

MANUAL
OF
PLANNING STANDARDS
FOR
SCHOOL BUILDINGS

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PREFACE

Although focused on teaching and learning, education must also address the need to maintain a safe, secure, and healthy school environment. The capacity of children to learn is impeded if their school environment contains elements that are hazardous to their health. The State Education Department and educators throughout the State of New York have a responsibility to assure the school community and the public that, based on the best available knowledge, school buildings contribute to achievement by being safe, healthy and clean environments in which to learn.

In December 1994, the New York State Board of Regents adopted the following guiding principles developed by the Regents Advisory Committee on Environmental Quality in Schools:

- Every child has a right to an environmentally safe and healthy learning environment that is clean and in good repair.
- Every child, parent, and school employee has a "right to know" about environmental health issues and hazards in their school environment.
- School officials and appropriate public agencies should be held accountable for environmentally safe and healthy school facilities.
- Schools should serve as role models for environmentally responsible behavior.
- Federal, State, local, and private sector entities should work together to ensure that resources are used effectively and efficiently to address environmental health and safety concerns.

Among the many responsibilities of the Commissioner of Education is that of establishing and enforcing school building construction standards for the health, comfort and safety of pupils attending public schools.

The Office of Facilities Planning, on behalf of the Commissioner, is the code enforcement authority for public schools and BOCES. In accordance with Department of State regulation Title 19, 1201.2(e), *The State Education Department shall be accountable for administration and enforcement of the Uniform Code with respect to buildings, premises and equipment in the custody of, or activities related thereto undertaken by, school districts and Boards of Cooperative Educational Services.*

Accordingly, all plans and specifications for the erection, repair, enlargement or remodeling of school buildings in any public school district in the State must be reviewed and approved by the Commissioner. The Office of Facilities Planning performs this function through the issuance of a building permit. However, the Office of Facilities Planning offers services beyond the approval of plans and specifications. We offer advice and technical assistance to school districts, architects and engineers to help them solve their school building needs with consideration of educational and planning efficiency, conservation of natural resources, initial and life-cycle costs and within the context of the most recent State and Federal laws.

The Manual of Planning Standards has proved invaluable to school district architects and engineers. It has simplified and expedited review and approval of plans and specifications by the Office of Facilities Planning. We would like to emphasize several things about this publication.

1. Included herein are both minimum requirements, which must be followed, and recommendations, which are optional. The language used indicates the distinction (e.g., such words as "shall" and "must" indicate requirements; "should" and "may" indicate recommendations).
2. The requirements stated herein are those that are currently in effect. Revisions will be made from time to time

because of changes in fire safety regulations, construction techniques, technological developments and changes in materials, as well as by progress in education, which has implications, for space requirements and types of facilities. This Manual, revisions and other useful planning information is also available at: www.p12.nysed.gov/facplan.

3. For help, technical assistance or current information relating to the layout of spaces and recommended equipment for the various curriculums, contact the Education Department's Office of Facilities Planning at (518) 474-3906 or by fax at (518) 486-5918.

We actively seek competent advice and welcome suggestions as to how our requirements might be improved to keep pace with educational and technical developments. We will be glad to consider applications for approval of experimental projects that deviate from established standards if it seems reasonable to expect that important benefits will result therefrom.

We urge that all school officials confronted with building needs contact the Office of Facilities Planning for consultation before detailed planning is undertaken. In this way costly mistakes and delays may be avoided. Even more importantly, early consultation will give us the opportunity to help districts secure the buildings best suited to their educational needs within the resources available.

This revision eliminates provisions of the former manual that are now incorporated in the Uniform Code. Where possible, we have included the guidance from newsletter articles in the appropriate sections.

There are also new provisions for health and safety that did not previously exist, added based on statewide experience.

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GENERAL PROVISIONS

S1 GENERAL

- a. Any school district which proposes to erect, repair, enlarge, or remodel a school building must investigate the necessity of submitting plans to the Office of Facilities Planning in accordance with current administrative procedures. The “Instruction Guide for Public School Districts and BOCES Obtaining Building Permits for Capital Construction Projects” is available on our web site.
- b. School Boards, School Administrators, Architects and Engineers should thoroughly understand the current requirements in respect to submission, review, and approval of plans and specifications and compliance with mandatory health, comfort, and safety regulations.
- c. School buildings, when designed or renovated, shall use design principles and construction materials which further the goals of fire safety, conserving energy, ensuring good indoor air quality, pest-proofing, radon-proofing, and easy maintenance, and include other factors contributing to positive learning environments.
- d. Schools shall conduct environmental site audits for new building construction, including adjacent land, to identify potential environmental health hazards.

S2 AUTHORITY

S2-1 Reviewing and Approving School Building Plans

- a. The authority of the Commissioner of Education for reviewing and approving plans is found in Sections 408 and 409 of the Education Law (Appendix A).
- b. The Commissioner’s responsibility is recognized by the Department of State, which does not direct cities, towns or villages to take on this responsibility for school district and boards of cooperative educational services. This is found in Title 19 NYCRR Part 1201.2(e). (Appendix A). School districts and BOCES are exempt from most local jurisdiction.

S2-2 Planning Standards

- a. The authority for the standards set forth in this Manual is derived from Regents Rules 8 NYCRR 14 Section 14.1 – School Buildings and Grounds. (Appendix A)

S3 SCOPE

- a. This Manual pertains to all public school building construction, and certain Charter school building construction, with the exception of schools in New York City.

S4 APPLICABLE CODES

- a. All new building construction is required to be in compliance with the New York State Uniform Fire Prevention and Building Code and the Energy Conservation Construction Code of New York State. Subsequent to January 1, 2003, the New York State Uniform Fire Prevention and Building Code moved from Title 9B NYCRR 600-1250 to Title 19 NYCRR 1220-1226, 1240.

- Part 1220.1 Residential Code of New York State
 - Part 1221.1 Building Code of New York State
 - Part 1222.1 Plumbing Code of New York State
 - Part 1223.1 Mechanical Code of New York State
 - Part 1224.1 Fuel Gas Code of New York State
 - Part 1225.1 Fire Code of New York State
 - Part 1226.1 Property Maintenance Code of New York State
 - Part 1227.1 Existing Building Code of New York State
 - Part 1240.1 Energy Conservation Construction Code of New York State
- b. The New York State Uniform Fire Prevention and Building Code and the Energy Conservation Construction Code apply to all buildings within New York State, with minor exceptions. This will hereafter be referred to as the Code.
- c. All buildings are required to be in compliance with the Manual of Planning Standards and the Code in effect at the time the Building Permit was issued. Over time, a building may have sections that comply with multiple editions of the Manual and the Code. At no time shall any additional construction reduce the compliance of existing buildings. Therefore, for portions of schools built between 1984 and 2003, not being modified, the building would need to be compliant with the previous Title 9B NYCRR code. Prior to 1984, there was no state code that pertained to public schools. Schools have been subject to the Commissioner's Manual of Planning Standards since 1925.
- d. This Manual and the Commissioner's Regulations Part 155, provide additional specific requirements beyond the Code. The Commissioner's regulations are retroactive for all facilities, with some exceptions for cities with a population over 125,000. If there are areas of the building out of the scope of work, they are still required to comply with the Commissioner's Regulations at all times.

S5 REFERENCE STANDARDS

- a. All construction, including structural, mechanical and electrical shall conform to the Code, the "Referenced Standards" listed in the Code and commonly accepted good practice.

S6 FINAL AUTHORITY

- a. Requirements set forth herein and in the Code are the minimum requirements unless otherwise specifically approved by the Commissioner of Education or the Department of State due to unusual conditions. The Office of Facilities Planning upon evaluation of a written request may consider variances from the requirements of this Manual for a specific project. Variances from the Code may be pursued by application to the Board of Review of the New York Department of State, Codes Division.
- b. The Commissioner shall determine decisions concerning requirements. In any conflict between the Code, the "Reference Standards", the Regulations of the Commissioner of Education and this Manual, the stricter requirements shall govern.
- c. Requirements exceeding those of this Manual may be deemed necessary by the Commissioner to insure health and safety. Each building will be reviewed based on its individual characteristics.
- d. Spaces on approved plans are reviewed with the pupil and staff's health and safety in mind. Any changes to the space's use, exiting, access or function that might affect the health, safety and comfort of pupils and staff shall not be made without the approval of the Commissioner.

- e. Any change to the building or its use must meet the requirements of the Code, the Regulations of the Commissioner of Education and this Manual. Such changes must be reported to the Office of Facilities Planning for further guidance.

S7 RESPONSIBILITY

S7-1 Building Permits for Capital Construction Projects

- a. It is important to refer to the “Instruction Guide for Public School Districts and BOCES Obtaining Building Permits for Capital Construction Projects” for detailed requirements for obtaining building permits for capital construction. The instruction guide is available on our web site.

S7-2 Architects and Engineers

- a. All design for school construction, and compliance of plans and specifications with the requirements of this Manual, the Commissioner’s Regulations and the Code are the direct responsibility of the architect / engineer retained by the Owner (Board of Education).

S7-3 School Boards and School Administrators

- a. In addition to the School Board's and School Administrator's responsibility for both immediate and long range planning, it is also their responsibility to obtain architectural and engineering services and adequate supervision or periodic inspection through the architect or engineer for all construction. Refer to the “*Instruction Guide for Public School Districts and BOCES Obtaining Building Permits for Capital Construction Projects*” for further guidance.

S8 COMPETITIVE BIDDING AND AWARDS

- S8-1 All construction documents and bidding procedures must be in full compliance with the General Municipal Law. While Appendix A contains excerpts of the General Municipal Law, all parties involved in the bidding process should seek clear guidance from their legal counsel.

S9 REGULATIONS OF THE COMMISSIONER OF EDUCATION, PART 155 EDUCATION FACILITIES (8NYCRR155)

- S9-1 The “Commissioner’s Regulations” are New York State statutory requirements which govern the acquisition, funding, management, maintenance, construction, health and safety and many other aspects of Public School Buildings. Part 155 applies to all schools with some exceptions for cities with a population over 125,000. A link to the complete regulations can be found on our web site. School administrators and design professionals should familiarize themselves with these regulations prior to performing any work on a school building. Currently there are 25 subdivisions, called Sections. Three of these Sections, 155.2, 155.5 and 155.7 specifically pertain to construction projects and are briefly described below.

S9-2 Section 155.2 - Construction and Remodeling of School District Facilities

- a. This section provides a general overview of requirements the District must follow when undertaking a construction project.

S9-3 Section 155.5 - Uniform Safety Standards for School Construction and Maintenance Projects

- a. This section contains the various requirements or responsibilities of the District, the Design Professional and the Contractor when a construction or maintenance project is executed. They are intended to ensure that safety is maintained for the students, staff and workers during the construction project. It is imperative that all of the requirements specifically related to the construction are thoroughly addressed in the Contract Documents. In larger projects temporary exit plans and/or phasing schedules may be required in order to satisfy these requirements. Some of the requirements are administrative or management issues and solely the responsibility of the District Administration.

S9-4 Section 155.7 - Health and Safety in Existing Educational Facilities

- a. This section describes the minimum standards of construction, equipment and safety which a school building must meet in order to maintain a Certificate of Occupancy. These requirements are mandatory for all schools. It does not matter when the building was built. If a non-conformance exists it must be corrected immediately. This section does not apply to city school districts in cities having a population of 125,000 inhabitants or more.

S10 DESIGN DOCUMENTS

- a. General: The construction documents submitted for review are required to contain the information listed below in order to determine compliance with all applicable codes, rules and regulations. The information required to determine compliance, is not necessarily limited to the following list. Any additional information that is needed to determine code compliance will be requested. Reviews are accomplished more efficiently when all pertinent information is clearly indicated. It is important that information shown on the drawings and in the specifications be complete, coordinated and code compliant. "Complete" means that all materials and equipment are indicated on the drawings and specified on the drawings or in the Project Manual. The work must be coordinated among the trades and with utility companies, local municipalities and government agencies prior to submitting documents. The work must be code compliant and conform to all applicable regulations, including the New York State Uniform Fire Prevention and Building Code, The Energy Conservation Construction Code of New York State, The Regulations of the Commissioner of Education, this Manual, and regulations of all State and Federal agencies with jurisdiction.
- b. All Trades:
 - All drawings and specifications must be dated and signed/sealed by a design professional.
 - Site/Civil, Architectural, Structural, Mechanical, Electrical, and Plumbing Drawings: Plans shall be drawn to scale. Details shall be drawn to scale as much as practicable.
 - Site Plans shall indicate handicap parking, curb ramps, fire apparatus access roads, all new utilities, existing and new fire hydrants, property lines, existing and new buildings and additions.
 - North Arrows are required on Site Plans, Key Plans, and Floor Plans.
 - Key Plans shall be provided whenever Floor Plans have to be divided and shown on separate drawings.

- Floor Plans shall include room labels (program use) and square footage for each space (new and existing).
- Door hardware alteration projects shall indicate all lockset functions.
- All fire-rated walls (existing and new) must be shown on the Architectural and HVAC floor plans. Fire ratings shall be indicated for all fire resistive assemblies including details showing conformance with their UL/FM test procedures. A wall legend indicating each type of rated wall system must be provided.
- Floor Plans shall include all door swings, handicap toilet facilities, stairs, ramps and windows.
- Provide key notes on all drawings to which they apply.
- Provide legends for all devices, fixtures, partitions and symbols used on plans.
- Exit sign face(s) and directional arrows shall be clearly indicated.

c. Code Compliance Drawings:

- Life safety plans for each level of the building clearly indicating means of egress, Rescue Windows and fire rated separations including floor and roof construction shall be provided and drawn to scale.
- Drawings shall indicate the proposed and existing fire rated assemblies. Fire Walls, Fire Barriers, Fire Partitions and Smoke Partitions shall be indicated on the floor plans. The Construction Classification of existing buildings and additions shall be indicated.
- Building Occupancy Classification or occupancy type shall be indicated for all projects. Occupant loads for each space are required for projects which include Level 2 & 3 Alterations, Change of Occupancy, and Additions.
- Indicate the maximum travel distance and path of travel for each primary and/or incidental occupancy shown. Show all applicable or planned areas of refuge, smoke compartments, horizontal exits, vertical exits, exit passageways, and width of egress doors.
- Overall Floor plans are required. Floor Plans shall include floor area of each space, door swings, stair and ramp configurations and enclosures, windows and rescue windows, means of egress components and exit widths.
- Show temporary means of egress, protection and construction separations to be utilized during construction activities. Temporary partitions, exit doors, panic hardware, exit signs, emergency lighting and phasing drawings shall be indicated and specified.

- d. Mechanical, Electrical and Plumbing (MEP): The MEP work must be coordinated among the trades, with the architectural components of the building, and with the site features. Mechanical equipment electrical power requirements must be shown on the electrical drawings. Water, sewer, gas, electric service, kitchens, pools, wastewater treatment, fuel tanks, etc requirements must be coordinated with utility companies, local municipalities and government agencies prior to submitting documents. The following information shall be indicated on MEP Drawings:
- All new heating and cooling equipment: boilers, water heaters, solar heaters, flues/vents, air handlers, fans, duct/sizes, diffusers, grilles, dampers (fire, smoke, volume control, backdraft, etc), heat exchangers, unit ventilators, unit heaters, refrigeration equipment, roof top units, exhaust fans, etc.
 - All piping must be shown including: water and gas service, hot and cold water supply, waste, gas piping, sanitary drains, vent, hydronic heating lines, recirculating, etc.
 - All new plumbing equipment: appliances, fixtures, valves, fittings, gages, vent terminations, drains, expansion fittings, hydrants, supports, appurtenances, etc.
 - All electrical equipment: service entrance feeders, service entrance equipment, transformers, metering equipment, electric panels, electric panel schedules, electric room equipment layout - drawn to scale, equipment loads, conduits, wiring, devices, lighting panels, fixture schedules, equipment schedules, fire alarm system panels and detection/notification devices, emergency and standby power equipment, emergency lighting, exit signs, electrically operated partition safety systems, site electrical connections, security, communications, technology, etc.
 - Sizes and ratings of materials and equipment, such as wire/conduit/fuses/circuit breakers/pipes/ducts/strobe candela/etc must be indicated.
 - Clearly indicate the specific locations where plenum rated cable is required or specify that plenum rated cable be used throughout the building. Simply stating that plenum rated cables shall be used in plenum spaces is not adequate.

S11 NY-CHPS HIGH PERFORMANCE SCHOOL BUILDINGS

S11-1 General

- a. In response to the growing recognition that the quality of the environment where learning takes place has an impact on the success of students, and the difficult economic challenges which school districts increasingly face, the N.Y.S. Education Department in conjunction with the N.Y.S. Energy Research and Development Authority (NYSERDA) developed the **NY-CHPS High Performance Schools Guidelines**. The document is based on the Massachusetts Collaborative for High Performance Schools Guidelines which were in turn based on CHPS, Inc. CHPS is the well known acronym for Collaborative for High Performance Schools, based in California. These guidelines are similar in intent and purpose to the LEED green building certification program developed by the United States Green Building Council. The NY-CHPS document contains most of the well known and proven principals of sustainable design and is made available for Districts to use as a valuable resource in the design, construction and maintenance of their facilities.
- b. The quality of the buildings and spaces in which students are taught is an important factor in the learning process. To be successful, a building must be attractive, efficiently organized, include a variety of spaces

and have plenty of natural light and ventilation. Materials must be durable in order to maintain their appearance and function after many years of use. Students and teachers must be able to see and hear clearly, and their surroundings must be comfortable and healthy. The various educational activities which take place in school, from listening and reading to watching movies, to performing on stage or in the gym, all require special lighting, heating and ventilation systems. Natural and artificial lighting, brightness, glare, room proportions, colors and finishes, furnishings, sound control, and the ability to demonstrate and use equipment must be considered. It is imperative that buildings be designed to operate efficiently, use materials wisely, are attractive and conserve environmental and monetary resources. High Performance Schools exceed normal standards, provide exciting, functional spaces and conserve energy and resources throughout the life of the building.

- c. The document can be found at the Facilities Planning web site at <http://www.p12.nysed.gov/facplan> by searching “NY-CHPS”. The document extensively describes sustainable building design concepts which can be incorporated into a school construction project. Even the smallest project can benefit from the use of the ideas and construction practices of sustainable design. We strongly encourage School Districts to design their projects using these guidelines to reduce maintenance and operational costs over the life of the facility while providing outstanding learning environments.

S12 PROFESSIONAL DESIGN DELEGATION

- a. Professional design delegation is often used in the design and construction of school construction projects. Building components which are often delegated include: Grandstands, bleachers, modular buildings, pre-engineered metal buildings, press boxes, modular retaining walls, wood trusses, structural elements and mechanical and electrical systems and components. As construction technology continues to improve many components of the building require specialized design professionals to provide design and engineering for the manufacture and installation of these elements.
- b. Proper design delegation is necessary for the Project Design Professional to legally assign the design of components or systems to specialized design professionals. Professional design delegation must be exercised in accordance with Education Law as established by the Rules of the Board of Regents, Part 29, Unprofessional Conduct, Section 29.3. Excerpts of these Rules can be found on the NYSED, Office of the Professions web site. Detailed explanations of these principals can be found on same the web site under Architecture, Practice Guidelines, and are the same for the practice of Engineering and Land Surveying.
- c. The basic requirements for design delegation are briefly described as follows:
 - The delegated work shall be designed by a N.Y.S. Licensed Design Professional.
 - The Delegator shall establish the parameters of the delegated work and thoroughly specify the criteria by which the work is to be designed. The specifications should require that complete and detailed construction documents are prepared and submitted to the Architect/Engineer of Record for review and approval.
 - The Designer/Delagatee shall sign and seal the design drawings and provide a certification statement that the design complies with the performance specifications and the New York State Uniform Fire Prevention and Building Code, the Energy Conservation Construction Code of New York State, the New York State Education Department Manual of Planning Standards and the Regulations of the Commissioner of Education.
 - The Delegator shall review and approve in writing the submitted design.

- d. To practice Engineering/Surveying and Architecture, design professionals must have a thorough knowledge of the Laws, Rules and Regulations of professional design practice. It is imperative the designer understands the legal implications of design delegation prior to executing this aspect of design service.

S13 ACCESSIBLE FACILITIES AND PROGRAMS

S13-1 Section 504 of the Rehabilitation Act of 1974 (updated July 2003)

- a. All school districts are responsible for coordination and implementation of Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans Disabilities Act of 1990 (ADA), which prohibit discrimination based on disability. Each district must have a self-evaluation and transition plan required under both of these statutes and a grievance procedure required under Title II of the ADA.
- b. This is not to say that all existing buildings must be fully accessible. However, ADA requires that public entities ensure that all programs and services must be accessible and usable by individuals with disabilities in the most integrated setting possible. The school district must provide access to all programs and services provided in the building. A school building is very challenging in this respect because it has so many program spaces. Program spaces include the administrative office, general classrooms, classrooms designated to kindergarten or pre-K, cafeteria, auditorium, gymnasium, library, media center, music/band room, technology room, art room, home and career room, science room and toilets. An elevator (or ramp) is not necessarily required if all the program spaces are on one accessible floor. In older schools where it may be physically impossible to provide access to any of these spaces, the program provided in that space must be made accessible in another location or otherwise made available in a non-discriminatory manner. It is not uncommon to require a new elevator attached to the exterior of the facility if necessary to provide accessibility to upper floor program spaces.

S13-2 Americans with Disabilities Act of 1990 (ADA), Public Law

- a. As public entities Public School Districts are responsible to have made "reasonable" modifications to provide accessibility in existing buildings as required by the provisions in Title II of the ADA. Revised regulations for Titles II and III were published in the Federal Register on September 15, 2010 and went into effect March 15, 2011. The ADA required an evaluation, a transition plan, and the removal of architectural barriers to be completed by all school districts prior to January 26, 1995. In that sense, basic modifications should have been made in response to the required ADA plan by January 26, 1995.
- b. One purpose of the ADA is to compel public entities to perform ongoing improvements to accessibility in their buildings over time. If accessibility is lacking in certain areas it should be addressed in the ADA Transition Plan and incorporated in capital projects within a reasonable time frame. The design professional must take the time to become familiar with the ADA to be able to properly apply the requirements to the construction of schools. For more information about the ADA please visit the Department of Justice website www.ADA.gov. The ICC based building codes include scoping requirements and reference standards which ensure that construction in new and existing buildings comply with ADA accessibility standards. Plans for capital projects submitted to Facilities Planning are specifically checked for any previous or current modifications for accessibility.

S13-3 New York State Building Code Compliance

- a. All new construction must meet Code requirements and the referenced International Code Council (ICC) / American National Standards Institute (ANSI) - Standard ICC/ANSI A117.1, Accessible and Usable

Buildings and Facilities. The 2010 ADA Revised Standards have been harmonized with the standards given in ICC/ANSI A117.1 assuring that compliance with the Building Code of NYS will effectively achieve ADA compliance.

- b. State Law must be met by reference and detail on the plans and/or in the specifications approved by the Commissioner. The design professional must certify to this.
- c. New construction and additions must meet current standards for accessibility. Alterations must be fully accessible or accessible to the maximum extent feasible

S14 CHARTER SCHOOLS AND THE AUTHORITY HAVING JURISDICTION

- a. State law regarding the treatment of charter schools is codified in Article 56, the New York State Charter Schools Act of 1998, as amended in 2007, and as amended most recently by Chapters 101, 102, and 221 of the Laws of 2010. A charter school is an independent public school that operates under a five year charter. A charter school is free to organize around a core mission, curriculum, theme, or innovative teaching model. The original statute included a cap of 200 charters which was subsequently increased to a cap of 460 during the laws of 2010. New charter school applications can only be approved by the Board of Regents and the State University of New York Board of Trustees, except that an application for the conversion of an existing public school to a charter school may be approved by the local board of education or the Chancellor of Education in New York City.
- b. The treatment of charter school facilities depends on when the charter was issued and where the charter school is located in accordance with the following:
 - All charter schools located in New York City are subject to the New York City Code as enforced by the City regardless of when the charter was issued. All local laws, rules, codes, regulations and ordinances are applicable. All building permits and Certificates of Occupancy will be issued by the city.
 - All charters issued for schools under the original 200 cap will be subject to the local code enforcement jurisdiction in which the school is located. The local authority having jurisdiction will review plans and specifications and issue building permits and certificates of occupancy. Those charter facilities are not subject to the NYSED's Manual of Planning Standards.
 - All charters issued above the original cap of 200 and located outside of New York City will be subject to the State Education Department as the Authority Having Jurisdiction for code compliance. The Manual of Planning Standards will apply, and all building permit applications and certificates of occupancy will be issued by Facilities Planning after the completion of our typical process.
- c. In addition, all charter schools are subject to various other federal and state laws that govern all public and private elementary schools. Examples include, but are not limited to: AHERA, fire inspections, fire drills, emergency evacuation plans, numerous provisions of education law 409 including no smoking on school property, eye safety during science, electrically operated partitions, notification of pesticide use, self extinguishing mercury vapor or metal halide lamps, procurement and use of environmentally-sensitive cleaning and maintenance products, etc.
- d. When charter schools are seeking appropriate facilities, it may be prudent to seek former school facilities such that a change in occupancy, and the relevant code upgrades may not be immediately

required. Co-location in partially used public schools may also provide adequate space at low initial capital cost.

- e. Charter schools under SED jurisdiction will be treated in the same manner as all other school projects and will be reviewed on a first in-first out basis. Please contact the Office of Facilities Planning to determine which charter schools are subject to SED jurisdiction, and to verify specific information and documents required for project review. If the proposed school is located in a leased building, approval from the local Building Code Authority will be required in addition to the SED approval.

PART I: BUILDING SAFETY PLANNING

S101 GENERAL

- a. This Part addresses Building Construction, Fire Safety and Egress. All new work is to be in full compliance with the Code, this Manual, and the Commissioner's Regulations. The following information contains additional State Education Department requirements and clarifications. No construction materials shall be used and no type of construction shall be permitted which would endanger the health, safety, or comfort of occupants of the facility.
- b. The Code is very receptive to building reuse. For guidance pertaining to work in existing buildings review the "Existing Building Code of New York State".
- c. The Americans with Disabilities Act of 1990 (ADA) requires all district programs and services to be accessible. Many existing buildings still do not comply with this Federal Law. Before the preliminary design phase, districts must evaluate their existing buildings for compliance with the ADA.

S102 BUILDING CONSTRUCTION

S102-1 General

- a. Typically, each school project requires financing. In many instances, districts are financing buildings for 30 years. Before the architect is brought on board, the district has typically sought guidance from bond counsel. They discuss financing and building longevity as it relates to Local Finance Law Article II; Local Indebtedness; Power to Contract Indebtedness; and Periods of Probable Usefulness, Section 11. If the building is to be financed for 25 or more years, the architect needs to be aware of the requirements imposed by the Local Finance Law. See Appendix A.
- b. School buildings are a part of a community's infrastructure and sustainable design must be considered. School buildings are subject to wear and tear. District staff and designers would be well advised to read "High Performance School Guidelines" prepared jointly by Facilities Planning and the NY State Energy Research and Development Authority in cooperation with the Collaborative for High Performance Schools, Inc. This booklet can be a guide through all phases of a project. The goal is to provide a building that is healthy and productive, cost effective and sustainable. See General Provisions, Section S11.
- c. Designers must have a discussion with their client about the anticipated useful life of the building or addition being designed. With the financial situation districts are facing today, there is the temptation to save pennies wherever possible. It is the architect and engineer's responsibility to advise their client of the long-term impacts of material and equipment choices.

S103 FIRE CONTROL

S103-1 Additions

- a. Many times, an addition is located at the rear of a building. In the past, this was not an issue of concern. However, the current Fire Code Chapter 5, Fire Service Features, may require additional fire hydrants and apparatus access road features that can complicate the design. The designer must review this chapter thoroughly at the beginning of the design phase. If a site raises great challenges, it is strongly recommended the responding fire organization be involved.

- b. Additions must comply with all requirements of the Code, this Manual, and the Commissioner's Regulations. If the addition can bring an existing building into conformance with the Code, this Manual, and the Commissioner's Regulations it should do so.
- c. Sometimes an addition can create an enclosed court (courtyard). Refer to Section S106-8 for further guidance.
- d. Passages or corridors connecting buildings to each other must meet all dead end restrictions of the Commissioner's Regulations and the Code.

S104 FIRE-RATED CONSTRUCTION

S104-1 Exterior Shell

- a. All roof assemblies and coverings shall have a Class A fire classification as tested in accordance with ASTM E108 or UL 790.

S104-2 Interior Space Requirements

- a. In addition to the Code requirements, the following spaces are required to have walls, floors, and ceilings of at least the fire resistance ratings listed below, with a non-combustible finish. The doors shall have the appropriate label for the wall fire rating. The doors shall be self-closing and latching. Those spaces having a roof over the entire space may have a roof/ceiling assembly which is non-rated.
- b. Two-hour construction:
 - 1. Boiler, heater or furnace rooms.
 - 2. Refrigeration rooms which house equipment that uses flammable refrigerant.
 - 3. Electrical Rooms (See S801)
 - 4. Emergency/standby generator rooms, or rooms housing equipment which uses any flammable liquid. (Sprinkler exception under S104-2 e below does not apply)
 - 5. Individual Vocational Technology Shops.
 - 6. Storage rooms for fuel, flammable liquids and gas powered equipment. (See S106-7 b)
- c. One-hour Construction:
 - 1. High School Art rooms.
 - 2. Home and Career rooms with cooking equipment.
 - 3. Commercial kitchens.

Exception: No separation is required when the kitchen is provided with an approved NFPA-13 sprinkler system.

