. Soils report with boring data
    e. Site Plan with all utilities
    f. Foundation drawings
    g. Architectural drawings for the building in the area of proposed vaults with floor elevations
    h. Structural drawings for the building in the area of the proposed vaults
    i. Details of any special construction at proposed vault location such as planting areas, sidewalk snow melting devise, street lights, hydrants, etc

2. The available voltage in NYC is generally 120/208 volts. In some areas of NYC, 265/460 volts may be available. If 265/460 volts is available, that is the preferred voltage provided it's cost effective and feasible based on the site conditions. When both voltages are available, the designer is to request both cost options from Con Edison so an economic analysis can be made in item 4 below. When the available voltage is 120/208 volts, the engineer must consider the cost effectiveness of stepping up the voltage to 265/460 volts for motor loads. The 120/208 volts shall be used for receptacles and other systems.

3. When the available voltage is 265/460 volts, the engineer must consider connecting the lighting and motor loads and stepping down the voltage to 120/208 volts for receptacles and other systems.

4. In either case, the design engineer must perform an economic analysis to justify the service voltage and design option selected. The cost should include internal distribution and associated work savings as well in comparing both voltage options.

5. If transformers (both step-up and step-down) are used in a project, the electrical engineer must coordinate with the HVAC discipline for the ventilation requirements.

6. If a step-up transformer is provided, the switch on the primary side of the step-up transformer must be carefully selected and specified to accommodate the prevalent high in-rush currents. The transformer in-rush current shall be limited to 10 times rated current.

7. For Con Edison Point of Entry (POE) service, rather than one foot past the property line, the conduits shall be run to one foot past the street curb line for all capacity projects. For all CIP projects, the POE service conduits shall be run to one foot past the property line when no sidewalk work is done or no sidewalk sheds are to be provided as part of the project or 1 foot past the street curb line when new sidewalk work is done or sidewalk sheds exists or sidewalk sheds are installed as part of the project

8. **For electrical service takeoffs and switchboards, the largest size shall not be larger than 4,000 Amps for 120/208-volt or 265/460-volt systems. There can be multiple service takeoffs at a maximum of 4,000 amps for each service takeoff for 120/208-volt or 265/460-volt systems.**

B. Electrification Projects/CIP Projects

1. All requirements shall apply as for a new service.

2. Electrical designer shall design new electrical service and determine the POE taking into consideration existing conditions and constructability and phasing of new service into the existing building. Designer shall evaluate existing electrical service by engaging electrician and switchgear experts/manufacturers during design to determine existing conditions and how to reinforce based on Con Edison service ruling.

   a. If Con Edison rules the existing 208-volt service can be reinforced due to existing vault space or available conduit spares and provides a new takeoff, existing service reinforcement should be considered since the existing service can be left alone and only new service switches are required to be added due to a new service takeoff for new loads.

   b. If 460-volt service is available, a hybrid electric service condition may be considered due to site space constraints where the existing 208-volt service can be left for the existing building loads and a new 460-volt service provided only for the new mechanical equipment loads.

   c. When there is not enough area to provide a vault (208-volt or 460-volt) within the public right of way or not enough area to do a network protector room or block house, provide a 265/460-volt pad-mounted transformer on the school property where Con Edison has a radial system in the Con Edison service area.

3. Preference is to have developer agreements with Con Edison to control scheduling for the project.

4. The Con Edison load letter shall indicate developer agreement would be preferred if new vault is being ruled at the requested POE.

5. The backup electrical service size for the heat pumps is to be based on 75% of the total size of all the heat pumps based on functioning energy recovery wheel at 50% efficiency**.** If a temporary street chiller/heater connection is provided at the building as a backup, there is no need for electric boiler backup. The electrical service size should never be sized for the simultaneous draw of the heat pump draw plus the backup redundancy electric heating draw, because those two loads will not occur simultaneously. **When providing a temporary boiler connection to the building for the backup temporary water heating system for the HVAC, coordinate with mechanical engineer for size of boiler to be provided. Provide**

electrical connection provision at the temporary water connection location. Provide camlock connections with disconnects on exterior of building.

6. Coordinate with the mechanical engineer and manufacturer to ensure that when looking at the electrical load of the heat pumps with auxiliary supplemental electric heating or the backup all-electric heating (heat pump compressors failed), only the largest of the two is included and not both in the electric service calculation when doing the load letter to Con Edison since, the two loads will never occur simultaneously.

C. NYCDOT Requirements

When a transformer vault is required by the utility company, the design engineer shall establish a reference number with the NYC Department of Transportation (NYCDOT) Office of Permit Management and meet with NYCDOT to secure vault grating location approvals. This meeting with NYCDOT shall take place during the Design Development Phase. Forms and information can be obtained at NYCDOT at: www.nyc.gov/dot or by calling (212) 676-9847.

D. Relevant Conceptual Sketches

- Sample load letter requesting service to the utility company

November 30, 2000

Consolidated Edison of New York
Address

Attention: Mr./ Ms. xxx
Major Account Services Representative

Re: P.S./I.S. 194 – Bronx (New School)
Block 3834, Lot 70
1301 Zerega Avenue, Bronx

Dear Mr./ Ms. xxx,

The NYC School Construction Authority, in conjunction with the Department of Education, is currently preparing plans and specifications for the construction of a new Primary/Intermediate School at the above mentioned location.

The building gross floor area is 140,000 square feet comprising of four stories educational spaces along with a Penthouse and Cellar and will be fully air-conditioned. Our preliminary estimate of the loads of the new building is as follows:

General Lighting and Convenience Outlets	560 KW
2 Chillers @ 285 KW	570 KW
3 Heat Pump Unit @ 3 KW	9 KW
20 Electric Unit Heater @ 7.5 KW	150 KW
2 Split A/C Units @ 5 KW	10 KW
2 Air Handling Units @ 30 HP	60 HP
6 Air Handling Units @ 20 HP	120 HP
5 Air Handling Units @ 15 HP	75 HP
6 Return Fans @ 10 HP	60 HP
7 Return Fans @ 7 ½ HP	53 HP
2 Smoke Purge Fans @ 15 HP	30 HP
15 Exhaust Fans @ 2 HP	30 HP
5 Chilled Water Pumps @ 40 HP	200 HP
2 Boiler Burner @ 5 HP	10 HP
3 Boiler Compressor @ 3 HP	6 HP
2 Boiler Feed Pumps @ 3 HP	3 HP
2 Vacuum Pumps @ 2 HP	4 HP
2 Cooling Tower @ 20 HP	40 HP
1 Fire Pump	30 HP
Miscellaneous single phase motors	20 HP
1 Elevator	40 HP
	Total: 2080 KW

The largest motor will be the 40 HP, Chilled Water Pump Unit.

Based on the above estimate, we are proposing to install a 6,000 AMP, 120/208 volts, 3-phase, 4-wire service, comprised of fifteen sets of 4-500MCM cables into the Electrical Switchboard Room in the Cellar.

Enclosed please find two copies of the Site and Cellar Plan indicating the Electrical Switchboard Room and our preferred Point of Entry. We would like to request a developer's agreement if vault is being ruled for the site. Kindly return one copy along with your service layout and available short circuit current. In order to confirm the location of available service suitable for the proposed building, we would like to schedule an early meeting with you at the site at your convenience.

Please contact the writer at xxxx for any other information you may require from the School Construction Authority. Please address your reply to the undersigned.

Sincerely,

xxxxx
Project Engineer

cf: SCA/A&E Design Manager
Project Architect

Enclosure
Site and Cellar Plan

Enclosed please find two copies of the Site and Cellar Plan indicating the Electrical Switchboard Room and our preferred Point of Entry. Kindly return one copy along with your service layout and available short circuit current. In order to confirm the location of available service suitable for the proposed building, we would like to schedule an early meeting with you at the site at your convenience.

Please contact the writer at xxxx for any other information you may require from the School Construction Authority. Please address your reply to the undersigned.

Sincerely,

xxxxx
Project Engineer

cf: SCA/A&E Design Manager
Project Architect

Enclosure
Site and Cellar Plan

7.1 Power Distribution

7.1.2 Emergency and Standby Generator

Description/Design Approach:

A. Per Section BC 2702.1 of the 2022 NYC Building Code, a diesel emergency generator, rated for stand-by operation, shall be provided in schools meeting any of the following conditions as per Chapter 27 of the 2022 NYC Building Code and shall be sized to accommodate all systems indicated in paragraph C below:
   - An occupied floor 75 or more feet above the lowest level of fire department vehicle access (Section BC 2702.2.14).
   - A gross floor area over 15,000 square feet on each floor (Section BC 2702.2.20).
   - A total gross floor area of 100,000 square feet or more (Section BC 2702.2.20).
   - For new construction when a fire alarm system with a voice communication system is provided (required for schools with greater than 100 occupants).
     - **Note for** projects in existing buildings when a new fire alarm with voice/alarm communication is being installed, SCA policy is to have the engineer to provide a UPS system as the secondary power source for the new fire alarm system with emergency voice/alarm communication, since there usually is no room within the existing building and/or lot/line issues and/or roof structural issues. (Refer to DR 7.3.15 for DOB letter and filing requirements with FDNY.)
   - As per Section BC 3002.4.1, a new elevator serving five stories or more is provided (new or existing building) and the floor square footage or total gross floor area square footage of Section BC 2702.2.20 is exceeded.

B. As required standby power must be provided for the following items per Section BC 2702.2.20 (though an emergency generator for the building may not have been required by code because it did not meet the requirements listed in paragraph A above), an emergency generator, rated for stand-by operation, shall be provided and sized to accommodate all systems indicated in paragraph C below:
   - All “Elevators” and “Platform Lifts (wheelchair lifts)” that serve as an “Accessible Means of Egress” per Sections BC 1009.5, BC 2702.2.5 and BC 3002.4.1.
     - Stages require two means of egress (Sections BC 1009.1 and BC 410.6.1). When a minimum of two means of egress is required, two accessible means of egress must be provided (Section BC 1009.1). Hence, if a required accessible means of egress, from a stage, is provided by an “Elevator” or “Lift”, it is required to be provided with stand-by power. When feasible and practical, the design of a stage should incorporate two accessible means of egress (i.e., stairs, corridors, ramps, etc.) that are independent from a “Lift” that provides access to a stage. The intent for most schools is to utilize platforms, not stages, and would not need to meet the requirements, but the intent is to have a means of egress independent from a ‘lift’ that provides access to the platform.
   - Smoke control system required for atriums (3 stories and above) and high-rise building stairways (Section BC 2702.2.2). Per Sections BC 403.5.4 and BC 1023.11, every required interior exit stairway and ramp serving occupied floors more than 75 feet above the lowest level of fire department vertical access shall be provided with smoke-proof enclosures or pressurized stairway.
   - A smoke venting system: Stages require an emergency ventilation system if greater than 1,000 sq. ft. in floor area or with a stage height higher than 40 ft. Reference Section BC

410.3.7.1 for roof vent requirements (preferred) or Section BC 410.3.7.2 for smoke venting requirements. Smoke venting systems shall be automatically activated by heat detector, smoke detector, sprinkler flow, etc. and supplemental manual activation.

- Power and lighting for the Fire Command Center required by Sections BC 403.4.6 and BC 2702.2.20.2.

C. Where an emergency generator is provided, the emergency loads shall be divided into the following classifications, each of which shall be connected to the emergency generator distribution system via its own dedicated automatic transfer switch (ATS):
   - Emergency Systems (NYCEC Article 700)
   - Legally Required Standby Systems (NYCEC Article 701)
   - Optional Standby Systems (NYCEC Article 702)
   - Fire Detection and Alarm Systems (NYCEC Article 700.10(E))
   - Fire or Sprinkler Booster Pumps (NYCEC Article 695).

   Coordinate with the Architect to provide separate ATS rooms, as the Code does not permit the Optional ATS to be in the same room as the emergency, legally required standby ATS and fire alarm ATS as per Section BC 2702.1.7.1.

   1. The following systems shall be connected to the Emergency Systems ATS per Section BC 2702.2.20.1:
      - Emergency lighting in corridors, exit discharges, Areas of Refuge, Safe Areas, stairs, places of assembly, electrical rooms containing electrical point of entry or building service disconnects (e.g., Electrical Service rooms), fire pump/sprinkler booster pump rooms, generator rooms, and public restrooms with an area greater than 300 ft².
      - Exterior lighting fixtures immediately adjacent to exit discharge doorways
      - Emergency Lighting for Fire Rescue Areas, Horizontal Exits, Holding Areas and Areas of Rescue Assistance
      - Signs or lighting meeting the required FC level identifying Fire Rescue Areas, Holding Areas, Horizontal Exits and Areas of Rescue Assistance
      - Intercom systems for Fire Rescue Areas, Holding Areas and Areas of Rescue Assistance
      - Elevator emergency communication
      - Exit Signs
      - Elevator cab lighting
      - Gas Leak Detection and Alarm System per Section BC 918.5
      - Exhaust fan in gas meter room (if any)
      - Generator accessory power for battery chargers, enclosure heaters, enclosure lighting, etc...
      - Fuel oil transfer pumps serving the generator

   2. The following systems shall be connected to the Legally Required Standby Systems ATS per Section BC 2702.2.20.2:
      - Elevators as indicated below.
        - Per Section BC 3003.3.1, Elevator in Readiness for Fire Department Emergency Access, except as provided in Section BC 3003.3.2 in buildings five stories in height or more, underground buildings as described in Section 405.1, and high-rise buildings, at least one elevator shall be kept available for immediate use by the Fire Department during all hours of the night and day, including holidays, Saturdays and Sundays. The elevator in readiness shall serve all floors of the building. For buildings where a Fire Service Access Elevator (FSAE) is provided,

the FSAE shall serve all floors of the building. There shall be available at all times a person competent to operate the elevator. However, an attendant shall not be required for buildings with occupied floors of 150 feet or less above the lowest level of the Fire Department vehicle access that have elevators with automatic or continuous pressure operation with keyed switches meeting the requirements of ASME A17.1-2013 as modified by Appendix K, Chapter K1, of the 2022 NYC Building Code so as to permit sole use of the elevators by the Fire Department. Provide for a manual transfer of power to each elevator.

- For high-rise buildings, power is to be provided for up to three elevators at one time, with manual transfer of power to all other elevators if more than three are provided in the building.

- Air conditioning or ventilation systems serving elevator machine rooms as per Section BC 3003.1.4.
- Wheelchair lifts if they are the accessible means of egress.
- Smoke Control Systems (including smoke control systems required for atriums and high-rise stair pressurization systems.)
- Stages requiring an emergency ventilation system if greater than 1,000 sq. ft. in floor area or with a stage height higher than 40 ft.
- Power and lighting for the Fire Command Center

3. The following systems shall be connected to the Optional Standby Systems ATS:
   - Public Address System
   - Telephone System
   - BACnet Server
   - Intrusion Alarm System
   - LAN System
   - Video Surveillance System
   - Lighting for Principal's Office, General Office, Medical Suite, Custodian Office and Electrical Rooms with point of entry or service disconnect

4. The following systems, as per Section 2702.2.20.1, shall be connected to the Fire Detection and Alarm Systems ATS:
   - Emergency Voice/Alarm Communication System (includes the ARC system in high-rise buildings and the Auditorium Pre-signal system, where required)
   - Automatic fire detection systems
   - Fire Alarm System

5. Electrically powered fire pumps, including manual fire pumps, automatic fire pumps and sprinkler booster pumps per Section BC 2702.2.20.1. The fire or sprinkler pump controller shall have its own integral dedicated and listed ATS. **The fire or sprinkler pump controllers shall have an integral surge protective device.**

Note that the Post-Fire Smoke Purge Systems are not required to be connected to the emergency power source.

D. An optional standby generator is to typically be provided for schools in a flood zone when undergoing a flood mitigation project at the school to power the emergency sump pumps (Refer to DR 1.3.1.11). The generator is to be a gas-powered generator (if gas is available) and as required by Section BC 2702.4, the following items are required to be connected to the generator when the item is required by the code:
   - Emergency Lighting if not already on battery backup;

- Fire Alarm Systems; and
- Elevators for buildings having occupied floors located more than 75 feet above the lowest level of fire department vehicle access, with at least one elevator that serves all floors.

Note: Natural gas fuel source is permitted where the 2022 NYC Building Code permits gas generators as per the Section EC 700.12(D)(2)(c) of the 2025 NYC Electrical Code that goes into effect on December 21, 2025.

E. Emergency Generators shall be installed in accordance with the New York City Electrical Code, NFPA 110 and NFPA 111. Emergency Generators shall be listed in accordance with UL 2200 and shall be registered with the NYCDEP. Fuel storage tank shall be an integral 275-gallon tank or greater (not exceeding 330 gallons). Its size shall be based on fuel consumption to provide at least six (6) hours running capacity. Optional standby generators, where provided, are to meet the same requirements below, as applicable to the fuel source.

1. Location of the emergency generator shall be coordinated with the architect at the Preliminary Design phase. The preferred location of the emergency generator is outdoors on grade (and not within the building footprint) within close proximity to the Electrical Service Room, in a suitable enclosure with accessibility for fueling. For projects in a flood plain, generators shall be mounted on a structure base that is a minimum of 2 feet above the greater of the FEMA FIRM or Pre-FIRM maps. Provide noise abatement barriers if standard UL 2200 unit will not meet DEP noise criteria for surrounding buildings.

2. Exhausts shall terminate a minimum of 10 feet from building openings (forced air intakes for mechanical equipment, operable windows and doors) measured horizontally, which is in keeping with the requirements of Section MC 811.2 of the 2022 NYC Mechanical Code, NFPA 37-15, and NFPA 211-13 (based on similar requirements in Section MC 401.4). Where the 10 feet requirement cannot be achieved, exhausts shall terminate at least 3 feet above the air intake openings when the exhaust termination is located within 10 feet from the air intake opening per Section MC 401.4.4 and NFPA 211-13. No point of the generator enclosure itself shall be located closer than 5 feet away from openings in walls per Section 4.1.4 of NFPA 37-15. At property lines it is preferred to provide additional distance and thus generators are to be located at least 10 feet from property lines unless approved as a deviation due to space constraints.

3. The generator shall be situated such that, per Section MC 1305.6.2, the diesel fuel oil fill terminal is located not less than 2 feet laterally from any building opening and not less than 5 feet away from any subway grating. Also, the fill terminal should not be more than 75 ft from the street curb or driveway to permit fueling.

4. Per Section MC 1305.7.2, diesel fuel oil vent lines shall terminate outside of buildings not less than 2 feet (measured vertically or horizontally) from any building opening.

5. The normal and emergency vents of a grade mounted generator shall have 3-foot pipe extension for each vent in accordance with NFPA 30-12. Support pipe extension as required. The normal and emergency vents may be combined into one vent pipe and be in accordance with the sizing methodology of Section 22.7 of NFPA 30-12. The designer shall show the combination vent pipe routing on the Drawings. Per Section MC 1305.8.4, calculations shall be performed (and submitted to the Authority for review, if requested) verifying that any extensions of the normal and emergency vent piping are in accordance with NFPA 30-12. In addition, per Table 1305.7(2) calculations shall be performed for the normal venting of UL 142 tanks. Emergency venting by long bolted covers which lift under emergency venting

pressures are not allowed Section MC 1305.8. Venting shall terminate outside of the enclosure. Vent pipes shall terminate in a weatherproof vent cap or fitting or weatherproof hood and shall not employ screens finer than No. 4 mesh. All vent caps shall have a minimum free open area equal to the cross-sectional area of the vent pipe. (Refer to Section MC 1305.7.3).

6. In the case where the generator is located above the lowest floor (including a roof mounted generator) and is fed by lower elevation transfer pumps, the designer shall show termination of the supply and return lines routed from the lower floor with flanged connections that in turn connect to the external flanged connections of the generator tank. These flanged connections are to be provided to enable testing of the fuel oil supply and return lines routed from the lower floors and to isolate the generator's UL 142 fuel tank during the line testing. All generator connections and flanges shall be shown located outside the UL 2200 generator enclosure as they must be delivered as integral components of the factory shipped unit; no field assembly or modification of the generator factory provided connections are permitted. The normal and emergency vents of the generators located above the lowest floor shall be combined into one vent pipe and be in accordance with the sizing methodology of Section 22.7 of NFPA 30-012 and per Section MC 1305.8.4. The Designer shall show the combination vent pipe routing on the Drawings. The combination normal and emergency vent piping shall be piped into the vent or top of the tank of the lowest floor storage tank that supplies the fuel to such tank. Per Section MC 1305.8.4, calculations shall be performed verifying that any extensions of the normal and emergency vent piping are in accordance with NFPA 30-12. Per Section MC 1305.9.4, the designer shall show a drainpipe installed at the base of shafts enclosing the supply and overflow piping. The pipe shall lead to a dedicated sump (preferred) or minimum 55-gallon container with a leak detection alarm, arranged so as to sound an alarm and shut down the transfer pump. The alarm shall be connected to a local audible alarm and to a remote alarm located at a supervising station. The Designer is advised that, per Section MC 1305.9.11, in systems with equipment above the lowest floor where such equipment is designed to operate utilizing fuel stored above the lowest floor, piping diameters shall not exceed 4".

7. The emergency and legally required standby automatic transfer switches and distribution panel shall be located in a room separate from the electrical service distribution equipment and switchgear and separate from the optional standby automatic transfer switches and distribution panels. The emergency and legally required standby equipment room shall be of 2-hour fire rated construction.

8. The optional standby automatic transfer switches and distribution panel shall be located in a room of 2-hour fire rated construction separate from the electrical service distribution equipment and switchgear and separate from the emergency and legally required standby automatic transfer switches and distribution panel.

9. Distribution associated with the emergency and legally required standby power systems shall not pass through the room containing main or primary electrical service equipment as per Section BC 2702.1.2.1.

10. The generator's remote annunciation panel, which is located in the custodian's office, shall be connected to the intrusion alarm panel for DOE central station monitoring.

11. For generators that cannot be in self-enclosed units outside the building, special attention shall be given to the NYC Mechanical Code requirements regarding fuel oil tank and fuel oil piping pressure testing, venting, fill and exhaust piping arrangement.

F. When an emergency generator is not being provided, as the conditions of paragraphs A and B above requiring such generator are not met, the remaining systems listed in Section BC 2702 that are part of the project must have other emergency or standby power as appropriate for the system (such as a battery back-up) per the applicable code reference.

G. A listed surge protective device shall be installed in or on all emergency systems switchboards and panelboard as per Section EC 700.8 for all projects that will follow the 2025 NYC Electrical Code.

H. For all projects that will follow the 2025 NYC Electrical Code, if the emergency/standby system relies on a single alternate source of power, the emergency/standby system shall include a permanent switching means to connect a portable or temporary alternate source of power, which shall be available for the duration of the maintenance or repair. The permanent switching means to connect a portable or temporary alternate source of power, such as generator via camlock cabinet with disconnect switch located on outside of building. Per the code, the fire alarm connection and fire pump connection must also have a tap between the camlock box and line side of disconnect switch. Also, a Kirk Key Interlock system must be provided to prevent both sources from feeding the emergency system simultaneously. The switching point must also include a contact point that signals a visual and audible signal at the custodian's office that the permanent generator has been disconnected from the emergency system. The switching point must also include control wiring from the automatic transfer switches to automatically start the portable or temporary generator.

I. Relevant Documents

- HVAC Design Requirement 6.2.21, Emergency Generator and Fuel Tank.

7.1 Power Distribution

7.1.3 Receptacles

Description/Design Approach:

A. Switched and Non-switched Receptacles

In order to reduce plug loads, the designer shall indicate on the drawings the locations of switched (Controlled) and non-switched receptacles. All switched receptacles shall be controlled through the respective electrical panel and shall be on a timer to shut off after school hours as indicated below or as needed. All switched receptacles shall be marked "Controlled" in silk screened letters as per UL 498 standards. As per Section 8.4.2 of ASHRAE 90.1-2016 (Appendix CA of the 2020 NYCECC), a minimum of 50% of receptacles are required to be switched.

B. Classrooms Receptacles

1. Classrooms for general instruction shall be provided with the following minimum convenience outlets, typically meeting the spacing and location as indicated on the Room Planning Standards:

- Front Teaching Wall**:**
  - One switched 20-Amp**,** 125-Volt, specification grade quad receptacle under the interactive whiteboard
  - One non-switched 20-Amp, 125-Volt, specification grade, quad receptacle with surge protection located near the teacher's computer station (Note: Provide data outlets per Design Requirement 7.3.5 next to the receptacles**)**

- Rear Wall:
  - One non-switched 20-Amp, 125-Volt, specification grade, duplex receptacle.
  - Additional non-switched 20-Amp, 125-Volt, specification grade, duplex receptacle on a dedicated circuit for the laptop charging cart.

- Window Wall: One non-switched and one switched 20-Amp, 125-Volt, specification grade, duplex receptacles placed above the bookcases and spaced as per the Room Planning Standards.

- Corridor Wall: One **non-**switched 20-Amp,125-Volt, specification grade, duplex receptacle on corridor-side wall near entry, used for cleaning purposes or to be used for the CASS system

- Computer counter:
  - One switched 20-Amp, 125-Volt, specification grade, Quadruplex receptacle under the counter (18" AFF) with surge suppression for computer, printer and/or scanner.
  - One switched quad receptacle above the counter (36" above finish floor) for the students use. (Note: Provide a data outlet as per Design Requirement 7.3.5 next to the receptacle.)

2. Pre-k and Kindergarten classrooms:
   - Front teaching wall and corridor wall: Similar to general instruction classrooms.
   - Rear Wall:
     - One non-switched 20-Amp, 125-Volt, specification grade, duplex receptacle
     - One switched 20-Amp, 125-Volt, specification grade, duplex receptacle.
     - Refer to the room planning standards.
   - Window wall: One non-switched 20-Amp, 125-Volt, specification grade, duplex receptacle
   - For kindergarten and pre-kindergarten classrooms, safety type receptacles are to be installed and the surge suppression feature should be provided at the panel.

C. Corridors, Lobbies, Places of Assembly, Parapet, Pipe Chases and Roofs

Receptacles for maintenance, non-switched 20-Amp, 125-Volt, specification grade, duplex type, shall be provided so that all areas in the spaces are accessible by a 50' extension cord. Parapet-mounted receptacles shall be GFCI protected.

D. Offices

Receptacles for which the office computers and printers will be plugged into shall be switched 20-Amp, 125-Volt, specification grade, duplex receptacle.

E. Kitchens and Bathrooms

Receptacles shall be 20-Amp, 125-Volt, GFCI protected duplex outlets. Outlet covers shall be stainless steel. For the cooking equipment under a Type I Exhaust Hood, provide waterproof receptacle with the GFCI circuit breaker in the panel that controls the receptacle circuit serving the equipment(s) under the hood.

F. Outlet Circuits

Outlet circuits shall be designed efficiently to minimize the number of circuits required. Typical classroom should be done with a maximum of 4 per classroom while Pre-K and kindergarten with a maximum of 2. Variations shall be discussed with A&E.

G. Tamper Resistant Receptacles (Safety Type Receptacles)

All receptacles in schools shall be tamper-resistant receptacles throughout the school as per Section EC 406.12 of the 2025 NYC Electrical Code (effective 12/21/25 when permits are pulled). Receptacles in the following locations shall not be required to be tamper resistant:

- **Receptacles located more than 5.5 feet above the floor.**
- **Receptacles part of a luminaire or appliance**
- **A single receptacle or duplex receptacle for two appliances, located within the dedicated space for each appliance that, in normal use, is not easily moved from one place or another and that is cord-and-plug connected.**

H. Ground Fault Circuit Interrupter Protection

Please ensure that circuit or receptacle have ground fault circuit interrupter protection for vending machines, sump pumps, drinking water fountains and bottle fill stations, and any receptacle that is within 6 feet from the top inside edge of bowl of the sink, or water

source, crawl spaces at or below grade level, unfinished areas of basements, locker rooms with showering facilities, indoor damp and wet locations, outdoors, rooftops, kitchens, and bathrooms.

7.1 Power Distribution

7.1.4 Kitchen Electrical Requirements

Description/Design Approach:

A. Electric kitchen equipment systems and electrically and mechanically operated gas valves, when provided**,** shall be installed in kitchens and interlocked with auxiliary systems and cooking equipment to provide proper control and safe operation as well as emergency features. For all Type I hoods, the interlocks and control schemes shall be as follows:

1. Exhaust Fan Interlock with Appliances

   a. The NFPA requires the energy source (gas or electric) producing heat for each appliance under the kitchen exhaust hood to be interlocked with the kitchen exhaust fan.

      In general, each gas appliance (if provided or existing) contains an integral gas shut down solenoid. Appliances with a gas pilot must be provided with a pilot bypass. The solenoid control circuit is factory-wired to the main electrical supply for the appliance. For both gas- or electric-operated appliances, the main electrical supply shall be interlocked with the exhaust fan. The power for the equipment under the hood shall be served from dedicated power panel**s** (KPP-2.X) and equipped with as many branch circuit breakers as required. Provide additional panels as required to feed the electric load under the hood and label KPP-2.1, KPP-2.2, etc. These power panels (KPP-2.X) shall be controlled via an auxiliary contact from the hood exhaust fan motor starter incorporated in the switching control circuit of a remote control switch furnished inside each of the KPP-2.X panels. For KPP-2.X panels, limit the size of the panels to 400A to accommodate the contactors and to limit the quantity of contactors to a minimum. All control coils shall be wired in series so the remote control switch can control all contactors simultaneously.

2. Fire Suppression System/Appliance Shutdown

   a. When the fire suppression system is activated, the energy source for the appliances under the hood must be shut down. However, the exhaust fan must continue to operate so as to aid in dispersing the fire suppression agent. The fuel and electrical supply reset shall be manual as per Section BC 904.12.2 of the 2022 NYC Building Code.

   b. To accomplish this, a normally closed pressure-activated micro switch, supplied by the fire suppression system contractor, shall be wired to the control loop of the KPP-2.X relays. This will shut down panels KPP-2.X when the fire suppression system is activated. In addition, a second micro switch contact shall be provided to notify the Fire Alarm Control Panel when the fire suppression system is activated.

   c. When provided or existing, the main gas supply is shut down by a mechanically operated valve, activated by the fire suppression system. This valve has no electrical connections.

3. Electric Appliances

   When the kitchen only has electrical appliances under the hood (typical of new design and kitchen equipment replacement projects), there shall be an emergency shutoff switch that will turn off all electrical appliances under the hood. The shutoff switch shall be located at each

egress door. Each shutoff switch shall be tied together so that any one of them will de-energize all the appliances under the hood. The electrical shutoff switch shall be a red mushroom push-button labeled “Emergency Shutoff” and located at each means of egress of the kitchen. The red mushroom pushbutton shall have a key to reset the switch.

4. Gas Appliances **-** Master Control Gas Valve (MGCV)

   When the kitchen only has gas appliances under the hood (existing kitchen or when approved on a special basis), the Master Control Gas Valve shall be capable of shutting off all gas flow to the kitchen in case of emergency. This sub-system is comprised of a 120-Volt 60 Hz AC valve, a relay control panel, and a master control station. The master control station shall contain a key switch to energize the gas valve and a red mushroom push-button labeled "Emergency Gas Shutoff" and be located near the kitchen entrance door. The Master Control Gas Valve shall be controlled by a relay control panel located underneath the valve, and they shall be located near the kitchen entrance door. Additionally, remote control stations shall be located at each means of egress of the Kitchen. The Master Control Gas Valve shall control the gas supply to all gas-fired appliances, including the pilot lights, when the Kitchen is closed for long periods of time and for an emergency shut-off situation.

5. Electric and Gas Appliances

   When there is both electric and gas appliances under the hood (rare situation), there need only be one red mushroom push-button to shut down both electric and gas appliances under the hood. Provide mushroom push-button labeled “Emergency Shutoff” next to each exit door in the kitchen. There shall still be a key switch to energize the gas valve adjacent to the red mushroom push-button at the kitchen entrance door as per paragraph 4 above.

B. General Electrical Requirements for the Kitchen

1. Exhaust Hood light fixtures provided by the Kitchen Equipment Contractor shall be installed and connected to a switch by the Electrical Contractor. The switch provided by the Electrical Contractor shall be installed next to the exhaust fan switch.

2. All disconnect switches in the kitchen area shall be in NEMA 4 enclosures to provide protection against splashing water. Surface-mounted switches shall be provided with waterproof hubs.

3. All 20-Amp, 125-Volt kitchen receptacles shall be GFCI protected.

4. Provide a doorbell at the Kitchen delivery door entrance and connect to the Auxiliary Signal System.

5. The Kitchen Power Panels (KPP-2.X) shall be located in an area adjacent to the kitchen, but not in the kitchen proper. For new construction design, coordinate with the Architect to provide a rectangular room to house the kitchen panels with all code required clearances to avoid panels in kitchen proper. Provide **permanent provision to** lock-out breakers for those circuits servicing equipment that is not plugged into outlets.

6. Provide a video intercom at the kitchen delivery door entrance and integrate with IPDVS. Refer to Specification Section 16724.

C. Relevant Documents

- Kitchen Hood Exhaust Motor Starter & Interlocking Wiring Diagram – Refer to Standard Detail 1648000a.

7.1 Power Systems

7.1.5 Lightning Protection

Description/Design Approach:

A. General

1. A lightning protection system **(LPS)** with UL Master Label Certificate shall be provided for new **stand-alone** schools in accordance with NFPA 780, UL 96A and SCA specifications.

2. Lightning protection for addition projects is to be designed by the same methodology and to the same standards as stand-alone buildings but for the addition building only. As the existing building will not be included in the LPS, the system will not be able to, or be required to, attain the UL Master Label Certificate.

3. Lightning protection is to be provided for boiler replacement projects installing a stainless steel liner. As the entire building will not be included in the LPS, the system will not be able to, or be required to, attain the UL Master Label Certificate.

B. Lightning Risk Assessment

At the Schematic Design Phase, the design engineer shall perform Lightning Risk Assessment calculations based on the latest NFPA 780 to determine if **an LPS** is warranted for the **new stand-alone** building **or addition**. **If the assessment shows protection is not warranted, no further analysis or design is required for the project.**

C. Equipment and Locations

1. The **LPS** shall be Franklin Rod type with strike termination devices (air terminals) provided along the rooftop, rooftop perimeter**, photovoltaic system (if determined to require them based on height and location)** and selected rooftop mechanical equipment. **Provide** ground conductors, surge suppression devices, and other connectors or fittings required to complete the system. Dedicated ground rods shall be provided for each down conductor. The lightning protection grounding system shall be bonded to the electrical grounding system electrode.

