PUBLIC SCHOOL STANDARDS & GUIDELINES FOR NEW SCHOOL CONSTRUCTION & MAJOR RENOVATION PROJECTS

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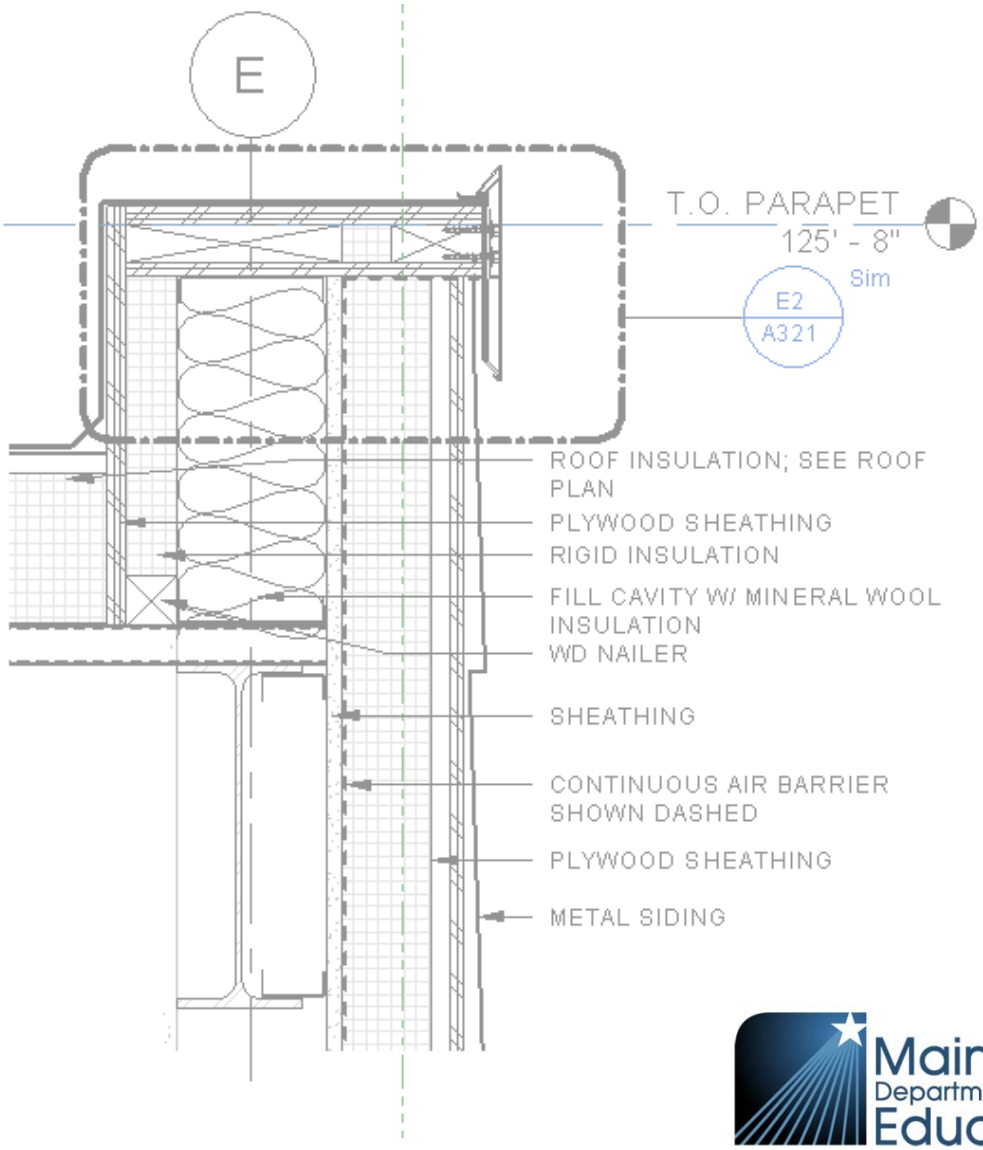

Maine Department of Education

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INTRODUCTION

OVERVIEW:

This document has been developed by the Department of Education (DOE) with assistance from practicing design professionals to assist school units and their architects in public school design. Under the Essential Programs and Services Model, the State will typically participate in much of the debt service cost for Major Capital Construction and Renovation that has received State Board of Education approval. However, high valuation units may need to contribute to debt service. Thus, each school system should review their individual status with the State's finance division prior to beginning the Major Capital process. With this deep financial involvement by the State, the Department of Education has a responsibility to assure that projects meet certain criteria including durability, economy, and quality.

It has become very evident that although the State has declining enrollments, there is still an extensive need for new and renovated school facilities. Many of the older schools in Maine do not meet the program needs of today's complex curricula. The older schools tend to be costly to maintain, very energy inefficient, and non-code-compliant. There are also many safety issues within and outside of older school buildings.

One of the major objectives of the State is to address as many projects as possible within the limited financial resources at both the State and local levels. To this end the State wants to avoid unnecessarily expensive designs, unapproved assemblies, and products that carry premium costs.

Objectives that were considered in preparing this document include, but are not limited to, operating costs, future expansion, flexibility, maintenance costs, and capital renewal costs.

COLLABORATION:

The State recognizes that school buildings will differ because of each school system's educational program and internal organization. The design of the building will also be determined by the school site, traffic patterns, and other external factors. Although the one-design-fits-all approach is not acceptable, the following document attempts to standardize quality considerations and design simplicity (indicated as Required OR Recommended). Local units that wish to exceed the State's size standards shall do so at local expense, paying a percentage of the impacted line items throughout the budget that reflect the "local only" square footage share of the total project. Also, school units that wish to incorporate architectural elements that exceed these standards (indicated as premium) shall do so at local expense without State subsidy support.

The State has a commitment to the development of quality educational spaces that will meet the educational needs of students in Maine schools. Spaces and buildings should be flexible in order that present and future programs can be housed appropriately to meet the needs of an ever-changing public school curriculum.

These standards and guidelines will be used by state officials when reviewing school designs and drawings. The State further recognizes that some of the premium elements in this booklet cannot be incorporated into a school without additional local funding beyond the limited state construction budget.

This document is intended to stimulate discussion. We hope these discussions will lead to the inclusion of the most appropriate elements that meet the unique needs of a specific project.

CHANGES & NEW PRODUCTS:

The State recognizes that there will be constant modifications to this document as new technologies and products enter the construction market. Design professionals are encouraged to discuss new approaches, technologies, and materials with State officials.

LIFE CYCLE COST ANALYSIS:

Many design decisions should be based on a "life-cycle analysis" that considers energy use, first cost, operational cost, equipment life, and replacement cost. In addition, consideration should be given to materials that can be recycled and are not hazardous to the environment.

The Department hopes this document assists in the development of quality school projects that are both high-performing and affordable. For further information contact the Director of School Facilities at the Department of Education.

SECTION I: DESIGN PROCESS PRINCIPLES

OVERVIEW:

State-funded major capital improvement projects must have a pre-design conference with the Department of Education that is attended by representatives from the school unit, their architect and engineers, and the Department of Education's School Facilities Team. The pre-design conference must be completed prior to beginning any educational programming design work.

The Department of Education encourages an integrated design process that combines the owner's project requirements with the Department of Education's Standards and Guidelines to provide the design team with greater clarity as to the needs of both the owner and Department of Education. This pre-design conference will bring the various stakeholders together at the beginning of the process and will stress the importance of maintaining collaboration and Department of Education's oversight throughout.

The Department of Education recognizes that development of the plans and specifications for a new school is a partnership between the State of Maine and officials at the local level led by their architects of record. Either party making decisions without the involvement of the other will lead to misunderstandings, conflicts and possibly to a project that becomes delayed or rejected. A cooperative approach will ensure a smooth process.

PREREQUISITES:

A pre-design conference with the Department of Education (DOE) can only be held after the owner has completed all of the requirements that will allow the Department of Education to understand the school unit's goals and allow the owner to understand DOE's project requirements.

Prior to the pre-design conference, the school unit should have completed the following items:

- Held an initial introductory meeting with the Department of Education
- Appointed a local building committee
- Selected an architect
- Completed a ten-year enrollment study
- Developed detailed educational specifications
- Reviewed the Department's Capital Project publications

Required:

The pre-design conference agenda will include:

- Review the educational goals outlined in the owner's educational specifications.
- Review and establish the grade levels and enrollment target for the project.
- Review DOE's Building Standards and Guidelines for New Construction.
- Review and answer questions regarding DOE's process.
- Review and answer questions regarding the State's timeline and schedule.
- Discuss and identify potential "State/Local" and "Local Only" cost parameters and the impacts that

those may have on the project's ability to be approved by the State Board of Education or the local referendum process.
- Discuss general goals for energy conservation and high performance building concepts.
- Outline an integrated design approach with continuous DOE involvement, review, and approvals.
- Review possible areas for value engineering and life cycle analysis.
- Review obligations for energy modeling, life cycle analysis, detailed cost estimates, and value engineering.

The owner's architect and engineers should consider options for streamlining the design and construction process. A pre-design conference is an opportunity for the school unit and DOE to talk about methodologies that can simplify construction through the use of efficient engineering systems, designs, and realistic construction schedules.

SECTION II: HIGH PERFORMANCE PRINCIPLES

OVERVIEW:

The Maine Department of Education (MDOE) encourages high performance schools for Maine communities. A high performance school is designed to conserve natural resources, save money, and improve the overall health and well-being of students, staff, and community. Emphasis is placed on low-impact site design, reduced impact on local infrastructure, energy efficiency, water use reduction, non-toxic materials, waste management, indoor air quality, efficient operations, and community engagement.

High performance school design principles can be broken into three general areas of emphasis:

- Integrative design process
- Human health and comfort
- Demand reduction

These principles are woven throughout this document as both required strategies and suggestions for premium strategies. Resources on high performance school design are included at the end of this section to provide further guidance to project teams.

INTEGRATIVE DESIGN PROCESS:

One of the key ingredients to creating a high performance school is to require an integrative design process. The integrative design process is a collaborative approach that includes the full team in decision-making from project inception through design, construction, and operations. The process focuses on a whole systems design approach: recognition that all the components of the building work interdependently and affect the performance of one another.

A few simple steps to implementing an integrative design process include:

- Set sustainability goals with the owner at project inception.
- Conduct a full team meeting at the beginning of each project phase.
- Include high performance design principles as an agenda item at all project meetings.
- Incorporate life cycle costs and operating costs into the project decision-making process.

