City of Yonkers
Green Development Workbook

Checklist and Standards
September 2014

Department of Planning and Development
Commissioner Wilson Kimball

Mayor Mike Spano
Acknowledgements

The City wishes to thank the following individuals and organizations for their hard work and dedication in development of the Green Development Standards.

Yonkers Green Development Standards Work Group
This work group, composed of city staff, building industry professionals, and civic and environmental leaders, was formed to develop measurable, clear, flexible, enforceable, and reasonable green development standards for the City of Yonkers.

Enterprise Green Communities
The City of Yonkers wishes to acknowledge the Enterprise Community Partners, Inc. whose Enterprise Green Communities Criteria was adapted to develop this standard. The Enterprise Green Communities Criteria was designed to deliver significant health, economic and environmental benefits to low-income families. For more information, visit www.enterprisecommunity.com
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Introduction
The Yonkers Green Development Workbook was developed to address the specific environmental impacts of development in Yonkers. Use of the standards conserves natural resources, increases energy and water efficiency and improves indoor air quality to maintain long term value, reduce operating costs, and ensure more comfortable and healthy buildings in Yonkers.

Private Development City-Wide
All new non-residential development site plan applications for projects greater than 15,000 square feet and residential development site plan applications for projects greater that 25 units shall include a Green Development Checklist. For private development projects outside of the Downtown Districts, submitting a completed checklist with the site plan application is the only requirement. Actual compliance with the standards is encouraged, but is purely voluntary.

Private Development in Downtown Yonkers
All construction projects that require a building permit in the Downtown Districts (see map in Appendix C) shall comply with the Yonkers Green Development Standards. This includes all projects that involve the construction, addition, alteration, enlargement, removal and demolition of every structure and any appurtenances connected or attached to such structures and to the site on which the structure is located, except that these provisions do not apply to detached and attached one- and two-family dwellings.

City of Yonkers-Owned Facilities
The Yonkers Green Development Standards apply to construction projects involving real property including land and/or buildings which meet the following criteria:

1. The City of Yonkers is the record owner of said real property including land and/or buildings or related improvements which are used for municipal or school purposes; and

2. Which involve (A) new construction, or (B) renovation of an existing building or the expansion of an existing building provided that these standards shall apply only to the extent of the improvements: i) necessary for the renovation or rehabilitation of a portion of an existing building, or ii) necessary for the expansion of an existing building, the standards shall apply only to such portion of an existing building being renovated or rehabilitated or to the actual expansion of the existing building respectively; and iii) where such rehabilitation or renovation includes separate specifications for the following four subdivisions of the work to be performed: a) plumbing; b) heating, ventilation and air conditioning; c) electric wiring; and d) general contracting.
Construction Types
The standards are applied differently for new construction, substantial rehab (gut rehab), or moderate rehab. A Substantial Rehab is defined as a project that includes the replacement and/or improvement of all the major systems of the building, including its envelope. The building envelope is defined as the air barrier and thermal barrier separating exterior from interior space. For Substantial Rehab projects, this could include either removing materials down to the studs or structural masonry on one side of the exterior walls.

A Moderate Rehab is defined as a project that does not include major systems or building envelope work as described for a Substantial Rehab.

Compliance Requirements
Compliance with the standards is a two step process, with step one occurring before a building permit is granted and step two occurring after the construction end date. In the first step, a building permit will not be issued without presenting a complete Green Development Standards Checklist that meets the requirements of this standard. Projects must meet all applicable mandatory measures and achieve the requisite number of optional points for that construction type. New construction projects must achieve 35 optional points, while substantial rehab projects must achieve 30 points. Moderate rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project’s scope.

In the second step, after construction is complete, a certificate of occupancy will not be granted until a pre-occupancy compliance report is approved by the Department of Housing and Buildings describing how work was completed in conformance with the approved Green Development Standards Checklist. The compliance report will include a statement signed by the registered design professional certifying that the project complies with the standards.

During the construction process, any change to the approved project checklist, including substitution of green development measures, shall be submitted in writing to the Department of Housing and Buildings for review and approval before construction is commenced.

If any requirements of the Yonkers Green Development Standards are found to be less stringent than existing codes, the requirements of the New York State Building Code and Yonkers Zoning Code shall take precedence.

Review
Whenever the Commissioner of Housing and Buildings rejects an application, the applicant may submit a request for review by the Green Development Standards Review Committee. The request for review shall be in writing and submitted within 30 days from the date of the rejection. The request shall set forth in detail the factual and legal
basis on which the request for review was based. Exemptions may be granted if an economic hardship related to the specific structure or project and/or the impracticality of complying with the standards is demonstrated to the satisfaction of the Committee. Costs incurred by the Committee for consultation fees or other extraordinary expenses in connection with the review of any application or referral may be charged to the applicant. The Committee shall meet within 30 days of the date of any application or referral to it, unless adjourned for good cause shown or stipulation of the parties.

When requesting a review, the burden of proof is on the applicant to indicate the maximum threshold of compliance he or she believes is feasible for the project.

The Green Development Standards Review Committee may issue advisory reports recommending approval, conditional approval subject to specific modifications, or disapproval of any matter which may be referred to it.

**Affordable Housing Projects**

Affordable housing projects that meet the following criteria may follow the Enterprise Green Communities Criteria (Enterprise Community Partners, version in effect on the date of the building permit application) as an alternative compliance path:

A structure, building, or site where a minimum of 80 percent of the square footage of the conditioned space is designated for residential use and 80 percent of the housing units serve residents at or below 60 percent Area Median Income for rental projects and at or below 80 percent Area Median Income for for-sale projects. For Neighborhood Stabilization Program-funded projects, 80 percent of the housing units must serve residents at or below 120 percent Area Median Income.
Yonkers Green Development Checklist

This checklist provides an overview of the technical elements of the Yonkers Green Development Standards. To comply with the standards, the project must integrate all yes/no measures applicable to that construction type. In addition, New Construction projects must achieve 35 optional points and Substantial Rehab projects must achieve 30 optional points. Moderate Rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project’s scope. Please refer to the Yonkers Green Development Workbook for details regarding each measure.

<table>
<thead>
<tr>
<th>Project Name: ___________________________</th>
<th>Block: _______</th>
<th>Lot: _______</th>
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<tbody>
<tr>
<td>Construction Type:</td>
<td></td>
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<tr>
<td>☐ New Construction</td>
<td>☐ Substantial Rehab</td>
<td>☐ Moderate Rehab</td>
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**1: Integrative Design**

<table>
<thead>
<tr>
<th>YES ☐ NO ☐</th>
<th>1.1a Green Development Plan: Integrative Design Meeting(s) (All Projects)</th>
<th>Conduct one or more integrative design meetings and submit a Green Development Plan or equivalent documentation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES ☐ NO ☐</td>
<td>1.1b Green Development Plan: Checklist Documentation (All Projects)</td>
<td>Create design and construction documentation to include information on implementation of appropriate Green Development Standards.</td>
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</table>

**1.2a Universal Design (New Construction, Residential only)** Design a minimum of 15% of the dwelling units (no fewer than one) in accordance with ICC /ANSI A117.1, Type A, Fully Accessible guidelines [10 points].

**1.2b Universal Design (Substantial and Moderate Rehab, Residential only)** Design a minimum of 10% of the dwelling units (no fewer than one) in accordance with ICC /ANSI A117.1, Type A, Fully Accessible guidelines [3 points] and, for an additional two points, the remainder of the ground-floor units and elevator-reachable units should have accessible unit entrances [2 points].

**2: Location + Neighborhood Fabric**

<table>
<thead>
<tr>
<th>YES ☐ NO ☐</th>
<th>2.1 Sensitive Site Protection (New Construction)</th>
<th>Do not locate new development, including buildings, built structures, roads, or other parking areas, on portions of sites that meet any of the following provisions: • Except for previously developed sites, land within 100 feet of wetlands, including isolated wetlands or streams • Land that is specifically identified as habitat for any species on federal or state threatened or endangered lists • Land with elevation at or below the 100-year floodplain.</th>
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</tbody>
</table>

**2.2 Proximity to Services (New Construction)** Locate the project within a 0.25-mile walk distance of at least two OR a 0.5-mile walk distance of at least four of the list of facilities [5 points].

**2.3 Preservation of and Access to Open Space (All Projects)** Establish a legally enforceable open space conservation easement for use by tenants that is binding on all future owners of the property for a percentage of the total project acreage: 10% [4 points]; 20% [6 points]; 30% [8 points]; and 40% [10 points].

**2.4 Access to Public Transportation (New Construction)** Locate the project within a 0.5-mile walk distance of combined transit services (bus and/or rail) constituting 76 or more transit rides per weekday and 32 or more transit rides on the weekend [5 points].

**2.5 Smart Site Location: Passive Solar Heating / Cooling (New Construction)** Demonstrate a building with a passive solar design, orientation, and shading that meet specified guidelines. Select one: • Single building — New Construction [10 points] • Multiple buildings — New Construction [10 points] • Moderate or Substantial Rehab [10 points].
Yonkers Green Development Checklist

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| __ / 10 | 2.6 Brownfield Site (New Construction) | Locate the project on a brownfield site [10 points]. |
| __ / 5  | 2.7 Access to Fresh, Local Foods (All Projects) | Pursue one of three options to provide residents, occupants and staff with access to fresh, local foods, including neighborhood farms and gardens; community-supported agriculture; proximity to farmers market [5 points]. |

3: Site Improvements

| YES □ | NO □ | 3.1 Environmental Remediation (All Projects) | Conduct an environmental site assessment to determine whether any hazardous materials are present on site. |
| YES □ | NO □ | 3.2 Erosion and Sedimentation Control (All Projects) | Implement the New York State Department of Environmental Conservation erosion and sedimentation control standards. |
| YES □ | NO □ | 3.3 Landscaping (All Projects) | Provide new plants (including trees, shrubs, and ground cover) such that at least 50% of area available for landscaping is planted with native or adaptive species, all new plants are appropriate to the site’s soil and microclimate, and none of the new plants is an invasive species. |
| YES □ | NO □ | 3.4 Efficient Irrigation and Water Reuse (All Projects) | If irrigation is utilized, install an efficient irrigation or water reuse system. |

| __ / 16 | 3.5 Surface Stormwater Management (All Projects) | Comply with the Stormwater Control section of the Yonkers Zoning Code and utilize one or more of the following best management practices: • Sheetflow to Riparian Buffers or Filter Strips - [2 points] • Vegetated Swale - [2 points] • Tree Planting / Tree Pit - [2 points] • Rain Gardens - [2 points] • Green Roofs - [2 points] • Stormwater Planters - [2 points] • Rain Barrels and Cisterns - [2 points] • Porous Pavement - [2 points]. |

4: Water Conservation

| YES □ | NO □ | 4.1 Water-Conserving Fixtures (All Projects) | Install or retrofit water-conserving fixtures with the following specifications: Toilets - 1.28 gpf; Urinals - 0.5 gpf; Showerheads - 2.0 gpm; Kitchen faucets - 2.0 gpm; Bath faucet - 1.5 gpm. |

| __ / 10 | 4.2 Advanced Water-Conserving Appliances and Fixtures (All Projects) | Install or retrofit water-conserving fixtures with the following specifications: Toilets - 1.2 gpf; Showerheads - 1.5 gpm; Kitchen faucets - 1.5 gpm; Bath faucet - 0.5 gpm. Select any, or all, of the options: • Toilets [4 points] • Showerheads [3 points] • Faucets - kitchen and bathroom [3 points]. |

| __ / 5 | 4.3 Water Reuse (All Projects) | Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project’s water needs. • 10% reuse [2 points] • 30% reuse [3 points] • 20% reuse [4 points] • 40% reuse [5 points]. |

5: Energy Efficiency

| YES □ | NO □ | 5.1 Building Performance Standard: Multifamily Three Stories or Fewer (New Construction only) | Certify the project under ENERGY STAR New Homes. |
Yonkers Green Development Checklist

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<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>5.1b</td>
<td>Building Performance Standard: Multifamily Four Stories or More (New Construction)</td>
<td>Demonstrate compliance with the New York State Energy Research and Development Authority’s (NYSERDA) Multifamily Performance Program (MPP).</td>
</tr>
<tr>
<td>5.1c</td>
<td>Building Performance Standard: Multifamily Three Stories or Fewer (Substantial and Moderate Rehab)</td>
<td>Demonstrate that the final energy performance of the building is equivalent to a Home Energy Rating System (HERS) Index of 85.</td>
</tr>
<tr>
<td>5.1d</td>
<td>Building Performance Standard: Multifamily Four Stories or More (Substantial and Moderate Rehab)</td>
<td>Demonstrate that the final energy performance of the building is equivalent to 15 percent above ASHRAE 90.1-2007.</td>
</tr>
<tr>
<td>5.1e</td>
<td>Building Performance Standard: Non-Residential (New Construction and Substantial Rehab)</td>
<td>Demonstrate that the final energy performance of the building is equivalent to 15 percent above ASHRAE 90.1-2007.</td>
</tr>
<tr>
<td>5.1f</td>
<td>Building Performance Standard: Non-Residential (Moderate Rehab)</td>
<td>Demonstrate that the final energy performance of the building is equivalent to 15 percent above ASHRAE 90.1-2007.</td>
</tr>
<tr>
<td>5.2</td>
<td>Additional Reductions in Energy Use (All Projects)</td>
<td>Demonstrate that the final energy performance of the building is improved by percentage increments above ASHRAE 90.1-2007. • 20 percent [5 points] • 30 percent [10 points] • 40 percent [15 points].</td>
</tr>
<tr>
<td>5.3</td>
<td>Sizing of Heating and Cooling Equipment (All Projects)</td>
<td>Size heating and cooling equipment in accordance with the Air Conditioning Contractors of America (ACCA) Manuals, Parts J and S, or ASHRAE handbooks.</td>
</tr>
<tr>
<td>5.4</td>
<td>Energy Star Appliances (All Projects)</td>
<td>If providing appliances, install ENERGY STAR–labeled clothes washers, dishwashers, and refrigerators.</td>
</tr>
<tr>
<td>5.5a</td>
<td>Efficient Lighting: Interior Units (All Projects)</td>
<td>Follow the guidance appropriate for the project type: install the ENERGY STAR Advanced Lighting Package (ALP); OR follow the ENERGY STAR MFHR program guidelines, which require that 80% of installed lighting fixtures within units must be ENERGY STAR–qualified or have ENERGY STAR–qualified lamps installed; OR if replacing, new fixtures and ceiling fans must meet or exceed ENERGY STAR efficiency levels.</td>
</tr>
<tr>
<td>5.5b</td>
<td>Efficient Lighting: Common Areas and Emergency Lighting (All Projects)</td>
<td>Follow the guidance appropriate for the project type: use ENERGY STAR–labeled fixtures or any equivalent high-performance lighting fixtures and bulbs in all common areas; OR if replacing, new common space and emergency lighting fixtures must meet or exceed ENERGY STAR efficiency levels. For emergency lighting, if installing new or replacing, all exit signs shall meet or exceed LED efficiency levels and conform to local building codes.</td>
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<td>5.5c Efficient Lighting: Exterior  <strong>(All Projects)</strong></td>
<td>Follow the guidance appropriate for the project type: install ENERGY STAR–qualified fixtures or LEDs with a minimum efficacy of 45 lumens / watt; OR follow the ENERGY STAR MFHR program guidelines, which require that 80% of outdoor lighting fixtures must be ENERGY STAR–qualified or have ENERGY STAR-qualified lamps installed; OR if replacing, install ENERGY STAR compact fluorescents or LEDs with a minimum efficacy of 45 lumens / watt.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
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<tr>
<td>5.6a Electricity Meter  <strong>(New Construction and Substantial Rehab)</strong></td>
<td>Install individual or sub-metered electric meters in all dwelling units or tenant spaces.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
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<tr>
<td>5.6b Electricity Meter  <strong>(Moderate Rehab)</strong></td>
<td>Install individual or sub-metered electric meters in all dwelling units [5 points].</td>
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<tr>
<td>5.7a Renewable Energy  <strong>(All Projects)</strong></td>
<td>Install photovoltaic (PV) panels, wind turbines, or other electric-generating renewable energy source to provide a specified percentage of the project’s estimated energy demand [15 points].</td>
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<tr>
<td>5.7b Photovoltaic / Solar Hot Water Ready  <strong>(All Projects)</strong></td>
<td>Site, design, engineer, and/or plumb the development to accommodate installation of photovoltaic (PV) or solar hot water system in the future [5 points].</td>
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<tr>
<td>5.8 Advanced Metering Infrastructure  <strong>(All Projects)</strong></td>
<td>Site, design, engineer, and wire the development to accommodate installation of smart meters and/or be able to interface with smart grid systems in the future [5 points].</td>
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## 6: Materials Beneficial to the Environment

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<tr>
<td>6.1 Low / No VOC Paints and Primers  <strong>(All Projects)</strong></td>
<td>All interior paints and primers must be less than or equal to the following VOC levels: Flats - 50 g/L; Non-flats - 50 g/L; Floor - 100 g/L.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
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<tr>
<td>6.2 Low / No VOC Adhesives and Sealants  <strong>(All Projects)</strong></td>
<td>All adhesives must comply with Rule 1168 of the South Coast Air Quality Management District. All caulks and sealants must comply with regulation 8, rule 51, of the Bay Area Air Quality Management District.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
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<tr>
<td>6.3 Construction Waste Management  <strong>(All Projects)</strong></td>
<td>Commit to following a waste management plan that reduces non-hazardous construction and demolition waste by at least 50% by weight through recycling, salvaging, or diversion strategies.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
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<tr>
<td>6.4 Construction Waste Management  <strong>(All Projects)</strong></td>
<td>Commit to following a waste management plan that reduces non-hazardous construction and demolition waste by at least 75% by weight through recycling, salvaging, or diversion strategies [15 points].</td>
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<tr>
<td>6.5 Recycling Storage  <strong>(All Projects)</strong></td>
<td>Provide one or more easily accessible, permanent areas for the collection of and storage of recyclable materials.</td>
</tr>
<tr>
<td>YES □</td>
<td>NO □</td>
</tr>
</tbody>
</table>
Yonkers Green Development Checklist

This checklist provides an overview of the technical elements of the Yonkers Green Development Standards. To comply with the standards, the project must integrate all yes/no measures applicable to that construction type. In addition, New Construction projects must achieve 35 optional points and Substantial Rehab projects must achieve 30 optional points. Moderate Rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project’s scope. Please refer to the Yonkers Green Development Workbook for details regarding each measure.

### 6.6 Recycled Content Material (All Projects)
Incorporate building materials that are composed of at least 25% post-consumer recycled content or at least 50% post-industrial recycled content. Select from the following:
- Framing materials [2 point]
- Exterior materials: siding, masonry, roofing [2 point]
- Concrete / cement and aggregate [2 point]
- Drywall / interior sheathing [2 point]
- Flooring materials [2 point].

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### 6.7 Regional Material Selection (All Projects)
Use products that were extracted, processed, and manufactured within 500 miles of the home or building for a minimum of 50% of the building material value (based on cost). Select any or all of these options:
- Framing materials [2 point]
- Exterior materials: siding, masonry, roofing [2 point]
- Concrete / cement and aggregate [2 point]
- Drywall / interior sheathing [2 point]
- Flooring materials [2 point].

__ / 10

### 6.8 Certified, Salvaged, and Engineered Wood Products (All Projects)
Commit to using wood products and materials of at least 25% that are (by cost): FSC-certified, salvaged products, or engineered framing materials without urea-formaldehyde binders [10 points].

YES ☐  NO ☐

### 6.9 Reduced Heat-Island Effect: Roofing (All Projects)
Use Energy Star–compliant roofing or install a “green” (vegetated) roof for at least 50% of the roof area.