2. The SCA does not recommend lightning protection system installation by early streamer emission system or charge dissipation system. **For lightning protection of new chimney liners, a Franklin Rod is be installed at the liner.**

D. System Types Based on Building Height

Ordinary structures not exceeding 75 ft (23 m) in height shall be protected with Class I materials as shown in NFPA 780 Table 4.1.1.1(A). Ordinary structures greater than 75 ft (23 m) in height shall be protected with Class II materials as shown in NFPA 780 Table 4.1.1.1(B). If part of a structure is over 75 ft (23 m) in height (e.g., **chimney**) and the remaining portion does not exceed 75 ft (23 m) in height, the requirements for Class II air terminals and conductors shall apply only to that portion exceeding 75 ft (23 m) in height. Class II conductors from the higher portion shall be extended to ground and shall be interconnected with the balance of the system.

E. Design

The design engineer shall engage the services of a LPS manufacturer's Engineering Department for assistance in the design of the **lightning protection system for new stand-alone buildings and new additions, which is to be provided on the Contract Documents as a basis of design.**

7.1 Power Distribution

7.1.6 Miscellaneous Power Distribution Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the Electrical Drawings:

1. Ensure that power and associated relays to the maxon valve has been coordinated with the plumbing designer and is included on the electrical drawings. If the valves are on the exterior, ensure the relays are in a NEMA-4 weather tight enclosure.

2. Ensure that power to the automatic hand wash sinks (Cafeteria, Nurses office) has been coordinated with the plumbing designer and is included on the electrical drawings.

3. Ensure the correct voltage is provided for the Art Room kiln.

4. Ensure that there is power provided to the card access reader for the elevator machine room door.

5. Ensure the correct voltage is provided for window AC Units.

6. Ensure that there is power provided to all energy consumption monitoring meters.

7. Ensure power requirement for outlet at floor cleaning station shown on RPS is shown on the appropriate power drawings.

8. Ensure appropriate power drawings show power to outlets on front of the kitchen tables and for the Mobile Cashier Counter (POS system). Provide power for POS system at both ends of the serving line.

9. Ensure that power supply to the gas and oil leak detection systems are indicated.

10. Ensure power is provided to the damper required during replacement of a gravity vent.

11. Ensure that miscellaneous wiring, receptacles and switches required for the elevators/lifts have been shown. Refer to Section 16120. **Provide Surge Protective Device (SPD) as required for the panel feeding elevators/lifts.**

12. Drawings are to indicate hospital grade wiring where required by Section 517 of the 2011 NEC. Provide for all school-based health clinic and other locations with exam rooms.

13. Ensure that the power requirements for the condensing unit for the walk-in refrigerators/freezers are provided, including wiring between the box and outdoor condensers, power for lighting and switches, etc., are coordinated with the Kitchen consultant and Architect, and shown on the Drawings.

14. Ensure “shunt valves” are installed in open chair lifts. Coordinate with Elevator consultant.

15. Ensure hard wiring of explosion-proof refrigerator and freezer installed in science labs has been shown on drawings.

16. If project has electrically operated retractable bleachers, show power requirements and wiring on the drawings.

17. Ensure a single-phase 110-volt duplex outlet and power is provided within 3 to 5 feet from the utility's electrical utility meter (to be used for the DOE's participation in a demand response program).

18. Ensure that wiring to be provided by the Electrical Contractor for various equipment as required by Article 3.04 of Section 11400 is shown on the electrical drawings.

19. For filing purposes and as required to facilitate plan review, Drawings shall clearly document the appropriate items of the 2020 NYCECC as per the Department of Buildings Document "2020 NYECC – How-to Guide – Lighting and Electrical Power".

20. Location of outlets for plug-in equipment in serveries and the layout of such equipment must be coordinated with the Architect and Mechanical Designer to avoid cords for the servery equipment to potentially drape over convectors, if convectors are used.

21. While not typical as the SCA standard is to use heat pump systems for heating and domestic hot water, provide emergency power connection for the exhaust fan in the gas meter room and the natural gas leak detection system, if gas is provided for the project. Ensure that the natural gas leak detection is tied to the fire alarm system and has a distinct supervisory and alarm reporting to Central Station.

22. For new buildings and existing buildings undergoing major modernization projects, coordinate with the plumbing and mechanical engineer for the required electrical loads associated with heat pumps with 100% electric backup for following systems:
    a. Domestic hot water heat pumps
    b. Vertical Unit Ventilators in classrooms with integral electric heaters
    c. Split systems, VRF systems, and DOAS with baseboard electric heat

23. Provide standby power for low energy power door opening systems. Coordinate with the Project Architect. For existing buildings projects installing such door (such as for a Path of Travel project) where there is no generator, provide door opening system manufacturer's battery backup system.

24. **Provide power for specialty spaces associated with the Athletic Fieldhouse as follows:**
    a. **Concession stand: Provide GFCI receptacles for convenience, refrigerators, heating appliances, heaters, grills, and associated equipment associated with the concession stand.**
    b. **Ticket booth: Provide GFCI receptacles to power POS, convenience receptacle and heater.**
    c. **Press box: Provide 2 dedicated circuit GFCI receptacles 36" AFF to power equipment for the room. A small 6-pole 100A power panel with spare breakers is to be provided to feed all circuits within the press box. Provide power for local sound system, if any. Most sound systems will be located within the athletic fieldhouse with remote connections in the press box. The press box is a small space, less than 500SF, and is basic room that is naturally ventilated with operable windows and no permanent means of heating or cooling.**

25. **For Electrical Vehicle Power Transfer System when designing for requirements to support Electric Vehicle Charging Stations for open and enclosed public parking garages and open parking lots as per NYCEC Section 625.1 and Local Law 55 of 2024. Due to the high percentage of charging stations that are required, there is an exception for DCAS to waive or adjust the requirement for city owned property. This needs to be discussed as early as possible with SCA for a decision since a waiver will be required for the exception.**

26. **When providing a temporary boiler connection to the building for the backup temporary water heating system for the HVAC, coordinate with mechanical engineer for size of boiler to be provided. Provide electrical connection provision at temporary water connection location. Provide camlock connections with disconnects on exterior of building.**

7.2 Lighting Systems

7.2.1 Interior Lighting

Description/Design Approach:

A. Energy Efficient Lighting Luminaires

1. Luminaires shall be high efficiency LED.

2. In general, Lighting Systems shall conform to NYC Green Schools Guide Credit Q6.1R – Interior Lighting Control, Credit Q6.2 – Interior Lighting Quality and Credit Q6.3R - Visual Performance, and the 2020 NYC Energy Conservation Code (NYCECC), which includes the NYC modifications to ASHRAE 90.1-2016.

3. The number of different luminaires shall be limited as much as possible. Custom luminaires shall be avoided.

B. Illumination Levels

1. The following are illumination levels for typical functional areas. This listing is intended to provide guidance in the design of lighting for the indicated areas as well as for other areas (unlisted) that have similar functions.

2. Listed illumination levels are average maintained values in foot-candles (FC) and are predicated on a thirty-inch (30") reference work plane, unless otherwise noted. Where multiple functions and multiple lighting levels are indicated for a particular area, it is intended that multiple switching be provided to achieve same. In all cases, compliance with IES minimum recommended illumination levels and the 2020 NYCECC watts per square foot limitations is intended. The maximum LPD per space is at or below ASHRAE 90.1-2016 levels**,** as modified by Appendix CA of the 2020 NYCECC, though they will typically be much lower to meet the required overall building LPD. Total building lighting power density (LPD) using the 2020 NYCECC – ASHRAE 90.1-2016 procedure shall be a maximum of: 0.5 w/ft² for new PS, IS, HS and Additions, Modernizations and new ECC. These are the values utilized in the SCA's prototypical energy modeling as a means to meet LL 31/16 goals. The total building LPD shall be determined utilizing ASHRAE Methodology. Trade-offs among spaces is permitted provided that the total LPD is not exceeded, though based on LED technology trade-offs should not be required for most spaces to maintain the indicated foot-candle levels.

Area	FC LEVEL	Maximum LPD*
Athletic Field House		
Concession Stand	**35**	
Ticket Booth	**35**	
Press Box	**35**	
Auditorium	*4	
Primary and Intermediate Schools		
General	40	0.63 W/ft^2
Aisles	2	
High School		
Theatrical/General Use/Study Room	15/30/40	0.63 W/ft^2
Stage – General	30	

Production	(As Required)	
Aisles	2	
Boiler Room	30	0.39 W/ft^2
Cafeteria/Lunchroom	30*4	0.53 W/ft^2
Serving Area	40	0.92 W/ft^2
Cafetorium	30*4	0.63 W/ft^2
Classrooms	35*2	0.5 W/ft^2
Community Rooms	40	0.7 W/ft^2
Computer Rooms	30/**35**	0.5 W/ft^2
Corridors	20 @ 18" AFF	**0.58** W/ft^2*3
Dance Studios	40 @ 18"AFF	0.5 W/ft^2
Duplication Room	30	0.5 W/ft^2
Electric Closets	30	0.39 W/ft^2
Elevator Machine/Control Room/Spaces	*5	0.39 W/ft^2
Exam Areas of Medical Suites/Clinics	50	1.1**6** W/ft^2
Exercise Room	30	0.5 W/ft^2
Gymnasium	*4	
General	30	0.75 W/ft^2
Bleacher	20	0.43 W/ft^2
Gymatorium	30	0.75 W/ft^2
Janitor Closets	20	0.43 W/ft^2
Kitchen	50	0.92 W/ft^2
Laboratories	50	1.0**4** W/ft^2
Library		
General	30	0.77 W/ft^2
Reading	40	0.77 W/ft^2
Stacks	20 @ 18" AFF	0.77 W/ft^2
Lobby	30	0.90 W/ft^2
Locker Rooms	20 @ 18" AFF	0.45 W/ft^2
Mechanical Areas – Service Areas	30	**0.39** W/ft^2
Media Centers/TV Studios	30/40	1.0 W/ft^2
Offices	35	0.5 W/ft^2
Pipe Chases/Crawl Spaces	10	
Playroom	30	0.5 W/ft^2
Records Room	20 @ 18" AFF	0.6 W/ft^2
Shops & Areas with Critical Visual Tasks	50	1.0**9** W/ft^2
Shower Rooms	20	0.75 W/ft^2
Staff – Lunchroom/Lounge	30	0.44 W/ft^2
Resource Center/Workroom	30/50	**1.09** W/ft^2
Stairs	20	**0.5** W/ft^2
Storage Rooms	30	0.43 W/ft^2
Swimming Pools *6		
Poolside	50	*6
Bleachers	20	0.4 W/ft^2
Switchboard Rooms	30	0.39 W/ft^2
Telecommunication Rooms	30	0.39 W/ft^2
Toilets	20	0.75 W/ft^2

* Denotes total average power density for particular spaces and includes all power densities for all areas within the space. For auditoriums, this power density shall be calculated utilizing a 40 FC setting, excluding the theatrical stage lighting. Submit computer generated lighting calculations and Lighting Power density at 60% Design for the following (Sample of typical classroom, general office, corridors, libraries, cafeteria, and gymnasium). Also submit total LPD for the entire school.

*2 Classroom foot-candle calculations shall exclude the levels in the area 3 feet around the perimeter of each classroom but shall include lighting over all teaching surfaces. Average maintained level at 30" AFF shall be a minimum of 35 FC with an average to minimum ratio not to exceed 2.5. For calculation purposes, use a light loss factor of 0.9 and room reflectance of 90/60/25 (Ceiling/walls/floors)

*3 Corridors with lockers can use the requirement for locker rooms.

*4 PA space foot-candle calculations shall exclude the levels in the area 3 feet around the perimeter of each space. Average maintained level at 30" AFF shall be the indicated FC with an average to minimum ratio not to exceed 2.5 to ensure even lighting. For calculation purposes, use a light loss factor of 0.9 and room reflectance of 80/50/20

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(Ceiling/walls/floors). Locations where providing such maximum ratio may increase the LPD above the required maximums shall be discussed with A&E.

*5 Must be 19 fc minimum at floor level for entire room per ASME 17.1.

*6 Lighting for Pool surfaces are excluded. Neither the surface area of the swimming pool nor the wattage of the lighting serving the pool shall be counted in the LPD.

C. Lighting Fixture Requirements by Space

1. General: Designers shall utilize those manufacturers and model numbers indicated in Section 16502 (LED Interior Lighting) of the Standard Specification as their Basis of Design.

2. Instructional Space and Library: Direct/indirect, ceiling pendant luminaires. For typical classrooms measuring approximately 29' X 26', lighting shall consist of two (2) rows of direct /indirect, ceiling pendant-mounted luminaires spaced approximately 12' on center to produce optimum lighting. The distance between the wall and the luminaires at the front of the run (the front wall with the marker boards) should be no more than 3'. Luminaires lighting distribution shall be 70% up and 30% down. The total luminary efficiency of the luminaires shall be 90% or better. Mounting shall be such that the bottom of the luminaires shall not be lower than 8'-0" in Early Childhood Centers and Primary Schools and 8'-6" in Intermediate Schools and High Schools, with the optimum fixture to ceiling distance ranging from 14" to 24". For non-conventional shaped instructional spaces (spaces not measuring approximately 29' X 26'), the quantity of pendant luminaires, rows of pendant luminaires, and their spacing shall vary as required to provide the required foot-candle levels and minimize lighting power density.

3. District 75 Classrooms: Pendant mounted indirect, 100% up-light to be used

4. Office and Cafeteria: Recessed 2'x4' luminaires,

5. Corridor: Recessed 2'x4' or 2x2, luminaires (based on ceiling grid selected)

6. Gymnasium: High Bay, non-glare luminaires with impact resistance lens

7. Kitchen Areas, Kitchen Storerooms and Servery Areas: Recessed 2'x2' luminaires, for metal pan ceiling using a lay in system such as Armstrong "Metal Works-Flush Tegular" with, gasket, UL listed for wet location, NSF C-2 certification, with silicone sealant on all seams.

8. Stair: 4' luminaires, wrap around, with vandal resistant lens with integral occupancy sensors.

9. Storage/Mechanical Space: 1' x 4' or 1' x 8' luminaires

10. Shower Room: Recessed 1' x 4' luminaires, gasketed, UL listed for wet location.

11. Toilet/Locker Room: Recessed 2'x4' luminaires

12. Auditorium, Main Lobby, Library and luminaires at the Main Entrance: The lighting designer may select luminaires suited to the aesthetic of the spaces.

D. Lighting Controls

1. All interior lighting shall automatically be controlled by a programmable Lighting Control Panel with integral clock as indicated in following Table. The Lighting Control Panel shall be

provided at the Electric Closet and shall control all spaces that do not have 100% automatic shut-off and/or Occupant sensors.

2. All stairs, locker/shower rooms and multi-user student toilet luminaires shall be set to 50% power levels in the unoccupied state using occupancy Sensors (Auto-ON) to bring it up to 100% when space is occupied.

3. Each area enclosed by walls or floor-to-ceiling partitions shall have at least one switch to control the lighting within. Due to the nature of schools and the need for safety and the potential for vandalism or horseplay, the code allowed exception to eliminate controls where safety is concerned has been utilized for some spaces. For (CIP) projects, window row (in a two or three luminaires row room) shall have the ability to be switched off manually.

4. Daylight Harvesting

   a. Provide for all spaces with windows where required per the 2020 NYC Energy Conservation Code. Daylight Harvesting per section C405.2.3 of 2020 NYCECC and Section 9.4.1.1.e of ASHRAE 90.1 2016 as modified by Appendix CA is required for New Construction in all areas with windows when total fenestration area in sidelighted daylight area is 24 SF per C405.2.3 or 20 SF per 9.4.1.1.e (whichever standard is used for the design) or greater and the general lighting in the primary sidelight area is 100W or greater.

   b. Install daylight harvesting sensor to control both rows in each classrooms and offices (with windows) to maintain required foot-candle (closed loop and dual loop sensors to be used in skylight application).

   c. Place the closed loop sensor between 1 to 2 times the height of the window away from the window (typically 12-15 ft. from the window).

   d. Provide room controller to control both rows of light.

   e. Provide an over-ride four position push button switch set to off, 30%, 70% and 100%.

   f. For all gymnasiums with skylights (as required by Section C402.4.2), provide daylight harvesting controls as required by Section C405.2.3.1 of the 2020 NYCECC and Section 9.4.1.1.f of ASHRAE 90.1-2016 as modified by Appendix CA. Auditorium type spaces are not required to have skylights.

   g. When daylight harvesting is not provided in spaces with windows, the designer to include in the GSG submission the following in support of justification that a daylight sensor is not required by code:
      - Area of window within the space
      - Daylight (sidelighted) area within the space
      - Wattage of lighting fixtures within the Daylight area

The following table provides guidelines for the individual controls for each space and is in keeping with the 2020 NYC Energy Code. Daylight harvesting controls are not indicated in the Local Automatic Control/Sensor column, as the requirements are described above and is dependent on several factors. 'Not Required' in this column applies to when either occupancy or vacancy sensors are not to be provided. Sensor locations described in the comment field do apply to the daylight harvesting sensors. The descriptions are typically for new construction and locations may need to be altered for CIP projects.

AREA	LOCAL MANUAL CONTROL/SWITCH	LOCAL AUTOMATIC CONTROL/SENSOR	Time Clock Control	COMMENTS
PUBLIC ASSEMBLY SPACES				
Auditorium				
General Lighting	Three-way dimming key pad	Vacancy sensor	No	Three-way dimming keypad to control house lighting to be located at the entrance and stage. Ceiling mounted sensors for existing auditorium projects, discuss with SCA.
Stage Area	Toggle switch	Not required	Yes	Switches to control non-theatrical stage lights to be located at the stage.
Gymnasium				
General Lighting, Emergency Circuit	Key-operated line voltage switch	Occupancy sensor	Yes	Switch at one entrance to turn on lights on emergency. All fixtures Normally at 50% of power level; turns to 100% on motion – (C405.2.1.4) Circuiting for lights to allow them to turn on upon loss of power if they are turned off.
General Lighting, non-emergency circuit	Key-operated switch	Occupancy sensor	Yes	Switches for general lighting to be located at same entrance as emergency lighting switch. Ceiling/corner/fixture mounted sensors depending on fixture height and required coverage.
Gymatorium				
General Lighting	Three-way dimming key pad	Vacancy sensor	No	Three-way dimming keypad to control house lighting to be located at the entrance and stage. Ceiling mounted sensors Daylight harvesting sensors to be luminaire mounted for those fixtures in the daylight zone to avoid interference with the zoning provided for the theater function.
Stage Area	Toggle switch	Not required	Yes	Switches to control non-theatrical stage lights to be located at the stage
Cafeteria/Lunch room				
General Lighting, Emergency Circuit	Key-operated line voltage switch	Not required	Yes	Switch at one entrance to turn on emergency lights that will also provide minimal entry/circulation illumination. Circuiting for lights to allow them to turn on upon loss of power if they are turned off.
General Lighting, non-emergency circuit	Key-operated low voltage switch	Occupancy sensor	Yes	Switches for general lighting to be located at same entrance as emergency lighting switch. Ceiling/corner/fixture mounted sensors depending on fixture height and required coverage.
Kitchen	Toggle switch	Not required	Yes	
Cafetorium				
General lighting	Three-way dimming key pad	Vacancy sensor	No	Three-way dimming keypad to control house lighting to be located at the entrance and stage. Ceiling mounted sensors. For existing auditorium projects, discuss with SCA
Stage Area	Toggle switch	Not required	Yes	Switches to control non-theatrical stage lights to be located at the stage

AREA	LOCAL MANUAL CONTROL/SWITCH	LOCAL AUTOMATIC CONTROL/SENSOR	Time Clock Control	COMMENTS
Library				
General	Three-way dimming pad	Vacancy sensor	No	Three-way switches at entrance and at Librarian desk. Ceiling mounted sensor.
Reading	Three-way low-voltage switch	Vacancy sensor	No	Three-way switches at entrance and at Librarian desk. Ceiling mounted sensor.
High Stacks	Three-way low-voltage switch	Luminaire-mounted occupancy and daylight harvesting sensor	No	Three-way switches at entrance and at Librarian desk. All luminaires in High Stack area shall be equipped with occupancy and daylight harvesting sensors
CLASSROOMS/OFFICES				
3K, Pre K	Low-voltage **4**-button dimmer switch	Vacancy	No	Ceiling mounted sensor (s)
K-12 including resource and CSD sped rooms	Low-voltage **4**-button dimmer switch	Vacancy	No	Ceiling mounted sensor (s)
D75 Instructional space	Low-voltage 5-button dimmer switch	Vacancy	No	Ceiling mounted sensor (s)
Community Rooms	Low-voltage **4**-Button Dimmer Switch	Vacancy	No	Ceiling mounted sensor(s)
Tech Laboratories (other than Science)	Low-voltage **4**-button dimmer switch	Vacancy	No	Ceiling mounted sensor(s)
Dance Studios	Low-voltage **4**-button dimmer switch	Vacancy	No	Ceiling mounted sensor(s)
Science labs and Prep Rooms- IS and High Schools	Low voltage Switch	Not required - **Safety**	Yes	
Media Centers/TV Studios	Low-voltage switch	Vacancy sensor	No	Ceiling mounted sensor(s)
Offices Large	Low-voltage **4**-button dimmer Switch	Vacancy sensor	No	Ceiling mounted sensor(s)
Individual offices	Low-voltage **2**-button dimmer switch	Vacancy sensor/	No	Ceiling mounted sensor(s)
Records Room	Low-voltage switch	Vacancy sensor/	No	Ceiling mounted sensor
Resource Center/Workroom	Low-voltage switch	Vacancy sensor/	No	Ceiling mounted sensor(s)
Staff – Lunchroom/Lounge	Low-voltage **2**-button dimmer switch	Vacancy sensor/	No	Ceiling mounted sensor(s)
School-based Health Clinic/Exam Areas of medical suites	Push-button switch (or toggle to match other spaces)	Not Required	Yes	Switch to match style of typical classroom
Waiting Areas	Low-voltage switch	Occupancy Sensors	No	Ceiling mounted sensor(s)
SERVICES/UTILITIES				
Electric Closets	Toggle switch	Not required	No	
Elevator Machine Room	Toggle switch	Not required	No	
Janitor Closets	Low-voltage switch	Vacancy sensor	No	Wall mounted sensor/switch
Mechanical Areas Service Areas	Toggle switch	Not required	No	
Pipe Chases/Crawl Spaces	Toggle switch	Not required	No	

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

AREA	LOCAL MANUAL CONTROL/SWITCH	LOCAL AUTOMATIC CONTROL/SENSOR	Time Clock Control	COMMENTS
Shops & Areas with Machinery	Low-voltage 2-Button Dimmer Switch	**Not required**	No	
Storage Rooms	Low-voltage **2**-Button Switch	Vacancy sensor	No	Wall-mounted sensor/switch if small storage room.
Switchboard Rooms	Toggle switch	Not required	No	Lighting on emergency circuit.
Telecommunication Rooms/Closets	Low voltage switch	Vacancy sensor	No	Wall-mounted sensor/switch
CIRCULATION AREAS				
Lobby	Key-operated switch (One for Emergency)	Occupancy sensor/Daylight harvesting sensor	Yes, for normal lighting only	Key operated switch located at main entrance for emergency lighting. Ceiling mounted sensor(s) for both emergency and non-emergency lighting luminaires. All fixtures Normally at 50% of power level; turns to 100% on motion – (C405.2.1.4) Circuiting for emergency lights to allow them to turn on upon loss of power if they are turned off. **The normal light control is from the respective floor electric closets controlling lights.**
Corridors	Key-operated switch (One for Emergency)	Occupancy sensor/ Daylight harvesting sensor built-in luminaire(s) near window	Yes, for normal lighting only	Key operated switch located at main entrance for emergency lighting. Ceiling mounted sensor(s) for both emergency and non-emergency lighting luminaires. All fixtures Normally at 50% of power level; turns to 100% on motion – (C405.2.1.4) Circuiting for emergency lights to allow them to turn on upon loss of power if they are turned off. **The normal light control is from the respective floor electric closets controlling lights.**
Stairs	Key-operated switch	Built-in Occupancy Sensor in each luminaire Daylight harvesting sensor built-in luminaire(s)	No	Key operated switch located at main entrance for emergency lighting in stairs (all luminaires in stairs are emergency). Normally at 50% of power level (if minimum fc **is** met); turns to 100% on motion - Life safety/security per C405.2 exception. Circuiting for emergency lights to allow them to turn on upon loss of power if they are turned off.
PHYSICAL EDUCATION				
Locker Rooms (Students)	Key-operated switch	Built-in occupancy sensor in each luminaire	Yes	Normally at 50% of power level; turns to 100% on motion - Life safety/security per C405.2 exception
Locker Room (Adult)	Low voltage switch	Vacancy sensor	No	Wall-mounted sensor/switch – Ceiling mounted if partition
Shower Rooms	Key-operated switch	Built-in occupancy sensor in each luminaire	No	Normally at 50% of power level; turns to 100% on motion. Luminaire mounted sensor - Life safety/security per C405.2 exceptions
Swimming Pools	Key-operated switch	Not required	Yes	
Poolside	Key-operated switch	Not required	Yes	
Bleachers	Key-operated switch	Occupancy	Yes	
Exercise Room	Low-voltage switch	Vacancy sensor	No	Ceiling-mounted sensor(s)
TOILETS				
Staff Toilet (single user)	Line voltage switch	Vacancy sensor	No	Wall-mounted sensor/switch
Staff Toilet (Multi-user)	Low voltage switch	Vacancy sensor	No	Ceiling-mounted sensor(s)
Student Multi-user Toilets	Key-operated switch	Built-in occupancy sensor in each luminaire	Yes	Normally at 50% of power level; turns to 100% on motion – Life safety/security per C405.2 exceptions

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

AREA	LOCAL MANUAL CONTROL/SWITCH	LOCAL AUTOMATIC CONTROL/SENSOR	Time Clock Control	COMMENTS
Student Classroom Toilets	Line voltage switch	Vacancy sensor	No	Wall-mounted sensor/switch
Student Toilet (single user)	Line voltage switch	**Vacancy** sensor	No	Wall-mounted sensor/switch

a. Instructional space: For spaces 2,000 SF or less in area, lighting shall be controlled by one ceiling mounted vacancy sensor and multiple daylight harvesting sensor one for each row of lights**,** and one 4-button switch located by the classroom entrance door.

b. Track luminaires in Labs to have a dedicated single on/off switch by the teacher's desk.

c. For CIP projects, required sensors in most spaces will likely need to be wall mounted, typically near the front corner. Designer is to submit all designs for review.

d. All sensors in corridors, student locker rooms, stairs and bathroom to be set for 5 minutes

e. Note that not all Room Planning Standards have been updated to incorporate all revisions to the controls. Follow the above table and modify the room requirements as appropriate.

7.2 Lighting Systems

7.2.2 Stage and Platform Lighting for Primary and Intermediate Schools

Description/Design Approach:

A. General

1. A dimming system shall be provided for auditorium/gymatorium stage area/platform lighting. The dimming system shall control spotlights and border lights via a stage control panel mounted on the stage area/platform and/or a remote portable control console that can be plugged into remote outlets. (Emergency lighting is not part of the dimming system and shall not be dimmed.)

2. Minimum requirements for a standard primary school and intermediate school configuration are indicated below. These may be augmented and modified to accommodate larger facilities (high schools), though a specialty consultant is typically to be utilized for those facility designs.

3. Coordinate exact location and mounting height of all fixtures with the Architect.

B. Requirements for Primary School Stages Less Than Thirty (30) Feet Wide and Fifteen (15) Feet Deep

1. Spotlights

a. Two (2) sets of spotlights shall be provided, ideally located 45 degrees up and 45 degrees to the left and right of the centerline of the stage. Each set shall consist of four (4) 6" zoom type ellipsoidal reflector spotlights. Spotlights shall have a knob-adjustable beam angle of 25-50 degrees to allow for adjustment to actual stage size. Fixtures shall be paired to light the Left, Center and Right portions of the stage, with the fourth fixture pair as a Front Special. **Fixtures shall use LED with five individually controllable LED colors as per Section 16502, capable of producing 75 fc with lens set for 30 degrees, 20 feet away.** In new construction, spotlight sets shall be housed inside ceiling pocket.

b. Mounting: Each spotlight shall be secured to a $1^{1}/_{2}$" iron pipe batten by means of a cast iron "C" clamp. One safety cable shall be provided for each spotlight.

c. Control: All spotlights shall be controlled by dimmers.

d. Electrical: Each spotlight shall be provided with a 3-foot, 3-wire flexible cable terminated in a 20 amp 3-wire stage pin plug. Four (4) 20 amp receptacles shall be set in an outlet box for each set of spotlights. Spotlight and stage pin receptacle outlet box shall be U.L. listed and grounded as per manufacturer's requirements.

2. Border Lights

a. Two (2) rows of border lights shall be provided above the platform. Each border light shall be **color mixed LED with DMX controls with a minimum of five individually controlled LEP colors per Section 16502.**

b. Mounting: Each border light shall be equipped with a heavy steel trunnion securely fastened to each of the cast steel end plates and equipped with iron "C" clamps for $1^{1}/_{2}$" pipe mounting. Each unit shall be provided with a tilt adjust knob and two safety cables.

c. Control: One dimmer per circuit, one control channel per color.

d. Electrical: Border light shall be U.L. listed and provided with #12 cable and grounding conductor. Cable shall be terminated in a terminal junction box. Terminal junction box shall also include (2) stage pin receptacle outlets for two Overhead Special dimming circuits. Two Overhead Special Circuits are parallel wired to each border light row.

3. Dimmer Racks

a. Dimmer racks shall be wall mounted dead front type. They shall accept plug-in electronic control modules and be designed to contain up to 24 plug-in dimmer modules each rated at 2.4 KW.

b. Dimmer racks shall be provided with a lockable door.

c. Dimmer racks shall be 120/208V, 3-phase, 4-wire, 60 Hz A.C. and U.L. listed.

4. Portable Control Console

a. Control console shall be microprocessor-based with 24 channels for two scene preset and manual operations, and switchable to 96 channels, 500 cues for advanced operation. Each dimmer shall be individually controllable with the control console. Console shall allow SubMaster grouping of control for multiple circuits such as border light colors. Console shall also have display and on-screen help menus.

b. Output of console shall be a digital multiplexed signal USITT Standard DMX-512

c. Two (2) 5-pin XLR type DMX input receptacles shall be provided for the control console. One shall be located at rear of room and another near stage control panel on platform. Provide one (1) fifty (50) foot extension DMX control cable. DMX control receptacles shall be located within two (2) feet of a 120 volt receptacle.

5. Stage Control Panel

a. Stage control panel shall be equipped with faders and master intensity control to provide easy playback and recording of a minimum of 8 lighting presets. Manual sliders shall be provided for Left, Center, Right and Front Special spotlights, Overhead Clear, Amber, Red and Blue Borderlights, two Overhead Specials and Two Stage Specials.

b. Stage control panel shall be wall mounted inside a lockable enclosure located on stage (Enclosure to be flush mounted in new construction and surface mounted in existing building).

6. Entry Stations

Provide additional single gang control stations at entry doors. Entry Stations shall have a key lockable cover and allow selection of the first preset and off.

7. Worklights

Worklights above the platform shall be building standard **LED** of the type used elsewhere in the room and shall be switched separately from the dimming system.

C. Requirements for Intermediate School Stages/Primary School Stages Greater Than Thirty (30) Feet Wide and Fifteen (15) Feet Deep, or any Stage with Front Curtain and Stage Apron Area

1. Spotlights

a. Two (2) sets of spotlights shall be provided, ideally located 45 degrees up and 45 degrees to the left and right of the centerline of the stage. Each set shall consist of eight (8) 6" zoom type ellipsoidal reflector spotlights. Spotlights shall have a knob-adjustable beam angle of 25-50 degrees to allow for adjustment to actual stage size. Fixtures shall be paired to light the Left, Center and Right portions of the stage in front of the curtain line, and Left, Center and Right behind the curtain, with the seventh and eighth fixture pair as Front Specials. Provide one additional non-dimmed circuit controlled by the dimmer rack at each location. **Fixtures shall use LED with five individually controllable LED colors as per Section 16502, capable of producing 75 fc with lens set for 30 degrees, 20 feet away.** In new construction, spotlight sets shall be housed inside ceiling pocket.

b. Mounting: Each spotlight shall be secured to a $1^{1}/_{2}$" iron pipe batten by means of a cast iron "C" clamp. One safety cable shall be provided for each spotlight.

c. Control: All spotlights shall be controlled by dimmers.

d. Electrical: Each spotlight shall be provided with a 3-foot, 3-wire flexible cable terminated in a 20 amp 3-wire stage pin plug. Nine (9) 20 amp receptacles shall be set in an outlet box or strip for each set of spotlights. Spotlight and stage pin receptacle outlet box shall be U.L. listed and grounded as per manufacturer's requirements.

2. Border Lights

a. Three (3) rows of border lights shall be provided above the platform. Each border light shall be **color mixed LED with DMX controls with a minimum of five individually controlled LEP colors per Section 16502.**

b. Mounting: Each border light shall be equipped with a heavy steel trunnion securely fastened to each of the cast steel end plates and equipped with iron "C" clamps for $1^{1}/_{2}$" pipe mounting. Each unit shall be provided with a tilt adjust knob and two safety cables.

c. Control: One dimmer per circuit.

d. Electrical: Border light shall be U.L. listed and provided with #12 cable and grounding conductor. Cable shall be terminated in a terminal junction box. Terminal junction box shall also include four (4) stage pin receptacle outlets for four (4) Overhead Special dimming circuits. The four Overhead Special Circuits are parallel wired to each border light row.

3. Dimmer Racks

a. Dimmer racks shall be wall mounted dead front type. They shall accept plug-in electronic control modules and be designed to contain up to 48 plug-in dimmer modules each rated at 2.4 KW.

b. Dimmer racks shall be provided with a lockable door.

c. Dimmer racks shall be 120/208V, 3-phase, 4-wire, 60 Hz A.C. and U.L. listed.

4. Portable Control Console

a. Control console shall be microprocessor-based with 48 channels for two scene preset and manual operations, and switchable to 250 channels, 10,000 cues for advanced operation. Each dimmer shall be individually controllable with the control console. Console shall allow SubMaster grouping of control for multiple circuits such as border light colors. Console shall also have display and on-screen help menus.

b. Output of console shall be a digital multiplexed signal USITT Standard DMX-512

c. Two (2) 5-pin XLR type DMX input receptacles shall be provided for the control console. One shall be located at rear of room and another near stage control panel on platform. Provide one (1) fifty (50) foot extension DMX control cable. DMX control receptacles shall be located within two (2) feet of a 120 volt receptacle.

5. Stage Control Panel

a. Stage control panel shall be equipped with faders and master intensity control to provide easy playback and recording of a minimum of 8 lighting presets. Manual sliders shall be provided for Left, Center, Right Front spotlights, Left, Center and Right Stage Spotlights, (2) two Front Special spotlights, Overhead Clear, Amber, Red and Blue Borderlights, (4) four Overhead Specials and (4) four Stage Specials.

b. Stage control panel shall be wall mounted inside a lockable enclosure located on stage (Enclosure to be flush mounted in new construction and surface mounted in existing building).

