



Washington Place Sustainability Narrative Mark Development

December 14th, 2016

Sustainable Design

Sustainability, energy efficiency, and a focus on quality design that translates to occupant comfort are driving forces behind our vision for Washington Place. Mark Development understands the importance of a holistic, integrated design approach in achieving such ambitious goals, and has assembled a design team that has the experience and expertise necessary to realize this vision. Energy use reduction is a critical local and global challenge, and Washington Place is being designed with that challenge in mind.

Building Envelope

Careful attention will be paid to design and construction of high R-value, durable, environmentally sensitive building assemblies. Continuous insulation wrapping both the exterior wall and roof assemblies will be a critical component of this design. The team will also focus closely on air sealing of the exterior envelope, and the demising walls between apartments. This starts with the development of comprehensive air barrier details, and continues into construction with careful air barrier inspections, testing, and verification.

Improved resiliency resulting from this design and construction approach provides additional tenant, environmental, and financial benefits. A well-insulated building envelope will mean that the building will maintain habitable temperatures longer in the case of a power outage and allow for extended sheltering-in-place.

Mechanical systems

These advanced building envelopes will be complemented by mechanical systems that have been chosen and sized to meet the minimal heating and cooling loads and ensure comfort. Rather than designing large central heating and cooling systems, individual, apartment level boilers and fan coils will be used. This design allows for compact high efficiency equipment, and the added benefit of redundancy should an individual system need repairs or maintenance.

Domestic hot water production and distribution are notoriously inefficient, even in new buildings. New Ecology has measured actual system efficiencies in buildings with central domestic hot water systems in the 20-50% range. The majority of the losses are the result of inefficient circulation of hot water throughout a building. The typical inefficiencies of the distribution system will be counteracted by supplying domestic hot water at the apartment level, using the same high efficiency boilers that are being used to heat the space. Low flow, high performance fixtures that meet or exceed the EPA WaterSense standards will also be integrated to reduce water and energy use while maintaining tenant comfort.

Lighting and Electricity

Appliances will be top performers in function, design, energy, and water efficiency. Electrical load will be reduced through smart lighting design that takes full advantage of the efficient, reliable, and attractive LED fixtures and lighting controls that are now available.

Solar Ready Design

The Washington Place team will build on the positive impacts of this efficiency by incorporating electrical, structural, and other design elements that make the building “solar ready” for renewable energy systems. Solar Ready design means that we have engaged in a roof mapping exercise to identify roof areas suited to renewable energy system integration, and that we are designing those areas of the roof to have the structural capability to carry the dead load and uplift loads of a renewable energy system. In addition, these areas of the roof are being kept free and clear of any mechanical systems or plumbing penetrations, which are a major contributor to reduced potential in terms of system size and production potential. All required electrical chases from the roof into the electrical room are being included in the design and construction of the building, and space is being left free and clear in that room for location of inverters.

In addition to areas being primarily designed for future integration of renewable energy systems, the team is also integrating flexibility into the roof design by making specific portions of the green roof area solar ready as well, and thus further increasing the square footage of the roof that can accommodate photovoltaic systems.

The development of renewable energy systems in Massachusetts at the current time is challenging due to the anticipated end of the SREC market, a proposed (but not yet approved) solar incentive program, as well as changes to the net metering caps and requirements. Mark Development will continue to monitor these developments and assess the feasibility of integration of renewable energy systems into the project.

Indoor Air Quality

Of equally important consideration are the indoor air quality impacts of our approach. Mark Development is committed to providing individuals and families with a living environment that enhances their lives and health. We will accomplish this through two methods: ventilation and material selection. Ventilation systems will be designed to provide fresh supply air directly to each apartment. Toxins and contaminants will be minimized through careful specification of low VOC and no added urea formaldehyde materials.

Site Design

Landscaping and site improvements will further emphasize the social and environmental priorities of this project. Outdoor spaces will be designed to encourage social engagement, turf will not be used on the project, and plantings will be drought tolerant and appropriate for the microclimates specific to each planting area.

Portions of the lower roof areas that are visible to tenants will include planted “green roof” systems. A “green roof” contains live plants in a lightweight soil medium that is designed to retain precipitation. The water is then taken up by the plants and returned to the air through transpiration. This process removes dissolved contaminants including phosphorus when the roof

is designed as a passive system that is not fertilized or watered. Phosphorus is a particular contaminant of concern in the Charles River watershed, of which the project site is a part.

In addition to the green roof areas, the project will include a substantial subsurface stormwater treatment system designed to treat and retain all stormwater within the site, further improving the water quality in the watershed and reducing the strain on the municipal drainage system.

A focus on alternative and improved modes of transportation includes plenty of short term and long term bike parking, Zip Car availability on the property, and designated spots and charging stations for low emitting vehicles and electric cars.

Training, Testing, and Verification

Managing the transition from modeled performance to achieving real world performance is a key reason why LEED for Homes Midrise is being incorporated in this project. A series of on-site trainings, inspections, testing, and continuous feedback to the team will be the primary tools used ensure designed and modeled approaches translate to performance achievement.

As part of this process, the Washington Place team will:

- Hold a pre-construction trades training focused on trade specific best practices around performance based construction;
- Review submittals for greening compliance;
- Conduct testing and inspections by a certified HERS rater that includes:
 - Foundation insulation inspection
 - Insulation and air barrier inspections
 - Mock-up level duct leakage and compartmentalization testing
 - Final duct leakage testing
 - Final compartmentalization testing
 - Flow testing on water use fixtures
- Train and educate the buildings operations staff on the green features of the building and how to operate and maintain them; and
- Train and educate the residents of the building on the green features and how to minimize environmental footprint.

Fundamental Commissioning

Fundamental commissioning provides another critical layer of oversight that will be integrated into the Washington Place project. Heating, cooling, ventilation, domestic hot water, lighting, and other mechanical systems are put through a performance testing and verification process to ensure proper installation and operations. As part of this process, a certified commissioning agent will:

- Develop and implement a commissioning plan
- Verify installation and performance of systems to be commissioned
- Provide a summary commissioning report to the building owner

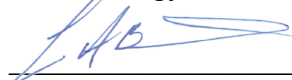
Certification and Operation

As we tally the benefits of the integrated approach we have outlined above, the result is a project that far exceeds the minimum requirements related to LEED certification, and allows for the level of LEED Gold certification. Beyond certifications, we expect the investment in a highly sustainable design and construction process to yield significant operating and durability related dividends. At the same time, we actively acknowledge the role and importance of proper commissioning, optimization, and education to accomplish these goals. We will spend time and resources educating tenants about how to best take advantage of the comfort, health, and energy savings benefits of their apartments. We will ensure that our maintenance and management teams understand the building systems, and have the training they need to operate the building at the designed level of performance.

Performance Expectations

All of the design, construction, and operations components described above play key roles in overall anticipated building performance. New Ecology has worked on hundreds of green buildings, and monitors and tracks their actual consumption through the WEGO Wise benchmarking tool (which we expect to use to track the actual performance of this project as well). Based on our experience, standard buildings built to modern energy codes typically achieve a heating load (one of the largest anticipated loads of the building) of 4-5 BTU per square foot per Heating Degree Day (HDD)¹. Buildings we have worked on recently that integrate the features that we have outlined above achieve a performance of approximately 2 BTU/SF/HDD, effectively a 50% reduction in heating load.

New Ecology, Inc.



Lauren Baumann

Vice President

Dated: December 14, 2016

¹ This is a heating load metric that is normalized for weather variation, eliminating the confounding potential of comparing buildings in different climate conditions, or comparing buildings between winters with varying intensity.