SUSTAINABLE DESIGN GOALS

SECTION 4 SUSTAINABLE DESIGN GOALS

The project will strive to meet the threshold of thirty-four points defined by the Massachusetts Collaborative for High Performance Schools (MA-CHPS).

In January 2008, the Permanent Building Committee (PBC) and the School Building Committee (SBC) sponsored a Green Charrette, an open public forum with consensus-based discussion 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 and plan follow-up research.

The PBC and SBC concluded on the sustainable design measures to be considered for inclusion in the project. Those measures are listed below.

SUSTAINABLE DESIGN CONSIDERATIONS AND GOALS WITHIN THE ELIGIBILE PROJECT COST PARAMETERS

SITE

- Bio-swales will be used to store storm water runoff, reducing the impact on the Town's storm sewer system.
- Storm water runoff from all parking areas will be captured and treated prior to release to the wetlands, improving the water quality entering the wetlands.
- Orientation of the building to increase the daylight into the building.
- Building footprint minimized to decrease site impacts.
- Limiting development as much as is practicable on site to those areas which are currently developed.
- Community shared recreational space.
- Re-use of existing high school site.
- Designed sidewalks and walkways that connect to a public way, and bike racks for 5% of building occupants.
- Roof designed to reduce heat islands by using a light colored roof membrane.
- Exterior light fixtures and layout to meet IESNA and dark sky requirements. Full-cut off fixtures outside reduce light spillage from the site (light pollution reduction).
- Solar powered or LED site lighting.
- Trees located on the southern facade to provide for shading (sustainable site and building layout).

WATER

- No permanent irrigation for landscaped and lawn areas.
- Drought resistant plants.
- Sensor operated toilets, urinals and lavatory faucets in male student toilet rooms.
- Sensor operated lavatories in staff and female student toilet rooms.
- Low flow shower heads.

ENERGY

- Lighting, Fenestration, Mechanical, and Ventilation to exceed MA Building Energy Code 6th Edition by 30%.
- Ventilation rates per ASHRAE 62.1 – 2004.
- No CFC refrigerants in all HVAC and refrigeration systems.
- CO_2 monitors and controls to provide demand ventilation in air conditioned spaces.
- Displacement Ventilation in Auditorium.
- Combination of mechanical and natural ventilation in classrooms using chimney effect.
- High efficient (90% to 95%), condensing boilers for off-peak load.
- Variable frequency drives.
- Energy management system to monitor HVAC system and hot water.
- Third party commissioning of Electrical, HVAC, and Plumbing systems.
- Temperature and light controls turn off lights when spaces are not occupied and when there is sufficient daylight.
- High efficiency lighting fixtures and energy saving lamps and ballasts.
- Low light power density, approximately 1.0 watt/square foot or less.
- Exterior sunshades to provide for shading and bounce light into the classrooms.
- High bay fluorescent fixtures in gymnasium.
- Facility staff training on Operations & Maintenance for Electrical, HVAC, and Plumbing.
- High performance building envelope:
    - Higher R-value insulation at roofs and walls.
    - High performance glazing selections.

MATERIALS

- Designated recycling collection areas and recycling separation area.
- 90% diversion of construction and demolition waste.

- Additional insulation on the exterior side of the cavity for higher R-value and more airtight construction.
- High recycled content gypsum wallboard.
- Formaldehyde-free particleboard.
- Low VOC countertop materials using recycled wood fiber.
- Acoustical tile with 80% recycled content.
- Forest Stewardship Council certified maple veneer, where applicable.
- Low VOC limits for adhesives, paints and sealants.
- 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 and walk-off mats.
- Protect building materials from moisture and mold.
- Optimize daylighting in classrooms.
- Skylights and or clerestories to introduce daylight to central rooms/spaces.
- South facing windows with sunshades to keep out unwanted summer sun and to bring in more daylight.
- Minimize east or west facing windows.
- Interior glass to distribute light throughout the interior.
- Interior lighting to be indirect/direct, using high performance T-8 lamps, enabling use of fewer fixtures (less energy use) while providing a glare-free environment.
- Electronic ignitions for 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 – 2004.
- 90% of the combined floor area of classrooms and administration will have access to views.
- Low volatile organic compound emitting materials selected for interior paint, resilient flooring & adhesives, carpet & adhesives, acoustic tile, wall board, linoleum and cabinetry.
- High efficiency MERV filters.
- Building ventilation flush-out performed prior to occupancy.
- HEPA vacuuming prior to substantial completion.
- High performance acoustical design for classrooms.
- Classrooms have operable windows.
- Temperature and lighting controls for each classroom.
- Formaldehyde-free insulation.

POLICY AND OPERATIONS

- Create a maintenance plan with an inventory of all equipment and required training of staff.
- School bus and delivery truck anti-idling measures.
- Computerized maintenance management system.
- Require Energy Star equipment and appliances.
- Provide components to teach about the innovative environmental elements of the school.
- Indoor environmental management plan (tools for schools.)

In addition, as a result of the Green Charrette, the committees recognized that increasing the level of sustainability offers multiple environmental benefits such as healthy indoor environments, improved air quality, potentially improved occupant productivity and opportunities for inclusion in the high school educational curriculum. As such, SMMA was requested to perform an economic analysis of the seven sustainable design alternatives identified in the Green Charrette. While the analysis showed lengthy paybacks/returns on investment, the committees concluded that increasing the sustainability of the building is in the best interest of the students, teachers, staff and the broader community. The cost for these additional elements is outside the eligible project cost parameters.

SUSTAINABLE DESIGN CONSIDERATIONS AND GOALS NOT WITHIN THE ELIGIBILE PROJECT COST PARAMETERS

The following sustainable design elements are not included in the $110,000,000 project cost model and will be funded 100% at the local level:

▪ Green Roof - 9,500 SF	$ 203,148
▪ Rainwater Harvesting System used to flush toilets	385,095
▪ Dual Flush Toilets for staff and female students	40,265
▪ Displacement Ventilation in Library computer labs, large group spaces	98,868
▪ Photovoltaic Array (40 kW)	371,518
▪ Data Acquisition System (DAS)	39,600
▪ Geothermal heating/cooling for Administration Offices only	262,680
▪ Escalation to March 2010	98,826
Total	$ 1,500,000