6. Entry Stations

Provide additional single gang control stations at entry doors. Entry Stations shall have a key lockable cover and allow selection of the first preset and off.

7. Worklights

Worklights above the platform shall be building standard **LED** of the type used elsewhere in the room and shall be switched separately from the dimming system.

7.2 Lighting Systems

7.2.3 Emergency Lighting

Description/Design Approach:

A. General

1. Emergency lighting shall be provided for all areas listed in Design Requirement 7.1.2.

2. Illumination levels required for emergency lighting shall be as follows:

Places of Assembly – Auditorium, Cafeteria, Gymnasium, Gymatorium	
General/ Aisle/Cross isles	1.0 foot-candle measured at floor
General/Aisle/Cross isles	0.5 foot-candles measured at the floor - During performance only
Places of Assembly – Auditorium, Gymatorium	
Exterior exit lights immediately adjacent to exit doorways leading into yards and courts	5 foot-candles measured at the floor over the specified area per **Section** BC 1029**.19.4 of the 2022 NYC Building Code**
Exit Doors	1 foot-candle measured at the floor
Corridors, exits, exit discharges, Areas of Refuge and stairs	1 foot-candle measured at the floor
Exits, in high-rise buildings with existing photoluminescent markings	2 foot-candles measured at the floor
Fire Rescue Areas/ Areas of Rescue Assistance	1 foot-candle measured at the floor
Safe Areas, including all stairs, ramps, etc within the area	5 foot-candles measured at the floor
Corridor sign for Fire Rescue Area/ Area of Rescue Assistance	25 foot-candles measured at sign
Electrical service room (containing the disconnect switch), Fire Command Center, Fire pump rooms, generator rooms	**1 foot-candle measured at the floor**
Public Restrooms with area greater than 300 square feet (e.g. Field House)	**1 foot-candle measured at the floor**

B. Buildings with Generator

1. In new buildings, major modernizations, or major additions where an emergency generator is being provided, provide power for Emergency Lighting through the Emergency Systems automatic transfer switch as described in DR 7.1.2.

C. Buildings without Generator

1. In buildings not provided with an emergency generator, emergency luminaire shall be connected to a power source recognized by Section 700-12 of the **2011** NYC Electrical Code.

2. The emergency luminaires in the Places of Assembly and the paths of egress to the outside shall be controlled by a relay with sensing circuit off the local lighting panel. A key operated test switch shall be wired into the **sensing** circuit.

7.2 Lighting Systems

7.2.4 Exit Signs

Description/Design Approach:

A. Exit signs shall be in accordance with Section BC 1013 of the 2022 NYC Building Code. Locations of exit signs shall be designated on the Contract Drawings by the Architect of Record. Means of egress shall be clearly marked by illuminated exit signs with 8" letters so that exits and path of egress are easily recognized from any point in a corridor or Place of Assembly. Exit signs placement shall be such that no point in an exit access corridor is more than 100 feet or the UL[1] listed viewing distance for the sign, whichever is less, from the nearest visible exit sign. Wall mounted exit signs are preferred over pendant mounted exit signs. Pendant mounted exit signs should be strictly limited to meet visibility requirements, and only when additional wall mounted units may not suit the need.

B. Exit signs shall be coordinated with fire alarm strobes so that a minimum separation of five feet is maintained.

C. For buildings with a generator, exit signs shall be connected to the emergency lighting panel through transfer switch.

D. For buildings without a generator, exit signs shall be provided with battery packs and fed from the same source as the area lighting for the space.

E. If mechanical rooms on the roof require two means of egress per Section BC 1006.2.2.1, exit signs are required out of the mechanical room. If one of these exits is the exterior door to the roof, then an exterior exit sign on the exterior side of the stair bulkhead door is required to direct occupants back into the building to the required egress path. Exterior exit signs are to be a "weatherproof" type.

Note:

[1] Manufacturers may request UL to test their self-luminous or electroluminescent exit signs at lesser distances. UL requires those signs to be marked with the legible viewing distance. The NYC DOB recognizes other nationally listed labs that perform tests in accordance with the UL standard.

7.2 Lighting Systems

7.2.5 Exterior/Site/Security Lighting

Description/Design Approach:

A. General

1. Exterior/site/security lighting shall be provided around the perimeter of the school and on playing fields for safe passage of students and staff and to deter theft and vandalism. Lighting design shall minimize light trespass from the building and site, reduce sky glow, improve nighttime visibility through glare reduction and reduce development impact on nocturnal environment.

2. For capacity and major modernization projects, design shall comply with all the requirements of NYC Green Schools Guide Credit for Light Pollution Reduction.

B. Lighting Levels

Provide computer generated lighting calculations for the entire school site. Provide calculations for building perimeter. Calculation results shall show horizontal illuminance on ground level. Where required, provide calculations in compliance with NYC Green Schools Guide Credit for Light Pollution Reduction.

1. All entrances, exits and walkways, including exit discharge to public way: 1.0 FC min. as per **Section** BC **1008.2.1** of the **2022** NYC Building Code. Exterior fixtures immediately adjacent to exit discharge doorways are required to be connected to emergency power. Refer to DR 7.2.3.

2. All Auditorium, Cafeteria, Gymnasium, Gymatorium or Cafetorium exit doors that open into an exit discharge area in schoolyard: 5.0 FC min. over the required area. Refer to **Section** BC **1029.19.4** for requirements.

3. Building perimeter: 1.0 FC (average maintained) to a 20-foot depth from the building with 0.1 FC minimum and 5 FC maximum. These levels shall be reduced to comply with Light Pollution Reduction Credit if building perimeter is on the site boundary.

4. Site (athletic fields security lighting): 0.5 FC (average maintained) with 0.01 FC minimum and 5 FC maximum. These levels shall be reduced to comply with Light Pollution Reduction Credit if building perimeter is on the site boundary.

C. Design Parameters

1. Due to the aesthetics of exterior lighting, its impact on a school facade and the difficulty in describing multiple elevations on a plan, it is essential that the designer provide building elevations to clearly depict the location and mounting height of each fixture.

2. The exterior lighting power densities shall not exceed those defined in Table 9.4.2-2 of ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYC Energy Conservation Code. All new building projects shall be classified under one of the following exterior Lighting Zones and shall follow the requirements for the specific zone. Determination of the Lighting

Zones indicated below for the specific project shall be based on RCNY 5000-01 of the Rules of the City of New York, which assigns an exterior Lighting Zone to each zoning district in the New York City Zoning Resolution. While it is the intent on each project to meet this credit, it may be difficult to achieve for buildings placed on the Street Line and fixtures should not be lowered to a height where they will be subject to vandalism to meet the credit. The design is to be discussed with the Authority once this condition is ascertained.

LZ1 – Dark (Park Land and Rural Settings)

Design exterior lighting so that all site and building mounted luminaries so that 0% of the total initial designed fixture lumens are emitted above horizontal. As per RCNY 5000-01: Parkland.

LZ2 – Low (Residential Area)

Design exterior lighting so that all site and building mounted luminaries **so** that no more than **1.5**% of the total initial designed fixture lumens are emitted above horizontal. For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site. As per RCNY 5000-01: All R districts, R districts with C overlays, and MX districts.

LZ3 – Medium (Commercial/Industrial, High-Density Residential)

Design exterior lighting so that all site and building mounted luminaries **so** that no more than **3**% of the total fixture lumens are emitted above horizontal. For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary. As per RCNY 5000-01: M districts, except MX; C districts, except C5, C6 and C overlays on R districts.

LZ4 – High (Major City Centers, Entertainment Districts)

Design exterior lighting so that all site and building mounted luminaries **so** that no more than **6**% of the total initial designed site lumens are emitted above horizontal. For site boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the site boundary. As per RCNY 5000-01: C5 and C6 districts.

D. Lighting Equipment

Lighting levels shall be achieved utilizing the following equipment:

1. Light Source: The light source for all exterior lighting shall be High Efficiency LED Luminaires and shall have a minimum of 50,000 hours of operation and comply with the IESNA LM-80 test method. All Luminaries shall be DLC certified (Design Lights Consortium)

2. Luminaires: Luminaire selection shall be coordinated with the architect so as to complement and accent architectural features. Luminaires for perimeter lighting shall be wall surface mounted at a maximum of 15 feet above grade for ease of service. Roof parapet mounted luminaires may be used only in as indicated in paragraph E below.

   a. Luminaires shall have cutoff optical system in compliance with NYC Green Schools Guide Light Pollution Reduction Credit. Use of non-cutoff luminaires shall not be utilized

and may be only permitted for the following applications: sports lighting (provide justification), construction lighting, and historic restoration lighting.

b. Luminaires shall have high reflectivity segmented optical system with minimum efficiency of (66%). Lighting distribution NEMA Type III and Type IV shall be used.

c. Luminaires shall have a minimum IP 65 rating, a minimum 2G vibration tested and shall be UL 1598 listed for 25 degrees Celsius ambient temperature application.

3. Poles:

a. The usage and quantities of poles shall be limited and may be used only with the written approval of the SCA Design Manager. When wall-mounted or parapet-mounted luminaires cannot achieve the intended site lighting criteria, pole mounted fixtures may be provided. Site lighting poles shall be anodized aluminum (tapered or square) with an overall maximum mounting height of forty (40) feet. Higher mounting heights may be considered only when heavy-duty poles are justified by unusual site conditions such as athletic field lighting. Mounting heights 25 feet and lower should be avoided to limit the number of poles and luminaires and to minimize light trespass. Spill light optical shields shall be used to minimize light behind pole to a 2% of the total lamp lumens.

b. In general, pole foundations shall be designed by a structural engineer and shown on the structural contract drawings with all conduit entries and exits. Poles shall be provided with a suitable lockable hand-hole and grounding lug. Plug fusing shall be provided on each circuit phase leg within the hand-hole.

4. Lighting Control: In new construction and major modernization, all site security lighting shall be master controlled by the building lighting management system. For Capital Improvement Projects, the security lighting shall be controlled by time clock, photocell and multi-pole lighting contactor. In all cases, the photocell shall be circuited in parallel to time clock such that either one will activate the site security lighting.

5. Raceways: In general, raceway shall be run on the inside face of the parapet and/or concealed in the building interior. Exposed raceway on building facades is not permissible.

E. CIP Projects

Existing buildings (over 15 years old or so) typically have large arm-mounted security lighting attached to the parapet. Security lighting may need to be replaced as part of a plan project due to BCAS rating or due to a parapet replacement/roof replacement.

1. SHPO Buildings

a. If parapet-mounted lights are less than 10 years old, the brackets can typically be reused and LED luminaries installed, unless they are already LED and have been replaced within the last 7 years and the entire system just reinstalled.

b. If the use of wall-pack models are feasible as building can facilitate running the conduit inside the building and approved by SHPO, use of parapet-mounted luminaires can be limited to playground lots or interior courtyards to avoid affecting the appearance of the façade and possible community complaints.

2. Non-SHPO Buildings: As there is less concern with the façade appearance, the use of roof-mounted lights can be avoided if possible as they are the subject of community complaints. Wall–pack luminaires shall be used except where roof mounted are needed for large playgrounds or interior courtyards. Conduit runs shall be shown with input from the architect to minimize the appearance and is to be painted to match the adjacent masonry. If parapet-mounted lights are less than 10 years old, the brackets can typically be reused and LED luminaries installed, unless they are already LED and have been replaced within the last 7 years and the entire assembly reinstalled.

7.2 Lighting Systems

7.2.6 Athletic Field/Sports Lighting

Description/Design Approach:

Athletic field lighting shall be provided only when requested specifically by the Department of Education Program of Requirements. The engineer must verify that the request is not intended for Security/Site Lighting.

In the event that Sports Lighting is confirmed, the designer shall follow the IES recommendations for the application.

When poles are required, provide aluminum or steel poles, mounted around the perimeter of the site to facilitate maintenance without driving onto the field. Any poles not located on the perimeter must be accessible by roadway suitable for a bucket truck with 75' boom **to avoid driving on the synthetic turf or natural grass field.**

Fixtures shall be selected for superior photometry minimizing the number of required fixtures and ease of maintenance/lamp replacement**, while avoiding light pollution trespass to adjoining properties.**

7.3 Low Voltage Systems

7.3.1 Fire Detection and Alarm System for School Buildings with Occupant Load <100

Description/Design Approach:

A. General

The fire detection and alarm system for low-rise school buildings (buildings less than 75 feet in height as defined by the 20**22** NYC Building Code) **with an occupant load of less than 100** shall be a Manual and Automatic Fire Alarm System with Central Office Connection provided in accordance with the Section BC 907.2.3 of the 20**22** NYC Building Code. This system shall be a fully supervised, microprocessor-based multiprocessing system with individually addressable devices connected to a central station. **This Design Requirement may apply to 3K lease projects and other very small buildings. Refer to DR 7.3.15 for all other buildings.**

B. Fire Alarm System Coding

The manual and automatic fire alarm system shall operate as a "Temporal 3" Coded System.

C. Smoke Control

1. Smoke control systems shall be provided for systems required by the 20**22** NYC Building Code (Refer to DR 6.2.10) and shall be designed in accordance with Section BC 909. Coordinate with HVAC engineers. **Due to the limited size of the building for the occupancy (<100), smoke control should not typically be required or the building designed to require such.**
   - Smoke control systems shall be activated by any of the following:
     - Automatically by area or duct smoke detectors
     - Automatically by sprinkler waterflow switches
     - Manually by the Fire Fighter's Smoke Control Station
   - Smoke control system activation shall be immediately initiated after receipt of appropriate automatic or manual activation command.
   - Activation of the smoke control system shall send an alarm to the Central Station.
   - The smoke control system shall be connected to the FACP via a UL 864 listed Fire Fighter's Smoke Control Station. This station shall provide status and manual override control of all automatic smoke control devices associated with the smoke control system, as well as manual control of Post-Fire Smoke Purge systems (where applicable).
   - The Fire Fighter's Smoke Control Station shall override any other building controls that may be controlling smoke control equipment from any control point other than the Fire Fighter's Smoke Control Station.

2. Post-Fire Smoke Purge systems are required for the following conditions for low-rise school buildings:
   - Buildings with any story exceeding 50,000 SF in floor area
   - Buildings with spaces exceeding 100 feet from natural ventilation openings (natural ventilation is defined in BC 91**7**.1)

System shall be designed in accordance with section BC 91**7** of the NYC Building Code.

- Post-fire smoke purge systems are not intended to be life safety system. They are typically operated after the fire has been extinguished.
- Post-fire smoke purge systems are manually controlled from the Post-Fire Smoke Purge panel. (If there is a smoke control system in place, then the post-fire smoke purge system is manually controlled from the Fire Fighter's Smoke Control Station).

3. Ensure drawings show a detail showing the supervised auxiliary fan shut-down relay within 3'-0" of each starter contact or motor control starter. As per NFPA 72, it is acceptable to have the supervised auxiliary fan shut down relay within 3'-0" of interposing UL 864-9th edition listed relays on the same rung of the ladder logic that connects to the starters to shut them down directly. Use of a cascading series of relays beyond the permitted interposing relay(s) to shut down the fans is not code compliant.

D. Equipment and Locations

Fire Alarm Control Panel (FACP), including Post-Fire Smoke Purge controls, where required, and Fire Fighter's Smoke Control Station, where required – Placed in the main lobby, near the main entrance. Provide microphone and voice control where presignal system for place of assembly is required.

Printer – Placed in the Custodian's Office

Remote Annunciator – Placed in the General Office

Manual Pull Station – Placed in accordance with Section BC 907.4.2. Specifically, they shall be provided at each door leading to legal exit in corridors, lobbies, places of assembly and as required to meet the NYC Building Code travel limitations of 200'. The height of the manual pull stations shall be a minimum of 3'-6" and maximum of 4'-0" measured vertically from the floor level to the activating handle. All manual pull stations shall be single-action type. False alarm stopper covers shall be provided over all manual pull stations in new buildings and major modernizations where the mounting boxes have been recessed and the 4" maximum protrusion in the path of travel required by ADA can be maintained. Capital Improvement Projects typically have the pull stations surface-mounted and will **require the shallow false alarm boxes to be used to** meet the 4" maximum protrusion requirement. Modify the specification appropriately.

Audible Notification Appliances (Horns) – Placed in accordance with Section BC 907.5.2.1. Specifically, they shall be placed in all corridors and elsewhere, where required by the NYC Building Code, to provide audibility of 15 dBA above the average ambient levels. Refer to Chapter 18 of NFPA 72-1**6** for audible requirements. Horns shall be wall-mounted with their tops above the finished floor at heights not less than 90" and below the finished ceiling at distance not less than 6".

Visual Annunciator (Strobes) – Placed in accordance with BC 907.5.2.3. Specifically, they shall be wall-mounted in places of instruction, corridors, places of assembly, library, shops, music rooms, toilets and elsewhere where required by the NYC Building Code. Strobes shall be unobstructed by other objects, visible from any position in the area and shall be a maximum of 15 ft. from end of the corridor. Strobes shall be wall-mounted such that the entire strobe lens is located **below** 96" above the finished floor or 6" below the ceiling, whichever is less in height. Strobe lights shall not be required in staircases. If three or more strobes are in the same room or adjacent space within the field of view, they shall be synchronized. Ceiling-mounted strobes are allowed where wall-mounted strobes cannot provide proper coverage.

Audible and Visual Notification Appliances (Horn/Strobes) – Where horn location coincides with strobes, use combination horn/strobe type. Horn/Strobes shall be wall-mounted such that the entire lens is located **below** 96" above the finished floor or 6" below the ceiling, whichever is less in height. If three or more strobes are in the same room or adjacent space within the field of view, they shall be synchronized.

Area Smoke Detector - Placed in all mechanical rooms, oil tank rooms, electrical switch gear rooms, electric closets, telecommunications room and closets, audio/video storage rooms, paint storage, elevator lobbies, top of elevator shafts **if shaft is provided with sprinkler per Section 2.27.4.2 of ASME 17.1-2013 as modified by Appendix K, Chapter K1, of the 2022 NYC Building Code (i.e. sprinklers in hydraulic elevator pits)**, elevator machine rooms, locations requiring smoke control systems (stage, atriums, etc.), storage rooms containing flammable materials (book storage, grounds equipment room, custodian's storage) and over cross-corridor doors where magnetic door holders are provided. Smoke detector layout shall comply with NFPA 72-**16 as modified by** Appendix **Q,** Section **Q107, of the 2022 NYC Building Code.** Spacing shall not exceed the limitations of UL listing for the specific smoke detectors.

Duct Smoke Detectors – Place where required by code. Duct detectors placed in roof-top mounted/exterior equipment and exterior ducts shall be weatherproof type.

Heat Detectors – Placed in boiler rooms, other mechanical rooms being fed with fuel oil, generator rooms/enclosures, kitchens and culinary art rooms, and other locations where smoke detectors are required but cannot be installed due to environmental conditions (temperature below 32°F) or potential false alarms. Heat detector layout shall comply with NFPA 72-1**6** as **modified by Section Q107.** Spacing shall not exceed the limitations of UL listing for the specific heat detectors. Heat Detectors in the oil burning equipment rooms shall shut down fuel oil transfer pumps to that equipment.

Flame Detectors - Ultraviolet (U/V) explosion-proof flame detectors shall be installed in all rooms containing natural gas piping at a pressure of 15 psi or greater.

Carbon Monoxide Detectors – Refer to DR7.3.13 for details

Gas Leak Detection - Provide a gas leak detection connection via monitoring module to the fire alarm system with separate and distinct central station notification meeting the requirements of Section BC 918 for projects utilizing gas (not typical of new installations as heating and domestic hot water is to be provided using heat pump systems). Verify with the mechanical engineer (review product literature) that existing gas leak detection has the required dry contacts to make the connection.

Metal Wire Guards – Provide in all gymnasiums and playrooms for visual and audible notification appliances. Also provide guards for such devices in corridors, bathrooms and locker rooms for high schools where the devices are below the 8'-0" requirement or accessible from a window sill or other similar structure.

Kitchen Hood Fire Suppression System (Ansul system) - Shall be interconnected to the fire alarm system and the activation of the fire suppression system shall be indicated as an alarm on the Fire Alarm System.

Digital Alarm Communicator Transmitter (DACT) and Central Station Monitoring - Shall be provided as follows:

1. For any new fire alarm system installations and fire alarm panel replacements - all manual and automatic detection devices connected to the fire alarm system shall send the following signals to the Central Station:

   - Manual Alarm - manual pull stations,
   - Sprinkler Alarm - sprinkler system waterflow switches,
   - Automatic Fire Alarm - area smoke detectors, duct smoke detectors, heat detectors, flame detectors, kitchen Ansul systems,
   - Carbon Monoxide Detectors - system-connected CO detectors.
   - Supervisory signals - sprinkler system tamper switches, fire/sprinkler booster pump status (power failure, pump running, phase reversal), water tank low air pressure), **generator run/fail**
   - Trouble signals - general trouble signal from the Fire Alarm Panel.

2. When there is a sprinkler booster pump/fire pump installation in an existing building without fire alarm panel replacement, supervisory signals; sprinkler system tamper switches, fire/sprinkler booster pump status (power failure, pump running, phase reversal), water tank low air pressure, **generator run/fail** shall be monitored by the Central Station. If existing panel does not have central station monitoring, provide an external DACT.

3. When there is no sprinkler booster pump/fire pump in the fire protection system and there are more than **6** sprinkler heads being installed in an existing building per fire zone, the sprinkler system waterflow switches and tamper switches shall be monitored by a central supervisory station. If existing panel does not have central station monitoring, provide an external DACT.

4. **Optional: IP with Cellular Interface is used for applications where Plain Old Telephone (POTs) lines are not available or where Managed Facility Voice Network (MFVN) analog lines do not provide a stable interface. All network and cellular connection shall be approved by FDNY and shall have a FDNY Certificate of approval.**

Smoke Control System – Refer to Item 3 above

Voice/Alarm Communication System for Group A Spaces **and Atriums – Based on the limited number of occupants (<100) that this Design Requirement would apply, the code requirements for these systems would typically not apply to these schools.**

Fire Alarm Control Panel Bypass Key-Switch – New fire alarm systems designed under the **2022** NYC Building Code do not require **the use of a** fan shutdown **bypass key switch** during daily fire alarm testing **as they** are to be programmed to prevent the fan-shut down during testing. However, when a project is assigned due to continuing failure of dampers during fan shut down due to daily testing of a fire alarm system that does not have a bypass key switch, install a key-switch to bypass the circuits controlling dampers and fan shutdown during daily testing:

Procedure for the installation of the bypass key-switch in existing Fire Department approved Fire Alarm System

1. During the scope/schematic phase, the Engineer of Record shall file for a site-specific variance to allow the addition of the bypass switch to the existing fire alarm panel. Variance request shall be sent to the NYC Fire Department, Bureau of Fire Prevention - Chief of Technology Management and reference Fire Prevention Index # 0707030

2. The site-specific variance request shall indicate the school name and address. This request shall include a copy of the Fire Department Letter of Approval of the existing system and a copy of the Certificate of Fitness of the person designated to test that specific fire alarm system
3. Fire Department Chief of Technology Management will respond in writing, granting a site-specific variance.
4. Fire Department site-specific variance shall be scanned by the Engineer of Record and placed on the Fire Alarm System drawings for filing with the Bureau of Fire Prevention.
5. The Engineer of Record shall comply with all the Fire Department requirements indicated in the site-specific variance.

E. Design and Filing Strategy for Addition Projects

1. The decision on filing strategy will be decided early in the design process and is based on several factors, especially the size of the addition, age of the building, and types of spaces being added.

2. The Authority's preferred approach is that building additions are to be designed and filed as new buildings. As such, the fire alarm for the new addition will be a separate new system. Determination of how to address the existing building's system is as follows:

a) The fire alarm of the existing building is to be retained, when possible. Determination as to whether the alarm can be retained is dependent on several conditions:

- If the system is an antiquated system, such as the Acme system installed under prior codes, the system is to be replaced.

- If the existing panel is sized that it can receive additional devices required due to the work or spaces being created in the existing building and is operational, the system can remain. Verify fan operation and shut down is working. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included with the existing building work.

- If the existing building fire alarm system requires expansion due to additional devices required for the work or spaces being created in the existing building and cannot be expanded without replacing the panel, replace the existing system.

- If the fire alarm system of the existing building requires replacement, the fire alarm system is to be designed and filed as a separate project from the fire alarm of the new addition. Ensure the fans and other systems are operational to allow required connections for fan shut down. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included with the existing building work. The decision as to which Contract performs the work will be decided during design.

b) A remote annunciator for each of the building's alarm system (existing building and new addition) is to be placed at the general office, custodian's office, and the security desk at the main entrance, depending on where these spaces are to be located, except where

the system panel is already located in one of those locations. In addition, a remote annunciator is to be placed at both fire alarm panels for the other's system. The annunciator at the security desk can be omitted if it is near the fire alarm panel at the building entrance.

c) Verify the existing ansul system is operational and connected to the system and approved by the FDNY Fire Suppression Unit, if the kitchen is not being moved to the addition. If the system is not approved and the kitchen is to remain in the existing building, a decision will need to be made to request for an upgrade to the ansul system and connection to the fire alarm or revision to kitchen equipment to avoid needing to install a new ansul system.

3. Addition projects filed as an Alt 1 are required to be integrated into the existing buildings alarm. This will typically require the existing buildings alarm to be replaced as part of the project to ensure the system will function, unless the fire alarm has been recently replaced and is functioning.

4. The Letter in Part **H** of this Design Requirement provides the strategy agreed to by the FDNY and is to be included in the Fire Alarm Drawings.

F. Capital Improvement Program Projects

1. For CIP projects where the fire alarm system is affected by the work and devices will need to be added or changed, the reasoning in Paragraph E.2 above can be followed in determining if the existing system can remain.

2. For Fire Alarm Replacement Projects, ensure the fans and other systems are operational to allow required connections for fan shut down. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included in the scope of the CIP project.

3. Ensure that existing water pressure switches or water flow detectors on sprinkler and/or standpipe systems are operational and can be adjusted and tested to provide a 30-second alarm notification delay with an activation of 90 seconds maximum. Coordinate with the Fire Protection Engineer. If existing devices are fitted with retarding chambers but cannot be adjusted to meet those notification requirements (or are not fitted with such chambers and chambers cannot be added) required by FDNY (the authority having jurisdiction), replace existing devices with new water flow detectors.

G. Requirements for the Engineering Plans.

1. Engineering plans shall contain all information in accordance with the Section BC 907.1.1. The sequence of operations shall be shown in the input/output matrix in the form prescribed by NFPA 72-1**6**. **S**igned and sealed drawings in **PDF format** shall be provided for filing **online** with the Fire Department.

2. The Engineer-of-Record shall be responsible for any modifications of the design drawings required to obtain the Fire Department plan approval.

3. Upon completion of the project **and the fire alarm is successfully installed and tested prior to FDNY inspection**, the Master Electrician will prepare and sign a set of as-builts,

including the revised input/output matrix. The Engineer-of-Record shall visually inspect the fire alarm installation and compare the As-built to the Contract drawings and if agreed and correct to the best of his/her knowledge, will sign and seal the as-built and the Contractor will submit to FDNY to facilitate their inspection. Once the letter of approval is attained from FDNY, submit one set of signed and sealed "AS-BUILT" riser drawings in 24" x 36" and one set of signed and sealed "AS-BUILT" drawings reduced to 11" x 17" to the NYC Department of Buildings. **(For new projects if the approved plans do not match the As-Built drawings, a new PAA needs to be filed with FDNY prior to inspection since the As-Built and FDNY approved plans must match.)**

H. Relevant Documents

* The 20**22** NYC Building Code.
* The 20**22** NYC Mechanical Code.
* NFPA 72, National Fire Alarm Code, **2016** Edition, as modified **by Appendix Q, Chapter Q107, of the 2022 NYC Building Code.**
* NYC Electrical Code, including 1 RCNY 4000.
* Fire Department Letter approving the bypassing of the circuits controlling dampers and fan shutdown during daily testing (For existing systems without shutdown)
* Letter to FDNY, accepted by FDNY, outlining SCA filing strategy for Addition Projects (to be included on addition project drawings)

JUL-31-2007 15:58 Z S ENGINEERING 5163286195 P.02/03

The City of New York

FIRE DEPARTMENT
9 METROTECH CENTER BROOKLYN, N.Y. 11201-3857

July 23, 2007

JUL 25 2007

Mr. Zygmunt Staszeski
ZS Engineering PC
99 Tulip Avenue
Floral Park, NY 11001

Re: Testing of Interior Alarm System in Public Schools, Fire Prevention index # 0707030

Mr. Zygmunt Staszewski

The Bureau of Fire Prevention acknowledges your letter dated June 26, 2007 concerning the above referenced subject matter and NYC School Construction Authority. The Bureau concurs with your assessment that the required daily testing of public school alarm systems for those building that contain HAVC equipment that require shut-down during alarm activation, places unnecessary stress on HAVC components.

The Bureau will accept fire alarm programming that will bypass damper and fan shutdown **PROVIDING THAT:**

1. During daily tests, a key switch shall be used to bypass the circuits that control dampers and fans shutdown.
2. The damper and fan bypass function shall be automatically restored to the normal un-shunted condition within forty-five minuets, if not done so manually before forty-five minuets.
3. The operation of the daily test shall be by a certificate of fitness holder
4. A log of daily fire alarm tests shall be maintained
5. Variance to install this bypass feature shall be site specific

JUL-31-2007 15:58 Z S ENGINEERING 5163286195 P.03/03

Testing Interior Fire Alarm. Public Schools
FPI # 0707030
July 23, 2007

6. The following documentation must be submitted with each variance.

   A. A copy of the certificate of fitness of the person designated to test the alarm

   B. A copy of the IFA approval letter issued by the Bureau

The Bureau of Fire Prevention may require additional requirement to ensure the integrity of the alarm system and safety of the public. When responding to this letter, kindly address your correspondence to Jack Taddeo, Chief of Technology Management and reference FPI# **0707030**

Signed

Jack Taddeo, Battalion Chief
Chief of Technology Management
Bureau of Fire Prevention
718 99 2377

TOTAL P.03

February 22, 2019

Department of Education

Chief Thomas Pigott
Chief of Technology Management
FDNY Bureau of fire Prevention
9 MetroTech Center 3rd Floor
Brooklyn, NY 11201

RE: Fire Alarm Filing Strategy – Public Schools
Additions filed as New Buildings – Revision

Dear Chief Pigott:

The NYCSCA would like to update you on our new filing strategy. We are in the process of constructing several new school buildings in all five boroughs. After our Agency has completed the feasibility study for each new building in accordance with the Administrative Section of the Building Code Administrative Sect. 28.2-901.9.4.1, & BC 1101.3.2 the determination for the filing category will be selected.

If the value of the new addition construction design meets/exceeds 50% and or 60% of the value of the existing building, then such new addition building will be filed as a "NEW BUILDING" in compliance with all the applicable codes. As a result of the NB filing classification, no ADA (triggered by 50%) or Fire Protection Systems (triggered by 60%) upgrades are required to be implemented to the existing building that was built in accordance with the governing Building Codes at that time. If the value of the new construction addition is less than either 50% of the value of the existing building, then the application will be filed as an "ALTERATION TYPE I", and will comply with all requirements outlined in the Administrative Code Sect. 28.2-901.9.4.2.

Requirements for New Building Filing:

1. New address with separate main entrance
2. Schedule A reflecting the Use and Floor Identification exclusive to the NB
3. New services/utilities directly related to the NB
4. Independent Egress
5. Fire wall separation between buildings, rating of new to match existing – ranging from 1 hr. -3hr
6. **New IFA panel located at main entrance with remote annunciation to custodian's office, main offices and Security station in the existing building as appropriate to the design.**
7. All ADA requirements as pertained to the governing code
8. FA plans will only reflect the details of the new building as per the related Schedule A, with any portion(s) of the existing building associated with the NB
9. **Connecting path of convenience between existing and new building – From the new building to the existing building – installed signage "Not An Exit" and from the existing building to the**

30-30 Thomson Avenue
Long Island City, NY 11101
718 472 8000 T
718 472 8840 F

new building (where necessary as per design). Installed signage to read "In Case of Fire - Access to Voluntary Fire Rescue Room".

Requirements for New Addition- Filed as Alteration Type I:

1. New addition building is connected to existing building as one building
2. Shares a common building address
3. Schedule A reflects the Use and Floor Identification for both buildings
4. Services and systems are and can be extended to provide coverage for both buildings
5. Shared Egress
6. One fire alarm system will provide coverage for both building using the existing "Phasing Agreement" between the NYCSCA and FDNY.

The filing types for these new school buildings will be depicted in section # 5 of the PW-1 and will be reflected in the BIS. All associated filings will follow suit accordingly, included that of the Fire Alarm application/plans.

Chief Pigott, the NYCSCA would appreciate FDNY Technology Management's support on this strategic approach, while maintaining the current phasing agreement still on record. This will enable us all to work well together toward a common vision without compromising the safety of the occupants or the general public.

If you have any questions, concerns or require further clarification, please do not hesitate to contact me immediately.

Sincerely,

Gordon Tung, P.E.
Vice President
New York City School Construction Authority

Gordon Tung, P.E.
Vice President
Construction Management

CC:
T. Shah – FDNY
R. Bonavita – FDNY
M. Yohan - FDNY
T. Sakin - FDNY
D. Choy – SCA
G. Roussey - SCA
B. Barrett - SCA
E. Abneri - SCA

7.3 Low Voltage Systems

7.3.3 Main Telecommunications Room and Intermediate Telecommunications Closet

Description/Design Approach:

A. Main Telecommunications Room (MDF)

A Main Telecommunications Room (MDF) shall be provided to house the main control equipment of the following systems:

- Local Area Network
- Telephone System
- Sound, Intercom and Teacher Activated Security System and Clock System
- Internet Protocol Digital Video Surveillance (IPDVS) System
- Building Management BACnet System
- **Video Intercom System**

The MDF shall not be placed in a cellar or basement and shall be centrally located on an upper floor of the school, but not in a space below a roof.

For a DIIT 'Small' school (student population of less than 40 students), a dedicated MDF is not required and a 1/4 height cabinet is to be provided. For a DIIT 'Medium' School (Student population greater than 40 students but less than or equal to 1000 students, a minimum of 150 sq. ft. is to be provided, proportionally 10' x 15,' though the POR requires a slightly larger size to account for installation of the BACnet cabinet if space is available. For a DIIT 'Large' school (student population of greater than 1000), a minimum of 300 sq. ft. of proportional width and length (not narrow and long) is to be provided. For existing schools and additions, if this area cannot be achieved due to the building layout and space restrictions, the equipment can be split into two separate rooms totaling the required square footage. If the space is not available, discussions with DIIT shall be held to determine alternate solutions. A 1/4" = 1' scale drawing of the MDF showing all the equipment and their electrical requirements shall be included in the Contract Documents. As a minimum, a 3'-0" clearance shall be provided on two sides (front and back) of the system equipment racks. Refer to the latest DIIT Standard of the v**7** series (refer to SCA website for latest version) for equipment and clearances, which are to be provided, in addition to required power requirements for the room and cabinets. Not all equipment such as the BMS cabinet are shown and must be located in the room and thus rooms will typically need to be larger than the minimum indicated.

