

## **The Bullitt Foundation**

This studio will focus on the design of the new headquarters for the Bullitt Foundation ([www.bullitt.org](http://www.bullitt.org)), a non-profit organization based in Seattle, Washington that supports environmental causes. The project program is approximately 50,000 square feet, including space for foundation offices, residential units, ground floor commercial and possibly the offices of the Miller | Hull Partnership. The foundation has purchased an urban site in Seattle's Capitol Hill neighborhood. It is the mission of the foundation to promote sustainable communities in the Northwest, and specifically to demonstrate urban ecology through the development of their new headquarters building. The foundation's goal is to meet the Cascadia Living Building Challenge, which has yet to be achieved in an actual building.

Attached is the Bullitt Foundation program document, describing in detail the mission of the foundation, the goals of the project and preliminary space requirements. The program is likely to evolve as the project develops over the next year. At the beginning of winter term, we will travel to Seattle to visit the site and meet Foundation staff, the architect and the developer. Rather than a fall term seminar, the site analysis and program development will occur in conjunction with concept design at the beginning of the winter term.

The foundation will participate in our studio as part of their commitment to education. The studio will have the opportunity to meet with the CEO and President of the Foundation, Denis Hayes, who is a national leader in the environmental movement and a founder of Earth Day. We will also be able to interact with and benefit from criticism from the architects at the Miller | Hull Partnership ([www.millerhull.com](http://www.millerhull.com)), who have recently been hired to do the project. The project developer, Point32 ([www.point32.com](http://www.point32.com)) will participate as well.

Specific studio emphases:

- Formulating clear concepts relevant to a real project
- Communicating design concepts in words and images
- Developing the skills and thought processes for effective design
- Exploring expressive media: conceptual graphics, physical models, hand drawings, digital tools
- Designing an urban building that demonstrates a new vision of urban ecology
- Conceiving and developing a building that meets the highest standard of sustainability

This is an opportunity to pull together all that you have learned about design and apply it to a complex, signature building on a compact, urban site. The project program and site are well-defined, allowing us to move quickly into conceptual design and have sufficient time for design development and presentation. This is an individual exploration, a statement of your values, insight and capability grounded in a real situation. You are expected to collaborate, participate and actively seek input. I am especially interested helping you strengthen your design process and understanding of the making of a building in a way that will be directly relevant to your next steps in the profession, and be a foundation for mature design.

**The Bullitt Foundation Building Program  
1501 East Madison Street, Seattle WA**

December 24, 2008

The mission of the Bullitt Foundation [www.bullitt.org](http://www.bullitt.org) is to safeguard the natural environment by promoting responsible human activities and sustainable communities in the Pacific Northwest. The Foundation's focus on urban ecology will lead to a better understanding of how the human population can promote sustainable activities and minimize its impact on the world's climate. Programmatic priorities include promotion of progressive planning and smart growth, ecologically sensitive urban design, water conservation, and the efficient use of renewable energy. Consonant with these goals, the Foundation has decided to explore the design and construction of a new building to accommodate its future headquarters and also house others who share the Foundation's values. Its intent is to stretch the boundaries of architecture toward the view of the building as a living organism, efficiently providing for a very large fraction of its own needs through on-site energy generation, water harvesting, and waste management.

The Foundation's goals are ambitious and forward thinking. At a minimum, the building must achieve LEED Version 2.2 Platinum certification for new construction. More challenging is Bullitt's serious intent to achieve the goals of The Living Building Challenge developed by the Cascadia Region Green Building Council. It is the Foundation's intent to set a new standard for designing, constructing and inhabiting a building that is inspirational as well as at the leading edge of urban sustainability in the Pacific Northwest. Much as thick adobe walls once characterized much of the Southwest, and screened verandas met the needs of the Southeast before the advent of cheap fossil fuels, the Foundation ambitiously aspires to develop an attractive form that will appropriately meet the needs of the Northwest in an era of global warming, carbon caps, and increasingly expensive power.