Buildings are often budgeted on first costs alone. Life cycle costing takes a more integrated approach, factoring in energy savings over time, durability and reduced maintenance of systems and materials, and enhanced occupant health and productivity. High performance design principles place emphasis on looking at the building as a whole over time to minimize energy use, maximize cost savings, and create comfortable and healthy spaces for the occupants.

HUMAN HEALTH AND COMFORT:

Learning environments have a huge impact on student performance, health, and overall well-being. High performance schools can provide high quality indoor air and thermal, visual, and acoustical comfort. Emphasis is placed on daylight in classrooms and views to the outdoors, HVAC and lighting controls, non-toxic materials, enhanced filtration, carbon dioxide sensors, cross-contamination prevention, natural ventilation, and increased outdoor airflow rates in mechanically ventilated spaces.

Benefits of high performance schools can include improved student performance, increased student health, reduced student absentee rates, and greater staff satisfaction. Best practices include providing green spaces, open spaces, and shared community spaces in the building; reusing and recycling materials during construction and occupancy; and creating an environment that is a community teaching tool for high performance building and sustainable living.

DEMAND REDUCTION:

High performance schools are designed to reduce demand on energy and natural resources, to optimize the performance of building systems, and to reduce the overall operating costs of the school. Emphasis is placed on energy efficient mechanical systems, high performance envelope design, low-flow water fixtures, renewable energy systems, lighting and daylight controls, and energy efficient equipment and appliances.

> Green schools use an average of 33% less energy and 32% less water than conventionally designed schools.
>
> —***Greening America's Schools: Costs and Benefits*** *by Gregory Kats, 2006*

As part of an integrative design process, energy modeling and commissioning will confirm that all systems and components are integrated to achieve optimum results and are installed and operated as designed. One strategy may offset another. For instance, daylight sensors may cost more up front as an individual strategy, but once energy savings and associated reduced mechanical loads are considered, the team may realize that they can save money by selecting a smaller mechanical system.

Practices to optimize systems integration and increase efficiency include energy modeling and building commissioning. Design-phase energy modeling is a tool to use early and throughout the design process to test a variety of energy efficiency measures to determine the best way to align systems and components. Commissioning also offers an opportunity to make adjustments in the field and to train occupants on how to use the systems, improving efficiency even further.

Employing high performance principles such as demand reduction, energy efficiency, and system optimization results in climate appropriate solutions, buildings that have low-to-no impact on local infrastructure, and an overall reduction in the project's carbon footprint.

HIGH PERFORMANCE CERTIFICATIONS:

High performance building certification systems such as the United States Green Building Council (USGBC) LEED for Schools Rating System and the Northeast Collaborative for High Performance Schools (NE CHPS) Criteria can provide detailed guidance on implementing high performance school design strategies.

Although DOE recognizes the value of building certifications by a third-party organization, the State will not participate in costs associated with these certifications that may result in materials and systems that cannot be supported by the State.

Premium:

- Green Building Certification: Register the project with the USGBC LEED Rating System and obtain LEED for Schools certification.
- Educational Display: Provide a permanent display, building signage, digital dashboard, or building tour that describe the high performance features of the school.
- Carbon Footprint Reporting: Calculate the school's carbon footprint. Include a greenhouse gas inventory and opportunities to reduce greenhouse gas emissions.
- Climate Action Plan: Develop and implement a climate action plan to raise awareness of the school community's carbon footprint and engage students, staff, and the community in reducing that carbon footprint.
- Performance Benchmarking: Track the school's energy use over time, using a tool such as the US EPA's Energy Star Portfolio Manager.

CODES AND REFERENCES FOR HIGH PERFORMANCE PRINCIPLES:

- Version 3.0 NE CHPS (Northeast Collaborative for High Performance Schools) Criteria for New Construction and Renovations, NEEP, 2013 (free download), **www.chps.net/dev/Drupal/node/35**
- Regional Operations & Maintenance Guide for High Performance Schools and Public Buildings in the Northeast and Mid-Atlantic, NEEP, 2013 (free download), **www.neep.org/public-policy/energy-efficient-buildings/high-performance-public-buildings/Regional-O&M-Guide**
- LEED Reference Guide for Building Design and Construction (includes LEED for Schools), USGBC, v3 2009 and v4 2013
- LEED Reference Guide for Green Building Operations & Maintenance, USGBC, v3 2009 and v4 2013
- Advanced Buildings New Construction Guide, New Buildings Institute, Inc., 2013
- The Integrative Design Guide to Green Building, by 7group and Bill Reed, 2009
- Northeast Energy Efficiency Partnership, **www.neep.org**
- Collaborative for High Performance Schools, **www.chps.net**
- United States Green Building Council (USGBC), **www.usgbc.org**
- Maine Advanced Buildings, Efficiency Maine, **www.efficiencymaine.com/at-work/maine-advance-buildings**
- The Center for Green Schools, **www.centerforgreenschools.org**
- EPA High Performance Schools, **www.epa.gov/iaq/schooldesign/highperformance.html**
- Clean Air-Cool Planet campus carbon calculator, **http://campuscarbon.com**
- US EPA Energy Star Portfolio Manager, **www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager**

SECTION III: SCHOOL SAFETY + SECURITY

OVERVIEW:

Recent tragedies at schools around the country have reinforced the need for designs to keep students and staff safe in our public schools. School safety experts and educational facility planners have been working together to develop recommendations that cover the outside and inside of school buildings.

The State encourages school districts to consider student safety as one of the most important criteria when designing or renovating schools.

SAFETY + SECURITY SITE DESIGN:

Required OR Recommended:

- Develop site plans that allow two separate points of access to the site.
- Make the main entrance easily identifiable from the street or main entry drive.
- Develop main entrances with discrete physical barriers such as concrete-filled steel bollards, large granite blocks, or other physical barriers to prevent cars or trucks from being driven into the school.
- Post large, permanent, weatherproof 10"-12"-high numbers at exterior doors. Number sequentially in a counter-clockwise pattern.
- Post similar numbers on the inside face of the exterior door walls.
- Keep perennial bushes and trees a minimum of 20'-0 away from each side of major entrance doors.
- Keep electric and telephone services secure from vandalism. Use the preferred method of protection, underground service from a street telephone pole to the entering point of a building.
- Bury exterior propane gas tanks underground or secure behind chain link fence enclosures with concrete-filled steel bollards to prevent car or truck vandalism.
- Provide adequate lighting for the main entrance sidewalk and parking lot to discourage loitering and vandalism.
- Provide appropriate site security gates at fire lanes to prevent non-authorized vehicles from driving around the sides or back of the school.
- Provide exterior public address systems that can be heard in the parking lot, bus loop, and playgrounds.
- Consider developing emergency off-site staging areas.

MAIN ENTRANCE + SECURITY VESTIBULES:

Required OR Recommended:

- Provide a single point of entry for all students and visitors that is easily identifiable from the main approach to the school.
- Provide a locked security vestibule at the main entrance that allows visitors to enter the vestibule and be identified by the main office before they are approved for entrance into the school. The interior bank of doors of the vestibule should be equipped with one electronic strike that allows the door to be

unlocked electronically by main office personnel after visitors have been approved for entrance.
- Provide proximity card readers for staff at the main, kitchen, and at least one other staff entrance.
- Provide video cameras in the ceiling of the security vestibule and directly inside of the vestibule doors so that visitors can be photographed on video loops for later review.
- Provide a security window in the main entrance vestibule to enable main office personnel to maintain clear vision within the vestibule, and to greet visitors for security screening.
- Locate the main office directly adjacent to the vestibule to allow for visitor recognition and sign-in.

SAFETY AND SECURITY AT MAIN OFFICE:

Required OR Recommended:

- Locate the main office door adjacent to the security vestibule lobby so office personnel can maintain visual supervision while visitors come in to sign the visitor log.
- Provide a hidden electronic security panic button in the office that can send a signal to police or emergency responders when a crisis is developing at the school.
- Provide a minimum of two locations for interior intercom and exterior public address system. The second location should be designated as a "safe room."
- Design main offices with a second means of exit, either directly outdoors or into a more remote hallway.
- Provide security cameras at the main entrance and other remote locations around the school. Video systems should be capable of being reviewed for live on-demand broadcasting as well as a minimum thirty-day archival library system.
- Design the main office so it has easy supervision of the security vestibule, the main entrance lobby, and one or more main corridors leading into the "heart" of the school.

GENERAL BUILDING SAFETY + SECURITY PLANNING PRINCIPLES:

Required OR Recommended:

- Design the building so it can be locked down into separate security zones, preferably at internal firewalls requiring rated steel fire doors.
- Consider putting fire doors on electric hold opens and having them tied into the emergency security notification system that allows the main office to release fire doors for lockdown.
- Provide a minimum of two means of exit out of any gymnasium, cafeteria, or library.
- Provide a secure steel service door at the kitchen entrance with a proximity reader and a means of identifying visitors without opening the door.
- Provide locked, secure chemical storage areas that are not accessible to students or visitors.
- Provide laminated security glass at remote exterior doors or sidelights.
- Consider providing steel frame doors with no glass vision panels at remote, unsupervised doors.
- Reduce the number of exterior doors that need to be supervised or checked for security and safety purposes.
- Provide exterior doors convenient to playgrounds and playfields that can be quickly unlocked by proximity card readers in cases requiring "reverse evacuation."
- Plan the kitchen area with at least one designated emergency safe room.
- Plan athletic areas with at least one designated emergency safe room with intercom and telephone service.
- Consider planning libraries and media rooms with at least one designated emergency safe room.

SAFETY + SECURITY AT CLASSROOMS:

Required OR Recommended:

- Provide commercial-grade hardware and locksets on all classroom doors, office doors, and doors to educational spaces.
- Provide heavy duty, commercial-grade hardware at classroom doors where the door can be quickly locked by the teacher from the inside.
- Provide small vision panels with laminated security glass in classroom doors.
- Provide a phone and two-way intercom system in every classroom.
- Provide a minimum of one National Fire Protection Assoc. (NFPA)-approved escape window in every classroom, where necessary.
- Consider constructing small toilet rooms and storage rooms associated with classrooms out of concrete block with steel doors so they can be used as safe rooms during lockdown emergencies.

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SECTION IV: SITE PLANNING

OVERVIEW:

The State must be involved in reviewing site selection, design, and programming. Selected sites should be affordable, easily developed, and close to commercial-grade utilities. Sites requiring extensive earthwork, long driveways, or environmental challenges should be avoided. Schools should not be located directly on state highways with high speeds or heavy traffic.