Designers are to ensure that interferences such as columns and braces are accounted for and do not reduce the area or prevent the equipment from being installed with the appropriate clearances.

B. Intermediate Telecommunications Closet (IDF)

Intermediate Telecommunications Closets (IDF) shall be centrally located and stacked. The number of IDFs required shall be dictated by a 100-meter maximum distance to any data/telephone/IPDVS outlet. In addition, if the 100-meter distance is not exceeded, the data/telephone/IPDVS cabling shall be homerun to the MDF.

The IDF size shall be 10 feet by 10 feet minimum and a 3'-0" minimum clearance shall be provided on two sides (front and back) of the equipment racks. Refer to the latest DIIT Standard of the v**7** series (refer to SCA website for latest version).

Designers are to ensure that interferences such as columns and braces are accounted for and do not reduce the area or prevent the equipment from being installed with the appropriate clearances.

C. Physical security for access to the MDF and IDF shall be provided.

D. Refer to Design Requirement 6.2.28 for the HVAC requirements of the MDF and IDF.

E. Refer to the Room Planning Standards for the layouts of the MDF and IDF (Room Planning Standards layouts #12-25, #12-26 and #12-31), along with latest DIIT Standard of the v**7** series (refer to SCA website for latest version).

7.3 Low Voltage Systems

7.3.4 Telephone System

Description/Design Approach:

A. General

1. The intent is to provide a school-wide Telephone System. The Contract Documents shall provide for a Telephone Cabling System including wiring, raceway, boxes and outlets. The Telephone System hardware including the PBX, racks, telephone instruments, cable manager, call accounting PC, printer and power supplies will be furnished and installed by the DOE/Division of Instructional and Information Technology (DIIT).

2. The Telephone System and the Data Cabling System shall be integrated as much as possible in common raceways.

B. Equipment and Locations

1. Main Distribution Frame (MDF) shall be an open-type distribution frame located in the Main Telecommunications Room (MDF room). The PBX, the Cable Manager, the Call Accounting System, Printer and RJ21X interface terminals should also be housed at the Main Telecommunications Room.

2. Desk telephone outlet shall be provided in all administrative areas, offices and security desk.

3. Wall telephone outlet in lock box shall be provided in every room of instructions and Places of Assembly.

4. Wall telephone outlet without lock box shall be provided in utility rooms, storage rooms greater than 200 sq. ft., mechanical rooms, elevator machine room, supply rooms and vault room.

5. Dedicated phone lines (not through the PBX) shall be provided for the Intrusion Alarm System, Fire Alarm System, Elevator Intercom System, **Chairlift Intercom,** and the nurse's office.

6. Loud Bell is to be placed in noisy areas including the auditorium, gymnasium, gymatorium, student cafeteria, kitchen and the boiler room. A loud bell may be required in other noisy areas; however, this will be addressed on a case-by-case basis and will be determined by the DIIT Project Manager.

C. Cabling

1. Entrance Cables: To ensure the ability to add lines in the future, the DIIT Project Manager will request the local telecommunications company (Telco) to provide a 100 or 200 pair service cable to the building D-Mark Point, which is to be located in the Main Telecommunications Room. To facilitate this, the Designer is to coordinate with the DIIT Project Manager and show two (2) 4" conduits running from the building Point of Entrance to the D-Mark Point in the MDF room on the drawings. This will facilitate running both copper and fiber optic lines. In addition, the drawings shall also indicate a poly-twine drag to be left

in the conduits so that the Telco can pull the service cable. In addition to the service cable, the Telco will also pull two (2), #22 AWG, solid core, 4-wire, individual shielded twisted pair, T-1 spec cables, terminated at both ends with RJ-48 jacks as needed.

The engineer shall transmit two copies of the Site Plan indicating the requested Point of Entry and the location of the Main Telecommunications Room along with the request letter (See samples at end of Design Requirement).

2. Riser Cabling for the voice system shall consist of a 6–strand, 50/125-µ, multi-mode fiber optic cable riser. Termination at the Main Telecommunications Room and Intermediate Telecommunications Rooms shall be at a rack-mounted interconnecting unit. Individual strands shall be fanned out and terminated with LC connectors in an interconnect plate with twelve interconnect sleeves, following proper manufacturer's specifications for bend radius and strain relief. In addition to the fiber backbone for voice connectivity, six (6) Category-6 cables shall be installed between the MDF and each IDF to provide a copper voice backbone for analog and/or other out-of-band network devices that require copper connectivity to the MDF room. The Category-6 cables shall be terminated on a 24 port Category-6 patch panel in each IDF; at the MDF these cables shall also be terminated on Category-6 patch panels; port count dependent upon the total number of copper riser cables installed. In all cases, the patch panel(s) shall be mounted in the voice communication rack directly under the fiber optic interconnect enclosure. One (1) 1U horizontal wire manager shall be installed immediately below the category 6 patch panel(s) in each room. Riser cabling of the data system is described in DR 7.3.5.

3. Horizontal Cables connect the MDF room or IDFs to each telephone station. Horizontal cable shall be one 4-pair, #23 AWG solid copper conductors, unshielded twisted pair Category 6 (Cat 6) cable. The Cat 6 cable shall be white in color.

4. Ladder racks shall be installed to manage cables in the Main Telecommunication Room and intermediate telecommunication closets where a bundled group of voice cables span a horizontal space greater than 18 inches.

D. Cable Termination

1. RJ21X Interface Terminals - The entrance cables shall be terminated at RJ21X Interface Terminals, which are supplied and installed by the Local Telephone Carrier and are to be mounted on the MDF.

2. MDF and IDF - At the telecommunication rooms (MDF room and/or IDF, depending upon cable design), the Authority's cabling vendor will terminate every pair of every voice and data cable on the Cat 6 compliant patch panel(s). Voice and data cables will be cut down on Cat 6 compliant patch panels with Cat 6 RJ-45 type, eight conductor, and modular receptacles.

3. Telephone Stations - The Cat 6 cable shall be terminated at an eight-conductor RJ-45 jack, configured as per EIA/TIA T568B jack designation.

4. Administrative Areas - The voice and data cables, consisting of one (1) four-pair Cat 6 cable for voice and one (1) four-pair Cat 6 cable for data, shall be terminated at a duplex combination faceplate consisting of two RJ-45 jacks.

5. Intrusion Alarm - The dedicated phone line for the system, consisting of one (1) four-pair Cat 6 cable, shall be terminated at one RJ-31X jack.

6. Fire Alarm System- The dedicated phone lines for the system, consisting of two (2) four-pair Cat 6 cables, shall be terminated at RJ-31X jacks.

7. Elevator Intercom – One dedicated phone line for each system, consisting of one (1) four-pair Cat 6 cable, shall each be terminated at a separate faceplate consisting of an RJ-45 jack.

8. Nurses Office – In addition to the standard phone and data to be provided to each nurse's desk, provide the following for the nurse's office/suite: voice and data cables consisting of one (1) four-pair Cat 6 cable dedicated phone line for the voice, one (1) four pair Cat 6 cable dedicated phone line for fax and one (1) four-pair Cat 6 cable for data, which shall be terminated at a triplex combination faceplate consisting of three RJ-45 jacks. The nurse's office phone is to be a dedicated line for the phone and fax, not through the PBX.

9. **Chairlift Intercom – One dedicated phone line for each chairlift, consisting of one (1) four-pair Cat 6 cable, shall each be terminated at a separate faceplate consisting of an RJ-45 jack at the chairlift. Chairlift is usually located in auditorium/gymatorium or other locations where provided for accessibility requirements.**

E. Power Requirements

The Telephone System PBX shall be provided with a dedicated 30-Amp, 120-Volt, circuit connected to the Emergency Panel. The Telephone System peripheral equipment (call accounting PC, printers, MAT terminal, power supplies) shall be provided with two (2) duplex, 20-amp, 120-Volt receptacles connected to a dedicated circuit in the Emergency Panel. The PBX should be independently grounded with a #6 AWG ground wire to the water service ground system via telecom room ground bus.

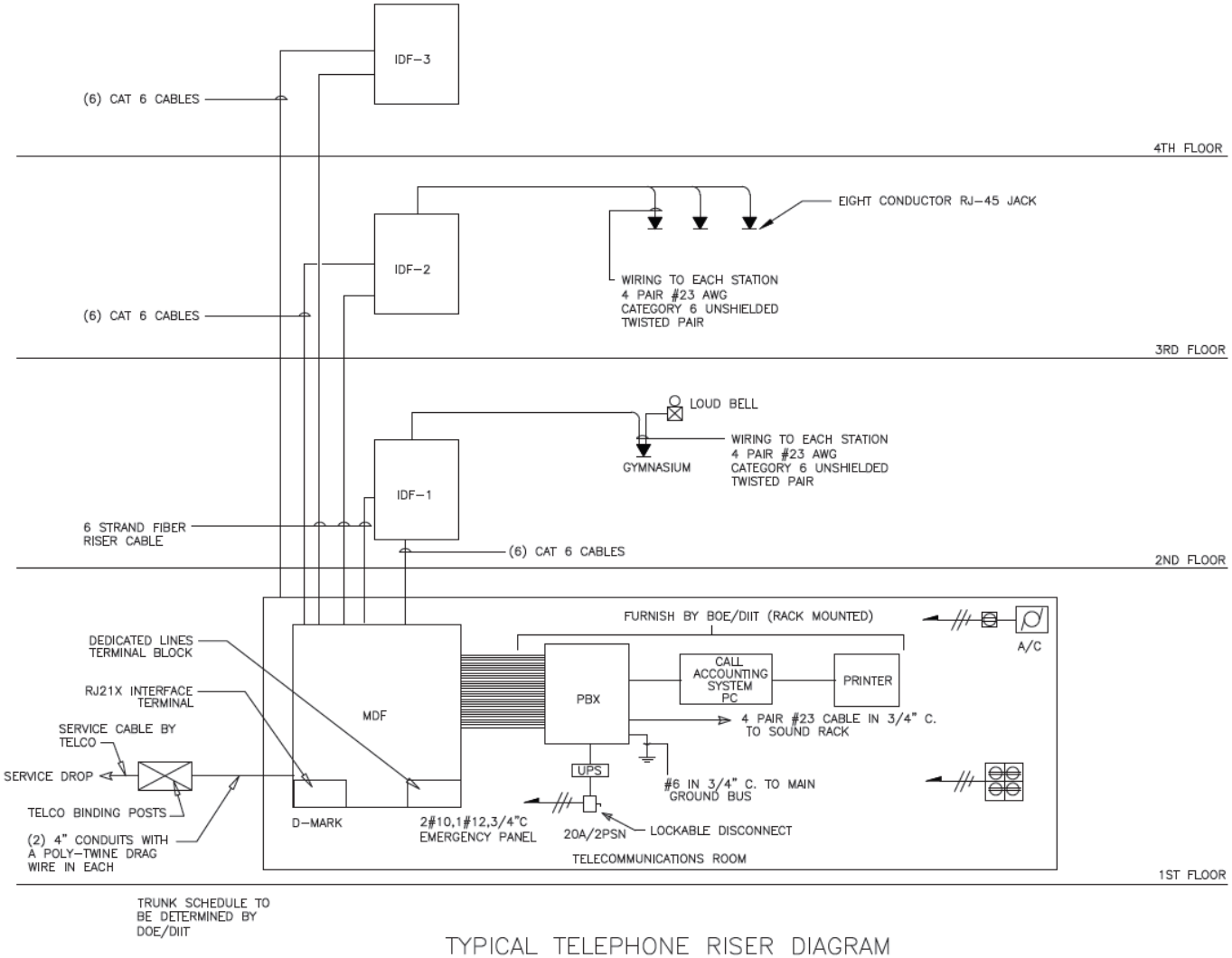
F. Coordination with the DOE/DIIT

At the Schematic Design Phase of a Capacity Project, the Project Engineer shall inform DOE/DIIT as to the type of project (addition, new building, etc.). DOE/DIIT shall advise the Project Engineer on the estimated cost for furnishing and installing the telephone system. The Project Engineer shall report said estimated cost in the Schematic Report for documenting same as separate item under Furniture & Equipment. DOE/DIIT will use these funds, when approved, to compensate their installing contractor.

When ordering the phone lines (MFVN Communications) for the Fire Alarm system, coordinate with DOE/DIIT to order the optional battery backup to be good for 8 hours of standby power supply as required by NFPA 72-16 A.3.3.151(3).

The Telephone System design documents, including riser diagram and floor plans, shall be submitted to DOE/DIIT for review and approval during the 60% and 100% design phases for Capacity Projects.

G. Relevant Conceptual Sketches
Typical Telephone System Riser Diagram
Sample letter requesting service to the Local Telephone Company



TYPICAL TELEPHONE RISER DIAGRAM

NOT TO SCALE

November 10, 1998

Verizon Communications Inc.
227 East 38th Street
New York, N.Y. 10016

Attention: **Name of Outside Plant Engineer**
Verizon Communications Inc.

RE: Kingsborough High School for the Sciences (New School)
2001 Oriental Blvd.
Brooklyn NY
Request for Telephone Service

Dear Mr. xxxxx:

The NYC School Construction Authority, in conjunction with the Department of Education, is currently preparing plans and specifications for the construction of a new High School for the Sciences on the Kingsborough Community College campus. The building will be a permanent four-story structure with no Cellar.

We are requesting an underground telephone service from Shore Boulevard into the building. The Main Telecommunications Room is located on the second floor. We propose to install two (2) 4" conduits from the Main Telecommunications Room to a point in the street one-foot from the curb line.

Enclosed please find two copies of the Site and Service Plan indicating the Main Telecommunications Room location. Kindly return one copy indicating the approved Point of Entry and any other information pertaining to the service.

Should you have any questions on this project, please do not hesitate to contact me at xxxx.
Please address your reply to the undersigned.

Sincerely,

xxxxx
Project Engineer

cf: SCA/A&E Design Manager
Project Architect

Enclosures
Site and Service Plan

7.3 Low Voltage Systems

7.3.5 Data Cabling Network

Description/Design Approach:

A. General

1. The intent is to provide high-speed data network-cabling infrastructure for administrative and instructional use. The Contract Documents shall provide for a Local Area Network (LAN) cabling infrastructure including wiring, raceway, boxes, outlets, patch panels, cabinets and racks.

2. The Local Area Network and the Telephone System cabling shall be integrated as much as possible in common raceway.

3. A Wireless Network Infrastructure shall be provided for use in accordance with the Department of Education's Division of Instructional and Information Technology (DOE/DIIT) requirements. As per **the latest** DIIT Standard **of the v6 series (refer to SCA website for latest version)**, wireless is to be provided throughout the entire school to provide the building with 100% wireless coverage.

4. Projects that include a building management control system shall also be provided with an additional backbone riser for the BACnet network system (coordinate with HVAC Design Requirement 6.2.20).

5. A separate isolated network shall be provided for the IP-Based Sound, Intercom and Teacher Activated Security System.

B. Equipment and Locations

1. Data-Main Distribution Frame (MDF) shall be an open type frame located in the Main Telecommunications Room (MDF room).

2. Wall Cabinet: Wall-mounted cabinet shall be installed in High-Density Rooms (rooms with 16 or more computers)

3. Patch Panels provide physical connectivity from the Main Telecommunications Room and Intermediate Telecommunication Closets (IDF) to the data outlets. Also, the patch panels provide cross connection between the MDF room and IDFs. Patch panels shall be housed in the MDF room, IDFs and at the High Density Room wall cabinet. The patch panels shall be sized to account for the port count plus 20% spare.

4. Data Outlets shall be provided at every area of instruction, every office including all cubicles, places of assembly, library, media centers, vault room, security desk and where required by the Point of Sale (POS) System and Comprehensive Attendance, Administration and Security System (CAASS).

5. The LAN hardware including switches, routers, communications servers, and un-interruptible power supplies (UPS) will be furnished and installed by the Computer Integrator contracted by the SCA/Furniture & Equipment Department.

6. BACnet wall data enclosures in the intermediate telecom closets will be furnished under Division 15 and installed under Division 16.

7. Provide enclosed rack and wall mounted cabinets in MDF and IDF locations for the IP-Based Sound, Intercom and Teacher Activated Security System.

C. Cabling

1. Entrance Cables - The Telecommunication Service Provider is responsible for providing and terminating the Wide Area Network (WAN) data circuits at the Main Telecommunications Room. DOE/DIIT is responsible for ordering the WAN circuits and assuming all installation responsibilities and expenses associated with the installation and operation of the circuits. The WAN provides the schools with connectivity to the Internet and administrative applications through the DOE computer facility at Metro Tech.

2. Riser Cables connect the Main Telecommunications Room or MDF to each Intermediate Telecommunications Room or IDF. Riser cabling for data shall consist of a 24-strand, 50/125-µ multi-mode fiber optic cable. The 24-Strand fiber optic cable shall be terminated at the MDF in rack mounted interconnect units with LC type connectors and shall be terminated at the IDF in rack mounted interconnect units with LC type connectors. Individual strands shall be fanned out and terminated with LC connectors in an interconnect plate with twelve interconnect sleeves, following proper manufacturer's specifications for bend radius and strain relief. Riser cabling of the phone system is described in DR 7.3.4.
.

3. Horizontal Cables connect the data outlets to the MDF or LDF. The horizontal cable shall be 4-pair, #24 AWG solid copper conductors, and unshielded twisted pair (UTP) Cat 6 communications cable. For the DOE's participation in a demand response program, a separate Cat 6 cable shall be run from a patch panel in the MDF/IDF to the main electrical room to within 3-5 feet of the electrical utility meter, terminated in the room with a box, cover, and chase nipple. Provide 6 feet of cable rolled up and tagged.

4. Horizontal Fiber Connections
Connect clinics and high-density areas directly to the MDF with 12-strand, 50/125µ, multi-mode fiber optic cable.

5. All UTP, fiber optic cable, patch panels and other components must adhere to performance levels specified in the TIA/EIA-568-A standards. Plenum grade cable shall be used only in plenum spaces.

D. Cable Termination

1. Cat 6 cables shall be terminated in an RJ-45 modular type eight-pin connector with outlets configured as per TIA/EIA T568B jack designation. At the MDF/IDF, cables shall be terminated on Cat 6 patch panels, and both ends of the cable shall adhere to TIA/AIA-568-B convention and shall be straight runs with no cross over.

2. BACnet backbone CAT 6 riser shall be terminated in an RJ-45 patch panel in the Main Telecommunications Room and with RJ-45 jacks in the Intermediate Telecommunication Closet data enclosures.

3. The BACnet data riser will have one network cable for each router that is located on each floor of the project as needed

E. Horizontal Cabling and Termination

1. Areas of Instruction shall be provided with five Cat 6 cable drops. Two of the Cat 6 cable drops shall be placed at the front wall of the instructional area by the instructor's desk. These cables shall be terminated in one duplex outlet. One Cat 6 cable drop is for student's use and shall be placed in the back of the room under the computer counter. The fourth cable drop shall be located at the entrance door for future use. The fifth cable drop is for the Wireless Access Point (WAP) as outlined below. Rooms larger than 1250 SF will likely have one additional Cat 6 cable drop as outlined below under "Wireless Network Infrastructure".

2. High-Density Rooms (rooms with over 16 computers/peripherals, library and media centers) shall receive a fiber run to guarantee a high-speed connection from the switch in addition to the Category-6 data drops described above. The fiber run shall consist of a 12-strand 50/125-µ multi-mode fiber optic cable (50 Micron OM4 spec), run from the designated classroom/office directly to the MDF. Termination of fibers in high-density areas must be with LC connectors mounted within a duplex fiber communication outlet or a combination faceplate in conjunction with one or more of the Category-6 cable(s). The fiber optic cable shall be terminated within the Wall Cabinet. In general, this fiber run shall include one termination in each high-density area. The DOE Project Manager will work with site administration to determine the appropriate numbers on a site-by-site basis.

3. General Assembly Areas (Auditorium, Gymnasium and Cafeteria) and Library shall be provided with a minimum of three Cat 6 drops as located on the individual Room Planning Standard and an additional Cat 6 drop for the Wireless Access Points as outlined below under "Wireless Network Infrastructure".

4. Administrative Areas shall be provided with two Cat 6 cable drops for each user. One Cat 6 cable is for data connected to the LAN and the other is for voice connected to the Telephone System. These cables shall be terminated in one duplex combination voice/data outlet and shall be placed according to the architectural layout. There shall also be a cable drop for the Wireless Access Point to serve the areas

5. Point of Sale (POS) System: A data outlet and a duplex, dedicated, 20-Amp, 120-Volt, receptacle shall be provided for each of the POS Stations in the Student's Servery and Teacher's Servery. A POS Station data outlet and receptacle shall be placed at the beginning and end of each of the serving lines in the servery. For High Schools only, a data outlet and a duplex, dedicated, 20-Amp, 120-Volt, receptacle shall be provided near the main building entrance. In the student cafeteria at the Intermediate, Junior and High Schools, dedicated data outlets and duplex, 20-Amp, 120-Volt, receptacles shall be provided for each POS Kiosk as follows:

# of student	# of POS Kiosk
1 – 750	1
751 – 1500	2
1501 and more	3

6. Comprehensive Attendance, Administration and Security System (CAASS): For Intermediate and High Schools, provide at least two data outlets and duplex, dedicated, 20-Amp, 120-Volt, receptacles at each of the student building entrances and one data outlet and duplex receptacle at each entrance to student locker rooms, library and cafeteria. The CAASS data outlet and duplex receptacle shall be placed at the corridor wall next to the room entrance doors.

7. Wireless Network Infrastructure: Cat 6 cable drop shall be provided from the MDF room or IDF to all areas of the building to provide at least one drop for each Wireless Access Point provided. Based on the **latest** DIIT standards **of the** v**6 series**, for areas of instruction the WAP is to be placed **at** the **front wall** of the classroom **at the ceiling level, but no higher than 10'-0" if the ceiling is higher**. If the front wall of the classroom is adjacent to the front wall of the classroom next door, the location of the WAP in one of the rooms must be located to the back of the room. The floor layout shall be such that there shall be no WAPs directly behind each other. Rooms larger than 1,250 sq. ft. shall have a minimum of two dedicated Cat 6 drops installed for two WAPs. Cluster suites shall be provided with only one Cat 6 drop if the total area is less than 1,250 sq. ft. Space the WAPs located in hallways, mechanical spaces, etc., to provide complete coverage. Ensure the Architect indicates in the room schedule under "Owner Supplied, Contractor Installed" the WAP and type of bracket (ceiling mount or wall mount) to be provided.

   a. The Authority's Computer System Integrator will assist the Design team in determining the final locations of the WAPs in common areas, mechanical areas, and rooms above 1250 sq. ft. during the design phase. The designer shall modify the standard locations provided on the Room Planning Standards with the revised locations as required by the latest DIIT standard and recommended by the Computer Systems Integrator. A survey and/or walk through might be required by the system Integrator/DIIT to optimize the system if provided in an existing school.

   b. The integrator will submit the suggested WAP locations in a marked-up floor plan along with network design package (WNDP). A&E is to request review by DIIT prior to completion of the project.

   c. The Authority's System Integrator is required to submit CAD Floor Plans of the school with WAP locations for common areas and those over 1250 sq. ft. to DIIT along with other final As-Built documents as a deliverables no later than two weeks after the integration at the school is completed.

8. The UTP cabling installation is required to be tested by the installer prior to acceptance from jack-to-jack (Permanent Link Testing) to Cat 6 performance standard EIA/TIA 568-B.2-1 using approved field test equipment and methodology as per the above standard.

F. Power Requirements

1. The number of receptacles for each cabinet/rack is dependent on size of the school (based on school population per DIIT) as defined by **the latest** DIIT Standards **of the v6 series**. Also refer to DR 7.3.3.

DIIT Small School (less than 40 students)

Volts/Amps	Outlets	Voice and Data
110v/20 Amp	quad (5-20R)	1

DIIT Medium School (40 to **1000** students)

Volts / Amps	Outlets	IPDVS	Data	Core Switch	Voice	Plywood
110v/20 Amp	single (5-20R)					
110v/20 Amp	duplex (5-20R)				1	
110v/20 Amp	quad (5-20R)	2				1
110 /30 Amp	Single (L5-30R)	1				
220v/30 Amp	Single (L6-30R)		2	2	**1**	

Note: System Integrator will determine if two data/core switch cabinets are required during design. DIIT diagram shows one, but two may be needed.

DIIT Large School (greater than **1000** students)

Volts / Amps	Outlets	Voice	Core Switch	Patch Panel	Class. Conn.	IPDVS	Plywood
110v/20 Amp	single (5-20R)						
110v/20 Amp	duplex (5-20R)						
110v/20 Amp	quad (5-20R)	1				2	1
110v/30 Amp	Single (L5-30R)					1	
220v/30 Amp	Single (L6-30R)	1	2	2	2		

2. IDF power requirements are as follows:

Volts/Amps	Outlets	Voice	Data Patch Panel	IPDVS	Class. Conn.
110v/20 Amp	quad (5-20R)	**1**	**0**	2	
220V/30 Amp	Single (L6-30)		**0**		**2**

3. Two duplex, dedicated, 20-Amp, 120-Volt, receptacle shall be provided inside the Wall Cabinet at the High Density Room.

4. Refer to latest DIIT Standards for actual numbers based on the equipment, which is based on number of classrooms. The Authority's Computer System Integrator will assist the Design team in determining the final power requirements based on the DIIT standards during the design phase.

5. BACnet requirements:

   a. Provide four duplex dedicated, 20 Amp, 120 Volt, receptacles at least two feet apart near the BACnet Data cabinet in the Main Telecommunications Room.

   b. Provide one Quad Receptacle (110V) to telecom plywood backboard in MDF for the powering of the Data Fiber MUX.

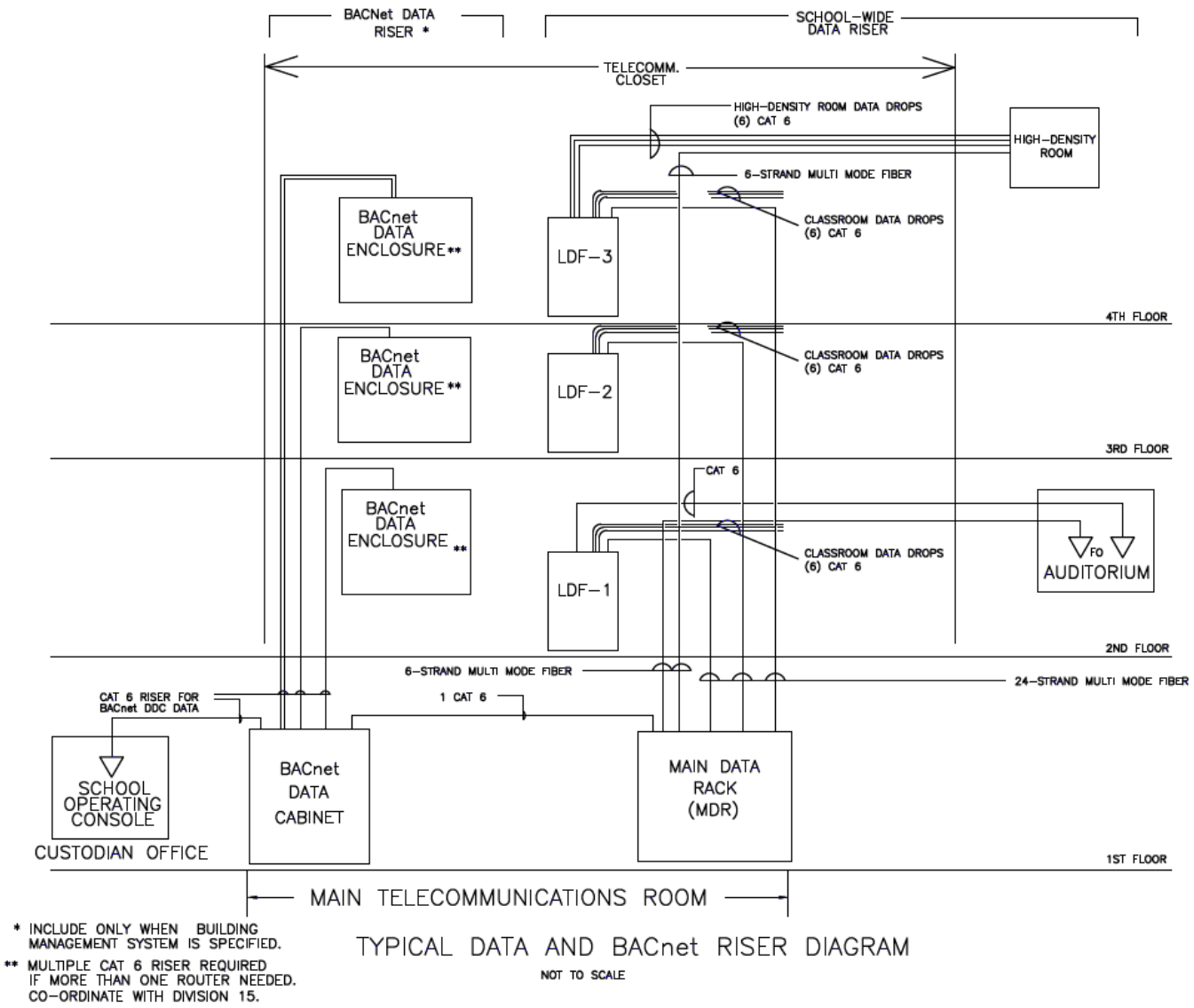
   c. Provide three quad, dedicated, 20-amp, 120 Volt, receptacles (type 5-20R), located at least two feet apart within three (3) feet of the data cabinet in all Intermediate Telecommunications Rooms.

G. Coordination with the DOE/DIIT

The Data/BACnet Cabling design documents, including riser diagram and floor plans, shall be submitted to DOE/DIIT for review and approval during the 60% and 100% phase.

H. Relevant Conceptual Sketch

Typical Data/BACnet Cabling Riser Diagram. **Refer to the latest DIIT standard (see the SCA website) for the latest data riser requirements, as the standard is updated regularly**.



Note: 6-strand fiber shown to high-density room to be 12-strand. **Refer to the latest DIIT standard (see the SCA website) for the latest data riser requirements, as the standard is updated regularly**.

7.3 Low Voltage Systems

7.3.6 Intercommunication Systems

Description/Design Approach:

A. Holding Areas, Areas of Rescue Assistance, Fire Rescue Areas, and Areas of Refuge Intercommunication System

1. A dedicated two-way voice communication system shall be provided to connect Holding Areas, Areas of Rescue Assistance, Fire Rescue Areas, and Areas of Refuge to all General and Custodian offices.

2. The units in the Custodian and General offices shall be master station, wall type units. Staff Stations in the Holding Areas, Areas of Rescue Assistance, and Fire Rescue Areas shall be wall mounted with call pushbuttons.

3. Note that systems utilizing telephone type instruments for either master or staff units are not acceptable.

4. Addition projects

   For most projects, the addition with its new elevator(s) will be making the existing building accessible, and thus there will not be existing Holding Rooms/Areas of Rescue Assistance. Provide a new intercommunications system, with staff stations in the Fire Rescue Areas of the addition and in the newly created Area of Rescue Assistance/Holding Room/**Fire Rescue Area**, if applicable, in the existing building, connected to master stations in the general office and custodial office. If the existing building already has a Holding Room/Area of Rescue Assistance/Fire Rescue Room, investigate the existing system and determine the requirements based on the following:

   a. General office to remain in existing location

      1) If existing system is functional, existing system is to remain. New spaces in new addition are to be provided with a new system with the new master station adjacent to the existing. If existing system can be expanded to receive new Staff Stations, the new Staff Stations can be connected to the existing Master Station.
      2) If existing system is not functional, remove the existing and provide a new system for the new and existing spaces, with the master station in the custodial and general offices.

   b. General office in addition building

      1) If existing system is functional, existing system is to be extended with twisted pair to a new master station in the new custodial and general offices of the addition. The new spaces in the addition are to be provided with a separate system with the master station adjacent to the existing building master station in the new custodial and general offices.
      2) If existing intercommunication system is not functional, remove existing and provide new system for the new and existing spaces, with the master station in the new custodial and general offices.

B. Elevator Intercommunication System

1. The elevator car station (hands-free, wall type unit, furnished under Specifications Division 14) shall have an auto-dialer. Provide a telephone set, as part of school telephone system, in each elevator machine room.

2. Connect the automatic dialing, hands-free station in the elevator car to a dedicated telephone line. The elevator car station shall automatically dial a programmed number connecting the passenger to the **security desk, general office, and** DOE Alarms Central Station to alert the security personnel that there is a problem in the elevator and identify visually which elevator is initiating the call.

3. **Provide a CAT 6 cable from the elevator machine room to each location listed below and also provide a local monitor/viewer (approximate panel size: 21"Hx25"Wx6"D) by elevator vendor at each location to view the camera feed from each of the elevators in an emergency condition:**
   a. **Elevator machine room**
   b. **Security desk in Lobby**
   c. **General Office**
   d. **At the Fire Command Center (FCC) within a high rise (delete at security desk if FCC is in vicinity of security desk)**

4. **Provide a UPS in elevator machine room for emergency backup (4 hours) when an emergency generator is not provided for a building for the two-way communication/visual requirements as per Section 2.27.1.1.5 of Appendix K, Chapter K1, of 2022 NYC Building Code.**

C. Wheelchair Lift Intercommunication System

1. The wheelchair lift (hands-free, furnished under Specifications Division 14) shall have an auto-dialer.

2. Connect the automatic dialing, hands-free station in the lift to a dedicated telephone line. The lift station shall automatically dial a programmed number connecting the passenger to the **security desk, general office and** DOE Alarms Central Station to alert the security personnel that there is a problem on the lift and identify which lift, if there is more than one in the school, is initiating the call.

7.3 Low Voltage Systems

7.3.8 Sound Intercommunication and Teacher Activated Security System

Description/Design Approach:

A. General

1. An IP-based school-wide Sound, Intercom and Teacher Activated Security System (Sound System) shall be provided with the following functions:

   - Public Address system for general announcements.
   - Two-way communication system between two stations and between station and any speaker, including each speaker in the corridor.
   - Privacy system to prevent eaves-dropping through classroom speaker.
   - Tone generation for emergency call from classrooms to central station.
   - All spaces, as well as each speaker in the corridor, shall be assigned a space number and the zone to which it is to be assigned, which shall be shown on plans. Include an operation matrix on the Drawings to indicate each operational zone and the space number assigned to each zone.