Site Characteristics

The Foundation recently purchased a highly visible property at 1501 Madison Street in Seattle's Capitol Hill neighborhood. The 10,000 square foot site is currently occupied by a small, single-story wood-framed structure and associated surface parking lot. The existing tenant operates a bar/restaurant whose lease terminates in the fall of 2009. The site fronts on Madison Street, 15<sup>th</sup> Avenue and an alley. It slopes uphill at an approximately 10% grade from 15<sup>th</sup> Avenue to the East, where it meets a neighboring apartment building. The location has many attributes, which made it a highly desirable property for acquisition.

- The site is convenient to downtown Seattle, offering easy, efficient access to the Foundation's grantees, colleagues, community leaders, students and visitors from out-of-town.
- It is located on Capitol Hill, one of Seattle's most vibrant and visible mixed-use neighborhoods. It is home to several colleges and universities, public and private schools, medical centers and hospitals, locally owned shops and restaurants, parks, museums and a wide variety of housing.

- The site is on major bus routes leading to and from Seattle's downtown. It is just 0.6 miles from Sound Transit's Capitol Hill light rail station in the Broadway business district (scheduled to be operational in 2016).
- Madison Street is a heavily trafficked and rapidly developing corridor where a "living building" can command significant 'drive-by' attention. This building's frontage on 15<sup>th</sup> Avenue, rising above the adjacent McGilvra pocket park, will be visible for several blocks by travelers heading east on Madison and Pike Streets.
- On Matt Lerner's "walkability index" <http://www.walkscore.com>, the site scores 98 out of a possible 100, reflecting neighborhood attributes such as mixed income and mixed use, density, access to transportation, parks, schools and local businesses.
- The site has excellent solar exposure to the south and west. The area immediately to the south of E. Pike Street is zoned to have buildings no higher than 30 feet (the temple to the southeast is grandfathered at a higher height, but does not shade the Foundation's property.)
- Beyond McGilvra park to the west are stunning views of the Seattle skyline, and views of the Olympic Mountains. On clear days, Mount Rainer will dominate the view to the south.

### Land Use and Permitting

In early 2008, a feasibility study prepared by Weber + Thompson architects summarized site characteristics, zoning, and a preliminary analysis of the Seattle Land Use Code.

Of primary interest is the building's height and scale, governed by the neighborhood commercial zone (NC3-65') that allows for a 65' building, and a total building area of 47,500 square feet for a mixed-use structure. The site falls within the Capitol Hill Urban Center Village, an overlay zone with site planning and building design goals specific to the neighborhood. Although parking is not a zoning requirement, market factors will help dictate the size of a future garage. The Foundation anticipates a future in which small electric commuting vehicles and plug-in hybrids will play an increasingly important role, and parking will be designed to be adaptable to such developments.

The Foundation anticipates participating in the City of Seattle's Priority Green Permitting program, a collaborative pilot program between City permitting officials and the green building team of the Department of Planning and Development. The goal of the program is to facilitate permit review for innovative development projects that have made a commitment to sustainability. Participation in the program can lead to early identification of code constraints and opportunities for code changes that will enable the Foundation to meet its performance goals.

To be considered for the Priority Green Permitting program, applicants must agree to achieve the LEED Platinum rating or subscribe to a similar point system under the program's Green Building Matrix. Points are awarded in five categories: energy and climate protection; healthy people and communities; restore our waters; green Seattle initiative; and waste reduction and recycling.

## Building Program

The Foundation seeks to create a building that will serve as a model for urban development by supporting a diversity of uses and achieving energy performance not yet seen in a mixed-use building of this scale. As part of the Foundation's due diligence process, a preliminary program was identified for a building with one floor below grade for parking and mechanical equipment, and up to six above-grade floors to accommodate retail, commercial and residential uses.

More specifically, this program considered reaching the maximum buildable area of 47,500 square feet through the following allocation of space.

Level A (below grade):	Up to 10,000 sq. ft. for rainwater storage, wastewater treatment, mechanical equipment, and parking.
Level 1 (15th Ave. access):	Up to 4500 square feet for retail and 5500 square feet of partially below grade parking.
Level 2 (Madison St. access):	Up to 9000 square feet of commercial/retail use and approximately 1000 square feet for circulation/core
Levels 3-6:	Approximately 27,500 square feet distributed between office and residential use.