SITE PLANNING SAFETY:

Required OR Recommended:

- Maintain clear and unobstructed sight lines for security and safety.
- Consult local officials, including fire, police, planning, and code enforcement officials in the initial stages of site design prior to site approval.
- Obtain preliminary approvals from the Maine Department of Environmental Protection, the Maine Department of Transportation, the Army Corp of Engineers, and other appropriate agencies before site approval.
- Consider how an emergency evacuation will be conducted. Consider bus loading areas and staging areas.
- Protect the main entry to the building with bollards or other barriers.
- Provide emergency vehicle access to all areas of the site, including playgrounds and fields.
- Provide secondary access to the site for emergency vehicles.
- Separate bus loop and parent drop-off areas and install fencing or guardrails to limit pedestrian circulation to designated crosswalks and sidewalks.
- Provide safe access for pedestrian and bicycle circulation from site entrances to the main building entrance and consider keeping pedestrian paths away from automobiles.
- Provide safe, clearly marked pedestrian crosswalks through the site.
- Locate play areas away from vehicle circulation and parking areas. Provide accessible pedestrian pathways to playgrounds and athletic fields that avoid vehicular traffic.
- Provide chain link fencing at the perimeter of playgrounds as required.
- Avoid sidewalks that link to high speed roads and highways.
- Provide clear vehicular circulation patterns and signage. Provide stop signs and speed tables.
- Provide LED lighting at all travel ways, parking areas, and building perimeter.
- Locate oil, propane, and gasoline tanks below ground. Small propane tanks serving kitchen or science room equipment may be located above ground and protected with fencing, berms, and bollards.
- Separate service vehicles from bus and parent drop-off areas.

Premium:

- Locally required off-site improvements.
- Brick or stone pavers.
- Concrete sidewalks further than 50'-0" from the main entrance.
- Granite curbing other than at sidewalks at bus loops, parent drop-offs, or main entrances.

SITE PLANNING DESIGN:

Required OR Recommended:

BUILDING ORIENTATION:

- Select the building site to minimize environmental impact and encourage a simple, straightforward construction process.
- Orient the main entrance to face east or south. Avoid entrances facing north.
- Orient the building design to maximize natural daylighting in classrooms and other occupied spaces.
- Keep building ventilation intakes away from vehicle exhaust and other sources of air pollution. Consider the site's prevailing winds when locating intake and exhaust equipment.

CIRCULATION AND PARKING:

- Design vehicle circulation and parking areas to maximize site safety.
- Provide light colored paving at the main and frequently used entrances to the building.
- Specify granite curbing at the bus and parent drop-offs and other vehicle contact areas.
- Specify slip-formed monolithic concrete at other areas. Avoid bituminous curbing except in low-slope "Cape-Cod" curbing applications.
- Specify heavy duty bituminous pavement at bus and delivery truck paths.
- Design the radii of turns to accommodate emergency vehicles and buses.
- Design to accommodate trailer truck deliveries.
- Minimize islands and other obstructions in parking areas, except where needed for circulation control, to accommodate snow removal and storage.
- Avoid locating light pole foundations within parking areas when possible. Concrete pole bases shall be 36" high to limit damage.
- Install speed control measures at long straightways and other areas.
- State support for parking will be limited to:
    - **Elementary Schools:** Staff plus 15 visitor parking spaces
    - **Middle and Junior High Schools:** Staff plus 15 visitor parking spaces
    - **High Schools:** 33% of Student Body for the total parking allowance
- Locate ADA parking spaces and drop-off zones near the main and frequently used entrances.
- Consider designating parking spaces near the main entrance for carpool and low-emitting vehicles.
- Costs for offsite road and sidewalk improvements mandated by the MEDOT will be considered a project expense.

Premium:

- Concrete or asphalt pavers.
- Additional parking and locally mandated parking above the standards.
- Concrete walks other than at the main entrance.
- Granite curbing at areas other than bus and parent drop-offs.
- Heavy-duty pavement other than at loading dock, service drives, bus loops, and dumpsters.
- "Porous" drainage pavement
- Radiant sidewalk and parking snow melt systems

SITE PLANNING AT PLAYGROUNDS AND ATHLETIC FIELDS:

Required OR Recommended:

- Design field orientation to conform with National Federation of State High School Associations–Court and Field Diagram Guide.
- Design play areas to conform to ASTM (American Society of Testing Materials) standards and the publication by the National Principals Association.
- Specify play area equipment and surfaces to meet Consumer Product Safety Commission standards.
- State support for play areas and athletic fields will be limited to:
    - **Grades Pre-K to 3:** A hard play area, a soft play area, and all-purpose field; sizes proportional to student population.
    - **Grades 4 to 6:** A hard play area, a soft play area, an age-appropriate baseball field, and an overlapping all-purpose field; sizes proportional to student population.
    - **Grades 6 to 8:** A hard play area, a softball field, a baseball field, and an overlapping all-purpose field; sizes proportional to student population.
    - **Grades 9 to 12:** A hard play area, a softball field, a baseball field, and an overlapping all-purpose field; sizes proportional to student population. Approved athletic programs will determine the facilities to be considered for development.
- Maintain playground equipment budgets based on $160/student. Schools of less than 300 students will be dealt with on a case-by-case basis.
- Limit baseball and softball field fencing to backstops and 4'-0"-high spectator fencing extending to 1st and 3rd bases.
- Install plastic safety guards on any playground fence that is 4'-0" high or less.
- Schools that have unique circumstances will be dealt with on a case-by-case basis.
- Provide drainage for play areas to prevent ponding.
- Specify surfaces and play equipment for soft play areas that meet ADA and OSHA standards.
- Provide subsurface drainage systems under soft play areas.
- Use linear shapes and simple forms at play areas to accommodate snow removal and maintenance.
- Specify playground equipment constructed of durable, weather-resistant, low maintenance materials.
- Consider bike racks at the main entrances to the building.
- Consider installing empty conduit for future power to the athletic fields.

Premium:

- Athletic and play areas that exceed the DOE's minimum standards.
- Bike trails or exercise trails.
- Bleachers, lighting, concession stands, irrigation systems, press boxes, scoreboards, and drinking fountains.
- Site irrigation systems for athletic fields.

SITE PLANNING UTILITIES + SERVICE AREAS:

Required OR Recommended:

- Select sites served by wireless cell phone service.
- Select sites with public water & sewer, 3-phase power, and fiber optic services.
- Design an on-site drainage system to keep stormwater run-off away from the building and to keep grounds, paved areas, and playfields free of standing water.
- Design paved areas to prevent stormwater and snowmelt from flowing across crosswalks and sidewalks.
- Design “open pond” stormwater storage systems. Avoid buried storage systems.
- Enclose stormwater ponds and holding areas with 4'-0"-high galvanized chain link fencing. Provide gates for maintenance.
- Provide drip edges at sloped roof areas with positive means of collecting roof runoff and a pipe to convey the flow to the drainage system. Do not use perimeter foundation drains to intercept roof runoff.
- Consider wastewater pretreatment systems at sites with septic systems.
- Locate kitchen delivery areas, school maintenance, delivery, and dumpsters away from the main building entrance or student activity areas.
- Locate the dumpster to encourage and maximize recycling of waste materials. Show storage areas for recycled materials in and outside the building on site and building plans.
- Enclose the dumpster with an 8'-0"-high chain link fence and set it on a bituminous concrete slab with steel bollard bumpers. Provide a 12'-0"-long reinforced concrete pad on the loading side of the dumpster.
- Avoid depressed loading docks.

SITE PLANNING LANDSCAPING:

Required OR Recommended:

The State-funded plantings budget will be limited to 0.1% of the building cost.

- Prioritize the location of plantings at the main entrance and as buffering for paved areas and walks, and along public building facades.
- Avoid plantings that create a security or visibility issue near entrances.
- Provide native, water conserving plants.
- Plant trees of a reasonable size and caliper.
- Locate trees away from the building to provide a minimum of 12'-0" clearance from the drip line of a fully grown tree.

Premium:

- Annual plantings
- Buffering plantings required by local authorities
- Decorative benches and elements
- Granite or stone benches or plazas
- Chain link fence coatings and screen slats
- Non-native plantings or trees

SITE PLANNING SIGNAGE:

Required OR Recommended:

- The school sign will be limited to a $15,000 allowance for all expenses.

HIGH PERFORMANCE SITE PLANNING PRINCIPLES:

Required OR Recommended:

- Site buildings to maximize daylighting (a north-south orientation for classrooms).
- Orient buildings with a major entrance on the south side whenever possible.
- Reduce light trespass onto adjacent sites and improve nighttime visibility by reducing up-lighting, reducing maximum lumens of fixtures above horizontal, and locating luminaires well inside the project site boundary.
- Reduce impervious surfaces on site, reduce quantity and improve quality of stormwater runoff. Practice low-impact rainwater management strategies.
- Choose native and adaptive plants that do not need permanent irrigation systems.
- Conduct a Phase I Environmental Assessment (and Phase II if necessary based on Phase I) to identify hazardous materials. Conduct required mediation on site.
- Control erosion and sedimentation during construction. Conform to the best management practices of the US EPA's NPDES (National Pollutant Discharge Elimination System).

Premium:

- Stormwater management: bioswales, pervious pavers
- Green roofs
- School vegetable gardens

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SECTION V: BUILDING EXTERIOR ENVELOPE

OVERVIEW:

The overall building design, footprint, configuration, and structural grid must be simple and straightforward, without complex geometries. The State prefers multi-level buildings to reduce the overall footprint and to decrease the exterior surface and roof area. Interior and exterior walls should be straight, with relatively few curves. Avoid complex configurations with unnecessary corners and changes of materials.

ROOFS:

Required OR Recommended:

- Use low pitch roof systems (flat roof system) for primary roof structures.
- Use small, efficient pitched roofs over entrances or other specialized areas only if the roof serves a functional purpose.
- Specify durable roofing materials for all roofs. Low-pitched roofs should be black EPDM or similar. Specify roofs with extended warranties with 20-year life. Avoid the use of scuppers except as code-required overflow drains. Avoid using residential materials and gutters.
- Avoid discharging water, snow, and ice along the face of any wall. Stormwater and snowmelt should be kept away from all entrances, sidewalks, and roadways.
- Design roof drainage "space" systems to prevent water from sheeting down across the face of exterior walls or splashing against exterior walls at grade level.
- Minimize complex and multiple roof levels in the building design.
- Minimize roof penetrations through the membrane. All roof penetrations shall be made by certified installers with approved roofing manufacturer details.
- Design required roof hatches for maintenance large enough to accommodate individuals equipped with full emergency gear or service personnel with supplies and toolboxes.
- Design roof access with regular stairways or alternating tread stairs, not by ship's ladders or exterior roof ladders.

