

## Chapter 1 Enhanced Design

Enhanced design incorporates sustainability up-front, uses an integrated and total systems approach to the development process, ensures aesthetics and livability, and educates and informs throughout the life cycle of the building (from pre-design through to closeout). The goal is to encourage a written commitment that carries through the project objectives from start to finish.

Sustainable building strategies should be considered from the moment that the developer initiates the project. Create a professional development team that includes a developer, architect, engineer, landscape architect, contractor, asset and property management staff that are committed to applying environmentally sensitive building principles and practices.

## Design Development

*This section includes primary design considerations that must be addressed before the construction document phase. Other design considerations, included in chapters 2 through 6 also need to be considered prior to construction. Be sure to review all **Essential** Action Items and look at all possible recommended Action Items up-front. It is always easier, and therefore more cost-effective, when actions are considered in pre-planning.*

1-1

**Essential:** Submit Sustainability Plan Template.

**WHY**

- A Sustainability Plan provides a framework for setting goals for the project and assessing progress towards those goals.
- Planning improves the opportunity for integrated design by letting all players know what the goals are and how you hope to achieve them.
- Planning optimizes the environmental and economic performance

**HOW**

- Assemble a development team with the capacity and desire to incorporate the SeaGreen Affordable Housing Guidelines into the project. Requests for qualifications or proposals should seek expertise in sustainable design.
- Hold at least one initial meeting of full design team to review the requirements and recommendations outlined in this Guide. Make a preliminary determination of which Action Items are appropriate for the project.
- Use the Sustainability Plan Template to identify sustainability goals. Briefly outline the steps that will be used to ensure implementation. Identify roles and responsibilities for investigating and implementing specific Action Items, checking off Action Items in the Guide that are suitable for the project.
- Use the Sustainability Plan Template to measure your progress and to orient the design and construction professionals subsequently joining the design team. This document can be used to communicate goals with City departments, such as DCLU, Seattle Public Utilities, City Light and Seattle Transportation.

- Meeting early on with appropriate City Departments is strongly encouraged. The plan can also be used as a framework for introducing sustainability into the neighborhood design review process.
- Fine-tune the plan by reviewing the design program intent and the list of Action Items. Develop a schedule for finalizing key points in the design process.

Portland Office of Sustainable Development



*Deconstruction is an economical alternative to demolition.*

1-2

**Essential for Rehabs:** Evaluate opportunities for deconstruction – systematic disassembly of a structure to remove and salvage usable materials prior to demolition.

**WHY**

- Seattle offers many cost-effective alternatives to conventional demolition
- Reuse is the highest waste management priority and represents the best use for discarded materials.
- Reuse may provide financial benefits with lower disposal costs and resale revenue.

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<b>HOW</b>	<ul style="list-style-type: none"><li>• Evaluate structural components, fixtures or other building elements for reuse in the project.</li><li>• Coordinate with contractor on design team.</li><li>• Consult with local salvage or deconstruction vendor. They may perform a waste evaluation to determine the types and quantities of reusable materials.</li><li>• Contact the Business and Industry Resource Venture for assistance in locating vendors, recycling and reuse opportunities and information, and additional resources, including how to perform a waste evaluation (see Resources).</li></ul>
<b>COST</b>	<ul style="list-style-type: none"><li>• Potential cost savings in resale proceeds and reduced dump fees.</li></ul>

1-3

**Essential for Rehabs:** Inspect for asbestos and lead prior to remodel. Abate as required.

### WHY

- Asbestos is a naturally occurring mineral fiber recognized as a health risk if fibers become airborne and inhaled. Though now tightly controlled, asbestos is commonly found in pre-existing systems and a variety of construction materials. Remodeling may disturb these materials and create an unsafe environment with possible health risks due to inhalation of airborne asbestos during construction for workers and for occupants if contamination is not properly managed.
- The Environmental Protection Agency (EPA) and the Washington Occupational Safety and Health Administration (OSHA) require that an asbestos survey be performed to determine the presence of asbestos containing materials in or on a structure prior to any remodeling, renovation, or demolition work.
- Managing potential lead contamination protects workers and occupants from associated health risks of lead exposure. Remodeling wastes often includes painted materials with lead-based paint, especially in buildings built prior to 1978. Lead paint presents problems if it is peeling or in the form of dust or chips, which are toxic to humans if ingested or inhaled. Lead solder was commonly used on copper pipe up until 1980 when it was banned in Seattle.