YES ☐  NO ☐

### 6.9b Reduced Heat-Island Effect: Paving (All Projects)
Use light-colored, high-albedo materials and/or open-grid pavement, with a minimum solar reflectance of 0.3, over at least 50% of the site’s hardscaped area.

YES ☐  NO ☐

---

### 7: Healthy Living Environment

#### 7.1 Composite Wood Products that Emit Low/ No Formaldehyde (All Projects)
All composite wood products must be certified compliant with California 93120. If using a composite wood product that does not comply with California 93120, all exposed edges and sides must be sealed with low-VOC sealants.

YES ☐  NO ☐

#### 7.2 Environmentally Preferable Flooring (All Projects)
Do not install carpets in entryways, laundry rooms, bathrooms, kitchens / kitchenettes, utility rooms, and all rooms of ground-connected floors. Any carpet products used must meet the Carpet and Rug Institute’s Green Label or Green Label Plus certification for carpet, pad, and carpet adhesives. Any hard surface flooring products used must be either ceramic tile, unfinished hardwood floors, OR in compliance with the Scientific Certification System’sFloorScore program criteria.

YES ☐  NO ☐

#### 7.3 Environmentally Preferable Flooring: Alternative Sources (All Projects)
Use non-vinyl, non-carpet floor coverings in all rooms of building [5 points].

__ / 5
Yonkers Green Development Checklist

This checklist provides an overview of the technical elements of the Yonkers Green Development Standards. To comply with the standards, the project must integrate all yes/no measures applicable to that construction type. In addition, New Construction projects must achieve 35 optional points and Substantial Rehab projects must achieve 30 optional points. Moderate Rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project's scope. Please refer to the Yonkers Green Development Workbook for details regarding each measure.

<table>
<thead>
<tr>
<th>Yes/No</th>
<th>7.4 Exhaust Fans: Bathroom (All Projects)</th>
<th>Install Energy Star–labeled bathroom fans that exhaust to the outdoors, are connected to a light switch, and are equipped with a humidistat sensor, timer, or other control (e.g., occupancy sensor, delay off switch, ventilation controller).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
<td>7.5 Exhaust Fans: Kitchen (All Projects)</td>
<td>Install power-vented fans or range hoods that exhaust to the exterior at the appropriate cfm rate, per ASHRAE 62.2, or install a central ventilation system with rooftop fans that meet efficiency criteria.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.6 Ventilation (New Construction and Substantial Rehab)</td>
<td>Install a ventilation system capable of providing adequate fresh air per ASHRAE requirements for the building type.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.7 Combustion Equipment (All Projects)</td>
<td>Specify power-vented or closed-combustion equipment when installing new space and water-heating equipment in New Construction and any Substantial and Moderate Rehab projects.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.8a Mold Prevention: Water Heaters (All Projects)</td>
<td>Provide adequate drainage for water heaters that includes drains or catch pans with drains piped to the exterior.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.8b Mold Prevention: Surfaces (All Projects)</td>
<td>In bathrooms, kitchens, and laundry rooms, use materials that have durable, cleanable surfaces.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.8c Mold Prevention: Tub and Shower Enclosures (All Projects)</td>
<td>Use non–paper-faced backing materials such as cement board, fiber cement board, or equivalent in bathrooms.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.9 Vapor Barrier Strategies (New Construction and Rehab Projects with foundation work only)</td>
<td>Install vapor barriers that meet specified criteria appropriate for the foundation type.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.10 Radon Mitigation (New Construction and Substantial Rehab only)</td>
<td>For New Construction, install passive radon-resistant features below the slab. For Substantial Rehab projects, test for the presence of radon and mitigate if elevated levels exist.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.11 Water Drainage (New Construction and Rehab projects replacing assemblies called out in Criterion only)</td>
<td>Provide drainage of water away from windows, walls, and foundations by implementing list of techniques.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>7.12 Garage Isolation (All Projects)</td>
<td>Follow list of criteria for projects with garages, including: provide a continuous air barrier between the conditioned (living) space and any garage space to prevent the migration of any contaminants into the living space, and install a CO alarm inside the house in the room with a door to the garage and outside all sleeping areas.</td>
</tr>
</tbody>
</table>
Yonkers Green Development Checklist

This checklist provides an overview of the technical elements of the Yonkers Green Development Standards. To comply with the standards, the project must integrate all yes/no measures applicable to that construction type. In addition, New Construction projects must achieve 35 optional points and Substantial Rehab projects must achieve 30 optional points. Moderate Rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project’s scope. Please refer to the Yonkers Green Development Workbook for details regarding each measure.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.13 Integrated Pest Management (All Projects)</td>
<td>Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate sealing methods to prevent pest entry.</td>
</tr>
<tr>
<td>7.14 Lead-Safe Work Practices (Substantial and Moderate Rehab)</td>
<td>For properties built before 1978, use lead-safe work practices consistent with the EPA’s Renovation, Repair, and Painting Regulation and applicable HUD requirements.</td>
</tr>
<tr>
<td>8.1 Building Maintenance Manual (All Projects)</td>
<td>Provide a building maintenance manual that addresses maintenance schedules and other specific instructions related to the building’s green features.</td>
</tr>
<tr>
<td>8.2 Tenant Manual (All Projects)</td>
<td>Provide a guide for homeowners and tenants that explains the intent, benefits, use, and maintenance of green building features.</td>
</tr>
<tr>
<td>8.3 Resident and Property Manager Orientation (All Projects)</td>
<td>Provide a comprehensive walk-through and orientation for residents and property managers using the appropriate building maintenance or resident’s manual.</td>
</tr>
<tr>
<td>8.4 Project Data Collection and Monitoring System (All Projects)</td>
<td>Collect and monitor project performance data on energy, water, and, if possible, healthy living environments for a minimum of five years [5 points].</td>
</tr>
</tbody>
</table>

Total Points: __ / 5

Contact Information

Name:_____________________________________________________________
Title:_____________________________________________________________
Company:__________________________________________________________
Phone:___________________Email:_____________________________________
Street:_____________________________________________________________
City:___________________State:__________Zip:__________________________

To Be Completed By Applicant

The number on the right is the maximum number of optional points for each measure. Please indicate how many points the project will include.

Contact Information

Total Points: __________
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An integrative design process facilitates the design and development team’s achievement of green objectives throughout the project life cycle.
1.1a

Green Development Plan: Integrative Design Meeting(s)
All Projects

Rationale
An integrative design process facilitates the design and development team’s achievement of green objectives throughout the project life cycle. The outcomes of an integrative design process can include substantially lower development costs and greater health, economic, and environmental benefits for residents, building occupants, property owners, and communities.

Recommendations
• Conduct a green design charrette with the full development team, including participants from the following disciplines or interests:
  – Prospective or current occupants and residents
  – Architecture or residential building design
  – Mechanical or energy engineering
  – Building science or performance testing
  – Green building or sustainable design
  – Civil engineering, landscape architecture, habitat restoration, or land-use planning
  – Building management and maintenance
  – Environmental science
  – Public health

• Best practices in documenting the integrative design charrette process required of project teams submitting for Certification include:
  – A roster of the name and role of each member of the professional design and development team
  – A statement of the overall green development goals of the project and the expected intended outcomes from addressing those goals
  – A summary of the process that was used to select the green building strategies, systems, and materials that will be incorporated into the project
  – A description of how each of the mandatory and optional items will be included in the project
  – Identification of which members of the design and development team are responsible for implementing the green features
  – A description of follow-up measures to be taken through the completion of design, permitting, construction, and operation to ensure that the green features are included and correctly installed, and that the owners or tenants receive information about the function and operation of the features
  – Meeting minutes or other documentation that captures and summarizes components of the integrative design process
• Project performance and durability can be dramatically affected by decisions and processes established during the integrative design phase. Consider the following list of recommendations for project teams to consider during integrative design:
  – Consider adding specific energy consumption thresholds or goals for each project that will be evaluated after project completion.
  – Document your process for approaching and complying with the standards for use in your future green projects. Include specific options for complying with the standards, contact information for useful resources (organizations, websites, product distributors, etc.), and lessons learned.
  – Adjust the scopes of all of the projects in your portfolio to match the standards in order to avoid confusion with changing expectations.
  – Add building envelope and mechanical installation details to your plans and specifications for the most critical project components, paying particular attention to: air handler closet air sealing, floor system and band air sealing, party wall air sealing, proper insulation installation, ventilation system installation, and duct sealing with “bucket” mastic. Also provide the construction team with installation guides for the measures above.
  – Consider creating incentives for your construction team based on the performance of various building components.
  – Add self-verification requirements for your construction team for certain project items that demand proper installation (e.g., testing of water fixtures, testing of bath fans, air sealing of air handler closets). Self-verification for product-based measures (submitting cut-sheets for appropriate paints, carpets, etc.) is most likely unnecessary.

Requirements
Conduct one or more integrative design meeting(s) as appropriate for your project and submit a Green Development Plan that outlines the design approach used for this development that demonstrates involvement of the entire project team throughout the design and development process.

Mandatory
Green Development Plan: Checklist Documentation
All Projects

Rationale
Projects that explicitly address accountability among project team members and implementation details for Green Development Standards in design and construction documentation tend to successfully implement the Standards on site during the construction phase.
Recommendations
Incorporate all Yonkers Green Development Standards mandatory and optional measures that the project intends to meet into the project plans and specifications as indicated in the Green Development Plan.

Requirements
Create design and construction documentation (e.g., plans, details, specifications) to include information on implementation of applicable green development measures.

1.2a  Optional – 5 points max
Universal Design
New Construction, Residential Only

Rationale
Universal design features result in a building that is sensitive to a wide range of resident needs, including those who have temporary or permanent disabilities. The creation of comfortable environments for a diverse population increases the likelihood of dynamic, diverse communities.

Recommendations
Universal design features should be considered during the integrative design process.

Requirements
Design a minimum of 15% of the dwelling units (no fewer than one) in accordance with ICC /ANSI A117.1 - 2003, Type A, Fully Accessible guidelines. The remainder of the ground-floor units and elevator-reachable units should be designed in accordance with ICC /ANSI A117.1 - 2003, Type B. [5 points]

Resources

1.2b  Optional – 5 points max
Universal Design
Substantial or Moderate Rehab, Residential Only

Rationale
Universal design features result in a building that is sensitive to a wide range of resident needs, including those who have temporary or permanent disabilities. The creation of
comfortable environments for a diverse population increases the likelihood of dynamic, diverse communities.

Recommendations
Universal design features should be considered during the integrative design process, based on the sustainability goals of the project.

Requirements
- Design a minimum of 10% of the dwelling units (no fewer than one) in accordance with ICC /ANSI A117.1 - 2003, Type A, Fully Accessible guidelines. [3 points]

AND, for 2 additional points:
- The remainder of the ground-floor units and elevator-reachable units should have accessible unit entrances (designed to accommodate wheelchair-bound people). [2 points]

Resources
Location + Neighborhood Fabric

Locating a project within an existing neighborhood and in close proximity to infrastructure encourages more resource-efficient development of land, reduces development costs, conserves energy, and adds to the vitality of the overall community.
2.1  
**Mandatory**  
**Sensitive Site Protection**  
**New Construction**

**Rationale**  
Proper site selection avoids damage to or loss of fragile and scarce environmental resources. It also reduces the risk of building damage from flooding.

**Recommendations**  
Identify all environmental site constraints on a site plan and develop a plan to protect natural resources and structures.

**Requirements**  
Comply with all relevant state and local requirements and do not locate new projects, including buildings, built structures, roads, or parking areas, on portions of sites that meet any of the following provisions:

1. Except for previously developed sites, land within 100 feet of wetlands, including isolated wetlands or streams. Maintain or establish riparian buffer using native vegetation where possible. Unpaved bike and foot paths are allowed if at least 25 feet from the wetlands boundary.
2. Land that is specifically identified as a critical habitat for a threatened or endangered species according to the U.S. Fish and Wildlife Service Critical Habitat for Threatened & Endangered Species Mapper.
3. Land with elevation at or below the 100-year floodplain

**Resources**
  Addresses methods that can help to minimize impacts to the site.

---

2.2  
**Optional – 5 points max**  
**Proximity to Services**  
**New Construction**

**Rationale**  
Compact development encourages more resource-efficient development of land, reduces project costs, and conserves energy. Additionally, it supports demand for other infrastructure such as public transportation and commercial development.
Recommendations
Provide a context map demonstrating that the center of the site is within the required walk distances of an adequate number of services. Google Maps offers a function to demonstrate walk distance. On Google Maps, go to “Directions” and select “Walk Directions” to obtain this information.

Requirements
Locate the project within a 0.25-mile walk distance of at least two or a 0.5-mile walk distance of at least four facilities in the table below:

<table>
<thead>
<tr>
<th>RETAIL</th>
<th>SERVICES</th>
<th>CIVIC AND COMMUNITY FACILITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarket</td>
<td>Bank</td>
<td>Adult or senior care (licensed)</td>
</tr>
<tr>
<td>Other food store with produce</td>
<td>Gym, health club, exercise studio</td>
<td>Child care</td>
</tr>
<tr>
<td>Farmers market</td>
<td>Hair care</td>
<td>Community or recreation center</td>
</tr>
<tr>
<td>Clothing store or department store selling clothes</td>
<td>Laundry, dry cleaner</td>
<td>Cultural arts facility (museum, performing arts)</td>
</tr>
<tr>
<td>Hardware store</td>
<td>Restaurant, café, diner</td>
<td>Educational facility (including K–12 school, university, adult education center, vocational school, community college)</td>
</tr>
<tr>
<td>Pharmacy</td>
<td></td>
<td>Entertainment venue (theater, sports)</td>
</tr>
<tr>
<td>Other retail</td>
<td></td>
<td>Government office that serves public on-site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Place of worship</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medical clinic or office that treats patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Police or fire station</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public library</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public park</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social services center</td>
</tr>
</tbody>
</table>

Resources
- Safe Routes to School National Partnership: [www.saferoutespartnership.org/home](http://www.saferoutespartnership.org/home)

This network of more than 300 nonprofit organizations, government agencies, schools, and professionals works to advance the Safe Routes to School (SRTS) movement in the United States. SRTS can provide a variety of important benefits to children and their communities, including increasing physical activity, reducing traffic congestion, improving air quality, and enhancing neighborhood safety.
Preservation of and Access to Open Space
All Projects

Rationale
Access to open space and natural resources improves quality of life and provides the opportunity to better understand the importance of the natural environment.

Recommendations
• Provide a site plan with total acres and the number of acres of the proposed open space and a narrative for a security, maintenance, and operations plan for the preservation of the open space.
• To calculate open space, deduct buildings, private outdoor areas, streets, and roadways. Open space calculations should not include streets, roadways, or private outdoor areas.
• When deciding which areas to preserve, consult the Open Space Design section of Green Infrastructure Practices chapter of the New York State Department of Conservation Stormwater Management Manual.
• Good design for open space should include at least one pedestrian trail or walkway, and should be improved to the extent necessary for safety.

Requirements
Establish a legally enforceable open space conservation easement for use by tenants that is binding on all future owners of the property for a percentage of the total project acreage: 10% [4 points]; 20% [6 points]; 30% [8 points]; and 40% [10 points].

Resources
• U.S. Environmental Protection Agency, Smart Growth and Open Space Conservation: www.epa.gov/smartgrowth/openspace.htm
• Trust for Public Land: www.tpl.org
  This organization conducts research to acquire knowledge about conservation issues and to improve conservation practices.
• Embrace Open Space, Citizens Resources: www.embraceopenspace.nonprofitoffice.com/
2.4 Optional – 5 points max
Access to Public Transportation
New Construction

Rationale
Projects located near transit reduce occupants’ need to own a car, thereby eliminating or lowering the costs of auto ownership. Transit use reduces related emissions of air pollutants and carbon dioxide.

Recommendations
Use a context map to demonstrate that the center of the site is within the required walk distance of transit options that provide an adequate number of rides per weekday.

Requirements
Locate project within a 0.5-mile walk distance of combined transit services (bus and/or rail) constituting 76 or more transit rides per weekday, and 32 or more transit rides on the weekend. A transit ride is defined as a scheduled stop along a transit defined route.

Resources
- MTA Metro North Railroad, www.mta.info
- Bee-Line Bus, Timetables and Maps
  http://transportation.westchestergov.com/timetables-and-maps
- Google Maps offers a function to demonstrate walk distance. On Google Maps, go to “Directions” and select “Walk Directions” to obtain this information.
  www.maps.google.com
- Reconnecting America: www.reconnectingamerica.org
  This national nonprofit organization provides both the public and the private sectors with a fact-based perspective on development-oriented transit and transit-oriented development. The organization seeks to reinvent the planning and delivery system for building regions and communities around transit and walking rather than solely around the automobile.

2.5 Optional – 10 points max
Smart Site Location: Passive Solar Heating / Cooling
All Projects

Rationale
The utilization of passive solar energy through design minimizes reliance on mechanical heating, lowers the cooling load, and provides more building occupants with access to daylight.
Recommendations

- Interior spaces requiring the most lighting, heating, and cooling should be along the south face of the building.
- A narrow floor plate (less than 40 feet), single-loaded corridors, and an open floor plan optimize daylight and natural ventilation.
- Thermal Massing
  - Locate a material with high thermal mass on the southern portion of the building where sunlight hits during the heating season.
  - Materials with thermal mass include brick, concrete, stone, water, and any other material of a similar high density and specific heat capacity.
  - The thermal mass location must be shown in the schematic wall section of the southern façades.
- Additional Potential Passive Cooling Strategies
  - Plant deciduous shade trees on the south façades.
  - Maximize cross ventilation by installing operable windows at the leeward and windward sides of the building.

Requirements

Demonstrate a project with a passive solar design, orientation, and shading that meets the following guidelines. Documentation must include sun angles, a wall section, and a site plan indicating true north.

<table>
<thead>
<tr>
<th>PROJECT TYPE</th>
<th>POTENTIAL POINTS</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand-alone building</td>
<td>10</td>
<td>Meet all guidelines</td>
</tr>
<tr>
<td>Projects with multiple buildings</td>
<td>2</td>
<td>25% of the gross square feet meet all guidelines</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>50% of the gross square feet meet all guidelines</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>75% of the gross square feet meet all guidelines</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>100% of the gross square feet meet all guidelines</td>
</tr>
<tr>
<td>Moderate or Substantial Rehab</td>
<td>4</td>
<td>All new windows must comply with the windows</td>
</tr>
<tr>
<td>projects</td>
<td></td>
<td>guidelines below</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>All south-facing elevations must comply with shading guidelines</td>
</tr>
</tbody>
</table>

Guidelines

1. Building orientation

Elongate the building on an east–west axis with a minimum ratio of width to depth of 2:1 and orient the east–west axis of the building to be within 20 degrees of true east–west.

2. Glazing

The glazing area on the south-facing façade should be 30% greater than the sum of the glazing areas on the east-, west-, and north-facing façades.
3. Glazing type
Provide windows with U-values and solar heat gain coefficients (SHGC) by orientation that meet the requirements in the following table and map.

4. Shading
For south-facing windows, follow the shading requirements in the following table.

### REQUIREMENTS FOR GLAZING AND SHADING

<table>
<thead>
<tr>
<th>U-FACTOR</th>
<th>MINIMUM SOLAR HEAT GAIN COEFFICIENT</th>
<th>PERCENTAGE OF WINDOWS THAT NEEDS TO BE SHADED BY JUNE 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>0.40</td>
<td>75%</td>
</tr>
</tbody>
</table>

**Resources**

**Optional – 10 points max**

### Brownfield Site

#### All Projects

**Rationale**
Use of brownfields reduces pressure on undeveloped land. Reuse of existing structures reduces the need for new materials.