Although this early allocation was based on a review of land use code and familiarity with the Capitol Hill market, future iterations will be driven by findings of the design, engineering and development team, market conditions, as well as the space needs of building occupants who may also become investment partners.

With the goal of both net zero energy and net zero water, computer modeling will help determine an appropriate balance of building uses based on projected energy generation, heating and cooling demands, and water use on daily and seasonal cycles.

## Aspirations for Energy Independence and Sustainability

The Bullitt Foundation will use this building project to push the boundaries of sustainable design, construction and performance. The Foundation will look to precedents and learn from professionals around the world. Through its efforts, the Foundation seeks to inspire future projects and practitioners to stretch toward energy independence within the physical, climatic, economic and cultural context of the Pacific Northwest.

Following site acquisition, the Foundation and Point32 began its investigation by working closely with a graduate research team from the University of Washington's School of Built Environments and the Puget Sound Integrated Design Lab. They sought to identify the design variables that will have the greatest impact on the building's use of water and energy over its lifetime, and to identify design and system strategies for capturing on-site energy and managing waste.

In order to measure success, the Foundation will consider several tools. At a minimum, the building must achieve LEED Version 2.2 Platinum certification for new construction. ([www.usgbc.org](http://www.usgbc.org)). This requires that the building achieve at least 52 out of a possible 69 points. Several buildings around the United States have achieved LEED Platinum certification, some at only modest incremental cost, and all with substantial reductions in operating expenses. In searching for features, the building's designers will also pay attention to the new rating level of BREEAM "Outstanding" ([www.breeam.org](http://www.breeam.org)), as well as to other non-U.S. sources of creativity and inspiration.

The most challenging part of the design process, however, will be a serious attempt to achieve the goals laid out in "The Living Building Challenge Version 1.2" described by the Cascadia Region Green Building Council ([www.cascadiagbc.org](http://www.cascadiagbc.org)). The "living building" evaluation assesses the building not in terms of design goals to be met but rather in terms the actual operation of the building one year after completion. It doesn't measure the "intent" of the developers but how well the building performs in the real world.

A preliminary analysis of the 15 prerequisites of the Living Building Challenge provides a starting point for future investigations by the design and development team.

1. Responsible Site Selection

The site at 1501 East Madison is located within the City of Seattle and is not adjacent to any sensitive habitat areas.

2. Limits to Growth

The site is a previously developed urban property, and given its current state of limited development presents an opportunity for much greater density.

3. Habitat Exchange

This requires that for each acre of development, an equal amount of land must be set-aside as part of a habitat exchange. The Foundation has already been responsible for preserving natural areas hundred of thousands of times larger than the size of this site, so it expects to retroactively receive credit for this achievement.

4. Net Zero Energy

100 percent of the building's energy use must be supplied by on-site renewable energy, on a net annual basis. This includes all electricity, heating and cooling requirements.

This will be a very serious challenge in Seattle. On-site renewable energy sources are limited to sunlight, subterranean heat, and wind, with the recognition that the vast majority of required energy will come from the sun. Because Seattle's sunlight is very limited, even when calculated on an annualized basis, every element of the structure and its internal lighting and appliances will have to be drawn from the most energy-efficient designs, technologies, construction methods and materials. The Foundation also envisions the building to be adaptive to future changes in

technology and accept advances made in solar energy and wind energy in particular. Every non-window exterior surface facing south or southwest should be positioned for maximum solar exposure, initially covered when the building is commissioned, and built to accommodate future technological retrofitting. A key design challenge is to accomplish this in an aesthetically pleasing way.

As the Foundation identifies future building occupants, it will look to attract partners that embrace energy efficiency, as it is far cheaper to reduce consumption of energy than to produce it. Where possible, the building will seek to make visible the amount of energy available and the amount of energy and other resources consumed. Within residential units for example, a 'dashboard' system will help homeowners monitor consumption and inspire daily conservation, especially at times when electricity production is limited by reduced sunlight.