- d. Under stage storage: Storage of scenery and equipment in space underneath the stage is not recommended. If it is provided, in addition to fire-rating requirements of the Code as storage space, the space shall have hardware that is readily operable from the inside for egress. A light shall also be provided in the space.
- e. Fire ratings are reduced one hour if the room or space is provided with an automatic fire extinguishing system.

S105 SMOKE CONTROL

S105-1 General

- a. Every floor of a building shall be separated from floor levels above and below by stair enclosures and smoke barriers constructed to effectively obstruct the passage of smoke and fumes.

S105-2 Smoke Zones / Smoke Barriers

- a. Smoke barriers required to divide a building into separate smoke zones shall be constructed of fire resistive materials of such design and detail to effectively obstruct the passage of smoke and fumes.
- b. Spaces which require two or more exits shall exit into a minimum of two separate smoke zones. No more than 60 percent of the required exit width shall be into the same interior smoke zone.
- c. Separate fire areas and building areas shall be separate smoke zones.
- d. In sprinklered buildings, all corridors shall be protected from the spread of smoke from adjacent spaces. Door closers and smoke dampers are required.

S105-3 Fire and Smoke Stopping

- a. Fire and smoke stopping shall be provided using non-combustible materials.

S105-4 Stairway Enclosures

- a. In those instances where a stairway enclosure is not required by the Code, stairways shall be enclosed so as to effectively provide floor to floor smoke separation.

S106 EGRESS

S106-1 General

- a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy. When a pupil enters into a corridor from a room of pupil occupancy, there shall be a choice of two unobstructed means of egress in different directions and leading to different exits.
- b. Required exits shall always be located remote from each other within a room or enclosed area. Exits shall be distributed as uniformly as possible along the perimeter of the room, such as at diagonally opposite room corners.
- c. Required exiting through adjacent spaces other than corridors will not be allowed, unless specifically

authorized.

- d. Folding or rolling partitions and sliding or overhead doors are not to be considered as exits.
- e. Fixed and movable gates shall not be located so that they create dead end conditions or obstructions. Smoke doors with panic hardware can generally be installed in lieu of gates to provide desired lockable administrative control to avoid dead end conditions beyond the doors.
- f. Required building exits cannot discharge into completely enclosed courtyards unless specifically authorized. (see S106-8d)
- g. Receiving areas may not be used for exiting purposes.
- h. Open cubbies are not allowed in corridors.
- i. SED strongly suggests that Pre-K, Kindergarten, and First Grade classrooms be located on the level of exit discharge.

S106-2 Egress from Space of Pupil Occupancy - WITH Traditional Corridor Concept :

- a. All doors to corridors from spaces of pupil occupancy shall swing into the room unless fully recessed.
- b. Every space of pupil occupancy over 500 square feet in area, shall have two separate means of egress from the space, each into a separate smoke zone. The primary means of egress is commonly the opening to the corridor. The second means of egress may be a door into a separate smoke zone or to the exterior, or a rescue window. A door providing a second means of egress through one intervening space may be approved on an individual basis.
- c. The second means of egress provided through an adjacent space will only be approved if the following conditions are met:
 - 1. The originating space is provided with a handicap accessible door to the adjacent space and the door is posted with a sign which reads "Emergency Escape". The sign shall have a bright yellow background with black letters, minimum size: 5 inches by 8 inches.
 - 2. The adjacent (intervening) space which contains the smoke zone exit shall be provided with either a Rescue Window, or a door which provides access to either the exterior of the building, a stair enclosure, or a corridor which is not in the same smoke zone as the corridor door from the originating room.
 - 3. The adjacent room shall be provided with emergency lighting.
- d. Buildings of Type V Construction - every space of pupil occupancy shall have an exit to the corridor and, in addition, a door directly to the exterior.
- e. No point in a space of pupil occupancy shall exceed a 50-foot straight-line distance to a door to the corridor or a door to the exterior, except assembly spaces and library/media centers.
- f. Divided spaces: In rooms planned for division into two, or more, separate areas by means of folding or movable type partitions, each divided area shall have its own exits and second means of egress, and the

combined space shall have proper remote exiting.

- g. With appropriate hardware, a pass door in an overhead garage type door or in an operable gymnasium partition can be approved as the second means of egress.
- h. Self-contained rooms created by wardrobes, cabinetry, or other furniture which present obstructions to egress, rather than those created by traditional walls, partitions, and doors, must meet all the above criteria. Corridors must be provided, with applicable travel distances in corridors and rooms.

S106-3 Egress from Space of Pupil Occupancy with Open-planned Areas: :

- a. When spaces of pupil occupancy are defined in an open area by wardrobes, cabinetry, and other furniture which DO NOT present obstructions to egress and allow students to circulate freely from one space to another, the total open space can be considered, for exiting purposes, as a single space.
- b. Each open-planned area shall have exits into separate smoke zones at remote locations. Such exits may be exterior doors, enclosed stairs, smoke barriers and/or approved exit passageways. No point in such an open-planned area shall be more than a 75-foot straight-line distance to an exit into a separate smoke zone. Corridor exit ways, in the usual sense, are not required within the open-planned area; however, space for circulation of students needs to be provided for successful daily use.
- c. Furniture layouts of all open-planned areas indicating the concept of free circulation must be submitted for review prior to approval of preliminary plans and submitted again with materials for final approval. Future operation within the open space must maintain free circulation, and location of movable cabinetry and furniture that would present obstructions to egress and restrict exiting shall be avoided. A 4-foot wide space shall be provided at all wall intersections. Movable partitions shall be stopped 4 foot from closing at either end to provide for circulation.
- d. Enclosed pupil occupied space(s) within open-planned areas may be approved on an individual basis. Separate smoke zone exiting is required when enclosed pupil occupied space(s) are required by function to have access from open-planned areas. Such spaces may be arranged so that normal pupil access to the space is through the open-planned area, but the enclosed space(s) must have means of egress as required in S106-2.

S106-4 Rescue Windows

- a. Emergency rescue windows, as required in S106-2, shall be windows of such size and design that will permit and facilitate emergency egress through them. Window hardware shall be a maximum of 54 inches above the floor. It is recommended that all classroom windows permit emergency egress. Double hung, casement, and sliding windows are satisfactory window types. Casement windows must have hardware that permits the window to open at least 90 degrees.
- b. The minimum clear opening area for rescue windows shall be at least 6 square feet and the minimum dimension shall be 24 inches unless otherwise approved.
- c. Screens, if provided at rescue windows, shall be hinged or sliding and shall be operable from the inside with one hand, and without the use of a key, special tool or special knowledge.
- d. When a rescue window is required, school authorities shall cause at least one such window per classroom, to be marked by an appropriate sign identifying the rescue window. Any window coverings that may

cover the window must also have a label.

- e. Rescue window labels shall be:
 - 1. Color: bright yellow background with black letters
 - 2. Size: 3 inches by 5 inches
 - 3. Text: **Rescue Window** readable from each side of the window
- f. Interior Rescue Window Access: Rescue windowsill height shall be at the recommended sill height for the grade level housed in the room (see Table S303-1). Casework/cabinets that support body weight, permanent platforms, or 60 degree ships ladders may be considered to access existing windowsill heights on an individual basis.
- g. Exterior Rescue Window access: Ground level access and level working areas must be provided for the use of emergency personnel. Local conditions and equipment may allow varying solutions to this requirement. Approval of the responding emergency agency(s) may be required in situations that are difficult.
- h. Rescue windows that open onto a roof from new construction may be approved on an individual basis providing the roof is readily accessible to emergency personnel and the roof structure is one-hour minimum fire protected. It is recommended that existing rescue windows meet these requirements for the safety of emergency personnel, students and staff. Renovations of areas under such windows must address this issue.

S106-5 Assembly Spaces

- a. Assembly spaces must have at least two exits into separate smoke zones.
- b. The means of egress width shall not be less than required by the Code. Additionally, assembly spaces listed herein must provide additional egress as follows:

The total width of means of egress **in inches** shall not be less than the **total occupant load served** by the means of egress **multiplied by the factors below**. (The factor is inches per occupant.)

Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.

Assembly Space	Factor
Gymnasium:	
Floor area	.28
Bleacher	.35
Cafeteria	.28
Auditorium	.28

Pool:	
Floor & pools areas	per Code
Pool Bleacher	.35

The calculation for numbers of doors of each assembly space shall be as follows:

$$\text{Width (in inches)} = \text{Occupant Load} \times \text{Factor (inches per occupant)}$$

$$\text{Width (in inches)} \div \text{Door size} = \text{Number of doors}$$

Occupant Load is determined from the Maximum Floor Area Allowances per the Occupant Load Table in Chapter 10 of the Code.

- c. In large gymnasiums, the calculation may result in a significantly larger width, resulting in a substantial number of additional doors. The Office of Facilities Planning may consider a reduction.
- d. No single exit doorway from assembly spaces shall be less than 36 inches wide and whenever possible shall be a direct exit through an exterior wall.
- e. Exit doors for assembly spaces, which open into a corridor, shall open outward in the direction of egress and should be fully recessed. Non-recessed doors shall swing in the direction of egress, shall swing through 180 degrees and shall leave a clear corridor width of 5'-0" in their greatest projecting position. It is strongly suggested that these doors be fully recessed.
- f. When folding partitions are used to separate floor areas in any gymnasium, a pass door may be acceptable as one of the required exits and must swing in the direction of egress, with appropriate hardware. Appropriate exit signage is required.
- g. Stages and Platforms over 500 square feet shall have remote exits. For further guidance, the designer shall refer to the Stages and Platforms section of the Code.
- h. No exit can lead into a pool. (It is a violation of, and in conflict with Section 6-1.16(a) of the State Sanitary Code.) In addition, for this same reason, the pool cannot be used as an emergency egress route to conform to smoke zone exiting as required in this Manual.

S106-6 Indoor Spaces with Fixed Seating

- a. For all indoor spaces with fixed seating, the designer is to incorporate all requirements in the Means of Egress chapter, Assembly section, of the Code. If there is a conflict between the Code and other sections of this Manual, the more stringent requirement shall be followed.

S106-7 Egress for Miscellaneous Spaces

- a. Boiler Rooms: Any boiler room over 300 square feet in area shall have two exits remote from each other, one of which may be by means of a ladder or through an areaway. Exterior doors should swing outward to relieve explosion pressures; interior doors in student occupied buildings shall swing into the boiler room (the Department of Labor allows this door to swing into the boiler room for schools only). For buildings of all other uses, the door must swing out. Alterations removing vestibules from existing buildings will only be considered if the altered boiler rooms are fully compliant with the latest code requirements.

- b. Storage Areas: Access to storage areas for gasoline-powered equipment cannot be directly from the school, but must be through an outside door.
- c. Projection Booths: Remote exiting into separate smoke zones is required for projection booths of 500 square feet or more in area.

S106-8 Enclosed Courts

- a. All courts over 500 square feet in area which have their perimeters completely enclosed are considered to be potential areas of pupil occupancy and as such must have exiting into two separate smoke zones as required in S106-2. Courts under 500 square feet in area may have one exit providing that exit is into a different corridor smoke zone than the room exits to the corridor from pupil occupied spaces which have smoke zone exiting into that court yard.
- b. Courts greater than 500 square feet area shall have at least two exits, remote from each other, equipped with panic type hardware operable from the court, with doors swinging in the direction of egress.
- c. If building security is a concern, an automatic alarm system may be installed.
- d. Enclosed courts created by an addition, which cannot be designed to eliminate a required building or assembly area exit into the new court may be approved on an individual case basis. Approval will require at minimum an exit from the court through a two-hour fire rated passage directly (line of sight) to the exterior of the building. The passage must be arranged so that emergency personnel can access the exterior doors, view into the court and bring ladders or other equipment through the vestibule to service a problem in or from the court. All doors must swing in the direction of exit travel from the court and must be provided with panic hardware.

S107 CORRIDORS

S107-1 General

- a. The designated widths of all corridors shall be the clear width, free of all fixed and movable obstructions.
- b. Any point in any ground floor corridor must be within 150 feet along the line of travel to *an exterior doorway*. Any point in a corridor other than a ground floor corridor shall not exceed 120 feet along the line of travel to the *stair enclosure of an exit stairway*.
- c. The distance from the stair enclosure door opening to the first stair riser shall not be more than 10 feet except where specifically approved. Stair enclosure doors shall be at least 5 feet away from a door to a room having pupil occupancy.
- d. Corridor pockets and dead end corridors shall be restricted to a depth of 1 and 1/2 times the width of the pocket, or to 1 and 1/2 times the width of the corridor, whichever is less.
- e. If lobbies or corridors are used for purposes other than circulation, they shall be planned with uninterrupted aisles equivalent to required corridor widths and separated by a fixed rail or other type of approved permanent divider.

S107-2 Main Corridors

- a. A main corridor is one that serves more than four standard classrooms, or more than 150 pupils.

- b. The required minimum clear width, without lockers or wardrobes, is 8'-0" wide, wall-to-wall.
- c. Corridor widths for large schools, particularly high schools, should be as wide as necessary for satisfactory circulation.
- d. Corridor lockers must be permanently attached and must provide for ease of maintenance and cleaning. Corridor locker doors may not project into the required corridor width.
 - 1. With lockers on one side, 9'-0" wide measured from the face of the locker to face of the opposite wall, assuming 12" locker doors.
 - 2. With lockers on two sides, 10'-0" wide measured from the face of the locker to face of the opposing lockers, assuming 12" locker doors.

S107-3 Secondary Corridors

- a. A secondary corridor is one that serves four or less classrooms, or not more than 150 pupils, exclusive of service areas. Consideration should be given to making these secondary corridors equal to the width of the main corridors for the addition of future classrooms.
- b. Minimum clear width shall be 6'-0".
- c. Secondary corridors are limited to 100'-0" in length.
- d. Corridor lockers must be permanently attached and must provide for ease of maintenance and cleaning. Corridor locker doors may not project into the required corridor width.
 - 1. With lockers on one side, 7'-0" wide measured from the face of the locker to face of the opposite wall, assuming 12" locker doors.
 - 2. With lockers on two sides, 8'-0" wide measured from the face of the locker to face of the opposing lockers, assuming 12" locker doors.

S107-4 Passageways

- a. A passageway provides access to rooms or areas not in the line of travel to main exits, such as passageways serving offices, locker rooms, or kitchen areas. These passageways vary in width according to the number of occupants involved but shall have a minimum width of 44 inches.

S108 STAIRS AND STAIRWAYS

S108-1 General

- a. There shall be at least two means of egress remote from each other from each occupied floor level including basements and student occupied mezzanines.
- b. There shall be no storage space under any stairs or landings unless separated from the stairway by two hour rated construction and accessed from another space or the corridor.
- c. At the grade level, the stairway enclosure door or bottom riser of an approved unenclosed stair shall be

within 50 feet along the line of travel of an exterior (not vestibule) door.

- d. It is strongly suggested that new stairs are designed wider than the minimum required width to alleviate congestion and improve circulation.

S108-2 Handrails / Railings

- a. Buildings serving young children should have an additional handrail in accordance with ADA Accessibility Guidelines for Building Elements Designed for Children's Use.
- b. Orientation and design of railing members shall inhibit climbing.

S108-3 Straight Runs of Stairs

- a. Each stairway from story to story shall be in two or more runs with not more than 16 risers each, nor less than 3 risers, per run; except that a straight run of stairs without any intermediate landing may be used for differences in floor elevations not exceeding seven feet. This does not apply to service stairs.

S108-4 Corridor Stairs

- a. Full-width corridor stairs separating changes of level within a corridor length shall have the top and/or bottom riser no closer to an intersecting corridor than 44 inches.

S108-5 Exterior Steps

- a. Exterior steps shall have an easy rake (Riser 6", Tread 11" or better) to compensate for the hazard of ice and snow.

S108-6 Fire Escapes

- a. Fire escapes are not permitted on new school buildings. (On existing school buildings covered exterior stairs shall be installed when other exits are determined to be inadequate for fire safety.)

S109 DOORS

S109-1 General

- a. Classroom doors, stair and corridor doors shall have vision panels. Vision panels are recommended in any other doors commonly used by students or staff where privacy is not an issue.
- b. Corridor and stair enclosure doors shall be provided so that traffic can flow in both directions at the same time and at the maximum corridor capacity during class changes. Double 3'-0" doors on automatic hold open devices are usually considered minimum for this purpose.
- c. Double egress doors are dangerous for student use, must be held open on automatic release devices, will usually diminish exiting capacity, and are discouraged. When provided, the right hand door leaf should swing in the direction of egress.
- d. Double-acting hinged doors are not permitted in required exits.

S109-2 Exit Doors and Doorways

- a. Permanent or removable mullions on pairs of doors are recommended at exterior doors for weather proofing and strength. Mullions are not recommended where doors are usually held in the open position.

S109-3 Door Sizes

- a. No door from a space of pupil occupancy nor a single exit door shall be less than 36 inches in width nor more than 44 inches in width unless specifically approved. Each leaf of a pair of doors (i.e. no mullion) shall not be less than 36 inches nor more than 44 inches in width unless specifically approved.
- b. Main corridors and stair enclosures should be equipped with at least two 36" doors to facilitate student movement from class to class.

S109-4 Stairway Enclosures and Smoke Barriers

- a. Doors shall be self-closing, swing in the direction of egress, with panic hardware. Corridor pockets opposing the swing of doors shall not exceed a depth of 1 1/2 times pocket width.
- b. Approved automatic hold-open devices shall be provided on all stair enclosure and corridor smoke barrier doors. The doors shall be released and close upon activation of the automatic fire alarm and detection system.

S110 DOOR HARDWARE

S110-1 General

- a. Magnetic locks and electronic (touch sensitive) panic devices are not allowed in new or existing buildings (no exceptions). Locking arrangements that inhibit or prevent egress discovered in existing buildings must be removed. Acceptable alternatives are electric strikes and mechanical panic devices with electric latch retraction.
- b. Padlocks are not allowed in new or existing buildings for any interior or exterior door.

S110-2 Hardware Specifications

- a. Hardware specifications shall include a statement that describes the type of hardware to be used on doors as described in this section.

S110-3 Door Hardware for Classrooms and Other Spaces of Pupil Occupancy

- a. Hardware on doors from spaces of pupil occupancy shall be a type that will always permit the door to be opened from the inside without direct manipulation of any type of locking device.
- b. Door closers and latches are required on all doors, including classroom doors, opening onto a corridor.
- c. If doors are provided with hold open devices, the doors must automatically release and close upon activation of the automatic fire alarm and detection system.

S110-4 Door Hardware for Toilet Rooms

- a. All toilet rooms on corridors shall have door hardware that will cause the door to close and latch.
- b. Locking devices should only be lockable from the outside with a key, and always allow the door to be opened from the inside without direct manipulation of the locking device.
- c. Staff Toilets: Single user staff toilets will be allowed to have an ADA thumb turn inside, key outside deadbolt, in addition to the lockset, to provide privacy.

S110-5 Panic Hardware

- a. All exterior and interior exit doors in exit ways and from all assembly spaces shall have panic hardware, with the following exceptions:
 1. All exterior corridor doors shall have panic hardware, except those serving only one or two classrooms with less than 50 people total, or service areas (such as a boiler room, kitchen, or storage room). They may have hardware in accordance with S110-3.
 2. Panic hardware is not required for push-pull interior doors from assembly spaces and exit ways if these doors have non-latching hardware and are not within fire rated walls or smoke partitions.

S110-6 Acoustical Seals

- a. Where some degree of sound isolation is needed between two adjacent spaces, doors separating these spaces should be supplied with continuous acoustical seals and automatic drop bottoms to be coordinated with panic and closure hardware. For more critical applications a laboratory-tested acoustical door assembly might be necessary.
- b. Door hardware must not interrupt perimeter seals or drop bottoms provided for acoustical reasons.

S111 SAFETY EQUIPMENT / ACCIDENT PROTECTION

S111-1 Fire Blankets

- a. Fire blankets for smothering clothing fires should be available in all areas where students are exposed to the hazards of any fire producing equipment or equipment having an open flame. Such blankets shall not contain asbestos.

S111-2 Electrically Operated Partitions::

- a. Electrically operated partitions must be provided with the following safety equipment in accordance with Commissioner's Regulations 155.25. Electrically operated partitions include any partition, divider, curtain, or other similar device which is controlled through the operation of an electric motor.
 1. Two (2) key-operated, tamper-proof, constant pressure control stations that are wired in series, remotely located at opposite ends and opposite sides of, and in view of, the partition, and which are designed and constructed so as to require simultaneous activation of both control stations to operate the partition.

2. The electric device controlling the operation of the partition is capable of being reversed at any point in the extend, retract, or stack travel cycle.
3. Device(s) are provided for all partitions that will stop the motion of the partition when a body or object passes between the leading edge of such partition and a wall, floor, or other termination point. The devices typically include beam type sensors (with a sending device and a receiving device) or motion detection sensors on each side of the partition such that if the beam is broken or motion is detected the partition will stop movement prior to an occupant reaching the partition. The beam type sensors or motion detection sensors must be located such that it is not possible for an occupant to go over or under the beam(s) or avoid the motion detection range. Multiple sets of beam type sensors or motion detection sensors may be required on each side of the partition to achieve total coverage of the area. Note that the sole use of partition leading edge sensors that require physical contact is not adequate. Manual reset is required.
4. Device(s) are provided for all partitions that will stop the backward motion of the partition and stop the stacking motion of the partition when a body or object is in the stacking area of such partition. The devices typically include, beam type sensors (with a sending device and a receiving device), motion detection sensors, pressure/weight sensitive mats, or heat detection sensors within the pocket area such that if an occupant is sensed entering or within the pocket the partition shall not move. The sensors must be located such that it is not possible for an occupant to go over or under the beam(s) or avoid the detection range. Multiple sets of beam type sensors, motion detection sensors, pressure/weight sensitive mats, or heat detection sensors may be required on each side of the partition to achieve total coverage of the area. Manual reset is required.
5. Signage must give notice regarding safe and proper operation and supervision of the electrical controls and partition/door pathway. The following suggested or similar wording for this notice must be posted at every control station:

CAUTION
ELECTRICALLY-POWERED PARTITION
Only Appropriately Trained Staff may operate this partition.
Control stations must be attended by staff members while the partition is in motion.
Staff members must stand on opposite sides of the opening or closing partition.
Students must stay away from the partition when in motion.

S111-3 Athletic Equipment (See Appendix “D” for additional information about Athletic Facilities.)

- a. Athletic equipment layouts must take into consideration spectator areas as well as room for safe use of equipment and out-of-bounds areas.
- b. District investment in athletic equipment should include secure and convenient storage of equipment when not in use.

S111-4 Shower Room Areas

- a. Shower rooms shall be designed to prevent water from being tracked into locker rooms. Where possible, curbs should be eliminated by proper location of drains.

- b. Consideration beyond handicapped accessibility requirements should be given to the installation of grab bars in shower rooms.

S112 VAULT CONSTRUCTION REQUIREMENTS

S112-1 Vaults for Regents Examination Storage

- a. Location: Access to any safe or vault where locked Regents boxes are stored must be from areas that are under constant supervision and must not be in areas that are accessible by the public so as to prohibit entry by students and other unauthorized persons.
- b. Walk-in Vaults must have all of the following:
 1. Poured concrete floor,
 2. No windows or access panels,
 3. Walls of reinforced concrete block or reinforced concrete, sealed to a poured concrete floor below and structural floor or roof deck above,
 4. Metal door in a metal frame,
 5. Hardware must be medium or heavy duty, consisting of hinges inside the vault or welded pin hinges, and classroom function lock set with dead locking latch bolt,
 6. Duct work penetrations in the walls for ventilation may be approved on an individual basis depending upon location relative to the door, exterior accessibility, and normally not to exceed 36 square inches.

PART II: MATERIALS

S201 GENERAL

- a. This Part addresses the selection of materials and finishes. Selections shall be made with the specific goal of promoting health and safety. Things to consider: fire safety; indoor air quality; life-cycle costs; durability; renewable sources; economical, efficient operation and maintenance.

S202 GLAZING

S202-1 General

- a. All safety glazing shall comply with the US Consumer Products Safety Commission Standard CPSC 16 CFR 1201, Safety Standard for Architectural Glazing Materials.
- b. All fire resistive rated glazing and safety rated materials must be marked with the approval of a Nationally Recognized Testing Laboratory (NRTL). (State Education Department does not approve any glazing materials that are not approved by a NRTL.)
- c. Wire glass is not allowed in new installations of doors, door sidelights, or other locations of potential impact and injury. We strongly recommend that all existing wire glass locations be evaluated for potential impact and injury. There are several alternatives available to remedy existing locations determined to be at risk, such as replacement with impact and fire resistant materials, coating the glass with specialty films and installing protective bars or railings. Laminated wire glass complying with CPSC 16 CFR 1201 is an approved alternative to wire glass.
- d. Interior panes of glass in skylights must be laminated glazing and exterior panes must be tempered glazing.
- e. When glass is used for the roof of a Greenhouse it must be laminated glazing.
- f. If a greenhouse is greater than 10 feet away from any other building, CC2 plastic materials may be permitted.

S202-2 Glazed Panels and Doors

- a. Safety glazing is required in the following locations unless railings or grilles are provided which will provide comparable protection from accidents due to physical contact:
 1. All interior glazing less than 60 inches above the floor shall be safety glazing.
 2. All glazing in areas where educational use may cause physical abuse, such as gymnasium, and playrooms.
 3. All doors and door sidelights.
 4. All mirrors shall be tempered glass.

S202-3 Marking of Glazed Doors and Sidelights

- a. Glazed doors and sidelights within 6 feet of such doors shall be marked by appropriate means in accordance with 12 NYCRR 47. (See Appendix A)

S203 INTERIOR FINISHES

S203-1 General

- a. Interior finishes are materials applied directly to walls, fixed or movable partitions, ceilings, as well as the exposed finish of construction materials. Such finishes may enhance the visual environment, assist in sound control, and provide thermal insulation and / or aid in sanitation. In all cases, how an interior finish will react in the event of a fire must be considered when selecting the materials.

S203-2 Limitation of Use of Interior Finishes

- a. Class A interior finishes shall be used in corridors and exits. (Exit enclosures, exit passageways, exterior exit stairs, exterior exit ramps and horizontal exits.) Class B is acceptable if these spaces have an approved NFPA-13 Sprinkler System.
- b. Interior finishes in school construction shall be Class A, B, or C, per the Code with the following exceptions:
 1. Class C interior finishes shall not be used in school construction of more than three stories.
 2. Class A or B interior finishes shall be used in the following locations:
 - Places of Assembly and Stages, except wainscots not over 8 feet above floor may be Class C. Class C is acceptable if the space has an approved NFPA-13 Sprinkler System.

S203-3 Curtains and Drapes

- a. All blinds, curtains, draperies, and shades shall be fire resistive or flame retardant. The Board of Education shall be responsible to ascertain this requirement is adhered to whether included in the original contract or purchased later as equipment.

S203-4 Furnishings

- a. Fixed seating
 1. New fixed seating is required to comply with the State of California's Department of Consumer Affairs Flammability Test Procedure for Seating Furniture for Use in Public Occupancies – Technical Bulletin 133. The test standard can be found at: <http://www.bhfti.ca.gov/industry/tb133.pdf>.
 2. Existing fixed seating that is being refurbished/reupholstered, is required to comply with the State of California's Department of Consumer Affairs Flammability Test Procedure for Seating Furniture for Use in Public Occupancies – Technical Bulletin 117. The test standard can be found at: <http://www.bhfti.ca.gov/industry/tb117.pdf>.

- b. Carpeting, area rugs, and backing must have a minimum Critical Radiant Flux (CRF) of 0.45 watts/cm². This equates to Class I materials as classified in accordance with NFPA 253. This applies whether provided by the school district, students, or staff.
- c. All upholstered furniture must meet interior finish and flammability standards for commercial installations. The school district is responsible for the compliance of each installation. The peak rate of heat release shall not exceed 80KW when tested in accordance with ASTM E1537 or California Technical Bulletin 133.
- d. Bleachers: Plastic materials used for bleachers must be CC1.
- e. Plastic lockers are not permitted in corridors or places of assembly.
- f. Plastic specialty items are combustible. These items include wastepaper baskets, tote trays, milk crates, foam-rubber athletic landing mats and plastic furniture such as shelving, desks and beanbag chairs. They add substantially to the fire load of a building. Flammability, fuel contribution and smoke considerations must be carefully investigated during the selection of such specialty items and furnishings. Fire test criteria and test results should be required of the manufacturers prior to purchase. Items of questionable hazard should be avoided.
- g. It should be noted that the School District assumes all liability for carpet, area rugs, furniture, and equipment placed in the building.

PART III: ENVIRONMENT

S301 GENERAL

- a. Although focused on teaching and learning, education must also address the need to maintain a safe, secure, and healthy school environment. The capacity of children to learn is impeded if their school environment contains elements that are hazardous to their health. The State Education Department and educators throughout the State of New York have a responsibility to assure the school community and the public that, based on the best available knowledge, school buildings are safe, healthy, clean and in good repair.

S302 SPATIAL ENVIRONMENT

S302-1 General

- a. Adequate space must be provided to house the district's educational program. That space shall be properly proportioned as to size and shape of room, including ceiling height.

S302-2 Room Sizes

- a. There are no laws regarding minimum classroom sizes. However, there are minimum size requirements to be eligible for State Aid. Additional information can be found in the publication "*State Building Aid for Public School Districts and BOCES*", available on our website.