Premium:

- Poured poly vinyl chloride (PVC) roofing systems
- Thermoplastic polyolefin (TPO) roofing systems with extensive welded joints
- Any colored roofing system other than black
- Bitumen or coal tar "built up" roofs
- Green roofs
- Pitched roofs except over small, specialized entrances or areas

BUILDING FOUNDATIONS:

OVERVIEW:

Building foundations should be designed by a structural engineer with the footing design based upon a licensed geotechnical engineer's recommendations. All foundations should be designed to resist frost heaving.

Required OR Recommended:

- Design the perimeter drainage system at the footings to keep ponded water away from the foundation.
- Avoid building on soils with high water tables, exceptionally high seasonal water tables, or on soils known to contain springs. Provide a quality vapor barrier at the first floor foundation and concrete slab. Specify a vapor barrier system with taped joints and chemical adherence to the foundation wall.
- Provide a passive radon venting system for all portions of a slab-on-grade. The system should be convertible in the future to a fan-run system, if necessary. Architects and engineers should be familiar with the radon potential of the rock and soils on the building site and take readings of radon levels in nearby buildings.
- Wherever possible, provide a minimum of 12" of grade difference between the finished floor slab and the finished exterior grade.
- Terminate all exterior wall flashing and weeps above the finish ground level. Insulate foundations with a minimum of R10 closed cell rigid insulation designed to eliminate or minimize heat loss through the perimeter.
- Design all exterior entry slabs to resist frost heaving. Provide full depth frost wall foundations where necessary to prevent frost heaving.
- Provide exterior sheet waterproofing on the foundation and footing and exterior side of all concrete walls that enclose space below the finish grade level. This includes occupied space as well as below-grade mechanical and storage spaces.

Premium:

- Granite or stone foundations
- Precast stone foundations
- Brick below the finish grade line

BUILDING ENTRANCE:

Required OR Recommended:

- Design the school so that students and visitors enter the building through one main entrance with a secure vestibule. All visitors shall be required to enter through the secure vestibule at the main building entrance. Design all exits and entrances so the building can be securely locked down after the start of school.
- Design all major and secondary entrances and exits with air lock vestibules if they are likely to be used during school hours.
- Design entrance doors to be controllable from a remote location, preferably at the administrative office, with a direct view and oversight of the main entrance security vestibule.
- Install exterior rain canopies at the main entrance and exterior doors that are expected to have high usage.

- Install 10"-12" high permanent numbers on the exterior and interior of each door. Number all exterior doors sequentially in a counter-clockwise pattern.
- Protect all front entrances and other major doors used on a regular basis throughout the school day with concrete-filled steel bollards or other appropriate, rugged obstructions.
- Use exterior metal grates to collect snow, ice, water, salt, and grit at the major building entrance.
- Use walk-off mat systems that can be removed and cleaned in all entry vestibules.
- Use walk-off rain mats directly inside of all vestibule doors leading down the main hallways for a minimum of 20'-0".
- At the receptionist's desk, install a panic/duress alarm or call button connected directly to emergency responders in case of security breach or emergency.
- Specify all systems and hardware to be commercial grade; residential grade is not acceptable.

Premium:

- Non-standard door series
- Doors higher than 84" or wider than 36"
- Stainless steel doors or frames
- Pivot hinges, sliders, or revolving doors
- Electric door openers other than at the ADA main entrance
- Overly complex ceiling finishes and features

EXTERIOR WALLS:

OVERVIEW:

Materials used for exterior enclosures shall be of commercial grade intended to have a minimum of a 30-year or longer life cycle. Products should be able to handle heavy use. Products that require sealants or paints are strongly discouraged. The designer should select products that will result in low maintenance and reduced replacement expenses for the building owner.

Required OR Recommended:

- Specify "severe weather"-rated veneer brick for exterior wall surfaces.
- Specify steel stud or concrete masonry unit (CMU) as backup for veneer brick.
- Design exterior masonry walls with impervious flashing and weep holes at the base of the wall and over openings such as louvers, windows, and doors.
- Avoid masonry that requires paint or sealers to prevent water intrusion.
- Specify other exterior materials of high durability, low maintenance, and an expected life span of 30 years.
- Specify weep holes at the base of masonry walls to be 8"-12" above finish grade, unobstructed, with insect screen.
- Design exterior walls with a continuous "water drainage plane" that redirects rainwater to the outdoors. Seal the drainage plane with a continuous sheet-applied air barrier system where thickness can be monitored and verified. Seal holes and penetrations through the air barrier system per manufacturer's recommendations.

- Specify masonry products that are “severe-weather”-rated with simple, cost effective detailing and patterns.
- Design flashing details as per Sheet Metal and Air Conditioning Contractors’ National Assoc. (SMACNA) flashing recommendations to prevent water infiltration into the wall.
- Design simple, cost effective steel, concrete, or masonry lintels.
- Specify galvanized exterior steel lintels.
- Do not use paper or organic products that support mold growth when wet in any exterior wall assemblies.

Premium:

- Glazed bricks, cast stone, “architectural” finish cast-in-place concrete
- Precast concrete
- Granite, slate, or other stone that is more expensive than common SW brick
- Lead-coated copper, stainless steel, zinc, or other metal shingles and siding products
- Ceramic, porcelain, or other tile products that are more expensive than common brick
- Phenolic resin aluminum skin panels
- Enamel panels or other manufactured curtain wall products
- Exterior porcelain tile, glass tile, or glass cladding systems
- Composite stone veneer cladding
- Channel glass facades
- Butt-glazing silicon glass systems

DOORS AND WINDOWS:

Required OR Recommended:

- Specify commercial-grade windows rated with prefinished exterior surfaces.
- Specify exterior windows constructed with thermally broken frames to reduce heat loss and prevent thermal conduction.
- Specify single-hung windows with window screens where operable windows are required.
- Specify casement and awning windows only where functionally required. Casement and awning windows must not be oversized and must be easily opened by crank mechanisms.
- Specify windows with sub-frame construction for efficiency and to resist water penetration.
- Specify thermally broken aluminum windows, aluminum clad wood windows, and storefront systems for large expanses of glass.
- Conduct life cycle analysis and collect detailed warranty information on vinyl, vinyl clad,and fiberglass clad windows to be reviewed before being approved by DOE.
- Specify hollow metal steel exterior doors, doors and frames to be fully galvanized or factory finish aluminum.
- Specify Grade 5 exterior door hardware with stainless steel components and no plastic components in hinges, locks, panic hardware, or lever handles.
- Specify interior and exterior doors with welded metal frames in all new construction. “Knock-down” frames are discouraged and only permitted with written approval.
- Specify 42" - wide service doors at limited locations only when functionally necessary.

Premium:

- Stainless steel, mahogany, teak, or exotic hardwood windows, skylights, or doors
- Triple-glazed windows
- Bullet-proof glass
- Any manufacturer's non-standard window sizes
- Non-standard doors that are higher than 7'-0" or wider than 36"
- Any windows or doors of special sizes requiring manufacturer's premium costs
- Silicone glazing systems, butt glazing systems, or double wall glazing systems
- Non-standard colors or finishes on windows or doors that require manufacturer's premium costs
- Interior overhead doors
- Glazed channel glass wall systems
- Infrastructure system costs related to monumental stairs
- Arched or complex windows and frames

HIGH PERFORMANCE PRINCIPLES:

Required OR Recommended:

- Specify high performance glazing determined by orientation

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SECTION VI: INTERIORS: DESIGN + PRODUCTS

OVERVIEW:

Every school plan should be a reflection of the DOE Space Allocation Guidelines, as well as the school district's educational specifications and pedagogy. The opportunity to redesign or design new school buildings is often a once-in-a-lifetime experience for teachers, school boards, and the local community. Serious consideration should be given to a comprehensive educational visioning process at local expense that reviews current state-of-the-art thinking and considers which educational strategies are most appropriate for the school's age group and local community values. Learning spaces should support traditional as well as expeditionary and "virtual" learning experiences.

Because education is constantly changing, school buildings should be designed to be as flexible as possible to accommodate future learning styles and technology. Building designs must allow for simple, low-cost expansion.

Designs should emphasize multi-functioning rooms to maximize daily use and minimize underutilized spaces. Plans should be organized to support small- and large-group activities.

GENERAL PLANNING PRINCIPLES:

- Design interior wall layouts to be simple and straightforward.
- Zone the building for public and after-hours use.
- Consider zoning the building for lockdowns that allow different sections of the building to be securely isolated.
- Design the floor plan to carefully separate quiet, academic areas from noisy, high activity functions.
- Design classrooms to conform to best practices for acoustic isolation and separation as defined by ANSI-S12.60-2010 (Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools Part I).
- Design the floor plan to optimize multi-functioning spaces such as cafeterias, lobbies, gymnasiums, and exploratory labs.
- Consider single or double intercommunicating doors between classrooms.
- Provide acoustical and smoke separation by designing classroom walls to extend to the underside of the structural deck whenever possible and when required by codes.

Premium:

- Complex floor patterns involving curves, cuts, and small tiles
- Elaborate, expensive, curved or complex walls, ceilings, windows, and arches
- Building plans with more than one elevator
- Stairways not required by code
- Operable partitions or large sliding doors
- Open, monumental stairs that are not simple and straightforward and that are not required for egress

- Complex ceilings with multiple levels and decorative soffits
- Wood or metal slat ceilings
- Plaster or fiberglass shaped ceiling planes
- Wood floors or natural stone floors
- Decorative wall lights
- Ceiling tiles larger than 24" x 48"
- “Regular” acoustic ceiling tile (ACT) grids and tiles
- Interior channel glass wall systems or glass block walls
- Architectural resin panels

GENERAL CLASSROOMS:

Required OR Recommended:

- Design classroom walls to the underside of the deck for smoke and acoustical performance.
- Specify classroom standards such as painted gypsum wallboard or concrete block walls, vinyl composition tile, floor carpet, and standard acoustical ceiling tile.
- Design all classroom doors to be easily lockable from the inside by the teacher but to allow egress from the classroom at any time.
- Consider toilets in the classrooms for grades Pre-k–1. For classroom toilets, provide seamless or ceramic tile flooring.
- Consider ceramic tile to a wainscoting height of 48" on the wet wall.
- Consider sinks in the classroom for grades Pre-k–5. Specify paperless and water-resistant materials, such as sheetrock, for wet walls.
- Specify sinks and countertops with postformed backsplash and front edge.
- Provide bookcases and teacher storage closets as required.
- Consider classroom cubbies for coats, hats, and boots in grades Pre-k–2.
- Provide waterproof finishes for winter boot storage.
- Provide separate row switching to allow artificial light levels to be reduced when natural daylight can be maximized.
- Design the classrooms for excellent acoustics.
- Provide a simple, straightforward lighting plan that provides appropriate light levels on white boards and does not interfere with projectors or TV video screens.
- Provide a technology plan that shows how technology can be incorporated in the classroom and supports the educational pedagogy.
- Consider radiant floor heating for grade levels where children are likely to sit on the floors.