2. The system shall cover the Main Building, all Additions, Mini-Buildings, Temporary Classroom Units and Temporary Classroom Buildings, where applicable. For building additions, the system shall be designed as follows:

   a. Main office to remain in existing location

      1) If existing building sound system is a functional analog system, convert the analog system to digital with a conversion panel at the existing sound rack and connect the IP panel of the addition to the conversion panel via a fiber connection. The system will have two phones, one for the existing system and one for the new system, with a relay being installed between the two systems to permit all call with either phone.

      2) If existing building sound system is not functional or can't be expanded for new devices required for the number of reconfigured spaces requiring such, remove existing analog system of the existing building and provide a new IP-based system for the new and existing portions of the building at the existing rack location in the existing building.

   b. Main office to be located in new addition building

      1) If existing building sound system is a functional analog system and the rack can remain within the reconfigured space without moving the rack, convert the analog system to digital with a conversion panel at the existing sound rack and connect to the new IP Panel located in the addition using a fiber connection. The system will have two phones, one for the existing system and one for the new system, with a relay being installed between the two systems to permit all call with either phone.

      2) If existing system is not functional, can't be expanded for new devices required for the number of reconfigured space requiring such, or the existing rack would need to be moved because of the repurposing of the space, remove existing analog system

of the existing building and provide a new IP-based system for the new and existing portions of the building with IP Panel located in the addition.

3. Places of Assembly, such as Auditoriums, Gymnasiums, Gymatoriums, Cafeterias, Cafetoriums, Multi-purpose Rooms, and Dance Studios/Classrooms**/Exercise Room** shall have their own Local Sound System. Each of these Local Sound Systems shall be fully interconnected to the Main Sound System and shall incorporate an audio amplification system for the hearing impaired. **Provide a fire alarm override for all local sound systems to disable the local sound system when the fire alarm system goes into alarm to allow the fire alarm notification devices to be heard. All call override will still work if announcements will need to be made on the public address system.**

4. The Main Sound System shall automatically override any Local Sound System for general announcements. The system shall have the capability to make a general announcement from any station connected to the Main System or from a dedicated microphone connected to the Local Sound System.

5. When replacing the Sound system in retrofit installations and the existing system is in working condition, the drawings shall state the existing system is not **to** be removed until the new system is complete and removal approved by the SCA.

B. Local Sound System Requirements

1. Gymnasium

   a. A Gymnasium without a partition requires a single local sound system with a single channel amplifier.

   b. A Gymnasium that is partitioned into two sections requires a single local sound system configured with a dual channel amplifier so that announcement can be made individually for each section of the Gymnasium and combined for the entire gymnasium.

2. Gymatorium/Cafetorium

   The Gymatorium/Cafetorium requires one local sound system with two amplifiers to drive two separate sets of speakers:

   a. When being used as the gymnasium/cafeteria, the designated gymnasium/cafeteria amplifier shall drive the ceiling speakers utilized for the gymnasium/cafeteria function. If the Gymatorium is partitioned, the amplifier shall be a dual channel and configured so that announcements can be made individually for each section of the Gymatorium and combined for the entire Gymatorium. Ensure spec is appropriately modified.

   b. When being used as the auditorium, the designated auditorium amplifier shall drive the wall-mounted speakers utilized for the auditorium function.

   c. A mixer shall be used to control the switching operation between the two amplifiers.

3. Audio Amplification System for the Hearing-Impaired

   a. An audio amplification system is required to be installed in all spaces with a local Public Address system as per ADA 2010.

b. Capacity Projects
- Provide a whole area induction loop system in accordance with Section **BC** N102 in the Cafeteria/Cafetorium. Utilize wire embedded in the slab system. If the project does not have such space, discuss with SCA A&E management as to the alternate location.
- Provide FM type system in accordance with Section **BC** N104 in the remaining spaces with the local sound system, such as Gymnasium, Gymatorium, multi-purpose room, Dance Studio/classrooms**/Exercise Room** and auditorium. If any of these spaces is part of a stand-alone structure or the only Public Assembly space in an addition, the induction loop system is to be used rather than the FM type, as LL 51/17 requires at least one induction loop system per building. If there is a technical issue in installing the induction loop in a space, discuss with SCA A&E management.

c. CIP Projects
- When renovating a space requiring an assistive listening system or replacing a local sound system and the cost is greater than $950,000, install the Induction Loop System as the assistive listening system, as at least one system in the building is required to be an Induction Loop system as required by LL 51/17. The loop system is to be installed in the floor and depending on the finish flooring shall utilize either wire placed in grooves cut into the floor slab or copper tape. However, if the cost of installing the induction loop system is greater than 5% of the construction cost of the project, the induction loop is not required as allowed by LL 51/17 and an FM system is to be installed.

d. At the security desk, a local induction loop system is to be provided as required by LL 51/17.

4. Clock System

a. Provide an integrated Sound/Clock System in new construction and in retrofit applications where the approved Scope Report provides that the existing clock system is to be replaced.

b. Where the Sound and Clock Systems are not to be integrated, as in the case of a retrofit application where the existing Clock System is to remain, provide a separate independent Sound System.

C. Equipment and Locations

1. Central Control Sound Rack shall be placed in the Main Telecommunications Room where available; otherwise in or near General Office. For system replacement in existing buildings, Central Control Sound Rack shall be installed at the same location.

2. Combination Speaker/Clock Assemblies (integrated speaker/clock assemblies) shall be provided in new construction and in retrofit applications where the existing Clocks System is being replaced. Install in areas of instruction, offices, and teacher's cafeteria/lounge.

3. Speaker Assemblies shall be provided in toilet rooms off corridors, Dance Studios**/Exercise room** and Places of Assembly such as Auditorium, Cafeteria, Gymnasium, Multi-purpose Room and Gymatorium. Horn type speakers shall be provided in corridors, play-yard,

mechanical rooms, and large storage spaces. Kitchen speakers shall be all-environment loudspeakers. Provide speakers in stairwells on alternate floors where required for audibility.

4. Privacy/Call-in Switches shall be provided in each classroom, areas of instruction, teacher's lounge, teacher's cafeteria, and all small offices. Locate privacy switch in the front of classroom near the corner adjacent to the exterior wall. The privacy/call-in switches shall not be mounted near the door.

5. Volume Control for Speaker (In High Schools only) shall be provided in each office.

6. Administrative Control Stations (ACS) shall be provided in General Office, Assistant Principal Offices, Principal's Office, D75 Administrative office and Custodian's Office. Outlets for ACS shall be installed at 18" A.F.F. near the desk.

7. Local Sound Systems shall be provided in Places of Assembly (Auditorium, Gymnasium, gymatorium, Cafeteria/Lunchroom, Cafetorium, Multi-purpose room) and Dance Studio/Classrooms**/Exercise Room**. The amplifiers shall be installed in a secure area not readily accessible to the public. **All local sound systems shall have an override to allow the fire alarm to be heard when the fire alarm is in alarm.**

   a. The Auditorium and auditorium portion of the Gymatorium/Cafetorium sound system shall be provided with four microphone outlets mounted in front of the stage at 18" A.F.F. All other local sound systems shall each be provided with three microphones outlets mounted at 18" A.F.F. except when the Gymnasium is partitioned, for which two microphones shall be provided in each section.

   b. Audio Amplification System for the Hearing-Impaired shall be provided with each local sound system as follows:
      - FM System
        Single channel receivers with headsets, teleloops, and silhouette coils shall be furnished in accordance with the required minimums of Table 219.3 of 2010 ADAAG (based on the population of each space). A calculator based on the table can be found on the following web page: https://www.williamssound.com/ada-calculator.
      - Induction Loop System
        Loop wiring with HPDE shielding is to be installed in the concrete slab for new construction and either the same wiring cut in the slab or copper tape depending on substrate for existing buildings. Consult with a certified installer for proper installation (certified installers to be found on the manufacturers' websites). Provide headsets that are compatible with the induction loop system for use by people without the t-coil hearing as per that required by Table 219.3 of 2010 ADAAG.

6. Administrative Control Stations (ACS) shall be provided in General Office, Assistant Principal Offices, Principal's Office, D75 Administrative office and Custodian's Office. Outlets for ACS shall be installed at 18" A.F.F. near the desk.

7. Local Sound Systems shall be provided in Places of Assembly (Auditorium, Gymnasium, gymatorium, Cafeteria/Lunchroom, Cafetorium, Multi-purpose room) and Dance Studio/Classrooms. The amplifiers shall be installed in a secure area not readily accessible to the public.

   a. The Auditorium and auditorium portion of the Gymatorium/Cafetorium sound system shall be provided with four microphone outlets mounted in front of the stage at 18" A.F.F. All other local sound systems shall each be provided with three microphones outlets mounted at 18" A.F.F. except when the Gymnasium is partitioned, for which two microphones shall be provided in each section.
   b. Audio Amplification System for the Hearing-Impaired shall be provided with each local sound system as follows:
      - FM System
        Single channel receivers with headsets, teleloops, and silhouette coils shall be furnished in accordance with the required minimums of Table 219.3 of 2010 ADAAG (based on the population of each space). A calculator based on the table can be found on the following web page: https://www.williamssound.com/ada-calculator.
      - Induction Loop System
        Loop wiring with HPDE shielding is to be installed in the concrete slab for new construction and either the same wiring cut in the slab or copper tape depending on substrate for existing buildings. Consult with a certified installer for proper installation (certified installers to be found on the manufacturers' websites). Provide headsets that are compatible with the induction loop system for use by people without the t-coil hearing as per that required by Table 219.3 of **2010 ADAAG**.

7.3 Low Voltage Systems

7.3.9 Clock System

Description/Design Approach:

A. General

The Clock System shall be fully integrated with the **IP-based** Sound System **(thereby requiring a CAT 6 cable per clock)**, especially when a new Central Control Sound Rack is being installed or where one is available in the building.

1. Where the Sound/Clock Systems are fully integrated, all wiring for secondary clocks shall be routed to the Central Control Sound Rack in common raceway with the Sound System. The program master clock shall be installed in the Central Control Sound Rack.

2. Where the Sound/Clock Systems are NOT integrated, an independent clock system shall be provided with its own master program clock.

B. Equipment and Locations

Master Program Clock (where required) shall be provided near the Central Control Sound Rack in the Main Telecommunications Room or in the General Office.

Combination Speaker/Clock Assemblies shall be provided in new construction and in retrofit applications where the existing Sound System is being replaced. Install in Areas of Instruction, Offices and Teacher's Cafeteria/Lounge.

Single-Faced Clocks shall be provided in Places of Assembly (Auditorium, Cafeteria/Lunchroom and Gymnasium). In retrofit application where the Sound System is not being replaced, install in Areas of Instruction, Offices, **and** Teacher's Cafeteria/Lounge.

Double-Faced Clocks shall be provided in the middle of corridors.

Time Card Recorder shall be provided in the General Office and Kitchen.

C. Wireless Clock System

The Wireless Clock System shall be provided only for projects in existing buildings as a stand-alone system. When installing a new Sound System and Clock System, Specification Section 16791 Self-Corrective Clock System shall be used.

Single faced clocks shall be provided in Areas of Instruction, Offices, Teacher's Cafeteria/Lounge and Places of Assembly (Auditorium, Cafeteria/Lunchroom, Gymnasium **and Gymatorium**)

Double-Faced Clocks shall be provided in the middle of corridors.

7.3 Low Voltage Systems

7.3.10 Intrusion Alarm System

Description/Design Approach:

A. General

An Intrusion Alarm System shall be installed to detect intruders when the school is unoccupied and to control the exterior doors while the school is occupied. The Intrusion Alarm System shall be programmed to independently and individually control each of the following spaces: kitchen/cafeteria, computer rooms, corridors and exterior doors.

B. Equipment and Locations

1. Main Control Panel with digital communicator for central station monitoring shall be provided in Custodian's Office.

2. Detectors with protective guards shall be provided
   - In all Corridors on all floors to protect the entire length
   - Boiler Room with accessible windows, only
   - Rooms and areas with windows having valuable equipment such as Sound System and Video Equipment
   - Computer Rooms, Laboratories and Shops
   - Rooms and areas accessible from, or adjacent to low roofs
   - Rooms with more than four computers on First Floor not on street side of building
   - Principal's Office, General Office and Custodian's Office
   - Kitchen and Food Storage Rooms with windows
   - Auditorium
   - Medical offices
   - School-based Health Clinics

3. Magnetic Contact Switches shall be located at
   - All exterior doors
   - Entry doors to Food Storage, Vault Room and Record Storage Rooms, if not provided with detectors
   - **MDF, IDF, and Elevator Machine Rooms**
   - Doors to rooms and closets storing valuable equipment such as computers, sound and video equipment and musical instruments

4. Panic Switches shall be located at the General Office, Custodian's Office, Nurse's Office, lobby security desk (if there is one) and Principal's Office. All Panic switches shall transmit a silent alarm to DOE Central Station via the digital communicator.

5. Alphanumeric Consoles shall be provided at
   - Control Panel with ability to control each partition
   - Main Entrance Vestibule
   - Custodial Entry (if different than Main Entrance Vestibule)
   - Kitchen Entry (if different than Custodial Entry)

6. Alarm Devices
   - Exterior Siren and Strobe shall be provided on exterior wall at minimum 20 feet above grade, mounted inconspicuously on either side of the main entrance at second floor level.
   - Interior Sirens shall be provided in Lunchroom, in corridor near General Office and in corridors on each floor.

   All sirens shall be equipped with cut-off switches and battery backup power

7. Dry Contacts
   - The control panel shall have dry contacts to be connected to and thus receive signals from other systems to utilize the auto-dialer and send an alarm signal. Drawings shall show the wiring from the other systems connected to the panel. The following systems shall be connected to the panel:
     - Boilers in existing buildings without a BMS connected to central host
     - Emergency generator

C. Zones

Each passive infrared detector shall be connected to a separate zone with a unique address. If having each detector as a separate zone exceeds the zone capability of the main control panel, then multiple detectors in the same space may be wired as a zone.
Computer Rooms located close to each other may be in one zone. Kitchen and kitchen storage rooms located close to each other may be in one zone.
Door switches for a given entry vestibule with multiple doors may be wired as a zone.

D. Monitoring

1. The DOE Central Station Alarm Unit shall provide monitoring of the school Intrusion Alarm System.

2. The system shall have a programmable chime option, which provides a three-beep tone at the alphanumeric console whenever a perimeter door is violated while the system is disarmed. This chime feature shall provide School Security with the ability to monitor perimeter doors from a Central Guard Station. The chime mode shall be turned on/off directly through the keypad by entering a valid security code.

E. Building Addition Projects

1. Custodian office to remain in existing location

   a. If existing panel is of sufficient size to receive new devices, devices from addition are to be connected to the existing panel.

   b. If existing panel cannot receive new devices, replace panel with larger panel to receive existing devices and devices from the addition.

   c. If existing system is antiquated and/or terminal devices of existing system are not operational, provide a new single system for the existing building and addition.

2. Custodian office in addition building

    a. If existing system is operational and panel can remain, connect existing panel to new panel with fiber connection. Verify with system manufacturer.

    b. If existing system is antiquated and/or terminal devices of existing system are not operational, or existing panel cannot remain in the existing location, provide a new single system for the existing building and addition.

F. Programming and Coordination with DOE

The DOE Security Unit will order telephone line (terminated in RJ31-X) and program account number and operator codes.

7.3 Low Voltage Systems

7.3.12 Auxiliary Signal System

Description/Design Approach:

A. General

An Auxiliary Signal System shall be installed to annunciate audio/visual alarm from various system signals as indicated below. The system shall also incorporate main entrance and kitchen delivery door pushbutton annunciations.

B. Equipment and Locations

1. Indicator Panels shall be provided in Custodian's Office and, **for existing buildings, the** Boiler/Mechanical room.

   At minimum, the auxiliary signal system shall annunciate the following in the Indicator panels:

   a. Sump pump high level alarm signal.
   b. Sewage ejector pump high level alarm signal
   c. Oil leak detection system signal
   d. Indoor chiller refrigerant monitor
   e. RPZ Leak Detection System signal.
   f. Entrance door pushbuttons
   g. Kitchen delivery door pushbutton
   h. Pushbutton station in General Office.
   i. Hydraulic elevator sump pump

2. Low voltage vibrating bells shall be located at

   a. All corridors
   b. Kitchen near Dietician office – **This bell shall be tied to the kitchen delivery door entrance button only.**
   c. Custodian office
   d. Boiler/Mechanical Rooms

3. Entrance pushbuttons shall be located at building main entrance and kitchen delivery door. A pushbutton station with multiple call buttons shall be located in General Office.

4. A Bell Transformer shall be provided in the electric switchboard room with sufficient power output to drive all bells of the system with full volume.

5. Addition Projects

a. Custodian office to remain in existing location

1) If existing system is functional, existing system is to remain. A new system with panel placed adjacent to the existing panel(s) is to be provided for listed items provided in the addition. Designer is to determine if panel is a recent

system that could possibly be expanded. If so, listed items in the addition can be added to the existing panel.

2) If existing system is not functional, remove existing system and provide a new system for the new and existing spaces with the master station in the same spaces of the building.

b. Custodian office in addition building

1) If existing system is functional, existing system is to be extended with fiber to the new units in the new custodian office in the addition. A new separate panel is to be placed in the existing building boiler/mechanical room with those listed items of the addition building connected to the new panel.

2) If existing system is not functional, remove existing and provide a new system for the new and existing spaces with the indicator panel in the new custodian's office and the existing boiler/mechanical room.

7.3 Low Voltage Systems

7.3.13 Carbon Monoxide Detection and Alarm Systems

Description/Design Approach:

A. General

A carbon monoxide detection and alarm system shall be provided in accordance with Section BC 9**15**.2 of the 20**22** NYC Building Code **for projects with fuel burning equipment**. Detectors shall conform to UL 2075 and shall annunciate locally in addition to sending the signal to the Fire Detection and Alarm System.

1. Power: Primary and back-up power for the carbon monoxide detectors that are part of the Fire Detection and Alarm System or stand-alone Carbon Monoxide Detection and Alarm System shall be through that system.

2. Fuel-burning equipment: Any equipment that burns fossil fuel or biofuel and thus can produce carbon monoxide (CO)

B. New Schools, Leased Buildings (Change of Use), Major Modernizations and Additions, Fire Alarm Replacement Projects:

1. Applicability: As the standard for new schools and many CIP projects will be the use of heat pump systems for heating and domestic hot water, CO detection will typically only be used with biofuel burner replacement projects and fire alarm replacement projects.

2. Unoccupied Spaces (Section BC **915.2**)

Installation: Carbon monoxide detectors/sensors shall be installed in unoccupied spaces within buildings such as rooms containing fuel-burning boilers, water heaters, emergency generators, and other spaces with vented fuel burning equipment that can potentially create CO and connected to the Fire Detection and Alarm System (see DR 7.3.1 and DR 7.3.15). Detectors shall be placed as follows:

a. Adjacent to water heater, above the vent of the water heater in the vicinity of the barometric damper

b. Above the breeching of the boilers

c. Adjacent to other fuel-burning equipment (unit heaters, duct furnaces, etc.) located within the building. (Install detectors above the exhaust flue).

d. Above the emergency generator exhaust for generators interior to the building (not in the enclosure of a packaged UL2200 exterior unit)

Operation: Upon detection of carbon monoxide, the detectors/sensors shall send a supervisory signal to the fire alarm control panel as indicated in paragraph C below and shall electrically shut down all **carbon monoxide producing equipment except generators**.

3. Occupied Spaces (Section BC **915.2**)

Installation: Carbon monoxide detectors/sensors shall be installed and connected to the Fire Detection and Alarm System (see DR 7.3.01 and DR 7.3.15) in occupied spaces as follows

a. Provide detectors/sensors in the following occupied spaces containing carbon monoxide producing equipment.

- Auto Shops
- Indoor Loading Dock
- Rooms with **carbon monoxide-producing equipment in accordance with Sections BC 202 and BC 915.2 including furnaces, boilers, water heaters, cooking appliance,** gas clothes dryers**, apparatus, appliances, or any device that burns natural gas**

Kitchens, science labs, and grounds equipment rooms are not considered spaces with carbon monoxide producing equipment and thus do not require carbon monoxide detectors/sensors.

b. Provide carbon monoxide detectors/sensors in corridors of the floors with the carbon monoxide producing equipment and one floor above and below such space at a spacing of 60 feet on center, or less if required by the manufacturer of the carbon monoxide detector.

c. Carbon monoxide detectors/sensors shall be located within 18” of the ceiling and spaced every 60’ on center, or as specified by the manufacturer.

d. For buildings with an A-3 occupancy, **Section** BC **915.1.2** also applies and with it Rule §908-01(d). As such, occupiable rooms or spaces greater than 75 SF on the same floor as, one story above, or one story below, the CO producing equipment that do not have mechanical ventilation are required to have CO detectors.

For schools that have indoor parking garages: Provide HVAC carbon monoxide detection system tied to the mechanical ventilation controls as per **the 2022** NYC Mechanical Code to avoid requiring the ventilation system to run continuously. In addition, provide carbon monoxide detectors/sensors in the parking garage spaces at intervals specified by the manufacturer and in all occupied spaces of the floor on the story where the garage is located as well as below (if any) and the floor above the enclosed parking garage.

4. Operation

a. Evacuation code shall not be sounded through the fire alarm horns upon CO detection. The specific CO detector in alarm will sound “Temporal 4" code through the built-in sounder base.

b. CO detectors shall be monitored for alarms by a fire alarm addressable module and upon activation sound an alarm tone at the Fire Command Center and Remote Annunciators.

c. A separate “CO Alarm” signal shall be sent to the Central Station through the DACT for Fire Department notification. CO sensors/detectors on each floor shall be monitored for

troubles by a fire alarm addressable module and upon activation sound a trouble tone at the Fire Alarm Panel and Remote Annunciators. In addition, a general trouble signal shall be sent to the Central Station through the DACT.

d. Activation of a CO detector shall electrically shut down all **carbon monoxide-producing equipment except generators**.

C. Schools Undergoing Indoor Combustion Equipment Upgrades, including fuel-burning Boilers, Water Heaters, and Emergency Generators in those same spaces **and existing Fire Alarm System is not being replaced**.

1. Applicability: As the standard for most CIP projects will be the use of heat pump systems for heating and domestic hot water, stand-alone CO detection will typically only be used with biofuel burner replacement projects and indoor emergency generator installation projects.

2. Installation: Carbon monoxide detectors/sensors in unoccupied spaces shall be installed and connected to a stand-alone carbon monoxide detection and alarm system connected to central station in unoccupied spaces as follows, depending on the Work type and location. The panel shall be placed adjacent to the schools Fire Alarm Control Panel:

a. Adjacent to water heater, above the vent of the water heater in the vicinity of the barometric damper.

b. Between the boilers, above the breeching of the boilers.

c. Adjacent to other fuel-burning equipment (unit heaters, duct furnaces, etc.) located within the building. (Install detectors in the vicinity of the exhaust flue).

d. Above the emergency generator exhaust (for indoor generators)

3. Operation

a. The specific CO detector in alarm will sound “Temporal 4" code through the built-in sounder base.

b. CO detectors shall be monitored for alarms by an addressable module and upon activation sound an alarm tone at the COACP (Carbon Monoxide Alarm Control Panel) and Remote Annunciators.

c. A “CO Alarm” signal shall be sent to the Central Station through the DACT for Fire Department notification. CO sensors/detectors shall be monitored for troubles by the addressable module and upon activation sound a trouble tone at the CO Detection and Alarm Panel. In addition, a general trouble signal shall be sent to the Central Station through the DACT.

d. Activation of a CO detector shall electrically shut down all **carbon monoxide-producing equipment except generators**.

D. Schools Undergoing Indoor Combustion Equipment Upgrades, including fuel-burning Boilers, Water Heaters, and Emergency Generators with items placed in newly created spaces **and spaces do not require new FA devices.**

1. Applicability: As the standard for most CIP projects will be the use of heat pump systems for heating and domestic hot water, stand-alone CO detection will typically only be used with biofuel burner replacement projects and indoor emergency and standby generator installation projects.

2. In addition to following the requirements for unoccupied spaces as applicable for the cases in **C** above, follow the requirements for occupied spaces as indicated **in B above.**

E. Relevant Documents

* The 20**22** New York City Building Code

* **1 RCNY Rule §908-01 Fire Protection Systems**

7.3 Low Voltage Systems

7.3.14 HVAC Remote Annunciation System

Description/Design Approach:

A. General

In order to notify the Department of Education of failures to the school's mechanical systems, a remote annunciation system connected to the school's intrusion alarm system is to be provided. Indicate the required wiring on the Drawings as defined below. In all cases, the Division of School Facilities (DSF) or its assigned intrusion alarm Contractor will program the intrusion alarm digital communicator (autodialer) to initiate a specific code (same for all schools). The central alarm monitoring station will follow protocol set by the Division of School Facilities for notification.

B. New Schools, Leased Buildings, Major Modernizations, Additions with full BMS/DDC systems

A twisted pair of conductors (AWG#16, dry contact) is to be connected to **the nearest BACnet controller** of the BMS and run to the intrusion alarm panel and connected.

C. Boiler Replacement Projects

A twisted pair of conductors (AWG#16, dry contact) shall be run in parallel from each of the boiler control panels to the intrusion alarm panel**. Additionally, a Cat-6 Ethernet Cable with RJ-45 connection ends shall be run from the boiler master control panel to the school's main internet switch rack and terminated on a port designated by the Project Connect Team and DIIT.**

1. For Boiler Replacement projects without a funded Intrusion Alarm Replacement project **as part of the Design bundle**: The twisted pair is to be indicated on the Drawings to be left unconnected, with the note,"Connection to intrusion alarm panel by others." (The Division of School Facilities or its assigned intrusion alarm Contractor will subsequently connect to the intrusion alarm panel and program the digital communicator to provide the required messaging). **The CAT-6 Ethernet cable shall be run from the Boiler Master Panel to the Main Internet Switch location and terminated on the port assignment location designated by the Project Connect Team and DIIT.**

2. For Boiler Replacement projects with a funded Intrusion Alarm Replacement **project as part of the Design bundle**: The twisted pair is to be connected to the intrusion alarm panel. **The CAT-6 Ethernet cable shall be run from the Boiler Master Panel to the Main Internet Switch location and terminated on the port assignment location designated by the Project Connect Team and DIIT.**

7.3 Low Voltage Systems

7.3.15 Fire Detection and Alarm System with Emergency Voice/Alarm Communication

Description/Design Approach:

A. General

The fire detection and alarm system shall be a Manual and Automatic Fire Alarm System with Emergency Voice/Alarm Communication System and Central Office Connection provided in accordance with Section BC 907.2.3 of the 2022 NYC Building Code, with additional requirements per Section BC 907.2.13 for high-rise buildings (buildings greater than 75 feet in height as defined by the 2022 NYC Building Code). This system shall be a fully supervised, microprocessor-based multiprocessing system with individually addressable devices connected to a central station. Buildings Bulletin 2009-018 issued by the Department of Buildings is to be used as a reference guide for the design, installation, operation, and testing of fire alarms in high-rise buildings.

1. Provide an Auxiliary Radio Communication (ARC) System for high-rise buildings, which shall be in accordance with Section BC 916. The ARC system is separate from the fire alarm system except that it is powered through the fire alarm system's fuse cutout. The ARC system is to be filed separately from the Fire Alarm System with the FDNY.

2. Presignal Event/Non-Event mode capabilities must be provided for A occupancies in the building with occupant loads of >1,000 or have a stage and an occupant load >75 per Section BC 907.2.1.

3. For CIP projects that do not have a generator, refer to DR 7.1.2 for requirements for secondary source of emergency power for emergency voice/alarm communication.

B. Fire Alarm System Coding

1. Upon activation of an alarm-initiating device (smoke detector, manual station, sprinkler water flow switch) in all buildings other than high-rise buildings, the system shall sound a Temporal 3 tone followed by voice communication on all floors in accordance with Section BC 907.5.2.2.

2. In high-rise buildings, upon activation of an alarm-initiating device (smoke detector, manual station, sprinkler water flow switch) the system shall sound a Temporal 3 tone followed by voice communication on the floor of incidence, one floor above and one floor below in accordance with Section BC 907.5.2.2.

C. Smoke Control

1. Smoke control and stair pressurization systems shall be provided for systems required by Sections BC 403 and BC 405 (Refer to DR 6.2.10) and shall be designed in accordance with Sections BC 909 and BC 1023.11. Coordinate with HVAC engineers.
   - Smoke control and stair pressurization systems shall be activated by any of the following:
     - Automatically by area or duct smoke detectors
     - Automatically by sprinkler waterflow switches
     - Manually by the Fire Fighter's Smoke Control Station

- Smoke control and **s**tair pressurization system activation shall be immediately initiated after receipt of appropriate automatic or manual activation command.
- Activation of the smoke control system shall send an alarm to the Central Station.
- The smoke control system shall be connected to the FACP via a UL 864 listed Fire Fighter's Smoke Control Station. This station shall provide status and manual override control of all automatic smoke control devices associated with the smoke control system, as well as manual control of Post-Fire Smoke Purge systems.
- The Fire Fighter's Smoke Control Station shall override any other building controls that may be controlling smoke control equipment from any control point other than the Fire Fighter's Smoke Control Station.

2. Post-Fire Smoke Purge System shall be designed in accordance with Section BC 917.
   - Post-fire smoke purge systems are not intended to be life safety system. They are typically operated after the fire has been extinguished.
   - Post-fire smoke purge systems are manually controlled from the Post-Fire Smoke Purge panel. (If there is a smoke control system in place, then the post-fire smoke purge system is manually controlled from the Fire Fighter's Smoke Control Station).

3. Ensure drawings show a detail showing the supervised auxiliary fan shut-down relay within 3'-0" of each starter contact or motor control starter. As per NFPA 72, it is acceptable to have the supervised auxiliary fan shut down relay within 3'-0" of interposing UL 864-9th edition listed relays on the same rung of the ladder logic that connects to the starters to shut them down directly. Use of a cascading series of relays beyond the permitted interposing relay(s) to shut down the fans is not code compliant.

D. Equipment and Locations

As per Buildings Bulletin 2013-012, the fire alarm panel, data gathering panels (DGP), terminal transmission boxes (TTB), and all associated fire alarm wiring shall not be installed in stair enclosures.

Fire Alarm Control Panel (FACP), including Post-Fire Smoke Purge controls, where required, and Fire Fighter's Smoke Control Station, where required – Placed in the main lobby, near the main entrance. Provide microphone and voice control for the building wide one-way voice communication and, where required, the pre-signal system for the place of assembly.

Fire Command Center (FCC), including FACP**,** Post-Fire Smoke Purge controls, where required, and Fire Fighter's Smoke Control Station, where required – Placed in the main lobby, near the main entrance for high-rise buildings.

Voice/Alarm Communication System for Group A Spaces (Pre-signal system) – Voice/alarm communication system, integrated with the fire alarm system is required in Group A-3 spaces **(**most schools) with an occupancy of 1000 or more. In addition, Section BC 410.8 requires stages (i.e. has drop down curtains) in an assembly space with an occupancy of 75 or more to be provided with such system per Section BC 907.2.1. Schools typically utilize platforms, unless a performing arts auditorium is provided, as curtains are sliding and Architect is to ensure the platform is labeled as such.

For schools where the presignal is required by 907.2.1.1 (places of assembly with 1000 or more or those with a stage and an occupancy of 75 or more), provide a paging microphone, LCD annunciator, and associated switches and program for presignal Event/Non-Event mode as

required by Section 23.8.1.2.3 of NFPA 72-16 as modified by Appendix Q107 of the 2022 NYC Building Code. Provide a warden phone to communicate to the base building FACP or Fire Command Center as applicable. Pre-signal unit must be located within view of the assembly area, with the rear of the assembly area the preferred space but may be required to be elsewhere to avoid being in play areas of Gymatoriums. System design is as follows:

1. In non-event mode, the speaker/strobes in the assembly activate immediately.

2. In the event mode, speaker/strobes within the assembly area do not activate upon activation of an initiating device within or outside the assembly area but are indicated at the assembly area presignal panel and acknowledged by the operator. If not acknowledged within 180 seconds by the operator, the presignal system shall activate regardless of where the alarm initiates within the building. If the alarm is generated within the assembly area it shall automatically activate all signals throughout the building except the signals within the assembly area unless the 180 second timer expires.

3. Manual announcement capability for the presignal panel shall be limited to the assembly area only. The main building panel microphone system must be able to make announcements in the assembly area and thus must have a speaker selector switch that activates the assembly zone space. Upon activation of the Event Mode Key Switch on the presignal system and the activation of the microphone for paging to the area or manual switch at the location, the auditorium sound system shall be silenced and the general house lighting shall come on.

4. Refer to DR 7.1.2 for requirements for secondary source of emergency power when a pre-signal system is provided.

Uninterruptible Power Supply (UPS) – Typically to be located inside a dedicated 2-hour fire-rated enclosure with smoke detector. Provide split system as required by size of the UPS to maintain proper temperature of room **for battery as per manufacturer recommendation (77°F)**. UPS sized as per NYC Electrical Code 760.41(c)1 to supply entire FA system along with the emergency voice alarm communication sized for 24-hour supervisory operation followed by full load operation for 6 hours for systems with voice communication (Note: 45 minutes of voice and alarm operation at maximum connected load shall be considered equivalent to 6 hours of total system operation.) UPS similar to Online Power. **UPS shall be labeled "FA UPS for FA USE ONLY". Provide monitoring module at fire alarm panel to indicate when UPS is running on battery. Send trouble signal to fire alarm control panel and central station when UPS fails as per Section 10.6.4.3 of NFPA 72-2016.**

Data Gathering Panels – Typically to be located inside a dedicated 2-hour fire-rated enclosure (preferably the telecom closet), with one provided for every 3 floors. When required by site conditions to be located in a 2-hour fire-rated stair, an egress study shall be performed to ensure the panel does not decrease the required width of the stair, though panel can potentially be placed at a higher level if it can safely be accessed from a step ladder. Additionally, panels installed in stairs are to be protected from vandalism.

Printer - Placed in the Custodian's Office

Remote Annunciator – Placed in the General Office

Manual Pull Station – Placed in accordance with Section BC 907.4.2. Specifically, they shall be provided at each door leading to legal exit in corridors, lobbies, places of assembly and as required to meet the NYC Building Code travel limitations of 200'. The height of the manual pull

stations shall be a minimum of 3'-6" and maximum of 4'-0" measured vertically from the floor level to the activating handle. All manual pull stations shall be single-action type. False alarm stopper covers shall be provided over all manual pull stations in new buildings and major modernizations where the mounting boxes have been recessed and the 4" maximum protrusion in the path of travel required by ADA can be maintained. Capital Improvement Projects typically have the pull stations surface-mounted and will require the shallow false alarm boxes to be used to meet the 4" maximum protrusion requirement. Modify the specification appropriately.