**Requirements**
Locate the project on a site, part or all of which is documented as contaminated by means of an ASTM E1903-97 Phase II Environmental Site Assessment and remediate site contamination. Submit a letter from the New York State Department of Environmental Conservation stating that the protective measures and / or cleanup are effective, safe, and appropriate for the future use of the site.

**Resources**
- New York State Department of Environmental Conservation, Brownfield Cleanup Program: [http://www.dec.ny.gov/chemical/8450.html](http://www.dec.ny.gov/chemical/8450.html)
• U.S. Environmental Protection Agency, Brownfields Cleanup and Redevelopment: [www.epa.gov/brownfields/index.html](http://www.epa.gov/brownfields/index.html)
  There is information on this site about EPA’s Brownfields Program, including the brownfields law, EPA Brownfields Grants, technical tools and resources, and brownfield projects across the country.

• Municipal Research and Services Center of Washington, Infill Development Strategies for Shaping Livable Neighborhoods: [www.mrsc.org/Publications/textfill.aspx](http://www.mrsc.org/Publications/textfill.aspx)
  This site contains an overview of strategies for encouraging and implementing infill development patterns.

• National Vacant Properties Campaign: [www.vacantproperties.org](http://www.vacantproperties.org)
  This website provides information, resources, tools, and assistance to support vacant property revitalization efforts.

**Optional – 10 points max**

### Access to Fresh, Local Foods

**All Projects**

**Rationale**
Access to fresh produce offers healthy food options for residents and building occupants. This measure also supports local economic development that increases the economic value and production of farmlands and community gardens.

**Recommendations**

- For projects pursuing Option 1a, consider bringing in an individual or group (e.g., master gardener(s) or a garden club) to work with the residents or building occupants to establish the garden and maintain productivity.
- For projects pursuing Option 2 or 3, encourage the farms supplying the produce to accept food stamps.

**Requirements**

**Option 1: Neighborhood Farms and Gardens [10 points]**

a) Dedicate permanent and viable growing space and/or related facilities (such as greenhouses) within the project equal or greater in size to 1 square foot per 50 square feet of the project’s gross floor area. Provide solar access, fencing, watering systems, garden bed enhancements (such as raised beds), secure storage space for tools, and pedestrian access for these spaces. Ensure that the spaces are owned and managed by an entity that includes occupants of the project in its decision making, such as a community group, homeowners’ association, or public body.
Established community gardens outside the project boundary but within a 0.5-mile walk distance of the project’s geographic center can satisfy this option if the garden otherwise meets all of the option requirements.

b) Dedicate permanent and viable growing space and/or related facilities (such as greenhouses) within the project equal or greater in size to 1 square foot per 50 square feet of the project’s gross floor area, and establish an agreement with a local farming operation to farm the land. Ensure in the agreement that at least 50% of the produce is made available for purchase by the project’s occupants. Provide solar access, fencing, watering systems, garden bed enhancements (such as raised beds), and secure storage space for tools.

OR

Option 2: Community-Supported Agriculture [10 points]
Offer a specified location within the project boundaries for delivery of community-supported agriculture (CSA) program shares for occupants, residents, project staff, and surrounding community members, as appropriate. The farm(s) supplying the CSA shares must be within 150 miles of the project site. Shares must be delivered to the specified delivery point on a regular schedule at least twice a month for at least four months of the year.

OR

Option 3: Proximity to Farmers Market [10 points]
Locate the project’s geographic center within a 0.5-mile walk distance of an existing or planned farmers market that is open or will operate at least once a week for at least five months of the year. A planned farmers market must have firm commitments from farmers and vendors that the market will meet all of the above requirements and be in full operation by the time there is 50% occupancy of the project’s gross square footage.

Resources

- Local Harvest: [www.localharvest.org](http://www.localharvest.org)
  This website offers a search function to find farmers markets, family farms, and other sources of local, sustainably grown food in a given area.
  This website links to dozens of publications, programs, and other sites.
Site Improvements

Low impact design and development principles minimize the site’s environmental footprint.
3.1 Mandatory
Environmental Remediation
All Projects

Rationale
The environmental site assessment determines the potential environmental liabilities associated with property acquisition and ownership.

Requirements
Conduct a Phase I Environmental Site Assessment, a Tier II Environmental Review Assessment per HUD funding requirements, an environmental site assessment approved by HUD through the Part 50 or Part 58 process, or an environmental site assessment approved by USDA through the 1940-G or 1794 process, and any additional assessments required to determine whether any hazardous materials are present on-site.

If an environmental site assessment reveals that mitigation is necessary, perform the appropriate mitigation steps and submit a letter from the New York State Department of Environmental Conservation stating that the site is cleaned to their satisfaction.

Resources
- New York State Department of Environmental Conservation, Brownfield Cleanup Program: [http://www.dec.ny.gov/chemical/8450.html](http://www.dec.ny.gov/chemical/8450.html)

3.2 Mandatory
Erosion and sedimentation control
All Projects

Rationale
Erosion and sedimentation control during site development keeps valuable topsoil on-site and reduces pollution, stormwater runoff, and sedimentation associated with construction activities into local waterways. Soils compacted from construction activities are less able to absorb water, resist plant root penetration, and lack the porosity needed for adequate aeration.

Recommendations
Common erosion control measures include:
- Stockpile and protect disturbed topsoil from erosion for reuse.
- Control the path and velocity of runoff with silt fencing or comparable measures.
• Protect on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.
• Provide swales to divert surface water from hillsides.
• If soil in a sloped area is disturbed during construction, use tiers, erosion blankets, compost blankets, filter socks and berms, or some comparable approach to keep soil stabilized.
• Consider opting for one of the following methods — phasing, seeding, grading, protecting on-site vegetation, directing runoff to on-site depressions, or swales. Additionally, the measures that are employed should result in no visible off-site discharge.

Requirements
Implement New York State Department of Environmental Conservation erosion and sedimentation control standards, referring to the DEC document “New York Standards and Specifications for Erosion and Sediment Control”

Resources
• U.S. Environmental Protection Agency, “Storm Water Management for Construction Activities” (EPA 832-R-92-005) may be downloaded from the National Service Center for Environmental Publications at www.epa.gov/nscep/ or purchased as item PB 922 359 51 from the National Technical Information Service at www.ntis.gov
• CPESC™ Inc.: www.cpesc.net
  Search the directory on this website to find certified erosion and sedimentation control professionals in New York State.

Mandatory
Landscaping
All Projects

Rationale
Native and adaptive plants are well suited to the climate and provide excellent erosion, sediment, dust, and pollution control. Native and adaptive plants are more resistant to naturally occurring disease, insects, and low levels of nutrients, thereby reducing or eliminating the need for fertilizers, pesticides, or herbicides.

Recommendations
• Consider “naturescaping,” a landscaping strategy that conserves water and reduces runoff while providing habitat for beneficial insects, birds, and other wildlife.
• Consult the Cornell Cooperative Extension of Westchester County or a local arborist and consider involving a landscape architect in the architectural design process to identify appropriate areas for landscaping and shading.

• Consider integrating the landscape plan with the stormwater management plan to provide water and drainage that is complementary with plants.

• While turf may be appropriate for some landscaping, such as for play areas, it should be minimized wherever possible.

• The project team should strive to use only organic and non-toxic fertilizers, pesticides, herbicides, fungicides, and pre-emergents.

Requirements
Provide plants (including trees, shrubs, and groundcover) such that at least 50% of the area available for landscaping is planted with native or adaptive species. Also, all new plants must be appropriate to the site’s soil and microclimate, and none of the new plants should be invasive species. For a list of acceptable plants for New York, please visit: http://www.wildflower.org/plants/

Resources
• Cornell Cooperative Extension of Westchester County, http://counties.cce.cornell.edu/westchester/index.htm

• U.S. Environmental Protection Agency, GreenScapes: http://www.epa.gov/epawaste/conserve/tools/greenscapes/index.htm
  This “naturescaping” program provides cost-efficient and environmentally friendly solutions for landscaping. Designed to help preserve natural resources and prevent waste and pollution, GreenScapes encourages holistic decisions regarding waste generation and disposal and the associated impacts on land, water, air, and energy use.

  Lists of local drought-tolerant plants may be available from local USDA Agricultural Cooperative Extension System offices, as well as through numerous online resources.

• Native Plant Information Network: www.wildflower.org/explore/
  The site, maintained by the Lady Bird Johnson Wildflower Center, includes a database of native wildflowers, plants, and landscapes throughout North America. The website also includes a National Suppliers Directory.

• USDA National Invasive Species Information Center: www.invasivespeciesinfo.gov/plants/main.shtml
  As part of the USDA’s National Agricultural Library, NISIC serves as a reference gateway to information, organizations, and services about invasive species.

• U.S. Forest Service “Celebrating Wildflowers”: http://www.fs.fed.us/wildflowers/
This site has extensive information on native gardening, selecting appropriate native plants, and invasive plant species, and has basic instructions for restoration and native landscaping projects.

### 3.4 Mandatory

#### Efficient Irrigation and Water Reuse

**All Projects**

**Rationale**

Accurate delivery of water reduces evaporation and eliminates overspray. Proper scheduling eliminates fluctuations between wet and dry states that stress plants.

**Recommendations**

Use high-efficiency irrigation nozzles with an average distribution uniformity (DU) of at least 0.70. This may include conventional rotors, multi-stream rotors, or high-efficiency spray heads, but the DU must be verified by manufacturer documentation or third-party tests.

**Requirements**

If irrigation is utilized, install an efficient irrigation or water reuse system. These irrigation requirements are mandatory only for permanent landscaping that requires regular irrigation.

**Option 1**

An efficient irrigation system must include the following at a minimum:

- a drip irrigation system for at least 50% of landscape planting beds
- separately zoned turf and each type of bedding area, based on watering needs
- a timer /controller that activates the valves for each watering zone at the best time of day to minimize evaporative losses while maintaining healthy plants and obeying local regulations and water-use guidance
- a moisture sensor controller or rain delay controller

**Option 2**

Reuse water for irrigation from one of the following sources:

- treated greywater
- rainwater, collected from the roof or site

For all projects, watering tubes for trees are allowed for a period of two years.

**Resources**

- American Society of Landscape Architects (ASLA): [www.asla.org](http://www.asla.org)
ASLA is the national professional association representing landscape architects. Their site provides information about members, products, services, publications, and events.

- U.S. Environmental Protection Agency, WaterSense: [http://www.epa.gov/watersense/](http://www.epa.gov/watersense/)
  This site provides information on the EPA WaterSense labeling program for water-efficient landscape irrigation products, plus tips and recommendations for water-efficient irrigation. Follow the link to *Weather- or Sensor-Based Irrigation Control Technologies* for related information on high-efficiency irrigation controllers.

  This manual provides information about reducing water consumption through creative landscaping techniques.

  This clearinghouse provides articles, reference materials, and papers on all forms of water efficiency.

### Optional – 16 points max

#### Surface Stormwater Management

**All Projects**

**Rationale**
Reducing or eliminating stormwater runoff through design and management techniques increases on-site filtration, reduces total suspended solids (TSS) and other pollutants from entering waterways, and reduces soil erosion. Water storage and nutrient collection processes reduce the need for irrigation and contribute to forming a healthier ecological community within the landscape.

**Recommendations**

- Strive to minimize impervious areas (surfaces that do not allow stormwater infiltration), including roofs, driveways, sidewalks, and streets, or use porous materials for such areas.
- Consult the New York State Department of Environmental Conservation Stormwater Management Design Manual which provides detailed guidance regarding green infrastructure practices and runoff reduction.

**Requirements**
Comply with the New York State Stormwater Management Design Manual requirements for the following green infrastructure techniques:
• Sheetflow to Riparian Buffers or Filter Strips - [2 points]
• Vegetated Swale - [2 points]
• Tree Planting / Tree Pit - [2 points]
• Rain Gardens - [2 points]
• Green Roofs - [2 points]
• Stormwater Planters - [2 points]
• Rain Barrels and Cisterns - [2 points]
• Porous Pavement - [2 points]

Resources
• New York State, Department of Environmental Conservation, New York State
  Stormwater Management Design Manual:
  http://www.dec.ny.gov/chemical/29072.html
• U.S. Environmental Protection Agency, Low-Impact Development Design Strategies:
  An Integrated Design Approach:
  http://water.epa.gov/polwaste/green/upload/lidnatl.pdf
• National Association of Home Builders Research Center ToolBase Services:
  Permeable Pavement: www.toolbase.org/Technology-
  Inventory/Sitework/permeable-pavement
  In a resource provided through a partnership with the Department of Housing and
  Urban Development, the Partnership for Advancing Technology in Housing, and the
  National Association of Home Builders Research Center, this site provides details,
  lists of manufacturers, and related information on permeable paving options.
Water Conservation

Water conservation translates into direct utility savings for residents and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities.
4.1
Mandatory
Water-conserving Fixtures
All Projects

Rationale
Water conservation translates into direct utility savings for residents, tenants and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities.

Recommendations
• Certain existing fixtures, such as bathroom faucets, can be retrofitted with an aerator to reduce water flow to the requisite level.
• Dual-flush toilets typically have an average flow rate calculated and provided by the manufacturer. However, if this information is not available, use a 2:1 ratio to determine the average flow rate.

For example, with a dual-flush toilet that has a 0.8 low-volume flush to a 1.6 high-volume flush, the calculation would be:

\[
\frac{0.8}{1.6} \times \frac{2}{1} \div 3 = 1.067 \text{ average gpf}
\]

• For projects using bathtubs rather than showers, the tub faucet is exempt from this measure.
• Consider conducting a WaterSense water pressure test at the street level, given that a project’s water pressure and the distance between the source of water and the fixture(s) may allow a fixture to release more or less water than its rating indicates.

Requirements
Install water-conserving fixtures with the following specifications:
• Toilets — 1.28 gpf (gallons per flush) or less, including dual-flush toilets and pressure-assisted toilets (Note that there are both dual-flush and single-flush models of 1.28 gpf toilets available.)
• Urinals — 0.5 gpf or less
• Showerheads — 2.0 gpm (gallons per minute) or less
• Kitchen faucets — 2.0 gpm or less
• Bathroom faucets — 1.5 gpm or less

Resources
• Not all high-efficiency toilets operate equally well, and poor design can lead to ineffective flushing and the need for multiple flushes. The EPA’s WaterSense program certifies toilets that achieve both water efficiency and operational effectiveness. The WaterSense label identifies high-efficiency products that have
been verified for performance. WaterSense currently has a specification for high-efficiency toilets and bathroom faucets, and specification for showerheads is under development. Information is available at: [www.epa.gov/owm/water-efficiency](http://www.epa.gov/owm/water-efficiency)


The MaP™ testing project was initiated in 2003 to test toilet models’ performance. This testing protocol simulates real-world use to help consumers identify high-efficiency toilets that not only save water but also work well. The current MaP testing report provides performance information on 470 toilet models. This site provides access to the complete listings of the tested toilets.

### 4.2 Optional – 10 points max

**Advanced Water-Conserving Appliances and Fixtures**

**All Projects**

**Rationale**

Water conservation translates into direct utility savings for residents, tenants and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities.

**Recommendations**

- Certain existing fixtures, such as bathroom faucets, can be retrofitted with an aerator to reduce water flow to the requisite level.

- Dual-flush toilets typically have an average flow rate calculated and provided by the manufacturer. However, if this information is not available, use a 2:1 ratio to determine the average flow rate.

\[
\text{low flow volume rate} \times \frac{2}{1} \div 3 = \text{average flow rate}
\]

For example, with a dual-flush toilet that has a 0.8 low-volume flush to a 1.6 high-volume flush, the calculation would be:

\[
\frac{0.8}{1.6} \times \frac{2}{1} \div 3 = 1.067 \text{ average gpf}
\]

- For projects using bathtubs rather than showers, the tub faucet is exempt from this measure.
Consider conducting a WaterSense water pressure test at the street level, given that a project’s water pressure and the distance between the source of water and the fixture(s) may allow a fixture to release more or less water than its rating indicates.

Requirements
Install water-conserving fixtures with the following specifications. Inclusion of each type of fixture is worth the following optional points:

- **Option 1 [4 points]**: All toilets — 1.2 gpf (gallons per flush) or less
- **Option 2 [3 points]**: All showerheads — 1.5 gpm (gallons per minute) or less
- **Option 3 [3 points]**: All faucets for kitchens and bathrooms
  - Kitchen faucets — 1.5 gpm or less
  - Bathroom faucets — 0.5 gpm or less

Substantial and Moderate Rehab projects can replace or retrofit all fixtures to meet the flow rates above to achieve these optional points.

Resources
- Not all high-efficiency toilets operate equally well, and poor design can lead to ineffective flushing and the need for multiple flushes. The EPA’s WaterSense program certifies toilets that achieve both water efficiency and operational effectiveness. The WaterSense label identifies high-efficiency products that have been verified for performance. WaterSense currently has a specification for high-efficiency toilets and bathroom faucets, and specification for showerheads is under development. Information is available at: [www.epa.gov/owm/water-efficiency](http://www.epa.gov/owm/water-efficiency)
  The MaP™ testing project was initiated in 2003 to test toilet models’ performance. This testing protocol simulates real-world use to help consumers identify high-efficiency toilets that not only save water but also work well. The current MaP testing report provides performance information on 470 toilet models. This site provides access to the complete listings of the tested toilets.

### Optional – 5 points max

**Water Reuse**
All Projects

**Rationale**
Rainwater and greywater reuse strategies reduce the need for municipal water supplies and sewage treatment.
Recommendations

- Rainwater can be harvested from impervious surfaces such as roofs and carried via gutters and downspouts to a storage tank or cistern where it can be treated or filtered.
- Greywater may be stored and treated for non-potable uses such as toilet flushing and irrigation.
- Rainwater and greywater systems are subject to state, county and local regulations and special requirements.

Requirements

Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project’s water needs.

To achieve optional points, provide the defined percentage of the project’s total water needs through rainwater and/or greywater (using either one or a combination of both strategies).

Total water needs include all exterior and interior water use.

<table>
<thead>
<tr>
<th>TOTAL WATER NEEDS SUPPLIED BY RAINWATER AND/OR GREYWATER</th>
<th>NUMBER OF OPTIONAL POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>2 points</td>
</tr>
<tr>
<td>20%</td>
<td>3 points</td>
</tr>
<tr>
<td>30%</td>
<td>4 points</td>
</tr>
<tr>
<td>40%</td>
<td>5 points</td>
</tr>
</tbody>
</table>

Resources

  This clearinghouse provides articles, reference materials, and papers on water recycling, greywater, and rainwater reuse.
- International Living Building Institute, Achieving Water Independence in Buildings: [https://ilbi.org/education/reports/oregon](https://ilbi.org/education/reports/oregon)
  This downloadable publication explains water reuse systems and regulatory barriers, and provides information for those wishing to explore the possibilities of water reuse in buildings and to reform limiting regulation.
Energy Efficiency

Improvements in building energy performance result in utility cost savings from more efficient heating, cooling, hot water, lights and appliances, which improves residents’ comfort and lowers operating costs.
5.1a

**Mandatory**

**Building Performance Standard: Multifamily**

**New Construction, three stories or fewer**

**Rationale**

ENERGY STAR–qualified homes are independently verified to be energy efficient and durable. These high-performance homes achieve energy savings in heating, cooling, hot water, lighting, and appliance efficiencies, which improve resident comfort, reduce operating costs, and decrease greenhouse gas emissions.