S302-3 Classroom Proportions

- a. Rooms shall be properly proportioned for intended use. In general, it is recommended that the short side of any room intended primarily for classroom or similar use be not less than two-thirds of the longer side. Since the windows are intended for view to the exterior, the maximum distance from the glazing to the most distant point within the room should be such as to permit view to the exterior by all room occupants. Forty feet is a suggested maximum.

S302-4 Ceiling Heights

- a. The ceiling heights of classrooms and similar areas measured from the floor to the principal plane of the ceiling shall not be less than nine feet. Ceiling heights for modular classroom buildings are allowed to be eight feet.
- b. Ceiling height of other spaces shall be properly proportioned to the size of the room, and as required by special considerations, with 7'-6" minimum. Note that low ceilings are generally more susceptible to physical abuse.

S302-5 Examination Storage

- a. State required examinations and materials are required to be stored in safes or vaults. Access to the provided storage used to store Examination Materials should be from areas that are under constant supervision and must not be in areas that are accessible by the public so as to prohibit entry by students and other unauthorized persons.

- b. See S112 for Vault construction requirements.

S303 VISUAL ENVIRONMENT

S303-1 Lighting

- a. Adequate levels of illumination, which may be a combination of artificial and natural light, shall be provided, consistent with efficient energy utilization, for the various visual tasks being performed in each area of the facility. See Section S804 for artificial lighting requirements.

S303-2 Vision Strips

- a. To provide a comfortable feeling for the room occupants and to provide eye relief through a substantial change in focusing distance, each room used by students must be designed to allow a view to the exterior (not just sky), in accordance with Table S303-1. Vision strips shall provide a minimum view distance of 30 feet beyond the exterior wall.
- b. The length of the vision strip shall be at least 50% of the lineal length of the outside wall of the room and the head of the window shall be at least 6'-0" above the floor.
- c. Windows should be placed and arranged to minimize brightness differences. Direct view of the sky or bright exterior surfaces produces glare and should be avoided. Glare can be controlled by:
 - 1. Building orientation
 - 2. Extension of roof overhangs
 - 3. Installation of "mesh" shades which allow the natural light, but eliminate glare
 - 4. Installation of blinds or drapes
- d. Exceptions to the requirements of Table S303-1 may be granted if it can be shown by written application, that the educational program warrants an exception.

S303-3 Natural Light

- a. A minimum amount of natural light shall be provided to allow for safe exiting. Where windows, vision panels in walls or doors, or skylights are not possible, the minimum light levels required for egress must be provided.

**TABLE S303-1
NATURAL LIGHT REQUIREMENTS**

Space	Maximum Stool Height (inches)	Vision Strip Required	Vision Strip Recommended	Natural Light Required	Natural Light Recommended
Teaching Spaces					
Classrooms					
Art & Drawing	40	X			
Computer Rooms	--		X		
Elementary	32*	X			
Home and Careers	40	X			
Secondary (Academic)	32	X			
Science Rooms (All)	40	X			
Study Hall	32	X			
Music					
Elementary	32	X			
Junior High School	32		X	X	
Jr./Sr. & Sr. High School	40		X	X	
Shops/Technology					
Agriculture	60	X			
General	60	X			
Vocational	60	X			
Special Education					
Classroom	32	X			
Remedial/Resource	--		X		X
Therapy	--				X

* 30 inches recommended

Space	Maximum Stool Height (inches)	Vision Strip Required	Vision Strip Recommended	Natural Light Required	Natural Light Recommended
Other Student Occupied Spaces					
Cafeteria	--		X	X	
Gymnasium	--			X	X
Library – up to 2000 sq. ft.	44	X			
Library – over 2000 sq. ft.	--		X	X	
Swimming Pool	--			X	
Administrative and Support Spaces					
Administration	--				X
Corridors	--				X
Guidance	--		X		X
Health	--				X
Kitchen	--		X		X
Office & Workroom	--				X
Stairways	--				X
Store Room	--				X
Teachers Room	--				X
Toilets	--				X

S304 ACOUSTICAL ENVIRONMENT

S304-1 Acoustics in Schools

- a. School officials and designers are encouraged to achieve the background noise levels, reverberation times, and sound isolation standards recommended by the ANSI (American National Standard Institute) Standard entitled '*Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*' (ANSI/ASA S12.60-latest version) for all core learning areas.
- b. For further information on acoustics see Section 5.5 of NYCHPS.

S304-2 Mechanical/Electrical/Plumbing Noise Control

- a. Achieving the proper level of ambient noise in an academic space is critical. If the level is too high, communication between teachers and students will be partially or fully masked. If too low, the slightest noises (pencils dropping, rustling of papers, etc.) will appear to be intensified in their level of disturbance. The intent of this section is to require the design of mechanical / electrical / plumbing systems to meet the

sound standards of *ANSI/ASA S12.60-latest version* in classrooms with K-6 occupancy and Large Group Instruction spaces used by any grade level. It is highly recommended that all general classrooms in 7-12 occupancies meet the sound standards of *ANSI/ASA S12.60-latest version*. Sound levels do not apply to mechanical / electrical / plumbing systems used solely for emergency purposes such as fire alarm notification devices or emergency generators.

- b. Table S304-1 is a table of ambient noise criteria for mechanical equipment based on the single number room criteria "RC" curves. The values and ranges represent general limits of acceptability for typical building occupancies. Designs shall not exceed upper values stated in Table for instructional spaces. Lower values may be more appropriate and should be based on a careful analysis of economics, space usage and user needs.
- c. Locations of mechanical and electrical equipment must be carefully chosen to not have an adverse impact on the ambient noise level in the adjacent spaces. To avoid excessive vibration of the building structure by mechanical air-handling units, chillers, compressors, transformers, etc., locate equipment rooms on grade whenever possible. Exterior equipment must be installed in locations such that the sound generated by the equipment will not intrude on instructional spaces at levels that exceed interior HVAC sound levels. Rooftop units, while having certain economical benefits, require very complex and costly solutions to eliminate noise and vibration, and should be avoided whenever possible near sound-critical rooms.
- d. Noise attenuation and vibration isolation should be achieved for piping and ductwork through the use of vibration isolation hangers/mounts, flexible sleeves and joints, and sound attenuators.
- e. Avoid routing main ductwork and piping over classrooms and other sound-critical spaces. Route ducts in the corridors and tap into each room separately. Ductwork serving highly sound-critical spaces (such as an Auditorium) should not be routed over any other noisy spaces after leaving the equipment room.
- f. Penetrations of sound-critical partitions by ductwork, piping and conduit must be sealed airtight with acoustical caulking (fire-rated, where necessary). Resilient sleeves should be used for large ductwork and piping as they pass through a partition.
- g. Plumbing piping and equipment in toilet rooms and custodial closets shall be designed to be inaudible in adjacent sound-critical spaces when HVAC equipment is operating at sound levels in accordance with design criteria in Table S304-1.
- h. When locating electrical receptacles for switches and outlets, no back-to-back boxes shall be installed in sound-critical rooms. Offset boxes at least two stud cavities from each other.
- i. All electrical equipment (lighting, clocks, transformers, etc.) shall be designed to be inaudible when HVAC equipment is operating at sound levels in accordance with design criteria in Table S304-1.

Table S304-1
Design Requirements for HVAC System Noise in Occupied Spaces

Space	RC Level
Classrooms, K-6	25
Classrooms, 7-12	25-30
Lecture Halls/Large Classrooms for more than 50 (unamplified speech)	25
Lecture Halls/Large Classrooms for more than 50 (amplified speech)	25-30
Libraries	30-40
Gymnasiums/Natatoriums	40-50
Cafeterias	40-50
Laboratories/ shops (group teaching)	35-45
Theaters/Auditoriums	25
Multi-purpose Rooms / Gymnasium / Auditorium / Cafeteria / Classroom	25-50
Music Teaching Studios	25
Music Practice Rooms	35
Halls, Corridors, Lobbies	35-45
Private Offices	25-35
Conference/Meeting Rooms	25-35
Offices	25-35

S305 EQUIPMENT

S305-1 In-Room Equipment

- a. Adequate room for fixed and movable equipment must be planned for each educational space. Care must be taken to provide secure and convenient storage for movable equipment.
- b. Audio-visual equipment including large projected computer displays must be considered when designing schools for flexible and efficient use of space and resources.
- c. Computer equipment generally takes less and less space to locate and use the equipment. Adequate power, special wiring and space for printer needs must be provided. Security for local area network equipment must be provided.
- d. Special equipment for technology (metal, wood, electric, printing and photography) requires adequate space to handle materials as well as space to house the equipment. Consideration should be given to present staff's teaching requirements as well as to future use. The advice of a consultant may be a wise investment in planning for present needs and future development in the technology.

S306 INDOOR AIR QUALITY

S306-1 General

- a. Ventilation systems shall be designed to prevent re-entrainment of exhaust contaminants, condensation or freeze-ups (or both) and growth of microorganisms. Air intakes, relief air outlets and exhaust air outlets shall be located to avoid contamination of the ventilation (outside) air.

S306-2 Air Intakes

- a. Locate outside air intake openings a minimum of 25 feet from any hazardous or noxious contaminants such as vents, chimneys, plumbing vents, exhaust fans, relief vents, cooling towers, streets, alleys, parking lots, loading docks, dumpster/recycling areas, bus loops or idling areas. When locating an intake opening within 25 feet of a contaminant source is unavoidable, such opening must be located a minimum of 10 feet horizontal distance and 2 feet lower than the contaminant source.
- b. Locate air intakes at least 2 feet above grade or roof deck; away from areas of potential snow buildup and plantings. When locating an intake opening at least 2 feet above grade is unavoidable, a hard surfaced well-drained area under the air intake is required. The hard surface should extend three feet beyond the edges of the opening and from the wall. Materials utilized for the hard surface shall not release any volatile or semi-volatile gasses. To eliminate the possibility of water ponding, top of surfaces shall be at or above grade, and slope away from the building; or be provided with a drain.
- c. Locate with regard to prevailing winds and physical obstructions. Minimum distance requirements may not be sufficient to prevent contaminants from entering a building's air intake. In particular, contaminant sources such as internal combustion engines and boiler/heater chimney/vents are a concern. Conditions such as prevailing winds, outside air temperature gradients, and obstructions may have an impact on the dispersal (or overshoot) of contaminants prior to (or beyond) air intakes. Bus or vehicle idling may be controlled by operational procedures (minimize or eliminate idling). Air intake locations on portions of buildings or additions, constructed downwind (prevailing wind) of fixed, fuel equipment, must be evaluated for the impact of fuel fired sources. Location of new, fuel equipment must be evaluated for impact on existing air intake locations. Evaluation must include any physical obstructions downwind of contaminant source.
- d. Grilles protecting air intakes must be bird- and rodent-proofed to prevent perching, roosting, and nesting.
- e. Intake Screens must be accessible for inspection and cleaning.
- f. Intake grilles must be designed to completely eliminate the intake of rain or snow; or the intake plenum must be sloped to the outside or to a drain to prevent moisture from entering the building.

S306-3 Filter Efficiency

- a. Air filters must have a Minimum Efficiency Reporting Value (MERV) of 10 or higher, except for unit ventilator systems, which must have a MERV of 7 or higher. Consider air filters with a MERV of 13 or higher.
- b. Install a pressure differential gauge across all filter banks in air handling units greater than 2000 cfm supply air capacity. Consider installing a pressure differential gauge across all filter banks. These can

assist in preventing health and maintenance problems caused by overloaded filters that have blown out. At a minimum the gauge should be easily visible from a standing position in an easily accessed location near the air handling unit.

S306-4 Air Flow Stations

- a. Provide air flow stations on all outside air intakes of central heating, ventilating and air-conditioning equipment.
- b. Provide air flow stations on outside air intakes of all variable air volume air handling units, and all air handling units where outside air is allowed to vary, based upon varying occupant loads.
- c. This system must include data accumulation and be down loadable for print out. Data to accumulate on cubic feet per minute basis at no more than 15 minute intervals.
- d. Air flow stations must be tied into the damper controls of all variable air volume equipment to assure a constant flow rate of ventilation (outside) air.
- e. Air flow stations must be calibrated on a yearly basis or as indicated by manufacturer recommendations. Data must be provided to the school district's Health and Safety Committee on a quarterly basis. Information must be kept for at least three years from the date of collection and must be made available to the public upon request.

S306-5 Building Pressurization

- a. Buildings must be designed to operate at a neutral or slightly positive pressure, relative to outdoors. Operating the building at a neutral or slightly positive pressure reduces the potential for the introduction of unconditioned air and pollutants from outside the building shell.
- b. Provide a design that does not allow the operation of exhaust systems when the system providing make-up air is turned off to avoid bringing in unconditioned air and pollutants from outside the building shell. Care should be used in designing make-up air systems for gang toilet rooms that are utilized after normal school hours. Gang toilet rooms can not receive makeup air from instructional spaces.
- c. Avoid placing duct under negative pressure (return air duct) in basements, crawlspaces, boiler/heater rooms, underground, refrigeration machine rooms, etc. It is desirable to keep supply air ducts out of these areas, also.
- d. Specify that the joints and seams of all ducts, including return ducts, are sealed using an appropriate material.
- e. Wherever possible, keep all air ducts within the conditioned space.

S306-6 Equipment Locations

- a. Air handling units must not be installed in areas where they may pull contaminants into the units; such as boiler rooms, refrigeration machine rooms, areas with dirt floors, and secondary school science prep/storage rooms.

S306-7 Equipment Access

- a. Ensure that all system components, including air handling units (AHUs), controls, and exhaust fans are easily accessible. To help ensure that proper operation and maintenance of HVAC system components will be performed, it is critical that the designer makes the components easily accessible. AHUs, controls, and exhaust fans should not require a ladder, the removal of ceiling tiles, or crawling to gain access. Rooftop equipment should be accessible by way of stairs and a full-sized door, not a fixed ladder and a hatch. Consider locating AHUs within the building (or penthouse) for ease of inspection and maintenance.

S306-8 Label All HVAC System Components

- a. Labeling of HVAC components is an inexpensive and effective method for helping facilities personnel properly operate and maintain the HVAC systems. The labels should be easy to read when standing next to the equipment, and durable to match the life of the equipment to which they are attached. At a minimum, the following components must be labeled in each ventilation zone of the school and should correspond with the HVAC diagrams and drawings. "AHU" refers to any air handling unit that is associated with outdoor air supply.
 1. The number or name of the AHU (e.g., AHU ##, or AHU for West Wing)
 2. The outdoor air (OA), supply air (SA), return air (RA), and exhaust or relief air (EA) connections to the AHU, each with arrows noting proper airflow direction
 3. The access door(s) for the air filters and the minimum filter dust-spot (or MERV) efficiency (Air Filters, minimum xx% dust spot efficiency)
 4. The filter pressure gauge and the recommended filter change pressure (Filter Pressure, max 0.x in. w.g.)
 5. The access door(s) for the condensate drain pan (Drain Pan)
 6. Other pertinent access doors such as to energy recovery ventilation wheels or plates (Energy Recovery Ventilation Unit)
 7. The minimum amount of outdoor air for each AHU (### CFM minimum during occupied times)
 8. The outdoor air damper (OA Damper), with special marks noting when the damper is in the fully closed (Closed), fully opened (open), and minimum designed position (Min)
 9. If a motorized relief damper is installed (EA Damper), note the same positions as above.
 10. The access door to any outdoor air controls (OA Control(s)) such as damper position adjustments, outdoor airflow measuring stations, resets, fuses, and switches)
 11. Breakers for exhaust fans (Exhaust Fan ##), AHU, unit ventilators
 12. Access doors for inspection and maintenance of air ducts
 13. Any dampers and controls for air side economizers (as appropriate)

14. The number or name of all exhaust fans, including the air quantity exhausted (EF##, ###CFM)

S306-9 Radon

- a. If a school is being constructed in an area with a high potential for radon (long-term living area estimate for homes above 4 pCi/L is greater than or equal to 11 percent), preventive design and construction measures must be taken so that a remediation system can be installed if radon levels are too high after the school is completed. To determine if the school is in a radon-prone area, check the New York State Department of Health Radon Level Maps and Statistics (http://www.health.state.ny.us/environmental/radiological/radon/maps_statistics.htm) to get specific information about the town in which the school is located. Radon resistant construction should be considered for all school buildings.

S306-10 Shell Penetration Barriers

- a. Seal all openings in walls, floors, and ceilings that separate conditioned space (heated or cooled) from unconditioned space. Seal all openings in floors that separate occupied spaces from basements, tunnels, and crawlspaces. Air that is contaminated with mold, radon, and moisture can easily enter the rooms, and pests such as roaches or rodents can enter the rooms, leaving behind odors, allergens, and potentially, disease-causing pathogens.

S306-11 Entry Mat Barriers

- a. Provide a three-part, walk-off system for all high volume entryways, and all those adjacent to playing fields and locker rooms, to capture dirt, particulates, and moisture before they enter the building. Entry mat systems are critical in trapping soil, pollutants, and moisture that otherwise would spread into and throughout the building, as well as in reducing the cost to properly maintain the building. Entry mat systems must be addressed during the design-phase of the building rather than as a maintenance issue after the fact.

S306-12 Selection of HVAC Equipment

- a. Where feasible, use central HVAC air handling units (AHUs) that serve multiple rooms in lieu of individual self contained units. Although there are many different types of air handling units, for general IAQ implications in schools, air handling units can be divided into two groups: individual units that serve a single room without ducts; and central air handling units that serve several rooms via duct work. Individual units have the advantage of reduced floor space requirements, and they do not recirculate air between rooms. However, it is more difficult to assure proper maintenance of multiple units over time, and they present additional opportunities for moisture problems through the wall penetration and from drain pan and discharge problems. Central air handling units have a number of advantages as compared to individual units serving individual rooms. They are:
 1. Quieter, and therefore more likely to be turned on or left on by teachers and staff;
 2. Less drafty due to multiple supplies and a return that is away from occupants;
 3. Better at controlling humidity and condensed moisture drainage;
 4. Easier to maintain due to reduced number of components and few units to access;

5. More space around units and can be accessed without interfering with class activities;
 6. Space for higher efficiency air filters, and more surface area;
 7. Made of heavier duty components;
 8. Less likely to have quantity of outdoor air supply inadvertently reduced.
- b. Specify the following features for all air handling units:
1. Double-sloped drain pan - A double-sloped pan prevents water from standing and stagnating in the pan.
 2. Non-corroding drain pan - Made from stainless steel or plastic. Prevents corrosion that would cause water to leak inside the AHU.
 3. Easy access doors - All access doors are hinged and use quick release latches that do not require tools to open. Easy access to filters, drain pans, and cooling coils is imperative.
 4. Double wall cabinet - The inner wall protects the insulation from moisture and mechanical damage, increases sound dampening, and is easier to clean.
 5. Tightly sealed cabinet - Small yet continuous air leaks in and out of the AHU cabinet can affect IAQ and energy. The greatest pressure differentials driving leaks occur at the AHU.
 6. Double wall doors with gaskets - Double wall doors provide better thermal and acoustic insulation, and will remain flatter, allowing a better seal against door frame gaskets.
 7. Minimum 2 inch thick filter slots - For better protection of the indoor environment, as well as the equipment and ducts, the filters slots should be able to accommodate 2 in. or thicker filters.
 8. Extended surface area filter bank - To reduce the frequency of filter maintenance and the cost of fan energy, the bank is designed to allow more filter area, such as the deep V approach.
 9. Air filter assemblies (racks & housings) designed for minimum leakage - The filter bank should have gaskets and sealants at all points where air could easily bypass the air filters, such as between the filter rack and the access door. Use properly gasketed manufacturer supplied filter rack spacers.
 10. Corrosion resistant dampers and linkages
- c. Energy or Heat Recovery Units: Consider specifying energy recovery ventilation equipment. Most HVAC system designers understand that increased amounts of outdoor air supply is generally better for IAQ. Yet there are concerns over the implications that this added amount of outdoor air supply has on the first cost and operating cost of the HVAC system, as well as moisture control for the school (too wet or too dry). First cost, energy costs, and moisture control do not have to be at odds with good IAQ. Energy recovery ventilation equipment can reduce the negative implications of the minimum required volumetric quantities of outdoor air, while retaining the IAQ advantage. Energy and heat recovery units shall be specified to meet a level of quality where cross contamination between the

exhaust air to the incoming outside air flow will not exceed 2 percent (by volumetric flow) under design conditions.

- d. Consider the use of thermal displacement ventilation units in classrooms to reduce noise, improve air quality, and reduce energy use.

S306-13 Ducts

- a. Design ducted HVAC returns to avoid dust and microbial growth issues. The use of ceiling plenum return vents is not acceptable as part of an HVAC system design.
- b. All surface grades, drainage systems, and HVAC condensate drainage systems must be designed to prevent the accumulation of water under, in, on top of, or near buildings.
- c. If specifying unit ventilator systems, drip pans using evaporation as means of collecting and removing condensate are prohibited.
- d. Pay special attention to preventing moisture from entering duct work. Design to minimize potential for moisture to enter ducts during operation, and installation. Preventing moisture from entering duct work is critical to preventing mold problems in all types of ducts. Because dust and dirt serve as a food source for mold and are usually present in all but brand new duct systems, mold will grow on any duct surface that remains wet.
- e. With the exception of factory constructed buildings, exposed fiberglass duct or duct insulation on the interior of the duct is prohibited. Limited installation of sound attenuators with perforated interior duct walls and interstitial insulation are also an exception.

S306-14 Indoor Air Quality During Construction

- a. Maintaining ventilation during school construction projects. The following information shall be included in all plans and specifications for school building projects: A plan detailing how adequate ventilation will be maintained during construction. The plan shall indicate ductwork which must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project.
- b. Control of chemical fumes, gases, and other contaminants during construction and maintenance projects. The bid specifications and construction contracts for each construction project shall indicate how and where welding, gasoline engine, roofing, paving, painting or other fumes will be exhausted. Care must be taken to assure fresh air intakes do not draw in such fumes.
 - 1. The bid specifications shall require schedules of work on construction and maintenance projects which include time for off-gassing of volatile organic compounds introduced during construction before occupancy is allowed. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If

the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or off- gas before re-occupancy.

2. Manufacturer's material safety data sheets (MSDS) shall be readily available for all products used in the project. MSDS must be provided to anyone who requests them. MSDS indicate chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.

PART IV: SITE AND UTILITIES

S401 GENERAL

- a. There are many essential engineering and infrastructure factors to take into consideration in the selection of a site. Some of these are:
 - Exposures to various facilities involving existing or proposed electric, gas and liquid fuel transmission, and distribution lines shall be limited within safe distances.
 - Sites should generally be selected where municipal water supplies are available or where conditions for well water are known to be favorable.
 - The availability of municipal sewer disposal systems is a distinct advantage in the selection of a school site. However, where municipal sewer districts do not exist, soil conditions and the ability to absorb sewage effluent are factors for consideration in site selection and operation.
 - Consideration of fire department facilities, available equipment and fire department reporting systems must be investigated.
 - Security systems such as exterior lighting should be incorporated into the design of school site and building. Police surveillance and available communication systems in an area may be desirable assets in the selection of a site and design of site access.
- b. Site design must also take into consideration separation of vehicular and pedestrian traffic for the health and safety of students. Strict requirements must be followed in the design of bus drop areas to eliminate vehicular traffic coming between the bus drop and the school building and bus movement during loading and unloading of students. Bus drop areas should be designed to eliminate the necessity to back up any bus. Guidance for detailed design, management and driver training is available from the Pupil Transportation Safety Institute, Inc.
- c. Wind Turbines and Cell Towers: Site the equipment such that the fall radius does not impinge on buildings, bleachers, sports fields, parking lots, etc.
- d. Further information and guidance can be found in the Facilities Planning publication, "School Site, Standards, Selection, Development."

S402 STANDARDS

- a. New and enlarged sites and new and enlarged buildings must meet the requirements of the State Environmental Quality Review Act (SEQRA).
- b. Generally the standards of construction for site and building are the New York State Uniform Fire Prevention and Building Code and the Energy Conservation Construction Code of New York State, Smart Growth principles and restrictions, and those contained within this Manual and the Education Department's publication "School Site Standards, Selection, Development". Cooperation and coordination with other planning agencies, municipalities and counties should be planned in the selection of a site and in the determination of accessibility, entrances, and exits onto roads and highways. Impact of landfills and locations of unfavorable industrial and other environmentally detrimental areas shall be

addressed. Existing trees and pleasant landscaping should be preserved to maintain the beauty and enhance the environment of the school and locality.

- c. Local and municipal codes generally do not apply to school construction or to the site. Exceptions apply. Local permits will be needed for curb cuts, construction in flood plains and coastal plains, and connection to municipal utilities. It is intended that cooperation and communication be maintained with municipalities and state agencies to coordinate various efforts of good design.
- d. Roof leaders must not be drained into the school on-site sewage disposal systems and must be conveyed independently to separate approved systems, ditches, streams or other approved outlets. Investigation of availability of municipal storm systems must be made prior to design.
- e. The requirements of the local public utility companies shall be applied to the site. The rules and regulations of the Public Service Commission with respect to gas, electrical, and petroleum transmission and distribution lines apply to the placement and installation of such lines near school buildings. Similarly, the placement of a school building near existing transmission and distribution lines must necessarily meet the same requirements of the Public Service Commission.
- f. State or Federal Permits:
 - 1. School Districts and BOCES are required to comply with State and Federal wetland laws and regulations. The SEQRA process for a project undertaken by a School District or BOCES must take into account if any state or federal wetlands will be affected.
 - 2. The New York State Department of Environmental Conservation has identified and mapped the wetlands which are protected under the Freshwater Wetlands Act of 1975. The maps, specific regulations and permit information are available on the DEC website at <http://www.dec.ny.gov/lands/305.html>.
 - 3. Flood plains, wetlands and low-lying areas should be avoided.
 - 4. If it is determined that either state or federal wetlands may be disturbed, permits must be obtained from the US Army Corps of Engineers and/or NYS DEC.

S403 WATER SUPPLY

- a. No source of water shall be utilized without the approval of the State Health Department through their appropriate District Office or County or City Health Department. Connection for water supply source shall be made to existing lines of nearby water districts or municipal water systems wherever possible. Permits for water well drilling and connections to public water supply systems are required by 10 NYCRR 5 State Sanitary Code.
- b. Water supplies for schools must be adequate, safe and palatable. There shall be an abundance of water available at all times for present and future expanded needs, at least 30 gallons per pupil per day for all purposes. The water must be safe for use as determined by state or local health authorities and must be maintained safe by protection of the source of supply by necessary treatment and by frequent analysis.
- c. Water for fire fighting purposes shall be provided as required by the Code. Investigation of existing water pressures and possible coverage for fire fighting purposes should be made with local municipal water district officials and fire department officials. A loop or grid system of water flow should be provided

wherever the mains are available.

- d. Prior to acquiring a site for a school building, boards of education and their architect or engineer should consult with the appropriate county, city, or state district health agency in a preliminary review to determine if the prospective sites can provide adequate water facilities.
- a. All underground pipes shall be protected from corrosion and shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.

S404 SEWAGE DISPOSAL

- a. Municipal sewage disposal systems are preferred for interconnection of a school building. Privately owned sewage disposal systems have been approved and accepted for interconnection with the school building; however, the service of such systems shall be provided. Where the site is adaptable, appropriate on site sewage disposal systems are acceptable. Prior to acquiring a site for a school building, boards of education and their architect and engineer should consult the appropriate county, city, or state environmental conservation agency, in a preliminary review to determine if the proposed sites are adaptable to provide adequate sanitary facilities.
- b. Plans for school sewage disposal systems should be based upon reasonable future requirements as well as present needs. Sewage connections to existing or nearby sewer districts or municipal systems shall be made wherever possible. If no such system is available, an independent system must be designed. Plans and specifications for independent sewage disposal systems shall be presented to the office of the appropriate local agency for approval. The services of the local public sanitary engineer should be sought in the early preparation of plans in order that the plans when completed will be acceptable to the Department of Environmental Conservation. Permits for on-site sewage system construction and operation are required. See 6 NYCRR 750.
- c. Normally the design for school septic systems is based upon a minimum of 15 gallons per pupil of flow per day without showers, 20 gallons per pupil per day with showers and 25 gallons per day with showers and cafeteria.

S405 SITE GAS

- a. Placement of gas transmission and distribution lines within certain distances of school buildings is regulated by the Public Service Commission Codes, Rules and Regulations NYCRR Part 255 and by the Federal Department of Transportation, Part 192. Conversely, school buildings must not be located within certain distances of existing gas lines unless such gas lines have met the requirements of the Public Service Commission and Federal Department of Transportation for the placement of school buildings and the installation standards of the American National Standards Institute.
- b. Outside shut-off valves to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.
- c. Pressure regulating and over pressure protection devices located outside the school building shall be protected in accordance with utility requirements and the Code. All high pressure or medium pressure regulating and over pressure protection devices shall be installed exterior to any occupied building, unless approval is received from the Education Department. If pressure regulating and over pressure protection devices are installed in an occupied building they must be located in a separate room within the building

walls. Construction of this room shall be of two-hour fire resistant, masonry concrete construction throughout (walls and floor) and sealed to the concrete slab ceiling or roof construction. This area shall be accessible only through an outside opening, shall be well ventilated and shall have adequate space and protection from falling objects for both equipment and piping.

- d. Gas service pressure regulators and over pressure relief valves shall also be suitably vented into the outside atmosphere at a location to prevent hazardous conditions to occupants and the surrounding area.
- e. See S710, Part VII, Plumbing and Gas Facilities.