	<ul style="list-style-type: none"> <li>• Proper control and disposal protects against land and water pollution caused by the release of lead into the environment.</li> </ul>
<b>HOW</b>	<ul style="list-style-type: none"> <li>• Conduct asbestos survey. For friable Asbestos Containing Materials (ACM) removal, documentation demonstrating abatement and disposal by a certified asbestos removal contractor is required. For non-friable ACM removal, documentation demonstrating compliance with federal, state, and local regulations and disposal at an authorized landfill is required.</li> <li>• The Toxicity Characteristic Leaching Procedure (TCLP) test is usually used to confirm the presence of lead in paint. Conduct the test or hire a qualified contractor to perform the test and report results. Abate as required and follow disposal requirements. As a worker safety measure, provide information to general contractor.</li> <li>• Specify all ductwork is sealed against dust, etc. during construction.</li> </ul>

<b>1-4</b>	Site building(s) within 1/4 mile of mass transit and within 1/2 mile of stores and services.
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<b>WHY</b>	<ul style="list-style-type: none"> <li>• Siting projects close to transit and services can reduce on-site parking needs and save associated construction costs.</li> <li>• It can reduce residents' need to own a car and eliminate the costs associated with auto ownership.</li> <li>• Pedestrian and transit-oriented neighborhoods provide residents with a range of services, parks and employment opportunities within walking</li> </ul>
<b>HOW</b>	<ul style="list-style-type: none"> <li>• Seek out potential development sites within 1/4 mile of mass transit and within 1/2 mile of stores and services.</li> <li>• If the neighborhood is lacking services, evaluate the viability of incorporating commercial, retail, or other community services into the development.</li> </ul>

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- Provide pedestrian access routes, including pathways and bicycle routes to provide safe and convenient access to services and provide bicycle storage facilities to encourage non-motorized transportation.
- Locate a "Flex-Car" station near site if available.
- **See also** Chapter 2: Site & Water, Action Items 19-20.

### 1-5

Preserve and create open space.

#### WHY

- Natural areas that include native vegetation, preserved as open space, offer many benefits: surface water management and flood control; on-site recreation areas for trails and other pedestrian uses; and wildlife habitat corridors.
- Preserving open space can serve also to protect environmentally sensitive

#### HOW

- Cluster units, buildings and site infrastructure on the site avoiding environmentally sensitive areas.
- Design building footprint and traffic paths to limit impact on site features and refrain from modifying natural topography.
- Limit clearing and grading of native vegetation to minimum amount necessary to build, allow access to utilities and site amenities, including parks and to provide fire protection.

### 1-6

Use efficient footprint and maximize space efficiency.

#### WHY

- Smaller, more efficiently designed buildings conserve energy, water, and materials, reduce operating costs, and create more space for on-site surface water management, as well as for resident activities such as recreation and vegetable gardens.
- Focusing on function rather than space tends to create a more livable

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**HOW**

- For common areas: design for safety and efficient public circulation and egress while maximizing interaction between residents. Public spaces should be designed to accommodate future adaptation. Consider including space for community gardening.
- Simplify building shape.
- Provide a common wall water access to reduce pipe runs, that is, locate kitchens above laundries and baths above kitchens.
- Layout the interior for efficient use of space. For instance a wider unit entry can provide added space for computer desk, storage, etc.
- Design floor plans to accommodate future adaptation. For example, design partition walls for future changes in common space or office space.
- Use standard dimensions in design to maximize materials efficiency: results in less wasted lumber, drywall, and other materials. Consider reducing lumber size at partitions from standard 2x4 to 2x3 or advanced framing options.

**1-7**

Site buildings for optimum access to natural ventilation.  
Design buildings to maximize natural ventilation.