Audible Notification Appliances (Speakers) – Placed in accordance with Section BC 907.5.2.1. Specifically, they shall be placed in all corridors and elsewhere, where required by the NYC Building Code, to provide audibility of 15 dBA above the average ambient levels as determined by NFPA 72-16. Refer to Chapter 18 of NFPA 72-16 for other requirements. Speakers shall be wall-mounted with their tops above the finished floor at heights not less than 90" and below the finished ceiling at distance not less than 6". Speakers shall also be placed within stairway on every other floor to ensure intelligibility of system and speakers set to appropriate taps (1/4watt) to provide audibility and intelligibility of 15 dBA above average ambient levels.

Visual Annunciator (Strobes) – Placed in accordance with Section BC 907.5.2.3. Specifically, they shall be wall-mounted in places of instruction, corridors, places of assembly, library, shops, music rooms, toilets and elsewhere where required by the NYC Building Code. Strobes shall be unobstructed by other objects, visible from any position in the area and shall be a maximum of 15 ft. from end of the corridor. Strobes shall be wall-mounted such that the entire strobe lens is located below 96" above the finished floor or 6" below the ceiling, whichever is less in height. Strobe lights shall not be required in staircases. If three or more strobes are in the same room or adjacent space within the field of view, they shall be synchronized. Ceiling-mounted strobes are allowed where wall-mounted strobes cannot provide proper coverage.

Audible and Visual Notification Appliances (Speaker/Strobes) – Where speaker location coincides with strobes, use combination speaker/strobe type. Speaker/Strobes shall be wall-mounted such that the entire lens is located below 96" above the finished floor or 6" below the ceiling, whichever is less in height. If three or more strobes are in the same room or adjacent space within the field of view, they shall be synchronized. Speaker/strobes shall also be in classrooms (1/4 watt), student toilets (1/4 watt), and locker rooms (1/2 watt) to ensure intelligibility of system and speakers set to appropriate taps to provide audibility and intelligibility of 15 dBA above average ambient levels.

Area Smoke Detector - Placed in all mechanical rooms, oil tank rooms, electrical switch gear rooms, electric closets, telecommunications room and closets, audio/video storage rooms, paint storage, elevator lobbies, locations requiring smoke control systems (smoke proof enclosures, stage, atriums, etc.), elevator machine rooms, storage rooms containing flammable materials (book storage, grounds equipment room, custodian's storage) and over cross-corridor doors where magnetic door holders are provided. Smoke detector layout shall comply with NFPA 72-16 as modified by Appendix Q, Section Q107. Spacing shall not exceed the limitations of UL listing for the specific smoke detectors.

Duct Smoke Detectors – Place where required by code. Duct detectors placed in roof-top mounted/exterior equipment and exterior ducts shall be weatherproof type.

Heat Detectors – Placed in boiler rooms, other mechanical rooms with equipment being fed with fuel oil, generator rooms/enclosures within the building/roof, kitchens and culinary art rooms, **concession stand,** top of elevator shafts if shaft is provided with sprinkler per Section 2.27.4.2 of ASME 17.1-2013, as modified by Chapter K1 of Appendix K of the 2022 NYC Building Code (i.e.

sprinklers in hydraulic elevator pits), and other locations where smoke detectors are required but cannot be installed due to environmental conditions (temperature below 32°F) or potential false alarms. Heat detector layout shall comply with NFPA 72-16 as modified by Section Q107. Spacing shall not exceed the limitations of UL listing for the specific heat detectors. Heat Detectors in the oil burning equipment rooms shall shut down fuel oil transfer pumps to that equipment.

Flame Detectors - Ultraviolet (U/V) explosion-proof flame detectors shall be installed in all rooms containing natural gas piping at a pressure of 15 psi or greater.

Carbon Monoxide Detectors – Refer to DR7.3.13 for details.

Gas Leak Detection - Provide a gas leak detection connection via monitoring module to fire alarm system with separate and distinct central station notification meeting the requirements of Section BC 918. Coordinate with mechanical engineer for aux contact on existing gas leak detection panel.

Metal Wire Guards – Provide in all gymnasiums and playrooms for visual and audible notification appliances. Also provide guards for such devices in corridors, bathrooms and locker rooms for high schools where the devices are below the 8'-0" requirement or accessible from a windowsill or other similar structure.

Kitchen Hood Fire Suppression System (Ansul system) - Shall be interconnected to the fire alarm system and the activation of the fire suppression system shall be indicated as an alarm on the Fire Alarm System.

Digital Alarm Communicator Transmitter (DACT) and Central Station Monitoring - Shall be provided as follows:

1. For any new fire alarm system installations and fire alarm panel replacements – all manual and automatic detection devices connected to the fire alarm system shall send the following signals to the Central Station:

    - Manual Alarm – manual pull stations,
    - Sprinkler Alarm – sprinkler system waterflow switches,
    - Automatic Fire Alarm – area smoke detectors, duct smoke detectors, heat detectors, flame detectors, kitchen Ansul systems,
    - Carbon Monoxide Detector – system-connected CO detectors.
    - Supervisory signals – sprinkler system tamper switches, fire/sprinkler booster pump status (power failure, pump running, phase reversal), water tank low air pressure), generator run/fail
    - Trouble signals – general trouble signal from the Fire Alarm Panel.

2. When there is a sprinkler booster pump/fire pump installation in an existing building without fire alarm panel replacement, supervisory signals; sprinkler system tamper switches, fire/sprinkler booster pump status (power failure, pump running, phase reversal), water tank low air pressure, generator run/fail shall be monitored by the Central Station. If existing panel does not have central station monitoring, provide an external DACT.

3. When there is no sprinkler booster pump/fire pump in the fire protection system and there are more than 6 sprinkler heads being installed in an existing building per fire zone, the sprinkler

system waterflow switches and tamper switches shall be monitored by a central supervisory station. If existing panel does not have central station monitoring, provide an external DACT.

4. Optional: IP with Cellular Interface is used for applications where Plain Old Telephone (POTs) lines are not available or where Managed Facility Voice Network (MFVN) analog lines do not provide a stable interface. All network and cellular connection shall be approved by FDNY and shall have an FDNY Certificate of approval.

Smoke Control System – Refer to Section C above

Fire Alarm Control Panel Bypass Key-Switch – New fire alarm systems designed under the 2022 NYC Building Code do not require the use of a fan shutdown bypass key switch during daily fire alarm testing since pull stations do not affect fan shutdown.

Local Sound System Overrides – New fire alarm systems designed under the 2022 NYC Building Code provide local sound system overrides so in event of fire alarm condition the fire alarm notification devices can be heard.

E. Survivability from Attack by Fire (typically for High-rise buildings)

1. For buildings with evacuation zones, such as high-rise buildings, fire alarm systems shall be designed and installed such that attack by fire within an evacuation signaling zone shall not impair control and operation of the notification appliances outside the evacuation signaling zone as per Section 23.10.2 of NFPA 72-16. Loop isolators shall be utilized on every floor whenever a Data Gathering Panel serves more than one floor or fire zone.

2. All circuits necessary for the operation of the notification appliances shall be protected until they enter the evacuation signaling zone that they serve. Any of the following methods shall be considered acceptable as meeting the requirements of this subsection:

   a. A 2-hour rated cable or cable system
   b. A 2-hour rated enclosure
   c. Performance alternatives approved by the NYC Department of Buildings and Fire Department.

F. Design and Filing Strategy for Addition Projects

1. The decision on filing strategy will be decided early in the design process and is based on several factors, especially the size of the addition, age of the building, and types of spaces being added.

2. The Authority's preferred approach is that building additions are to be designed and filed as new buildings. As such, the fire alarm for the new addition will be a separate new system. Determination of how to address the existing building's system is as follows:

   a. The fire alarm of the existing building is to be retained, when possible. Determination as to whether the alarm can be retained is dependent on several conditions:

      - If the system is an antiquated system, such as the Acme system installed under prior codes, the system is to be replaced.

- If the existing panel is sized that it can receive additional devices required due to the work or spaces being created in the existing building and is operational, the system can remain. Verify fan operation and shut down is working. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included with the existing building work.

- If the existing building fire alarm system requires expansion due to additional devices required for the work or spaces being created in the existing building and cannot be expanded without replacing the panel, replace the existing system.

- If the fire alarm system of the existing building requires replacement, the fire alarm system is to be designed and filed as a separate project from the fire alarm of the new addition. Ensure the fans and other systems are operational to allow required connections for fan shut down. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included with the existing building work. The decision as to which Contract performs the work will be decided during design.

b. A remote annunciator for each of the building's alarm system (existing building and new addition) is to be placed at the general office, custodian's office, and the security desk at the main entrance, depending on where these spaces are to be located, except where the system panel is already located in one of those locations. In addition, a remote annunciator is to be placed at both fire alarm panels for the other's system. The annunciator at the security desk can be omitted if it is near the fire alarm panel at the building entrance.

c. Verify the existing ansul system is operational and connected to the system and approved by the FDNY Fire Suppression Unit if the kitchen is not being moved to the addition. If the system is not approved and the kitchen is to remain in the existing building, a decision will need to be made to request for an upgrade to the ansul system and connection to the fire alarm or revision to kitchen equipment to avoid needing to install a new ansul system.

3. Addition projects filed as an Alt 1 are required to be integrated into the existing buildings alarm. This will typically require the existing buildings alarm to be replaced as part of the project to ensure the system will function, unless the fire alarm has been recently replaced and is functioning.

4. The Letter in Part I of this Design Requirement provides the strategy agreed to by the FDNY and is to be included in the Fire Alarm Drawings.

5. The Letter in Part I of this Design Requirement needs to be provided to FDNY and is to be included in the Fire Alarm Drawings when filing for the UPS as a secondary power source for new fire alarm systems in existing buildings.

G. Capital Improvement Program Projects

1. For CIP projects where the fire alarm system is affected by the work and devices will need to be added or changed, the reasoning in Paragraph **F**.2 above can be followed in determining if the existing system can remain.

2. For Fire Alarm Replacement Projects, ensure the fans and other systems are operational to allow required connections for fan shut down. If minor repairs are needed to the system, the work can be sent to the Division of School Facilities through Capital Plan Development and Implementation for repairs. If repairs cannot be made by DSF, the repair work will need to be included in the scope of the CIP project.

3. Ensure that existing water pressure switches or water flow detectors on sprinkler and/or standpipe systems are operational and can be adjusted and tested to provide a 30-second alarm notification delay with an activation of 90 seconds maximum. Coordinate with the Fire Protection Engineer. If existing devices are fitted with retarding chambers but cannot be adjusted to meet those notification requirements (or are not fitted with such chambers and chambers cannot be added) required by FDNY (the authority having jurisdiction), replace existing devices with new water flow detectors.

4. For capital improvement projects where new fire alarm systems are installed in existing buildings without generators, provide a UPS for secondary power source for fire alarm system in accordance with NYC DOB letter included in relevant documents and file with the fire alarm plans with FDNY.

H. Requirements for the Engineering Plans.

1. Engineering plans shall contain all information in accordance with Section BC 907.1.1. The sequence of operations shall be shown in the input/output matrix in the form prescribed by NFPA 72-16. Signed and sealed drawings in PDF format shall be provided for filing online with the Fire Department.

2. The Engineer-of-Record shall be responsible for any modifications of the design drawings required to obtain the Fire Department plan approval.

3. Upon completion of the project and the fire alarm is successfully installed and tested prior to FDNY inspection, the Master Electrician will prepare and sign a set of as-builts, including the revised input/output matrix. The Engineer-of-Record shall visually inspect the fire alarm installation and compare the As-built to the Contract drawings and if agreed and correct to the best of his/her knowledge, will sign and seal the as-built and the Contractor will submit to FDNY to facilitate their inspection. Once the letter of approval is attained from FDNY, submit one set of signed and sealed “AS-BUILT” riser drawings in 24” x 36” and one set of signed and sealed “AS-BUILT” drawings reduced to 11” x 17” to the NYC Department of Buildings. (For new projects if the approved plans do not match the As-Built drawings, a new PAA needs to be filed with FDNY prior to inspection since the As-Built and FDNY approved plans must match.)

4. For projects with new fire alarm systems in existing buildings where there is no generator, provide a new UPS as secondary power source for the new fire alarm system. The NYC DOB letter must be submitted with the filing drawings. Drawings for each submission must also contain written description of practical difficulty for each building making use of the letter.

Sample description of practical difficulty to be written in notes on filing drawings:

a. Lack of space to support the installation of a new generator system within an existing building or on an existing lot.

b. Existing buildings structural system lacks capacity to support the weight of generator and its associated system equipment. (if applicable)

I. Relevant Documents

* The 2022 New York City Building Code.

* The 2022 NYC New York City Mechanical Code.

* NFPA 72, National Fire Alarm Code, 201**6** Edition as modified by Appendix Q, Section Q107, of the 2022 NYC Building Code.

* NYC Electrical Code, including 1 RCNY 4000.

* Fire Department Letter approving the bypassing of the circuits controlling dampers and fan shutdown during daily testing (For existing systems without shutdown).

* Letter to FDNY, accepted by FDNY, outlining SCA filing strategy for Addition Projects (to be included on addition project drawings).

* Letter from NYC Department of Buildings, Re: Fire Alarm Secondary Power Source and Uninterruptible Power Systems, outlining the submission requirements for utilizing UPS for new fire alarm system for existing buildings that do not have a generator.

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The City of New York

FIRE DEPARTMENT
9 METROTECH CENTER BROOKLYN, N.Y. 11201-3857

July 23, 2007

JUL 25 2007

Mr. Zygmunt Staszeski
ZS Engineering PC
99 Tulip Avenue
Floral Park, NY 11001

Re: Testing of Interior Alarm System in Public Schools, Fire Prevention index # 0707030

Mr. Zygmunt Staszewski

The Bureau of Fire Prevention acknowledges your letter dated June 26, 2007 concerning the above referenced subject matter and NYC School Construction Authority. The Bureau concurs with your assessment that the required daily testing of public school alarm systems for those building that contain HAVC equipment that require shut-down during alarm activation, places unnecessary stress on HAVC components.

The Bureau will accept fire alarm programming that will bypass damper and fan shutdown **PROVIDING THAT:**

1. During daily tests, a key switch shall be used to bypass the circuits that control dampers and fans shutdown.
2. The damper and fan bypass function shall be automatically restored to the normal un-shunted condition within forty-five minuets, if not done so manually before forty-five minuets.
3. The operation of the daily test shall be by a certificate of fitness holder
4. A log of daily fire alarm tests shall be maintained
5. Variance to install this bypass feature shall be site specific

February 22, 2019

Department of Education

Chief Thomas Pigott
Chief of Technology Management
FDNY Bureau of fire Prevention
9 MetroTech Center 3rd Floor
Brooklyn, NY 11201

RE: Fire Alarm Filing Strategy – Public Schools
Additions filed as New Buildings – Revision

Dear Chief Pigott:

The NYCSCA would like to update you on our new filing strategy. We are in the process of constructing several new school buildings in all five boroughs. After our Agency has completed the feasibility study for each new building in accordance with the Administrative Section of the Building Code Administrative Sect. 28.2-901.9.4.1, & BC 1101.3.2 the determination for the filing category will be selected.

If the value of the new addition construction design meets/exceeds 50% and or 60% of the value of the existing building, then such new addition building will be filed as a "NEW BUILDING" in compliance with all the applicable codes. As a result of the NB filing classification, no ADA (triggered by 50%) or Fire Protection Systems (triggered by 60%) upgrades are required to be implemented to the existing building that was built in accordance with the governing Building Codes at that time. If the value of the new construction addition is less than either 50% of the value of the existing building, then the application will be filed as an "ALTERATION TYPE I", and will comply with all requirements outlined in the Administrative Code Sect. 28.2-901.9.4.2.

Requirements for New Building Filing:

1. New address with separate main entrance
2. Schedule A reflecting the Use and Floor Identification exclusive to the NB
3. New services/utilities directly related to the NB
4. Independent Egress
5. Fire wall separation between buildings, rating of new to match existing – ranging from 1 hr. -3hr
6. **New IFA panel located at main entrance with remote annunciation to custodian's office, main offices and Security station in the existing building as appropriate to the design.**
7. All ADA requirements as pertained to the governing code
8. FA plans will only reflect the details of the new building as per the related Schedule A, with any portion(s) of the existing building associated with the NB
9. **Connecting path of convenience between existing and new building – From the new building to the existing building – installed signage "Not An Exit" and from the existing building to the**

30-30 Thomson Avenue
Long Island City, NY 11101
718 472 8000 T
718 472 8840 F

new building (where necessary as per design). Installed signage to read "In Case of Fire - Access to Voluntary Fire Rescue Room".

Requirements for New Addition- Filed as Alteration Type I:

1. New addition building is connected to existing building as one building
2. Shares a common building address
3. Schedule A reflects the Use and Floor Identification for both buildings
4. Services and systems are and can be extended to provide coverage for both buildings
5. Shared Egress
6. One fire alarm system will provide coverage for both building using the existing "Phasing Agreement" between the NYCSCA and FDNY.

The filing types for these new school buildings will be depicted in section # 5 of the PW-1 and will be reflected in the BIS. All associated filings will follow suit accordingly, included that of the Fire Alarm application/plans.

Chief Pigott, the NYCSCA would appreciate FDNY Technology Management's support on this strategic approach, while maintaining the current phasing agreement still on record. This will enable us all to work well together toward a common vision without compromising the safety of the occupants or the general public.

If you have any questions, concerns or require further clarification, please do not hesitate to contact me immediately.

Sincerely,

Gordon Tung, P.E.
Vice President
New York City School Construction Authority

Gordon Tung, P.E.
Vice President
Construction Management

CC:
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R. Bonavita – FDNY
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To: **Thomas Fariello, RA**
Vice President of the Environmental and Regulatory Compliance Unit,
NYC School Construction Authority

From: **Gus Sirakis, P.E.**
Deputy Commissioner, Development and Technical Affairs

Date: **July 18, 2024**

Re: **Fire Alarm Secondary Power Source and Uninterruptable Power Systems**

This letter is in response to the NYC School Construction Authority (SCA) letter, dated May 6, 2024 and sent by Thomas Fariello RA, Vice President of the Environmental and Regulatory Compliance Unit, pertaining to SCA's request that uninterruptable power system (UPS) batteries serve as the secondary power sources for new fire alarm (FA) systems having voice communication capability. This is part of the work involved in upgrading several existing public schools, and would be in lieu of providing generators in accordance with 2022 Building Code (BC) section 2702.1.2 requirements, which states,

*"**2702.1.2 Stationary generators.** Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200."*

FA systems having voice communication capability will be required in these public schools having Occupancy Class A and E areas, pursuant BC 907.2.1 and BC 907.2.3 respectively, and such FA systems with voice communication capability must be provided with an approved emergency power source pursuant BC 907.5.2.2.5, which requires that the emergency power source be designed and installed in accordance with BC 2702 and the 2011 New York City Electrical Code (NYC EC). BC 2702.1 Installation, states,

"Emergency power systems and standby power systems shall be installed in accordance with the New York City Electrical Code, NFPA 110 and NFPA 111".

2011 NYC EC subsection 760.41 (B), which prohibits the use of batteries as an as-of-right secondary power source for fire alarm circuits, states in part,

"…
***(B) Secondary Power Source**. Where an emergency power system is provided or required to be provided for emergency system loads, the fire alarm circuits shall be provided with a secondary power source. Batteries shall not be a substitute for connection to a secondary power source. The secondary power source shall comply with the requirements for emergency power systems and/or emergency generator that are used for emergency systems loads."*

However, NYC EC subsection 700.12(C) allows UPS batteries to provide power for emergency systems, in lieu of generators, if special permission is given by the Department of Buildings. Such special permissions are routinely sought by the SCA and granted by the Department. NYC EC subsection 700.12(C) states in relevant part,

NYC Buildings

*"(C) **Uninterruptible Power Supplies.** Uninterruptible power supplies may be used to provide power for emergency systems only where special permission is granted for such use."*

The preceding NYC EC sections amended the 2008 National Electric Code (NEC) to limit the use of UPS. However, UPS batteries are currently safer as the associated technology has greatly advanced during the past 15 years. Consequently, amendments to Article 760.41 of the draft NYC EC (Intro #436-2024) will allow UPS to be used as a secondary power source for fire alarm systems as of right in certain instances. In light of the preceding, the Department anticipates the issuance of a Buildings Bulletin (BB) that will allow use of UPS as a secondary power source for fire alarms without the need to obtain special permission. The Department plans to issue BB prior to the enactment of (Intro #436-2024) that is now awaiting New York City Council approval.

1 RCNY 4000-01(b)(2) requires applicants to submit special permission requests, to the Department, which include a practical difficulty and an equally safe alternative. **1 RCNY 4000-01(b)(2)** states, in part, for "**special permission**"

***(2) Special permission.** Request for special permission must be made electronically and comply with the following: (i) Demonstrate practical difficulty and provide supporting documentation. (ii) Proposed equally safe alternative methods must be included.*

As a result of recent advances in UPS battery technology and the anticipated NYC EC update, the Department views the use of UPS systems as being a safe alternative to new generators when located in certain existing SCA school buildings, and under certain conditions. Furthermore, current code requirements to provide new generators as secondary power sources for the FA systems having voice communication presents a hardship for SCA, when secondary power sources were not required to be installed in existing school buildings. As such the Department recognizes the following as practical difficulties:

- Lack of space to support the installation of a new generator system within an existing building or on an existing lot.
- Existing building's structural system which lacks capacity to support the weight of an additional generator and its associated system equipment.

Based on the preceding, the Department grants SCA's request for UPS batteries to serve as the secondary power sources for new FA systems having voice communication capability, in lieu of providing generators, which is part of the upgrade work for several existing public schools without the submission of a site specific special permission provided the following conditions are met:

1. UPS batteries used shall be limited to Lead Acid technology. Lithium ion shall not be permitted without a site-specific special permission.
2. The room containing the UPS and associated system components shall have enclosures that are 2-hour fire-resistance-rated. The ventilation of such room must comply with the requirements in 2022 Mechanical Code (MC) section 502.4. Compliance with Fire Code (FC) section 608 is also required with respect to indoor battery installation, including but not limited to ventilation, fire suppression, smoke detection and monitoring.
3. The UPS battery system must comply with the NFPA 111-2013, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* and must comply with all additional requirements as prescribed in NFPA 72-2016, which allows the use of such batteries as the secondary power supply.
4. UPS batteries and system components must have UL 1778, UL 1989 and UL 1481 listings.
5. If a trouble signal is received in the building's FA system from to the UPS, no assembly areas (Occupancy Classification "A") within the building can remain occupied if such UPS trouble signal reveals that the UPS

is completely discharged/non-operational. In such instance occupation within the assembly areas shall be permitted when Fire Guard(s) are provided as per FC 901.7.2.2, or the UPS and corresponding trouble signal is corrected.

6. The UPS must be dedicated to the FA system and cannot supply or provide back-up to any other electrical load.
7. The UPS must be sized in accordance with NYC EC 760.41(C)(1) for the entire school FA system.
8. Submitted application drawings must reference this letter. Drawings for each application must contain, as required, written descriptions of the practical difficulty for each building making use of this letter.
9. FA system applications and drawings shall be submitted to FDNY for review and approval by their plan examination unit.

Sincerely,

Gus Sirakis
Deputy Commissioner
Development and Technical Affairs

cc.
Joseph Ackroyd, Assistant Commissioner, Department of Buildings
Thomas J. Currao, Chief, Fire Department of New York
Rocco Bonavita, Director, Fire Department of New York

7.3 Low Voltage Systems

7.3.16 Internet Protocol Digital Video Surveillance System using Digital Cameras

Description/Design Approach:

A. General

1. An Internet Protocol Digital Video Surveillance (IPDVS) system using Category 6 cabling shall be integrated with the LAN network infrastructure components to minimize duplication of cable, wiring and communications infrastructure. The IP camera is connected to a Category 6 Cable to carry the video, and control signals, camera power injectors to supply PTZ cameras for heater and blower operation (IDF or MDF). The finished infrastructure initially shall serve to deploy an IP--based video signaling system but shall be "as installed" capable of serving an IP-based signaling format in the future without any substantial changes to the infrastructure as built.

2. The video surveillance network consists of IP camera, IP-enabled video capture points and an application server running proprietary software to process and manage the video feeds. At the telecommunication closets, that forwards the digital video to the central video server(s) in the Main Telecommunication Room, using the network backbone of the school. Both live and archived video images can be viewed locally on administrative LAN and remotely over DOE WAN. The servers are sized to retain archived video from all cameras for 60 days.

3. For Capacity projects, Cameras are purchased and installed by the Contractor. For CIP projects, the SCA's Furniture and Equipment Department will purchase the cameras for installation by the Contractor.

4. For Capacity projects, the IPDVS System shall be installed in the following buildings:
- Stand-alone buildings
- Additions - The type of camera installation for addition projects is to be decided on a case-by-case basis in consultation with Capital Plan Management. In general, provide an integrated system for the existing building and addition. When an integrated system is being provided, the MDF for the entire complex will typically be created in the addition and thus house the IPDVS **in the data** rack.
  - If the decision is made to not replace the functional analog camera system in the existing building, refer to DR 7.3.17 and utilize Section 16783 and provide analog cameras in the addition.
  - If the decision is made to replace the cameras in the existing building, provide digital camera system in accordance with Section 16785. Existing wiring may be used to the greatest extent possible, but the analog cameras in the existing building shall be replaced.
- Leased facilities with a long-term lease of 7 years or longer and the approval of the SCA.

B. Equipment and Locations

1. The Contract Documents shall provide for IP cameras and Category 6 cabling to telecommunication closets, including wiring, raceway, boxes, outlets, **and** patch panels **in the data cabinet** in telecommunication closets and **data** cabinet in Main Telecommunication Room.

2. Every site receives a main viewing station including a computer with two (2) 20" LCD monitors. The main viewing station for CIP projects may be in a secure office or at the main entrance. A console may be required if the main viewing station is to be located at the main entrance.

3. The System Integrator (SI), contracted by the SCA/Furniture & Equipment Department, will furnish and install the system hardware, Camera power injector, network switch(es), router(s) and application server(s) running proprietary software to process and manage the video feeds. Additionally, the SI will furnish and install a computer with monitor(s) for the main viewing station.

4. Cameras shall be provided at following locations:

- All exterior doors
- At selected Hallways at selected Stairwells
- Cafeteria
- Auditorium
- At selected outdoor locations (to cover playground, athletic field, main entrances, loading docks, parking lot)
- Additional cameras may be used to monitor sensitive areas such as: vestibules, storage areas, etc.
- Areas outside all student locker rooms
- MDF Rooms
  - Locate cameras to capture door and as much of the telecommunications equipment racks as possible, regardless of location of IPDVS rack in school.
  - If MDF room is too small to accommodate the camera, place the camera outside the room to capture the door provided the door is in a public location (e.g., corridor). If door is in an instructional area (e.g., library, classroom), do not provide camera unless it can be focused only on the door and not pointed at the students or teachers**.**

5. In order to respect the privacy of students and staff, cameras are not permitted in rest rooms, locker rooms, instructional rooms, administrative offices, and guidance offices.

6. Designer shall show the optimum location of cameras on plan and draw a proposed field of view with a dotted line. Each camera shall be clearly labeled on plans and riser diagram with a unique number beginning with C1-01 or E1-01 ("C"=Interior Camera, "E"=Exterior Camera "1"=floor, "01"=camera number) and increasing in increment of 1.

7. The video surveillance system capacity is dependent on the school type and capacity and shall be designed as per the following guidelines:

a. <u>For CIP Projects:</u>

Based on detailed site survey and walk-thru with school, Integrated Service Center, central and NYPD personnel

Number of Cameras	Area (square feet)
6-20	Less than 50K
16-40	50K-100K
32-64	100K-200K

48-80	200K-350K
64-96	More than 350K

b. For Capacity Projects:

School Type	Number of Cameras	Area (square feet)
ECC	6-10	45,000
PS/IS 660	16-32	95,000
IS/HS 800	32-48	104,000*
HS 1660	48-72	215,000*

* Based on 130 SF per student

C. Power Requirements

Provide one twist lock receptacle 30-Amp, 120-Volt on separate dedicated circuits with NEMA L5-30R at the main telecommunications room **or telecommunication closet housing the IPDVS server in the data rack** to power the UPS for the single server and two (when the camera count requires dual server) L5-30R for dual server configuration. **The receptacles shall be placed near the Data cabinet housing the Video Surveillance.**

D. Internet Protocol Digital Video Surveillance System Signage

Provide a video surveillance signage at all entrances (indoor & outdoor) and school main lobby. The signage shall read “This building is under video surveillance that may be monitored and/or recorded at any time”. For capacity projects, signage is provided as per Section 10400. For CIP projects, signage is provided as per Section 16786.

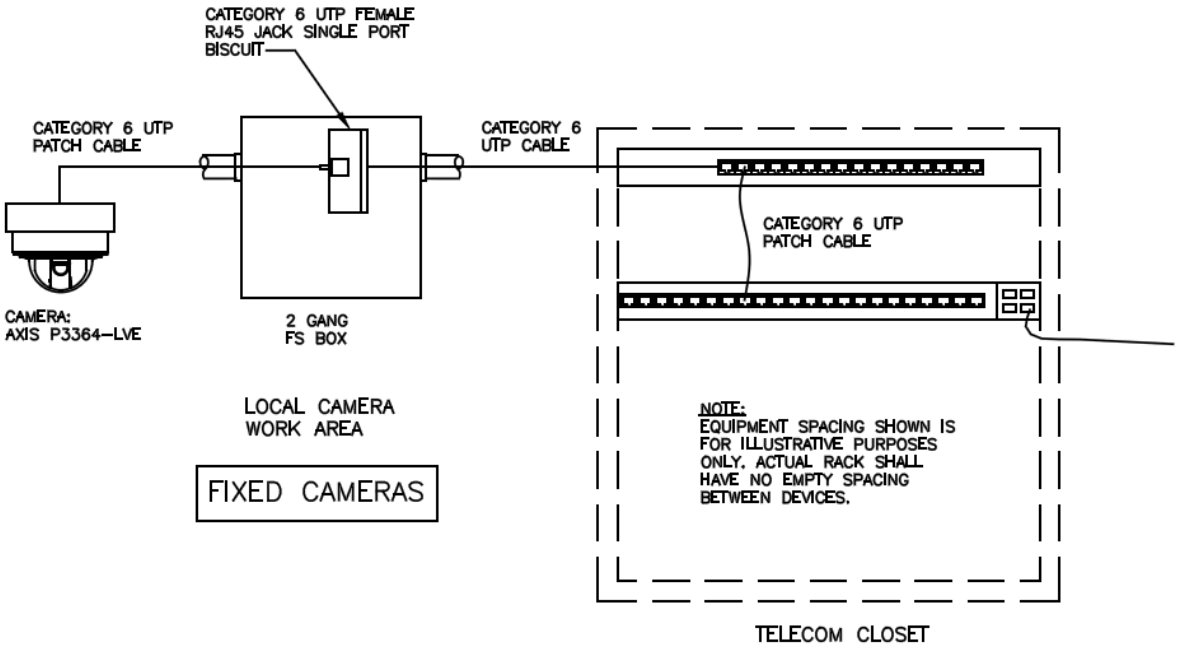
E. Coordination

1. Coordinate system design with DIIT (via SCA/F&E’s System Integrator), DOE Office of School and Youth Development, DOE Integrated Service Center and NYPD School Safety Division.

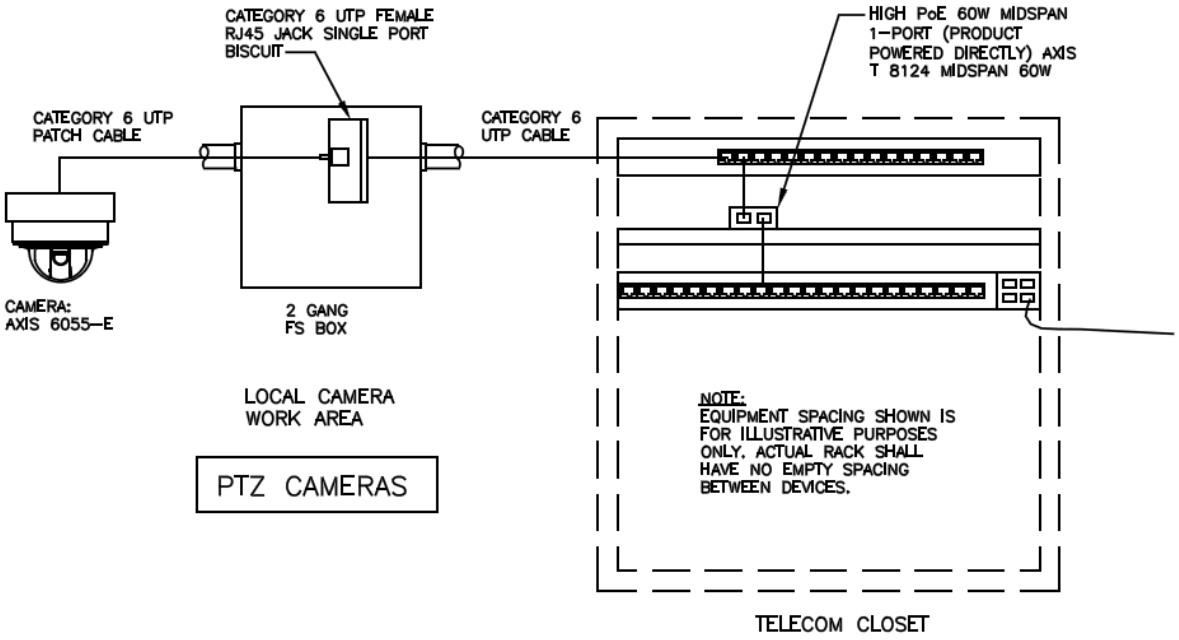
2. Capacity Projects only: During construction, submit a copy of the Contractor’s shop drawings after review and mark-up to the Authority’s Systems Integrator. The integrator’s comments are to be incorporated into the Contract after concurrence with the Authority’s A&E Department.