S406 SITE ELECTRIC

- a. Electrical lines must be placed underground or if installed overhead must not cross any useable portion of the site or any area where they would present a hazard to the children. Overhead electrical service lines may follow property lines; however, it is preferred that service lines be installed underground wherever possible.
- b. It is recommended that an approach be taken which minimizes unnecessary increases in existing levels of electromagnetic field exposures.
- c. Interim measures, applicable only to future electric transmission facilities certified under Article VII of the Public Service Law are:
 - 1. Transmission circuits shall be designed, constructed and operated such that magnetic fields at the edges of their rights-of-way (measured one meter above ground level) will not exceed 200 milligauss.
 - 2. Where there is no edge of the right-of-way defined, the field level shall not exceed 200 milligauss above at a horizontal distance of 75 feet from the centerline of a transmission circuit operating at 345 KV, or 60 feet from the centerline of a circuit operating at 230 KV or 50 feet from the centerline of a circuit operating at a lower voltage.
 - 3. Where multiple transmission circuits will exist within the same corridor the combination of circuits shall be used to determine compliance with the interim 200 milligauss standard.
 - 4. An electrical field strength interim standard shall be 1.6 KV/m for facilities (at the edge of the right-of-way) one meter above the ground level, with the line at rated voltage.
- d. Investigative work needed to provide complete designs, such as soil borings required for sports field light pole foundation designs, must be performed and incorporated into the design.

S407 SITE LIQUID PETROLEUM

- a. Liquid petroleum pipelines on school owned property should be avoided.

S408 FUEL TANKS

- a. Fuel tanks shall be designed and installed in accordance with NYS Codes, NYS DEC Regulations and EPA Regulations.

S409 SITE AIR EMISSIONS

- a. New or substantially modified stationary fuel-fired air emission sources, such as fuel oil, fuel gas, and biomass heating plants or co-generation plants, or any other kind of installation capable of generating air emissions in excess of regulated levels, shall be subject to approval of the Department of Environmental Conservation, Division of Air Resources. A copy of the transmittal to the Department of Environmental Conservation shall be submitted to the Commissioner of Education.

PART V: MECHANICAL AND ELECTRICAL REQUIREMENTS

S501 GENERAL

- a. A school building must provide for the health, comfort, and safety of children, teachers, and other occupants. No mechanical/electrical equipment or construction materials shall be used, nor any type of construction permitted, which will endanger the health, safety, or comfort of the occupants.
- b. The school board shall authorize engineering studies of any new building program by an engineer, in conjunction with the architect, to determine all practical steps that can be taken in the building design to most efficiently utilize the energy that will be consumed. Selection of equipment, and method of its use, shall be made on a basis of Life Cycle Costing. Heat (energy) recovery systems should be utilized wherever possible. Discretion must be used in the selection of any mechanical system; the efficient utilization of energy in one particular system may have complementary, or contradictory, effects on other systems of the same building, and, therefore, require alternative selections.

S502 STANDARDS

- a. All mechanical and electrical devices and equipment and packaged equipment shall meet the standards and bear the label of a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories Inc. (UL).
- b. Generally, all mechanical and electrical installations shall meet the requirements of the American National Standards Institute (ANSI), American Society for Testing of Materials (ASTM), and National Fire Protection Association (NFPA).
- c. All major items of kitchen equipment shall be selected for sanitary operation and maintenance and shall bear the seal of National Sanitation Foundation (NSF). In addition, the energy efficiency of appliances shall be a prime consideration in their selection.

S503 AVAILABLE SERVICE

- a. At the outset of a building program an investigation must be made with regard to the available fuels, electrical service, water supply, and sewage disposal facilities which are available or for which provision will have to be made.
- b. The selection of the energy for heating and of heating mediums and systems must be made with economic considerations for owning and operation of the systems, as well as for their relative efficient use of energy.

S504 NOISE LEVELS

- a. Mechanical and electrical equipment shall be selected so that there is no noise interference with communication or intended use in any place of pupil occupancy. Noise levels in all other areas shall be maintained at acceptable levels with consideration given to the intended use of such space. Compliance with the provisions of Section S304 Acoustic Environment is required.

S505 MECHANICAL REQUIREMENTS OF SPECIAL AREAS

- a. In the early stages of design, a study should be made of the educational program to determine special

mechanical and electrical requirements in various areas, such as the large group instruction, auditorium-study halls, audio-visual, vocational, music, science, homemaking center, art center classrooms, cafeteria and kitchen. In these areas special ventilation or air exhausting, special temperature controls, special temperature zoning, special plumbing fixtures, special gas and air piping, special power provisions, special acoustical requirements, and special lighting may be required to achieve a satisfactory design.

- b. Special attention must be given to such factors as electrical "demand" loads to achieve an energy efficient building package.

S506 PROTECTION OF PIPING

- a. All underground pipes and conduits, regardless of their contents, shall be protected from corrosion and shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.

S507 EQUIPMENT AND PIPING IDENTIFICATION

- a. All heating, ventilating, air conditioning, plumbing, and electrical equipment and their controllers shall be labeled and tagged for quick identification.
- b. All piping and valves shall be marked and identified as to direction of flows and type of flows within piping in accordance with American National Standards Institute (ANSI A13.1).

S508 MACHINERY GUARDS

- a. Adequate guards shall be provided on all moving parts of mechanical and electrical equipment such as belts, pulleys, couplings which may be a safety hazard.

S509 BALANCING AND TESTING OF MECHANICAL AND ELECTRICAL SYSTEMS

- a. Responsibility for balancing and testing of mechanical and electrical systems must be clarified within the specifications. The mechanical or electrical contractor, or a separate balancing contractor must be specified as the responsible party who shall balance the mechanical and electrical systems to perform and function within the design criteria.
- b. Provision shall be made for initial start-up and operation of the mechanical and electrical systems by the contractor(s) in the presence of the architect or engineer, the owner's representative, with the assistance of the necessary factory trained mechanics and public utility representatives as required for the various systems.

S510 COMMISSIONING THE BUILDING

- a. Commissioning requirements shall be included in the construction documents. Commissioning requirements must be integrated into the construction documents to clearly specify the responsibilities and tasks to be performed. Of particular importance is the delineation of the contractors' responsibilities regarding documentation, functional performance testing, occupant and operator training, and the creation of the operations and maintenance manuals. Commissioning must include a means to demonstrate that the building's systems: have met the design intent and specifications; have been properly installed; are performing as expected; and that proper operations and maintenance

(O&M) documentation and training have been provided. As built drawings must be provided to the building owner.

- b. Commissioning must include but not be limited to the following critical building systems:
 - 1. Building Automation or Energy Management Systems (sequences, function, operation and training);
 - 2. Lighting controls (daylight, occupancy, timers, etc.);
 - 3. HVAC systems (ventilation and controls, test and balance), heating and chiller plant;
 - 4. Plumbing systems (domestic hot water, fixtures, sprinkler, natural gas piping);
 - 5. Life Safety (fire alarm, smoke control) systems and emergency (lights and exit signs) power;
 - 6. Special systems (eg. kitchen, security).
- c. The mechanical and electrical specifications shall require that trade contractors or their representatives shall instruct the maintenance staff in the proper operation and service of all mechanical and electrical equipment at the time of completion and before acceptance of the school building.
- d. Operation manuals shall be provided to the Board of Education or their representatives. The manuals shall explain the mechanical and electrical systems that have been provided; the function of heating, ventilating, and air conditioning systems, the intent of the temperature control systems, operation of boilers or furnaces; the provisions of the electrical systems with regard to the functions of the fire alarm and detection system, exit light system, emergency lighting and the distribution systems for lighting, power, and communications; and the necessary preventive maintenance for electrical equipment and fans, air handling systems and individual items of heating and equipment which will be necessary to maintain the building.

S511 YEARLY INSPECTION, TESTING, AND MAINTENANCE

- a. In addition to the inspection, testing and maintenance requirements of the Code, Boards of Education shall make provision for inspection, testing, and maintenance of all mechanical and electrical systems at least yearly, or in accordance with manufacturer's instructions, by competent personnel to ensure that the systems continue to operate as designed.

PART VI: HEATING, VENTILATING AND AIR CONDITIONING REQUIREMENTS

S601 GENERAL

- a. These standards are performance standards. The Commissioner of Education has been given wide, discretionary powers in the approval of specifications for heating, ventilating, air-conditioning, and refrigeration (HVAC&R). Any type of system that meets these minimum standards will be considered for approval. However, simplicity of design with detailed attention to the comfort and health of the occupants, the efficient use of energy, and ease of maintenance, shall be provided by the engineer. Consider alternative heating and cooling sources.
- b. Pressure vessels shall bear the seal of the ASME Boiler and Pressure Vessel Codes.
- c. Boilers shall also meet the requirements of 12NYCRR 4 (low pressure boilers) or 14 (high pressure boilers) of the New York State Department of Labor.

S602 THERMAL ENVIRONMENT

S602-1 General

- a. Architects, engineers, boards of education and educators must have common understanding, at the outset of a building program, of the design criteria selected, and of the thermal environment that can be attained from such criteria. The efficient use of energy for the operation of the heating, ventilating, and mechanical cooling systems may mean that at certain infrequent outside temperatures the interior thermal environment may be other than optimum.
- b. Schools are occupied during the warmer hours of the day, and, due to the metabolic heat released by occupants, the heat of lighting, office equipment, computers, and solar gain, there is a build-up of heat.
- c. Infiltration occurs naturally through windows, doors and other areas of air leakage of a building that are not under positive pressure. To this must be added the purges brought about by exterior doors being opened for passage of the entire school population at least twice daily, plus unavoidable air leakage through ventilation equipment.
- d. Energy is more efficiently used in heating, ventilating, and mechanical cooling systems when outside air introduced by such systems does not have to be heated. Also, when inside temperatures rise, it is desirable to introduce increasing quantities of outside air to provide natural cooling without the use of mechanical cooling equipment. Auxiliary forms of ventilation such as operable windows, louver intakes, and supplemental mechanical exhaust must be considered in addition to ventilation supplied from basic units.
- e. It is strongly recommended that heat recovery devices be provided for all significant exhaust air systems.
- f. See S809-1 for Fire Alarm fan shutdown requirements.

S602-2 Heating

- a. Maximum air temperature gradient from floor to 60" above floor shall not exceed 5 degrees.
- b. Air motion in zones of occupancy shall not cause discomfort of occupants, due to hot or cold air

movements. Air shall be introduced in such manner to prevent pockets of stagnant air in the breathing zone.

- c. Heating and ventilating systems shall be so designed that when properly installed and operated during the heating season they will produce the room temperatures required per Code and this section. Because of program use, the State Education Department requires higher design temperatures as follows:

Locker Rooms	70° - 72°
Shower Rooms	74° - 76°
Swimming Pool Area	78° - 80° (As per NYS DOH)

- d. The State Education Department requires that consideration be given to floor level temperatures for First Grade and younger occupancies. The Code does not adequately address design criteria for the comfort of spaces with younger students.

S602-3 Ventilating (Please see Part III Environment for additional requirements.)

- a. All occupied areas within school buildings shall be provided with mechanical ventilation. Mechanical relief is required for the minimum ventilation air requirements. Relief for quantities of ventilation air greater than the minimum may be either mechanical or gravity relief. It is recommended that all relief be mechanical.
- b. Air intakes. Please see Section S306
- c. It is recommended that school districts upgrade heating, ventilation and air-conditioning systems to meet the ventilation requirements of the Code, where needed and feasible.

S602-4 Special Ventilation

- a. Special ventilating equipment, entirely independent of the ventilating system(s) serving the balance of the building, shall be provided in areas where odors are likely to be strong, where fumes or dust are common, where overheating is likely to occur, and as necessary to avoid concentrations of toxic fumes. Provide separate make-up air systems to all fume hoods wherever practicable, preferably using air recirculated from other portions of the building; however, if make-up air must be taken from the outside, temper such air sufficiently to avoid condensation in hoods. Consider heat recovery devices.
- b. Shops, laboratories, science, art and homemaking rooms shall each have independent ventilation systems. Spaces with similar program use may be combined. These spaces shall be maintained slightly negative with respect to adjacent occupied spaces, including corridors, when lab stations and equipment in the spaces are being used. Local mechanical ventilation with hood vents shall be provided at all areas where off-gassing or smoke production is expected; such as but not limited to welding/brazing areas, plastic heating/extrusion areas, chemical mixing, the use photographic chemicals, and spray painting. Recirculation of exhaust from such operations is prohibited.
- c. The air for chemical prep, mixing, and storage rooms shall be changed six times per hour during every 24-hour period. These spaces shall be kept slightly negative with respect to adjacent spaces. Air from these spaces shall not be recirculated. Exhaust fans shall be selected to be explosion proof and corrosion resistant.
- d. Cafeteria-Kitchens: Cafeterias and kitchens shall have independent ventilation systems. Makeup air may

be taken from cafeteria relief for kitchen exhaust requirements. Consider systems designed to reduce energy use by automatically varying the kitchen hood exhaust and make-up air flow in response to detectors that sense the level of cooking duty.

- e. Locker rooms, toilet rooms, janitor's closets, and gym storage rooms shall have independent exhaust systems. These types of rooms may be tied into combined exhaust. Recirculation is allowed in accordance with the Code only when ventilation air is provided directly to those spaces. Recirculation of air from these spaces to other spaces is not allowed, except when an energy or heat recovery unit (see S306-10c) is used in a 100% exhaust air, 100% make-up/supply air design. Such systems shall be designed to prevent the transfer of odors from these spaces to adjacent spaces during unoccupied operation (ie. when an energy or heat recovery unit enters a recirculation mode).
 - 1. Locker rooms: It is recommended that locker rooms be ventilated at 1 cfm per square foot floor area. It is recommended that exhaust system(s) serving locker rooms in secondary schools be independent from all other exhausts.
 - 2. Janitor's Closets. Provide exhaust ventilation for janitor's closets. Exhaust for these spaces shall be the greater of what is required for Locker rooms in the "Code" or a minimum of 50 cfm.
- f. Stationary internal combustion engines for educational use shall be exhausted directly to the outdoors. Carbon monoxide, source capture exhaust systems that connect directly to the vehicle's exhaust are required in shops where fuel fired motor vehicles will be repaired, serviced or operated. This system is not required for vehicles that are operated only for the duration necessary to move the vehicle in or out of the building. Carbon monoxide detectors and alarm system are required in shops with stationary or mobile internal combustion engines.
- g. Teacher's workrooms and Arts and Crafts areas. Provide local exhaust for arts and crafts preparation areas where off-gassing from significant quantities of materials or products may occur.

S602-5 Natural Cooling

- a. Natural cooling shall be provided to all occupied spaces that are not mechanically cooled. In addition to providing ventilation air, mechanical equipment shall provide for variable introduction of outdoor air up to 100% fan capacity, with proportionate increases of exhaust air and decreases in return air.
- b. Heat recovery and energy recovery units used in conjunction with heating only systems (no mechanical cooling) shall be designed and operated to ensure there is a means to provide additional outdoor air for natural cooling, and that heat from the spaces served is not transferred to the outdoor air when cooling is called for by the space.
- c. It is recommended that the Board of Education consider a resolution that will set the standard for a maximum temperature at which the district will allow occupancy.

S602-6 Mechanical Cooling (Air-Conditioning)

- a. During the normal school year there are many days when mechanical cooling provided by refrigeration equipment would be desirable, and to an even greater extent, when there is extensive summer use of rooms.

- b. Mechanical Cooling of Interior Spaces. Interior spaces of pupil occupancy, which are approved because of educational program, shall be provided with equipment for mechanical cooling when natural cooling provided by outdoor air cannot maintain a temperature of 74°F.in the spaces.
- c. Systems requiring quantities of cold air to be heated to an acceptable discharge temperature during a cooling cycle shall be avoided.

S603 CONTROLS

- a. New HVAC controls shall be DDC (direct digital control) with electric actuators. DDC hardware and software shall be specified open protocol, and web-based communication. Temperature sensors/controls shall be provided for every student occupied space. Groups of small spaces (such as offices) with similar building exposures may share sensors. It is recommended that temperature sensors for kindergarten through second grades be located closer to the floor to accurately evaluate the comfort of younger students.
- b. Building automation control workstations and temperature Control Panels should be located so as to be under the supervision of the building supervisor, either in the custodian's office, mechanical equipment room, or in a central area. Subpanels of lower control hierarchy should be located near equipment and spaces served for ease of maintenance and troubleshooting. Head end equipment shall not be located in the Boiler Room. Control indicator panels for rooftop units shall be situated within the building so as to be readily accessible to facility staff for all new construction.
- c. Provide a sequence of operation for all HVAC&R equipment that is clearly written to be applicable to the spaces served and that maintains the code required ventilation and occupant comfort. Control systems shall be arranged and cycled to provide the conditions described for heating, ventilation and/or mechanical cooling. Advantage shall be taken of natural "free" cooling whenever outdoor temperatures will allow provision for favorable indoor conditions.
- d. Consider employing variable frequency drives on pump and fan motors for energy efficiency under part load conditions.
- e. Air flow monitoring stations. Please see Section S306.
- f. Provide motorized, low leakage, insulated dampers at all HVAC&R intakes, relief and exhaust air openings.

S604 BOILERS

S604-1 Boilers and Boiler Pressures

- a. Only low-pressure boilers shall be installed in school buildings. Such boilers shall produce steam or vapor at a pressure of 15 pounds per square inch gauge (psig) or less, or hot water at a pressure not exceeding 160 pounds per square inch gauge (psig), and at a temperature not exceeding 250 degrees Fahrenheit.
- b. High-pressure boilers may be installed in a centralized heating plant. The centralized heating plant shall be a separate facility and shall not be part of a school building. Heat exchangers shall then be installed in the school building at the point of entry of the high-pressure steam lines to provide a low-pressure distribution system throughout the building. High-pressure steam lines shall not run through school

buildings. Heat exchangers shall be placed in spaces that meet the requirements of boiler rooms.

- c. Boilers that are used for vocational instructional purposes shall meet all the equipment and control requirements as for conventional heating equipment used in boiler rooms.

S604-2 Boilers/Burner Controls

- a. The State Education Department's intent is to encourage the incorporation of new devices and controls, as they are developed and accepted, into the control system of the boiler-burner and heating system. All boiler/burner controls and accessories, that are necessary to insure safe operation, shall be listed and bear the seal of approval of a Nationally Recognized Testing Laboratory (NRTL).
- b. The burner and boiler shall be installed with adequate controls to provide the following functions and interlocks:
 - 1. Automatic flame safeguard controls.
 - 2. Trial for ignition periods on the pilot and main burner.
 - 3. Combustion airflow supervision to the combustion chamber.
 - 4. Pre-ignition purging of the combustion chamber (four air changes of combustion chamber.)
 - 5. Proven start and supervision of induced draft and forced draft fan operation.
 - 6. Proven low-fire start on inputs over 1,000,000 BTU per hour.
 - 7. Shut-down on low oil temperature and low oil pressure.
 - 8. Non-recycling safety shut-down on upper limit gas pressure or low limit gas pressure.
 - 9. Proving fuel valve in closed position for burners on boilers over 250 BHP.
 - 10. All flame supervisory and programming control units shall include a self checking circuit. This self-checking must be performed at least once on each ignition cycle. For 5 million BTU or larger systems, it is required that the flame detector and programmer check itself continuously and periodically during operation to assure safe equipment conditions during prolonged firing periods.
 - 11. High limit manual reset operating control of heating medium. This additional limit control shall not be installed on a common sampling tube with the operative limit control.
 - 12. High-pressure limit control for steam; high temperature limit control for warm air and hot water.
 - 13. Low water cut-off control. Two low water cut-offs are required to automatically shut off fuel to the boiler. One may have an automatic reset; the second shall have a manual reset.
 - 14. An alarm system to signal burner failure and shut-down.
 - 15. Observation ports shall be provided for visually observing the pilot and main flame.

S604-3 Boiler Room

- a. The following general boiler room provisions must be provided:
 - 1. A manual fuel shut-off valve on the supply main that is accessible for emergency use.
 - 2. ASME approved safety relief valves of adequate capacity and size for the pressure vessel.
 - 3. Emergency shut off controls clearly labeled at boiler room entrance or entrances (inside or outside of boiler room) to de-energize the primary control circuit and to close the main fuel valves and shut down the fuel pumps to stop the flow of fuel through the burner during an emergency.
 - 4. Natural gas detector(s) and alarm system are required where natural gas is provided.
 - 5. Propane (LPG) detectors and alarm system are required where LPG is provided.
 - 6. Carbon monoxide detector(s) and alarm system are required.
 - 7. Operational tests for all fuel and distribution piping and start-up tests for burners and boilers and furnaces and boiler room equipment.
- b. The following general boiler room provisions should be provided:
 - 1. A flood detection system is recommended for areas that have the ability to hold water, such as boiler rooms.
- c. Ventilation should be provided as necessary to reduce heat build-up in the space. Forced ventilation for heater and boiler rooms is required if the space above the room is occupied. Wherever spaces exist above the boiler room, then the ceiling must be made fire-resistive, providing at least a 2-hour rating and shall be insulated to prevent heat transfer. Caution should be used so as not to cause the Boiler Room to operate at a negative air pressure, which can cause hazardous and explosive reactions.

S605 BIOMASS BOILERS: In addition to the general requirements for boilers the following apply to biomass boilers.

- a. Biomass boilers must be designed to minimize the potential health and safety effects from the use of renewable resources.
- b. An evaluation of the potential health and environmental effects must be performed. This evaluation should include a comparison of potential biomass boiler emissions and thermal efficiencies to displaced fuels systems (e.g., oil, gas, *etc.*), discussion of proposed fuel delivery mechanisms and storage, consideration of potential wind patterns and terrain as it may influence emission impacts. A copy of the evaluation report must be made available to the public. A copy must be submitted with the design package.
- c. Solid fuel fired boilers of one million Btu/hour rated input capacity or more must obtain the approval of the Department of Environmental Conservation Division of Air Resources by way of an issued air permit or registration. Approval by the Commissioner of Education is contingent upon Department of Environmental Conservation approval.

d. Design:

1. The design must include the following requirements in addition to the general boiler requirements:
 - a. Boiler room and fuel storage areas attached to student occupied buildings must be fully sprinkled.
 - b. Final fuel feed delivery system to boiler must be interlocked with the boiler to operate at all times the boiler is operating, or otherwise maintained clear of fuel when the system is not actively calling for fuel.
 - c. Final feed and portion of feed system delivering fuel to the final feed system must be provided with an automatic fire suppression system, designed to flood the feed system, upon detection of a fire in feed system.
 - d. Control system must incorporate a time lag prior to reducing air supply when going from high fire to low fire.
 - e. Upon loss of draft the fuel feed system must shut down.
 - f. Fuel storage areas, attached to occupied buildings, shall be separated from the occupied portion of the building by two-hour, fire rated construction.
 - g. Fuel storage areas, attached to occupied buildings, shall be designed to prevent dust, odors, and potential, toxic gases from entering the occupied portion of the building.
 - h. Electrical devices, located in fuel storage areas shall be designed for expected hazard.
 - i. Carbon monoxide detector(s) and alarm system are required in all building spaces, located adjacent to pellet storage areas that are attached to occupied buildings.
2. The design should address the following considerations:
 - a. It is strongly recommended the following, general, system components be included in the consideration: high-efficiency pellet boiler (minimum efficiency of 85% at high load); emission controls; thermal storage; boiler optimization controls; and pellet storage.
 - b. Fuel source and characteristics (including average moisture content);
 - c. Multi-stage combustion;
 - d. Equipment to reduce particulates in the combustion vent stream (*e.g.*, bag houses, cyclones, multi-cyclones, electrostatic precipitators);
 - e. Stack heights consistent with good engineering practice to minimize building/terrain, causing wake effects on emissions;
 - f. Sample ports in the combustion vent stream;
 - g. Other technologies or equipment arrangements to minimize emissions.

- h. Installation of active ventilation systems in pellet storage areas.
- e. Biomass will only be approved in certain cases. Talk to Facilities Planning early in the planning phase of the project.
- f. Operational considerations:
 - 1. The amount of biomass fuel storage should be minimized, to the extent possible, during non-heating seasons.
 - 2. Access to pellet storage areas must take into account potential hazards associated with spaces.

S606 INDIRECT FIRED AND ELECTRIC HEATING UNITS (ALSO SEE S803)

- a. Indirect fired heating units (sealed combustion chamber) with a heat exchanger, such as self-contained heaters or heating and ventilating furnaces, regardless of fuel used, shall not be installed in any place of pupil occupancy. All indirect fired heaters shall be located within fire resistive spaces having at least two-hour fire-rated construction, and such spaces must have fire dampers at wall penetrations.
- b. Exterior mounted indirect fired units with furnace combustion areas and electric heating units with open type elements may be used when installed in accordance with the following criteria:
 - 1. Roof mounted units: The structural integrity of the roof deck must be maintained within the curb(s) supporting the unit by fire resistive material - something other than the integral bottom of the unit, i.e., metal roof deck, metal pan, structural slab, etc.
 - 2. Wall mounted units: The structural integrity of the walls must be maintained within the area supporting the unit with fire resistive material.
- c. Direct fired heating units are not allowed. Exception: Makeup air units directly serving a kitchen hood. Exception: Makeup air units directly serving an automotive paint spray room or directly serving an automotive paint spray booth installed in a spray room, where all occupants in the space are receiving their breathing air from a source that is not contaminated (supplied-air respirator or self-contained breathing apparatus). Fire-rated construction and structural integrity based on unit location shall be provided as required for indirect fired heating units.
- d. Carbon monoxide detector(s) and alarm system are required in at least one of the occupied spaces served by each indirect fired heating unit.

PART VII: PLUMBING AND GAS FACILITIES

S701 GENERAL

- a. Complete, well-arranged, and well-maintained sanitary facilities are essential for health, comfort and convenience of the occupants.
- b. Equipment shall be selected and operation designed so as to be energy efficient and water conserving.

S702 SITE

- a. See Part IV, Site and Utilities.

S703 WATER SUPPLY

- a. See Section S403; Part IV, Site and Utilities.
- b. All equipment installed as part of a potable water supply system should be specified at 0.25% or less lead content. Valves, fittings and faucets to be specified to meet National Sanitation Foundation (NSF) 61 no lead requirements.

S703-1 Water Conditioning

- a. Where the school is served by municipal water supply, obtain a copy of the chemical water analysis to determine if water conditioning is required.
- b. Generally, it is desirable to provide conditioned water as makeup water to the boiler, the water lines serving the kitchen, and domestic hot water outlets. Care shall be taken to insure that there is no mixing of conditioned water and raw water in the distribution systems to prevent corrosion and restrictions in the pipe distribution lines. Check valves at strategic locations may have to be included.
- c. Water conditioning processes should be considered early in order to incorporate such equipment into the final building plans and specifications. Where well water is to be the source of water supply, it is often difficult to predict the water condition and to select the water conditioning process equipment. It is beneficial to drill a test well to determine the aquifer yield and water quality. Water conditioning should then be considered for incorporation into the building project by means of an alternate. In such instances, piping arrangement and valves can be incorporated in the plans and specifications to accommodate the addition of equipment at a later date.
- d. Separate and special valved connections and piping arrangements shall also be provided for boiler water treatment as deemed necessary.

S703-2 Domestic Hot Water

- a. Hot water shall be provided for all lavatories and sinks.
- b. Domestic hot water tanks shall bear the seal of the ASME Boiler and Pressure Vessel Codes.
- c. Fuel fired domestic hot water heaters must be provided with electronic flame safeguard controls.

- d. Where cost effective consider use of separate instantaneous hot water heaters serving separate areas of the building rather than a central hot water source.
- e. Where cost effective consider use of solar thermal hot water systems.
- f. Provide water at 100 degrees F to all fixtures for elementary schools, and 110 degrees F for secondary schools.
- g. Refer to Department of Health for hot water requirements at fixtures serving pool locker rooms.

S704 SWIMMING POOLS

- a. Installations of swimming pools as part of the physical education program require certificates of construction by the Department of Health (DOH). Therefore, it is necessary to submit applications for approval to the local agency of the Health Department. SED approval is contingent upon DOH approval.
- b. Mechanical equipment plans and layouts for swimming pools, together with their specifications, shall be presented to the appropriate State Health Department Agency prior to the date of the approval desired from the Office of Facilities Planning. Final plans and specifications for school buildings that include swimming pools shall be accompanied by a copy of the transmittal to the Department of Health.
- c. See 10 NYCRR 6 (DOH Sanitary code), and 9 NYCRR 650 Article 9.

S705 SEWAGE DISPOSAL

- a. See Part IV, Site and Utilities.
- b. Kitchen grease traps should be exterior and shall meet Code, municipal sewer authority, Department of Environmental Conservation (DEC), and health department requirements.
- c. If septic tanks are used, the acid-proof drain from the science laboratories after neutralization shall run into a separate holding tank.
- d. Art classrooms shall be provided with clay traps in the waste system, depending upon the instruction program.
- e. Acceptable acid waste drain piping consists of the following: silicon cast iron, stainless steel, glass, polypropylene, and listed chlorinated polyvinylchloride. For below ground installations, double wall piping may be required. Consult local county health departments for additional requirements.
- f. Chemical lab wastes that pose a potential hazard to ground water or treatment facility are prohibited from being placed in the sewer. Alternate treatment/disposal is required. Consult with local county health department and/or municipal treatment authority for requirements.
- g. Consult municipal sewer authority, if there is an expected increase in waste flow to the municipal system.
- h. The use of asbestos-cement pipe is not permitted.

