

---

## SECTION FOUR

## SUSTAINABLE DESIGN GOALS

### 4.1 SUSTAINABLE DESIGN GOALS

The project will strive to meet the threshold 34 points defined by the Massachusetts Collaborative for High Performance Schools (MA-CHPS) and maximize the Energy Efficiency incentive points established by the MSBA.

A “green charrette,” open public forum with consensus-based discussion, was held on November 18, 2009 in Grafton. The purpose of the charrette was to: 1) familiarize and educate the Town’s constituencies on sustainable design and MA-CHPS; 2) identify sustainable design opportunities; and, 3) develop sustainable design goals.

A second “green charrette” is planned to be held as part of the Design Development phase.

The project team embraced an integrative design approach with the participation of the facility staff, teachers and students early in the schematic design phase. The design process addressed sustainable design criteria opportunities using the building as a 21<sup>st</sup> century teaching tool. The project team will support the Town in obtaining grants from the MRET (formerly known as MTC) as applicable, and energy efficiency incentives from the major utilities.

Sustainable design considerations and goals that are in the current cost evaluation and are anticipated to be in the project are:

#### **SITE**

- Storm water runoff from all parking areas will be captured and treated through stormwater treatment structures. Sub-surface infiltration systems will be used to store storm water runoff, reducing the impact on the Town’s storm sewer system. Bio-swales and bio-retention systems are under consideration as an alternative to the proposed water quality and infiltration systems.
- Stormwater runoff from the building roof will be captured and recharged directly to the ground via sub-surface infiltration systems.
- Building orientation such that it optimizes daylight brought into the building, despite the existing site constraints.
- Building footprint is minimized to decrease site impact.

- Community shared recreational space.
- Sidewalks and walkways connect to a public way, and bike racks for 5% of building occupants.
- Roof shall be designed to reduce heat islands by using a light colored roof membrane and a portion of the roof will be constructed to allow a future vegetated roof.
- Exterior light fixtures and layout are to meet IESNA and dark sky requirements. Full cut-off fixtures outside reduces light spillage from the site (light pollution reduction).

## WATER

- Drought resistant plants to minimize irrigation demand.
- Sensor operated toilets, urinals and lavatory faucets.
- Low flow urinals and toilets.
- Low Flow shower heads.

## ENERGY

- Lighting, Fenestration, Mechanical, and Ventilation to exceed MA Building Energy Code, 7<sup>th</sup> Edition, by up to 20%.
- Ventilation rates per ASHRAE 62.1 – 2007.
- No CFC refrigerants in all HVAC and refrigeration systems.
- CO<sub>2</sub> monitors and controls to provide demand ventilation in air conditioned spaces.
- Combination of mechanical and natural ventilation in classrooms using operable windows.
- Energy recovery at some air handling units.
- High-efficiency (90% to 95%) condensing boilers.
- Variable frequency drives.
- Radiant panels providing quiet, efficient heating and no loss of floor space.
- Energy management system to control and monitor HVAC system components.
- Submetering of mechanical and electrical systems to assist in monitoring and adjusting the energy efficiency of the building systems.
- Demand control ventilation in appropriate spaces.
- Unoccupied setback for classroom airflow.
- Displacement ventilation in some areas to minimize energy consumption and improve ventilation effectiveness.

- Third party commissioning of Electrical, HVAC, and Plumbing systems.
- Controls to turn off lights when spaces aren't occupied and when there is sufficient daylight.
- High efficiency lighting fixtures with energy-saving lamps and ballasts.
- Low light power density: approximately 1.0 watt/square foot or less for the building and approximately 0.85 watts/square foot for the classrooms.
- High bay fluorescent light fixtures in gymnasium.
- Consideration for LED site lighting
- Facility staff training on Operations and Maintenance for Electrical, HVAC, and Plumbing.
- Exterior sunshades to provide for shading and interior light shelves bounce light into the classrooms.
- High performance building envelope:
  - Higher R-value insulation at roofs and walls.[ Increased insulation on the exterior side of the cavity for higher R-value].
  - High performance glazing systems' selection.
- Solar PV ready roof with optimal South exposure.
- Demonstration Photovoltaic Array System(2 panels) for use as an educational tool within the Science Program

## **MATERIALS**

- Designated recycling collection areas and recycling separation area.
- 90%+ diversion goal for construction and demolition waste.
- High recycled content gypsum wallboard.
- Consideration for Linoleum flooring rather than vinyl composition sheet or tile in specific areas.
- Linoleum tack boards, which are rapidly renewable as well as a highly functional product.
- Seek to maximize the use of highly recycled content products, such as optimizing recycled content in acoustical tile.
- Forest Stewardship Council certified wood, where applicable.
- Use of salvaged, recycled, or bio-based materials (ceiling tiles, doors, steel studs, etc.)