Premium:

- Wall paneling or wallpaper
- Solid wood cabinets or wood veneer cabinets
- Flooring materials other than vinyl composition tile, linoleum, or floor carpet
- Cork, bamboo, recycled rubber, or other expensive flooring materials
- Decorative or specialty lighting other than standard classroom lights
- Decorative wall sconces

- Custom designed sliding doors or operable wall systems
- Casework or architectural woodwork such as picture rails, wainscoting, crown moulding, or paneling
- Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings
- Demountable wall systems
- ACT ceiling trims other than 15/16" grid profiles
- Solid vinyl or polycarbonate solid surface countertops
- Recycled glass countertops

ART ROOMS:

Required OR Recommended:

- Specify floor and ceiling systems similar to general classrooms.
- Consider concrete or seamless floors that can resist paint, markers, and other art materials.
- Provide separate storage area and separate kiln room with exhaust.
- Specify cleanable and stain resistant room finishes, including countertops, floors, and wall backsplashes.
- Design for abundant natural lighting with preferred north orientation.
- Consider floor drains with appropriate traps and trap primers.
- Provide clay traps at all sinks to be used for paper mache or clay.
- Provide appropriate acoustical absorption in rooms with open ceiling structure.
- Provide postformed countertops at sink areas.
- Provide plastic laminate casework throughout for easy cleaning and stain resistance.
- Provide deep sinks with gooseneck faucets.
- Consider multiple station student cleanup sinks.
- Provide adequate storage for student projects.
- Provide adequate wall display systems for hanging two-dimensional artwork.

Premium:

- Stone or epoxy countertops
- Wood cabinetry or architectural millwork
- Decorative or special light track lighting
- Expensive tile floors such as stone, ceramic tile, or quarry tile

MUSIC ROOMS:

Required OR Recommended:

- Design band, chorus, keyboard, and practice rooms to prevent noise from leaking into adjacent spaces and floors. Design walls and floors to prevent noise through ceilings or structural elements.
- Provide acoustic vestibules at doorways to prevent music from disturbing the rest of the building.
- Tune band and chorus rooms with sound absorbing materials and acoustic mass to prevent sound transmission.
- Tune chorus spaces to help amplify the human voice without the use of amplification systems.
- Specify washable hard surface floors in band rooms.

- Provide security glass in the doors of keyboarding and practice rooms.
- Prefer flat floors with portable risers over permanent concrete step floors.
- Design door configurations to allow for the easy movement of pianos, drums, and other large instruments.
- Provide lockable storage for music instruments.
- Design for convenient access to stages and other performance areas.

Premium:

- Natural hardwood paneling or woodwork used as acoustical baffles and reverberation panels
- Specialty flooring
- Television or acoustical recording studios or services
- Prefabricated practice rooms

SPECIAL EDUCATION AREAS:

Required OR Recommended:

Design requirements will be considered on an individual basis based on existing programs supported at the school.

- Integrate special education spaces within the larger school population.
- Provide appropriate storage for special education equipment.
- Consider OT and PT space adjacent to or inside of other multi-functioning spaces to maximize efficiency.
- Provide full-height gypsum or masonry walls with vinyl composition tile or carpet floor and acoustical tile ceilings to control noise.
- Provide appropriate structural support for special swings or hanging equipment.
- Provide quiet spaces or timeout rooms that are hygienic, vandal proof, and code compliant.

LIBRARY + MULTI-MEDIA ROOMS:

Required OR Recommended:

- Refer to the Maine DOE Space Allocation Standards for acceptable room sizes based on student population.
- Design the library in consultation with school district librarians and design guidelines developed by the Maine Library Association.
- Design the library for easy adult supervision.
- Specify gypsum or masonry walls with carpeted floor and acoustical ceiling.
- Provide appropriate structural design to accommodate heavy book loading.
-

Premium:

- Space required for non-school, town-owned library functions
- Excessively high ceilings or volumes
- Expensive architectural woodworking, paneling, and custom millwork
- Custom ceilings, soffits, skylights, or other monumental architectural features

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SCIENCE LABS:

Required OR Recommended:

- Design and equip science labs to support the educational specifications and to conform to the State's Space Allocation Guidelines. Equip science rooms and labs to serve only the science program for which the room is designed.
- Design science rooms or labs using best practices for safety.
- Design science labs to allow for adult supervision throughout the room.
- Provide deluge showers, eye wash stations, and emergency shut-off equipment where required for safety.
- In science rooms and labs where chemicals will be used, specify appropriate chemical-resistant furniture and countertops, fume hoods, acid neutralization tanks, and plumbing that will prevent wastewater contamination.
- In science rooms and labs where chemicals will be used, design appropriate safety equipment into the room and design appropriate prep rooms with lockable storage and fireproof, chemical-resistant cabinets.
- In middle and high school science labs, provide appropriately designed tables and countertops for computer use with experiments.
- In chemistry labs, design for fire-resistant construction as per IBC and NFPA codes. Labs should contain lockable and chemical-resistant equipment that meets the provisions of the Maine State Plumbing Code.
- Design to maximize shared amenities such as fume hoods, prep rooms, and storage.

Premium:

- Compressed air systems
- Gas at rooms other than chemistry
- Fume hoods at rooms other than chemistry

IT/COMPUTER SUPPORT:

Required OR Recommended:

- Write a technology plan covering grades Pre-K-12 that anticipates changes in technology. In the technology plan:
    - Describe how students are expected to use technology
    - Describe what technology will be installed when the school opens.
    - Clearly justify support rooms for equipment or recharging stations.
    - Describe how the district will handle recharging and computer repair, programming, and storage.
    - Consider mobile devices and pads as future substitutes for today's technology.

CONFERENCE ROOMS:

Required OR Recommended:

- Consult the Space Allocation Guidelines for the description of the functions and average group size to be

accommodated.
- Design conference rooms with full height walls to underside of structure with appropriate acoustical insulation and isolation.
- Locate conference rooms adjacent to the functional areas most likely to use these rooms.
- Specify finishes similar to those of administrative areas and general classrooms.

Premium:

- Special architectural woodwork and finish carpentry
- Special lighting or video and multi-media systems
- Special flooring, ceilings, or wall finishes

GYMNASIUMS:

Required OR Recommended:

- Consider gymnasiums as possible multi-functioning and multipurpose spaces. Provide enough sound absorbing material to allow for good voice recognition, and appropriate sound amplification for group presentations.
- Provide synthetic sports floors in Pre-K-5 schools.
- Specify MFMA-RL second or better grade, plain sawn hard maple floor systems for middle and high schools only.
- Provide minimum underslab 15 mil vapor retarder that meets Class “B” WYB.
- Refer to the DOE Space Allocation Guidelines to determine the size of the gymnasium, locker rooms, bleachers and support areas.
- Provide public toilet areas near the gymnasium.
- Provide for wireless network computer access in the gymnasium and offices.
- Locate gymnasiums adjacent to or with easy access to exterior playfields and parking lots for public events.
- Locate bleachers and gymnasium doors to protect floors from street shoe traffic.
- Provide energy-efficient lighting that can resist damage from thrown basketballs, softballs and dodge balls.
- Provide safety and security cages around light switches, thermostats, sensors, etc.
- Locate door swings, equipment, and other enclosures so they do not become dangerous obstructions to running students playing within the space.
- Present affordable strategies for maintaining appropriate humidity levels for wood flooring.
- Design gymnasiums with supporting toilet and shower facilities.
- Consider sports net dividers to maximize class use of gyms.
- Do not place drinking fountains in gymnasiums.
- Limit wall padding to competition court basketball backstops only.

Premium:

- Separate, specialized dehumidification systems for wood floors
- Glass backboards or automatic electric winch backboards other than two for the main court
- Climbing walls

- Floor painting other than simple, straightforward markings for volleyball and basketball. No school names, mascots, or logos.
- Movable bleacher systems designed to be relocated throughout the room
- Large, tall, electric operable divider systems
- Specialty equipment other than basketball and volleyball supports or tie-downs
- Batting cages
- Television platforms for broadcasting games and events
- College or professional grade floor systems

AUDITORIUM + STAGE:

Required OR Recommended:

- Consult the DOE Space Allocation Guidelines for state-supported stage sizes based upon program and grade configuration.
- Specify a state-supported basic stage curtain, sound system, and theatrical lighting systems
- Design dressing rooms, storage rooms, and scenery shops only if academic theater programs exist as part of the school curriculum.
- Design a reasonably sized control booth, 10’-0" x 15'-0".
- Specify sealed or painted concrete floors with carpeted aisles.
- Locate the control booth for visual supervision of the stage and for video and audio recording of performances.
- Design the auditorium stage and all support areas to be ADA accessible.

Premium:

- Square footage that exceeds that required for seating one-third of the student body or for the appropriate stage as recommended by the Space Allocation Guidelines
- Additional seating
- Additional theater curtains
- Proscenium arches wider than 60'-0"
- Fly galleries
- Stage gridirons, pin rails, or catwalks over stages
- Proscenium openings higher than 25'-0" or stage ceilings higher than 30'-0"
- Under-stage storage
- Orchestra pits
- Professional theater lighting systems
- Theater balconies or spectator boxes
- Elevators dedicated to serving just the auditorium
- Special curved plaster wall or ceiling assemblies designed for acoustic balancing
- Decorative wood paneling, wallpaper, and murals
- Spaces and systems for “black-box” theaters

NON-INSTRUCTIONAL SPACES:

OVERVIEW:

Non-instructional spaces house student services such as guidance and counseling, nurse and health clinic, food service, and administration. These important adult environments will also be used by students and visiting parents. The design of these spaces should encourage full day, multi-functioning sharing of spaces to minimize unoccupied spaces. These spaces should be served by state-of-the-art technology including communication and security systems and should provide for maximum student safety including glass supervision panels.