S706 PLUMBING

S706-1 Toilet Rooms

- a. Toilet rooms for pupils of both sexes shall be located on each floor to provide greater convenience. Entrances to gang toilet rooms shall be screened. Toilet rooms shall be available and open at all times of building occupancy, and when occupants are on site for school authorized activities.
- b. Toilet rooms for pre-kindergarten and kindergarten shall be placed adjacent to these rooms, and open into them. For other elementary, junior high school, and senior high school pupils, the toilet rooms should be located in the elementary, junior high, or senior high school areas, respectively.
- c. Toilet rooms shall be conveniently located for assembly spaces such as auditoriums, gymnasiums, cafeterias, meeting rooms, and other parts of the school commonly used for assembly activities.
- d. Separate toilet rooms shall be provided for school staff.
- e. Where school grounds are likely to be used for school authorized events at times when the school building is closed, toilet rooms must be accessible to the outdoor spaces. Provisions must be made to provide toilet rooms without making it necessary to open up large portions of the school building. If locker rooms are used for this purpose and the doors leading from the locker rooms into the interior of the building will be locked, exiting capacity requirements to the outdoors shall be maintained at all times.
- f. Toilet Facilities in detached Classroom Buildings:
 1. Classroom buildings that contain 3 or more classrooms are required to contain toilet fixtures in such quantity as required by Code.
 2. Classroom buildings that contain 1 or 2 classrooms are required to contain toilet fixtures unless all of the following conditions are met:
 - Accessible toilet rooms are available in an existing, school building, and the fixture count meets the requirements of the Code for both the existing building and the new building.
 - The path of travel from the classroom to the existing toilet facilities is on an accessible route and is within a maximum distance of 250 feet,
 - The detached classrooms do not house elementary grade students, or classrooms dedicated to students with special needs.
 - Potable water for drinking is provided in all classroom buildings.

S706-2 Accessories

- a. Toilet rooms shall be provided with soap dispensers, grab bars, toilet paper holders, waste containers, mirrors, shelves and hand drying facilities. Sanitary napkin dispensers and separate waste receptacles are required in appropriate toilet rooms.

S706-3 Water Closets, Urinals

- a. Water closets and urinals shall be of vitreous china or stainless steel.

S706-4 Lavatories

- a. Lavatories or wash basins shall be provided for toilet rooms and shall be placed so that pupils will pass them as they leave the room.
- b. Wash facilities are strongly recommended on the path to or near the cafeteria with the number of lavatories based on the throughput of the cafeteria. The intent is to provide all students with the opportunity to wash their hands prior to eating.
- c. Lavatories shall be provided with a grid strainer. Both hot and cold water shall be provided from single stem mixing type faucets with spray nozzles. Positive temperature control must be provided to insure that the hot water will not exceed 100 degrees F for elementary schools and 110 degrees F for secondary schools.
- d. Lavatories must use self-closing faucets.

S706-5 Sinks

- a. Classrooms sinks shall be provided as required by program use.

S706-6 Shower Heads

- a. Where showers are provided, showerheads with water saver nozzle and controls shall be located at least 4 feet apart. Showers shall have a positive temperature control to insure the temperature is at a maximum of 110 degrees F. Vandal proof heads are recommended.

S706-7 Service Sinks

- a. A custodian's closet with a service sink is required on each floor. The sink should be placed low for convenience and have a chip-proof rim. Consideration should be given to the floor-recessed type of mop and service sink which has a rim approximately 8 inches above the floor. Faucets should be installed high enough above slop sinks to permit filling of water buckets. Service sinks should have available a three-quarter inch service pipe for flow of hot and cold water.

S706-8 Drinking Fountains / Water Coolers

- a. Provide water fountains at the ratio required by code, with a minimum of one drinking fountain on each floor having pupil occupancy.
- b. Drinking fountains should be of an impervious material, of a type that will not permit the mouth of the pupil to come in contact with the nozzle, nor permit the water to fall back upon the nozzle. The fountain jets and all openings in the water supply piping should issue above the level of the fountain bowl rim. Drinking fountain valves must be self closing.
- c. Fountains shall not be attached to lavatories or sinks. They shall be located convenient to gymnasiums, cafeterias, and multipurpose rooms. It is recommended to provide access to drinking fountains from

playgrounds. It is not good practice to locate gymnasium drinking fountains and cuspidors within the gymnasium playing area.

- d. Drinking facilities shall be available in pre-kindergarten, kindergarten and first grade classrooms. Drinking fountains may be installed in conjunction with classroom sinks in the following manner: A shallow receptor for the fountain, having a minimum edge clearance from the sink of 6", may be installed in the counter top with its drain draining into the sink drain.
- e. Drinking fountains of the frost proof type should be located convenient to the playground area.

S706-9 Floor Drains

- a. Provide sufficient floor drains in the shower and drying rooms.
- b. Automotive shops should have floor drain(s) to cover an area approximately 14 x 14 feet in front of the overhead door. An oil interceptor shall be provided for schools served by municipal sewer systems for automotive shop floor drains.
- c. Cafeteria kitchens are considered commercial kitchens in accordance with Code and will require floor drains. Floors under and around steamers and kettles shall be drained to the grease trap independently of other floor areas.

S706-10 Outside Hose Fixtures

- a. Hose fixtures should be provided around the perimeter of the building. Frost proof hydrants here and elsewhere on the school grounds are recommended.

S706-11 Piping

- a. Long-range economy justifies the use of piping, selected not only for immediate demands but also with a view to possible expansion of the building and its services.
- b. All piping and valves shall be labeled and tagged per requirements of Part V. Valves and fittings should also be selected with a view to ease of service and replacement. All valves shall be tagged for identification and a chart of the piping layout should be readily accessible in the custodian's room.
- c. Insulate all hot water piping. Cold water piping should be insulated to prevent condensation.

S707 SPECIAL CONSIDERATIONS

S707-1 Cafeteria-Kitchen

- a. In the cafeteria-kitchen, provide pre-rinse hot water at 110 degrees F, wash tank hot water at 140 degrees to 160 degrees F, and final rinse hot water (if no chemical sanitizer is used) at 180 degrees F. Dynamic pressure should be a minimum of 20-25 psig.

S707-2 Agricultural Shops

- a. In vocational agriculture a milk-testing sink is usually included. The students may use this same sink, which should be acid-proof with an acid-proof trap and waste, as a wash sink.

S707-3 Emergency Showers and Eyewashes

- a. Emergency showers shall be provided for high school chemistry laboratories and any other spaces where chemicals are corrosive, caustic, or immediately injurious to the skin of the occupants.
- b. Emergency eyewash stations shall be provided in shops, laboratories, and other spaces based on program use where chemicals, paint, or particulates would likely injure the eye. In addition, chemistry preparation rooms with sinks shall be provided with emergency eyewashes, or have an eyewash available within a travel time of ten seconds.
- c. Boiler rooms and maintenance areas where occupants are handling chemicals, paint or particulate injurious to the eyes shall be provided with an emergency eyewash station.

S708 GAS FACILITIES

- a. See Part IV, Site and Utilities.
- b. In addition to the shut-off valve located on the supply side of the meter in accordance with Code, a valve to shut off the supply of gas to the building shall be installed and located for ready accessibility on the load side of the meter in case of emergency. Additional shut-off valves and signage may be required by other provisions in Code.
- c. All gas equipment shall be listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) such as the Canadian Standards Association (CSA) or Underwriter's Laboratories, Inc. (UL). Installation of gas equipment and piping shall be in accord with the applicable American National Standards Institute (ANSI) Code and the rules and regulations of the local gas utility.
- d. All gas appliances shall be provided with suitable pressure regulation by approved individual regulator. It is not required that individual Bunsen burner outlets be provided with pressure regulators.
- e. Gas Piping Tests
 1. Gas piping with a working pressure of up to 0.5 psig is to be pressure tested with air or inert gas for a minimum of one hour at 15 psig.
 2. Gas piping with a working pressure above 0.5 psig shall be pressure tested with air or inert gas for a minimum of one hour at 1-1/2/ times the working pressure or a minimum of 50 psig.
 3. Coated or wrapped pipe must be tested at 100 psig for a time period of 1 hour to insure the gas tightness of the pipe.
 4. The source of test pressure shall be isolated before the pressure tests are made. Tests shall be made in the presence of the architect, engineer, or their representative in conjunction with the local gas utility requirements.
- f. Whenever liquefied petroleum is used, special pipe joint compound resistant to liquefied petroleum gas shall be used.
- g. It is recommended that gas piping enter a building above grade.

- h. Gas piping entering a building below grade shall be sleeved and sealed as stated in S506a. A vent at the building wall shall be provided.
- i. Liquefied petroleum gas (LPG) detectors and alarm systems are required and shall be provided in all areas of buildings, located below grade, where LPG piping is provided. It is recommended that LPG piping never be placed in areas of a building below grade.
- j. LPG detectors and alarm system are recommended wherever LPG is used.
- k. Natural gas detectors and alarm systems are recommended wherever natural gas is used.

S709 BUILDING GAS PRESSURES

- a. The allowable gas pressures within areas of the school building, other than the Boiler Room, (after the meter and/or regulators) shall be no greater than 1/2 psig.
- b. The allowable gas pressures for piping run exterior to the building and within the Boiler Room, after the meter and/or regulators, may be up to 5 psig.
- c. Vent line size
 - 1. Vent lines for gas pressure regulators and other devices requiring venting which do not normally discharge gas through the vent shall be vented to the outdoors through a rigid pipe at least 3/4" in size. Consideration shall be given to increasing the size of the vent lines longer than 20 feet. Manifolding of these vents is allowed providing the cross-sectional area of a common vent line is equal to the sum of the cross sectional areas of the manifolded vent lines.
 - 2. Vent lines for relief valves and normally open vent valves shall be piped directly to the outdoors. (They shall not be vented commonly with devices requiring atmospheric air pressure to balance a diaphragm.) The size of these lines shall be calculated to provide full relief capacity under the conditions of design. The size of such lines shall never be less than the size of the connection at the device. Manifolding of these vent lines is allowed providing the cross-sectional area of a common vent line is not less than the cross-sectional area of the largest individual line plus 50% of the total cross-sectional area of all other connecting lines.
- d. Vent termination: All vent lines shall terminate outdoors in a safe place and not less than two feet from any opening or overhang. Termination points shall also comply with distance requirements to outside air intakes. Adequate means shall be employed to prevent water from entering the vent pipe, and also to prevent stoppage of it by insects or foreign matter.

S710 GAS DISTRIBUTION

- a. Science classrooms - gas outlets at fixed spacing (usually 5 feet) at work counters.
- b. Homemaking classrooms - outlets to gas burner type kitchen equipment.
- c. Gas fired kilns - whenever used, a control valve shall be provided.
- d. Kitchens - as required by equipment.

- e. Soldering and Annealing - with compressed air if a compressed air torch is to be used.
- f. A lockable master control valve shall be provided in an accessible place for the instructor's control in any student occupied space having 3 or more gas outlets. This valve may be either a manual or an electrically operated solenoid valve with manual reset or electric key operated reset.
- g. If gas outlets are in close proximity to water or air outlets, the gas supply pipe shall be equipped with a gas check valve.
- h. A lockable master control valve shall be provided in an accessible place for the instructor's control for all student occupied spaces with fuel fired equipment. This valve may be either a manual or an electrically operated solenoid valve with manual reset or electric key operated reset.
- i. Electrically operated solenoid valves shall fail to the closed position.

PART VIII: ELECTRICAL WORK

S801 GENERAL

- a. Electrical devices, materials, and packaged equipment shall be listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories Inc. (UL), for the intended use, and shall bear its label. Note that NRTL approval of individual components of packaged equipment does not constitute approval of the entire package.
- b. Provisions shall be made in accordance with manufacturer's recommendations for adequate ventilation in rooms with transformers or other heat producing equipment.
- c. Use of premium efficiency motors is recommended.
- d. Lightning protection systems, where provided, shall conform to the requirements of the most current edition of NFPA 780, UL96A, UL96, and other associated UL standards.
- e. Instructional spaces shall be provided with an adequate quantity of electric power, communication, and data outlets. The outlets shall be provided at appropriate locations. The anticipated program use of each space must be discussed with appropriate school district personnel and submitted designs must account for these requirements. Allowances must be made for flexibility in adding peripheral equipment, and special needs as they develop.
- f. Cables within buildings: AC cables are not allowed unless they include an insulated (green) equipment grounding conductor. The following cable types are not allowed within school buildings: NM, NMC, NMS, SE, USE, UF, FC, FCC, and TC cables.
- g. Aluminum conductors are not allowed. [Exception: Aluminum cables, for electrical systems operating over 600 Volts nominal, are allowed to be buried underground, outside of the building footprint, when required by the serving electric utility company.]
- h. Minimum wire size shall be #12 AWG for branch circuits.
- i. Coordinate with the electric utility company, as required. Provide load letters, as required. Submit the design to the electric utility company for review and approval, as required. Comply with all the requirements of the electric utility company.
- j. Electrically driven fire pumps shall be provided with a standby power supply in addition to the normal electrical power source. Normal power sources will not be considered reliable when evaluating need for alternate power source in accordance with NFPA 20.
- k. Carbon monoxide, propane, natural gas, and refrigerant detectors/sensors and alarm systems shall be provided with a standby power supply in addition to the normal electrical power source.
- l. Elevators shall be provided with a standby power supply to lower the elevators (preferably to an egress level) in addition to the normal electrical power source.
- m. Platform lifts and stairway chairlifts shall be provided with a standby power supply to lower the platform lifts and stairway chairlifts (preferably to an egress level) in addition to the normal electrical power source.

- n. Area of Refuge: The central control point communication equipment shall be located adjacent to the Fire Alarm Annunciator Panel(s) at the normal fire department entrance and also at a location in the building that is normally occupied at any time the building is occupied. The area of refuge shall also have controlled access to a public telephone system. Communication equipment shall connect to the central control point communication equipment prior to connecting to the public telephone system. The central control point communication equipment must have a graphic plan, which indicates the location(s) of the activated area of refuge communication equipment, mounted immediately adjacent to the equipment. Coordinate with the fire department and obtain approval for the locations. The communication equipment and signage shall be provided with a standby power supply in addition to the normal electrical power source.
- o. Doors (for occupant movement) shall not swing into the National Electrical Code (NEC) required working space.
- p. Specify that new circuit breaker(s) to be added to existing panelboard(s) shall be listed/labeled for use with the existing panelboard(s).
- q. The short-circuit ratings of all protective devices shall be equal to or exceed the available short-circuit current. Series-connected (combination) systems, where the short-circuit rating of the upstream protector is fully rated but the downstream protector is not fully rated, are not allowed.
- r. When new panelboard interiors are retrofitted into existing enclosures (back boxes) the architect/engineer shall determine if the box wiring space is adequate for the installation. Panelboard interiors not marked for use in the existing enclosures revert to a short-circuit current rating of 10,000 AIC. If a short-circuit current rating above 10,000 AIC is required, a Field Evaluation shall be performed by UL (or other NRTL) to determine the actual short-circuit current rating of the new panelboard interior and existing enclosure combination.
- s. When the buss of an existing panelboard or switchboard is tapped the architect/engineer shall determine if the box wiring space is adequate for the installation. Tap connections may violate the listing and labeling of the equipment. The holes in a panelboard or switchboard buss are not generally intended for tap connections. The equipment manufacturer should specify if the holes are intended for tap connections. The architect/engineer shall either acquire instructions on how to do the tap connection without violating the listing and labeling of the equipment from the manufacturer or require that a Field Evaluation shall be performed by UL (or other NRTL).
- t. Where ground-fault circuit-interrupter (GFCI) protection for personnel is required or provided, the feed-through feature of a GFCI-type receptacle shall not be utilized. Installation of GFCI-type receptacles at each location, where GFCI protection for personnel is provided, is acceptable. GFCI-type circuit breakers may be used to supply a branch circuit where each receptacle supplied from the branch circuit is labeled "GFCI Protected".
- u. Corrosion resistant conduit, fittings, supports, boxes, cabinets, etc shall be used in harsh environments, where corrosion may readily occur, such as pool equipment rooms and pool areas. PVC non-metallic and PVC coated metallic products are examples of acceptable materials.
- v. Electrical Rooms – Include but are not limited to:
 - 1. Rooms housing transformers rated over 75kVA or panels/breakers/motor controllers/switches/etc rated over 225A at 208V or over 100A at 480V.

2. Rooms housing multiple transformers, panels, circuit breakers, motor controllers, disconnect switches, etc regardless of size.
3. Rooms housing stored electrical energy systems or generator systems.
4. Rooms housing electrical equipment rated greater than 600V.

S802 TESTS AND INSPECTIONS

- a. Tests of all electrical work shall be performed, in the presence of the engineer or architect, as equipment is installed and as systems installations are completed. Tests shall include a run under full load (or a reasonable overload) long enough to determine that no excessive heat will be developed at terminal points, switches, and other points of installation. Tests shall be specified and conducted for the Fire Alarm System, Emergency Lighting, Exit Signs, Generator Systems, Central Battery Inverter Systems, Other Emergency/Standby Power Supply Systems, Elevator Systems, Electrically Operated Partition/Curtain Safety Systems, Lighting, Lighting Controls, Communication Systems, Emergency Shutdowns, Motors, Safety Devices, Grounding, Ground Fault Protection, Interlocks, and other electrical equipment/systems. Tests shall verify that the equipment/system functions as designed and as required by the Code and this Manual. The tests shall be in accordance with the appropriate Code reference standard or be as specified by the engineer or architect for systems that do not have a Code reference standard. A record of all tests shall be maintained by the School District.
- b. Electrical inspections are required for projects involving electric work. The electrical inspection shall be performed, in the presence of the engineer or architect, by a qualified electrical inspection agency such as Middle Department Inspection Agency, Inc., Atlantic-Inland, Inc., and Commonwealth Electrical Inspection Service, Inc. An electric approval certificate shall be issued by the electrical inspection agency.
- c. UL Master Label Certification (Certificate of Inspection) shall be obtained and maintained for lightning protection systems.

S803 ELECTRIC HEATING

S803-1 Requirements

- a. Heating elements, rated over 50kW, and used with fans or in air-handling units are required to be installed in a furnace room which is separated from the remainder of the building with a 2 hour fire barrier, or located at the exterior of the building in accordance with provisions of Part VI.
- b. Heating elements, rated 50kW or less, and used with fans, in air-handling units, or in duct reheat applications shall not be accessible nor within reach of the general population of the school building. A minimum horizontal distance of 24 inches shall be maintained from the outlet of the duct serving such space and the heating element.
- c. Baseboard heaters and cabinet heaters must have heating elements of the enclosed, sheathed, and finned type.
- d. Clearances from combustible materials and furnishings must be maintained as required by the NRTL standards and the manufacturer.

- e. Electrical heating systems must perform satisfactorily with respect to proper loading, convection, airflow, and surface temperatures.
- f. Electrical space heating equipment must incorporate controls that will provide for safe operation of the equipment, and will limit air discharge temperature.

S804 ARTIFICIAL LIGHTING

S804-1 General

- a. School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light. The guidelines established in the most recent editions of the Illuminating Engineering Society of North America (IESNA) publications shall be used to determine required lighting levels. The minimum acceptable standards are the greater of either the IESNA values or the values shown in Table S804-1. Note that the values shown in Table S804-1 are commonly accepted values while the IESNA guidelines include detailed information based on specific program uses.

Table S804-1

Minimum Foot Candle Requirements

Location	Minimum Maintained Horizontal Foot-Candles	Minimum Maintained Vertical Foot-Candles	Initial Horizontal Foot-Candles	Initial Vertical Foot-Candles
Classrooms, study halls, and lecture rooms (non-demonstration) [on desks and tables],	50		67	
Classrooms, lecture rooms [on chalk boards]		50		67
Classrooms, lecture rooms [on white boards]		5		7
Offices [on desks]	50	10	67	13
Libraries [on desks and tables]	30		40	
Libraries [book stacks]		30		40
Music rooms [on work]	40	10	53	13
Sewing rooms, drafting rooms, home economics [on work]	50	10	67	13
Shops, laboratories, and art rooms [on work]	50	30	67	40
Computer Rooms [on work]	50	10	67	13
Gymnasiums (without organized sports) and playrooms	30	10	40	13
Gymnasiums (with organized sports)*	*	*	*	*
Swimming pools**	**	**	**	**
Cafeterias [used for study]	40	10	53	13
Cafeterias [not used for study]	20	5	27	7
Auditoriums	10	3	13	4
Conference Rooms [meeting]	30	5	40	7
Reception Areas	20	5	27	7
Corridors, stairs, passageways, interior means of egress, Area of Refuge	10	10	13	13
Locker rooms and toilets	10	3	13	4

* Gymnasiums used for organized sports or spectator events will require greater lighting levels in accordance with IESNA standards.

** Illumination levels and quality of lighting must comply with NYS Department of Health regulations (Sanitary Code 6-1).

- b. Do not exceed lighting levels adapted to the expected function of a particular room or area. Provide minimum foot candle levels as required by either the IESNA or Table S804-1. Supplement general lighting with additional task lighting as required.
- c. The information throughout the IESNA publications shall be used as design guidelines. Lighting designs shall incorporate features which result in a high quality visual environment.
- d. In classrooms, consider specifying direct-indirect, semi-indirect, or totally indirect luminaires.
- e. Specify energy efficient lighting equipment which will provide maximum lumen output with minimum wattage consumption. Use of energy efficient lighting equipment is extremely important because lighting accounts for a large portion of the energy consumption and costs in a building.
- f. Luminaries shall be selected that have a minimum initial NEMA LE6 Target Efficacy Rating (TER) as shown in Table S804-2. Other luminaire types shall be selected to maximize lumen output per wattage input. Note that use of down lighting should be limited because those luminaires typically have a lower TER than linear luminaires. (Exception: Limited quantity of specialty luminaires for particular circumstances.)

**Table S804-2
Luminaire TER**

Luminaire Type	Minimum TER (lumens/watt)
Fluorescent (T8 & T5) (Tubes – Linear; U; Circ) (1x2; 1x4; 2x2; 2x4; etc)	70
LED (1x2; 1x4; 2x2; 2x4; etc)	80
Compact Fluorescent Downlight	30
Metal Halide Downlight	35
LED Downlight	40
Incandescent/Halogen Downlight	Typically not acceptable (except special applications such as Auditorium/Stage)

- g. Lamps for general lighting shall be selected to have a minimum initial efficacy as shown in Table S804-3. Other lamp types shall be selected to maximize lumen output per wattage input. (Exception: Limited quantity of specialty lamps for particular circumstances.)

**Table S804-3
Lamp Efficacy**

Lamp Type	Minimum Initial Efficacy (lumens per watt) (@77 degrees F)	Minimum Initial Efficacy (lumens per watt) (@95 degrees F)
T8 Fluorescent		
2' (nominal)	80	
3' (nominal)	85	
4' (nominal)	92	
5' (nominal)	90	
8' (nominal)	100	
U-Tube	85	
T5 Fluorescent		
2' (nominal)	82	92
3' (nominal)	85	95
4' (nominal)	87	97
5' (nominal)	90	100
Circular	80	
Compact Fluorescent (CFL) (Self Ballasted)		
Bare Bulb		
< 13 Watt	50	
≥ 13 Watt	60	
Covered Bulb		
< 14 Watt	40	
≥ 14 Watt	50	
Reflector Bulb	45	
Compact Fluorescent (CFL) (Non-Self Ballasted)		
< 32 Watt	65	
≥ 32 Watt	75	
Incandescent/Halogen are typically not acceptable except special applications such as Auditorium/Stage		

- h. Color Rendering Index (CRI): Minimum CRI of 80. Select appropriate CRI at or above 85 for specific program uses (ie. art rooms, science labs, etc). (Exception: Limited quantity of specialty lamps for particular circumstances.)
- i. Correlated Color Temperature (CCT): Select appropriate CCT values for the program use.
- j. See S303 for additional information regarding the visual environment.
- k. Designs shall incorporate appropriate levels of lighting uniformity, distribution, and contrast. Designs shall minimize glare.
- l. Investigate the practicality of collecting heat energy generated by lighting equipment to supplement space heating in winter, and expelling it by natural cooling in summer, rather than imposing additional load upon refrigeration equipment.
- m. Mercury vapor and metal halide lamps must be of the safety type or self-extinguishing upon the breaking, cracking or removal of the outer shield protecting the lamp. If a safety type or self-extinguishing lamp is not available, each lamp or its fixture shall be equipped with a shield adequate to protect against and absorb ultraviolet radiation if the lamp were to break or become defective.
- n. Completely enclosed Courts (Courtyards): In addition to Code requirements, means of egress lighting shall be provided.
- o. Group U Occupancies: Means of egress lighting, including the exit discharge, shall be provided. Exception: Where electric work is not provided.
- p. Lighting fixtures shall not be solely supported by the framing members of suspended ceilings. Safety support (aircraft cable or else) connected to the building structure above the suspended ceiling shall be provided in addition to any bolts, screws, rivets, or listed clips fastened to the ceiling framing members.
- q. Lighting fixtures in gymnasiums and other areas where the lighting fixtures are subject to impact shall be provided with safety support (aircraft cable or else) in addition to normal lighting fixture support.
- r. The use of fluorescent lamps with low mercury content is recommended.

S804-2 Switching and Controls

- a. In addition to compliance with the Energy Conservation Construction Code of New York State: provide easily accessible local switching; provide dual level illumination in all teaching spaces, one level suitable for reading and note taking, and a lower level for passive lectures.
- b. Switching of electrical lighting circuits shall be so arranged that certain windowless areas with student occupancy shall either be circuited for some continuous lighting (night lights) directly from the lighting panel or shall be on key-operated switches mounted on the wall. Occupancy sensors shall not shut off all the lighting in the space. Such interior spaces may include, but are not limited to, classrooms, large group instruction areas, libraries, study halls, music rooms, gymnasiums, and gang toilets. All natatorium (swimming pools) shall have some continuous lighting whether or not natural light is provided.
- c. Automatic lighting control systems shall be specified to be normally closed, such that failure of any system component results in power transfer through system to manual switches or light fixtures.

- d. Automatic lighting controls in the means of egress, with the exception of stairs: The means of egress illumination level shall not be less than 1 foot-candle at the floor level at all times the building space served by the means of egress is occupied. Light fixtures shall be arranged such that failure of any single lamp does not result in an illumination level of less than 0.2 foot-candle in any space. Upon any occupant movement in the area served by the light fixtures, the illumination level must be brought up to at least the minimum level(s) as required by Section S804-1.
- e. Automatic lighting controls in stairs and areas of refuge: The means of egress illumination level shall not be less than 10 foot-candle at the walking surfaces at all times the building space(s) served by the stairs and area(s) of refuge are occupied.
- f. Automatic lighting controls serving light fixtures in areas where electric panels are located shall have a manual means for overriding such controls. Automatic lighting controls serving light fixtures in areas with ladders or stairs leading to equipment rooms or providing roof access shall have a manual means for overriding such controls, or controls installed to ensure lights will come on upon initial access to ladder/stair from any point.

S805 EMERGENCY LIGHTING

- a. Emergency Lighting, in addition to code requirements, shall be provided in spaces including, but not limited to:
 - 1. Completely enclosed Courts (Courtyards)
 - 2. Libraries (over 1000 sq ft)
 - 3. Single fixture, windowless, toilet rooms
 - 4. Spaces used outside of normal daylight hours. Such spaces are dependent upon program use. These may include, but not be limited to the following: locker rooms, team rooms, classrooms, athletic/dance rooms, and music rooms.
 - 5. Spaces requiring a second means of egress through an intervening space as well as the intervening space. (See S106-2.b)
 - 6. Common areas (waiting areas) of spaces such as office suites, guidance suites, and nurse suites
 - 7. Elevator machine rooms
 - 8. Spaces with potential for injury to staff such as, but not limited to the following: boiler rooms, furnace rooms, mechanical equipment/appliance rooms, pool equipment rooms, and electric rooms.
- b. Emergency lighting systems shall be arranged such that failure of a normal area lighting circuit shall cause the emergency lighting system to automatically energize, within 10 seconds, or maintain energized emergency lighting in the area at all times (24 hours/day, 365 days/year) whether the building space served by the means of egress is occupied or not occupied.
- c. New or modified emergency lighting circuits cannot be connected to existing generator and storage battery emergency power systems that do not comply with current code requirements. Generator and storage battery emergency power systems and emergency lighting circuiting shall be made to comply with current code requirements when new or modified emergency lighting circuit connections are installed.
- d. Existing emergency lighting circuiting is acceptable if installed in accordance with the Code requirements at the time of design. If the existing emergency lighting circuiting is not in accordance with the Code requirements at the time of design the circuiting will have to be retrofitted to be

compliant with current code requirements.