**Recommendations**

- **ENERGY STAR New Homes Version 3** is designed to be at least 15% more stringent than the 2009 IECC for low-rise multifamily residential structures under four stories. Multifamily residential buildings that are four or five stories and have their own heating, cooling, and hot water systems, separate from other units, may also qualify for ENERGY STAR. Residential buildings can achieve this by using a prescriptive or a performance path.
- For the prescriptive path, projects must meet the ENERGY STAR Reference Design, a set of design specifications compiled by ENERGY STAR.
- For the performance path, projects will utilize the ENERGY STAR Reference Design and a Size Adjustment Factor to determine an ENERGY STAR HERS Index Target for each home.
  - The baseline building performance standard can only be met through building performance improvements, and not through the addition of electric-generating renewable energy systems. Other “renewable” technologies such as solar domestic hot water collectors and geothermal H/AC systems (ground source heat pumps) can be included.
- Under ENERGY STAR Version 3, both paths are required to complete the “Thermal Enclosure System Rater Checklist,” as well as:
  - HVAC System Quality Installation Contractor Checklist
  - HVAC System Quality Installation Rater Checklist
  - Water Management System Building Checklist (or Indoor airPLUS Verification Checklist)
- During the design phase, work with a qualified Home Energy Rater to set energy efficiency goals that comply with ENERGY STAR Version 3. After the project team has decided on an “energy package,” build the finalized building performance threshold and measures into the project plans and specs, work with the HERS Rater to create and implement a verification plan during the construction processes, and conduct building performance tests post-construction.
- ENERGY STAR Version 3 offers a sampling protocol that allows a builder with a large volume of projects to qualify a group of new homes to meet ENERGY STAR guidelines based on pre-analysis of building plans and subsequent random testing and inspections of a sample set of the homes as-built. For more information on the
U.S. EPA sampling protocols, see the adopted 2006 Enhancements to National Home Energy Ratings Standards at www.resnet.us/standards/sampling_standard.pdf

Requirements
Certify the project under ENERGY STAR New Homes Version 3. See the “Recommendations” section for additional information on the registration timeline and pathways for projects to achieve ENERGY STAR.

The following project types are subject to this requirement:

- Units in multifamily buildings that are three stories or fewer
- Units in multifamily buildings that are four or five stories and have their own heating, cooling, and hot water systems, separate from other units

Resources

- For more information regarding ENERGY STAR standards: www.energystar.gov/homes
- To identify a Home Energy Rater in your area visit www.energystar.gov/index.cfm?fuseaction=new_homes_partners.locator or call the ENERGY STAR toll-free hotline: 888.STAR.YES
- The EPA provides additional guidance for qualifying units in multifamily buildings (including buildings with four or five stories): www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_multifamily_units

5.1b

Mandatory
Building Performance Standard: Multifamily
New Construction, four stories or more

Rationale
Buildings meeting the Multifamily Performance Program are designed to be energy efficient and durable. These high-performance buildings achieve energy savings in heating, cooling, hot water, lighting, and appliance efficiencies, which improve resident comfort, reduce operating costs, and decrease greenhouse gas emissions.

Recommendations

- Enroll in the NYSERDA MPP program in the early design stage: http://www.nyserda.ny.gov/Energy-Efficiency-and-Renewable-Programs/Multifamily-Performance-Program/Multifamily-Performance-Program/New-Construction.aspx
- Projects participating in the NYSERDA MPP program are designed to perform at least 15% better than ASHRAE 90.1-2010.
• Identify a qualified professional with experience performing energy modeling per ASHRAE Standard 90.1, Appendix G. In the early design stage, the qualified professional should prepare the energy model and work with the integrative design team to identify cost effective strategies for meeting the performance target.
• Take advantage of Incentives that may be available through NYSERDA MPP.

Requirements
Projects must demonstrate compliance with the New York State Energy Research and Development Authority’s (NYSERDA) Multifamily Performance Program (MPP).

Resources
• To enroll in the New York State Energy Research and Development Authority (NYSERDA), Multifamily Performance Program (MPP), visit: http://www.nyserda.ny.gov/Energy-Efficiency-and-Renewable-Programs/Multifamily-Performance-Program/Multifamily-Performance-Program/New-Construction.aspx

5.1c
Mandatory
Building Performance Standard: Multifamily
Substantial Rehab, three stories or fewer

Rationale
Buildings rehabilitated to a HERS Index of 85 will achieve approximately 2009 IECC energy performance levels in heating, cooling, hot water, lighting, and appliance efficiencies, which improve resident comfort, reduce operating costs, and decrease greenhouse gas emissions.

Recommendations
• To demonstrate energy performance equivalent to a HERS Index 85, contract with a certified Home Energy Rater (HERS). The HERS rater will perform energy modeling and generate the HERS certificate.
• The HERS rater will be responsible for:
  – creating an energy model to the building plans and specified building plans and specifications to show the building’s projected energy performance in the design stage
  – conducting a mid construction pre-drywall thermal enclosure, using the ENERGY STAR version 3 “Thermal Enclosure System Rater Checklist”
  – verifying the final performance of the building with post-construction performance testing, including a blower door and duct blaster test of the home and/or units
• The energy rating software used must be accredited by RESNET.
• Any method or strategy (except for electric-generating renewable energy systems) can be implemented to satisfy the targeted minimum energy performance.
• If rehabilitating a multifamily low-rise building, generate a HERS certificate for each unique floorplan within the project or subdivision.

Requirements
Demonstrate that the energy performance of the completed building is equivalent to a HERS Index of 85 through energy modeling that generates a Home Energy Rating certificate.

Resources
• New York State Energy Research and Development Authority: http://www.nyserda.ny.gov/
  This fact sheet describes the importance of sealing air leaks and providing controlled ventilation.
• To identify a Home Energy Rater in your area visit www.energystar.gov/index.cfm?fuseaction=new_homes_partners.locator or call the ENERGY STAR toll-free hotline: 888.STAR.YES
• Enterprise Green Communities Neighborhood Stabilization Program: www.greenbuildingadvisor.com/green-communities-nsp
  Enterprise and BuildingGreen have partnered to offer technical resources that build on Enterprise’s Green Rehabilitation Specifications. These resources are largely focused on the application of building science concepts that are critical to a building’s performance.
  This site provides a set of guidelines regarding combustion safety when conducting audits and diagnostic testing.
• Residential Energy Services Network (RESNET): www.resnet.us
  A resource where residents can learn about the energy audit and rating process and search the RESNET directory to find certified energy auditors and raters.
Mandatory

Building Performance Standard: Multifamily
Substantial Rehab, four stories or more

Rationale
Buildings rehabilitated to ASHRAE 90.1-2010 achieve energy savings in heating, cooling, hot water, lighting, and appliance efficiencies, which improve resident comfort, lower operating costs, and decrease greenhouse gas emissions.

Recommendations
- To demonstrate energy performance equivalent to ASHRAE 90.1-2010, contract with an energy services provider. The energy services provider will be responsible for:
  - creating an energy model with the building plans and specifications to show the building’s projected energy performance in the design stages
  - conducting a mid-construction pre-drywall thermal enclosure inspection
  - verifying the final performance of the building with performance testing
- The energy services provider must use an energy rating software from the following list:
  - DOE2
  - eQuest
  - VisuaslDOE
  - EZDOE
  - TRACE
  - HAP
  - TRNSYS
  - EnergyPlus
- The project does not have to follow the code requirements of the ASHRAE 90.1 2010; it is only required to meet the minimum energy performance target that was calculated from the energy model. Any method or strategy (except for electric-generating renewable energy systems) can be implemented to satisfy the targeted minimum energy performance.

Requirements
Demonstrate that the energy performance of the completed building will be equivalent to ASHRAE 90.1-2010 using an energy model created by a qualified energy services provider.

This performance requirement can only be met through building performance improvements, and not through the addition of electric-generating renewable energy systems.
5.1e

**Mandatory**

**Building Performance Standard: Non-Residential Buildings**

**New Construction and Substantial Rehab**

**Rationale**

Buildings meeting 15% above ASHRAE 90.1-2010 energy performance levels achieve energy savings in heating, cooling, hot water, lighting, and appliance efficiencies, which improve occupant comfort, lower operating costs, and decrease greenhouse gas emissions.

**Recommendations**

- To demonstrate energy performance equivalent to 15% above ASHRAE 90.1-2010, contract with an energy services provider. The energy services provider will be responsible for:
  - creating an energy model with the building plans and specifications to show the building’s projected energy performance in the design stages
  - conducting a mid-construction pre-drywall thermal enclosure inspection
  - verifying the final performance of the building with performance testing
- The energy services provider must use an energy rating software from the following list:
  - DOE2
  - eQuest
  - VisualDOE
  - EZDOE
  - TRACE
  - HAP
  - TRNSYS
  - EnergyPlus
Requirements
Demonstrate that the energy performance of the completed building will be equivalent to 15 percent above ASHRAE 90.1-2010 using an energy model created by a qualified energy services provider.

This performance requirement can only be met through building performance improvements, and not through the addition of electric-generating renewable energy systems.

Resources
- For more information on ASHRAE 90.1-2010: [www.ashrae.org](http://www.ashrae.org) or 800.527.4723

5.1f

**Mandatory**

**Building Performance Standard: Moderate Rehab Projects**

**Moderate Rehab**

Rationale
 Moderate rehab projects meeting the 2010 Energy Conservation Construction Code of New York State achieve energy savings which improve occupant comfort, lower operating costs, and decrease greenhouse gas emissions.

Recommendations
Review the 2010 Energy Conservation Construction Code of New York State.

Requirements
The moderate rehabilitation of an existing building, building system or portion thereof shall conform to the provisions of 2010 Energy Conservation Construction Code of New York State as such provisions relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with the 2010 Energy Conservation Construction Code of New York State.

**Exception:** The following need not comply with this code, provided the energy use of the building is not increased:
1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.

Resources
- New York State Energy Research and Development Authority: http://www.nyserda.ny.gov/
- U.S. Department of Energy, Air Sealing, Technology Fact Sheet: http://web.ornl.gov/sci/roofs+walls/insulation/fact%20sheets/Air%20sealing%20technology%20fact.pdf This fact sheet describes the importance of sealing air leaks and providing controlled ventilation.
- For more information on ASHRAE 90.1-2010: www.ashrae.org or 800.527.4723

**5.2**

**Optional – 15 points max**

**Additional Reductions in Energy Use**

**New Construction and Substantial Rehab**

**Rationale**

Improvements in building energy performance result in utility cost savings from more efficient heating, cooling, hot water, lights and appliances, which improve residents comfort, lower operating costs, and decrease greenhouse gas emissions.

**Recommendations**

- Go above and beyond by building to Passive House standards.
- Using the baseline energy model created in 5.1a – 5.1e, analyze and adopt energy improvements to achieve additional energy reductions beyond the mandatory levels.
- Projects that use a prescriptive path for 5.1a – 5.1e will not be able to obtain points under this credit.
- Additional reductions in energy use must be captured by energy conservation measures associated with improved building component systems, and not through the addition of electric-generating renewable energy systems.

**Requirements**

**5.2a. New Construction — Multifamily Buildings** (three stories or fewer): 1 point for each additional 1 point decrease in the targeted HERS Index as outlined in 5.1a

**5.2b. New Construction—Multifamily Buildings** (four stories or more): 1 point for each additional 1% energy improvement from the required energy performance target calculated in 5.1b

**5.2c. Substantial Rehab — Multifamily Buildings** (three stories or fewer): 1 point for each additional 1 point decrease in the targeted HERS Index as outlined in 5.1c.
5.2d. **Substantial Rehab — Multifamily Buildings** (four stories or more): 1 point for each additional 1% energy improvement from the required energy performance target calculated in 5.1d

5.2e. **New Construction and Substantial Rehab – Non-residential buildings**: 1 point for each additional 1% energy improvement from the required energy performance target calculated in 5.1e

**Resources**
- Projects can reference the Passive House Institute US standard as a means to go above and beyond in energy performance. Information about Passive House concepts and standards can be found at: [www.passivehouse.us](http://www.passivehouse.us)
- The Building America program offers free research publications, webinars, and newsletters on cost-effective, energy efficient building strategies: [http://energy.gov/eere/buildings/building-america-bringing-building-innovations-market](http://energy.gov/eere/buildings/building-america-bringing-building-innovations-market)

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### 5.3 **Mandatory**

**Sizing of Heating and Cooling Equipment**

**All Projects**

**Rationale**

Appropriately sized equipment can save money, ensure adequate dehumidification, and prevent short-cycling that can lead to excess moisture in the air.

**Recommendations**
- The HVAC design professional generates a Manual J load calculation to ensure proper sizing of the cooling system. This calculation accounts for factors such as the home’s orientation with respect to the sun, window design and insulation R-value, installation quality, and building air leakage. The design professional can use one of the HVAC industry-adopted software programs, based upon Manual J, which assists with these designs. Consult [www.acca.org](http://www.acca.org) for a list of software programs to perform Manual J calculations.
- Consider locating air handler and ductwork within the building envelope. Do not locate air handler or ductwork within the garage space.

**Requirements**

Size heating and cooling equipment in accordance with the Air Conditioning Contractors of America (ACCA) Manuals, Parts J and S, or ASHRAE handbooks.

**Resources**
The site also includes links to various articles and other ANSI and ACCA standards.
This site provides an overview of good practices for designing and installing the HVAC system, as well as detailed strategies and measures for the “house as a system” approach to construction.
• For additional information on duct sealing details: www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_ducts

5.4 Mandatory
Energy Star Appliances
All Projects

Rationale
ENERGY STAR products meet strict energy-efficiency criteria set by EPA. These products reduce utility costs and greenhouse gas emissions.

Recommendations
The specifications of the installed appliances should be reflected in the energy modeling building input data report.

Requirements
If providing appliances, install ENERGY STAR–labeled clothes washers, dishwashers, and refrigerators.

Resources
• For bulk orders of ENERGY STAR products, use the web-based purchasing tool “Quantity Quotes”: www.quantityquotes.net
  This site connects purchasing groups with suppliers.
• When preparing project specifications, find ENERGY STAR product information, including model numbers, at https://www.energystar.gov/index.cfm?c=product_specs.pt_product_qpi
**Rationale**

Energy reductions through efficient lighting products contribute to lower utility costs and lower greenhouse gas emissions.

**Recommendations**

- The ENERGY STAR ALP requires that a minimum of 60% ENERGY STAR–qualified fixtures and 100% ENERGY STAR–qualified ceiling fans and ceiling fans with lighting are installed.
- Screw-in adapters that convert incandescent light sockets into pin-type sockets can be used to meet the requirement.

**Requirements**

**New Construction — Multifamily and Non-Residential Buildings** (three stories or fewer): Install the ENERGY STAR Advanced Lighting Package (ALP) in all buildings. ENERGY STAR–qualified LED fixtures can qualify in the place of ENERGY STAR–labeled fixtures. Fixtures with screw-base lamps are permitted only in unoccupied spaces such as closets and storage areas.

**New Construction — Multifamily and Non-Residential Buildings** (four stories or more): Projects must follow the ENERGY STAR MFHR program guidelines, which require that 80% of installed light fixtures within units must be ENERGY STAR qualified or have ENERGY STAR–qualified lamps installed. Fixtures with screw-base lamps are permitted only in uninhabited spaces such as closets and storage areas.

**Substantial and Moderate Rehab – All buildings**: If being replaced, new fixtures and ceiling fans are required to meet or exceed ENERGY STAR efficiency levels. If reusing existing fixtures in a rehab, projects must install screw-in compact fluorescent light bulbs (CFLs).

**Resources**

  This site includes complete information on EPA’s ALP specifications and requirements, along with extensive technical resources, qualified product and manufacturer lists and locators, case studies, and marketing support resources.
- For more information on lighting: [www.energystar.gov](http://www.energystar.gov)
- The Lighting Research Center: [www.lrc.rpi.edu/](http://www.lrc.rpi.edu/)
This university-based, independent lighting research and education group provides objective and timely information about lighting technologies and applications, and about human response to light.

**Mandatory**

### 5.5b Efficient Lighting: Common Areas and Emergency Lighting

#### All Projects

**Rationale**

Energy reductions through efficient lighting products contribute to lower utility costs and lower greenhouse gas emissions.

**Requirements**

**Common Area Lighting**

**New Construction - Multifamily and Non-Residential Buildings:** Projects should use ENERGY STAR–labeled fixtures, LEDs, T8 fixtures with electronic ballasts or better, or any equivalent high-performance lighting fixtures and bulbs in all common areas. Non-apartment spaces, except those intended for 24-hour operation, or where automatic shutoff would endanger the safety of the occupants, must have occupancy sensors or automatic bi-level lighting controls. Projects following the ENERGY STAR MFHR prescriptive path must install fixtures that meet the following requirements: 80% of installed fixtures in common spaces must be ENERGY STAR–qualified or have ENERGY STAR–qualified lamps installed.

**Substantial and Moderate Rehab – All buildings:** If being replaced, new common space and emergency lighting fixtures must be ENERGY STAR–labeled fixtures, LEDs, T8 fixtures with electronic ballasts or better, or any equivalent high-performance lighting fixtures and bulbs.

If reusing existing fixtures in a rehab, projects must install screw-in compact fluorescent light bulbs (CFLs) where applicable.

**Emergency Lighting**

**All Buildings:** If installing new or replacing, all exit signs shall meet or exceed LED efficiency levels and conform to local building codes; fixtures located above stairwell doors and other forms of egress shall contain a battery backup feature.
5.5c Mandatory
Efficient Lighting: Exterior
All Projects

Rationale
Energy reductions through efficient lighting products contribute to lower utility costs and lower greenhouse gas emissions.

Recommendations
Design outdoor lighting to eliminate light trespass from the project site and to minimize impact on nocturnal environments.

Requirements
Install ENERGY STAR qualified fixtures or LEDs with a minimum efficacy of 45 lumens/watt or have ENERGY STAR–qualified lamps installed.
- Fixtures should include automatic switching on timers or photocell controls for all lighting not intended for 24-hour operation or required for security.
- All fixtures must be full cut-off fixtures that shield light pollution from the night sky.

Resources
- Full Cut-off Dark Sky Approved Fixtures: [www.darksky.org](http://www.darksky.org)

5.6a Mandatory
Electricity meter
New Construction and Substantial Rehab

Rationale
Providing information to residents or occupants on the cost and usage associated with the electricity consumption in their unit may reduce energy use.

Recommendations
Individual metering and/or sub-metering should be specified in the Integrative Design stage.

Requirements
Install individual or sub-metered electric meters in all dwelling units or tenant spaces.
5.6b  
**Optional – 5 points max**

**Electricity meter**  
**Moderate Rehab**

**Rationale**  
Providing information to residents or occupants on the cost and usage associated with the electricity consumption in their unit may reduce energy use.

**Recommendations**  
Individual meters or sub-meters should be specified in the Integrative Design stage.

**Requirements**  
Install individual or sub-metered electric meters in all dwelling units or tenant spaces.

5.7a  
**Optional – 12 points max**

**Renewable Energy**  
**All Projects**

**Rationale**  
Renewable energy reduces environmental impacts such as greenhouse gas emissions that are associated with energy sourced and produced from fossil fuels. Use of on-site renewable energy technologies can also result in energy cost savings.

**Recommendations**  
- When calculating points for 5.7a, use the total energy consumption of the building(s) estimated in the energy model for 5.1a – 5.1e.
- Projects that use a prescriptive path for 5.1a – 5.1e will not be able to obtain points under 5.7a.
- For moderate rehab projects, use three consecutive years of electricity bills to establish the baseline.
- To provide a higher percentage of the project’s estimated annual energy consumption with electric-generating renewable energy sources, focus on reducing the building’s overall energy consumption in 5.1a – 5.1e and 5.2 with energy-efficiency measures. Energy-efficiency measures are generally more cost-effective than renewables.