ADMINISTRATIVE AREAS:

Required OR Recommended:

- Design the main administrative office to have visual control of the main entrance, student drop-offs, bus loops, and major internal school circulation areas.
- Locate the administrative office directly adjacent to the main entrance security vestibule. The administrative office is the electronic security control center for the building. This office should be able to provide electronic access for approved visitors, who should be welcomed through a glass partition between the administrative office and security vestibule. Provide an easily accessible area where visitors may wait, sign in, and obtain badges.
- Provide a central intercom system, telephone system, and exterior public address (PA) system in the administrative area. Administrators should have access to emergency response communication systems.

GUIDANCE:

Required OR Recommended:

- Design guidance areas with offices for individual counselors and a small professional library, student display areas, waiting area, and administrative support space.
- Locate guidance areas near or adjacent to the conference room to accommodate pupil evaluation teams of 10-14 people.
- Specify typical finishes similar to those of the administrative office.

SPECIAL STUDENT SERVICES:

Required OR Recommended:

- Design student service areas with offices for psychologists, social workers, substance abuse counselors, speech specialists, and school resource officer.
- Specify typical finishes similar to those of the administrative office.

TEACHER WORKROOMS:

Required OR Recommended:

- Size and design teacher workrooms based on the educational specifications, the pedagogy, and whether teachers have individual classrooms or are moving as part of a rotating collegiate model schedule.
- Vary designs for workrooms depending on the age-level grouping and amount of ownership for teachers with individual classrooms. Consider confidential and secure workstations for teachers who are not assigned permanent classroom locations.
- Design teacher workrooms to encourage collegiality. Workrooms provide an opportunity for teachers to collaborate, solve problems, and develop team teaching curriculum.
- Specify finishes for teacher workrooms similar to those of other administrative areas.

TEACHER BREAK ROOM:

Required OR Recommended:

- Provide space and equipment to allow for lunches and the warming and refrigeration of prepared foods.
- Locate separate adult toilets adjacent to break rooms.
- Specify finishes for these rooms similar to other administrative areas.

HEALTH CLINIC + NURSE'S STATION:

Required OR Recommended:

- Locate the nurse's station and health clinic near or adjacent to administrative areas for shared supervision and easy parent pick-up.
- Provide lockable storage cabinet, closet, and refrigerator for student medicines and emergency response medication.
- Provide a small area for nurse and doctor examinations.
- Provide for a minimum of one cot in an alcove adjacent to a toilet and shower area.
- Provide a small office area for the nurse's files and work area.
- Specify moisture-resistant gypsum wallboard with washable paint finish, ceramic tile floor, resilient sheet goods, and gypsum wallboard ceilings.

CAFETERIA:

Required OR Recommended:

- Refer to the Space Allocation Guidelines for cafeteria sizing.
- Provide an economical sound system for group instruction and public uses.
- Specify hard, washable, durable wall finishes such as concrete block, ceramic tile, epoxy paint on moisture resistant drywall, etc.
- Design ceilings with simple volumes and finishes.
- Specify washable, durable floor finishes, such as quarry tile, porcelain tile, quartz tile, or durable sheet goods capable of greater impact resistance.
- Provide wireless network capabilities for communication and electronic point-of-service.

- Provide tray return with washable finishes throughout the dishwashing room.
- Design cafeterias to ensure smooth flow of students from the hallway into the serving area, through the dining area into the dish return area.
- Avoid multi-level cafeterias requiring steps and ramps.
- Provide bathrooms and custodial closets adjacent to or near the cafeteria.
- Locate hand sinks in the cafeteria for student and staff use, preferably where students enter the cafeteria.
- Designate space within the cafeteria for recycling and composting programs as designed by the local school district.
- Select movable furniture for durability and flexibility for a variety of uses.

Premium:

- Space in excess of that required for three cafeteria seatings as described in the Space Allocation Guidelines
- Abnormally high ceiling spaces
- Complicated and unusual ceiling designs including multiple levels and large skylights
- Non-standard ceiling materials other than quality ACT acoustical ceilings or gypsum drywall
- Unusual and complicated lighting systems such as non-standard pendant lighting
- Architectural woodwork paneling, hardwood trim, wallpaper, ceramic tile, or specialty murals
- Floor finishes other than those described as required and recommended
- Operable room dividers or custom-designed sliding doors or exterior wall shading devices

KITCHEN:

Required OR Recommended:

- Design the kitchen to meet Maine Food Code (Chapter 200) for school commercial kitchen standards.
- Specify hard, washable, durable wall finishes such as epoxy-painted concrete block or fiber-reinforced plastic (FRP) panels or other approved material.
- Specify washable, durable ceiling finishes such as moisture-resistant gypsum wallboard or approved commercial kitchen ACT material.
- Specify hard, washable, durable, slip-resistant floor finishes such as quarry tile or other approved floors suitable for commercial cooking kitchens.
- Specify multiple floor drains with floors sloped to drain.
- Avoid electrical floor outlets.
- Provide a small, secure kitchen office work area.
- Provide a lockable dry goods stockroom.
- Provide lockable refrigeration and freezer compartments.
- Design a kitchen layout that allows the kitchen staff easy supervision for safety and security.
- Locate kitchens with easy access to the outdoors and a secure outdoor delivery entrance.
- Provide a locked vestibule, if necessary, for late night or early morning deliveries of food.
- Design kitchens to be secured from other areas of the building.
- Provide staff toilet and lockers in conformance with health laws and away from food preparation areas.
- Locate kitchens with easy access to dumpsters and compactors.
- Locate custodial rooms near the kitchen and outdoor service area.
- Submit kitchen plans to the State's inspection program, as well as Health and Human Services and the

State's food nutrition staff.
- Protect delivery loading areas inside and outside with masonry wall construction.
- Provide hand sinks and dishwashing sinks as required by Maine State building codes.
- Provide a separate dishwashing area with stainless steel trim and sink access from the cafeteria area for student and staff drop-off of dirty dishes.

BUILDING CIRCULATION + SERVICE SPACES:

OVERVIEW:

Building designs should minimize corridors, lobbies, and circulation space to reduce wasted space. Circulation spaces should be of durable materials such as concrete block or plywood-backed, vandal resistant wallboard. The building should be designed with only one elevator whenever possible.

STAIRWELLS:

Required OR Recommended:

- Construct stairways of masonry unless otherwise approved.
- Locate monumental stairs, if included, in the lobby area. Design must be simple, straightforward, and functional.
- Design stairways of the appropriate width to assure a smooth transition between building levels.
- Specify non-slip and durable floor finishes.
- Provide non-slip nosings and appropriate color identification for edge of landings and nosings.
- Provide handrails and guards as required by code.
- Avoid vinyl composition tile on stair treads, landings, and ramps. Provide non-slip durable materials.
- Minimize required stairwells in the building design.

Premium:

- Stainless steel handrails and guardrail systems
- Glass guardrail systems
- Custom terrazzo treads, landings, or pavers

CORRIDORS:

Required OR Recommended:

- Design corridor widths that meet or exceed NFPA and IBC code requirements.
- Design corridors that do not exceed 8' wide if serving fewer than eight classrooms
- Design corridors that do not exceed 10' clear width.
- Specify durable finishes in corridors.
- Specify lockers properly designed to accommodate backpacks for appropriate grade levels.
- Specify a locker system with locks and silencers to reduce noise.
- Do not install electrical panels in corridors.

- Design corridors that are easily observable by administrators and teachers for security reasons.
- Avoid designing areas that provide hiding spaces.
- Specify approved safety glass for all glass in corridors.

Premium:

- Extensive decorative soffits and ceiling details
- Architectural woodwork and paneling including hardwood chair rails, picture rails, crown mouldings, or cove ceiling trim
- Extensive glass applications
- Extensive display cases
- Decorative masonry or ceramic tile wainscoting

LOBBIES:

Required OR Recommended:

- Specify durable materials in lobbies.
- Avoid excessive volume in lobbies.
- Provide light fixtures with lamps that can be changed without electric lifts.
- Design lobbies to control access to various sections of the building.
- Design lobbies to serve as many large-group spaces as possible, such as gyms, cafeterias, auditoriums.

CUSTODIAL + STORAGE SPACES:

Required OR Recommended:

- Locate custodial and building storage spaces to serve multiple sections of the building.
- Provide custodial spaces on each floor of multi-story buildings.
- Provide central building storage near a truck unloading area.
- Separate electrical and IT communication closets from custodial and storage spaces.
- Provide hot and cold water, floor-mounted service sinks, and proper chemical storage in custodial spaces.
- Provide proper ventilation and eyewash stations where chemicals are stored and used.
- Specify durable, washable finishes, preferably concrete floors and epoxy painted masonry walls.
- Provide proper ventilation and exhaust system for all areas where chemicals are stored.
- Provide-full height walls to the underside of the deck in all custodial and chemical storage areas.
- Provide floor drains in all wet custodial rooms.

BATHROOMS:

Required OR Recommended:

- Provide water saving fixtures and hands-free fixtures in gang bathrooms.
- Specify ceramic tile or heavy, commercial-grade, welded, seamless, uric-acid-resistant vinyl flooring for gang bathrooms.
- Specify masonry block with epoxy-painted finish or moisture resistant drywall with tile wainscoting to 48"

above finish floor on wet walls.
- Specify solid gypsum wallboard ceilings with locked, tamperproof access panels for valves and mechanical control systems.
- Specify dark-colored grouts with quarry or ceramic tile.
- Minimum use of paper products in public bathrooms.
- Consider masonry block walls wherever possible for toilet and urinal partitions. Where masonry is not possible, use solid plastic or other non-corrosive materials.
- Provide floor drains and sloping floors in all gang bathrooms.
- Specify ceiling braced toilet partition stalls with triangular cross-brace members to discourage students hanging on braces and structure.
- Keep HVAC fixtures and piping concealed and high on walls to avoid damage, rust, and vandalism.
- Consider eliminating doors and frames. Consider using airport-style entrances to gang bathrooms.

Premium:

- Stainless steel or stone partitions
- Custom European fixtures, faucets, or accessories
- Custom-designed fixtures or hardware

BUILDING STORAGE AREAS:

Required OR Recommended:

- Locate storage areas to serve multiple users throughout the building.
- Provide separate locked storage areas adjacent to kitchens, cafeterias, gymnasiums, and auditoriums.
- Provide outdoor access storage for athletic and maintenance storage.
- Provide storage areas accessed only from the outdoors for equipment requiring storage of gasoline. All such storage should conform to NFPA and IBC Building Codes.