- e. When replacing or adding exterior lighting at exterior exits, exterior exit areas shall be equipped with emergency lighting such that failure of the normal lighting circuit serving the exterior exit area shall cause the emergency power system to automatically energize or maintain energized emergency lighting serving the exterior exit area. Exterior emergency lighting shall be provided for new ramps and stairs when constructed. Exterior exit area is defined as the exterior landing and the ramps and/or stairs serving the landing.
- f. SED considers program spaces with hot equipment, open flame, welders, kilns, rotating equipment and/or use of potentially hazardous chemicals to be in the same category as shops (ie. art, home economics, etc) for purposes of retroactive emergency lighting requirements.
- g. Where emergency power for emergency lights in an area is supplied by an emergency generator, some lighting (normal lighting) in the area shall be supplied from a panelboard that is not supplied by the load side of the emergency generator transfer switch and other lighting (emergency lighting) in the area shall be supplied from a panelboard that is supplied by the load side of the emergency generator transfer switch. The normal lighting and the emergency lighting each, separately, shall provide illumination levels equal to or greater than the levels required by the Code for emergency lighting.
- h. Where emergency power for emergency lights in an area is supplied by a central storage battery system, some lighting (normal lighting) in the area shall be supplied from a panelboard that is not supplied by the central storage battery system and other lighting (emergency lighting) in the area shall be supplied from the central storage battery system. The normal lighting and the emergency lighting each, separately, shall provide illumination levels equal to or greater than the levels required by the Code for emergency lighting.
- i. Where UL 924 Automatic Load Control Relays or UL 1008 Transfer Devices are used to energize or maintain energized emergency lighting in an area upon loss of the normal lighting supply in the area, the relays/devices shall be located in the area served by the emergency lighting.
- j. Emergency lights shall be easily identifiable for inspection and facilitating required maintenance. Wall mounted battery pack emergency lights are readily identifiable by their form. However, ceiling mounted emergency light fixtures, which have integral battery ballast backup or are tied into an emergency power system (i.e. emergency generator, central battery inverter, etc), are not easily identifiable. Labels shall be attached to these fixtures so that they are readily discernible, by a person standing on the normal walking surface in the area, for testing purposes. In addition, some emergency lights are designed to be illuminated at all times. Since these lights are on all the time, the lamps (bulbs) are likely to burn out faster than the rest of the lights serving the area. Lamps must be replaced immediately upon burning out in order to maintain emergency light coverage.
- k. School district buildings that will be used as emergency shelter facilities must have appropriate emergency power systems. When a generator is installed to satisfy the lighting and power requirements of an occupied emergency shelter, consideration shall be given to the potential for generator failure and fuel supply depletion or failure. While the electric utility connection is failed, the generator is considered the normal power source for the occupied emergency shelter. If the generator was to fail or the fuel supply became unavailable, the occupied emergency shelter would immediately be left in darkness, resulting in a dangerous condition where the means of egress would be extremely difficult to navigate. Systems shall be provided to supplement the generator system such that code required emergency illumination is provided, for at least 90 minutes to allow for evacuation, in the

event of generator failure or fuel supply unavailability.

1. Floor proximity egress path marking in accordance with the provisions in NFPA 101 are recommended.

S806 EXIT SIGNS

- a. Exit Signs, in addition to code requirements, shall be provided in spaces including, but not limited to:
 1. Completely enclosed Courts (Courtyards)
 2. Libraries (over 1000 sq ft)
 3. Spaces where egress doors are not readily visible or apparent. These may include, but not be limited to the following: locker rooms, team rooms, common areas of office, guidance or nurse suites, libraries
- b. Doors shall be presumed closed for layout of Exit Signs.
- c. "EXIT" face(s) and directional arrows shall be clearly indicated on the drawings.
- d. Where emergency power for Exit Signs is supplied by an emergency generator, the exit signs shall be listed/labeled for two separate circuit inputs. Exit Signs shall be supplied from both a panelboard that is not supplied by the load side of the emergency generator transfer switch and also from a panelboard that is supplied by the load side of the emergency generator transfer switch. Exit Sign circuiting shall be supplied from both the local area normal lighting circuit and the local area emergency lighting circuit, ahead of any switching, and wired to minimize the possibility of interruption.
- e. Where emergency power for Exit Signs is supplied by a central storage battery system, the Exit Signs shall be listed/labeled for two separate circuit inputs. Exit Signs shall be supplied from a panelboard that is not supplied by the central storage battery system and also from the central storage battery system. Exit Sign circuiting shall be supplied from both the local area normal lighting circuit and the local area emergency lighting circuit, ahead of any switching, and wired to minimize the possibility of interruption.
- f. Exit Sign circuiting, for battery equipped unit equipment exit signs, shall be supplied from the local area normal lighting circuit, ahead of any switching, and wired to minimize the possibility of interruption.
- g. Exit Signs shall be the LED type.
- h. Floor proximity exit signs in accordance with the provisions in NFPA 101 are recommended.

S807 EMERGENCY and STANDBY POWER SYSTEMS

- a. Clearly indicate if generator systems are separately derived or not separately derived.
- b. Clearly indicate Level, Type, and Class for systems.
- c. Clearly indicate all loads connected to emergency and standby power systems. Clearly indicate if the loads are emergency or standby loads.

S808 GROUNDING and BONDING

- a. Provide a separate (insulated green) equipment grounding conductor (EGC) for all feeders and branch circuits. Use of a conduit as the sole EGC is not allowed.
- b. Above-ground portions of metal air ducts shall be electrically continuous and bonded to an effective ground-fault current path. Metal air ducts shall be considered to be bonded when connected to the equipment grounding conductors of associated heating, ventilating, and air conditioning equipment. Install bonding jumper to bond across flexible duct connections. Use braided bonding straps.
- c. Above-ground portions of metal piping systems shall be electrically continuous and bonded to an effective ground-fault current path. Metal piping systems shall be considered to be bonded when connected to the equipment grounding conductors of associated pumps and equipment. Install bonding jumper to bond across flexible pipe connections. Use braided bonding straps. Metal underground gas piping shall not be used as a grounding electrode. Coordinate with the gas utility company to determine if a dielectric fitting is required to be installed in the gas piping where it connects to the utility company meter.
- d. Provide a ground rod and ground conductor bonded to each site lighting pole, CCTV pole, etc.
- e. Provide ground rods and ground conductors bonded to metal fences and gates.
- f. Provide, at a minimum, ground rods and ground ring conductors at exterior generators.
- g. Provide detailed grounding design including locations/configurations/sizes of all grounding electrodes, sizes of grounding electrode conductors, and neutral to ground bonding requirements. Simply specifying compliance with Article 250 of the NEC is not adequate.
- h. Coordinate with the electric utility company, regarding service entrance grounding, as required. Submit the design to the electric utility company for review and approval, as required.
- i. Solar Photovoltaic (PV) Systems with Alternating-Current and Direct-Current Grounding Requirements: Provide a separate DC grounding electrode conductor routed to either DC grounding electrode(s) [typically ground rods] near the PV system or directly to the building AC electrical service entrance grounding electrode(s) if nearby. DC grounding electrode(s), when used, shall be bonded to the building AC electrical service entrance grounding electrode(s).

S809 FIRE ALARM SYSTEMS

S809-1 General Requirements

- a. A manual and automatic fire alarm system shall be installed.
- b. Any school located in a municipal fire district having a general fire alarm system shall be provided with a fire alarm box on the premises that shall be interlocked with the school system to automatically notify the fire department reporting system. The typical alarm box used in the city, village, town, or fire district is to be located on the premises as directed by a responsible authority in the fire department.
- c. Motors operating fans in air handling systems and exhaust systems, serving multiple spaces, assembly spaces or corridors, having fan capacities of greater than 1000 CFM, shall be interconnected to the fire

alarm system to shut down such motors when the fire alarm is activated. It is recommended that single unit ventilators serving individual rooms, and exhaust fans of 1000 CFM capacity and less, also be so connected. Building control panels may be used as part of the fan motor shutdown, if they are listed and labeled as fire alarm control panels, and protected as required for fire alarm control panels. Note that there may be special circumstances where shutdown of fans is not desirable (examples: certain commercial kitchen exhaust hoods with extinguishing systems that require the exhaust fans to operate – verify with the manufacturer of the proposed extinguishing system; certain laboratory fume hood exhaust systems where it would not be prudent to allow the vapors of hazardous chemicals used in experiments to escape into the laboratory; smoke control systems; etc).

- d. The Fire Alarm Control Panel (FACP) shall be available to responding firemen. Coordinate with the fire department and obtain approval for the location(s).
- e. The Fire Alarm Annunciator Panel (FAAP) and the FACP must have graphic plans, which indicate the location(s) of the activated initiation device(s), mounted immediately adjacent to the panels. The graphic plans shall be protected from damage. Where the building is broken into zones on the graphic plans, careful thought should be put into the zone layouts such that responding fire department personnel can easily locate areas of interest. Proposed FAAP and FACP graphic plans shall be included in the design submission to SED. FAAP and graphic plans must be located at the normal fire department entrance, near a window so that they may be read by firefighter personnel without entering the building and also at a location in the building that is normally occupied at any time the building is occupied (i.e. main office). A locked fire drill switch shall be provided in the main office. Coordinate with the fire department and obtain approval for the locations and graphic plans.
- f. Door hold-open release devices (i.e. magnetic door holders) normally holding doors in the open position must be interlocked with the fire alarm system such that, upon activation of the fire alarm system the door hold-open release devices will automatically allow the doors to close. (See S109 and S110 for additional information.)
- g. Smoke dampers must be interlocked with the fire alarm system so that, upon activation of the fire alarm system the smoke dampers will automatically close. [Exception: Smoke control systems.]
- h. Elevator Recall: Clearly indicate which floor level is the designated recall floor level. Clearly indicate which floor level is the alternate recall floor level. Clearly indicate which detectors initiate recall including which floor level the elevator shall recall to.
- i. Carbon monoxide, propane, natural gas, and refrigerant detectors/sensors and alarm systems shall be connected to the combination (fire and non-fire) alarm system. Propane, natural gas, and refrigerant detectors/sensors shall be listed/labeled in accordance with UL 2075. Provide local audible and visual alarms based on initiation of these detectors/sensors. Audible and visual alarms activated based on initiation of these detectors/sensors must be distinctively different from fire alarm signals. Initiation of these detectors/sensors shall be monitored, as a supervisory signal, by the supervising station specifically as to the type of detection. These detectors/sensors shall send a specific trouble signal to the fire alarm system if a problem exists with the sensing circuit or if the detector has reached its maximum lifespan. Note that appropriate monitor modules will be necessary when the detectors/sensors are not specifically listed/labeled to be directly connected to the combination (fire and non-fire) alarm system. Electrochemical carbon monoxide detectors/sensors are recommended.
- j. FACP Replacement Only: Provide a FACP that complies with the listing/labeling requirements of the

current Code and this Manual. Provide a FACP that is capable of, or can be readily expanded to be capable of, accommodating the future installation of all initiation devices, notification appliances, and other equipment, required by current Code and this Manual, throughout the building. The fire alarm equipment shall be protected in accordance with current Code and this Manual.

- k. FACP and Device/Appliance/Equipment Replacement: This is considered a replacement of the fire alarm system. The entire fire alarm system shall comply with current Code and this Manual. All devices and appliances shall be installed in accordance with their listing/labeling and the requirements of Code and this Manual. (For Example: any existing pull station locations that are not located within the height and distance requirements of current Code and this Manual can't be reused.)

S809-2 Manual Fire Alarm Boxes (Pull Stations)

- a. Fire alarm manual pull stations, in addition to code requirements, shall be located within 5 feet of the following: exterior doors from occupied areas; exterior doors from areas having unusual fire hazards including, but not limited to, boiler rooms, furnace rooms, mechanical equipment/appliance rooms, and electrical rooms.

S809-3 Automatic Fire Detection – Smoke Detectors and Heat Detectors

- a. Smoke detectors shall be provided throughout each student occupied building. Exception: Heat detectors may be substituted for smoke detectors if the environmental conditions in a particular area hinder the proper operation of smoke detectors.
- b. Total (complete) coverage automatic fire detection systems are recommended throughout each student occupied building.
- c. Duct smoke detectors must be installed in both the supply air and return air duct(s) to indirect fired and electric heating units and must be interconnected with the unit and fire alarm system such that detection of smoke will shut off the main supply of fuel or energy and shut off the fans and activate the building fire alarm system. Exception: Duct smoke detectors are not required where all spaces served have area smoke detector coverage, and the unit shuts down upon activation of the fire alarm system.
- d. Provide a readily accessible remote alarm indicator and keyed test/reset station for each duct smoke detector. Locate the indicator and station outside of the access point for each duct smoke detector.
- e. Provide a readily accessible remote alarm indicator and keyed test/reset station for each smoke or heat detector that is either not readily accessible or concealed. Locate the indicator and station outside of the access point for each concealed detector.
- f. All smoke and heat detectors must be interconnected with the fire alarm system to: automatically activate the building's fire alarm notification appliances; automatically send a signal to the municipal fire alarm system (where available); automatically send signal to the approved supervising station; initiate fire safety functions.
- g. Clearly indicate the type of smoke or heat detector on the construction documents. Clearly indicate the temperature classification of heat detectors on the construction documents. Clearly indicate the listed spacing required for the smoke and heat detectors on the construction documents.

S809-4 Alarm Notification Appliances

- a. Visual or audible/visual notification appliances shall be provided in areas including, but not limited to, boiler rooms, furnace rooms, mechanical equipment/appliance rooms, electrical rooms, attics, basements, and crawlspaces in addition to code requirements.
- b. Visual notification appliances: Public and Common areas include, but are not limited to: corridors, lobbies, assembly spaces (50 occupants or more) and associated surrounding spaces, music rooms, practice rooms, stages, platforms, various types of classrooms, cafeterias, ganged toilet rooms, toilet rooms accessible to the public, single water closet toilet rooms, dressing rooms, locker and shower areas, team rooms, libraries, meeting and conference rooms, common areas of office suites, offices, filing and photocopy rooms, employee break rooms, common areas of nurse suites, examination and treatment rooms, and courtyards (exception: teacher supervised single water closet toilet room, serving a single lower grade level classroom in an existing building, that does not meet the accessibility requirements of ANSI A117.1 and will not be used by someone who is hearing impaired).
- c. Doors shall be presumed closed for layout of notification appliances.
- d. Clearly indicate the candela rating/setting of each visual notification appliance on the construction documents.
- e. When an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed, visual notification appliances shall be provided throughout the entire building.

S810 COMMUNICATION SYSTEMS

- a. A Public Address (PA) system shall be provided in all school buildings having pupil occupancy. The public address system shall broadcast to every occupied space. PA systems shall be provided with a standby power supply power supply in addition to the normal electrical power source.
- b. Communication equipment shall be provided in each student occupied space. The communication equipment shall be capable of two-way communication between the pupil occupied space and the main office. The communication equipment shall also have controlled access to a public telephone system. Communication equipment shall connect to the central control point communication equipment prior to connecting to the public telephone system. The communication equipment shall be provided with a standby power supply in addition to the normal electrical power source.
- c. Communications: Installations shall comply with current TIA and EIA standards.

S811 TELEPHONE

- a. A public telephone shall be provided in all school buildings having pupil occupancy.
- b. Telephone systems shall be provided with a standby power supply in addition to the normal electrical power source.

S812 AREAS OF SPECIAL ELECTRICAL NEEDS

- a. Areas including, but not limited to, Home and Careers, Science, Art, Electric Kilns, Shops, Kitchens, Stages, Audio Visual, Paint Spray Rooms, and Computer Rooms often have special electrical needs such

as voltage ratings other than 120 Volts, circuits rated greater than 20 Amps, 3-Phase circuits, dedicated equipment circuits, floor outlets, power poles, cord reels, etc. The anticipated program use of each space must be discussed with appropriate school district personnel and submitted designs must account for these requirements. Allowances must be made for flexibility in adding peripheral equipment, and special needs as they develop.

- b. Gymnasium:
 - 1. Provide impact guards and lenses for light fixtures such that shards from a broken lamp will be contained within the fixture. Provide impact guards for fire alarm system equipment.
 - 2. Where occupancy sensors are utilized for control of HID lighting, provide supplemental means of egress lighting to offset the impact of the HID lighting warm-up time.
- c. Crawlspace and Maintenance Work Areas: 125-volt, single-phase, 15- and 20-ampere receptacles shall have GFCI protection for personnel. Lighting fixtures – lamps shall be shielded from accidental blows.
- d. Serving areas for kitchens and cafeterias shall be considered a “kitchen” (per the NEC) for the purposes of providing GFCI protection for all 125-volt, single-phase, 15- and 20-ampere receptacles.

S813 VOCATIONAL TECHNOLOGY and SHOPS

- a. Lighting fixtures for vocational technology or shops shall be of a type in which the maximum surface temperature of the lamp or tube does not rise above 165°C. Shielding of the lamps from accidental blows must also be provided.
- b. Woodworking machine tools shall be provided with dust-tight plugs and receptacles, or shall be provided with a rigid to flexible permanent connection. Dust-tight motor starters are to be provided on such equipment. Motors attached to woodworking machine tools shall be the self-enclosed type.
- c. Shop emergency shutdown stations are required. The emergency shutdown stations shall be red Emergency Stop mushroom pushbuttons (key-released version). One (1) shall be located on each wall of the room. The emergency shutdown stations shall be provided in locations with a clear unobstructed access that is minimum 36” wide. The emergency shutdown stations shall be configured to de-energize the power panel(s) supplying shop equipment in emergencies.
- d. 125-volt, single-phase, 15- and 20-ampere receptacles shall have GFCI protection for personnel.
- e. Shop equipment shall be provided with magnetic switches such that the equipment will not restart automatically upon restoration of power after an electrical shutdown.
- f. Automotive areas shall be designed in accordance with the NEC requirements for Commercial Garages.

S814 PANEL LOCKING DEVICES

- a. Lighting and power panels shall be provided with door locking devices. Doors shall be locked.

S815 ELECTRICAL IDENTIFICATION

a. General:

1. Provide identification on all equipment, raceways, boxes, conductors, and devices.
2. Identification provided shall match the identification names, designations, and letters/numbers indicated on drawings schematic and interconnection diagrams, equipment manufacturer's shop drawings, and in specifications. Identification names, designations, and letters/numbers shall match the standards of each individual school district. If no school district standard exists, a standard shall be developed.
3. Electrical identification includes, but is not limited to, warning signs, nameplates, cable tags, wire markers, phase identification tape, identification labels, and nominal system voltage designation labels.
4. Electrical identification shall be permanent.
5. Electrical identification shall be machine printed.
6. Utilize machine engraved laminated engraving stock where appropriate.
7. Electrical identification shall be appropriately sized.
8. Electrical identification shall be provided such that it is easily read upon approach or within enclosures.

b. Power, Lighting, and Control:

1. Switchboards, Panelboards, MCCs, Equipment Cabinets, Control Panels, Generators, UPS, Disconnect Switches, Enclosed Circuit Breakers, and Motor Controllers:
 - i. Provide nameplate with equipment identification as indicated on the drawings.
 - ii. Indicate source and location of the source.
 - iii. Provide nominal system voltage designation labels on cover.
2. Disconnect Switches and Enclosed Circuit Breakers:
 - i. Indicate the equipment designation and location which the disconnect serves.
3. Motor Controllers:
 - i. Indicate the motor designation, location, and the type of service
4. Transfer Switches:
 - i. Provide nameplate with equipment identification as indicated on the drawings.
 - ii. Indicate the equipment designation and location which the transfer switch serves.
 - iii. Indicate normal and standby/emergency sources and location of the sources.
 - iv. Provide nominal system voltage designation labels on cover.
5. Pullboxes, Enclosures, Junction Boxes:
 - i. Provide identification labels with feeder, branch circuit, and control circuit numbers on cover.

- ii. Indicate source(s) and location(s) of the source(s).
 - iii. Indicate the load(s) and location(s) of the load(s) served.
 - iv. Provide nominal system voltage designation labels on cover.
6. Feeder Circuits, Branch Circuits, Control Circuits, Site Lighting Circuits:
- i. Provide cable tags, wire markers, and phase identification tape as appropriate.
 - ii. Identify circuits in each junction box, pullbox, outlet box, enclosure, gutter, manhole, handhole, lighting standard base, and at each termination.
 - iii. Identify with circuit number, load and location served, and panel (equipment) designation and location from which it originates.
 - iv. Include identification of the building from which it originates for exterior circuits.
7. Circuits Over 600 Volts:
- i. Cables shall be identified at each manhole, handhole, junction box, transformer, switch, and at each termination using cable tags.
 - ii. Identify nominal voltage, circuit number, circuit size, load served, and equipment designation and location from which it originates.
 - iii. Exposed conduit runs shall be identified continuously similar to “DANGER – 4160 VOLTS”, “DANGER – 13,200 VOLTS” or as appropriate.
8. Underground Conduits and Circuits:
- i. Provide warning ribbon above the underground installation. The ribbon shall be capable of being identified by a metal detector. The ribbon shall include continuous lettering similar to “CAUTION BURIED ELECTRIC BELOW”.
9. Empty Conduit Runs and Conduits with Conductors for Future Use:
- i. Provide cable tags
 - ii. Indicate proposed future use
 - iii. Label conduits and conductors at both ends, including location of other end.
10. Receptacles, Switches, and Control Devices:
- i. Provide identification label on faceplate.
 - ii. Identify branch circuit number and panel designation and location from which it originates.
 - iii. Identify receptacles supplied from GFCI-type circuit breakers in accordance with Section S801.
11. Emergency Lighting Fixtures:
- i. Provide identification labels in accordance with 805-i requirements.
- c. Systems:
1. Equipment Cabinets, Terminal Cabinets, Control Panels, Patch Panels, Racks:
- i. Provide nameplates with equipment identification as indicated on the drawings.
 - ii. Label termination blocks and ports.
 - iii. Provide nominal system voltage designation labels on cover.
2. Pullboxes, Enclosures, Junction Boxes:
- i. Provide identification labels including system type and circuit numbers on cover.
 - ii. Indicate equipment and location(s) from which enclosed cables originate.

- iii. Indicate the equipment and location(s) of the equipment served.
 - iv. Provide nominal system voltage designation labels on cover.
3. Cables and Conduits:
- i. Provide cable tags, wire markers, and identification labels including system type and circuit numbers as appropriate.
 - ii. Identify cables in each junction box, pullbox, device box, enclosure, gutter, manhole, handhole, and at each termination.
 - iii. Identify with cable number, equipment and location(s) of the equipment served, and equipment designation and location from which it originates.
 - iv. Label conduits at both ends, including conduit number and location of other end.
 - v. Include identification of the building from which it originates for exterior cables.
4. Underground Conduits and Cables:
- i. Provide warning ribbon above the underground installation. The ribbon shall be capable of being identified by a metal detector. The ribbon shall include continuous lettering similar to “CAUTION BURIED ELECTRIC BELOW”.
5. Empty Conduit Runs and Conduits with Cables for Future Use:
- i. Provide cable tags and identification labels.
 - ii. Indicate proposed future use.
 - iii. Label conduits and cables at both ends (including location of other end).
6. Fire Alarm:
- i. Fire alarm junction boxes and pull fittings shall be painted to identify them as components of the fire alarm system as compared to other systems. Red is a typical paint color for fire alarm system components although the color should match the standards of the school district.
 - ii. Remote Smoke Detector Lamps and Test Stations – Provide nameplate indicating the location of the connected device.
 - iii. Initiation Devices, Notification Appliances, Fire Alarm Relays – Provide device identification and zone or address identification label.
7. Communication:
- i. Comply with applicable EIA, TIA, and ANSI standards.
 - ii. Data Outlets – Provide device identification label on faceplate. Identify equipment designation and location from which it originates.
8. Security:
- i. Provide device identification labels.
 - ii. Identify equipment designation and location from which it originates.

APPENDIX A: LAWS (EXCERPTS) RELATING TO SCHOOL BUILDING PROJECTS

A001 INTRODUCTION

The following excerpts from Laws and Regulations of the State of New York serve to highlight a few of the various laws which pertain to school construction, financing and safety. The excerpts are given the full name of the title of the law or regulation from which they are taken to enable the reader to easily find and review the regulation in full. These are just a few of the many laws which govern capital improvements of public school facilities. The design professionals and school administrators must be familiar with those laws and will often need to consult with their attorneys to ensure that all aspects of the construction and financing of school facilities are performed properly.

A002 EDUCATION LAW - Excerpts

Title 1 General Provisions, Article 9 – School Buildings and Sites
Section 408.

Plans and specifications of school buildings must be approved by the Commissioner of Education.

1. No schoolhouse shall hereafter be erected, repaired, enlarged or remodeled in any school district except in a city school district in a city having seventy thousand inhabitants or more, at an expense which shall exceed one hundred thousand dollars, until the plans and specifications thereof shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating and lighting of such buildings.

In the case of a school district in a city having seventy thousand inhabitants or more, all of the provisions previously set forth in this subdivision shall apply...

In either case, the commissioner may, in his discretion, review plans and specification for projects estimated at an expense of less than one hundred thousand dollars.

2. The commissioner of education shall not approve the plans for the erection of any school building or addition thereto or remodeling thereof unless the same shall provide for heating, ventilation, lighting, sanitation, storm drainage and health, fire and accident protection adequate to maintain healthful, safety and comfortable conditions therein and unless the county superintendent of highways or commissioner of public works has been advised of the location of all temporary and permanent entrances and exits shown on public highways and the storm drainage plan which is to be used.
3. The commissioner of education shall approve the plans and specifications, heretofore or hereafter submitted pursuant to this section, for the erection or purchase of any school building or addition thereto or remodeling thereof on the site or sites selected therefore pursuant to this chapter, if such plans conform to the requirements and provisions of this chapter and regulations of the commissioner adopted pursuant to this chapter in all other respects; provided, however, that the commissioner of education shall not approve the plans for the erection or purchase of any school building or addition thereto unless the site has been selected with reasonable consideration of the following factors; its place in a comprehensive, long-term school building program; area required for outdoor educational activities; educational adaptability, environment, accessibility; soil conditions; initial and ultimate cost. In developing such plans and specifications, school districts are encouraged to review the energy conservation and saving best practices available from the department and the New York State Energy Research and Development Authority.
4. No funds voted by a district meeting or other competent authority in any school district to which the provisions of subdivision one of this section are applicable, exceeding the amounts specified in such subdivision, shall be expended

by the trustees or board of education until the commissioner of education shall certify that the plans and specifications for the same comply with the provisions of this section.

Section 409.

School building regulations in relation to health and safety.

All school buildings of common, union free, central, central high school, and city school districts other than city school districts of cities having one hundred twenty-five thousand inhabitants or more shall comply with such regulations as the commissioner of education shall adopt from time to time for the purpose of insuring the health and safety of pupils in relation to proper heating, lighting, ventilation, sanitation and health, fire and accident protection.

Title 8, The Professions, Article 145 Engineering and Land Surveying

Section 7209. Special provisions

1. ...all plans, specifications, ...relating to the construction or alteration of buildings or structures ... shall be stamped with such seal and shall be signed, on the original with the personal signature of such professional engineer....No official of this State, or of any city, county, town or village therein, charged with the enforcement of laws, ordinances or regulations shall accept or approve any plans or specifications that are not stamped: a. With the seal of an architect or professional engineer....
2. No county, city, town or village or other political subdivision of this State shall engage in the construction or maintenance of any public work...for which plans, specifications and estimates have not been made by, and the construction or maintenance supervised by, a professional engineer...; provided that this section shall not apply to the construction...of county roads or town highways, nor to any other public works wherein the contemplated expenditure for the completed project does not exceed five thousand dollars. This section shall not be construed as effecting or preventing ...engaging an architect licensed in this State for the preparation of plans, specifications and estimates for and the supervision of construction or maintenance of public works.

A003 NEW YORK CODES RULES AND REGULATIONS (8 NYCRR 14) – Excerpts

Title 8 Education Department, Chapter I – Rules of the Board of Regents, Part 14

Section 14.1 – School Buildings and Grounds

- a. Regulations. The Commissioner shall make regulations governing the requirements for the plans and specifications for the erection, repair, enlargement and remodeling of school buildings.

General requirement. Each school district shall provide suitable and adequate school buildings and grounds for the instruction and accommodation of the pupils of such district.

A004 NEW YORK CODES RULES AND REGULATIONS (19 NYCRR 1201) – Excerpts

Title 19 Department of State, Chapter XXXII - Division of Code Enforcement and Administration, Part 1201 Uniform Code: Procedures for Certain Classes of Buildings

1201.1 Introduction. In general, Section 381 of the Executive Law directs the State's cities, towns and villages administer and enforce the New York State Uniform Fire Prevention and Building Code (Uniform Code). However, the statute contemplates the need for alternative procedures for certain classes of buildings based upon their design, construction, ownership, occupancy or use, and authorizes the Secretary of State to establish those procedures. Those exceptions are subject of this Part.

1201.2 Governmental Buildings and Activities

- (e) The State Education Department shall be accountable for administration and enforcement of the Uniform Code with respect to buildings, premises and equipment in the custody of, or activities related thereto undertaken by, school districts and boards of cooperative educational services.

A005 GENERAL MUNICIPAL LAW – Excerpts

Article 5-A – Public Contracts

Section 101. Separate specifications for certain public work.

1. Every officer, board or agency of a political subdivision ... charged with the duty of preparing specification or awarding or entering into contracts for the erection, construction, reconstruction or alteration of buildings, when the entire cost of such work shall exceed three million dollars in counties of the Bronx, Kings, New York, Queens, and Richmond; one million five hundred thousand dollars in the counties of Nassau, Suffolk and Westchester; and five hundred thousand dollars in all other counties within the state, shall prepare separate specifications for the following three subdivisions of the work to be performed:
 - (a) plumbing and gas fittings;
 - (b) steam heating, hot water heating, ventilating and air conditioning apparatus; and
 - (c) electrical wiring and standard illuminating fixtures.
2. Such specifications shall be drawn so as to permit separate and independent bidding upon each of the above three subdivisions of work. All contracts awarded shall award the three separate subdivisions of the above specified work separately Nothing in this section shall be construed to prevent any political subdivision from performing any such branches of work by or through their regular employees

Section 103. Advertising for bids and offers; letting contracts; criminal conspiracies.

1. Except as otherwise expressly provided by an act of the legislature or by a local law adopted prior to September first, nineteen hundred fifty-three, all contracts for public work involving an expenditure of more than thirty-five thousand dollars and all purchase contracts involving an expenditure of more than twenty thousand dollars, shall be awarded by the appropriate officer, board or agency of a political subdivision or of any district therein including but not limited to a soil conservation district to the lowest responsible bidder furnishing the required security after advertisement for sealed bids in the manner provided by this section, provided . . .