F. Conceptual Sketches

- Camera Wiring Details (Fixed/PTZ)



FIXED CAMERAS



PTZ CAMERAS

7.3 Low Voltage Systems

7.3.17 Internet Protocol Digital Video Surveillance System for Capacity Addition Projects

Description/Design Approach:

A. General

1. An Internet Protocol Digital Video Surveillance (IPDVS) system to be provided in schools is typically to be designed per DR 7.3.16 utilizing digital cameras. However, the type of camera installation for addition projects is to be decided on a case-by-case basis in consultation with Capital Plan Management. If the decision is made to replace the existing analog camera system in the existing building, follow DR **7**.3.16. If the decision is made not to replace the functional analog camera system in the existing building, this DR is to be followed and utilize specification Section 16783 in the Contract Documents, providing analog cameras in the new addition. Category 6 cabling shall be integrated with the LAN network infrastructure components to minimize duplication of cable, wiring and communications infrastructure. The NVT Power Supply Passive Receiver Hub (NV-8PS13-PVD) integrates power, video, and control signals for camera over a single Category 6 cable. A separate cable shall be provided for outdoor PTZ camera's heater and/or blower from a local power supply (IDF or MDF). The finished infrastructure initially shall serve to deploy an analog-based video signaling system but shall be "as installed" capable of serving an IP-based signaling format in the future without any substantial changes to the infrastructure as built.

2. The video surveillance network consists of analog cameras, IP-enabled video capture points and an application server running proprietary software to process and manage the video feeds. At the telecommunication closets, the video encoder converts the analog video from the cameras into networked digital streams that forward the digital video to the central video server(s) in the Main Telecommunication Room, using the network backbone of the school. Both live and archived video images can be viewed locally on administrative LAN and remotely over DOE WAN. The servers are sized to retain archived video from all cameras for 60 days.

3. In general, provide an integrated system for the existing building and addition. When an integrated system is being provided, the MDF for the entire complex will typically be created in the addition and thus house the IPDVS **in the data** rack.

B. Equipment and Locations

1. The Contract Documents shall provide for analog video cameras and Category 6 cabling to telecommunication closets, including wiring, raceway, boxes, outlets, patch panels, **and** NVT Power Supply Passive Receiver Hub **in the data cabinet** in telecommunication closets and **data** cabinet in Main Telecommunication Room.

2. Every site receives a main viewing station including a computer with two (2) 20" LCD monitors.

3. The System Integrator (SI), contracted by the SCA/Furniture & Equipment Department, will furnish and install the system hardware, including video encoder(s), network switch(es), router(s) and application server(s) running proprietary software to process and manage the video feeds. Additionally, SI will furnish and install a computer with monitor(s) for the main viewing station.

4. Cameras shall be provided at following locations:
- All exterior doors
- At selected Hallways
- At selected Stairwells
- Cafeteria
- Auditorium
- At selected outdoor locations (to cover playground, athletic field, main entrances, loading docks, parking lot)
- Additional cameras may be used to monitor sensitive areas such as: vestibules, storage areas, etc.
- Areas outside all student locker rooms
- MDF Rooms
  - Locate cameras to capture door and as much of the telecommunications equipment racks as possible.

5. In order to respect the privacy of students and staff, cameras are not permitted in rest rooms, locker rooms, instructional rooms, administrative offices, and guidance offices.

6. Designer shall show the optimum location of cameras on plan and draw a proposed field of view with a dotted line. Each camera shall be clearly labeled on plans and riser diagram with a unique number beginning with C1-01 or E1-01 ("C"=Interior Camera, "E"=Exterior Camera "1"=floor, "01"=camera number) and increasing in increment of 1.

7. The video surveillance system capacity is dependent on the school type and capacity and shall be designed as per the following guidelines:

School Type	Number of Cameras	Area (square feet)
ECC	6-10	45,000
PS/IS 660	16-32	95,000
IS/HS 800	32-48	104,000*
HS 1660	48-72	215,000*

* Based on 130 sqft. per student

C. Power Requirements

Provide one twist lock receptacle 30-Amp, 120-Volt on separate dedicated circuits with NEMA L5-30R at the main telecommunications room **or telecommunication closet housing the IPDVS server in the data rack** to power the UPS for the single server and two (when the camera count requires dual server) L5-30R for dual server configuration. **The receptacles shall be placed near the Data cabinet housing the Video Surveillance.**

D. Internet Protocol Digital Video Surveillance System Signage

Provide a video surveillance signage at all entrances (indoor & outdoor) and school main lobby as per specification section 10400. The signage shall read "This building is under video surveillance that may be monitored and/or recorded at any time."

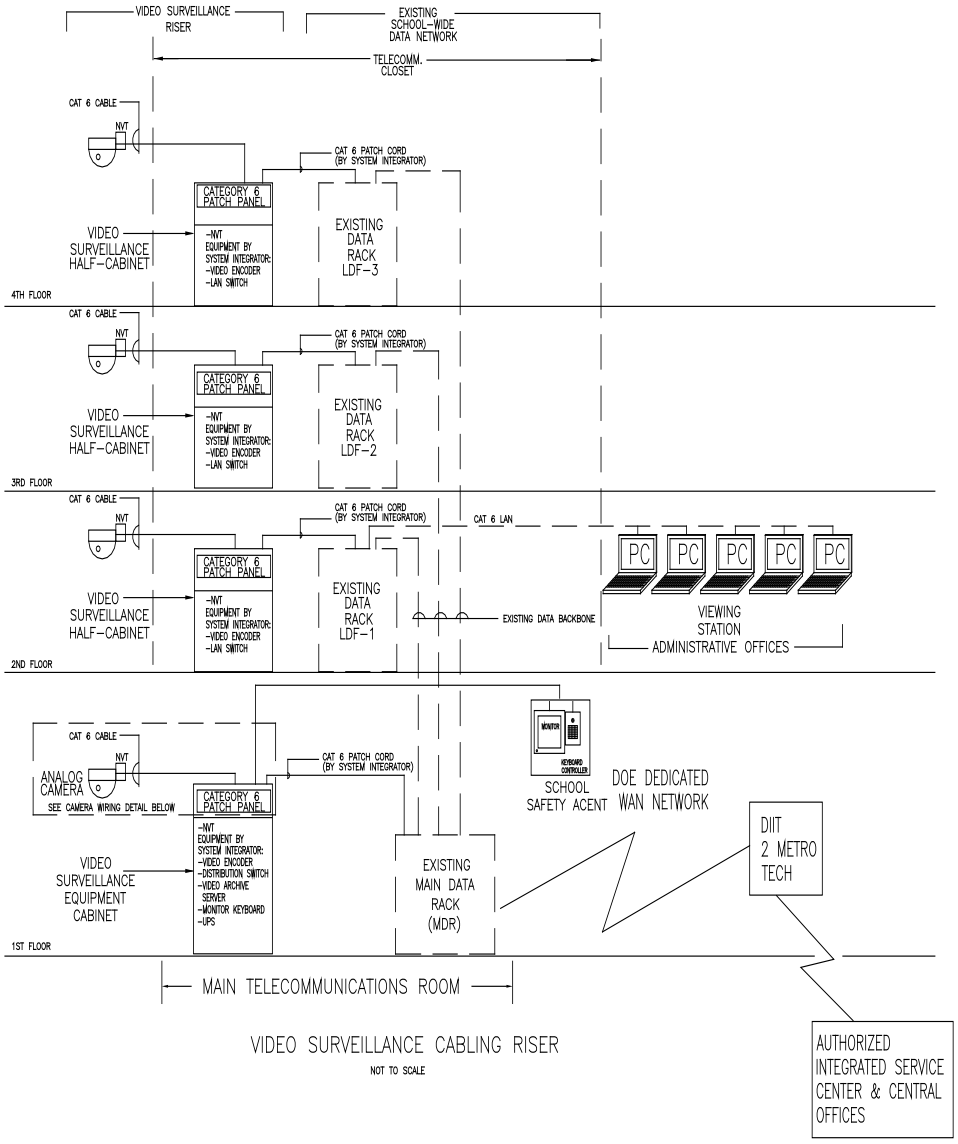
E. Coordination

1. Coordinate system design with DIIT (via SCA/F&E's System Integrator), DOE Office of School and Youth Development, DOE Integrated Service Center and NYPD School Safety Division.

2. Capacity projects only: During construction, submit a copy of the Contractor's shop drawings after review and mark-up to the Authority's Systems Integrator. The integrator's comments are to be incorporated into the Contract after concurrence with the Authority's A&E Department.

F. Conceptual Sketches

- Video Surveillance Cabling Riser Diagram
- Camera Wiring Detail

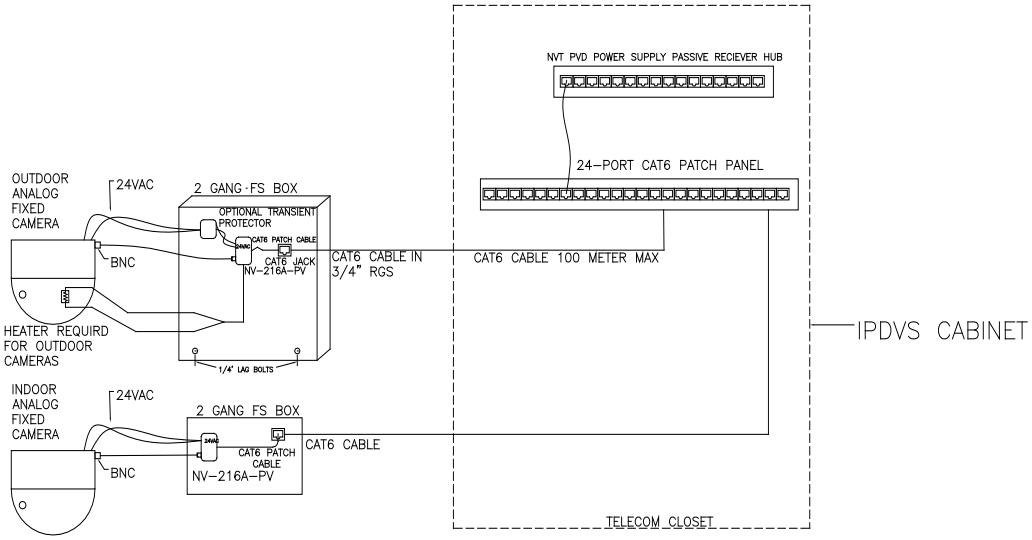


VIDEO SURVEILLANCE CABLING RISER

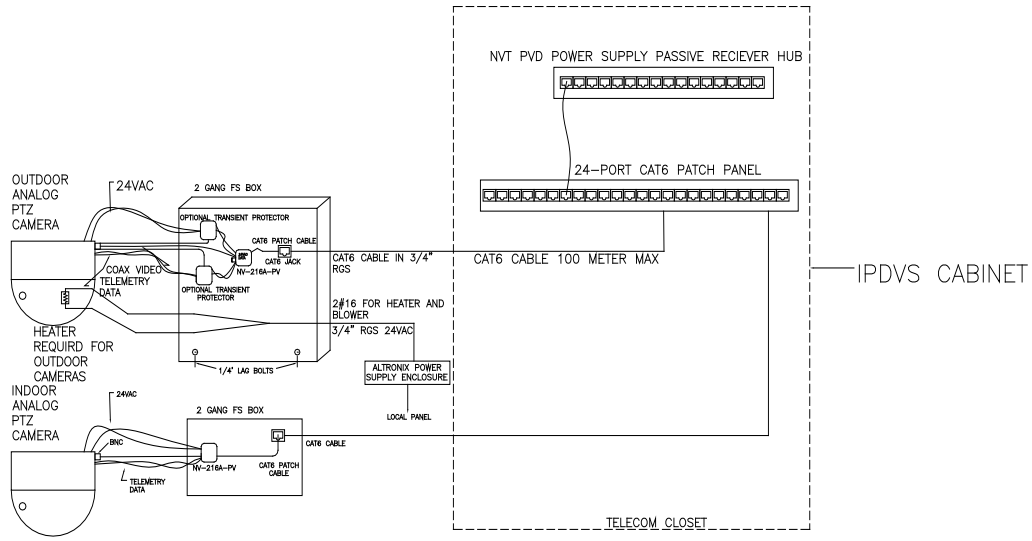
NOT TO SCALE

Requirement Applies to: ✔ **New Construction** **Major Modernizations** ✔ **Capital Improvement Projects**

FIXED CAMERAS



PTZ CAMERAS



7.3 Low Voltage Systems

7.3.18 Miscellaneous Low Voltage Drawing Requirements

Description/Design Approach:

A. The following items shall be shown or taken into account on the Electrical Drawings:

1. Ensure that a heat trace system is provided for the walk-in freezer unit condensate lines and is coordinated with the Kitchen Consultant and Architect. System shall be shown on the Drawings and shall be connected to the freezer unit's controller so it only comes on during the defrost cycle. Ensure any other heat trace required is also shown.

2. Ensure that the time clock/PA speaker required for the dietician's office and kitchen is shown on the drawings.

3. Ensure that the location of the Electronic Time Recorders for outside the Dietician's office and the recorder for the General Office are coordinated with the Architect and shown on the Electrical Drawings with associated power.

4. Provide data for the Kitchen POS system at both ends of the serving line.

5. Ensure the location of the remote receptacle/pad (MTU) for the water meter provided with the meter and wiring from the meter to the receptacle is shown on the electrical Drawings. Location of the remote receptacle/pad is to be on the outside of the building fronting the street. Wire shall be installed in conduit.

6. Ensure that a #12 copper earth ground for the utility meter/demarcation box is shown on the drawings, placed in a conduit.

7. Ensure that the cabling between the elevator card reader in the custodian's office and the elevator(s) machine room that is specified in Division 14 is shown on the drawings. Provide a Cat 6 line or when required, as these are many times the distance between the spaces is over the 100-meter maximum limit for a Cat 6 cable run, fiber cable.

8. Ensure that the door release system is shown on the drawings, with a CAT6 cable, OSDP Cable and #18 cable runs from a designated door at the main entrance and the exterior kitchen door used to receive deliveries to the nearest MDF/IDF. Provide a CAT6 and #18 cables to the security desk for the door release and panic button connection.

9. Ensure that corridor clocks are shown to be on the opposite wall from the fire alarm system strobes in order that the strobes are not visually blocked by the clock.

10. Athletic Fieldhouses

a. Provide data connection for POS systems for specialty spaces associated with the fieldhouse, such as the concession stand and ticket booth.

b. Provide voice connection for specialty spaces associated with the fieldhouse, such as the concession stand and ticket booth.

c. Provide PA system speaker in concession stand. PA speaker shall be connected to the fieldhouse PA system.

d. Press box shall have the following: wireless controls for the scoreboard, data connection from the fieldhouse and microphone input tied into the PA system located in the fieldhouse. If press box is too far from the fieldhouse, solutions such as a ruggedized switch in a Nema 3R enclosure within the press box shall be provided for data connections, with fiber runs provided from the fieldhouse to the press box.

7.4 Seismic Design

7.4.1 Electrical Seismic Design Criteria

Description/Design Approach:

A, As per Section BC 1613.1 of the **2022** NYC Building Code, every new school building structure and portions thereof, including nonstructural components (architectural, MEP, fire protection) along with their permanent attachments and supports to the structure, shall be designed and constructed to resist the ground motion resulting from earthquake events in accordance with ASCE 7–**16**, excluding Chapter 14 and appendix 11A. The Seismic Design Category will be determined by the structural Engineer of Record and indicated on the structural drawings

B. Per Section BC 1601.2.3, the determination as to whether seismic requirements apply to an alteration shall be made in accordance with the 1968 NYC Building Code and interpretations by the Department of Buildings relating to such determinations. Refer to Local Law 17/1995 and TPPN 4/99. Any applicable seismic loads and requirements, including for the bracing of electrical systems and equipment, shall be permitted to be determined in accordance with Chapter 16 of the **2022** NYC Building Code or reference standard RS 9-6 of the 1968 NYC Building Code

C. If an existing building is required to meet seismic requirements as per the criteria described in DR 3.1.3 and a waiver from the Department of Buildings (DOB) cannot be obtained, the electrical retrofit work must then meet such requirements.

1. For new additions projects, any electrical item in the existing building shall also meet the seismic requirements of the addition if they are integrated with systems in the new addition that are required to function after an earthquake.

D. New School Buildings and Additions constructed after LL17/1995 went into effect are subject to the seismic requirements of the New York City Construction Code and are considered Risk Category III, “Buildings and other structures that represent a substantial hazard to human life in the event of failure” for seismic design as per Table BC 1604.5.

1. Seismic Design Category shall be determined by the project structural engineers. The Seismic Design Category for a structure is determined in accordance with Section BC 1613. The Seismic Design Category is to be indicated on the Structural Drawings (Refer to Detail 0100054a) and Component Importance Factors related to electrical shall be indicated on the electrical drawings. (Refer to Standard Detail 1650301a).

2. Component Importance Factors (I_p) are prescribed in **Chapter 13 of** ASCE 7-**16**. The default value for typical components in normal service is I_p=1.0. The following components have I_p=1.5 (Refer to Standard Details 1650301a for a specific listing of common items):

   a. Life safety components required to function after an earthquake. This includes fire alarm, emergency generator systems, automatic transfer switches, UPS, transformers for life safety systems, emergency and exit lighting, distribution panels that drive life safety equipment (e.g. smoke control fans, fire pump controllers), etc. Functioning after an earthquake means just long enough to evacuate the building as opposed to functioning as a disaster relief center. Per Section 13.2.2 **of ASCE 7-16**, active electrical equipment that must remain operable following the design earthquake ground motion shall be certified by the manufacturer as operable whereby active parts or energized components

shall be certified exclusively on the basis of approved shake table testing in accordance with Section 13.2.5, analysis or experience data in accordance with Section 13.2.6, unless it can be shown that the component is inherently rugged by comparison with similar seismically qualified components. Evidence demonstrating compliance with this requirement shall be submitted for approval by the SCA after review and acceptance by the Contractor's registered design professional.

b. Components with I_p=1.0 located above or in proximity to components of MEP items with I_p=1.5 which could damage the I_p=1.5 equipment shall be braced.

3. For Seismic Design Category B, all electrical components are exempt from the seismic requirements.

4. For Seismic Design Category C, all electrical components with I_p=1.0 are exempt from the seismic requirements.

5. For Seismic Design Category C, all electrical components with I_p=1.5 shall be designed and constructed to seismic requirements.

6. Appropriate seismic coefficients to be utilized in the design of seismic resistance for the electrical system shall be those listed in Table 13.6-1 of ASCE 7-**16**.

7. Electrical system components along with their attachments or supports to the structure shall be designed in accordance with Section 13.4 of ACE 7-**16**. They shall be bolted, welded or otherwise positively fastened without consideration of the frictional resistance produced by the effects of gravity. A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be provided. The component forces shall be those as determined by the calculations outlined in Section 13.3.1.

9. Electrical system components shall be designed as per Section 13.6.**3 of ASCE 7-16** in that the seismic resistance force for the electrical system component shall match the seismic forces and the relative displacement as prescribed by the calculations outlined in Section 13.3. Conduits, cable tray and other electrical distribution systems (raceways) shall be designed according to Section 13.6.5.

10. Light Fixtures and lighted signs that are supported by chains and meet the requirements listed in Section 13.6.1 of ASCE 7-16.

11. When seismic design is required, generic seismic bracing details shall be shown on the contract drawing bid set. A note shall be added stating, "Details are shown to illustrate the scope of work. Contractor's registered professional engineer shall provide calculations and be responsible for providing signed/sealed coordinated shop drawings indicating locations of seismic braces and the required connection details to file with the DOB/BCC".

12. All bracing devices shall be qualified through either analysis or be tested and certified in accordance with ICC-ES AC 156. Local NYC accelerations are to be used when computing seismic inertia forces. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to seismic bracing designs must be stamped by the Contractor's Registered Professional Engineer with at least five years of seismic design experience in non-structural building components in New York State.

13. All attachments of hangers and bracing shall be positive attachments that shall be cast-in-place anchors, drill-in wedge anchors, or a welded or bolted connection to structure. Drill-in wedge anchors shall be epoxy adhesive based and shall have an evaluation report number from ICC-ES verifying their allowable loads. Double-sided beam clamps are required for bracing. Anchors must be certified for use in cracked concrete.

E. The following note is to be included on the electrical drawings:

"For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a Professional Engineer licensed in the State of New York engaged by the Contractor. The Engineer shall provide installation supervision of all seismic supports and restraints. The Contractor's Registered Professional Engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings."

8.1 Sustainable Roof Systems

8.1.1 Sustainable Roofing Zone Determination

Description/Design Approach:

A. Local Law 94-2019 requires new buildings, new roofs resulting from enlargement of existing buildings, and existing buildings replacing an entire existing roof deck or roof assembly to be provided with a "sustainable roofing zone", 100 percent of which must be a solar photovoltaic electricity generating system, a green roof system, or a combination thereof.

B. Beginning in the Pre-Schematic phase, project teams shall assess the potential of renewable energy **and green roof** as part of the Integrative Design Process (IDP) outlined in the 2019 NYC Green Schools Guide to evaluate synergistic opportunities with building systems and for compliance with Section BC 1512 of the 2022 NYC Building Code (Local Law 94 of 2019). Project teams will evaluate various roof uses to comprise the mandated sustainable roofing zone. While PV systems remain the SCA's preferred sustainable roof zone option, the requirements for green infrastructure or other feasibility considerations will determine the selected roof use. During the Schematic Design Phase, the project team shall further investigate the feasibility of renewable energy production per Green Schools Guide E6.1P criteria and Local Law 51/23 feasibility study requirements. If a PV roof system is selected, this preliminary analysis will serve as the basis of design to be used in subsequent design phases in order to comply with regulatory requirements. If a PV roof system is selected, this preliminary analysis will serve as the basis of design to be used in subsequent design phases in order to comply with regulatory requirements.

C. Pursuant to the DEP's USWR, the project team shall evaluate during the SWPPP process whether a green roof is required for stormwater retention.

D. **Refer to DOB Buildings Bulletin 2019-010 for further information and exemptions.**

8.1 Sustainable Roof Systems

8.1.2 Sustainable Roofing Zone System Selection

Description/Design Approach:

A. To meet the DEP's USWR water retention and water quality requirements, the preferred approach is to place green infrastructure at grade. If the requirements cannot be met at grade, a Green Roof will be required and will meet the Local Law 94/19 sustainable roof zone requirements. The site civil engineer shall determine as early in the design process as possible if a green roof will be required to meet the requirements.

1. If all quality and quantity of stormwater retention requirements of the DEP's USWR can be met on grade, which is the SCA's preferred approach, a green roof can be omitted, and a solar PV system shall be provided. Refer to DR 8.2.1.1 and DR 8.2.1.2.

    a. Ballasted PV systems are the preferred path of compliance for Section BC 1512, but depending on seismic requirements may need an anchored system.

2. If all stormwater mitigation requirements cannot be met on grade, a green roof will be required by DEP to meet its USWR requirements. Refer to DR 8.3.1. As part of the IDP process, the designer shall provide a rough estimate of what the cost of providing a PV system in addition to the green roof will be so the Authority can investigate additional funding sources to provide the solar-PV hybrid system.

8.2 Renewable Energy Systems

8.2.1 Rooftop Solar Photovoltaic Systems

8.2.1.1 General Rooftop PV Requirements

Description/Design Approach:

A. Shading Analysis

1. The intent of the shading analysis is to provide an estimated PV system production capacity to inform the design.

2. The shading analysis will provide the following information: monthly and annual production, solar irradiance, percentage/areas of roof that are shaded, sources of system loss, solar access by month, and minimum PV system generation based on the Southeastern and Southwestern shading analyses.

3. The shading analysis will initially be conducted by the design team during the 60% phase and updated at the 100% phase when the roof layout has been updated. A shading analysis shall also be performed by the PV contractor/installer for filing and prior to system installation. Shop drawings including the shading analysis will be submitted to the designer for review of conformance with the construction documents set.

4. The designer shall take into account shading from all roof layout infrastructure, such as mechanical/electrical/plumbing equipment, bulkheads, rooftop obstructions, etc. Existing site conditions including trees shall be counted in the shading analysis as a shading structure/obstruction. The designer shall analyze if any existing trees or adjacent tall structures will obstruct solar access to the roof. Exceptions for tree trimming, where trees from an adjoining property affect project adversely or create shading on the roof, may be taken at the discretion of the project team.

5. The shading analysis shall be conducted using HelioScope. The designer shall perform the shading analysis yielding an assessment at the Southwest and Southeast orientations and at the Winter equinox (December 21st), in order to receive the worst-case scenario, or minimum PV system generation output estimate. The designer will need to input the roof and PV system area, all roof layout obstructions (equipment, bulkheads, etc.), project address, system tilt angle, and specifications for the solar panel and inverter components.

B. General PV Design Parameters

1. PV panels shall be shown with landscape orientation only.

2. Panels shall face south when possible to optimize PV system output.

3. The panel efficiency used to determine the potential capacity of a solar photovoltaic system shall not be less than 19.4%.

4. Panels shall be selected from the Tier 1 list updated and published quarterly by BNEF (Bloomberg New Energy Finance)

5. When suitable, PV systems shall be designed to meet between a five to ten degree tilt angle to optimize PV system output.

C. PV Systems on Bulkheads

1. Rooftop solar installations on bulkheads shall be designed in accordance with DR 1.3.1.14, including Sections FC 504.4.4 and FC 504.4.6 of the 2022 NYC Fire Code, for access and clearance requirements.

2, The bulkhead will not be subject to rooftop solar applications if fewer than ten panels can be accommodated on the bulkhead roof area.

D. Structural Analysis

1. Structural Analysis Requirements: Refer to Section BC 1607.13.5 of the 2022 NYC Building Code for provisions regarding design loads on rooftop mounted PV systems and structures supporting them.

2. Strength and Stability Requirements: PV systems and structures supporting them shall be designed to resist the design loads and combinations required per Chapter 16, with considerations for array-level, panel-level, and fastener-level strength and stability. The PV system, including its racking/railing and any attachments to the roof base structure, shall be designed for all applicable design loads determined using ASCE 7-16 as modified by the 2022 NYC Building Code. The PV contractor will be responsible to hire a NY state registered PE to prepare signed and sealed calculations and shop drawings for the PV system and to submit for approval (Article 1.07 of Specification Section 13602 has the Contractor's design requirements for a ballasted system and similar requirements would need to be included in a specification for a racking system). The AEOR will be responsible to design the direct-mounted assembly attached to the structure to support the Contractor's PV racking system.

3. PV Mounting Systems: Three relevant categories of building PV mounting systems are considered: ballasted, direct-mounted and building-integrated PV (BIPV) systems.

   a. Ballasted systems are fastened securely together and are supported by frequent bearing points (not penetrating the roof surface). Ballasted systems are, in rare cases, directly attached to supporting structures, but unattached ballasted systems are preferred due to their simplicity of construction, flexibility of layout, and low cost. For stability, unattached ballasted systems use the weight of the panels, racking system, and ballast blocks (typically CMU) to resist sliding or uplift failure. The use of unattached ballasted PV systems is limited to roofs with a maximum slope of 1 to 12 (per NYCBC 1613.6). Rooftop ballast is prohibited for PV installations 100 feet or higher above grade (per 1 RCNY 105-02 (e)(ii)(f)).

   b. Direct-mounted systems are fastened securely together and use the strength of mechanical attachments (bolting, welding, clamping, or anchoring) to the building structure to provide support for the PV system. Direct-mounted PV systems can be

supported by light-gage steel framing, minor steel framing, or minor reinforced concrete elements, ultimately transferring loads to the structural system. Building structural designers should note that structural standard details for mechanical equipment dunnage will typically be inefficient and overdesigned for mounting PV arrays.

c. BIPV systems are defined by the building code as "a building product that incorporates photovoltaic modules and functions as a component of the building envelope." Structural design of BIPV systems is implicitly governed by the requirements imposed on the kind of envelope component the BIPV product serves as. Only BIPV roofing would contribute to a building's sustainable roofing zone compliance, but BIPV façade cladding products are available. These systems are not being used on SCA projects as of yet as research will be ongoing for potential future use.

4. Assumed Dead Load: For design of the building roof structure, the superimposed dead load from a ballasted PV system including the weight of the panels, racking and ballast blocks may be assumed to be 20 psf. Where ballasted PV systems are used, cementitious-topped roof insulation board shall be used as the top layer of insulation in place of full pavers to reduce overall weight and reduce the structural impact to the base building design.

5. Wind Load Determination for PV Systems: Chapter 29, 'Wind Loads on Building Appurtenances and Other Structures…', of ASCE 7-16 provides two cases where design wind load determination for PV systems follows special methods rather than those pertaining to building components and cladding.

   a. Section 29.4.3 of ASCE 7-16 applies to low-profile arrays, which may be angled relative to the supporting flat (maximum 7-degree slope) roof.

   b. Section 29.4.4 of ASCE 7-16 applies to flush-mounted arrays parallel to a supporting roof of any slope.

   Ballasted PV systems shall be designed for wind load determination according to Section 29.4.3 of ASCE 7-16, and flush-mounted direct-attached arrays shall be designed for wind load determination according to Section 29.4.4, where possible. These provisions allow for determination of relatively low design wind loads on PV systems that also satisfy the live load removal provision of Section BC 1607.13.5.1 (Refer to DR 3.1.2). When utilizing these wind load determination methods, the roof shall be designed for the greater load effects from either the installed PV case, or the case where PV systems are not installed.

6. Seismic Design Category: All types of PV systems are permitted, without any pertinent seismic requirements, on buildings assigned to Seismic Design Categories A (per Section 11.7 of ASCE 7-16) and B (per Section 13.1.4 of ASCE 7-16). Schools are assigned to Risk Category III and will typically be assigned to Seismic Design Category B, but may be assigned to Seismic Design Category C. See SCA DR 3.1.3 for further details.

7. Seismic Design Requirements: PV systems are considered "nonstructural components" for the purpose of seismic design. PV systems are not considered critical equipment during an emergency and thus seismic component importance factor 'Ip' of the PV system is equal to 1.0, unless depended upon for powering critical equipment.

a. Ballasted PV systems can be used on buildings designated as Seismic Design Category C, but they are subject to the requirements of Section BC 1613.6 and Section 13.6.12 of ASCE 7-16. These provisions allow for the sliding displacement of the ballasted PV systems during the design seismic event but, among other requirements, the provisions require either shake-table testing or nonlinear response history analysis (BC 1613.6). Due to these requirements, which are not likely practical to perform, a direct-mounted system shall be used.

b. Direct-mounted PV systems used on buildings designated Seismic Design Category C may be exempted from seismic design requirements per Section 13.1.4, item 5, of ASCE 7-16.

c. BIPV components used on buildings designated in Seismic Design Category C with a component importance factor Ip = 1.0 and positive attachment to the building structure, may be exempted from seismic design requirements per Section 13.1.4, item 5, of ASCE 7-16. In the case of a BIPV component with Ip = 1.5, the same exemption may apply based on the component weight. If seismic design requirements for nonstructural components apply for a BIPV product, the Contract Documents shall indicate that the PV contractor's engineer must indicate on their shop drawings the parameters considered in determining the seismic design horizontal force Fp for PV design engineer's approval.

E. Power Distribution

1. Electric Service

a. This photovoltaic system's utility interconnection point shall meet the specific requirements of article 690 of the New York City Electric Code, local code requirements and the requirements of the interconnection agreement.

b. During the Pre-schematic Design Phase, the design engineer shall submit a load letter to ConEdison indicating the required service load and proposed Solar Load anticipated.

c. The building shall be provided with a utility disconnect switch to disconnect PV system and associated equipment, such as inverters, batteries, and charge controllers, from all ungrounded conductors.

d. For detailed interconnection requirements, refer to the *New York State Standardized Interconnection Requirements, Section II. Interconnection Requirements.* Interconnection requirements must conform with the most current version of IEEE Std 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems as well as any local requirements.

e. This requirement covers the following sections that may be applicable: Voltage Response, Frequency Response, Reconnection to the Utility System post disconnection, Synchronous Generators, Induction Generators, Inverters, Minimum Protective Function Requirements, Metering, Operating Requirements, Dedicated Transformer, Disconnect Switch, Power Quality, Power Factor, Islanding, Equipment Certification, Verification Testing and Interconnection Inventory.

f. ConEdison makes the determination on affected transformer vaults. If PV installation affects transformer, there is an additional cost to upgrade ConEdison's equipment.

2. Component Requirements

   a. All exterior components shall have a NEMA rated enclosure. The EOR shall review the final submission for compliance with Article 690 of the 2011 New York City Electrical Code.

   b. A PV system disconnecting means shall be provided to disconnect the PV system from all wiring systems including power systems, energy storage systems, and utilization equipment and its associated premises wiring.

   c. The PV system disconnecting means shall be installed at a readily accessible location. Isolating devices or equipment disconnecting means shall be installed in circuits connected to equipment at a location within the equipment, or within sight and within 3 m (10 ft) of the equipment. An equipment disconnecting means shall be permitted to be remote from the equipment where the equipment disconnecting means can be remotely operated from within 3 m (10 ft) of the equipment.

   d. An equipment disconnecting means shall be one of the following devices:
      1) A manually operable switch or circuit breaker
      2) A connector meeting the requirements of 690.33 (E) (1)
      3) A load break fused pull out switch
      4) A remote-controlled circuit breaker that is operable locally and opens automatically when control power is interrupted

   e. An initiation device shall be provided on the rooftop as close as possible to the PV system to initiate the rapid shutdown function of the PV system during emergency circumstances. Rapid shutdown will disconnect the entire system.

   f. PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for emergency responders in accordance with 690.12(A) through (D).

   g. The initiation device(s) shall initiate the rapid shutdown function of the PV system. The device "off' position shall indicate that the rapid shutdown function has been initiated for all PV systems connected to that device. The rapid shutdown initiation device(s) shall consist of at least one of the following:
      1) Service disconnecting means
      2) PV system disconnecting means
      3) Readily accessible switch that plainly indicates whether it is in the "off" or "on" position

   h. Equipment that performs the rapid shutdown functions, other than initiation devices such as listed disconnect switches, circuit breakers, or control switches, shall be listed for providing rapid shutdown protection

   i. A PV arc-fault circuit shall be provided to detect an interrupt arcing faults resulting from a failure in the intended continuity of a conductor, connection, module or other system component in the PV system dc circuits. Photovoltaic Systems operating at 80 volts dc or greater between any two conductors shall be protected by a listed PV arc-fault circuit interrupter or other system components listed to provide equivalent protection. The

system shall detect and interrupt arcing faults resulting from a failure in the intended continuity of a conductor, connection, module, or other system component in the PV system de circuits.

j. A PV combiner box shall be provided as needed to combine two or more DC circuit inputs and provide one DC circuit output.

k. A DC-to-DC converter/power optimizer- A device installed in the PV source circuit or PV output circuit that can provide an output dc voltage and current at a higher or lower value than the input dc voltage and current (one optimizer per panel).

l. Overcurrent Protection shall be provided to protect the PV system against overcurrent.

m. Inverters shall be provided to convert DC input to an AC output.

n. The preferred location for an inverter will be an exterior allocated space and as close to the PV system as feasible. Additional interior space shall not be provided for the sole purpose of accommodating inverters. Additionally, inverters shall be weather rated for exterior siting.

o. The Designer shall indicate location of inverters in the drawings.