MECHANICAL ROOMS:

Required OR Recommended:

- Locate mechanical rooms centrally to reduce piping and ductwork runs.
- Design mechanical rooms to properly isolate sound, vibration, and odors from the rest of the school.
- Avoid roof-mounted equipment.
- Locate mechanical rooms so they can be accessed via hallways, stairways, or alternating stair treads. Make sure filters and equipment can be replaced without using ship's or movable ladders.
- Locate intake louvers away from chimneys, vehicular exhaust areas, or other sources of contamination.
- Consider prevailing winds, dark-colored roofs, and exhaust equipment when designing intake systems.
- Design air intake to prevent wind-driven snow and rain from entering the building or any part of the HVAC system.
- Locate louvers at least 8'-0" above finish floor level for safety and security.

RECYCLING ROOM:

Required OR Recommended:

- Locate the recycling room to encourage student and staff use throughout the school day.
- Provide easy access for outdoor removal of recycled materials.

HIGH PERFORMANCE BUILDING INTERIOR PRINCIPLES

Required OR Recommended:

- When cost effective, specify environmentally friendly materials that are regional and have recycled content.
- Design classrooms to provide speech privacy, sound isolation, and acoustical comfort.
    - Reduce background noise from the HVAC system and reduce the amount of site exterior noise that affects interior spaces.
    - Provide low-velocity ventilation.
    - Design classrooms and learning spaces so that sound is not transmitted from one space to another.
    - Isolate large multipurpose spaces from classrooms.
    - Provide sound isolating gaskets on doors in all core learning spaces.
- Reduce the VOC (volatile organic compounds) content of interior building materials. Choose materials installed inside the weatherproofing system that meet the following VOC limits:
    - Paints and coatings (required, industry standard): All paints and coatings shall meet the VOC limits of CARB 2007 SCM for Architectural Coatings, or the SCAQMD Rule 1113, effective June 3, 2011.
    - Adhesives and sealants (required, industry standard): All adhesives and sealants shall meet the VOC limits of CARB 2007 SCM for Architectural Coatings or SCAQMD Rule 1168, July 1, 2005.
    - Flooring (required, industry standard): All flooring, including but not limited to carpet and hard surface flooring, shall meet the VOC limits of the CDPH Standard Method v1.1, 2010. The Carpet and Rug Institute (CRI) Green Label Plus (GLP), Scientific Certification Systems (SCS) Indoor Advantage Gold, Resilient Floor Covering Institute (RFCI) FloorScore, and GREENGUARD Gold
    - Where possible, choose untreated natural materials (such as untreated wood, stone, ceramic, glass, concrete, and clay brick) that are inherently non-emitting sources of VOCs and are considered compliant without any VOC testing. Any finishes, coatings, and binders used with these products should meet VOC requirements as listed.

Premium:

- Ceiling and wall systems, including acoustical tile, wall treatments, gypsum board, and insulation that meet the VOC limits of the GREENGUARD Gold (formerly GREENGUARD Children & Schools)
- Composite wood products containing no added formaldehyde resins, or which meet CARB ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins.
- FSC certified wood products.

INTERIORS: EQUIPMENT + FURNISHINGS

OVERVIEW:

Modern school design requires detailed coordination between the building shell and built-in furnishings and technology. This section outlines the built-in components installed by general contractors and the movable furnishings and technology provided and installed by other vendors prior to occupancy of the building.

The voice/data components of any building are changing rapidly from year to year with new technology resulting in faster, lightweight, affordable, and portable "plug-in" equipment. The State expects schools to take advantage of the latest technology that can simplify building systems and lower installed technology costs.

This section contains two parts: Part A covers built-in furnishings and equipment to be installed by the general contractor as part of the base building. Part B describes loose furniture and equipment purchased separately and installed by independent installers or school department personnel.

The total of Part A building built-in equipment and architectural woodwork should not exceed 7.0% of the building construction cost for elementary schools or 6.0% for high schools and middle schools.

PART A: BUILT-IN EQUIPMENT, FURNISHINGS, AND TECHNOLOGY:

FINISH CARPENTRY AND ARCHITECTURAL WOODWORK (DIVISION 6)

OVERVIEW:

School designers shall prepare concept designs and estimates of probable cost that follow traditional CSI formats. During concept design, they shall identify Division 6 costs for finish carpentry and architectural woodwork that shall include cabinetry, built-in shelving, and science casework. The estimates should include finish carpentry such as wood or laminated windowsills, built-in benches, wood and laminate wall panel and trims, as well as fiber-reinforced plastic (FRP) panels and trim.

Required OR Recommended:

- Specify finish carpentry and architectural woodwork not to exceed 2.0% of the building-only construction budget (excluding site) except by permission of DOE.
- Specify durable and easily washable casework. Preferred casework is plastic laminate over stable substrate with 4 mil. polyvinyl chloride (PVC) edge banding. Self-edging is discouraged.
- Limit paneling in lobbies or auditoriums to wood veneer plywood; birch, oak, or maple.
- Limit solid wood trim to custom design areas only. Birch, maple, and oak are the only species permitted.

Premium:

- Solid wood or wood veneer cabinetry, casework, or shelving

- Wood veneer paneling species other than oak, maple, or birch
- Solid hardwood trim of any species other than birch
- Hardware pulls greater than 6" in length
- Solid surfacing material at windowsills
- Paneling or cabinetry incorporating glass tiles or decorative clear plastic sheets with graphics
- Chair rails, crown mouldings, or picture rails
- Solid surface countertops such as Corian, solid vinyl, or polycarbonate
- Recycled glass countertops
- Solid wood cabinets or wood veneer cabinets in classrooms
- Expensive renewable products such as bamboo, wheat board, or recycled laminated wood
- Wood panel doors taller than 84"

BUILDING SPECIALTIES (DIVISION 10):

OVERVIEW:

Building specialties shall include toilets, urinals, shower partitions, mailbox systems, markerboards and tackboards, student or athletic lockers, locker benches, vocational lockers, interior building signage for directions, ADA identification, bulletin boards and directories, fire extinguishers and fire extinguisher cabinets, shower and cubicle curtains and tracks, operable walls, shower curtain rods and accessories, wall mirrors, toilet accessories, exterior sun screens, and interior light shelves.

Required OR Recommended:

- Specify specialties not to exceed 2.0% of the total building-only budget (excluding site work) except by permission of DOE.

Premium Products:

- Stainless steel bathroom and shower partitions
- Hardwood or hardwood veneer lockers
- Motorized or operable exterior sunscreens or sunshades
- Motorized or operable interior light shelves
- Operable partitions in classrooms
- Motorized, operable partitions in gyms or cafeterias

BUILT-IN EQUIPMENT AND FURNISHINGS (DIVISION 11 & 12):

OVERVIEW:

Fixed building equipment shall include equipment and appliances for the commercial kitchen, staff room, culinary arts and family consumer classrooms, and science classrooms. Fixed equipment shall also include such gym equipment as basketball backstops, wall pads, volleyball nets and sleeve, one (1) scoreboard, and electric gymnasium mesh divider curtains, washer and dryer units, and projection screens.

Built-in furnishings shall include entry mats, recessed vestibule grids and walk-off mats, and window treatments such as roller shades, miniblinds, and sunscreen roll shades. Fixed furnishings shall also include fixed auditorium and lecture seating, gymnasium bleachers, stage curtains and backdrops, and TV studio green screens.

Required OR Recommended:

- Specify built-in equipment and furnishings not to exceed 2.0% of the building-only budget (excluding site costs) except by permission of DOE.

Premium:

- Electric operating projection screens in any location other than auditoriums or presentation lecture halls
- Electric operating window treatment shades or sunscreens
- Stainless steel exterior sunshades or sunscreens
- Motorized or operable exterior sunscreens or sunshades
- Motorized or operable interior light shelves
- Stage curtains and tracks other than at proscenium arches unless approved for high school auditoriums

PART B: MOVABLE EQUIPMENT:

OVERVIEW:

Equipment and technology lists must be approved by the DOE. Movable equipment costs will not exceed 9% of building-only construction costs (excluding site) in a project budget. Movable equipment is purchased separately from the general contract and can be installed by independent vendors or school department personnel. Movable equipment falls into three categories as follows:

- Movable furniture and equipment
- Outdoor site furnishings and equipment
- Technology equipment

Movable Equipment Examples:

- **Movable furnishings and equipment** shall include interior maintenance equipment for facility managers and custodians, tables, desks, chairs, file cabinets, conference tables, indoor athletic equipment, movable carts, library shelving and library systems, instructor tables, conference tables, storage cabinets,

art room equipment, consumer science equipment, music tables, chairs and music stands, movable storage cabinets, and vocational school lab equipment.

- **Outdoor site equipment** shall include site maintenance equipment, movable athletic equipment such as movable soccer and lacrosse goals, team benches, movable track and field equipment, and other outdoor equipment approved by DOE.
- **Technology** includes phone system devices and phone servers, computers, network equipment and software, including servers, routers, switches and wireless equipment systems, digital video projectors, interactive presentation devices (including interactive white boards), classroom enhanced auditory systems, auditorium enhanced auditory systems, video storage, television monitors, distribution equipment, and specialized systems such as 3D printers, cameras, measuring and recording devices, and digital signage display systems.
- Refer to State Board of Education's Chapter 61-Section 10 for further definition and requirements.

Premium:

- College or university technology systems
- Teleconferencing equipment
- Interactive lecture and auditorium systems requiring technology at fixed seating
- Professional-grade theater equipment such as sound boards, light boards, video and auditory recording devices, and television transmission systems

SECTION VII: HVAC + PLUMBING

OVERVIEW:

The building's HVAC and plumbing systems shall be designed to conserve energy and water to reduce operating costs. The systems shall be integrated with the design of the building plan and envelope to optimize performance and provide occupant comfort. The systems shall be durable, expandable, and easily maintained.

SPRINKLER SYSTEMS:

Required OR Recommended:

- Full National Fire Protection Assoc. (NFPA) 13 systems are recommended.
- "Maine Life Safety" sprinkler systems may be considered by the State Fire Marshal's Office on a case-by-case basis where no public water supply is available.
- Design sprinkler systems in conformance with local sprinkler ordinances.