A006 LOCAL FINANCE LAW – Excerpts

Article II – Local Indebtedness

Title 1 – Power to Contract Indebtedness and Periods of Probable Usefulness

11.0 – Periods of Probable Usefulness

11. Buildings. The acquisition or construction of buildings not included in any other subdivision hereof, whether or not including grading or improvement of the site, original furnishings, equipment, machinery or apparatus required for the purposes for which such buildings are to be used, as follows:
 - (a) Class “A” (fireproof and certain fire resistant) buildings.
 - (1) Buildings, the walls of which are constructed of brick, stone, concrete, metal or other incombustible material, and in which there are no wooden beams or lintels, except wood glue laminated structural members, and in which the floors, roofs, stairhalls, and other means of vertical communication between floors and their enclosures are built entirely of brick, stone, metal or other incombustible materials, and in

which no woodwork or other inflammable material is used in any of the rough partitions, floor or ceiling structures, or

- (2) Buildings, not more than one story above the ground, the outer walls of which are constructed of brick, the outer walls of which are constructed of brick, stone, concrete, metal, stucco or other fire-resisting material and which are to be used as school houses by school districts wholly outside of a city, thirty years.
- (b) Class “B” (fire-resistant) buildings. Buildings, the outer walls of which are constructed of brick, stone, concrete, metal, stucco, or other fire-resistant material, twenty-five years.
- (c) Class “C” buildings. Buildings which are neither class “A” nor class “B”, as defined in items (a) and (b) above, including any such building which is rebuilt or altered so that it, together with any addition or vertical or other extension, is not fire-proof nor fire-resisting, as thus defined, fifteen years.

12. Additions to or conversion of buildings.

- (a) (1) The construction of an addition or additions to or the reconstruction of a class “A” building, whether or not such construction or reconstruction includes grading or improvement of the site, twenty five years, except as hereinafter provided; the conversion of a class “B” or class “C” building into a class “A” building, whether or not such conversion includes grading or improvement of the site, twenty-five years. If indebtedness has been contracted or is to be contracted with a maximum maturity of over twenty-five years, but not to exceed thirty years, to finance the acquisition or construction of a class “A” building and if more than twenty-five annual installments of principal on the indebtedness evidenced or to be evidenced by bonds or notes have not matured, then the foregoing twenty-five year period of probable usefulness for the construction of an addition to such class “A” building shall be increased by the number of years over twenty-five as there are unmatured annual installments of principal on such indebtedness which has been or is to be contracted for the class “A” building; provided that such addition is to be constructed to meet the construction standards of the class “A” building to which it is an addition. The maximum maturity of such indebtedness for the class “A” building shall be measured from the date of the bonds or from the date of the first bond anticipation note issued on anticipation of such bonds, whichever is the earlier.
- (2) The construction of an addition or additions to or the reconstruction of a class “B” building or the conversion of a class “C” building into a class “B” building, whether or not such construction, reconstruction or conversion includes grading or improvement of the site, fifteen years.
- (3) The construction of an addition or addition to or the reconstruction of a class “C” building, whether or not such construction or reconstruction includes grading or improvement of the site, ten years.
- (b) The periods of probable usefulness set forth in item (a) above shall include original furnishings, equipment, machinery or apparatus required for the purposes for which such additions to such buildings for which such reconstructed or converted buildings are to be used.
- (c) A building which is to be attached to an existing building or buildings shall be deemed to be a new building and not an addition if the probable useful life thereof is not dependent upon the useful life of such existing building or buildings.

A007 NEW YORK CODES, RULES AND REGULATIONS (12 NYCRR 47) – Excerpts

Title 12 Department of Labor, Chapter I – Board of Appeals, Part 47
(Industrial Code Rule No. 47)

Part 47 Transparent Glass Doors in Mercantile Establishments and in Public and Commercial Buildings and Structures

47.4 Application. ...applies ... to all transparent glass doors and fixed adjacent glass sidelights ...

Exceptions:

1. Fixed adjacent transparent glass sidelights 20 inches or less in width with opaque stiles at least one and three-quarters inches in width shall be exempt from the requirements of this Part. (rule)
2. Where the ground, floor or equivalent surface area in the path of approach to a fixed adjacent transparent

glass sidelight from either side for a minimum distance of three feet from such sidelight is so arranged, constructed or designed as to deter persons from approaching such sidelight or a permanent barrier is installed in the path of approach, the sidelight shall be exempt from the requirements of this Part (rule). Decorative pools, horticultural planting or similar installations shall be considered as indicating that the ground, floor or equivalent surface area is not a path of approach. Planters, benches and similar barriers which are securely fastened to the floor or wall to prevent their removal shall be considered as blocking the path of approach provided they shall not be less than 18 inches in height from the ground, floor or equivalent surface and extend across at least two-thirds of the total width of the glazed area of the sidelight.

3. Fixed adjacent transparent glass sidelights which are supported by opaque sill and wall construction of at least 18 inches above the ground, floor or equivalent surface immediately adjacent shall be exempt from the requirements of this Part (rule)...

47.5 Definitions. (g) Sidelights. Fixed panels of transparent glass which form part of or are immediately adjacent to and within six feet horizontally of the vertical edge of an opening in which transparent glass doors are located. For purposes of this rule, a sidelight shall consist of transparent glass in which the transparent area above a reference line 18 inches above the adjacent ground, floor or equivalent surface is 80 percent or more of the remaining area of the panel above such reference line.

47.7 Marking. All transparent doors and fixed adjacent transparent glass sidelights shall be marked as hereinafter required...shall be of such a design as to be readily discernible to any person approaching the doors and sidelights from any direction.

47.8 Marking locations. Transparent glass doors and fixed adjacent transparent glass sidelights shall be marked in two areas on the glass surface thereof. One such area shall be located at least 30, but not more than 36 inches and the other at least 60, but not more than 66 inches above the ground, floor or equivalent surface below the door or sidelight.

Exceptions:

1. Transparent glass doors and fixed adjacent transparent glass sidelights shall be exempt from the upper area marking requirement (60 to 66 inches above the ground, floor or equivalent surface) if they are provided with horizontal separation bars, muntin bars or equivalent at least one and one-half inches in vertical dimension that extend across the total width of the glazed area and are located at least 40, but not more than 50 inches above the bottom of the door or sidelight.

47.9 Marking dimensions. The marking design shall be at least four inches in diameter if circular or four inches in its least dimension if elliptical or polygonal, or shall be at least 12 inches in horizontal dimension if the marking is less than four inches in its least dimension. In no event shall the vertical dimension of any marking including lettering be less than one and one-half inches in height.

47.10 Marking methods. (a) In addition to horizontal muntin bars, separation bars or equivalent, any of the following methods may be used to alert persons to the presence of transparent glass doors and fixed adjacent transparent glass sidelight in their path of movement:

- (1) chemical etching
- (2) sandblasting
- (3) adhesive strips not less than one and one-half inches in vertical dimension extending across at least two-thirds of the total glazed area.
- (4) Decals
- (5) Paint, gilding or other opaque marking materials
- (6) Opaque door pulls or push bars extending across at least two-thirds of the total width of the glazed area

APPENDIX B: HEALTH AND SAFETY COMMITTEES

B001 GENERAL

- a. The Commissioner has established a requirement that all school districts and BOCES must have a Health and Safety Committee.

B002 REGULATIONS

- a. Regulation *155.5 Uniform Safety Standards for School Construction and Maintenance Projects*. It is the responsibility of the Board of Education or BOCES to ensure the regulation is followed. There are responsibilities to be addressed when there are construction or maintenance projects as well as when there are no activities present. This regulation may be read in full on our web site.

APPENDIX C: MANUFACTURED CLASSROOM BUILDINGS

C001 GENERAL

- a. Manufactured Classroom Buildings are often referred to as Modular, Relocatable, or Portable Classrooms. This section applies to new or used, and purchased or leased buildings. A Manufactured Classroom Building can not be legally occupied without a Certificate of Occupancy from Facilities Planning. Review the SED Instruction Guide For Public School Districts and BOCES Obtaining Building Permits for Capital Construction Projects for additional information on Manufactured Buildings.
- b. All Manufactured Classroom Building installations or relocations require building permits prior to bidding, leasing or installation. Therefore, every installation or relocation must be submitted to Facilities Planning for review, the same as any other capital project. Purchased and leased manufactured buildings must be bid before they are installed or relocated.
- c. Leasing of modulares is not eligible for building aid, purchase of modulares is eligible for building aid, and manufacturers will often buy back units. However, if you are planning to build permanent classroom space in the future this may affect that aid. You should consult with your SED project manager.

C002 CODE COMPLIANCE

- a. All construction shall comply with the New York State Uniform Fire Prevention and Building Code, the Manual of Planning Standards and the Commissioner's Regulations. This applies to all disciplines; architectural, heating, ventilation, plumbing, electric, fire alarm detection/suppression, energy code, and accessibility requirements.
- b. The State Building Code requires new manufactured buildings to have an Insignia of Approval issued by the Secretary of State that certifies that the structure or component is in compliance with the building code for the proposed use. The architect/engineer of record must provide a copy of the Insignia to Facilities Planning with the Certificate of Substantial Completion. This will be required prior to Facilities Planning issuing a certificate of occupancy (see the note below);
- c. For buildings that are being relocated, Chapter 12 of the Existing Building Code of New York State, Relocated or Moved Buildings, applies. If the building will contain classrooms, Commissioner's Regulation 155.7 also applies. Buildings built prior to January 1, 2003 will not be required to have an Insignia of Approval.

C003 BUILDING DESIGN

- a. Every new installation or relocation of a manufactured building will require the building to be accessible for the physically impaired. Previously approved manufactured buildings being relocated that are not accessible must be made 100% accessible. Accessibility includes parking, an exterior route to the building, entrance, all door clearances, door hardware, workstations, sinks, bubblers, toilets, and signage.
- b. Manufactured buildings which are wood frame or Type 5 Construction and will be used for classrooms are required to have two exit doors from each classroom.
 - i. The primary entrance door, and exit stair, and/or ramp shall be covered with a canopy or may be enclosed.

- ii. As noted above, the secondary exit for classrooms in buildings with any wood construction must be a door and not a rescue window.
- iii. The secondary exit is not required to be covered. However, if the secondary exit stair and/or ramp is not covered, it shall have a non-slip surface. If the secondary exit does not have a ramp it shall have a landing for an exterior area for assisted rescue.
- c. Exterior stair risers shall be 6” maximum height, and treads and risers shall be solid.
- d. 8 foot ceiling heights will be allowed in modular classrooms.
- e. If a wood framed modular is to be connected to a fire resistant building, it will require a 2 hour fire rated separation and the code required distance separation. The Building Code requires a fire wall to separate combustible from noncombustible construction, and the required separation between two buildings must be maintained. Exiting from the fire resistant building can not be through a wood structure. Therefore, if an existing exit is to continue into the addition, a noncombustible vestibule is required between the wood frame modular and the existing fire resistive building.
- f. Modular classroom buildings are required to have foundations which resist the effects of frost and structure to resist lateral and overturning forces.
- g. If the modular is heated with gas fired units there must be the required fire resistance separation from the classroom space.
- h. The ventilation equipment must be capable of supplying the minimum quantity of fresh air per person.

C004 SUBMISSION

- a. Providing a submission to Facilities Planning for a manufactured classroom building is no different than any other project. An SED Code Compliance Checklist, Form FP-CCC (latest date), is required.
- b. The site plans must show property lines, existing buildings, proper building distance separations, existing and new exterior stairs, ramps, sidewalks, underground and overhead utilities including electric, gas, sanitary, storm, and water lines.
- c. The drawings and specifications must provide clear information for the structure including loads, foundation design, modular structure, and anchoring details. Drawings and specifications are required for mechanical, ventilation, electric, fire alarm detection/suppression, and plumbing systems. The drawings must also show plans and details for all construction built on site such as canopies, ramps, stairs, vestibules, and covered walkways.
- d. If enclosed walkways are provided, the drawings shall show the proper fire wall or fire barrier, and foundation, wall, and roof construction.

C006 PROJECT COMPLETION

- a. Like all other construction projects, upon completion of construction or installation and prior to occupancy, the school district must submit a Certificate of Substantial Completion and a Fire Safety Report to Facilities Planning to obtain their Certificate of Occupancy.
- b. The Insignia of Approval must be attached to the Certificate of Substantial Completion.

APPENDIX D: ATHLETIC FACILITIES AND PLAYGROUNDS

D001 GENERAL

- a. Athletic Facilities pertain to buildings and structures placed on the school district's sites in support of athletic events. In addition to the playing surface or court, support facilities include Grandstands/Bleachers, Press Boxes, Concession Stands, Dugouts, and Toilet Facilities.
- b. Athletic Competition and Sports Facility Design:
 - For playing surfaces, dimensions and parameters comply with the New York State Public High School Athletic Association (NYSPHSAA) standards. NYSPHSAA is a member of the National Federation of State High School Associations (NFHS). With the exception of Health and Labor Department Code requirements that apply in only a few instances, neither the State Education Department nor the Code have any requirements for the competition rooms and fields. In the instance that the playing field is exterior, we participate in the SEQRA process and provide comments regarding environmental impacts as necessary. We do not review the adequacy of sports field design beyond code compliance. For interior spaces we follow the Code requirements for fire ratings, exiting, etc.
 - Typically each school follows the requirements for rules set by NFHS. Many of their "rule books" have requirements for setting up playing fields, courts, etc. This includes football, basketball, volleyball, swimming, diving, baseball, soccer, field hockey, ice hockey, wrestling, lacrosse, and others. For example, when there is a health code that applies to the depth of a pool, this is a minimum standard. When the corresponding NFHS rules require the depth to be deeper, the pool must be deeper to comply with athletic competition requirements.
 - The National Federation of High School Athletic Associations web address is <http://www.nfhs.org>.

D002 CODE COMPLIANCE

- a. All construction is to be fully compliant with the New York State Uniform Fire Prevention and Building Code, the Manual of Planning Standards, and the Commissioner's Regulations. This applies to all disciplines; architectural, heating, ventilation, plumbing, electric, fire alarm detection/suppression, and energy code.

D003 GRANDSTANDS/BLEACHERS

- a. Provide an SED Code Compliance Checklist (Form FP-CCC, latest date).
- b. The Occupancy Classification listed in the Uniform Fire Prevention and Building Code for Grandstands/Bleachers is A-5 (Assembly uses intended for participation in or viewing outdoor activities).
- c. Grandstands/Bleachers shall comply with ICC 300.
- d. The primary exit stair to grade from the grandstand/bleacher platform shall be a non-slip surface (not wood).
- e. Documents shall show full accessibility for the physically impaired. Accessibility shall include

parking, an exterior route to the grandstand/bleacher, ramp or stair applications, and signage.

- f. New grandstands/bleachers, and replacement units that are substantially larger than the existing units, are required to have toilet facilities within 500', or provide toilet facilities in compliance with the Plumbing Code of New York State.

D004 PRESS BOXES

- a. General: :

- 1. Public school districts often construct a Press Box to provide shelter and a vantage point for score keepers, videography, and broadcast equipment. These facilities, like all other district facilities, may only be used if they have a current Certificate of Occupancy. The facility must be listed on the New York State Education Department Fire/Safety building inventory and pass annual Fire/Safety Inspections.
- 2. If your building is not listed on the Annual Fire Inspection biography, please submit our "Request for Approval of Use of a Facility Form" (Form FP-AU) to apply for Commissioner's approval of an existing building. The form can be found on our web site.
- 3. If you are constructing a new Press Box, follow our normal procedures by submitting a letter of intent so that we may issue a project number. Approval is based on the New York State Uniform Fire Prevention and Building Code (Code) and Education Department requirements.

- b. Provide an SED Code Compliance Checklist (Form FP-CCC, latest date).

- c. Press Boxes are considered a U - Utility and Miscellaneous occupancy. Buildings that also include other occupancies such as storage or concession stands, must comply with the Code and Education Department requirements for each occupancy. Fire rated separations between occupancies must meet Code requirements, and proper exiting based on Code and Education Department requirements must be provided.

- d. The "Construction Classification" depends on what materials are used in the construction of the building. The materials and fire protection of building components, as well as the height and fire area of the building, are governed by the Code. In addition, Press Boxes must meet the following requirements:

- 1. Buildings having three usable floor levels (i.e., three enclosed floors with no access to, or use of the roof) , or two enclosed floors and use of the roof level, must be at a minimum Construction Type I, II-A, III-A or IV. These are noncombustible, fire rated, and heavy timber construction types. Three usable floors means that there is a storage room or concession stand on the grade level, the first level of the press box is above that and accessible from the bleachers, with only one usable level above the bleacher level.
- 2. Buildings having two usable floor levels (i.e., two enclosed floors with no access to or use of the roof), or one enclosed floor and use of the roof level, must be at a minimum Construction Type II-B, III-B or V-A. These construction types are Non-combustible, Ordinary and Protected Wood Frame. All have Code requirements for fire ratings.
- 3. The maximum occupancy on each floor level shall be determined on the basis of 15 square feet

per person. Appropriate signs limiting occupancy must be posted.

4. Safe remote means of egress shall be provided from each floor level. The primary exit shall be a conventional stair. Vertical ladders are not acceptable as the primary exit. The second means of egress may be through a window or panel with a minimum clear opening area of six square feet, and a minimum dimension of 24 inches, which opens onto the bleachers. Vertical ladders or access directly to bleachers or grandstands may be used as the second means of egress. Noncombustible bleachers or grandstands may be used for primary exiting. Exterior exit stairs need not be enclosed. However, consideration should be given to local concerns for the prevention of vandalism.
5. Guards per Code are required on three sides of all floor and roof openings, and at open sides of stairs. Handrails are required on both sides of stairs.
6. Hardware on exit doors shall be at least classroom function. Dead bolts or padlock hasps are not allowed on any public school owned or occupied building or space.
7. Building systems, electrical, plumbing, heating and ventilation systems shall meet all applicable Code provisions.
8. Accessibility by disabled persons is not required for Press Boxes with an aggregate area of 500 square feet or less. However, an outlet or wireless controls for operation of the scoreboard and public address systems is required at an accessible location.
9. Useable Roof:
 - i. The primary exit from a useable roof is not allowed to be a conventional vertical ladder. The exit options are the same as the interior of the Press Box. A second means of egress is also required from the roof when it is a useable platform. A vertical ladder or retractable egress ladder is minimally required for a second means of egress from the roof.
 - ii. Usable roof viewing or filming platforms must have compliant guardrails, with a toe board, on all four sides and guardrails on three sides of the roof access. The maximum occupancy of useable roof viewing areas shall be posted for a maximum of six people.
 - iii. Interior emergency lighting shall be provided when an egress path from the roof is provided through the interior of the press box.

D005 CONCESSION STANDS

a. General:

1. Many School Districts have concession stands at their sporting fields to accommodate spectators. The concession stands are often constructed and operated by booster clubs. Regardless of who constructs or operates the concession stand, the District is the owner, and is responsible and liable for the building.
2. Districts should be very careful about Booster Club constructed concession stands. If the building is constructed by volunteer labor, the District needs to be aware that they could be liable for any injuries during construction. The District must have drawings stamped by a NYS

licensed professional that have been approved by SED, and the NYS licensed design professional must inspect the construction. If the district expends any funds for the concession stand they must get voter approval.

3. These facilities, like all other district facilities, may only be used if they have a current Certificate of Occupancy. The facility must be listed on the New York State Education Department Fire/Safety building inventory and pass annual Fire/Safety Inspections.
 4. If your building is not listed on the Annual Fire Inspection biography, please submit our "Request for Approval of Use of a Facility Form" (Form FP-AU) to apply for Commissioner's approval of an existing building. The form can be found on our web site.
 5. If you are constructing a new Concession Stand, follow our normal procedures by submitting a letter of intent so that we may issue a project number. Approval is based on the New York State Uniform Fire Prevention and Building Code (Code) and Education Department requirements.
- b. Provide an SED Code Compliance Checklist (Form FP-CCC, latest date).
 - c. Concession Stands are considered an M – Mercantile occupancy and require a 1 hour fire separation from a Press Box, Toilets, or Storage Rooms. Provide plans indicating required distance separation to other structures and fire rating for adjacent spaces.
 - d. Mixed occupancy buildings require a manual and automatic fire alarm system that will annunciate a fire in one occupancy to the other occupancies. Emergency lights are required in all spaces.
 - e. The building must be accessible by people with disabilities, and the service counter must also be accessible.
 - f. One exit is allowed if the maximum travel distance is 25 feet or less. Concession stands can not be placed under grandstands/bleachers unless there is a one hour fire separation from the grandstands/bleachers. Concession stands must also comply with Department of Health regulations for cleanable surfaces, three bowl sinks, etc.
 - g. The Fire Code of NY requires a Type I exhaust hood be installed in accordance with the Mechanical Code of NY at all commercial cooking appliances and domestic appliances used for commercial purposes that produce grease vapors. There are two exceptions to this rule, first, countertop, plug in appliances are not regulated by the Code and therefore the hood requirement would not apply. Secondly, the Mechanical Code Commentary states that the code official should consider the frequency of use of the appliances in making the determination of the need for a Type I hood. The commentary cites VFW and similar halls as an example. We believe that very few, if any school district concession stands would rise to the level of requiring a Type I Hood. We will review projects with this in mind and question the expected frequency of use of large extensive concession stands. Note that proper fire extinguishers are required and if there is a vegetable oil fryer, a Class K extinguisher is required.
 - h. Hardware on exit doors shall be at least classroom function. Dead bolts or padlock hasps are not allowed on any public school owned or occupied building or space.

D006 TOILET FACILITIES

- a. General:
 1. Many School Districts have toilet facilities at their sporting fields to accommodate spectators. These facilities, like all other district facilities, may only be used if they have a current Certificate of Occupancy. The facility must be listed on the New York State Education Department Fire/Safety building inventory and pass annual Fire/Safety Inspections.
 2. If your building is not listed on the Annual Fire Inspection biography, please submit our "Request for Approval of Use of a Facility Form" (Form FP-AU) to apply for Commissioner's approval of an existing building. The form can be found on our web site.
 3. If you are constructing new Toilet Facilities, follow our normal procedures by submitting a letter of intent so that we may issue a project number. Approval is based on the New York State Uniform Fire Prevention and Building Code (Code) and Education Department requirements.
- b. Provide an SED Code Compliance Checklist (Form FP-CCC, latest date).
- c. When constructing a new grandstand/bleacher, the number of toilets, lavatories, and urinals provided must be fully compliant with the Code. The total number of fixtures required to meet the Code may be a combination of permanent or portable units. If portable units are used, a location with a least a gravel surface shall be permanently designated on the site. Toilet facilities in the main school building can be designated as the accommodating facilities if they are within or less than a travel distance of 500 feet from the athletic facilities and the main school building is always available.
- d. Hardware on exit doors shall be at least classroom function. Dead bolts or padlock hasps are not allowed on any public school owned or occupied building or space.
- e. Toilet facility documents shall show full accessibility for the physically impaired.

D007 SUBMISSION

- a. Provide plans as applicable (with toilet rooms, foundation, structural section, anchoring details, mechanical, ventilation, electric, fire alarm detection/suppression and plumbing) and structural loading;
- b. Provide Site plans (including proper distance separations, exits, stairs, ramps, sidewalks, electric, waste disposal and plumbing);

D008 PROJECT COMPLETE

- a. Like all other construction projects, upon completion of construction or installation, and prior to occupancy, the School District must submit a Certificate of Substantial Completion and a Fire Safety Report to Facilities Planning to obtain a Certificate of Occupancy.

D009 PLAYGROUNDS

- a. The State Education Department does not have specific regulations regarding playgrounds. Compliance with the Handbook for Public Playground Safety by the US Consumer Product Safety Commission (CPSC) is required. The Handbook is available at www.cpsc.gov/cpscpub/pubs/325.pdf.
- b. All playgrounds are required to be accessible to persons with disabilities, including the access walkway to the playground.
- c. Existing playgrounds fall under the ADA's requirement that all programs and services provided by a school district be accessible. While the State Education Department Office of Facilities Planning does not enforce the ADA, the school district is still required to comply with the ADA.
- d. New and renovated or relocated playgrounds must comply with the Architectural and Transportation Barriers Compliance Board's Play Area Access Guidelines. The Guidelines are available at www.access-board.gov/play/guide/guide.pdf.
- e. The use of Chromated Copper Arsenate (CCA) lumber:
 - New playground equipment is prohibited to be CCA lumber per New York State law.
 - Existing CCA playground equipment or adjacent materials are not required to be removed, but they must be encapsulated. If the district chooses to maintain or remove the CCA products, the Federal Environmental Protection Agency has guidelines to follow. The guidelines may be found at www.epa.gov.

APPENDIX E: DISCOVERED BUILDINGS

E001 GENERAL

- a. A "discovered building" is any building constructed or placed on school district property without first obtaining approval from the Commissioner of Education and a Building Permit from the Office of Facilities Planning. Most "discovered buildings" are identified by a fire inspector hired by the district to conduct the required annual building and fire safety inspections of every building owned or used by the district.
- b. Manufactured classroom buildings (i.e. modulares, relocatables, portables, etc.) have additional submission requirements for instructional space, to effectively safeguard the occupants of these types of facilities. Refer to Appendix C.
- c. Occupying or using any buildings without Certificate of Occupancy (C.O.) " is illegal and potentially dangerous. It also places substantial liability on the district, the Superintendent and the Board of Education. We realize districts face significant time and financial constraints, but districts must comply with legal requirements regarding all capital construction.
- d. Typically a district will contact our office when they are contemplating some capital construction work. However, in the case of "discovered buildings," we often find out about them through the fire inspection process and we may then take the initiative to establish a project without requiring a Letter of Intent (LOI) Form from the district. It is incumbent upon the district to send us an LOI form as soon as possible when there is a facility on their property, possibly being used, that does not have a C.O.

E002 CODE COMPLIANCE

- a. All construction is to be fully compliant with the New York State Uniform Fire Prevention and Building Code, the Manual of Planning Standards, and the Commissioner's Regulations. This applies to all disciplines; architectural, heating, ventilation, plumbing, electric, fire alarm detection/suppression, and energy code.

E003 SUBMISSION

- a. The following are to be provided:
 1. REQUEST FOR APPROVAL OF USE" OF A FACILITY (Form FP-AU) with authorizing signatures and page 2, outline specifications.
 2. FIRE SAFETY REPORT. Completion of all items on the cover and Part I, General Information; Part III, Certifications; and the Public Fire Safety Nonconformance Report Form.
 3. Certification by an Architect or Engineer – The district must have an Architect or Engineer who is licensed by the State of New York certify in writing (usually by letter) that the building complies with applicable provisions of the New York State Uniform Fire Prevention and Building Code. If the building is heated or air-conditioned, conformance with the Energy Conservation Construction Code of New York State must also be certified.
 - Exception: Shipping containers, and manufactured sheds of maximum 150 square foot size, will not require certification by an Architect or Engineer.

4. Proof of the existence of an Asbestos Maintenance Plan (copy of AHERA 5) or certification that no asbestos was used in construction.
- b. In addition, to ascertain compliance a set of plans showing all floor levels of the building (use and square footage), exit paths to the exterior, elevations, locations of life safety systems and equipment and a plot plan are needed.
 - c. Submit one copy of architectural-quality floor plan(s), 1/8" scale minimum, that show:
 - All exits from every floor, corridors, stairs, walls, door openings and swings, windows, room uses, design loads, and elevations, along with all dimensions.
 - Limit dead end corridor pockets to a maximum of 1-1/2 times the corridor width (155.7a2).
 - Required fire rated separations.
 - Location(s) of fire system components (detectors, audio/visual devices, manual stations, fire alarm control panel, etc).
 - Fire extinguisher locations.
 - Handicapped access in accordance with the New York State Uniform Fire Prevention and Building Code, Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973.
 - d. One copy of architectural-quality site plan that shows the total property and indicates the relative location of buildings, streets, roads, parking areas, walks and fire hydrants.

APPENDIX F: TEMPORARY QUARTERS

F001 GENERAL

- a. Temporary quarters take many forms; for the purposes of the Department, two categories apply:
 - Leased space for educational use, acquired pursuant to Education Law, Section 1709.7 (Church rooms, grange halls, store fronts etc.)
 - Leased space for other than educational use, acquired pursuant to Education Law, Section 1709.7 (Administration, office, storage, etc.)
- b. Temporary quarters shall be approved by the Commissioner pursuant to Section 155.4 of the Regulations of the Commissioner of Education, and by the local authority having jurisdiction (AHJ) pursuant to 19 NYCRR Part 1203. Such facilities must meet specific requirements of educational adequacy and of health and safety prior to approval and occupancy.

F002 CODE COMPLIANCE

- a. All construction is to be fully compliant with the New York State Uniform Fire Prevention and Building Code, the Manual of Planning Standards and the Commissioner's Regulations. This applies to all disciplines; architectural, heating, ventilation, plumbing, electric, fire alarm detection/suppression, and energy code.

F004 SUBMISSION

- a. To ascertain compliance, drawings shall be submitted showing all floor levels of the building, and the areas to be leased. The overall building area and leased area (in square feet) are to be indicated. The following drawings are required:
 1. Architectural quality floor plans which show doors/door swings, windows, stairs, ramps, room names and dimensions.
 2. Exterior photographs of the building which show major materials, windows, doors, roof and grade.
 3. Site Plan which shows walks, parking, drives, buildings on the same lot and the street or road.
- b. Compliance with Commissioner's Regulation 155.7 is required and the following requirements need to be verified and indicated on the drawings:
 1. Egress into two separate smoke zones from spaces of pupil occupancy over 500 square feet.
 2. Dead end corridor pockets limited to a maximum of 1-1/2 times the width of the corridor.
 3. Two hour fire-rated enclosures at boiler/furnace rooms, electrical equipment rooms, incinerator rooms, rooms for storage of flammable liquids and gas powered equipment and transformer vaults.
 4. Exit lights, emergency lighting, and fire alarm system requirements in accordance with 155.7(g) (detectors, audio/visual devices, manual stations, fire alarm control panel, etc. should be indicated).

