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T O W N O F W E L L E S L E Y M A S S A C H U S E T T S

SUSTAINABLE ENERGY COMMITTEE

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Position Paper on the Hunnewell Hardy Upham Project ("HHU")
July 21, 2017

Introduction

In May 2017, the School Committee asked the SEC to provide advice to the School Committee and the HHU School Building Committee ("SBC") on sustainability-related facets of HHU, and to support liaison efforts with interested community members. In preparing these recommendations, the SEC reviewed guidance from a number of national and state programs for promoting sustainable buildings and infrastructure. Most notable among these programs are The Center for High Performance Schools (CHPS), Leadership in Energy and Environmental Design (LEED), and Envision. The SEC also consulted with Wellesley community members and grass roots organizations, and with experts in architecture and sustainable building design and management.

The HHU process presents a significant opportunity for Wellesley to explore the possibility of constructing sustainable schools that can protect human health and the environment, contribute to climate change mitigation and resiliency, potentially save money, and align with Wellesley's demonstrated commitment to sustainability (see Exhibit A). This exploration, we believe, should commence with the Feasibility Study Request for Qualifications (RFQ) process. A sustainable school is cost-effective and minimizes consumption of energy, materials, and water throughout siting, design, operation, maintenance, and removal. A sustainable school also supports the health and productivity of the school's occupants, and reduces waste, pollution and environmental degradation. HHU offers the chance for Wellesley to be an environmental leader, set an example for our students, educate our community, and take advantage of the win-win-win economic, health, and environmental benefits from sustainable schools.

Timing

Some people think that sustainability considerations do not come into play until the building design phase. Such a delay, however, is likely to undermine the SBC's ability to understand the full range of options in the realm of sustainable school design, choose the most sustainable site, and attract and vet

the best-suited firms. Projects that address energy and other sustainability-related factors in the early, planning stages foster more creative approaches to site layout, building footprint, water use and energy use that optimize building design, minimize capital costs, and realize cost savings.[1] Use of the site's climatic resources, and design of the building footprint, orientation, and daylighting systems are just some examples of building elements that benefit from consideration during the site selection and early planning phases of the project.[2]

Cost

There is a general misperception that the capital costs of zero net energy, LEED, or high performance buildings are prohibitive. Many reputable sources indicate that, when integrated design and high performance are goals on day one of a project, upfront costs are comparable, and perhaps even lower, than the upfront costs for traditional buildings. In addition, the use of fewer construction materials and less energy and water in sustainable schools can more than compensate for any higher upfront costs.[3] For example, the National Renewable Energy Laboratory ("NREL") in the U.S. Department of Energy has a Research Support Facility, that is LEED Platinum, zero net energy, and high performance. NREL's 360,000-square-foot, zero net energy research building cost $259 per square foot to build, compared with $250-$350 per square foot for a traditional building.

Cost considerations point to the importance of deciding to pursue a sustainable, high performance school early in the planning process. The earlier the commitment to sustainability in the planning process, the more opportunities there are for cost-effective, sustainable project implementation.[4]

Those guiding the HHU project owe it to the community to fully vet potential sustainable design approaches that can provide decades of savings on annual operating budgets.

Recommendations

1. The School Committee instruct the SBC to explore the full range of sustainability options (including those described in Exhibit B) at the current, RFQ/Feasibility Study stage.
2. The SBC compose an RFQ that indicates plans to explore a full range of sustainable approaches and has the potential to attract firms with a high level of expertise in sustainable school design.
3. The SBC seek out firms that can provide a range of school design options from conventional to state-of-the-art-sustainable (with cost-benefit scenarios) so that Wellesley has a full suite of options and can make an informed decision.
4. The SBC weigh sustainability expertise in choosing the firm to engage, including its experience designing sustainable schools.
5. The SBC indicate, in the RFQ, that the Feasibility Study will include an environmental site audit. In carrying out the audit, the Feasibility Study firm should assess the sites on the criteria, below, on a scale of 1 to 5:

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[1] Massachusetts Zero Net Energy Building Task Force (MA ZNEB), "Getting to Zero: Final Report of the Massachusetts Zero Net Energy Buildings Task Force" (March 11, 2009). http://www.mass.gov/eea/docs/eea/press/publications/zneb-taskforce-report.pdf

[2] American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), et. al., "Advanced Energy Design Guide for K-12 School Buildings: Achieving 50% Energy Savings Toward a Net Zero Energy Building." Atlanta, GA: ASHRAE, Inc. (2011).