**Requirements**  
Install photovoltaic (PV) panels, wind turbines, or other electric-generating renewable energy source to provide a specified percentage of the project’s estimated energy demand. Refer to the table below for the point structure.
### Resources

- **American Solar Energy Society:** [www.ases.org](http://www.ases.org)
  ASES is a nonprofit organization committed to a sustainable energy economy. ASES accelerates the development and use of solar and other renewable energy resources through advocacy, education, research, and collaboration among professionals, policymakers, and the public.

- **American Wind Energy Association:** [www.awea.org](http://www.awea.org)
  AWEA is a national trade association representing wind power plant developers, wind turbine manufacturers, utilities, consultants, insurers, financiers, researchers, and others involved in the wind industry.

- **Database of State Incentives for Renewable Energy:** [www.dsireusa.org](http://www.dsireusa.org)
  The North Carolina Solar Center developed this database to collect information on state financial and regulatory incentives (e.g., tax credits, grants, and special utility rates) designed to promote the application of renewable energy technologies. DSIRE also offers additional features, such as preparing and printing reports that detail the incentives on a state-by-state basis.

- **National Renewable Energy Laboratory:** [www.nrel.gov/ncpv](http://www.nrel.gov/ncpv)
  NREL photovoltaic research provides a clearinghouse on all aspects of photovoltaic solar cell systems.

- **National Renewable Energy Laboratory:** [www.nrel.gov](http://www.nrel.gov)
  NREL is a leader in the U.S. Department of Energy’s effort to create a secure energy future for the nation that is environmentally and economically sustainable.


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### 5.7b Optional – 5 points max

**Photovoltaic / Solar Hot Water Ready All Projects**

#### Rationale

Designing for the future installation of photovoltaic or solar hot water systems allows a building owner the flexibility to transition to increased energy generation through renewable energy sources, as resources become available. Installation of renewable energy systems is a hedge against rising costs for purchased energy.

#### Recommendations

- When designing a photovoltaic or solar hot water ready system, include the following in the project plans and specifications (as applicable to each technology):
- Site map showing that the building(s) have a southern orientation and unobstructed access to sunlight
- A design schematic of the future solar array, indicating the south face, slope, and any rooftop equipment that could obstruct the array
- The type of roof to be installed (e.g., asphalt, standing seam metal, tile)
- The future location within the building for the inverter

- For solar hot water, run piping from the designed or current location of the water heater up to the prospective solar hot water collectors.
- Check the zoning laws to ensure that future buildings will not be able to shade your array.
- Work with an engineer to calculate that the roof can carry the dead load of the solar equipment and withstand the wind loads.
- Determine if the roof has a warranty and if the placement of the solar equipment voids the warranty.
- General contractor, PV, and/or solar hot water contractor must document the information on the roof load, location of conduit, piping, and the potential location of the dash box. GC, PV, and solar hot water contractor should provide documentation to building owner and manager.
- The first cost of PV can be high, but grants and subsidies may be available through Con Edison or NYSERDA.

Requirements
Site, design, engineer, and/or plumb the development to accommodate installation of photovoltaic (PV) or solar hot water system in the future.

Minimum required south-facing exposure:
- **Low-Rise Buildings:** 250 square feet of unobstructed roof area that is oriented within 15 degrees of true south
- **Mid- and High-Rise Buildings:** \( \geq 30\% \) of unobstructed roof area or maximum that is oriented within 15 degrees of true south

Resources
  [www.nrel.gov/docs/fy10osti/46078.pdf](http://www.nrel.gov/docs/fy10osti/46078.pdf)
  A paper published by NREL in December 2009 that details design guidelines and checklists for designing solar-ready buildings.
- Database of State Incentives for Renewables & Efficiency: [www.dsireusa.org](http://www.dsireusa.org)
  The North Carolina Solar Center developed this database to collect information on state financial and regulatory incentives (e.g., tax credits, grants, and special utility rates) designed to promote the application of renewable energy technologies. DSIRE also offers additional features, such as preparing and printing reports that detail the incentives on a state-by-state basis.
Rationale
Installation of smart meters allows for more control over a project’s electricity use, to realize savings associated during off-peak times. Education on energy consumption habits will allow residents, building staff, and owners to fully realize the environmental and economic benefits that green housing offers.

Requirements
Site, design, engineer, and wire the development to accommodate installation of smart meters and /or be able to interface with smart grid systems in the future.

Resources
- Smart Grid Information Clearinghouse: www.sgiclearninghouse.org/
Materials Beneficial to the Environment

Purchasing green construction materials, diverting construction debris and recycling and reusing materials whenever possible reduces waste and disposal costs.
Mandatory
Low / No VOC Paints and Primers
All Projects

Rationale
Interior paints and primers may release VOCs, particularly when wet. Exposure to individual VOCs and mixtures of VOCs can cause or aggravate health conditions, including allergies, asthma, and irritation of the eyes, nose, and airways; however, no health-based standards for indoor non-occupational exposure have been set.

Recommendations
Avoid epoxy-based paints, even those that comply with VOC standards, as these contain the chemical Bisphenol A. Bisphenol A was identified by the EPA on March 29, 2010, as a “chemical of concern.” See www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html

Requirements
All interior paints and primers must be less than or equal to the following VOC levels, in grams per liter, based on a combination of the MPI and GreenSeal standards.

<table>
<thead>
<tr>
<th>PAINT TYPE</th>
<th>MAXIMUM VOC LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flats</td>
<td>50 g/L</td>
</tr>
<tr>
<td>Non-flats</td>
<td>50 g/L</td>
</tr>
<tr>
<td>Floor</td>
<td>100 g/L</td>
</tr>
<tr>
<td>Anti-corrosive</td>
<td>250 g/L</td>
</tr>
</tbody>
</table>

Resources
Products do not have to meet MPI or Green Seal standards per this criterion, but these standards may be helpful in locating products that meet the maximum VOC levels.
- Green Seal standard and locator for finding products: http://www.greenseal.org/FindGreenSealProductsAndServices.aspx
6.2 Mandatory
Low / No VOC Adhesives and Sealants
All Projects

Rationale
Interior adhesives and sealants may release VOCs, particularly when wet. Exposure to individual VOCs and mixtures of VOCs can cause or aggravate health conditions, including allergies, asthma, and irritation of the eyes, nose, and airways; however, no health-based standards for indoor non-occupational exposure have been set.

Recommendations
- Many construction adhesives are not capable of adhering at temperatures below 40°F. Projects be exempted from the required low-VOC adhesives and sealants if they prove problematic due to the above reason. In this instance, please identify in the project submittal documents if other adhesives and/or sealants were needed and at what stage of construction the project team was unable to use required low-VOC products.
- Avoid epoxy-based caulks and epoxy-based sealants, as these contain Bisphenol A. Bisphenol A was listed on March 29, 2010 by the EPA as a “chemical of concern.” See: [www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html](http://www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html)

Requirements
All adhesives must comply with Rule 1168 of the South Coast Air Quality Management District. All caulks and sealants must comply with Regulation 8, Rule 51, of the Bay Area Air Quality Management District (BAAQMD).

VOC Limits
South Coast Air Quality Management District (AQMD), Rule 1168, establishes VOC limits for adhesives: [http://www.arb.ca.gov/drdb/sc/curhtml/r1168.pdf](http://www.arb.ca.gov/drdb/sc/curhtml/r1168.pdf)

AQMD Architectural Applications Current VOC Limit
Less water and less exempt compounds in grams per liter

<table>
<thead>
<tr>
<th>PRODUCT TYPE</th>
<th>VOC LIMIT (G/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor carpet adhesives</td>
<td>50</td>
</tr>
<tr>
<td>Carpet pad adhesives</td>
<td>50</td>
</tr>
<tr>
<td>Outdoor carpet adhesives</td>
<td>150</td>
</tr>
<tr>
<td>Wood flooring adhesives</td>
<td>100</td>
</tr>
<tr>
<td>Rubber floor adhesives</td>
<td>60</td>
</tr>
<tr>
<td>Subfloor adhesives</td>
<td>50</td>
</tr>
<tr>
<td>Ceramic tile adhesives</td>
<td>65</td>
</tr>
<tr>
<td>VCT and asphalt tile adhesives</td>
<td>50</td>
</tr>
</tbody>
</table>
Bay Area Air Quality Management District Regulation 8, Rule 51, establishes VOC limits for sealants: www.baaqmd.gov

**8-51-301 Adhesive Product, Application Limits:** Except as provided in Section 8-51-305, a person shall not use in the following applications any adhesive product with a VOC content, as defined in Section 8-51-226, that exceeds the following VOC limits (expressed as grams of VOC per liter):

<table>
<thead>
<tr>
<th>BAAQMD VOC Standards</th>
<th>VOC LIMIT (G/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor floor covering installation</td>
<td>150</td>
</tr>
<tr>
<td>Multipurpose construction</td>
<td>200</td>
</tr>
<tr>
<td>Nonmembrane roof installation / repair</td>
<td>300</td>
</tr>
<tr>
<td>Outdoor floor covering installation</td>
<td>250</td>
</tr>
<tr>
<td>Single-ply roof material installation / repair</td>
<td>250</td>
</tr>
<tr>
<td>Structural glazing</td>
<td>100</td>
</tr>
<tr>
<td>Ceramic tile installation</td>
<td>130</td>
</tr>
<tr>
<td>Cove base installation</td>
<td>150</td>
</tr>
<tr>
<td>Perimeter bonded sheet vinyl flooring installation</td>
<td>660</td>
</tr>
</tbody>
</table>

More information can be found online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Rules%20and%20Regs/reg%2008/rg0851.ashx?la=en

**Resources**
- 2009 IECC Climate Zones Map: http://energycode.pnl.gov/EnergyCodeReqs A detailed map that shows Climate Zones zoomed into each state and county as well as the basic 2009 IECC Building Code requirements for each Climate Zone.
6.3

Mandatory
Construction Waste Management
All Projects

Rationale
Diverting construction debris and recycling and reusing materials whenever possible reduces waste and disposal costs. In addition, construction waste management reduces the project’s impact on landfills.

Recommendations
- Investigate and document local options for recycling or reusing all anticipated major constituents of the project waste stream.
- Consider creating detailed framing plans or scopes of work and accompanying architectural details for use on the job site. Consider creating a detailed cut list and lumber order prior to construction.
- For projects with limited access to recycling centers, consider waste diversion strategies such as using panelized walls and roof trusses to minimize total materials.
- Consider recycling carpet for rehab projects when carpeting is being removed. The specification language below may be customized and included to determine whether carpet recycling is feasible and cost-effective.
  - Vendor shall supply a price quote to recycle carpet and carpet components at 100%, 50%, and 30% of product tonnage.
  - Property manager shall identify the carpet product and polymer, nylon, polypropylene (which is documented on carpet specification). This will enable the carpet vendor to ascertain the recyclability of the product.
- Some manufacturers of drywall and certain types of ceiling tiles will accept the return of old materials for re-processing.

Requirements
Commit to following a waste management plan that reduces non-hazardous construction and demolition waste by at least 50% by weight through recycling, salvaging, or diversion strategies.

Resources
  This site includes frequently asked questions, case studies, reports, and various links. It includes *A Builder’s Field Guide*, which includes guidance for creating a step-by-step construction waste management and recovery plan.
This site has information about the WasteWise Building Challenge program, including articles, publications, and various links and resources for more information.

  This site includes basic information on construction and demolition debris disposal practices, regional and state programs, publications, and links.
- Construction Materials Recycling Association: [www.cdrecycling.org](http://www.cdrecycling.org)
  This site includes links to websites on recycling concrete, asphalt roof shingles, and drywall, as well as a state-by-state listing of construction waste reusers and recyclers.

6.4 **Optional – 15 points max**

**Construction Waste Management**

**All Projects**

**Rationale**
Diverting construction debris and recycling and reusing materials whenever possible reduces waste and disposal costs. In addition, construction waste management reduces the project’s impact on landfills.

**Recommendations**
- Investigate and document local options for recycling or reuse of all anticipated major constituents of the project waste stream, including cardboard packaging and “household” recyclables (e.g., beverage containers).
- Consider creating detailed framing plans or scopes of work and accompanying architectural details for use on the job site. Consider creating a detailed cut list and lumber order prior to construction.
- For projects with limited access to recycling centers, consider waste diversion strategies such as using panelized walls and roof trusses to minimize overall material use.
- Consider recycling carpet for rehab projects when carpeting is being removed. The specification language below may be customized and included to determine whether carpet recycling is feasible and cost-effective in your locale.
- Vendor shall supply a price quote to recycle carpet and carpet components at 100%, 50%, and 30% of product tonnage.
- Property manager shall identify the carpet product and polymer, nylon, polypropylene (which is documented on carpet specification). This will enable the carpet vendor to ascertain the recyclability of the product.
Requirements
Commit to following a waste management plan that reduces non-hazardous construction and demolition waste by more than 75% by weight through recycling, salvaging, or waste diversion strategies.

Resources
  This site includes frequently asked questions, case studies, reports, and various links. It includes A Builder’s Field Guide, which includes guidance for creating a step-by-step construction waste management and recovery plan.
  This site has information about the WasteWise Building Challenge program, including articles, publications, and various links and resources for more information.
  This site includes basic information on construction and demolition debris disposal practices, regional and state programs, publications, and links.
- Construction Materials Recycling Association: www.cdrecycling.org
  This site includes links to websites on recycling concrete, asphalt roof shingles, and drywall, as well as a state-by-state listing of construction waste reusers and recyclers.

6.5 Mandatory
Recycling Storage
All Projects

Rationale
Recycling prevents usable materials from entering the waste stream.

Recommendations
- Ensure that the recycling program has management support.
- Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area.
- Identify local waste handlers and buyers for glass, plastic, metals, office paper, newspaper, cardboard, and organic wastes.
- Instruct occupants on recycling procedures through clear and visible signs that include pictures and/or languages of residents. Also, include the recycling plan in the Tenant manual.
• Ensure that the recycling program is monitored and improved to address contamination, low participation, and the like.
• Ensure that project staff follow procedures for collecting recyclables for your recycling hauler, and include those procedures in the project maintenance manual.

Requirements
Provide one or more easily accessible, permanent, and dedicated areas for the collection of and storage of recyclable materials for the entire project. Materials must include, at a minimum, paper, corrugated cardboard, glass, plastics, and metals.

6.6 Optional – 10 points max
Recycled Content Material
All Projects

Rationale
Use of building materials with recycled content reduces the negative environmental impact resulting from extraction and processing of virgin materials.

Recommendations
Consider the incorporation of recycled content building materials from the early stages of project design.

Requirements
A building material must make up at least 90% of the project component either by weight or by volume to qualify under this measure. A qualifying building material must be composed of at least 25% post-consumer recycled content or at least 50% post-industrial recycled content to achieve 2 points.

The following table lists the project components and example materials that a team can incorporate for optional points. Each material that meets the requirements of this standard is worth 2 points.

<table>
<thead>
<tr>
<th>PROJECT COMPONENT</th>
<th>BUILDING MATERIAL (EXAMPLES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framing</td>
<td>Wood, concrete, steel, aluminum</td>
</tr>
<tr>
<td>Siding or masonry</td>
<td>Wood, metal, masonry</td>
</tr>
<tr>
<td>Flooring (non-structural)</td>
<td>Linoleum, cork, bamboo, reclaimed wood, sealed concrete, carpet</td>
</tr>
<tr>
<td>Concrete / cement and aggregate</td>
<td>Urbanite</td>
</tr>
<tr>
<td>Roofing</td>
<td>Wood shingles, asphalt shingles, tile, metal</td>
</tr>
<tr>
<td>Insulation</td>
<td>Fiberglass batt, cellulose, rigid panel</td>
</tr>
<tr>
<td>Sheathing</td>
<td>Plywood, OSB</td>
</tr>
</tbody>
</table>
Resources

  
  Many commonly used products, such as metals, concrete, masonry, acoustic tile, drywall, carpet, ceramic tile, and insulation, are now available with recycled content.

- GreenSpec Directory, Building Green: [www.buildinggreen.com](http://www.buildinggreen.com)
  
  The online GreenSpec® Directory lists product descriptions for more than 2,000 environmentally preferable products.

- Pharos Project, Healthy Building Network: [www.pharosproject.net](http://www.pharosproject.net)
  
  The Pharos Project provides health and environmental data about the manufacture, use, and end of life of building materials specified in a web-based tool.

### 6.7 Optional – 10 points max

**Regional Material Selection**

**All Projects**

**Rationale**

Building materials that are extracted, processed, and manufactured locally to the project site minimize the energy embedded in their transportation and contribute to the local economy.

**Recommendations**

Natural building materials that are approved by HUD or USDA can qualify for points under this measure.

**Requirements**

Use products that were extracted, processed, and manufactured within 500 miles of the project for a minimum of 50%, based on cost, of the building materials’ value.

Building material types that can qualify for these points include the following *(each material can qualify for 2 points)*:

- Framing materials
- Exterior materials — siding, masonry, roofing
- Concrete / cement and aggregate
- Drywall / interior sheathing
- Flooring materials

**Resources**

- GreenSpec Directory, Building Green: [www.buildinggreen.com](http://www.buildinggreen.com)
  
  The online GreenSpec® Directory lists product descriptions for more than 2,000 environmentally preferable products.
Pharos Project, Healthy Building Network: [www.pharosproject.net](http://www.pharosproject.net)
The Pharos Project provides health and environmental data about the manufacture, use, and end of life of building materials specified in a web-based tool.

**Optional – 10 points max**

### Certified, Salvaged, and Engineered Wood Products

#### All Projects

**Rationale**
Less than 10% of the old growth forest remains in the United States. The use of salvaged wood and engineered wood products precludes the need to use old-growth lumber. Forest Stewardship Council–certified wood encourages forestry practices that are environmentally responsible.

**EQUATION**

\[
\frac{\text{Sum of the value of all certified, salvaged, or engineered wood products}}{\text{The value of all wood products as structural components}} = \text{Percentage of total wood products that meet this criterion}
\]

**Requirements**
Commit to using wood products and materials of at least 25%, by cost, that are either:

- Certified in accordance with the Forest Stewardship Council
- Salvaged products
- Engineered framing materials that do not include urea formaldehyde–based binders (see 7.3)

The percentage of certified, salvaged, and engineered wood products is based on cost or value.

**Resources**

- For help in locating FSC-certified products, visit: [https://ic.fsc.org/choose-fsc.195.htm](https://ic.fsc.org/choose-fsc.195.htm)
  FSC will circulate it to certified companies, and these companies will contact you if they have the desired product(s) available.
  This site lists U.S. suppliers, manufacturers, and distributors of FSC-certified building products.
Mandatory

Reduced Heat-Island Effect: Roofing All Projects

Rationale
Urban heat islands increase local air temperatures due to the absorption of solar energy by the built environment. Reducing the heat island effect decreases energy consumption by decreasing loads on cooling systems.

Recommendations
Avoid PVC membrane roofing, which is manufactured using phthalates, a chemical listed on December 30, 2009 by EPA as a “chemical of concern” to human health: www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html

Requirements

Option 1
Use ENERGY STAR–compliant roofing, which requires:

<table>
<thead>
<tr>
<th>ROOF SLOPE</th>
<th>INITIAL SOLAR REFLECTANCE</th>
<th>MAINTAINED SOLAR REFLECTANCE</th>
<th>EMISSIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Slope</td>
<td>( \leq 2 : 12 )</td>
<td>( \geq 0.65 )</td>
<td>( \geq 0.50 )</td>
</tr>
<tr>
<td>Steep Slope</td>
<td>( &gt; 2 : 12 )</td>
<td>( \geq 0.25 )</td>
<td>( \geq 0.15 )</td>
</tr>
</tbody>
</table>

Emissivity should be greater than or equal to 0.8 when tested in accordance with ASTM 408.
For Option 1, 90% of the roof area must meet the requirements above.