5. Heating, ventilating, and air-conditioning system which operates according to the Code requirements in effect at the time it was installed.
 6. Fire extinguishers.
 7. Handicap access in accordance with the New York State Uniform Fire Prevention and Building Code, and the Americans with Disabilities Act.
- c. Forms and Documents:
1. REQUEST FOR APPROVAL OF USE OF A FACILITY (form FP-AU) with authorizing signatures and page 2, outlining specifications.
 2. FIRE SAFETY REPORT. Completion of all items on the cover and Part I, General Information; Part III, Certifications; and the Public Fire Safety Nonconformance Report Form.
 3. A copy of the current Certificate of Occupancy or Certificate of Use, issued by the local code enforcement agency, showing approval for proposed use. If owned by a public school district, certification by a licensed architect or engineer that the whole building, as well as the space being used, complies with applicable provisions of the New York State Uniform Fire Prevention and Building Code.
 4. Proof of the existence of an Asbestos Maintenance Plan (copy of AHERA 5) or certification that no asbestos was used in construction.

F005 PROJECT COMPLETE

- a. Once approved, a State Education Department Annual Certificate of Occupancy for the building or space will be issued.

APPENDIX G: SHIPPING CONTAINERS

G001 GENERAL

- a. Metal shipping containers may be used as an alternative to storage sheds and will require review and approval as a building project or a discovered building.

G002 SUBMISSION

- a. Provide the following documents for review:
 - Site Plan indicating location and distance separation requirements.
 - Door hardware: one of the doors must always be easily operable from the inside. A description of the hardware or photograph will be acceptable.
 - The unit must have a louver to allow ventilation of the space.
- b. The unit will not require a foundation or tie-downs.
- c. We will not require certification by an Architect or Engineer that the unit complies with the Code.

APPENDIX H: PRE-K and DAY CARE

H001 GENERAL

- a. Many Pre-kindergarten (Pre-K) programs fit the requirement for Child Day Care Centers, especially those located in leased spaces or operated by a BOCES.
- b. Any program designated Pre-K operated in a leased space or meeting the definition of Child Day Care Centers in any other fashion, must be licensed by the New York State Office of Children and Family Service (OCFS) as a Child Day Care Center. The link to the Office of Children and Family Services (OCFS) Regulations is: http://www.ocfs.state.ny.us/main/becs/daycare_regs.htm
- c. Further, the program must be operated by a school district on the campus where the elementary and/or the secondary programs are conducted. A Pre-K program cannot be off-campus or in a rented temporary space.

H002 CODE COMPLIANCE

- a. All construction is to be fully compliant with the New York State Uniform Fire Prevention and Building Code, the Manual of Planning Standards and the Commissioner's Regulations. This applies to all disciplines; architectural, heating, ventilation, plumbing, electric, fire alarm detection/suppression, and energy code.
- b. In addition, if it is in a leased space it must have a Certificate of Occupancy as a Day Care Center from the local municipal code enforcement official.
- c. The facility must also comply with the Commissioner of Education's Part 151-1.10 Facilities Requirements for the universal pre-kindergarten program. The link for Part 151-1.10 Facilities Requirements for the universal pre-kindergarten program is: <http://www.p12.nysed.gov/facplan/policy/8NYCRR155,5,15,00.html> (151-1.10 is at the bottom of the page.) This regulation requires the Pre-K program meet the Office of Children and Family Services (OCFS) Regulations for Child Day Care Centers, Part 418.

H003 BUILDING DESIGN

- a. Every building is to be 100% accessible for the physically impaired. Accessibility includes parking, an exterior route to the building, entrance, interior routes, all door clearances, door hardware, workstations, sinks, bubblers, toilets, and signage
- b. It is important for the designer to review the OFCS Regulations, in particular Part 413, Definitions, and Part 418, Child Day Care Centers.
- c. The keys to Pre-Ks being exempt from being licensed as a day care center are:
 - To meet the definition for daycare it must have more than 6 children and operate for more than 3 hours per day,
 - No carryover of children in the under 3-hour program, i.e., children in a morning program cannot attend an afternoon program in the same facility.

H004 SUBMISSION

- a. Follow the guidance provided for Temporary Quarters or Discovered Building.

APPENDIX I: ASBESTOS, LEAD, PCBs & MOLD

I001 ASBESTOS

- a. Asbestos Designer
 1. Asbestos designers must have a current New York State Department of Labor Certificate.
 2. Asbestos designers must be a Registered Architect or Professional Engineer (R.A or P.E.) licensed in New York State.
 3. The completed documents should have the seal of the R.A or P.E. asbestos designer on the drawings and within the specifications either on the specification cover with the other professional seals or on the first page of the asbestos specification.
- b. Asbestos Reports (Reference State of New York Department of Labor, (DOL) Industrial Code Rule 56, 12 NYCRR, SUBPART 56-5, 56-5.1, PHASE IA: ASBESTOS SURVEY PLANNING AND DESIGN)
 1. One (1) copy of the completed asbestos survey shall be sent to the local government entity charged with issuing a permit for such demolition, renovation, remodeling or repair work under applicable State or local laws. For Public Schools, that's Facilities Planning. Please provide the completed asbestos survey with your Asbestos Designer's DOL Certificate.
 2. Exemptions that pertain to schools where reports are not necessary:
 - Buildings or structures for which original construction commenced on or after January 1, 1974;
 - Buildings being entirely demolished that are being treated as containing asbestos.

c. Asbestos Final Air Clearance Requirements:

Asbestos Abatement Project Clearance Air Samples				
Project Size	AHERA	NYSED	NYS DOL	Notes
NYSDOL—Large (≥260 ft. or ≥160 ft ²)	5 inside + 5 outside + 3 blanks (TEM)	5 inside + 5 outside + 3 blanks (TEM)	≥ 5 inside* + 5 outside** + 2/3 blanks (PCM/TEM)	* Inside will increase if work area >25,000 sq. ft. ** Outside samples will vary with methodology. For PCM and TEM (NIOSH 7402) in non- school buildings only 1 outside sample is required when the entire building/structure is the regulated abatement work area.
NYSDOL—Small (>25 - <260 ft or >10 - <160 ft ²)	5 inside + 2 blanks (PCM)	5 inside + 2 blanks (PCM)	3 inside + 3 outside** + 2 blanks (PCM)	** Outside samples will vary with methodology. For PCM and TEM (NIOSH 7402) in non- school buildings only 1 outside sample is required when the entire building/structure is the regulated abatement work area.
NYSDOL—Minor (≤25 ft or ≤10 ft ²)	5 inside + 2 blanks (PCM)	5 inside + 2 blanks (PCM)	None if <u>planned</u> minor size asbestos project only *** 1 inside + 1 outside	*** Only for incidental disturbance, glove bag/tent failure or if minor size asbestos project work area is part of a small or large asbestos project
AHERA—SSSD or Minor Fiber Release (≤3 ft or ≤3 ft ²)	None	None if <u>planned</u> minor size asbestos project only *** 1 inside + 1 outside + 2 blanks (PCM)	+ 2 blanks (PCM)	

The containment barriers used to isolate the functional space must not be artificially created to limit the quantity of asbestos containing materials to be abated. Contiguous portions of material to be abated at approximately the same time must not be separated to qualify as a smaller sized project.

d. AHERA Air Sampling Requirements in Dirt Crawlspace:

1. Many school districts are involved in projects which will require asbestos abatement in dirt-floored crawlspaces. Aggressive sampling as per the code rule presents a problem in these situations. The dirt floor creates airborne dust which can over-load sample cassettes and thus render them unreadable and unacceptable under Industrial Code Rule 56 and AHERA requirements. This results in re-cleaning and re-sampling of the area, and in some cases may result in multiple failures/re-cleanings/re-samplings, each adding time and cost to the process of clearing a regulated work area.

2. Unfortunately, AHERA does not provide flexible language concerning this issue. The EPA's Office of Pollution Prevention and Toxins (OPPT) recognized this problem many years ago and, in 1994, had attempted to propose new language amending AHERA that would have addressed this area of concern. However, the amendments were never pushed forward.
3. The NYS Department of Labor has been in discussions with the EPA and they have acknowledged that the current regulatory language is inadequate in some cases. The EPA's OPPT suggests that common sense be used in such situations and if it is necessary to provide guidance to address those deviant scenarios, one should refer to the language used to address alternative approaches as presented in the drafted 1994 AHERA amendments. Although they are not legally binding, are not captured in their regulations, and are not enforceable, the discussions presented provide a reasonable approach for dealing with these situations.
4. NYS DOL has accepted, by variance, a clearance air sampling strategy that does not involve the use of "normal", aggressive air sampling techniques. Clearance air samples are collected during final cleaning activities. This method appears acceptable to both NYS DOL and EPA.
5. The accredited project designer shall develop and include in the project design the modification to be followed, including the particular element to be modified, and a justification for deviating from the aggressive air monitoring method, addressing the elements of subparagraphs § 763.90(i)(6)(ii)(A) and (B) and submit the request for a variance to the NYS DOL.

1002 LEAD

- a. The EPA established the Lead; Renovation, Repair and Paint Program Rule which became effective April 2010. The Rule requires contractors that are hired to perform renovation, repair and painting projects in homes, child care facilities and schools (containing preschool and kindergarten classrooms) built before 1978 that disturb lead-based paint to be certified and trained to follow specific work practices to prevent lead contamination.
- b. Because the EPA did not have any regulations for construction or renovation activities which effect surfaces containing lead based paints, the Office of Facilities Planning wrote into the 1998 RESCUE regulations for schools a provision that required *all public schools, regardless of grade level*, to test for the presence of lead in any areas that were scheduled to be disturbed by construction or renovation activities. If lead was discovered, it required that districts follow the HUD standard entitled "Guidelines for the evaluation and control of lead based paint hazards in Housing." The Commissioner's Regulations Part 155, Section 155.5(l) states that "all areas scheduled for construction as well as areas of flaking or peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines". Since the RESCUE regulations cover district obligations under construction and maintenance activities, all work at districts had been subject to these requirements.
- c. In that the EPA has finally established regulations for renovation work effecting lead based paint, SED will requires the EPA Lead; Renovation, Repair and Paint Program Rule be followed for all public school construction and maintenance operations.
- d. The Rule requires the renovation company to be certified and the work must be supervised by an EPA certified contractor. Workers must receive on-the-job training in lead safe practices. The Rule also requires pre-renovation education, posting of warning signs, containment of the work area, waste management, cleaning and post-renovation cleaning verification.

- e. Minor repair and maintenance that will disturb less than 6 sq ft per room interior or 20 sq ft exterior, excluding window replacement are exempt from this Rule.
- f. Not more than 60 days prior to the renovation, the contractor must provide the owner of the building with the EPA pamphlet “Renovating Right”. SED Commissioners Regulations Part 155.5(d) requires the school district to notify parents, staff and the community of construction projects. That notification will now have to be modified to include the availability of the EPA pamphlet. During the renovation the contractor must post informational signs describing the general nature and locations of the renovation and the anticipated completion date.
- g. For school district maintenance projects performed by district personnel, there must be an EPA certified person that will supervise the work and train the workers in lead safe practices and the school district will have to register with the EPA as a contractor. Additional information on this EPA rule can be found at www.epa.gov/lead.

I003 PCBs IN CAULK AND LIGHTING BALLASTS

- a. Polychlorinated biphenyls, PCBs, are persistent manmade chemicals that were widely used in caulking and electrical fixtures before 1978. In 1976, Congress banned the manufacture and use of PCBs because of concern about their health and environmental effects. Because the Federal manufacturing ban did not require removal of existing PCB containing products, they remain present today in the caulking and electrical fixtures of some New York State schools. The following is a protocol for addressing PCBs in caulking materials in schools, which was developed in consultation with the New York State Health Department. Leaking PCB containing lighting ballasts shall be removed immediately and non-leaking PCB containing ballasts should be removed as soon as possible. Removal of PCB containing ballasts shall be performed by workers with special training in hazardous waste handling.
- b. Protocol for Addressing Polychlorinated Biphenyls (PCBs) in Caulking Materials in School Buildings:
 - 1. Background:
 - Recently, several school districts have discovered that PCBs are present in building caulk installed on their facilities and sometimes in the soil near caulked structures. Typical locations include windows and expansion joints. PCBs are regulated by the U.S. Environmental Protection Agency (U.S. EPA) and the State of New York, and caulk containing PCBs should be properly managed when disturbed through building renovations.

- PCBs are currently prohibited from being used in caulk and other commodities (U.S. EPA, 40 CFR 761). However, prior to 1977, PCBs were present in some caulking materials used in the construction of schools and other buildings. Studies have shown that concentrations of PCB can exceed 1% (10,000 ppm) by weight in some caulk materials. An investigation of 24 buildings in the Greater Boston Area revealed that one-third of the buildings tested (8 of 24) contained caulking materials with polychlorinated biphenyl (PCB) content exceeding 50 ppm by weight with an average concentration of 15,600 ppm or 1.5% (Herrick *et al.*, 2004). These buildings included schools and other public buildings.
- The U.S. EPA regulates the disposal of caulk, as well as soil and other materials contaminated with PCBs from caulk, if the concentration of PCBs exceeds 50 ppm. Such materials must be disposed at an appropriate approved or permitted facility.
- U.S. EPA regulation 40 CFR 761 defines "PCB remediation waste" to include contaminated soil, and specifies a clean-up level of ≤ 1 ppm without further conditions for unrestricted use in "high occupancy areas" (i.e., areas where individuals may be present for 335 hours or more per year). PCB caulk is defined as a PCB bulk product waste, and its disposal is subject to U.S. EPA regulations under the Toxic Substances Control Act (40 CFR761.62).
- This protocol has been developed in consultation with the New York State Department of Health, Division of Environmental Health Assessment, Bureau of Toxic Substance Assessment to address concerns about properly managing caulk containing PCBs that will be disturbed during building renovation and maintenance.

2. Objective:

- For any school buildings constructed or renovated between 1950 and 1977 and undergoing current renovation or demolition, NYSED and NYSDOH recommend that the building(s) be evaluated prior to the renovation work to determine whether they contain caulk that is contaminated with PCBs. If so, a plan should be developed to address potential environmental and public health concerns about potential PCB exposure.

3. Investigation and Testing:

- To adequately characterize PCB contamination, a professional environmental consultant with appropriate experience in environmental investigation and testing should prepare a detailed work plan to guide this work.
- Caulk Sample Collection:
 - Buildings constructed or renovated between 1950 and 1977 have a potential to contain PCBs in existing caulk. Representative samples of caulking materials from these buildings prior to renovation or demolition work should be tested to determine whether the caulk is contaminated with PCBs. Professional judgment should be used to design the sampling plan for characterizing caulk throughout the building. The consultant should pay particular attention to construction and maintenance records and to the appearance of caulking materials (likenesses and differences). Samples should be taken from window frames or expansion joints that have not been repaired or replaced since 1977. Depending on specific information provided in the work plan developed by the

project manager, such as window placement, compositing of some caulk samples might be appropriate. Caulk from different time periods or that have a different appearance should not be composited together.

- It is important to note that caulk used during the time period of interest may also contain asbestos or lead. Therefore, the work plan should include testing, handling and disposal requirements appropriate for such regulated materials.
- Soil Sample Collection:
 - Buildings constructed or renovated between 1950 and 1977, which have undergone further renovation after 1977, may have residual PCB contamination in adjacent soils. An adequate representation of surface soils should be tested to assess the potential for residual PCB contamination.
 - When designing a representative soil sampling plan, the likelihood of soil contamination from deteriorated or deteriorating caulk should be considered. Caulk that has in the past dried out and fallen to the ground is the most important source of soil contamination. Thus, sampling should include soil beneath windows where caulk has obviously deteriorated or been replaced because of previous deterioration. Areas subject to the stress of sun and prevailing weather (typically the southern and western side of each structure) should be included for sampling. These samples would provide a conservative evaluation of soil conditions due to an increased potential for material failure, possibly resulting in contamination of soil. Also, if earlier renovation or demolition work may have stockpiled potentially contaminated caulk in other school areas, the school should consider having soils in those areas tested as well.
 - Soil sampling should focus on areas of the building where “banks” or “gangs” of windows exist/were replaced and areas of the structure where large expansion joints are located. This would provide a conservative evaluation of potential soil contamination and permit efficient sampling.
 - Samples should be collected in a manner that prevents cross-contamination. Augers or driven core samplers should be avoided, as any caulk caught on the edge of this type of tool could be driven to lower intervals. Using a designated trowel for each sample location and each interval of depth is encouraged. If the sampling tool is field cleaned between samples, do so in a manner that does not add solvent contamination to the environment.
- Laboratory Analyses of Soil and Caulk Samples
 - Specific information concerning laboratory procedures and protocols must be detailed in the work plan.
 - Duplicate analysis should be performed on 10% of samples received by the laboratory.
 - The soil sample or extract of the soil sample collected at a depth of 6-12 inches may be archived until the sample results for 2-6 inches are available, provided that the appropriate sample holding times are not exceeded.

- All caulk and soil samples must be analyzed for PCBs by a NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory. ELAP certified labs can be found at the following link: www.wadsworth.org/labcert/elap/elap.html. Results provided should be for total PCBs.

4. Abatement:

- If it is determined that caulk materials contain PCBs, a site specific abatement plan should be developed to address potential environmental and public health concerns. The **HUD Technical Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing** available at www.hud.gov/offices/lead/guidelines/hudguidelines/ can be used as a basis for developing the steps for abating the contamination and preventing contamination of nearby areas. This is the same guideline required by NYSED to manage lead contaminated materials in schools under the RESCUE regulations. Caulking materials that contain either lead, PCBs, or both can therefore be managed under the same guidance. Caulking materials that contain asbestos in addition to either lead or PCBs or samples that contain only asbestos will be managed in accordance with requirements of the NYS Department of Labor Code Rule 56.
- As stated in Section I, cleanup and disposal of PCB remediation and bulk product waste is subject to U.S. EPA regulations under the Toxic Substances Control Act (40 CFR 761) (see <http://www.epa.gov/pcb/pubs/200540cfr761.pdf>). For information or assistance pertaining to the federal PCB regulations, please contact either Daniel Kraft or James Haklar, at the Pesticides and Toxic Substances Branch of U.S. EPA Region 2. Daniel Kraft can be contacted at kraft.daniel@epa.gov or (732) 321-6669, and James Haklar can be reached at haklar.james@epa.gov or (732) 906-6817.
- Disposal of contaminated materials from abatement activities (soil or caulk) is regulated by the NYSDEC solid waste regulations (6NYCRR Part 360) if concentrations are <50 ppm and by the hazardous waste regulations (6NYCRR 370-373) if PCB concentrations are 50 ppm or greater. Contact the NYSDEC Regional Office for additional guidance.

5. References:

- Herrick RF, McClean MD, Meeker JD, Baxter LK, Weymouth GA. 2004. An Unrecognized Source of PCB Contamination in Schools and Other Buildings. *Environmental Health Perspectives*. 112:1051-1053.
- USEPA. 40 CFR 761. Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. (<http://www.epa.gov/pcb/pubs/200540cfr761.pdf>)
- 6 NYCRR Part 375. Environmental Remedial Programs. Subpart 375-6: Remedial Program Soil Cleanup Objectives. §375-6.8 Soil Cleanup Objective Tables. Table 375-6.8(b): Restricted Use Soil Cleanup Objectives. (<http://www.dec.ny.gov/regs/15507.html>)

APPENDIX J: DEMAND CONTROL VENTILATION

J001 GENERAL

- a. Demand Control Ventilation (DCV) is required for some ventilation systems in accordance with Code.
- b. Where demand control ventilation is not required by Code, it may be permitted.
- c. Where not required by Code, use of demand control ventilation (through use of carbon dioxide (CO₂) sensors) is not recommended for instructional spaces.
- e. Design of DCV requires a whole building approach.
- f. Different types of DCV.
 - 1. Occupancy through use of sensor.
 - i. On/Off similar to lighting occupancy sensor.
 - ii. Variable flow rate of outside air based upon occupant load (i.e. CO₂ sensor).
 - 2. Occupancy scheduled through building control system.

J002 WHERE PERMITTED

- a. DCV is required by the “Energy Conservation Construction Code of New York State” for certain systems that comply with the ventilation requirements of the “Mechanical Code of New York State”.
- b. Where not required by Code, use of demand control ventilation (through use of CO₂ sensors) is not recommended for instructional spaces.
 - 1. It has been demonstrated that ventilation air (outside air) provided to classrooms has a beneficial impact on, indoor air quality, occupant health, and student achievement.
 - 2. DCV through the use of CO₂ sensors results in a time lag between the time the occupants enter the space and the time the appropriate amount of outside air for the occupant load is brought into the space. Thus, the use of CO₂ sensors almost always results in indoor air quality that is poorer than that provided using the minimum required by the Mechanical Code.

- c. If a school district wishes to employ demand control ventilation (DCV), it will be permitted; where strict compliance with the “Code” and the requirements of this Appendix are complied.
- d. DCV may not be used in such spaces where the source of contaminants is primarily not occupant related. Such spaces include, but are not limited to: locker rooms, gang toilet rooms, and storage or science prep rooms containing chemicals.
- e. DCV is not recommended for areas where odors are likely to be strong or where fumes or dust are common. (Spaces such as science rooms, art rooms, home and careers, and technology.) Local exhaust systems serving such spaces must be tied into ventilation systems to ensure sufficient makeup air is provided for the exhaust.

J003 MINIMUM REQUIREMENTS FOR DEMAND CONTROL VENTILATION

- a. All air handling equipment must be set up and capable of handling the volumetric flow rate of outside air at design day conditions for the maximum occupant load of the space(s) to receive DCV. Volumetric flow rate shall be determined using the “Mechanical Code”
 - 1. Classrooms: For ventilation purposes, the estimated, maximum occupant load in a standard size classroom as determined by NYSED may be less than that called out in the "Mechanical Code". The maximum, occupant load is based upon NYSED (historical) statistical data that allows, in accordance with the "Mechanical Code", a lesser (alternate) occupant density. Where the actual, maximum, occupant load is greater than the estimated, maximum load, the actual load shall be used. Unless the actual occupant load is greater, the maximum occupant load for sizing equipment will be no less than 30 occupants for a standard size, general, classroom (approximately 770 square feet in size).
- b. Building pressures shall be maintained neutral or slightly positive during all occupied times.
 - 1. All building pressurization requirements of the Indoor Air Quality section of Part III Environment shall be provided.
- c. Air Flow Stations.
 - 1. All air flow station requirements of the Indoor Air Quality section of Part III Environment shall be provided.
- d. Radon testing during the first heating season, after installation, is required in areas to receive DCV after installation. Exception: Areas of the State where the long-term living area estimate for homes above 4 pCi/L is less than 2 percent. To determine if the school is in a radon-prone area, check the New York State Department of Health Radon Level Maps and Statistics (http://www.health.state.ny.us/environmental/radiological/radon/maps_statistics.htm) to get specific information about the town in which the school is located. Testing results to be provided to NYS Department of Health and School District’s Health and Safety Committee.
 - 1. Other potential indoor air contaminants: DCV may not be appropriate for buildings with existing, potential, air, contaminant sources. School District must evaluate other potential indoor air contaminants that may be present in their buildings.
- e. Carbon monoxide detector(s) and alarm system are required in at least one of the occupied spaces served by each indirect fuel fired heating unit to be controlled by DCV.

- f. Direct digital controls are required for all control devices serving the air handling systems to be controlled by variable volumetric flow rates of outside air.
- g. Air handling units (AHU's), serving multiple spaces must have sensors provided in each occupiable space served by the AHU. AHU's must be controlled in such a manner that occupancy of any space will result in the proper amount of ventilation air (outside air) supplied to that space.

J004 REQUIREMENTS FOR DEMAND CONTROL VENTILATION ON EXISTING EQUIPMENT

- a. DCV may only be installed on existing equipment where the existing systems fully comply with the requirements of a new installation.
 - 1. If the existing ventilation rate for a space, based upon the maximum occupant load, as determined by the “Mechanical Code”, is less than that required for new construction, adding DCV will make the ventilation rate (and indoor air quality) worse than the existing condition and worse than if the system was new. For example, if the volumetric flow rate of the existing ventilation system is less than current requirements (say 10 cfm/of outside air per occupant), then demand control ventilation can not be installed on that system. By shutting down ventilation air when the space is unoccupied, but the building is occupied; the existing condition is made worse. There is no opportunity for the indoor air quality to come back to an acceptable condition (according to current code) prior to the next class.

J005 REQUIREMENTS FOR DEMAND CONTROL VENTILATION USING ON-OFF OCCUPANCY SENSORS

- a. Control systems shall be set up such that sensor failure results in the delivery of outside air for the maximum occupant load during occupied times.

J006 REQUIREMENTS FOR DEMAND CONTROL VENTILATION USING SCHEDULED OCCUPANCY

- a. Occupancy must be scheduled through building control system. In addition, occupancy may be overridden on by manual control.
- b. CO₂ sensor must be provided to monitor occupant load.
- c. Record keeping: Records to be provided to School District’s Health and Safety Committee.
 - 1. Space CO₂ concentrations must be recorded at not greater than 15-minute intervals. Records of CO₂ concentrations must be kept for a minimum of three years.
 - 2. Air flow readings are required in accordance with Indoor Air Quality section of Part III Environment.

J007 REQUIREMENTS FOR DEMAND CONTROL VENTILATION USING CO₂ SENSORS

- a. Requirements applicable to all DCV systems shall also apply to those systems using CO₂ sensors.

- b. Sensors shall have the following requirements:
 - 1. Sensors must be located at points that are reflective of the breathing zone of each space served.
 - i. Sensor location(s) must avoid impact of doorways, windows, short circuiting, and supply air vents.
 - ii. An adequate number of CO₂ sensors, must be provided for each space.
 - 2. Sensor quality:
 - i. Error not to exceed 50 parts per million (ppm) in expected range of measurement.
 - ii. Drift not to exceed 20 ppm.
 - 3. Redundant CO₂ sensors shall be provided at each location installed. If the difference in reading between sensors at the same location exceeds ten percent (10%), both sensors will require calibration.
 - 4. Measurement of outside air CO₂ concentrations are not required. An assumed value of 350 ppm may be used in determining ambient CO₂ concentration.
 - 5. Sensors shall take measurements (readings) in each space at intervals not to exceed 1 minute.
- c. A minimum volumetric flow of outside air must be provided during occupied times.
 - 1. Minimum flow rate must take into account dilution of non-occupant generated contaminants as well as make-up air requirements of all spaces served by the unit (i.e. make-up air delivered to locker rooms from gymnasium).
 - i. If not providing make-up air to other spaces requiring greater flow rates of outside air, the minimum volumetric flow rate of outside air for large spaces (Gyms with spectator seating, Auditoriums, Cafeterias, Band/Choir rooms, Large Group Instruction) shall be at least twenty percent (20%) of volumetric flow rate of outside air for the maximum occupant load of the space.
 - ii. Classrooms: If not providing make-up air to other spaces requiring greater flow rates of outside air, the minimum volumetric flow rate of outside air shall be at least twenty-five percent (25%) of volumetric flow rate of outside air for the maximum occupant load of the space.
- d. Pre occupancy purge: If the sequence does not include a provision for minimum ventilation rate, 24 hours per day, 365 days per year, a purge of the space is required prior to occupancy. A preoccupancy purge cycle shall consist of a 30-minute operation of the air handling systems, serving the area, with all dampers (outside air, return air, exhaust air, relief air) positioned, and all fans running to provide the quantity of outside air for the maximum occupant loading of the space.
- e. Post Occupancy Flush: Air handling systems, serving the area, must operate after the occupied times to

reduce CO₂ concentrations in the space to outside air levels, prior to shutting down. Dampers (outside air, return air, exhaust air, relief air) must be positioned, and all fans must run at speeds to provide at least the minimum flow rate of outside air during the post occupancy flush.

- f. Provide provision for economizer override of CO₂ control when conditions permit natural cooling of space(s) served.
- g. Upper limit of CO₂ (ppm) must be provided. The upper limit (Control Point) must be based on the metabolic rate of activities in area and the volumetric flow rate required by Code for the area served.
- h. Air handling system control during occupied times: All dampers and fans serving a space shall modulate from the minimum setting, starting at an interior CO₂ concentration of not greater than 100 ppm over that of the outside air. Dampers and fans shall modulate such that concentrations never exceed upper limit for space.
- i. Provide provision for a proportional-integral or a proportional-integral-derivative CO₂ controller.
- j. DCV through the use of CO₂ sensors may not be used where there is a provision to remove CO₂ by any method other than dilution.
- k. Provide provision for extended commissioning (1 year) to check calibration of CO₂ sensor, monitor/test CO₂ levels to ensure target per person ventilation rates are met and maintained.
- l. Record keeping: Records to be provided to School District's Health and Safety Committee.
 - 1. CO₂ concentration readings from all sensors serving each space must be recorded at not greater than 15-minute intervals. Records of CO₂ concentrations must be kept for a minimum of three years.
 - 2. Air flow readings are required in accordance with Indoor Air Quality section of Part III Environment.

J008 REQUIREMENTS FOR DEMAND CONTROL VENTILATION USING OTHER TYPES OF SENSORS/EQUIPMENT

- a. (RESERVED)

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