Through research, we have identified projects that have achieved 60% reductions in energy use from a combination of new technologies and building operations. Although this is a significant accomplishment, it will be necessary to achieve greater energy reductions to match the limited level of energy harvesting that can be achieved on structure with current technologies.

With the goal of net zero energy, we have identified the following preliminary strategies for the building design and its systems:

#### Building Form, Orientation and Overall Design:

- Position building for balanced daylight and maximum solar gain from south and west-facing facades. Use very efficient windows.
- Create narrow floor plates of approximately 35 to 40 feet to facilitate natural ventilation, achieve required daylight, and reduce build-up of internal heat in core areas.
- Maximize roof area and south-facing vertical wall area to accommodate solar panels and/or building integrated photovoltaic panels.
- Leverage height of existing apartment building to the east for natural shading and cooling.
- Take advantage of multiple entrance and exit opportunities provided by the sloped site and character of street frontages. Use very efficient entrances, such as revolving doors or vestibules.
- Make visible and locate unheated circulation stairs on building exterior or within a publicly accessible atrium to encourage physical exercise and reduce energy demands.
- The design of the building envelope is the most critical element in achieving the energy performance, aesthetic and livability goals for this building. Minimizing heat losses (winter) and heat gains (summer and 'shoulder' seasons) will be key in achieving the performance targets.

### Daylighting and Glazing:

- Take advantage of sunlight and skylight to illuminate indoor environments at a level that is appropriate for programmatic and visual comfort.
- Recognize benefits of daylighting on worker productivity and comfort.
- Provide effective building geometry, size, location and orientation of window openings, and interior surface relationships to meet illumination requirements.
- Incorporate sophisticated exterior shading devices to control solar load on the building skin and limit interior glare, as well as increased area for photovoltaic arrays.
- Reduce electric light use relative to the presence of daylight to minimize power consumption and interior heat gains.
- Employ the most efficient electric lighting systems that meet legitimate needs.
- Analyze energy performance of various glazing systems and impact on overall building design (e.g. punched opening versus curtain wall).
- Consider light transmittance, color quality and cost in the context of total performance.
- Utilize new glazing technologies, such as Vision Wall's curtain wall system or Southwall Technology's Heat Mirror insulated and laminated glass systems.

### Heating and Cooling:

- Widen acceptable temperature ranges in circulation spaces where people spend less time (stairwells, lobbies, corridors).
- Increase vertical and horizontal insulation to minimize seasonal heat gain and heat loss.
- Use passive ventilation as primary source of cooling and to regulate healthy air.
- Use heat recovery for intake air through centrally located vertical shaft or floor trickle vents along building perimeter.
- Use ground source heat pumps and perhaps solar hot water to increase efficiency and performance of heating and cooling systems.
- Rely on radiant heating & cooling delivered through in-floor, ceiling panel and/or radiator applications as determined by final building type, form and use.
- Eliminate forced air systems and compressor driven air conditioning.
- Consider use of a secondary glazing skin to augment heating energy requirements.
- Consider heat recovery system from gray water discharge.

### Solar Equipment:

- Maximize solar energy potential through building integrated and freestanding photovoltaic arrays.

- Consider a sloped roof of roughly 5:12 – 8:12 south-facing pitch to maximize solar gain and eliminate additional armature to support solar arrays.
- Orient and design building surfaces in response to energy requirements, sun path and land use code setback requirements (e.g. canted south wall).
- Consider secondary use of photovoltaic panels as exterior element of building envelope (e.g. rainscreen).
- Consider bifacial photovoltaic modules as shade elements to achieve greater solar performance.
- Design with flexibility to accommodate future technological advances.

5. The Materials Red List.

The building cannot contain any of a list of 13 materials that have been determined to be unhealthy at some stage in their life cycle. Although eliminating hazardous building materials is attainable, sourcing approved materials that are attractive, effective, durable, and affordable from appropriate distances (prerequisite #8) may be more challenging to achieve.