[3] MA ZNEB; ASHRAE; Laidlaw, Emily. "Net-Zero Building Technologies Create Substantial Energy Savings." Continuum (6): 16-17 (Spring 2014). http://www.nrel.gov/continuum/homes_buildings/netzero.html

[4] Laidlaw, 2014.

- Site disturbance;
- Open space;
- Public space;
- Drainage;
- Building footprint;
- Building orientation;
- Accessibility;
- Nuisances and pollution;
- Excavated materials; and
- Shared use.

The above criteria, presented in more detail on Sheet 1 of the attached spreadsheet (Exhibit C), are based on a review of guidance from LEED, CHPS, and Envision, as detailed on Sheet 2 of the attached spreadsheet of the attached (Exhibit D).

Conclusion

This Position Paper is in keeping with a Town-wide commitment to sustainability, described in Exhibit A. Since at least 2010, the citizens and Town leaders of Wellesley have demonstrated this commitment through reductions in public and private energy use and improvements in materials management practices.

These recommendations provide a road map for ensuring the Town obtains the information necessary to assess and choose from among a range of conventional to highly sustainable approaches to the HHU project.

Approved unanimously by the Sustainable Energy Committee on July 21, 2017

Exhibit A

Examples of the Town of Wellesley's Demonstrated Commitment to Sustainability

- Town Meeting set a goal to reduce Town-wide greenhouse (GHG) emissions 25% below 2007 levels by the year 2020 and established the SEC to support programs aimed at achieving these goals.
- The Town is in the final stages of meeting the criteria to become a "Green Community," as defined by the Massachusetts DOER.
- Wellesley is a USEPA "Green Power Community" because of its high percentage of residents who voluntarily purchase renewable energy through the Power to Choose program.
- More than 30 organizations, including Town entities, grass roots environmental organizations, houses of faith, land conservation groups, garden clubs and civic organizations, participate in Wellesley's Green Collaborative.
- The Wellesley Municipal Light Plant supports solar installations, energy audits, street light conversions and many other programs that reduce Wellesley's carbon footprint.
- The Facilities Maintenance Department continues to invest heavily in programs and technologies that reduce energy use.
- The Department of Public Works hosts a model recycling program and is a strong supporter of materials management improvements under WasteWise Wellesley.
- The School Department supports a food rescue and recycling pilot at Bates School and is expanding this program to other schools.
- The Natural Resources Commission manages public open space using sustainable methods, protects our trees and our Tree City designation, leads many initiatives such as addressing gas leaks and provides education on various environmental topics.

Exhibit B

Sustainable School Attributes

Sustainability encompasses multiple attributes which are not fully captured in any one measurement tool. The SEC urges a full exploration the following attributes and assessment criteria.

- **Energy Efficiency**

    - **Energy Efficiency that Exceeds the Stretch Building Code.** A local architect and sustainable design expert, whom the SEC consulted, recommends a performance target of 50% energy savings compared to ASHRAE 90.1-2007. The LEED prerequisite for energy efficiency is 10% below ASHRAE 90.1-2007. However, greater energy efficiency is readily achievable for new elementary schools.

    - **A Zero Net Energy Building**. A zero net energy building ("ZNEB") is one in which the total amount of energy used on an annual basis is roughly equal to the amount of renewable energy generated at the site. Schools are among the best candidates for ZNEBs.[5] A ZNEB does not necessarily require more capital costs, but does yield significant energy cost savings during the life of the building.

