“WOCSO will be a nationally recognized system known for high performing schools that produce creative, caring, competent students who take charge of their own learning.”

WOCSO Vision Statement

(Educational Planning + Sustainability) x Community Connections = High Performance Design
Existing 1975 Conditions – 89,600 sqft

Oil-fired Radiant Heat system with Unit vents
Large Air Handlers for assembly spaces

No Air Conditioning

Operable Window Ventilation (closed in cold weather)

Pneumatic local HVAC controls

Mix of T5, T8, and T12 fluorescent lights; with local on/off control

Metal Halide exterior lighting; with photocell

1” of rigid insulation at exterior wall

3” of roof insulation.

Aluminum double hung windows with single pane glass and hollow metal steel doors and frames
Visioning Process – Non-negotiables

Addition and Renovation:
“..to look and feel like a new school…”

Educational Planning

Site Strategies

Reduce the Loads

“…as energy-efficient as possible…” for $178 per sqft construction budget

Tier 2 New Building Institute
Advanced Buildings
New Construction Guide

Operations and Maintenance

Renewable Energy-ready
Visioning Process – New Building Institute Advanced Buildings

Maine Advanced Buildings
Tier 2 Requirements Checklist – Post-Construction
Section 8 and 2 of Advanced Buildings: New Construction Guide

Section | Criteria | Complete
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0.1 | Design Process Strategies |  
0.1.1 | Identity/Design Intent |  
0.1.2 | Design Intent/Documentations |  
0.1.2.1 | Operational/Performance Requirements Narrative (created prior to building or commencement of construction) – documents the design intent and building features incorporated to support efficient building performance and meet IAB requirements (page 22).  
0.1.2.2 | Owner/Interface (completed prior to building occupancy) - provides information to building owner and occupants on how to use and maintain building (page 24).  
0.1.2.3 | Operations and Maintenance Manual (provided prior to building occupancy) – provides information about building and systems maintenance and operation (page 24).  
0.1.2.4 | Acceptance Testing or Commissioning Plan (completed prior to building construction) – specifies process for testing project requirements and how operation of systems and equipment will be verified (page 25).  
0.1.2.5 | Construction Documents and Bid Submittals – requirements on page 25.  
0.2 | Building Construction Alternatives |  
0.2.1 | Evaluation during conceptual and schematic design phases to address impact of climate, site, building orientation and shape, HVAC and lighting system selection and installation strategies (pages 27 – 29).  
0.3 | Mechanical Systems Design |  
0.3.1 | Documentation of design considerations and calculations employed during design process to improve system performance and ensure mechanical systems are designed to minimize energy consumption and maximize occupant comfort (pages 30 – 31).  
0.4 | Operating Training and Documentation |  
0.4.1 | Resources, documentation, and training to be provided to owner/occupants during building handoff to ensure building operations team understands how to efficiently operate the building (page 32).  

Tier 2 Basic Requirements

2.1 | Energy Code Compliance: Building shall meet or exceed applicable state or local energy codes, 2012 IBC, or 

2.2 | Air Barrier Performance: air barrier performance shall be verified to ensure minimal energy losses through 

2.3 | Opacities Walls and Below Grade Assemblies: walls, roof, and floor assemblies that are part of the building 

2.4 | Glazing System Performance: the weighted average of all fenestration assemblies shall meet the U-Value and 

2.5 | Daylighting: reduce energy consumption attributable to lighting through incorporation of daylighting. 

2.6 | Lighting Controls: reduce lighting energy use through installation of automatic lighting controls and 

2.7 | Lighting Power Density: installed lighting power density shall not exceed the values in Table 2.7.1 (pages 

2.8 | Exterior Lighting Efficiency: lamps over 75W used for exterior lighting shall meet the requirements listed on 

2.9 | HVAC System Efficiency - All HVAC system components shall meet efficiency requirements listed on Tables 2.9.1 through 2.9.7 (pages 101 – 107). Additional criteria for select equipment listed on page 100.  

Owner Incentive Amount: $189,232.50 = $1.45 per sqft  
A/E team Incentive Amount: $31,538.75
New Design – 129,700 sqft - Tier 2 NBI Advanced Buildings

NH, ME, VT = Climate Zone 6A = Simple & Cost Effective Measures

Natural Gas Fired Hydronic Heat with Electric Chiller system and Solar Hot Water – all geothermal ready (designed as bid alternate)

Fully Air Conditioning of learning spaces with partial AC gyms

Operable Window with full mechanical DOAS Ventilation with CO2 controls

Complete energy recovery and economizer + BAS whole building monitoring and metering controls

Mix of T5, HPT8, and LED lighting; with occupant and daylight controls (all Energy Star and Design Consortium’s Qualified listed fixtures)

Enhanced Envelope = Tier 2 NBI Advanced Buildings

Fiberglas single hung and fixed windows with thermally broken HP aluminum curtain wall, storefront, and exterior doors
Visioning Process – Reduce the Loads

Distributed CHW Low Temperature HVAC System – Hybrid for Geothermal option.. reduced boiler plant size

Mix of LED and T8 Lighting on daylight and sensor controls

Enhanced Exterior Envelope
R26.4 new walls (ci)... which is just shy of the required R27.7
R7 existing walls (ci)
R36 min (ci) + tapered roof areas... actual average is R47.5 (Grey Roof)
R5 below new slab areas + R10 at radiant heat areas

All new windows and doors
U=0.22 (30-40% window to wall ratio)... better than required 0.29 (0-30%)
U=0.70 doors

Energy Modeling Results:
As designed = 3203.7 MBH.......Baseline NBI Tier 2 = 3230.7 MBH
As designed = 195.3 Tons........ Baseline NBI Tier 2 = 198.5 Tons
Visioning Process – Energy Savings

Energy Star – Target Finder: 83
Site EUI = 33
Source EUI = 109
Total Energy Cost per year = $1.24 per sqft

Actual – Energy Savings (1 year of operation)

Energy Star – Target Finder: 95
Site EUI = 37.1
Source EUI = 78.4
Total Energy Cost per year = $0.89 per sqft
Conceptual Design

Second Floor
Conceptual Design

Third Floor