

Linden Street

1. Category entered:

- b. residences (houses, apartment buildings, dormitories, or other such facility)

2. Describe the building location with respect to local and regional resources of its context.

Linden Street resides in the Union Square area of Somerville, Massachusetts, on the edge of a vibrant residential urban neighborhood with large retail buildings as neighbors. For decades, the Linden Street neighborhood suffered encroachment by industrial and truck repair shops. The brownfield site supported no trees, had no pervious surfaces, and generated a range of environmental problems for the surrounding neighborhood.

3. List the key sustainable design features.

Environmentally-Conscious Building Design:

- The exterior walls are insulated with 5.5" of damp-sprayed cellulose insulation, a product manufactured from recycled paper.
- Wall framing was pre-manufactured in an enclosed facility to minimize lumber waste inherent to typical job sites. Wall panels were bulk-shipped to the site and assembled, insulated, and sealed.
- Roof framing was also pre-manufactured in an enclosed facility for efficient use of lumber.
- Slabs-on-grade have a carefully-crafted insulated thermal break to prevent cold floors and condensation at the floor slab/foundation wall joint. Rigid foam insulation is installed at all thermal breaks and below all slabs to improve thermal efficiency and limit condensation at cold surfaces.
- Roofs trusses are insulated and sealed with Icynene foam to R-40, which provides superior insulation and air seal.
- The building systems, engineered for high efficiency, include mechanical ventilation of each residence for automatic exhaust of stale air. The mechanical systems are centralized in just seven locations to achieve higher efficiency heat and hot water production.
- The clapboards are fiber-cement siding with a long-term paint warranty, helping to control future maintenance costs.
- Interior finishes, such as rubber stairway treads and risers, have a long life.
- Steel railings at balconies and porches will prove more durable than wood in this heavy-use urban environment.
- The roof drainage system recharges rainwater water into groundwater.
- The Linden Street apartments are provided with recessed and surface-mounted high efficient fluorescent lights, inside and out.
- All in all, the fuel consumption for heat and hot water at the Linden Street development has been estimated to be 43% less than the average newly-constructed housing.

"City Green" Landscape:

- The 6-family buildings have a highly efficient layout, preserving materials and energy and allowing a greater part of the site to be devoted to greenspace.
- A landscaped Commons, including public walkways, provides access to the neighborhood and encourages the use of variously-scaled green spaces for community activities.
- Over 50 trees, including rare American Elms and a variety of deciduous evergreens, add to the aesthetic of the Commons and provide year-round greenery.
- In addition to a shady sitting oval and walking paths, the Commons contains a children's play area within easy view of most apartments.
- Surrounded by the Commons, the parking lot is safe and convenient, with exterior lighting carefully planned to limit light pollution and inadvertent lighting of abutting properties.
- Each apartment features a private balcony from which the family can enjoy the fresh air and gardens.
- Longer apartment buildings screen the neighborhood from large, unsightly commercial structures.

4. Describe relationships between the formal, programmatic, and high-performance design strategies and the site - that is, how is the green architecture linked to its site context.

The Linden Street development 'lives' green, with an emphasis not just on efficiency, but on landscaped views, enjoyable exterior spaces, and sunlit interiors. The entire urban neighborhood benefits from the conversion of this industrial site to family housing and common greenspace.

The brownfield site is cleansed for safe public use. The site engineering included the removal of hazardous soil and replacement with clean topsoil, including the stockpiling, testing, and disposal of hazardous soils. The site clean-up allowed the landscaped ground plane to be open to recreation and child play. The final grading was carefully designed to limit stormwater runoff and to contain excess stormwater during extreme rainstorms.

A willingness to fit easily into its urban neighborhood context required that the buildings be appropriately scaled. The 42 units are provided in 9 buildings, including four 3-family buildings and five 6-family buildings. Where beneficial to isolate the interior greenspace from surrounding commercial activity, the 6-family buildings share a party wall, forming a long facade. These 6-family buildings are a very efficient use of space and resources, leaving more of the ground-plane open for greenspace.

Durable building materials were used for the building exteriors, allowing the building to age gracefully in its urban environment.

5. Summarize the building program and program-specific features.

In what became the largest new affordable housing development in Somerville in almost 20 years, Mostue & Associates' helped reclaimed this urban enclave for the community and created an inexpensive, environmentally-friendly place to live.

Environmental consciousness and energy efficient design were integrated with the community design goals at the Linden Street development. Details of construction, methods and materials, and systems were selected not just for efficiency and comfort, but for effective integration with the design goals and aesthetics.

Construction materials were selected in an effort to reduce maintenance and energy costs. Panelized wall frames and roof trusses, pre-manufactured off-site, were use for material efficiency. Windows were glazed with low-E glass and installed with minimally-expanding foam. Fiber-cement siding with a long-term paint warranty helps cut future costs. The rainwater drainage system recharges much-needed water into groundwater. And by using spray-on cellulose to an R-value of 20 to insulate the walls, Icynene to an R-value of over 40 to insulate the roof and sealed combustion condensing boilers with indirect-fired hot water, Mostue & Associates made the 1.5 acre, 42-unit building complex extremely energy efficient. All in all, the result achieved by efficient utilization of commonly available materials is superbly efficient, comfortable, bright interior spaces.

On top of environmental considerations, Mostue & Associates focused much of their efforts on the landscape. The heart of the Linden Street development is a central Commons with over 50 trees, including rare American Elms and a variety of deciduous evergreens for a year-round landscape. The building entrances are reinforced by plantings, and the careful grading offers universally-accessible entrances without handicapped ramps and railings. While residents can enjoy the fresh air and gardens from their private balconies, the neighborhood is invited by walkways to utilize the children's play area and the sitting oval of the Commons.

6. Provide the building's gross square footage (if mixed use, note approximate sq'/use).

65,340 square feet (1.5 acres)

7. Provide project cost (approximate total per square foot).

\$6.5 million (\$99.5/square foot)

8. Provide performance information, including BTUs per square foot per year and any additional information, measured or simulated.

The Energy Star program, administered locally by Conservation Services Group, has modeled the performance of the Linden Street development using the design drawings and specifications and actual measurements of air leakage collected from blower-door test of each building. They have projected that the Linden Street development will use 43% less energy for heat and hot water than comparable new residential construction.

In addition, the electricity use of this development will be much lower than comparable new developments due to the use of the use of fluorescent fixtures both interior and exterior, and the careful placement of site lighting to avoid light pollution and over-lighting of adjacent properties.

9. Outline design intentions and methodological approach.

Design Intentions:

- Provide 42 units of comfortable, bright, functional housing.
- Incorporate exterior private space into the floor plan for each apartment.
- Energize the site plan through programmed uses, pathways, and parking, and building entries.
- Maximize the daylight and views of the interiors.
- Provide unit floor plans with spacious interiors and open communication between kitchen, dining, and living spaces.

Methodological Approach:

- The design approach stressed continuity with positive neighborhood typological patterns to integrate the new site development into the existing fabric.
- The design approach incorporated official public planning process, since the project was constructed under the 40B comprehensive permit laws. This process involved meetings with public departments including Planning, Zoning Board of Appeals, Traffic and Parking, as well as Inspectional Services and the City Engineering Department.
- The design approach involved public neighborhood meetings at each design phase, organized by the client, the Somerville Community Corporation. Neighborhood meetings yielded a wealth of information about local pedestrian patterns, programmatic preferences for the open greenspace, and historical information regarding city utility services.