6. Construction Carbon Footprint

The project must account for the embodied carbon footprint of its construction through a one-time carbon offset tied to the building's square footage and general construction type. The Foundation, which is philosophically and pragmatically opposed to offsetting 200-million-year-old fossil carbon with 80-year trees, will assume responsibility for this requirement by paying the incremental cost of some renewable energy project that will actually cause less coal, oil, or gas to be burned.

7. All wood must be FSC certified or salvaged.

All new wood must come from independent 3<sup>rd</sup> party organizations operating under standards promulgated by the Forest Stewardship Council.

8. Appropriate Materials/Service Radius

We must meet the following tests governing the distance that materials may travel to the construction site:

Ideas:	From anywhere
Renewable Energy Technologies	7,000 miles
Consultant travel	1,500 miles*
Lightweight materials	1,000 miles
Medium weight materials	500 miles
Heavy materials	250 miles

\*"Specialty consultants" are given an exception up to 3,000 miles. Even with an acceptable distance of 1500 miles for consultant travel, the Foundation will focus its initial search on consultants working in the Northwest to facilitate a more efficient and cost-effective process, though it wishes to have deeply experienced Boston consultant involved in all decisions regarding photovoltaics.

9. Leadership in Construction Waste

Construction waste must be diverted (i.e., reused, recycled, salvaged, or composted) from landfills in the following percentages:

Metals	95 percent
Paper and cardboard	95 percent
Soil and biomass	100 percent
Rigid foam, carpet, and insulation	90 percent
All others (weighted average)	80 percent

10. Net zero water

100 percent of occupants' water use must come from captured precipitation or reused water that is appropriately purified without the use of chemicals. An exception is made for water that must be from potable sources due to local health regulations. This includes water from sinks, faucets & showers but excludes irrigation, toilet flushing, janitorial uses, and equipment uses.

- Capture 100 percent of rainwater falling on site.
- Maintain regular supply in below-grade cistern for non-potable uses, irrigation and (perhaps) evaporative cooling.
- Install permeable sidewalks and planting strips along city streets to eliminate storm water.

11. Sustainable Water Discharge

100 percent of storm water and building water discharge must be handled on-site.

- Incorporate on-site water cleansing systems to service a 47,500 square foot mixed-use building.
- Treat and recycle grey water.
- Seriously consider treating and recycling black water with a bioreactor.
- Identify opportunities, e.g. employing nano-filtration or osmosis equipment, to purify rainwater to potable standards.

12. A Civilized Work Environment

The building must provide a working and living environment that is comfortable for all inhabitants and visitors. Operable windows that provide fresh air and daylight are prerequisites.

13. Healthy Air / Source Control

Entryways must have an external dirt track-in system and an internal one contained within a separate entry space. All kitchens and bathrooms must be separately ventilated. All copy rooms, janitorial closets, and chemical storage spaces must be separately ventilated. All interior finishes, paints, and adhesives must comply with

South Coast Air Quality Management District (SCAQMD) 2007/2008 standards. All other interior materials such as flooring and case works must comply with California Standard 01350 for indoor air quality emissions. The building will be a non-smoking facility, including residential units.

14. Healthy Air / Ventilation

The building will deliver air change rates in compliance with California Title 24 requirements, making use of air-to-air heat exchangers. The building's form and orientation will be influenced by natural ventilation requirements and the need to mitigate noise and dirt emanating from motor vehicle traffic on Madison Avenue.

15. Beauty and Spirit

The Bullitt Foundation Building provides an opportunity to create a place that is aesthetically pleasing as much as it is environmentally sustainable. The project will contain design features intended solely for human delight and the celebration of culture, spirit, and its Capitol Hill neighborhood. And, in our ideal outcome, it will contain features that are so obviously appropriate and functional in a Cascadian context that they will blaze a fresh trail in regional design.

16. Inspiration and Education

Educational materials about the performance and operation of the project must be shared with the public in order to inspire and educate. Given the mixed-use nature of the building and its strategic location, the Foundation anticipates a great deal of exposure to visitors and passersby. In addition, the Living Building Challenge requires that non-sensitive areas of the building must be held open to the public at least one day per year to facilitate direct contact with a truly sustainable building. We wish to work with architects, engineers, and contractors who will share our desire to proselytize the values that underlie the building.