**WHY**

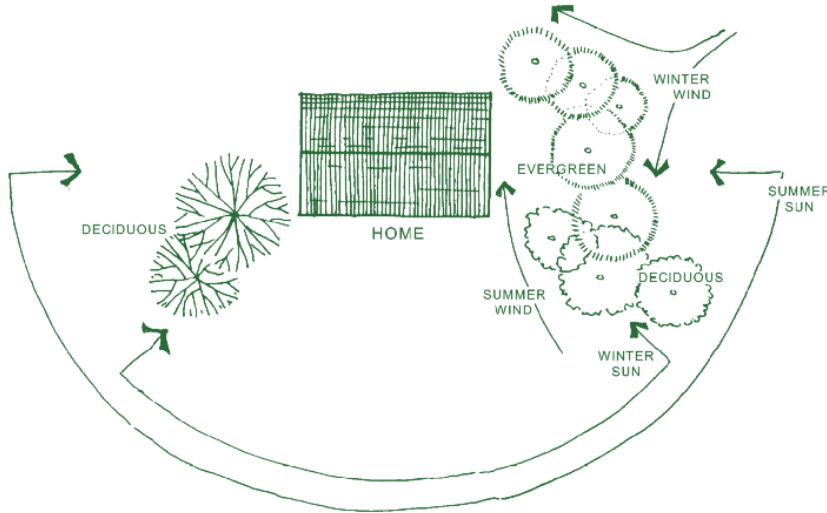
- Using natural ventilation can reduce or eliminate the need for mechanical air conditioning. Maximizing natural ventilation reduces up-front equipment costs and operating costs.
- Optimizing natural ventilation contributes to a more comfortable living environment.

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**HOW**

- Stagger buildings to allow individual units to catch breezes and discourage stagnant air buildup associated with conventional design.
- Design for cross ventilation and courtyards.
- Microclimates can be created by locating trees and shrubs in relationship with incoming breezes.

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*Site analysis includes sun and wind patterns - information that influences site and building design. For example, well-placed landscaping can block winter winds, channel summer winds and shade buildings from summer sun.*

**1-8** Site building(s) to maximize solar access. Design buildings to take advantage of solar heating potential and daylighting opportunities.

**WHY**

- Maximizing solar access creates more energy efficient, healthy and comfortable spaces.
- Good daylighting can provide a sense of wellbeing. In addition, it has been proven to improve learning and productivity in school settings and work environments.
- Sunlight through clear glazing or open windows kills pathogens that can

**HOW**

- Properly size overhangs to prevent excessive solar gains in the summer while allowing the sun to enter the building during the heating season.
- To make the best use of passive solar: orient the majority of the building's glazing within 22 degrees of due South—remember to make the correction for magnetic North, which is 21 to 22 degrees East in the Puget Sound area; specify south windows to maximize solar gain; and design adequate thermal mass.

- Install windows adjacent to walls to help bounce sunlight deep into interior spaces.
- Consult the Lighting Design Lab to evaluate daylighting options. (See Resources 3)
- Use trees and other natural landscaping to provide east and west shading strategies to help protect against overheating.

## 1-9

Design below-ground space for non-occupancy uses.

### WHY

- To ensure no resident is subjected to excessive mold and mildew problems.

### HOW

- Design any below-ground space for non-occupancy uses.
- If the building includes below-ground units, take extra measures to incorporate proper insulating moisture control and ventilation to avoid trapping mold.
- **See also** Chapter 1: Enhanced Design, Action Item 11.

## 1-10

Specify regionally manufactured building materials (within 500 miles).

### WHY

- Purchasing regionally manufactured materials and products supports the local economy and reduces transportation costs and impacts, i.e.

### HOW

- Work with suppliers to identify regionally manufactured building materials.
- Many materials listed in the Resource section are manufactured in the Pacific Northwest.

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**1-11**

For Rehabs, investigate for mold and mildew prior to and during remodel. Remediate/repair as appropriate.

**WHY**

The presence of indoor mold growth indicates high levels of biological contaminants that contribute to unacceptable indoor air quality. Mold removal and repair protects occupants against potential health effects and symptoms associated with mold exposures, including allergic reactions, asthma, and other respiratory complaints.

Additionally, mold remediation/repair protects against further damage to building structure and furnishings. This reduces negative environmental

**HOW**

Look for signs of water collection or leaks and remove the source of the moisture.