## INDOOR ENVIRONMENTAL QUALITY

- Indoor Air Quality plan created and followed during construction including good practice such as sealing ducts, negative air pressure at areas of chemical use, walk-off mats.
- Protect building materials from moisture and mold.
- Building orientation to optimize daylighting in classrooms.
- Clerestories and roof monitors to introduce daylight to central rooms/spaces.
- Interior glass to distribute light throughout the interior.
- Interior lighting to be indirect/direct, using high performance lamps and ballasts, enabling use of fewer fixtures (less energy use) while providing a glare-free environment.
- Electronic ignitions for indoor gas-fired equipment.
- Air intake locations designed to be away from contaminants.
- No fossil-fuel burning equipment permitted indoors.
- Comply with thermal comfort standards from ASHRAE 55 – 2007.
- A goal for 80% of the combined floor area of classrooms and administration to have access to views.
- Low VOC (volatile organic compound) emitting materials selected for interior paints, coatings, sealants, resilient flooring and adhesives, carpet and adhesives, acoustic tile, wall board, linoleum and cabinetry.
- Formaldehyde-free, low-VOC particleboard and composite wood products.
- Pollutant source control through the use of high efficiency filters MERV filters (MERV 13 or better).
- Building ventilation flush-out performed prior to occupancy.
- HEPA vacuuming prior to substantial completion.
- High performance acoustical design for classrooms.
- Classrooms to have operable windows.
- Temperature and lighting controls for each classroom.

## POLICY AND OPERATIONS

- Create a maintenance plan with an inventory of all equipment and required training of staff.
- School bus anti-idling measures.
- Consideration for a computerized maintenance management system.

- Require Energy Star equipment and appliances.
- Provide components to teach about the innovative environmental elements of the school.
- Consideration for outstanding performance in water efficiency (40%).
- Consideration for Green Housekeeping policies.

The following sustainable design elements are not included in the current cost evaluations:

- Green roofs
- Porous Pavement
- Geo-thermal heating and cooling
- Photo-voltaic system (preparation for future installation only)
- Solar Thermal System
- Energy Performance Measurement

### **Utility Incentives Programs**

The project will seek the applicable utility incentives program. National Grid is the electrical utility and NStar is the natural gas utility. The first meeting with National Grid is planned for December 2nd, 2009. The meeting will address the utility process and support to obtain optimal incentives aligned with the project's energy efficiency goals.

## **4.2 CONSTRUCTION WASTE MANAGEMENT PLAN**

The goal of the project is to salvage, recycle, or reuse at least 90 percent (by weight) of non-hazardous demolition and construction waste and qualify for MA-CHPS Materials Credit MP2.

The Contractor will be required to develop a Waste Management Plan that ensures that this goal will be met and is in compliance with 310 CMR 19.017, Massachusetts Waste Disposal Ban Regulation, and with hauling and disposal regulations of authorities having jurisdiction.

A waste management coordinator will be employed by the Contractor, who will be on site and be responsible for implementing, monitoring, and reporting status of waste management work. Provide on-site waste collection and recycling bins and train workers, including subcontractors' and suppliers' personnel

working on site, to use them. Contractor will have the option to perform on-site or off-site separation.

Contractor will be required to prepare and submit monthly progress reports documenting waste reduction quantities and recipients. Upon completion of the work, Contractor will be required to submit a summary document, a cost/revenue analysis of the waste management plan, and any other auditing information which may be required by MA-CHPS.

The following are examples of materials which can be salvaged or recycled to meet this goal:

- Concrete and concrete masonry units (CMU).
- Brick.
- Paper, including cardboard, mixed paper, packing materials, and packaging.
- Paint: Excess materials not required to be turned over to the Owner.
- Glass.
- Plastics.
- New gypsum wallboard; excess after installation and scraps.
- New acoustical ceiling panels; excess after installation and scraps.
- Steel and iron, including, but not limited to, structural steel, stud framing, ductwork, piping, and reinforcing steel (rebar).
- Other metals, including, but not limited to, piping, wiring, roofing, aluminum, copper, zinc, lead, brass, and bronze.
- Wood, including clean dimensional wood, pallet wood, crates, plywood and other types of wood-based panels.
- Manufactured items reclaimed during building demolition, including but not limited to, windows (provided they are not contaminated with asbestos caulking), doors and frames, door hardware, porcelain plumbing fixtures, casework.
- General waste generated by on-site workers, including beverage containers, paper, and plastic food containers.

### 4.3 MA – CHPS SCORECARD

The new Grafton High School will be designed and constructed in accordance with the principals of the Massachusetts High Performance Green Schools planning and criteria guidelines (MA-CHPS), published by the Collaborative for High Performance Schools. The project will strive to meet the threshold 34 points defined by the Massachusetts Collaborative for High Performance Schools (MA-CHPS) and maximize the reimbursement incentive points established by the MSBA.

A progress MA-CHPS scorecard is included in this section. This scorecard identifies the project design criteria and associated credits which are under consideration for this project.

Specifications will include instructions to Contractor regarding waste management and waste diversion goals (90%), and construction indoor air quality goals.

Note that the points awarded under Operations and Maintenance (formerly Policy & Operations) are contingent upon the Town committing to certain policies and actions.