OR Option 2

Install a “green” (vegetated) roof for at least 50% of the roof area.

Combinations of ENERGY STAR–compliant and vegetated roofing can be used, providing they collectively cover 75% of the roof area.

Resources
  CRRC maintains a third-party rating system of radiative properties of roof surfacing materials.
- U.S. Environmental Protection Agency, Heat Island Effect: www.epa.gov/heatisland
This site contains information about heat island effect, its social and environmental costs, and strategies to minimize its prevalence, including shading and coloration of hardscapes.

  The Lawrence Berkeley National Laboratory conducts research to find, analyze, and implement solutions to minimizing heat island effects; its current efforts focus on the study and development of more reflective surfaces for roadways and buildings.

### 6.9b Mandatory

**Reduced Heat-Island Effect: Paving All Projects**

**Rationale**

Urban heat islands increase local air temperatures due to the absorption of solar energy by the built environment. Reducing the heat island effect decreases energy consumption by decreasing loads on cooling systems.

**Requirements**

Use light-colored, high-albedo materials and/or an open-grid pavement, with a minimum solar reflectance of 0.3, over at least 50% of the site’s hardscaped area.

**Resources**

- U.S. Environmental Protection Agency, Heat Island Effect: [www.epa.gov/heatisland](http://www.epa.gov/heatisland)
  This site contains information about heat island effect, its social and environmental costs, and strategies to minimize its prevalence, including shading and coloration of hardscapes.

  The Lawrence Berkeley National Laboratory conducts research to find, analyze, and implement solutions to minimizing heat island effects; its current efforts focus on the study and development of more reflective surfaces for roadways and buildings.
Healthy Indoor Environment

Optimal ventilation improves indoor air quality and the flow of fresh air throughout the building, contributing to a healthier indoor environment.
7.1 Composite Wood Products that Emit Low/No Formaldehyde
All Projects

Rationale
Composite wood products using formaldehyde-based binders will emit formaldehyde, which is a volatile organic compound. Symptoms of exposure vary widely and include a host of bodily reactions. Avoiding products that emit formaldehyde will reduce the quantity of harmful indoor air contaminants.

Recommendations
- Make this requirement part of the specifications for sub-contractor submittals. Obtain the manufacturer’s specifications to determine whether materials meet this requirement. Seek composite wood products compliant with California 93120. California 93120 is a regulation issued by the California Air Resources Board (CARB) limiting allowable formaldehyde emissions from composite wood products.
- Seek composite wood products with no added formaldehyde-based compounds in the contents. Seek composite wood products with CARB No Added Formaldehyde (NAF) certification. Also, Scientific Certification Systems offers a Formaldehyde Free certification, and product listings are available at www.scscertified.com/products/index.php.
- If feasible, specify formaldehyde-free hardwood, plywood, particleboard, or medium density fiberboard.

Requirements
All composite wood products (plywood, OSB, MDF, cabinetry) must be certified compliant with California 93120. If using a composite wood product that does not comply with California 93120, all exposed edges and sides must be sealed with low-VOC sealants, per 6.2.

Resources
- In July 2010, the U.S. Congress passed Public Law No: 111–199, the S. 1660: Formaldehyde Standards for Composite Wood Products Act, which updates the Toxic Substances Control Act of 1976 to align with the recent California legislation 93120. More information on Public Law No: 111–199 S.1660 can be found online at www.govtrack.us/congress/bill.xpd?bill=s111-1660. A summary of the Toxic Substances Control Act of 1976 can be found online at the EPA’s website at www.epa.gov/lawsregs/laws/tsca.html.
- The California Air Resources Board approved an Airborne Toxic Control Measure in April 2007 to reduce formaldehyde emissions from composite wood products including hardwood plywood, medium-density fiberboard, and particleboard (Title 17, California Code of Regulations 93120-93120.12). California 93120. More
Mandatory
Environmental Preferable Flooring
All Projects

Rationale
Carpets have a short lifespan (studies suggest 3–5 years), and thus may need frequent replacement. More durable flooring options that last longer and wear better than carpet promote resource conservation through their longevity. New carpets, padding, and adhesives also release VOCs that may pose health hazards to residents, occupants and workers. In addition, carpets trap dust and other allergens.

Recommendations
- Consider non-carpet flooring alternatives such as natural linoleum; Forest Stewardship Council (FSC)–certified or salvaged hardwoods; cork; bamboo; ceramic or stone tile; or sealed concrete.
- Make this requirement part of the specifications.

Requirements

Prohibited Locations
Do not install carpets in entryways, laundry rooms, bathrooms, kitchens / kitchenettes, and utility rooms in residential units.

Products
Any hard surface flooring products used must:

be either ceramic tile or unfinished hardwood floors

OR

meet the Scientific Certification System's FloorScore program criteria (including pre-finished hardwood flooring).

The use of reclaimed flooring is encouraged, and such flooring need not meet the FloorScore certification. Reclaimed wood flooring should be free of lead-based paint, and tiles should be free of asbestos.

Any carpet products used must meet the Carpet and Rug Institute’s Green Label or Green Label Plus certification for carpet, pad, and carpet adhesives.
Resources
- The SCS FloorScore program website includes information about the program, as well as a list of certified products that is updated regularly: 
  www.scscertified.com/iaq/floorscore.html and 
  www.rfci.com/index.php?option=com_content&view=article&id=101&Itemid=100
- The Carpet and Rug Institute maintains a list of manufacturers and products meeting the Green Label Plus standard: 
- For online comparison of flooring alternatives, see the Healthy Building Network’s Pharos Project: 
  www.pharosproject.net

Optional – 5 points max

7.3 Environmentally Preferable Flooring: Alternative Sources

All Projects

Rationale
Natural and renewable alternative flooring materials have demonstrated environmental benefits, including low levels of VOC emissions and environmentally friendly production methods. These products are good substitutes for standard products linked with certain health hazards.

Recommendations
- Whenever possible, select resilient flooring that has passed a California 01350 test (FloorScore, CHPS) or NSF/ANSI 332. For California 01350, give highest preference to those that pass the residential version of the test, as the residential test is more stringent.
- Use alternative flooring materials such as natural linoleum, ceramic tile, bamboo, cork, or hardwood (especially salvaged wood).
- For basements, leave the slab exposed and stained with low-VOC material rather than providing any floor treatments.

Requirements
Use non-vinyl, non-carpet floor coverings in all rooms of the building.

Resources
  www.buildinggreen.com/ecommerce/gbp.cfm
- For online comparison of flooring alternatives, see the Healthy Building Network’s Pharos Project: 
  www.pharosproject.net
- The U.S. Environmental Protection Agency identified phthalates, a chemical used to make sheet vinyl pliable, as a “chemical of concern” on December 30, 2009: 
  www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html
**Rationale**
Properly sized and controlled exhaust fans in bathrooms reduce moisture condensation, lowering the potential for indoor mold growth that may yield odors and pose health hazards. ENERGY STAR–qualified fans use 65% less energy on average than standard models and move more air per unit of energy used with less noise. Timers and humidistat sensors help ensure that fans regularly remove moisture and provide increased ventilation.

**Recommendations**
- If the continuous bathroom fan option is used to meet the ventilation requirements for ventilation under 7.6 or 7.7, project teams should be careful not to exceed the cfm requirements for whole building/unit ventilation (i.e., the fan should have the capability to be set to a low-speed condition or controlled by a cycle timer to meet the requirement).
- Placing a single multi-port, in-line fan in each apartment to exhaust air from the kitchen and bathroom(s) is an acceptable ventilation strategy. In addition to meeting local code requirements for the minimum distance of thru-wall exhaust vents from windows, the in-line fan must be ENERGY STAR–labeled, and the kitchen and bathroom exhaust ventilation rates must comply with ASHRAE 62.2-2010.
- Consider performing the following test to determine if an installed bathroom exhaust fan is pulling roughly the appropriate amount of air. Tear off single squares of toilet paper, hold the toilet paper square up to the fan grill, and turn the fan on. If a bathroom fan can hold one square of toilet paper, then it is pulling about 25 cfm; if a bathroom fan can hold two squares on top of each other, then it is pulling about 50 cfm.
- Review relevant sections of the New York State Building Code.

**Requirements**
Install ENERGY STAR–labeled intermittent bathroom fans that exhaust to the outdoors, are connected to a light switch, and are equipped with a humidistat sensor, timer, or other control (e.g., occupancy sensor, delay off switch, ventilation controller). Intermittent bathroom fans should operate at an exhaust rate of 50 cubic feet per minute (cfm) to the outdoors, per ASHRAE 62.2-2010. No recirculating fans.

**OR**
Install ENERGY STAR–labeled continuous bathroom fans that exhaust to the outdoors and operate continuously at a rate of 20 cfm, per ASHRAE 62.2-2010. No recirculating fans.
Install central ventilation systems to meet ASHRAE requirements with rooftop fans that meet the following criteria:

- Roof fans up to 300 design cfm must be direct-drive and variable-speed control with speed controller mounted near the fan.
- Roof fans between 300–2000 design cfm must be direct-drive, variable-speed control, and electronically commutated motors (ECM), with speed controllers mounted near the fan.
- No recirculating fans.

**Resources**

  - This website describes the advantages of ENERGY STAR–labeled bathroom, utility room, and kitchen exhaust fans, and provides product and manufacturer lists.
  - The HVI provides consumers an assurance of product performance. It also works to increase public awareness of the need for good ventilation and provides resources for selecting the proper ventilation products.
  - This page provides a link to a report that reviews current and potential ventilation technologies for residential buildings with particular emphasis on North American climates and construction.

**Mandatory**

**Exhaust Fans: Kitchen**

**All Projects**

**Rationale**

Properly sized and controlled exhaust fans in kitchens reduce moisture condensation, lowering the potential for indoor mold growth that may yield odors and pose health hazards. Besides helping to reduce moisture, kitchen fans also help remove carbon dioxide and carbon monoxide over fuel-burning appliances and other air contaminants that may be by-products of cooking.
Recommendations

- There is currently no ENERGY STAR labeling program for kitchen range fans. Avoid oversized range fans, which can depressurize homes and cause back-drafting of combustion appliances.
- Placing a single multi-port, in-line fan in each apartment to exhaust air from the kitchen and bathroom(s) is an acceptable ventilation strategy. In addition to meeting local code requirements for the minimum distance of thru-wall exhaust vents from windows, the in-line fan must be ENERGY STAR–labeled, and the kitchen and bathroom exhaust ventilation rates must comply with ASHRAE 62.2-2010. Ensure that the placement of the exhaust grill meets code requirements for kitchen ventilation.

Requirements

Install power-vented fans or range hoods that exhaust to the outdoors at an intermittent rate of 100 cfm, per ASHRAE 62.2-2010.

OR

Install power-vented fans or range hoods that exhaust to the outdoors at a continuous rate of five air changes per hour based on kitchen volume.

OR

Install central ventilation systems to meet ASHRAE requirements with rooftop fans that meet the following criteria:
- Roof fans up to 300 design cfm must be direct-drive and variable-speed control with speed controller mounted near the fan.
- Roof fans between 300–2000 design cfm must be direct-drive, variable-speed control, and ECM with speed controllers mounted near the fan.

Resources

- For more information on kitchen fans or range hoods, go to the products section of the ENERGY STAR homepage: www.energystar.gov

Mandatory

Ventilation

All Projects

Rationale

Optimal ventilation improves indoor air quality and the flow of fresh air throughout the home, contributing to a healthier living environment.
Recommendations

- Review relevant section of the New York State Building Code.
- With continuous, demand-controlled, or other centralized ventilation systems, the project team (specifically, the designer, installer, and maintenance staff) should ensure that the systems are balanced from unit to unit to meet the requirements of ASHRAE 62.2-2010.
  
  Also, consider the following guidance:
  - For fans designed to exhaust more than 250 cfm, consider using ECM with speed controllers mounted near the fan for ease of balancing.
  - For fans designed to exhaust less than 250 cfm, consider using direct drive with speed controller mounted near the fan for ease of balancing.
- For climate-specific strategies, project teams should consult ASHRAE 62.2-2010.
- For projects located in hot and humid climates, systems should be designed to be capable of ASHRAE 62.2 ventilation levels. Supplemental dehumidification is likely necessary for compliance in these climates to maintain comfort during times of high ambient relative humidity. Additionally, the goal should be to design a system to meet ASHRAE requirements and then provide for additional accommodations to adjust the amount of outside air flow being introduced.

- Consider the following controls for introducing outside air:
  - Flow control / butterfly damper to allow for control over the amount of air being introduced through the outside air intake.
  - Shut-off damper (electronic or barometric) to close off the outside air intake when the HVAC system is not calling for air.
  - Fan timer / cycler on the system that allows for control over how many minutes of a “system run cycle” the outside air intake remains open.
  - Per ASHRAE ventilation requirements, reliance on operable windows is not permitted as a strategy to meet ASHRAE 62.2 whole-project ventilation requirements.

Requirements

Low-Rise Multifamily

Install a ventilation system for the dwelling unit capable of providing adequate fresh air per ASHRAE 62.2-2010 requirements for low-rise multifamily dwellings. Use the following formula, or refer to the table on the next page as a reference for calculating the ventilation rate.

\[
[7.5 \text{ cfm per } (\text{# of bedrooms } + 1)] + [1 \text{ cfm per } 100 \text{ ft}^2 \text{ of floor area}] = (\text{ASHRAE E 62.2-2010})
\]

Multifamily, four stories or more

Install a ventilation system capable of providing adequate fresh air per ASHRAE 62.2-2010 for all dwelling units, and ASHRAE 62.1-2010 for all hallways and common spaces.

\[
[7.5 \text{ cfm per } (\text{# of bedrooms } + 1)] + [1 \text{ cfm per } 100 \text{ ft}^2 \text{ of floor area}] = (\text{ASHRAE E 62.2-2010})
\]
AND

\[0.06 \text{ cfm per ft}^2 \text{ of common corridors} + 25 \text{ cfm} / 1000 \text{ ft}^2 \] = (ASHRAE 62.1-2010)

Alternatively, project teams can use the table below from ASHRAE 62.2-2010 to determine required ventilation rates. Note that the table provides ventilation air requirements for a singlefamily or a multifamily unit. Thus, the floor area and number of bedrooms listed should be used to derive the required cfm for each unit. Then the units should be aggregated along with the required cfm for the common space to reach the total required cfm for the project.

### VENTILATION AIR REQUIREMENTS (IN CFMS)

<table>
<thead>
<tr>
<th>FLOOR AREA (BY UNIT)</th>
<th>BEDROOMS (BY UNIT)</th>
<th>0–1</th>
<th>2–3</th>
<th>4–5</th>
<th>6–7</th>
<th>&gt; 7</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<td>45</td>
<td>60</td>
<td>75</td>
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<td>1501–3000</td>
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<td>45</td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
</tr>
<tr>
<td>3001–4500</td>
<td></td>
<td>60</td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>4501–6000</td>
<td></td>
<td>75</td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
</tr>
<tr>
<td>6001–7500</td>
<td></td>
<td>90</td>
<td>105</td>
<td>120</td>
<td>135</td>
<td>150</td>
</tr>
</tbody>
</table>

For Substantial Rehab projects, consult Appendix A of ASHRAE 62.2-2010, which provides options relevant to existing buildings.

**Multifamily Projects with Central Ventilation Systems**

Establish ventilation rates for bathrooms, kitchens, and units based on ASHRAE 62.2-2010 requirements. Using these ventilation levels, install a centralized ventilation system that is balanced to run at the required ASHRAE 62.2-2010 levels for each unit and 62.1-2010 levels for common spaces. Include information on the central systems and controls used to achieve the residential in-unit ventilation requirements per ASHRAE 62.2-2010 in the pre-occupancy compliance report.

**Non-Residential Projects**

Install a ventilation system(s) capable of providing adequate fresh air per ASHRAE 62.1-2010 requirements.

**Resources**

- Specify a mechanical whole-house ventilation system per ASHRAE 62.2-2010 and the EPA ENERGY STAR with Indoor Air Package Specifications.
  
  This site provides a viewable version of ASHRAE Standard 62.2-2010 and 62.1-2010. The online version cannot be printed or saved but can be previewed.
This site provides a brief, easy-to-understand overview of heat- and energy-recovery ventilators.

  This page provides a link to “Review of Residential Ventilation Technologies,” a report that reviews current and potential ventilation technologies for residential projects, with particular emphasis on North American climates and construction.

### 7.7 Combustion Equipment

**All Projects**

**Rationale**
Direct-vent systems draw all the air needed directly from the outside so there is no risk of spilling combustion contaminants into the occupied space. Power-vented equipment uses a fan or blower to create the pressure difference that causes air to flow from inside the building, through the combustion device, and out an approved chimney or vent system, to the outdoors.

**Recommendations**
Review relevant sections of the New York State Mechanical Code.

**Requirements**
Specify power-vented or closed-combustion equipment when installing new space and water heating equipment. Projects should install one hard-wired carbon monoxide (CO) alarm for each sleeping area, minimum one per floor. Multifamily projects should follow state and local law requirements for location of CO alarms. Projects without combustion equipment (i.e., space and water heating equipment, cook tops, and any other combustion equipment) or attached garages are exempt from this measure. Also, projects with combustion equipment located in detached utility building(s) or open-air facilities are exempt from this measure.

**Resources**
- U.S. Environmental Protection Agency, Combustion Products and Carbon Monoxide: [www.epa.gov/iaq/combust.html](http://www.epa.gov/iaq/combust.html) and [www.epa.gov/iaq/co.html](http://www.epa.gov/iaq/co.html)
  These two extensive EPA sites describe the sources of carbon monoxide and other combustion gases, their health effects, steps to reduce exposure, related standards and guidelines, and additional resources and links.
  This site is part of CMHC’s “About Your House” series of educational articles. It includes information about combustion gases, the effects of exposure, and strategies for limiting exposure.
This site provides a basic overview of the problems associated with carbon monoxide, as well as tips about purchasing and installing carbon monoxide alarms.

7.8a Mandatory
Mold Prevention: Water Heaters
All Projects

Rationale
The use of heaters with drains and catch pans prevents moisture problems caused by leakage or overflow. This prevents water from sitting idle, creating excess moisture and allowing mold to germinate.

Recommendations
• Tankless water heaters, by virtue of the product type, meet the intent of this measure.
• Review relevant sections of the New York State Plumbing Code.

Requirements
Provide adequate drainage for water heaters that includes drains or catch pans with drains piped to the exterior. Water heaters should be located in rooms with non–water sensitive floor coverings. Drain pans should be sloped and corrosion resistant (e.g., stainless or plastic) with drains at the low point. Condensate lines should be drained to a drainage system, and not just deposited under slab.

Resources
• Canada Mortgage and Housing Corporation’s “Fighting Mold”: http://www.tenants.bc.ca/ckfinder/userfiles/files/Fighting%20Mold.pdf
For information on mold identification and remediation in existing homes.
Mandatory

Mold Prevention: Surfaces
All Projects

Rationale
The use of moisture-resistant materials in wet areas reduces moisture buildup, diminishing the potential for indoor mold growth that may yield odors and pose health hazards to residents.

Recommendations
When possible, avoid materials that facilitate the growth of mold spores, such as vinyl wallpaper and unsealed grout.

Requirements
In bathrooms, kitchens, and laundry rooms, use materials that have durable, cleanable surfaces.