Look for staining or discoloration in drywall and in and around windows and remove and repair as necessary.

Look for adequate ventilation in kitchens, bathrooms, attics, and crawlspaces.

If you can smell a musty odor or if you suspect a large leak, it is advisable to consult a professional environmental inspector or building envelope specialist. They should be equipped with both penetrating and non-penetrating moisture meters and be prepared to inspect all possible areas of the building and offer a report. Remediate and repair as necessary and remove the source of the problem.

Specify all ductwork is sealed against dust, moisture, etc. during

**COST**

Identifying and eliminating the source of the problem, as opposed to simply treating mold, will incur costs for inspection and repairs. Remediation may require redesigning elements of the building that could add costs.

## 1-12

### Evaluate life cycle cost benefits.

#### WHY

- A life cycle cost analysis can be used to develop a cost-effective 20-year capital needs replacement schedule.

- A life cycle cost analysis or other method can accurately show long-term cost implications of choice. Sustainable choices can sometimes mean a first cost premium when compared to conventional choices, but over the long-term provide greater durability, reduced maintenance and replacement costs and lower utility bills.

#### HOW

- Analysis should relate to a sustainability plan and focus on an integrated design approach rather than on a specific technique or product. For instance if the design intent includes energy efficiency, several techniques or products combined would be used to optimize energy efficiency. You would want to look at these options as a package, then make adjustments to balance highest efficiency for the least life-cycle cost.

## 1-13

### Provide permanent interpretive signs highlighting key environmental and other features.

#### WHY

- Creating community awareness of special environmental features within a community helps foster a sense of stewardship and a greater understanding of the interconnectedness of built and natural environments.

- Connection to place helps foster a sense of stewardship overall.

- Fish friendly signage like "Dump no oil—drains to streams!" at storm drains is an important water quality message.

#### HOW

- Use signs to identify features, such as "*Built Smart* energy efficient building," "drought tolerant landscape" or "Habitat Area." Describe its environmental protective function, or provide additional information on the sustainable feature. Sometimes a sustainable feature is subtle enough that it requires an informative message.

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- Use interpretive signage to highlight cultural or historical landmarks, to further develop a sense of place.
- Energy Star<sup>®</sup>, green label, and other similar product identifiers should be displayed.

### Construction Documents

1-14

**Essential:** Reflect sustainability plan in your contract documents and project management.

#### WHY

- Contract documents are the best means to convey to contractors the sustainability plan in concrete terms, and to make sure the sustainability goals are actually achieved.
- Frequently, substitutions are made in the field during construction that can undermine the initial intention of the sustainability plan as a whole or specific Action Items.

#### HOW

- Prepare specifications, bid packages, purchasing criteria for materials and services, salvage instructions, etc. reflecting the project's sustainability goals. Incorporate specific requirements for products and techniques consistent with Action Items identified in the Sustainability Plan, and determined through the design process to be appropriate for the project.
- Include sustainable building items in base bid. Adding them through change order can increase their cost.
- Use "or *approved* equal" rather than "or equivalent" for allowable substitutions. Ensure the approval process includes a review for environmental preferences.

- Specifications should call out environmentally preferable attributes or environmental performance reference standards for products and techniques intended to satisfy Action Items identified for the project. Clearly state that substitutions must perform to the intended design standard. Avoid ambiguous language such as “contractor is encouraged” or “as much as possible.”
- In addition to contract documents, provide the contractor with a copy of the Sustainability Plan.
- Change orders should meet required Action Item objectives and /or intent. If there are change orders, strive to ensure that details of the sustainability plan are not undermined.
- Develop a contractor’s checklist that incorporates in-the-field verification of preferred installation and practice. **See also** Chapter 1: Enhanced Design, Action Item 18.
- Be familiar with the plans and specifications. Assign your project manager with responsibility to achieve desired outcomes.

<b>Close-Out</b>	
<b>1-15</b>	<b>Essential:</b> Reflect sustainability goals in O&M Manual.