PLUMBING:

Required OR Recommended:

- Provide water conserving fixtures
- Provide automatic controls at sinks and toilets
- Provide fixtures and controls that meet American Disabilities Act (ADA) requirements.
- Provide fixtures that are durable and easily maintained.
- Lay out toilet and shower rooms efficiently.
- Specify floor drains with trap primers where practical.
- Pitch all slabs to floor drains.
- Provide floor drains with trap primers in student ganged bathrooms and mechanical rooms.
- Avoid locating floor and roof drains over electrical and data system equipment.
- Provide emergency eyewash, shower units, floor drains, and sloped slabs as required by Occupational Safety and Health Administration (OSHA) in science rooms, art rooms, shop and maintenance spaces, and any classroom where chemicals are used.
- Provide tamper-proof hose bibs adequately spaced around the perimeter of the building.
- Provide appropriate water supply and floor drains in building maintenance areas.
- Provide solids interceptors (plaster traps) at art rooms.
- Provide grease traps at kitchens.
- Provide toilets in Pre-k–1st grade classrooms only.
- Provide sinks in classrooms for elementary grades including grade 5.
- Specify recirculating or heat trace domestic hot water supplies on supply mains.
- Specify insulated or cast iron sanitary drain piping to eliminate noise in occupied spaces.
- Specify insulated roof drain sumps and condensate drain piping to prevent condensation from forming inside the building.
- Locate plumbing vents away from roof edges, operable windows, snow drift locations, and air intakes.
- Locate stack vents near the ridge of sloping roofs.

Premium:

- European fixtures, faucets, or radiators
- Colored plumbing fixtures
- Electric hot water systems
- Solar domestic hot water systems
- Gray water and rainwater systems
- Clean agent extinguishing systems for server rooms
- Individual bathrooms in classrooms other than Pre-k–1st grade.

HVAC:

Required OR Recommended:

- Conform with all relevant code standards such as International Energy Conservation Code (IECC), ASHRAE 90.1, and ASHRAE 62.1 (American Society of Heating, Refrigerating and Air Conditioning Engineers).
- Use energy modeling during the design phase for system selection and building configuration.
- Compile a comprehensive life cycle analysis that addresses the initial cost of the systems, annual operating cost, maintenance costs, and replacement costs.
- Use high performance heating and ventilating systems.
- Hire a 3rd party agent to perform commissioning. Enhanced commissioning should be done after occupancy to monitor systems performance. Systems to be commissioned include: heating ventilation and cooling (HVAC), controls, lighting and power loads, and air barrier systems.
- Use Energy Recovery Ventilation (ERV) and air handling units with heat recovery wheels.
- Design building systems to allow for future expansion.
- Design return air through ducts; do not use plenum spaces.
- Consider high performance glazing to reduce cooling requirements.
- Provide individual room controls with carbon dioxide sensors, variable air systems (VAV), and operable windows.
- Locate mechanical rooms away from educational spaces to avoid the transfer of noise and vibrations.
- Provide Minimum Efficiency Reporting Value (MERV) 13 filters, MERV 11 minimum if higher-rated filters are not provided by the unit manufacturer.
- Consider natural gas and biomass systems.
- Locate louvers at least 8'-0" above grade and keep plantings away from louvers.
- Hire an independent consultant (working for the owner) for testing and balancing.
- Control HVAC systems with a direct digital control (DDC) system.
- Require extended warranties on boilers and major equipment.
- Control indoor air quality during construction to prevent dust in ductwork and equipment.
- Limit air conditioning to spaces used year-round: administrative offices, auditoriums, data and equipment rooms with equipment that generates heat, and spaces needed for summer school programs.
- Locate HVAC equipment in most cases in mechanical rooms or penthouses, not on roofs.
- Locate equipment like make-up air units (MAU) for kitchens on the roof.

- Locate intake louvers away from sources of air pollution such as buses, exhaust vents, kitchens, and shop spaces.

- Consider using radiant slab heating systems with in-slab sensors at main entry vestibules, lobbies, and primary grade classrooms.
- Control solar heat gain with sun shades, glazing materials, and/or design orientation.
- Avoid fin tube radiation at floor level in WCs. Consider radiant ceiling panels in bathrooms.
- Provide passive radon venting that can be converted to active ventilation.
- Cluster air conditioned spaces to maximize efficiency and lower first construction costs.

Premium:

- Electric baseboard
- Dedicated stand-alone air conditioning systems for areas other than those listed above
- Dehumidification systems for summer use
- Electrostatic precipitators for wood chip systems
- Expensive control and monitoring of building systems including utilities
- Raised floor distribution systems for HVAC
- Building flush-out following LEED requirements.
- Geothermal heating and cooling systems.

HIGH PERFORMANCE HVAC + PLUMBING PRINCIPLES:

Required OR Recommended:

- Select water conserving fixtures that meet the Energy Policy Act (EPAct) 1992, with Amendments. Reduce potable water use by choosing low-flow water fixtures that meet these maximum flow rates:

Restroom and classroom sinks	0.5 gpm metered
Water closet	1.28 gpf
Urinal	0.125 gpf
Showerhead	1.5 gpm
Kitchen sink (commercial kitchen sink excluded)	1.5 gpm
No garbage disposals	

- Select Water Sense-labeled plumbing fixtures when available.
- Control indoor air quality during construction, meeting SMACNA IAQ Guideline for Occupied Buildings under Construction 2007, Chapter 3.
- Provide deck-to-deck partitions, dedicated exhaust to the outdoors, and negative air pressure for spaces with hazardous materials (janitors' closets, chemical mixing areas, darkrooms, and high-volume copy rooms, etc.).
- Provide a walk-off mat system at every main entrance.
- Choose equipment and appliances that have an Energy Star label.

Premium:

- Connect a permanent metering system to the building management system to track water and energy consumption, manage use, and identify opportunities for additional savings.
- Re-commission systems two years after the school opens to ensure the high performance features are operating as intended and to make adjustments to increase efficiency.

SECTION VIII: ELECTRICAL + DATA/TECHNOLOGY SYSTEMS

OVERVIEW:

Building systems shall be energy efficient to reduce initial construction costs as well as long-term energy consumption and operating costs.

ELECTRICAL & TECHNOLOGY:

Required OR Recommended:

- Review Efficiency Maine Programs for rebate incentive programs and provide a summary to DOE.
- Provide light emitting diode (LED) site lighting with zero cut-off fixtures.
- Consider control for site and corridor lighting systems with the direct digital control system.
- Track energy use through a building automation system (BAS).
- Provide daylighting integrated with lighting controls and occupancy sensors.
- Consider occupancy sensors in occupied rooms.
- Provide light foot-candle levels as recommended by the Illuminating Engineering Society of North America (IES):

Average Foot Candle Levels	
Interiors	
Classrooms	30–40
Libraries	reading 25, support 15
Stairs	5–7.5
Labs	bench 25, teaching demonstration 50
Gyms	PE 25, basketball 50
Corridors	5
Offices	30–45, 25–65 years of age
Site	
Parking	.2 fc min–max to min ratio 15:1
Roadways	.3 min–6:1 avg to min–10:1 max to min
Entrances	2.5–5

- Minimize the types of lamps to reduce inventory and replacement costs.
- Provide fixtures that are easily relamped and cleaned.
- Consider direct/indirect fixtures in classrooms with 10'-0" ceilings or greater.
- Provide lighting controls for dimming or multi-level light switching in educational spaces.
- Install task lighting at instructional area wall surfaces where necessary.
- Install LED fixtures or extended life lamps in areas with high ceilings where relamping is difficult.
- Provide adequate electrical capacity for future building expansion.
- Specify variable speed drives on electrical motors.
- Specify a minimum of two (2) double duplex outlets (2 outlets per circuit) per classroom wall.
- Locate electrical distribution and breaker panels in locked electrical closets or service/mechanical areas.

- Security Systems
    - Provide surveillance cameras at least at all major entry points and corridors.
    - Install door status and intrusion monitoring and access control systems at exterior doors.
    - Provide intercom and door release systems at the main entries, as well as those frequently used by staff, students, and delivery personnel.
    - Provide a “panic” lockdown button at the main office and security office.
- Consider an emergency generator to support critical systems only.
- Coordinate ceiling plan and lights with projectors and IT equipment.
- Technology:
    - Use the same installer for phone and intercom systems.
    - Provide classroom ceilings with an outlet with voice/data capability and power for technology.
    - Provide for wireless connectivity.
    - Provide locations with dedicated circuits for laptop charging stations if programmed.
    - Provide CAT 6 cabling–all runs to be less than 300' in length.
    - Provide one (1) voice/data jack at each classroom wall.
    - Provide appropriate air conditioning in computer rooms, computer labs, and data hub rooms.
    - Provide power and data for electronic whiteboards or digital TVs in classrooms.
    - During design development, provide layouts and cut sheets for all equipment requiring active electrical equipment to be built-in or purchased as part of movable equipment budget.
    - Provide fiber option connectivity between IT closets.

Premium:

- Emergency generator beyond critical emergency systems
- Interior LED lighting except for high ceilings and hard-to-reach places
- Expensive or imported light fixtures
- Decorative wall sconces
- Surveillance cameras at locations other than exterior doors or corridors
- Photovoltaic arrays or systems
- Electrical wind generators
- Raised floor raceway systems
- Interior cameras that exceed the ratio of 1 camera per 10,000 sf
- Security camera systems that exceed 25 cameras

SECTION IX: CODES + REFERENCES

OVERVIEW:

Major capital school projects are required to comply with current MDOE rules and regulations as well as local, state, and federal rules and codes.

The attached list is not intended to be exhaustive or to include all codes and regulations required for public school buildings. Designers and owners are responsible for determining what standards and codes are required.

Required OR Recommended:

- State Board of Education ***Rules for Major Capital School Construction Projects, Chapter 61***
- Maine Department of Education ***Space Allocation Guidelines***
- Maine Department of Education flowchart and current ***School Construction Project Workbook*** for new school construction and major renovation projects
- NFPA 101 Life Safety Code, NFPA 1 Fire Code, and National Fire Protection Assoc. (NFPA) 13 Sprinkler Code as administered by the State Fire Marshal's Office
- International Building Code (IBC)
- Maine Uniform Building and Energy Code (MUBEC)
- International Energy Conservation Code (IECC) as required by MUBEC
- American Society of Heating and Air-Conditioning Engineers (ASHRAE)
- ASHRAE 90.1-2007 as required by MUBEC
- ASHRAE 62.1
- ANSI-ASA ST.60-2010 American National Standard for Acoustic Performance Criteria, design requirements and guidelines for schools
- Underwriter's Laboratory Fire Resistance Directory
- National Electrical Code
- Maine State Plumbing Code
- Maine State Elevator and Hoist way Code.
- All other cross referenced and required industry standards and codes as required by the State of Maine and local jurisdictions governing public school buildings
- Northeast Collaborative for High Performance Schools (NE-CHPS)
- U. S. Green Building Council (Leadership in Energy and Environmental Design [LEED])

Maine Department of Education
Division of School Facilities
http://www.maine.gov/doe/facilities/
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