Resources
- BuildingGreen: www.buildinggreen.com
  Resources on product composition and performance.
- Canada Mortgage and Housing Corporation’s “Fighting Mold”: http://www.tenants.bc.ca/ckfinder/userfiles/files/Fighting%20Mold.pdf
  For information on mold identification and remediation in existing homes.

Mandatory

Mold Prevention: Tub and Shower Enclosures
All Projects

Rationale
The use of moisture-resistant materials in wet areas reduces moisture buildup, diminishing the potential for indoor mold growth that may yield odors and pose health hazards to residents.

Requirements
Use non-paper–faced backing materials such as cement board, fiber cement board, or equivalent in bathrooms.

Resources
- Canada Mortgage and Housing Corporation’s “Fighting Mold”: http://www.tenants.bc.ca/ckfinder/userfiles/files/Fighting%20Mold.pdf
  For information on mold identification and remediation in existing homes.
Mandatory

Vapor Barrier Strategies
All projects with foundation work in scope

Rationale
Water can migrate through concrete and most other masonry materials. Proper foundation drainage prevents water from saturated soils from being pushed by hydrostatic pressure through small cracks. Vapor barriers and waterproofing materials can greatly reduce the migration of moisture that can occur even in non-saturated soils.

Recommendations
- Review relevant sections of the New York State Building Code.
- Ensure that other trades’ work does not puncture the vapor barrier.

Requirements

Beneath Concrete Slabs, Including Basements
- Provide vapor barriers under all slabs.
- Install a capillary break as follows:
  - Install a 4-inch layer of ½-inch diameter or greater clean aggregate, covered with 6 mil (or thicker) polyethylene sheeting, overlapped 6 to 12 inches at the seams, and in direct contact with the concrete slab above.

  OR

  - Install a 4-inch uniform layer of sand, overlain with a layer or strips of geotextile drainage matting installed according to the manufacturer’s instructions, and covered with polyethylene sheeting overlapped 6 to 12 inches at the seams.

- On interior below-grade walls, avoid using separate vapor barrier or a below-grade vertical insulation (such as polyethylene sheeting, vinyl wallpaper, or foil faced), which can trap moisture inside wall systems. Semi–vapor-permeable rigid insulation is not considered a vapor barrier.

Beneath Crawl Spaces
- Install 8-mil minimum thickness cross-laminated polyethylene on the crawl floor, extended at least 12 inches up on piers and foundation walls, and with joints overlapping at least 12 inches. (The 8-mil polyethylene and the cross-lamination ensure longevity of the poly.)
- Line the likely “high-traffic” areas of the crawl space with foam board, so the polyethylene beneath will not be disturbed.
Rationale
Exposure to radon is the second leading cause of lung cancer in the United States. Testing and mitigation if necessary will reduce concentrations of radon that can leak into homes through cracks in the slab and foundation.

Recommendations
- Additional guidance for dealing with underground garages:
  - International Mechanical Code (IMC), which requires 0.75 cfm/sf for garages serving multifamily projects, and ASHRAE Standard 62.1-2010 section 5.15, which encourages maintaining attached garage air pressure at or below adjacent occupiable spaces.
  - If the pressure management strategy is not designed to continually maintain negative pressure in the underground garage space relative to the occupied spaces (i.e., if a timer is used for exhaust fan control), then radon control is not assured. In such situations, use either the radon-resistant New Construction techniques summarized in IAP spec 2.1 (www.epa.gov/indoorairplus/construction_specifications.html#moisture%20control) and detailed further in EPA guidance and/or test the occupied space for radon.
  - If the underground garage does not cover the entire foundation (i.e., some living space is directly above a slab or crawlspace), then those portions of the project should be handled per Indoor airPLUS specs.
  - Any mechanical or service closets in the garage area that are connected to the conditioned enclosure should be aggressively sealed between the garage and the conditioned space.
  - For projects located on brownfields or proximate to industrial operations, consider testing for radon to determine if elevated levels exist on-site. If the radon level is elevated above 4 pCi/L (pico curies per liter), install radon reduction measures.

Requirements
Hire a Certified Radon Tester to test for radon using a New York State Approved Radon Testing Laboratory. If tests are at or above 4.0 pCi/L, install radon reduction measures.

For Underground Garages Serving Multifamily Projects, follow the prescriptive measure below taken from EPA’s Indoor airPLUS program:
- IAP 2.1 Radon control: Foundation air sealing with polyurethane caulk or the equivalent at all slab openings, penetrations, and control or expansion joints. Sump
covers also shall be air sealed (e.g., mechanically attached with full gasket seal or equivalent).

Resources
- New York State Department of Health, Certified Radon Testers – Westchester County: http://www.health.ny.gov/environmental/radiological radon/certified_radon_testers/west_radontesters.htm
- New York State Department of Health, Radon Information: http://www.health.ny.gov/environmental/radiological/radon/radon.htm
- U.S. Environmental Protection Agency: www.epa.gov/radon/zonemap.html Or contact your state radon coordinator through the state health office, to determine if your project is located in a Zone 1 or 2 radon area.
- American Lung Association, Radon Fact Sheet: www.lungusa.org/healthy-air/home/resources/radon.html
  This is a general overview of the health risks associated with radon exposure.

7.11 Mandatory
Water Drainage
All Projects

Rationale
Diverting water from the project prevents bulk water entry into foundations and basements, which can contribute to moisture-related problems such as mold and the deterioration of wood and other building materials. Flashing helps direct water away from wall cavities to the drainage plane.

Recommendations
- Review relevant sections of the New York State Building Code.
- Where a high water table is anticipated or observed, or has been documented in the soil boring report, or where specifically recommended by the geotechnical engineer, provide subsurface drain tile or other drainage system in strict accordance with the
geotechnical engineer’s or other qualified professional’s recommendations, to divert underground water away from the structure.

- Ensure that a vapor barrier with the appropriate permeability rating is installed on the correct side of the wall assembly, based on climatic considerations.
- Best practices include a grade of one-half inch per foot, or approximately a 4% pitch. EPA recommends a 2% pitch (one-quarter inch per foot) for hard surfaces such as patio slabs, walks, and driveways.

Requirements
Provide drainage of water away from windows, walls, and foundations by implementing the following techniques.

Water Management — Walls
- Provide a housewrap/weather-resistive barrier with sheets lapped, shingle-style, especially over windows, doors, and other penetrations to prevent rainwater that penetrates the finished exterior cladding system from entering the wall assembly or being introduced into window or door openings.
- Provide a pathway for liquid water that has penetrated the cladding system or accumulates due to daily or seasonal changes in thermal and humidity levels behind the cladding system to safely exit the exterior wall assembly.
- Flashing and/or weather-resistive barriers installed in rough window and door openings must integrate with window and door unit flashings, particularly at the sill and head.

OR

- Install pan flashing, side flashing that extends over pan flashing, and head flashing (top flashing) that extends over side flashing on windows and exterior door openings. Apply window pan flashing over building paper at sill and corner patches.
- Flashings at roof/wall intersections and at penetrations through the wall (i.e., plumbing, electrical, vents, HVAC refrigerant lines, and the like) that are provided by other trades must be integrated with the drainage plane to keep water from entering the wall assembly.

Water Management — Roof Systems
- Installation of drip edge at entire perimeter of roof.
- Install flashing where sloped roofs meet gable wall end and integrate all vertical walls into project drainage plane.
- Use kick-out flashings at all wall/eave intersections and integrate into drainage plane.
- At wall/roof intersections, maintain ≥/≤ 2" clearance between wall cladding and roofing materials.
Integrity and Continuity of the Thermal Barrier

- The drainage plane, when properly sealed, can also reduce airflow through the wall assembly, which improves the thermal performance of the cavity insulation.

Resources

  Free downloads on best building practices.
- U.S. Environmental Protection Agency, Indoor airPLUS Construction Specifications: [http://www.epa.gov/iaplus01/construction_specifications.html](http://www.epa.gov/iaplus01/construction_specifications.html)
  Includes detailed construction specifications, several of which are focused on moisture management.

| 7.12 | Mandatory
| --- | ---
| Garage Isolation | All Projects |

Rationale
Carbon monoxide inhalation can be dangerous to human health. The air barrier and air sealing will help prevent carbon monoxide migration from the garage to the living space, and the CO alarm will help ensure that residents are alerted in the case of accidental accumulation of the gas.

Recommendations

- Refer to ASHRAE 62.2 to specify garage contaminant isolation measures.
- Review relevant sections of the New York State Building Code.

Requirements

- Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of any contaminants into the conditioned space.
- Avoid as much as possible the need to install ductwork or air handling equipment in a garage.
- All connecting doors between occupied space and garage must include an automatic closer / spring hinges, and be fixed with gaskets or otherwise made substantially airtight with weather stripping.
- In multifamily buildings with garages, install a CO alarm inside in the room with a door to the garage AND outside all sleeping areas.
• Common walls and ceilings between attached garages and living spaces must be visually inspected to ensure that they are air-sealed before insulation is installed (requirement taken from EPA’s Indoor airPLUS program 5.5).

Resources
• National Institute of Standards and Technology, Air and Pollutant Transport from Attached Garages to Residential Living Spaces”: www.fire.nist.gov/bfrlpubs/build03/art068.html
  This report provides an overview of the major issues, as well as a review of relevant scientific studies and a series of field studies.
  Refer to the discussion and construction details regarding air sealing and connected garages.

7.13 Mandatory
Integrated Pest Management
All Projects

Rationale
Sealing of cracks and penetrations will minimize entry points for pests such as rodents and cockroaches. Avoiding unnecessary pesticides, improving resident housekeeping, and promptly responding to pest problems will reduce the chemicals needed to treat pests and will keep homes pest-free longer than a routine chemical treatment program.

Recommendations
• For guidance on low-VOC caulk, see 7.2.
• Integrated pest management work should be completed in conjunction with air sealing. Project teams should work with an air sealing contractor to ensure that IPM strategies are part of scope.

Requirements
Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate non-toxic sealing methods to prevent pest entry. Provide rodent- and corrosion-proof screens (e.g., copper or stainless steel mesh or rigid metal cloth) for openings greater than ¼ inch. Develop an integrated pest management (IPM) policy and, as part of that, develop resident guidance related to pesticide use, housekeeping, and prompt reporting of pest problems to be included in the Maintenance and Tenant manuals for cockroaches, rodents, and bedbugs.
Resources


This webpage has resources dedicated to IPM in affordable housing, including model RFPs and contract language for greener pest control, case studies, and training.

### 7.14 Mandatory

**Lead-Safe Work Practices**

**Substantial and Moderate Rehab**

**Rationale**

Any activity that disturbs painted surfaces or project components in pre-1978 dwellings that contain lead-based paint may generate and spread lead dust and debris, increasing the risk of lead poisoning for exposed children and families. Controlling lead dust and debris helps minimize lead in the environment.

**Recommendations**

- Review relevant New York State regulations and requirements.
- Consider undertaking a lead inspection to determine if the property or surfaces to be disturbed contain lead-based paint. Properties built from 1960 through 1978 are more likely to be free of lead-based paint. Housing and painted components documented to be free of lead-based paint (using EPA-approved methods) are exempt from EPA Renovation, Repair and Painting Regulation. In housing built before 1940, it is very likely that lead-based paint is present.
- Undertake the appropriate training and certification for in-house maintenance staff and ensure that contractors are meeting the lead RRP requirements.

**Requirements**

For properties built before 1978, use lead-safe work practices consistent with the EPA’s Renovation, Repair, and Painting Regulation (RRP) (40 CFR 745) and applicable HUD Requirements at 24 CFR 35.

**Resources**

- U.S. Environmental Protection Agency: [www.epa.gov/lead/pubs/traincert.htm](http://www.epa.gov/lead/pubs/traincert.htm) and U.S. Department of Housing and Urban Development: [www.hud.gov/offices/lead/training/index.cfm](http://www.hud.gov/offices/lead/training/index.cfm)

Information about lead-safe work practices.
U.S. Environmental Protection Agency, Small Entity Compliance Guide to Renovate Right EPA’s Lead-Based Paint Renovation, Repair, and Painting Program:
General information on compliance with these requirements.
An orientation to the project helps educate residents and property managers on the green features that were designed to deliver health, economic, and environmental benefits, as well as their role in realizing those benefits in their own lives and the lives of future residents.
Rationale
Regular building maintenance using green methods helps minimize utility consumption and provides a healthy and durable living environment for residents.

Recommendations
- During the design process, keep a running list of how maintenance and landscaping teams and residents may need to be involved with the building in order to ensure that its lifespan is maximized and that it will perform as intended. Once the project team has completed the integrative design process, amend templates of the Operations and Maintenance documents with project-specific information for maintenance and residents. By working in this manner, Operations and Maintenance documents will be informed by the development process and completed at the same time the project is ready for occupancy.
- Manuals and other training materials are most effective when presented in conjunction with training sessions. These educational sessions give the project maintenance staff an opportunity to share best practices and troubleshoot project performance problems together.
- Consider developing an integrated pest management (IPM) policy and, as part of that, develop guidance related to pesticide use, housekeeping, and prompt reporting of pest problems to be included in maintenance manuals.
- If the project is utilizing greywater, design and institute a policy that requires biodegradable soaps, cleaners, and other products that are flushed down the drains.
- Provide maintenance staff with local information for handling hazardous waste, including fluorescent and compact fluorescent lighting (CFLs).

Requirements
Provide a manual that addresses the following:
- operations and maintenance guidance for all appliances
- HVAC operation and maintenance schedule
- location of water-system turnoffs
- lighting equipment
- paving materials and landscaping
- green cleaning products and schedule(s)
- pest control
- any other systems within the project, including renewable energy systems if applicable
- an occupancy turnover plan that describes the turnover process, including all materials that are frequently replaced at turnover and the process of educating the residents about proper use and maintenance of all project systems
Resources
• For language on residential IPM policy, the University of Minnesota offers the following resource: www.entomology.umn.edu/cues/em/index.html

8.2
Tenant Manual
All Projects

Rationale
Education on the operations and maintenance of the space will allow tenants to fully realize the environmental, health, and economic benefits that green development offers. This resource is intended to familiarize tenants with the green features and methods used in their building and additional activities they could initiate to realize the building’s benefits.

Recommendations
• During the design process, keep a running list of how maintenance and landscaping teams and tenants may need to be involved with the building in order to ensure that its lifespan is maximized and that it will perform as intended. Once the project team has completed the integrative design process (see 1.1), amend templates of the Operations and Maintenance documents with project-specific information for maintenance and tenants. By working in this manner, Operations and Maintenance documents will be informed by the development process and completed at the same time the project is ready for occupancy.
• If the project is utilizing greywater, design and institute a policy that requires biodegradable soaps, cleaners, and other products that are flushed down the drains.
• Provide homeowners / tenants with two radon test kits designed for 48-hour exposure, and include instructions for use and follow-up action, per EPA’s Indoor Air Package.
• Provide tenants with local information for handling household hazardous waste, including CFLs.
• Consider including ENERGY STAR “Best Practices” information in the Tenant Manual. See the following websites:
  – For washers and dryers: www.energystar.gov/index.cfm?c=clotheswash.clothes_washers_performance_tips
– For refrigerators: www.energystar.gov/index.cfm?c=refrig.pr_best_practices_refrigerators
– For dishwashers: www.energystar.gov/index.cfm?c=dishwash.pr_best_practices

For additional best practices on ENERGY STAR products: www.energystar.gov/index.cfm?c=products.pr_find_es_products

Select a product type, click on “Buying Guidance,” and scroll down to the bottom of the page to select “Best Practices” products.

Requirements
Provide a guide for tenant that explains the intent, benefits, use, and maintenance of green building features. The guide also should include the location of transit stops and other neighborhood amenities, and encourage additional green activities such as recycling, gardening, use of healthy cleaning materials, alternative measures to pest control, and purchase of green power.

For multifamily projects, include, as applicable, these additional instructions within the Tenant Manual:

• a routine maintenance plan
• operations and maintenance guidance for all appliances and special plumbing fixtures (e.g., dual-flush toilets)
• HVAC operation
• cautions or appropriate maintenance on renewable energy systems
• location of water-system turnoffs
• lighting equipment
• interior finish materials, including paints, caulks, and flooring
• paving materials and landscaping
• pest control
• special health considerations if greywater is used indoors (e.g., do not drink from the toilet in emergency situations)
• any other systems that are part of the home

Resources
• Refer to the Enterprise Green Communities Resident Manual Templates: www.greencommunitiesonline.org/tools/resources/index.asp
  This is a simple brochure with a readable layout and good presentation.
• Home Energy Resource MN: www.homeenergyresourcemn.org/index.aspx
  This site provides information for homeowners on maintaining their home. It includes seasonal checklists and step-by-step instructions for general maintenance, as well as special instructions for new home buyers on maintaining their home during its first year.
8.3 Mandatory

Tenant and Property Manager Orientation
All Projects

Rationale
An orientation to the project helps educate tenants and property manager(s) on the green features that were designed to deliver health, economic, and environmental benefits, as well as their role in realizing those benefits in their own lives and the lives of future tenants.

Requirements
Provide a comprehensive walk-through and orientation for the tenant and property manager(s) using the appropriate manual (see 8.1 and 8.2) to review the project’s green features, operations, and maintenance, and, for the tenant orientation, the neighborhood amenities that may facilitate a healthy lifestyle.

8.4 Optional – 5 points max

Project Data Collection and Monitoring System
All Projects

Rationale
A data collection and monitoring system helps project owners, on-site staff, and residents to understand project performance issues. Once an issue is identified, appropriate actions can be taken to maximize cost savings and health benefits associated with green building features.

Recommendations
- Ensure that the training for tenants and building maintenance staff includes information on how to effectively use the data collection, monitoring, and reporting system.
- Multifamily building data can be tracked and analyzed using EPA’s Portfolio Manager tool.
- Property owners have indicated that the best time to collect tenant release forms is during tenant lease-up.

Requirements
Collect and monitor project performance data on energy, water, and, if possible, healthy living environments for a minimum of five years. For sub-metered residential projects, property owner /developer must agree to collect utility release forms from a percentage of residents to track actual utility data of a sample of homes. The following table identifies the percentage of residents for which the property owner /developer must collect and track utility data, as based on the project size in total number of units.
Number of units Percentage of units
0 – 25 units 50%
25 – 100 units 25%
100+ units 15%

Resources
• Environmental Protection Agency, Portfolio Manager Overview:  
  www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager
  The Portfolio Manager Overview is an interactive energy management tool that  
  allows the project team to track and assess energy and water consumption across its  
  entire portfolio of buildings in a secure online environment.
**Glossary**

Websites listed were last accessed June 20, 2014.

**Adaptive plant species:** A non-native plant species that performs similarly to a native species in a particular region, state, ecosystem, and habitat, and that 1) can survive temperature / weather extremes in the microclimate; 2) requires little irrigation or fertilization, once established; 3) is resistant to local pests and diseases; and 4) does not displace other plants, as invasives do.

**Adaptive reuse site:** A site that was previously developed for non-residential purposes in which at least 25% of the proposed development will reuse existing non-residential structures.


**ASHRAE Standard 90.1-2010:** Establishes minimum requirements for the energy-efficient design of buildings, except single-family houses, multifamily structures of three stories or fewer above grade, and manufactured houses (mobile and modular). This standard is also the basis of Chapter 7 of the International Code Council’s International Energy Conservation Codes. State energy codes that may be more stringent than ASHRAE 90.1 are identified on the U.S. Department of Energy’s Building Energy Codes website, [www.energycodes.gov](http://www.energycodes.gov).