**WHY**

- An O&M Manual can significantly increase the chance that actions taken on the project, as part of the Sustainability Plan, will produce the environmental and economic benefits desired over the life of the building.
- To make sure routine maintenance does not reduce environmental performance of green or sustainable products installed in the building.
- To make sure custodial and maintenance staff have the information they need to maintain the level of sustainability achieved in the building when they need to replace products for wear and tear. Feedback on the positive (or negative) results of using a particular “green” product is

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### HOW

- Provide an outline of the O&M manual with project submittal.
- Review Chapter 6: Operations & Maintenance for specific issues that should be addressed in an O&M Manual incorporating sustainability. The O&M Plan should include a maintenance schedule, operating tips, and a list of green/sustainable products installed in the project, noting preferred maintenance and replacement procedures for those products.
- Integrate maintenance and operations procedures for sustainable design features (materials and equipment) with “conventional” operations and maintenance. Eliminate or modify “conventional” practices that substantively conflict with sustainability goals.
- Incorporate a summary of policies and requirements that are relevant during the occupancy of the building. For example, if there is a requirement for Integrated Pest Management of building and landscape pests, it should be included in this section of the O&M Manual. **See also** Chapter 6: Operations & Maintenance, Action Item 2.
- Require annual updates and review of the O&M Manual with the Maintenance Staff. Include update and review of approved products list for maintenance.
- Address any problem substances such as encapsulated asbestos, that may still be in building after occupancy. Include a hazardous materials management plan.
- When handing over the manual, an initial training should be conducted.

1-16

Air out the building prior to occupancy. At least 2 weeks prior to occupancy restrict all use of toxic solvents, paints, etc. and for final cleaning use only low-toxic, non-toxic and environmentally benign maintenance materials and practices.

### WHY

- Using toxic chemicals or environmentally inappropriate practices to prepare for building occupancy can significantly undermine any efforts made to design a project that is healthy for the occupants.
- Wet carpet cleaning saturates carpet with more moisture than can evaporate and traps it below the carpet's surface, creating a potential

<b>HOW</b>	<ul style="list-style-type: none"> <li>• Specify low-toxic maintenance materials throughout construction, and in particular as part of close-out. Disallow the use of chemical solvents for interior surfaces. Soy- or citrus-based cleaning products are preferable alternatives.</li> <li>• Provide construction signage that instructs construction clean-up crews in proper close-out procedures.</li> <li>• For rehab: Specify steam cleaning for carpets, no wet carpet cleaning.</li> <li>• Specify the use of HEPA filters for vacuum cleaners used during construction, and at close-out. HEPA or Filtreat vacuum filters can trap</li> </ul>
<b>COST</b>	<ul style="list-style-type: none"> <li>• Quality HEPA or Filtreat vacuum cleaners cost \$400 or more retail, and their specialized filters cost between \$20-60 each. High quality Hepa vacuum cleaners do not need filter replacement very often.</li> </ul>

1-17	Conduct owner orientation/operation walk-through.
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<b>WHY</b>	<ul style="list-style-type: none"> <li>• Combined with a good O&amp;M Manual, a walk-through and orientation can ensure that the environmental and economic benefits intended through the Sustainability Plan are achieved.</li> </ul>
<b>HOW</b>	<ul style="list-style-type: none"> <li>• Develop and orient staff to O&amp;M Manual prior to the scheduled walk-through and allow an opportunity for a question and answer session.</li> </ul>

1-18	Conduct 3 <sup>rd</sup> party verification/certification that sustainable products and practices were used in the project.
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<b>WHY</b>	<ul style="list-style-type: none"> <li>• Frequently, lack of information, scheduling problems, or other unforeseen circumstances may stand in the way of implementation of a sustainable feature as the designer intends.</li> </ul>
<b>HOW</b>	<ul style="list-style-type: none"> <li>• For energy and indoor quality features, you can use the help of qualified specialists in programs such as Energy Star® Seattle City Light's <i>BUILT SMART</i>, or the American Lung Association's Healthy House Program to certify your project has met its goals. See Resources Section for contact information. For large buildings it is recommended that a commissioning specialist be engaged early and contracted to assure quality performance of all systems.</li> </ul>

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- For construction waste management recognition, participate in *Construction Works* program through the Business Industry Resource Venture (BIRV.) See resource section.