3. Power Distribution Drawing Requirements

a. One Line Diagram- The designer shall indicate the location of the meter, demonstrate grounding and indicate AC and DC disconnects and inverter.

b. PV System Electrical Notes
This drawing shall indicate general requirements, manner of installation, and criteria for conductors and conductors' installation, phase relationship, conduits and raceways, grounding and tests.

c. Typical Details: Solar System Typical Grounding Detail, Inverter Area Elevation, Racking System Details Landscape Layout, Solar Monitoring System, Solar System Flat Screen Display Wiring Diagram, Solar System String Wiring Details, Ground Lug to Solar Panel Detail, Bonding Bushing Grounding Detail, Racking Systems Details Landscape Layout

1) The designer shall select typical standard details as listed above and modify them for each specific project. The vendor/installer will typically utilize these details and modify slightly per their discretion and submit as part of the shop drawings.

2) All of these details shall be included in the shop drawings submission, with the exception of the Solar System Flat Screen Display Wiring detail, which shall be provided by the designer.

3) The following details will likely require major modifications by the installer for inclusion in the shop drawing submission:

a) Inverter Area Elevation

b) Solar System String Wiring- dependent upon inverter and array size

4. PV Grounding

   a. General
   Grounding of the solar panel is required as per Article 690 of NFPA 70.

   b. Solar System Grounding Detail

5. Lightning Protection

   a. For New Construction projects, the PV system will be covered by/tied into the general lightning protection system.

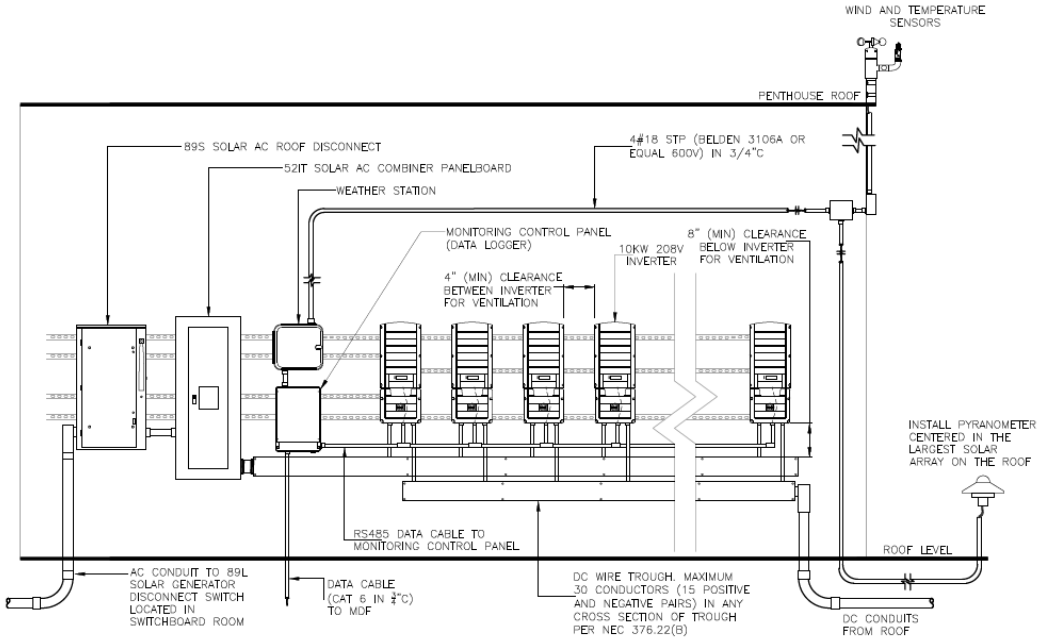
   b. Solar PV system installations shall be connected to the building lightning protection system. The designer shall refer to Design Requirements, Electrical and Communication Services- 7.0 for general lighting protection requirements. Lightning protection for solar PV arrays shall comply with the requirements of UL96A and NFPA 780.

6. Contractor's Responsibilities

   The Contractor's engineer is required to submit an application package to the utility company, consisting of all items detailed in Appendix F (Application Package Checklist) of the *New York State Standardized Interconnection Requirements.* The utility has ten days to determine if the application is complete and meets all interconnection requirements. The Contractor may proceed once a formal letter of acceptance and the New York State Standardized Interconnection Contract for interconnection has been received from the utility company. Projects with PV systems below 50 kW will receive a determination from the utility indicating whether the project is eligible for the expedited process and whether it is approved for interconnection if eligible. The utility has ten days upon receipt of the application submittal to make such determination. Projects with PV systems measuring 50 kW or above may be required to go through a Coordinated Electric System Interconnection Review (CESIR) as required by the utility company.

F. Relevant Conceptual Sketches

1. Inverter elevation



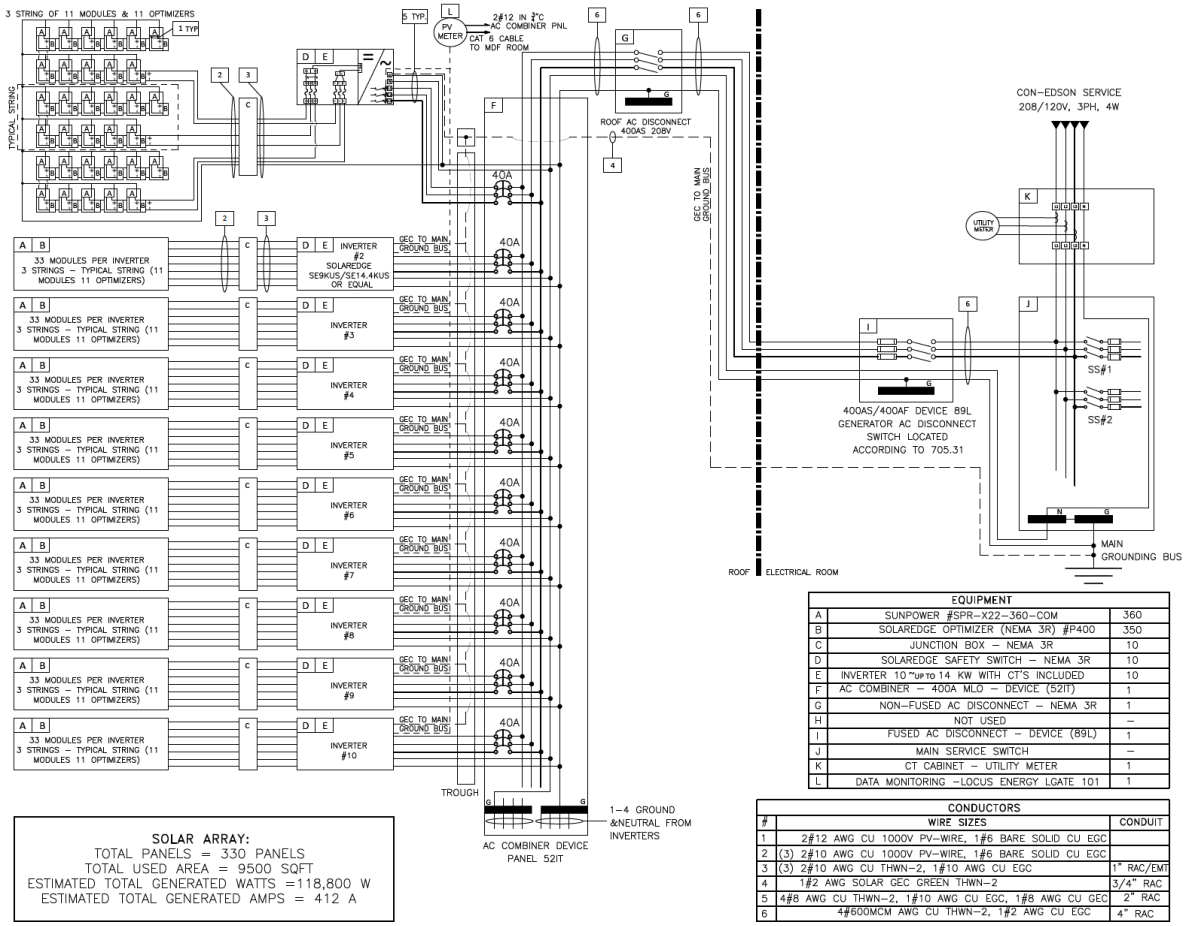
1 INVERTER AREA ELEVATION
N.T.S.

THE TOTAL CABLE LENGTH OF THE STRING FROM THE EXTENDED POWER THREE PHASE INVERTER TO THE FARTHEST POWER OPTIMIZER IS 1,150FT (2,300FT FROM DC+ TO DC− OF THE INVERTER).

2. The designer shall indicate inverter size and string configuration in the drawings.

   The below sample is a basis of design for a typical PV installation to ensure a balanced system. For example:

   Typical single inverter - 3 strings
   Typical single string - 10-14 panels
   Each Inverter is typically tied to 30-35 panels



EQUIPMENT		
A	SUNPOWER #SPR-X22-360-COM	360
B	SOLAREDGE OPTIMIZER (NEMA 3R) #P400	350
C	JUNCTION BOX – NEMA 3R	10
D	SOLAREDGE SAFETY SWITCH – NEMA 3R	10
E	INVERTER 10 ~UP TO 14 KW WITH CT'S INCLUDED	10
F	AC COMBINER – 400A MLO – DEVICE (52IT)	1
G	NON-FUSED AC DISCONNECT – NEMA 3R	1
H	NOT USED	–
I	FUSED AC DISCONNECT – DEVICE (89L)	1
J	MAIN SERVICE SWITCH	–
K	CT CABINET – UTILITY METER	1
L	DATA MONITORING –LOCUS ENERGY LGATE 101	1

CONDUCTORS		
#	WIRE SIZES	CONDUIT
1	2#12 AWG CU 1000V PV-WIRE, 1#6 BARE SOLID CU EGC	
2	(3) 2#10 AWG CU 1000V PV-WIRE, 1#6 BARE SOLID CU EGC	
3	(3) 2#10 AWG CU THWN-2, 1#10 AWG CU EGC	1" RAC/EMT
4	1#2 AWG SOLAR GEC GREEN THWN-2	3/4" RAC
5	4#8 AWG CU THWN-2, 1#10 AWG CU EGC, 1#8 AWG CU GEC	2" RAC
6	4#600MCM AWG CU THWN-2, 1#2 AWG CU EGC	4" RAC

SOLAR ARRAY:
TOTAL PANELS = 330 PANELS
TOTAL USED AREA = 9500 SQFT
ESTIMATED TOTAL GENERATED WATTS =118,800 W
ESTIMATED TOTAL GENERATED AMPS = 412 A

Requirement Applies to: ✔ **New Construction** ✔ **Major Modernizations** ✔ **Capital Improvement Projects**

8.1 Renewable Energy Systems

8.2.1 Rooftop Solar Photovoltaic Systems

8.2.1.2 Rooftop PV Regulatory Requirements

Description/Design Approach:

A. Applicable Local Laws and Regulations

1. Sustainable Roofing Zone Requirements per Section BC 1512 of the 2022 NYC Building Code (Local Law 94 of 2019)

   Section BC 1512 requires new buildings and new roofs resulting from enlargement of existing buildings to have a "sustainable roofing zone", which mandates 100 percent of the zone to be provided with a solar photovoltaic electricity generating system, a green roof system, or a combination thereof. Where PV installation has been selected, the layout of the PV system in relation to other rooftop structures and equipment is to minimize small sections of green roof that would not be maintainable.

   a. Low Slope Roofs (roof slope <2:12):
   Where a contiguous sustainable roofing zone on a roof is greater or equal to 200 square feet, either a solar photovoltaic system or a green roof system, or a combination thereof, must be installed. If a solar photovoltaic system cannot meet or exceed a capacity of 4kW due to site conditions such as shading, a green roof system shall be provided

   b. High Slope Roofs (roof slope >2:12):
   On a high-slope roof, a solar photovoltaic system shall be provided. Where the solar photovoltaic system cannot meet or exceed a capacity of 4kW, the roof is exempt.

   c. Excluded Areas

      1) Areas required to be set aside for setbacks or access pursuant to the New York City Fire Code, New York City Construction Codes or the Zoning Resolution of the City of New York. For example, rooftop access areas required by Sections FC 504.4 and FC 512.3.1 of the 2022 NYC Fire Code that must be kept clear are excluded from the sustainable roofing zone.

      2) Areas occupied by rooftop structures, water towers, greenhouses, mechanical equipment, towers, antennas, parapets, guardrails, solar thermal systems, equipment access pathways and appurtenances.

      3) Areas occupied by obstructions related to stormwater management practices including, but not limited to, cisterns, or reuse systems that are installed to comply with site connection or stormwater construction permits issued by the Department of Environmental Protection.

      4) Recreational spaces that are integral to the principal use of the building on which the rooftop is located, including but not limited to playgrounds and participant sport areas for sports facilities and schools, roof terraces and passive recreation areas that are

documented on the certificate of occupancy or Department of Buildings approved filing as outlined in Building Bulletin 2018-002.

5) Pitched roofs (roof slopes greater than 17 percent) that would accommodate less than 4kW of solar photovoltaic electricity generating capacity. Supporting documents, including calculations and shading report by a qualified contractor or NYS registered design professional, shall be submitted.

6) Areas where site conditions are determined by the BCC/DOB to be unfavorable to either a solar photovoltaic electricity generating system or a green roof system. For example, in cases where the entire roof assembly including roof deck is replaced, but the building structure cannot support the added weight of a sustainable roofing zone, a statement by a NYS registered design professional shall be submitted to the BCC/DOB to substantiate the practical difficulty due to structural limitation.

2. Fire Code Requirements for Rooftop Solar Installations

a. The designer shall meet the requirements of DR 1.3.14 for Rooftop Access and shall refer to **Section** FC 512 for additional provisions:

b. As per Fire Code Section **FC** 512:

FC 512.2 Flat-roofed buildings and structures 100 feet or less in height.
Solar panel installations shall not obstruct any rooftop area access to which is required pursuant to **Section** FC 504.4, except that solar panel installations may obstruct the clear path required by **Section** FC 504.4.4 as follows:

1) if the installation is provided with a hinged mechanism or other device for which a certificate of approval has been issued that enables the installation to be safely swung, slid, lifted, collapsed or otherwise moved out of the clear path, and that is designed to allow for operation by one person, without the use of a tool; or

2) on any building with a rooftop width or depth of 25 feet or less, where the design of a solar panel installation necessitates coverage of all or substantially all of the rooftop across the full width or length thereof, the commissioner may authorize permanent obstructions that encroach upon and thereby reduce the clear path width within such area when necessary to accommodate the presence of hatches; scuttles and skylights; bulkheads; attic ventilators; chimneys and plumbing vents; and heating, ventilation and air conditioning equipment or other rooftop building service equipment.

FC 512.3 Pitched-roofed buildings and structures 100 feet or less in height.
Solar panel installations shall be designed, installed, operated and maintained in accordance with this section on rooftops of buildings and structures 100 feet or less in height with a slope exceeding 20 degrees, except detached Group U buildings and structures.

FC 512.3.1 Hip roofs.
Solar panel installations shall provide a 3-foot wide clear access area along the ridge on each roof slope upon which solar panels are installed.

FC 512.3.2 Ventilation. Solar panels shall not be installed closer than 3 feet (914 mm) to the ridge line.

3. Energy Code Commissioning and Building Code Progress Inspection Requirements for Rooftop Solar Installations

   a. Energy Code

      1) Renewable energy and energy storage systems with a generating capacity of 25 kW or greater shall indicate provisions for commissioning and completion requirements in accordance with Section C408.2 of the 2020 NYC Energy Conservation Code (NYCECC) and GSG Credit E1.1P - Fundamental Commissioning & Verification. A Commissioning Plan shall be developed in accordance with these requirements.

      2) If system capacity is less than 25kW, Quality Control commissioning is to be performed by the Authority to meet GSG Credit E1.1P credit requirements.

   b. Building Code

      Rooftop solar installations are subject toTR8 Progress Inspections per the Building Code and Department of Building requirements.

4. Zoning Requirements for Rooftop Solar Installations

   Solar energy systems are permitted obstructions on roofs/bulkheads/walls of buildings and accessory structures within required open space, yards, courts, and height and setbacks subject to regulations of the Zoning Resolution.

   a. All portions of the solar panels that project more than 4 feet above the maximum height limit are limited to a cumulative total of twenty-five percent (25%) of roof coverage, must be set back at least six feet from the street wall (to limit visibility), and depending on the zoning district are also limited to: (i) in R1 through R5 (including C-overlays), C3, & C4-1 Districts, a height of six feet above the building height limit or finished level of the roof, whichever is higher; (ii) in R6 through R10, C & M Districts, a height of 15 feet; (However, sky exposure planes are in effect in the vast majority of M Districts, creating great potential for rooftop solar installations above relatively low buildings. This would permit an exposure plane to be exceeded by 15 feet. Please consult full Zoning Text.) (iii) when located on a bulkhead or other obstruction, a height of six feet.

   b. Zone Green Text Amendment: Allows solar panels on flat roofs anywhere below the parapet, regardless of building height. Portions of taller solar installations that are higher than 4 feet would be subject to limits on roof coverage and height. On sloping roofs, panels would be allowed to be flat-mounted (less than 18” high).

   c. Solar Installed on Pitched Roofs- If solar panels are installed on a pitched roof with a slope greater than 20 degrees, the PV panels are limited to 18 inches in height as measured perpendicular to the roof surface.

5. Historic Building Requirements for Additions/Annex Rooftop Solar Installations

   Rooftop solar installations for buildings designated by SHPO as meeting the criteria for listing on the National Register of Historic Places and buildings classified as New York City Landmarks should refer to the below guidelines. For roof applications not including PV ballasted systems on flat roofs, provide the following supporting documentation:

   a. Sight line studies for flat roof buildings showing that the panels are not visible from the ground in a variety of locations, close to the building and down the street.

   b. Drawings showing that the panels will be on the slope not facing the street on sloped roofs.

B. Permitting & Approval Procedures

1. BCC/DOB Filing Procedures

   For capacity project (NB) filings, two items shall be required for submission to the Building Code Compliance (BCC) Unit/DOB:

   a. A roof plan to indicate sustainable roofing zone(s) and all exemptions as Section BC 1512.
   b. A signed and sealed Local Law 92/94 of 2019 Sustainable Roof Zone form, certifying sustainable roofing zone compliance.
   (https://www1.nyc.gov/assets/buildings/pdf/sustainable_roof_zone_form.pdf)

   Solar PV applications shall be filed as part of a New Building application or a PW-1/Alt 2 if the filing is not signed off by the original design professional.

   During the initial filing of the above documents, no electrical filing will occur.

2. Construction Documents Requirements

   (The Designer) shall provide roof plans with a code compliant sustainable roofing zone. Roof plan(s), elevations(s), and drawings of the solar installation shall be submitted. Roof plan(s) shall show the included and excluded areas of the sustainable roofing zone. Fire Department access areas shall be clearly indicated. Additional information such as drawings showing anchorage, details, diagrams, and tabulation of areas included and excluded from such zone shall also be submitted.

3. Solar PV System Drawings

   The following drawings should be included in the construction documents set. For electrical drawings, refer to DR 8.1.1.3, Section D, Power Distribution, 3. Power Distribution Drawing Requirements.

   a. Site Plan

      The designer shall indicate the location of the solar electric generating system elements on the building/site.
      Minimum requirements include:

- North arrow; Streets- distance to street
- Dimension of lot
- Adjacent buildings
- Building height/stories
- Panel locations
- Trees, utility poles, or other falling hazards

b. PV Ballast Racking System Details

The designer shall indicate the design of the PV racking system, including, for ballasted systems, ballast pans and ballast blocks.

c. Sustainable Roofing Zones Schematic

The designer shall show compliance with Section BC 1512 requirements, indicating all applicable and exempt roofing zones. Clearly indicate the site boundaries and roof layout, location, quantity, and size of PV solar arrays, roof pitch and any rooftop obstructions and clearances required. Indicate a North arrow.

d. Sustainable Roofing Zone Notes

The designer shall indicate all exemption zones as outlined in **Section BC 1512.2**.

e. Roofing Section at PV System

The designer shall indicate the roofing system and PV system attachment.

f. Elevation views must be shown to demonstrate compliance with zoning. Additionally, a zoning height/setback diagram is required if panels are proposed to be elevated over 4' high or provide a note stating, "The solar system installation complies with ZR 23-42(n)(1) [commercial].

4. CESIR Requirements

The CESIR (Coordinated Electric System Interconnection Review) review by ConEdison will require a minimum of 6 months. Projects 50 kW or greater (in AC) need to be submitted for CESIR review. Refer to DR 8.1.1.3, Section D, Power Distribution, 1. Electrical Service for the documentation package requirements. The following are the responsibilities of the different entities involved:

a. The SCA

1) The SCA is required to provide signatures for authorization for interconnection, commitment letters, and potentially other clerical work to be submitted by the installer.

b. SCA's Engineer

1) The Engineer of Record shall initiate contact with the utility service during the Schematic design phase as the building load letter is also being prepared to obtain a

pre-qualification of the PV system, including a request for preliminary analysis for grid capacity for the proposed PV system generation load. The designer shall include the proposed PV system capacity in a submission to ConEdison's Energy Services *Project Center*.

2) The engineer shall provide confirmation of information needed on RFI's from the installers/ConEdison.

c. Installer

The solar PV installer is responsible for uploading all required documentation via ConEdison's web portal, "PowerClerk."

C. Appendix

1. ConEdison Application Portals

- Small Distributed Generation Application Portal
  (Projects up to 50 kW)
  https://conedsmalldg.powerclerk.com/MvcAccount/Login

- Large Distributed Generation Application Portal
  (Projects 50 kW to 5MW)
  https://conedlargedg.powerclerk.com/MvcAccount/Login

Project teams may refer to the link below for application procedures:
https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/dcf68efca391ad6085257687006f396b/$FILE/December%202019%20SIR%20-%20FINAL%20-%20Clean.pdf

Solar projects up to 50 kW will follow an expedited process (no engineering review, self-certification).

8.3 Green Infrastructure

8.3.1 Green Roofs

Description/Design Approach:

A. General

1. Green roofs, also known as 'living roofs,' are systems consisting of vegetation, growing media (i.e., soil), filtration media, and drainage media, and can be applied to flat or minimally sloped roofs. For stormwater management, green roofs can provide multiple functions including:
   - Retention, via the uptake and release of water by plants (evapotranspiration).
   - Detention, via the temporary storage and slow release of water by in specialized detention layers placed under the growing media and plants.
   - Filtration, via the movement of water through the growing media and geotextile layers.
   - Resiliency benefits, such as heat island reduction.
   - Ballast for a photovoltaic array when a combination green /photovoltaic roof is approved for use.

2. For SCA projects, green roofs are typically only provided to satisfy the requirements of the Department of Environmental Protection (DEP) Unified Storm Water Rules (USWR) as part of the Stormwater Pollution Prevention Plan (SWPPP). If water quality and retention can be provided by other means at grade, the SCA preference is for the roof to have photovoltaic arrays installed to meet the city's decarbonization efforts. Green roofs may be included in SCA projects for aesthetic and/or pedagogical reasons, which would typically be intensive green roofs, when approved by CPM.

B. Extensive Green Roofs

1. Definition: Extensive green roofs typically have a maximum of 6" to 8" of growth media with primarily sedum vegetation to provide stormwater management and reduce heat island effect. They are designed to be lightweight, low-maintenance, drought tolerant without the need for irrigation, and cost-effective. Extensive green roofs are recommended for most SCA applications unless they are part of a curriculum.

2. Vegetation

   a. For extensive green roofs in NYC, manufacturers and installers recommend low-growing (< 4" tall), drought-tolerant plants that absorb water when available and conserve it by closing their leaf pores during the day and opening them at night.
   b. Optimal species for extensive green roofs in NYC include Sedums, Alliums, Sempervivums, Euphorbias, and Delospermas. Some systems may only have a variety of sedums.
   c. Extensive green roofs are exempt from SCA Green School Guide requirements to use native or adaptive species, as there are very few species native to NYC that evolved to survive in typical green roof conditions.

d. Plantings shall be provided in carpet or tile. Trays are not permitted.

3. Growth media
   A specific blend of lightweight expanded clay or rock, sand and compost intended to meet specific retention targets of the overall green roof assembly, while offering long term plant health. The FLL standards adopted in the US offer guidance on specific media requirements

   a. Growth media minimum depth for stormwater quality is 6", with DEP considering 8" to meet water quality requirements for the site.
   b. Minimum depth is 4" for challenging sites, but this will then typically require on-grade green infrastructure to address the remainder of the DEP water quality requirements.
   c. The growth media must meet the strict gradation requirements indicated in the DEP stormwater manual and material submitted during construction must be checked carefully in order to ensure DEP acceptance.
   d. Needled mineral wool may be substituted for soil on a 1:1 depth basis after the initial 4" of growth media to a maximum of 1" of depth at this time. Refer to below

4. Retention layer
   Retention Layers are focused on water quality and plant health and aim to reduce the outflow volume that otherwise would reach the sewer. A retention layer holds onto water for extended periods of time to make water plant-available during periods of drought so that the soil and plants can release the water into the atmosphere as vapor.

   a. They must have seepage outlets to release water slowly into primary roof drains.
   b. They must have overflow outlets aligned with overflow roof drains to prevent any standing water in the growing media layer above. Standing water in the growing media layer will cause root rot.
   c. Storage layers without outflow (i.e., true stormwater retention layers) are not to be provided.
      1) Non-Rigid Retention Layers
         a) Rock fiber materials (e.g. needled mineral wool) retain more water than growth media (soil) and can act as a filter layer.
         b) Restrict to 1" thick total.
         c) Install over a separate drainage and air layer

4. Filter layer

   a. A geotextile is required directly below the growth media layer to prevent fine particulate from clogging drainage.
   b. Water-permeable, UV-stabilized polymer fabric.
   c. May be a separate layer or incorporated into the top of a storage layer.
   d. Depending on the vegetative roof manufacturer, a filter layer may not be required if using a non-rigid stormwater storage layer without voids (e.g., needled mineral wool), which provides filtration (see below).
   e. Must continue vertically up all green roof terminations to at least 1/2" higher than the level of the green roof media surface.

5. Detention layer
   If the on-grade site does not have space to install detention system required for site connection approval, a detention layer can be installed as part of a green roof system to meet some or all of the required release rate required by DEP. Temporary detention storage is added below the vegetative layers of the green roof to temporarily detain peak stormwater volume, and slowly release it over a relatively short period of time (between 12 to 72 hours).

   a. Semi-Rigid Detention Layers with Small Voids
      1) These are sometimes referred to as “honeycomb” or “egg crate” systems.
      2) Depth may vary from 1"-6"; 1"-3" typical; 1.5"-3" is recommended.
      3) Typically semi-rigid, i.e., packaged as rolls (preferred); may be rigid.
   b. Rigid Detention Layers with Large Voids
      These are also known as stormwater risers, stormwater cells, blue roof cells, or “milk crate” systems. Use only where other solutions such as detention or retention tanks are not feasible.
      1) Depth may vary from 4" to 12" or more.
      2) Install across entire roof deck, including beneath non-vegetated areas. (Otherwise, would require too many additional layers of insulation in order to make adjacent pavers level with green roof surface.)
      3) For increased detention and optimal green roof health, may be combined with a semi-rigid detention layer between the growing media and the rigid detention layer.

6. Root barrier
   Required to prevent plant root penetration into the roofing membrane.

   a. Must be coordinated with the roof membrane manufacturer and comply with their requirements.
   b. A root barrier may be separate from or combined with Roof Membrane Protection Layer

7. Drainage Layer
   Required below all non-rigid detention layers without voids (e.g., needled mineral wool or polymer moisture retention mats).

   a. Minimum flow rate to be determined by plumbing engineer and green roof manufacturer or installer.
   b. Typically 1/2" to 3/4" deep. A thicker drainage layer with greater capacity may be required if:
      1) The nearest roof drain is distant.
      2) The green roof area receives directed stormwater from scuppers above.
      3) More growing media (a thicker green roof) is used, although a different type of detention layer is recommended for such applications.
   c. May provide an additional detention function by creating turbulence or friction to slow drainage. Consult with green roof manufacturer or installer to ensure that this does not duplicate or diminish the function of the stormwater detention layer above.
   d. Not required with most semi-rigid or rigid stormwater detention layers with voids, but may be recommended by green roof manufacturer or installer.

8. Edging

    a. Perforated vertical edging is required at all green roof terminations adjoining pavers and VFZs.
    b. Stainless steel, aluminum or hot-dipped galvanized steel.
    c. The top of edging shall be at least 3/4" above level of green roof.
        1) If desired, the top of edging can be made level with adjoining non-vegetated roof surface if level of green roof is depressed by 3/4".
        2) However, green roof manufacturers and installers do not consider edging protruding 3/4" to be a tripping hazard.
    d. Return (horizontal) leg of edging must be placed above roof insulation and may be placed immediately below the filter layer or beneath the uppermost stormwater storage layer or (if applicable) air and drainage layer.
    e. Held in place by weight of green roof layers above. Should not require fasteners.

9. Typical roofing components
   These are the roofing components covered under other specification sections.

    a. Insulation
    b. Roof membrane

C. Intensive Green Roofs

1. Definition: Intensive green roofs typically have a minimum of 8” and typically 12” of growth media to support a larger variety of plants than an extensive green roof. have higher plant diversity of usually less drought tolerant plant species albeit with a higher aesthetic value and are therefore often deployed in more visible areas. Intensive roofs are more costly, require permanent irrigation and tend to demand more maintenance,

2. Intensive green roofs should seek to use native or adaptive species where feasible, consistent with the educational or ecological function of the plantings

D. Vegetation-free zones (VFZs)

1. General Parameters

    a. VFZs should be minimized in order to maximize the stormwater and other benefits of green roofs.
    b. Extents and uplift resistance requirements of areas subject to high winds should be determined by the structural engineer and green roof manufacturer or installer.
    c. Extents of areas that require frequent access or maintenance should be determined by the design team in consultation with the SCA.
    d. VFZ surfaces must have an initial Solar Reflectance Index (SRI) of 82 or higher.
    e. VFZs greater than 1’ wide must use pavers. Narrower, small, isolated VFZs less than 10 square feet in area, on roofs below 100 feet in height, may use gravel infill.

2. VFZ Applications and Widths
   Other than specific VFZ widths required in areas subject to high winds, recommended VFZ widths are as follows:

   a. 6' VFZ:
      1) Bulkhead doors (required by NYCBC)
      2) Bases of ladders (to provide an even, stable surface)
      3) Exhaust louvers less than 6' above finished roof surface (to prevent browning of green roof from hot air)
      4) Areas adjacent to south-facing, highly reflective surfaces (to prevent browning of green roof from concentrated sunlight)
   b. 2' VFZ:
      1) All building perimeters (parapets, bulkheads, etc.) to provide sufficient access for maintenance.
      2) Access to expansion joints or critical flashings to provide sufficient access for maintenance and/or replacement.
      3) Watershed areas from accessory structures, such as splash blocks below scuppers and downspouts to prevent erosion of green roof from splashing water.
   c. 1' VFZ:
      1) Exhaust fans
      2) Roof drains
   d. No VFZ required:
      1) Hatches
      2) Mechanical dunnage posts or other structural penetrations
      3) Ductwork, pipe, and conduit penetrations

3. VFZ Materials

   a. Concrete Pavers
      1) Weight 24 lb/sf minimum. (Typical 2” paver is 25 psf)
      2) Use two layers (4" to 5" thick) only where required, as determined by structural engineer for wind loads. Additional layer is preferable to a single layer with “lock-down” pedestals or risers.
      3) A second layer of pavers should not be necessary solely to counteract buoyancy of built-up insulation (see below) added to make pavers level with green roof.
      4) In general, pavers, like green roof surfaces, should follow the slope of the (low-slope) roof. Use tapered shims only where necessary to maintain a flush surface across pavers on different slopes.
   b. Paver Pedestals (Shims, Pads, Plates)
      Preferred method to make pavers level with adjacent green roof surface.
      1) Typical pedestal or shim height is 3/8" to 5/8", but may be as high as 1" to 1 1/2".
      2) Tabs on tops of pedestals should also provide consistent 1/8" spacing between adjacent pavers.
   c. Paver Risers (Elevators, Stands, Pedestals)
      May be used in some circumstances (see limitations below), instead of pedestals, to make pavers level with adjacent green roof surface.
      1) Limit height to 4" in order to avoid issues with bracing.

2) Adjustable risers may be used, but fixed, single-component risers are preferred.
3) Wide, stable bases and tops should not require any fasteners.
4) Tabs on tops of risers should also provide consistent 1/8" spacing between adjacent pavers.

d. Gravel
Gravel is not permitted.

4. Roof Drains

Roof drains must be separated from vegetated areas by a minimum 1' VFZ, and protected by a drain body extension. If for some reason this is not possible, roof drains should be protected by a perforated metal box structure with a hatch in order to:
a. Facilitate maintenance.
b. Reduce clogs from windblown debris.

E. Wind Resistance and Erosion Control for Vegetated Areas

1. Erosion Blankets/Netting
Required where vegetation is installed in areas with high winds (to be determined by structural engineer or green roof manufacturer or installer).

a. Required in specific green roof areas where vegetation is installed as carpets, tiles, or trays.
b. Required throughout all green roof areas where vegetation is installed as plugs or seedlings.
c. Natural Erosion Blankets: Coconut coir or other natural fibers are preferred in order to minimize the use of plastic netting, particularly in areas not subject to high winds
d. Plastic Netting: Required instead of natural materials in areas subject to high winds. Must not be used solely to prevent erosion. SCA preference is to avoid the use of plastics where possible.

2. Disk Anchors
Must be used to secure either erosion blankets or netting in areas with high winds.

a. Layout to be determined by green roof manufacturer or installer.
b. Pavers may not be used to secure netting.

F. Irrigation

1. Permanent Irrigation
Not permitted.

2. Periodic Irrigation
Periodic irrigation is critical during the initial plant establishment period or during extended periods of hot, dry weather:

a. Provide at least one rooftop hose bibb or hydrant at each main green roof level.

b. Provide enough hose bibbs to ensure that all green roof areas can be irrigated. Assume each hose bibb can cover an area with a maximum radius of 50 feet.
c. Smaller isolated green roof areas on top of stair or elevator bulkheads do not require their own hose bibbs if they are within the coverage of this 50-foot radius.

3. Irrigation Frequency and Quantity
Provide irrigation as directed by green roof installer. In the absence of such guidance, provide regular, soaking irrigation as follows:

a. No less than 3X per week during the 3-month plant establishment period after initial green roof installation or substantial replanting.
b. Daily after any period of 3 days or more under any of the following weather conditions, until the condition ends:
    1) Temperatures 40ºF to 90ºF (including during winter) and no precipitation.
    2) Temperatures above 90ºF and limited precipitation (< 1/2" over three days).
    3) High humidity (> 80% RH) with nighttime temperatures above 70ºF.
c. If possible, irrigation is during the early morning hours.