      The Massachusetts Zero Net Energy Task Force under the Department of Energy Resources ("DOER") put forth 44 recommendations aimed at moving the Commonwealth to 100% ZNEB residential and commercial construction by 2030. The City of Cambridge, adopted a 25-year Zero Net Action Plan, aimed at 100% zero net construction. Three local examples of recent zero net buildings are the Martin Luther King Jr. School in Cambridge, the Massachusetts Division of Fisheries and Wildlife Field Head Quarters in Westborough, and an academic and administrative building at Clark University in Worcester.

- **Siting that Maximizes Opportunities for Solar, Daylight, Views and Ventilation.** Balancing active and passive solar design with beneficial daylighting and views to 100% of the interior spaces offers many benefits. Abundant daylight and operable windows improve student and worker performance, attendance, and health.[6]

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[5] Schools are considered among the best candidates for zero net energy buildings because of:

- Low energy demand: Schools operate for limited hours. Access is relatively controlled. Occupancy levels are predictable and constant, and after hours only partial. Plug loads are low compared to buildings that run a lot appliances and computer equipment.
- High renewable energy potential: Because schools are usually one or two stories, they provide a big footprint for photovoltaic panels relative to the square footage inside. Most demand comes during the day, when the sun generates electricity.
- Owner occupancy: School boards have a long-term interest in reducing utility expenses.
- Sustainable mission: Zero net energy schools provide living labs for growing curricular emphases on technology and the environment.
- Better learning: A healthier, more comfortable indoor environment stimulates learning, reduces student absences and increases teacher retention.
- More resilient: In natural disasters, schools with their own power can continue to function and can serve more effectively as community centers (House-Energy EJCR, 2013).

[6] Plympton, Patricia, Susan Conway, and Kyra Epstein, NREL, "Daylighting in Schools: Improving Student Performance and Health at a Price Schools Can Afford." Presented at the American Solar Energy Society Conference Madison, Wisconsin (June 16,

- **Platinum LEED Certification.** LEED is a broad rating system that encompasses multiple additional attributes including water use, lighting, use of locally sourced, recycled and renewable materials, disposal of construction debris, minimization of transportation and more. The consultant should identify whether LEED Platinum is possible with a conventional budget. If not, the consultant should provide a life-cycle cost analysis for any premium costs to assist the community in determining which of these investments seem worthwhile. Higher up-front costs can be more than offset by operational savings over time since, on average, sustainable schools use 33% less energy and 32% less water than conventional schools.[7]

These two important attributes may not be fully captured in the abovementioned rating systems.

- **Adaptability**. Adoption of the concept of "long life, loose fit," refers to opportunities to maximize the potential uses of space through design that can accommodate changing curriculum, enrollment, special needs requirements, and community expectations such as for preschool and before/after school programs.

- **Climate Resilience.** The HHU buildings will have a life span of at least 50 years during which time Massachusetts is projected to experience a several degree increase in average annual ambient temperature. Higher temperature will be accompanied by more hot and humid days, more frequent and severe storms, and heavy rain and snow.[8] Our schools will need to accommodate these kinds of changes.

2000), http://www.nrel.gov/docs/fy00osti/28049.pdf, and personal communication with local expert in architecture and sustainable design.

[7] United States Green Building Council (USGBC), "Myths and Facts About Green Schools" (first published June 30, 2015). https://www.centerforgreenschools.org/myths-and-facts-about-green-schools

[8] http://www.mass.gov/eea/waste-mgnt-recycling/air-quality/climate-change-adaptation/climate-change-adaptation-in-ma.html (2017).

Exhibit C

Sustainability Questions for HHU Feasibility Study

(Please see attached spreadsheet.)

Exhibit D

Summary of Relevant Site Selection Criteria from CHPS, LEED, and Envision

(Please see attached spreadsheet.)