**Berm:** A sloped wall or embankment, typically constructed of earth, hay bales, or timber framing, used to prevent inflow or outflow of material into or out of an area. [www.epa.gov/OUST/pubs/tum_appx.pdf](http://www.epa.gov/OUST/pubs/tum_appx.pdf)

**Building Performance Institute (BPI):** A national standards development and credentialing organization for residential energy-efficiency retrofit work that provides training through a network of affiliate organizations, individual certifications, company accreditations, and quality assurance programs.

**California 01350:** A Special Environmental Requirements standard specification developed by the State of California to cover key environmental performance and public health considerations for building projects. Contains guidelines for energy, materials, water efficiency, indoor air quality (IAQ), nontoxic performance standards for cleaning and maintenance products, and sustainable site planning and landscaping considerations, among other measures. [www.calrecycle.ca.gov/greenbuilding/specs/section01350/](http://www.calrecycle.ca.gov/greenbuilding/specs/section01350/)
**CFM (cubic feet per minute):** A standard unit of measurement for airflow that indicates how many cubic feet of air are passing through a fixed point per minute.

**Charrette:** A focused and collaborative brainstorming session held at the beginning of a project to bring people from different disciplines and backgrounds together to explore design options for a particular area or site. All stakeholders are encouraged to exchange ideas and information beyond their areas of expertise so as to allow truly integrative design solutions to take form. [www.wbdg.org/wbdg_approach.php](http://www.wbdg.org/wbdg_approach.php)

**Common area:** An area available for use by more than one person, including rental or sales offices, entrances, hallways, shared leisure rooms, resident services areas, and laundry rooms.

**CSA (Community-Supported Agriculture):** A community of individuals who pledge support to a farm operation so that the farmland becomes the community’s farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production. Typically, members of the farm or garden pledge in advance to cover the anticipated costs of the farm operation and the farmer’s salary. In return, they receive shares in the farm’s bounty throughout the growing season. Members also share in the risks of farming, including poor harvests due to unfavorable weather or pests. [www.nal.usda.gov/afsic/pubs/csa/csadef.shtml](http://www.nal.usda.gov/afsic/pubs/csa/csadef.shtml)

**Compost blanket:** A layer of loosely applied compost or composted material that is placed on the soil in disturbed areas to control erosion and retain sediment resulting from sheet-flow runoff.

**CO (carbon monoxide):** A colorless, odorless, and tasteless gas that greatly affects indoor air quality. Because it is impossible to see, taste, or smell the toxic fumes, CO can kill you before you are aware it is in your home. At lower levels of exposure, CO causes mild effects that are often mistaken for the flu. These symptoms include headaches, dizziness, disorientation, nausea, and fatigue. [www.epa.gov/iaq/co.html](http://www.epa.gov/iaq/co.html)

**Distribution Uniformity:** A measure of the evenness of irrigation water coverage over a given area. [http://www.epa.gov/watersense/docs/home_final_waterbudget508.pdf](http://www.epa.gov/watersense/docs/home_final_waterbudget508.pdf)

**DU (distribution uniformity):** A standard unit of measurement that looks at how uniformly water is applied to a defined area.

**ECM (electronically commutated motor):** A DC electric motor that uses electricity efficiently, particularly at lower speeds. Also known as a “brushless DC motor.”

**Emissivity:** A unitless measure, describing the relative ability of a surface to emit heat through radiation, ranging from 0.00 (minimum radiation of heat) to 1.00 (maximum radiation of heat). Generally, more reflective materials have a lower emissivity.
**ENERGYSTAR**: A voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Introduced by the EPA in 1992, ENERGY STAR is an accepted, national standard for single-family and low-rise residential New Construction projects. ENERGY STAR New Homes Version 3 will be expanded to include mid-rise multifamily buildings with their own heating, cooling, and hot water systems.

**Engineered wood products**: Wood building materials manufactured by gluing particles, fibers, or veneers to increase strength. For the purposes of this standard, prefabricated and precut wood products are considered “engineered wood products.”
[www.astm.org/SNEWS/JUNE_2003/yeh_jun03.html](http://www.astm.org/SNEWS/JUNE_2003/yeh_jun03.html)

**Entryway**: Threshold separating the indoor space from the outdoor space.

**Environmental site assessment**: An investigation of the site’s conditions often performed before acquisition of a property to satisfy the due-diligence requirements of a property transaction.

**Erosion blankets**: Porous fabrics used for a variety of purposes, including separators, reinforcement, filtration and drainage, and erosion control.

**Filter sock**: A mesh tube filled with composted material that is placed perpendicular to sheet-flow runoff to control erosion and retain sediment in disturbed areas.

**Formaldehyde**: A chemical used widely by industry to manufacture building materials and numerous household products. Formaldehyde is also a by-product of combustion and certain other natural processes, and thus may be present in substantial concentrations both indoors and outdoors. Health effects include eye, nose, and throat irritation; wheezing and coughing; fatigue; skin rash; and severe allergic reactions. May cause cancer. [www.epa.gov/iaq/formalde.html](http://www.epa.gov/iaq/formalde.html)

**Greenfield**: A previously undeveloped parcel of land.

**Green roof**: A planted roof that reduces stormwater runoff.

**Greywater**: Wastewater produced from baths and showers, clothes washers, and lavatories. Greywater gets its name from its cloudy appearance and from its status as being neither fresh (as in potable water) nor heavily contaminated (as in blackwater from toilet waste).
**HERS Index (Home Energy Rating System Index):** A scoring system established by the Residential Energy Services Network (RESNET) in which a home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower a home’s HERS Index, the more energy efficient it is in comparison to the HERS Reference Home. Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home; thus a home with a HERS Index of 85 is 15% more energy-efficient than the HERS Reference Home, and a home with a HERS Index of 80 is 20% more energy-efficient.

**Home Energy Rating:** An analysis of a home’s construction plans and onsite inspections. Based on the home’s plans, the Home Energy Rater uses an energy-efficiency software package to perform an energy analysis of the home’s design. This analysis yields a projected, pre-construction HERS Index. Upon completion of the plan review, the rater will work with the builder to identify the energy-efficiency improvements needed to ensure that the house will meet ENERGY STAR performance guidelines. The rater then conducts on-site inspections, typically including a blower door test (to test the leakiness of the house) and a duct test (to test the leakiness of the ducts). Results of these tests, along with inputs derived from the plan review, are used to generate the HERS Index score for the home.

**IECC (International Energy Conservation Code):** A model building energy code created by the International Code Council to set a minimum standard for energy efficiency. [www.iccsafe.org/Pages/default.aspx](http://www.iccsafe.org/Pages/default.aspx)

**Infill:** A site with 75% of its perimeter bordering existing development or roads and with access to existing infrastructure.

**Integrative design:** A design approach that brings together at an early stage in project planning all the members of the building stakeholder community, and the technical planning, design, and construction team (including green building consultants such as the green rater, mechanical engineer /energy expert, and others) to look at the project objectives, building materials, systems, and assemblies from many different perspectives. This approach is a deviation from the typical planning and design process of relying on the expertise of specialists who work in their respective specialties somewhat isolated from each other. [www.wbdg.org/wbdg_approach.php](http://www.wbdg.org/wbdg_approach.php)

**Intermittent rate:** Ventilation that stops and starts at regular intervals (i.e., the opposite of continuous ventilation).

**LED (light-emitting diode):** Energy-efficient lights that produce less initial heat per lumen, consume less energy, and last longer than conventional incandescent and fluorescent lights.
**Low-impact development:** A strategy of site design where the goal is to restore the natural, pre-developed ability of an urban site to absorb stormwater.

**Maintained solar reflectance:** A measure of a material’s ability to maintain its initially rated solar reflectance. Products are tested over a period of three years.

**Manual D:** Manual prepared by the Air Conditioning Contractors of America (ACCA) on residential duct sizing.


**Moderate rehabilitation:** Enterprise Green Communities defines a moderate rehab as a project that does not fully gut and expose the structure and air barrier of the building envelope or replace / improve all major systems of the building.

**Native plant species:** A plant species that occurs naturally in a particular region, state, ecosystem, and habitat without direct or indirect human actions. [http://www.wildflower.org/plants/](http://www.wildflower.org/plants/)

**Naturescaping:** A method of landscaping that reduces water use, energy consumption, and chemical needs by using climate-appropriate plants and maintenance techniques.

**Non-buildable land:** Land that is not economically feasible to be developed, such as easements, utility fall zones, unsuitable soil, steep grades, water features, wetlands, or natural preserves.

**Open space:** Undeveloped land that is permanently set aside for public use. Open space may be used as community open space or preserved as green space, and includes parcels in conservation easement or land trust, park or recreation areas, and community gardens.

**Permeable paving:** A porous cover system that encourages groundwater recharge and infiltration. [www.epa.gov/oaintrnt/stormwater/pavers.htm](http://www.epa.gov/oaintrnt/stormwater/pavers.htm) and [www.epa.gov/greeningepa/stormwater/best_practices.htm](http://www.epa.gov/greeningepa/stormwater/best_practices.htm)

**Phenol-formaldehyde:** A resin used in the manufacture of composite wood products primarily for outdoor use, including softwood plywood and flake or oriented strand board. Composite wood products that contain phenol-formaldehyde generally emit formaldehyde at lower rates than those containing urea formaldehyde resin. [www.epa.gov/iaq/formalde.html](http://www.epa.gov/iaq/formalde.html)
**Photocell:** A light-sensitive device that detects ambient light and controls exterior fixtures accordingly.

**Photovoltaics:** Composite materials that convert sunlight directly into electrical power.

**Post-consumer waste:** Materials or finished products that have served their intended use and so have been diverted or recovered from waste destined for disposal.

**Post-industrial waste (also called pre-consumer waste):** Materials generated in manufacturing and converting processes such as manufacturing scrap and trimmings and cuttings.

**Public–private regional transportation:** Private company offering public transit services through a public funding stream, based on a regular schedule and permanent stops.

**Radon:** A colorless, odorless, and tasteless gas that greatly affects indoor air quality. According to the EPA, radon exposure is the second leading cause of lung cancer in the United States. [www.epa.gov/radon/pubs/citguide.html](http://www.epa.gov/radon/pubs/citguide.html)

**Resilient flooring:** Flooring products in which the wearing surface is non-textile, including but not limited to rubber, polymeric, and linoleum.

**RESNET (Residential Energy Services Network):** A national, nonprofit corporation that certifies raters to evaluate building energy performance using HERS. [www.resnet.us](http://www.resnet.us)

**Retention basin:** A shallow impoundment designed to infiltrate stormwater into the soil. [http://www.dec.ny.gov/lands/58930.html](http://www.dec.ny.gov/lands/58930.html)

**Road section:** The cross-section through a street, with particular attention paid to the width of the street and its hydrology. Carefully planned road sections can decrease the amount of impervious surfaces and can improve the overall stormwater management for the project site. More information can be found in the document *Low-Impact Development Design Strategies: An Integrated Design Approach*, found at [http://water.epa.gov/polwaste/green/upload/lidnatl.pdf](http://water.epa.gov/polwaste/green/upload/lidnatl.pdf)

**Rock filter:** A permanent or temporary stone structure installed to serve as a sediment-filtering device in drainage ways. Allows a pool to form in an excavated or natural depression, where sediment can settle. The pool is then dewatered through the gravel rock dam. [http://www.dec.ny.gov/lands/58930.html](http://www.dec.ny.gov/lands/58930.html)

**Silt fencing:** A temporary fabric barrier surrounding a site to control stormwater runoff. [http://www.dec.ny.gov/lands/58930.html](http://www.dec.ny.gov/lands/58930.html)
Silt sacks: Tube-shaped erosion-control devices.  
http://www.dec.ny.gov/lands/58930.html

Smart grid: A modern electrical grid that integrates a digital communication overlay on the electromechanical grid from the power plant to the end-use appliance.

Smart meter: A system that collects energy usage data (both energy consumption and production, if renewable systems are present) from a home or building.

Solar hot water system: Captures, converts, and transfers heat from direct and indirect sunlight to heat an auxiliary water tank and provide hot water for a building’s occupants.

Solar reflectance (or albedo): A measure of a material’s ability to reflect sunlight (including the visible, infrared, and ultraviolet wavelengths) on a scale of 0 to 1. A solar reflectance value of 0.0 indicates that the surface absorbs all solar radiation, and a 1.0 solar reflectance value represents total reflectivity.

Solar south: A measurement of the sun’s true position based on its path across the sky. It is different from magnetic south, which is taken from a compass reading. Methods for calculating solar south include the solar noon method or a compass using a magnetic declination chart to correct for magnetic declination.

Straw bale: A bound block of straw and organic material used to control stormwater runoff.  
http://www.dec.ny.gov/lands/58930.html

Substantial rehabilitation: Substantial rehab (or gut rehab) is defined as a project that guts and exposes the building envelope to expose the structure and air barrier and replaces or improves major systems of the building.

Supportive housing dwelling units: Permanent housing with attached intensive services targeted to populations that have special needs, including people who are currently or formerly homeless; those with serious, chronic mental health issues; people in various stages of recovery from substance abuse; people with HIV/AIDS, or physical or developmental disabilities; the formerly incarcerated, the frail elderly, homeless or emancipated youth, and victims of domestic violence; and other groups that would not be able to live independently and maintain housing without intensive support.

Swales: Shallow grass-covered hydraulic conveyance channels that help to slow runoff and facilitate infiltration.  
http://www.dec.ny.gov/lands/58930.html
**T8 fixture:** A fixture made up of a tubular fluorescent bulb and an electronic ballast, both operating with a higher efficacy than traditional tubular fluorescent design technology, such as the T12 bulb and magnetic ballast.

**Tiers:** Earthen embankments that reduce erosion by slowing, collecting, and redistributing surface runoff to stable outlets that increase the distance of overland runoff flow. [http://www.dec.ny.gov/lands/58930.html](http://www.dec.ny.gov/lands/58930.html)


**Transit ride:** A scheduled stop along a defined route of one form of public transportation (bus or rail).

**Universal design:** The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The principles of universal design are as follows: 1) equitable use, 2) flexibility in use, 3) simple and intuitive use, 4) perceptible information, 5) tolerance for error, 6) low physical effort, and 7) size and space for approach and use.

**Urea-formaldehyde:** A toxic resin created from formaldehyde that causes similar side effects. Composite wood products made for indoor use, such as particleboard, hardwood plywood paneling, and medium-density fiberboard, often contain this resin. [www.epa.gov/iaq/formalde.html](http://www.epa.gov/iaq/formalde.html)

**Ventilation:** The process of supplying outdoor air to, or removing indoor air from, a dwelling by natural or mechanical means. Such air may or may not have been conditioned.

**VOCs (Volatile Organic Compounds):** A large group of carbon-based chemicals that easily evaporate at room temperature. [www.epa.gov/iaq/voc.html](http://www.epa.gov/iaq/voc.html)

**Walk distance:** The distance a pedestrian must travel between origins and destinations without obstruction, in a safe and comfortable environment on a continuous network of sidewalks, all-weather surface footpaths, crosswalks, or equivalent pedestrian facilities. Any crossing of a street with speeds at or greater than 30 miles per hour requires controlled crossing (e.g., a stop sign or stop light).

**Watershed:** The area of land where all of the water that is under it or drains off of it goes into the same place. [www.epa.gov/owow/watershed/whatis.html](http://www.epa.gov/owow/watershed/whatis.html)
**Weekend ride options:** A public transit option of either bus, rail, or ferry service. Employer-assisted vanpools and dial-a-ride programs are examples of qualifying weekend service.

**Xeriscaping:** A method of landscaping aimed at reducing or eliminating excess water from irrigation by using drought-tolerant plants.
Appendix A

Yonkers Green Buildings Ordinance
GENERAL ORDINANCE NO.3-2013

BY COUNCIL PRESIDENT LESNICK, MAJORITY LEADER TERRERO,
MINORITY LEADER LARKIN, COUNCILMEMBERS JOHNSON,
SABATINO, SHEPHERD AND BREEN:

A GENERAL ORDINANCE AMENDING PART V OF THE YONKERS
CITY CODE BY ADDING CHAPTER 50 ENTITLED "YONKERS GREEN
BUILDINGS"

Be it ordained by the City Council of the City of Yonkers, as follows:

Section 1. Part V of the Code of the City of Yonkers entitled "Land
Use" is hereby amended in part by adding a new Chapter 50 entitled
"Yonkers Green Buildings" to read as follows:

§ 50-1. Short title; statement of purpose and legislative findings.

a. This Chapter shall be known as "the Yonkers Green Buildings Code."

b. The purpose of this legislation is to establish a City of Yonkers policy to
plan, design, construct, manage, renovate, and maintain its facilities
and buildings to be sustainable and to encourage certain commercial
and residential developers to do the same.

c. Legislative Findings:

(1) The City of Yonkers is dedicated to the mutually compatible
goals of economic vitality, social equality and environmental
stewardship.

(2) The City of Yonkers is dedicated to the environmental health
and safety of its employees, and to efficient and effective work.

(3) Municipal governments should assume the role of leadership in
promoting the efficient use of natural resources providing for the
long-term protection and enhancement of our environment, our
economy and the health of our citizens and future generations.

(4) Buildings are one of the heaviest consumers of natural
resources and account for a significant portion of the
GENERAL ORDINANCE NO.3-2013 (CONTINUED)

greenhouse gas emissions that affect climate change. In the United States, buildings account for 38% of all CO\textsubscript{2} emissions. Buildings represent 73% of electricity consumption.

(5) The Yonkers Green Development Standards will address specific environmental impacts of development in Yonkers. Use of these standards will conserve natural resources, increase energy and water efficiency and improves indoor air quality to maintain long terms value, reduce operating costs, and ensure more comfortable and healthy buildings in Yonkers.

(6) It is in the best interest of the people of Yonkers that all municipal buildings constructed, expanded, or renovated should be modern facilities, combining the most energy-efficient design, the most environmentally sustainable systems, with maximum access and benefit to employees and the public.

(7) The City of Yonkers should encourage the use of the Yonkers Green Building Standards in certain commercial and residential developments.

§ 50-2. Definitions

a) “City” means the City of Yonkers and its departments, offices, including the Yonkers City School District.

b) “Commissioner” means the Commissioner of the Yonkers Department of Planning and Development.

c) “Covered Public Project” means a construction project involving real property including land and/or buildings which meet the terms of subparagraphs (1) and (2) of this paragraph:

1) The City is the record owner of said real property including land and/or buildings or related improvements which are used for municipal or school purposes; and

2) Which involve (A) new construction, or (B) renovation of an existing building or the expansion of an existing building provided that this ordinance shall apply only to the extent of the improvements: i) necessary for the
GENERAL ORDINANCE NO. 3-2013 (CONTINUED)

renovation or rehabilitation of a portion of an existing building, or ii) necessary for the expansion of an existing building, the applicable green building standards shall apply only to such portion of an existing building being renovated or rehabilitated or to the actual expansion of the existing building respectively; and iii) where such rehabilitation or renovation includes separate specifications for the following four subdivisions of the work to be performed: a) plumbing; b) heating, ventilation and air conditioning; c) electric wiring; and d) general contracting.

d) "Department" means the Department of Planning and Development.

e) "Public Building" means any real property and buildings and/or improvements thereon owned by the City of Yonkers and used for municipal and public purposes.

f) "Yonkers Green Building Standards" shall mean the standards developed and approved by the Commissioner designed to conserve natural resources, increase energy and efficiency and improve indoor air quality.


The Commissioner shall implement the Yonkers Green Building Standards within thirty days after passage of this legislation by the Yonkers City Council. The Commissioner shall cause said standards to be reviewed on an annual basis and provide an annual report to the City Council.


a) Green Building Standards.

All Covered Public Projects entering the design phase 90 or more days after the effective date of this legislation shall be designed, constructed and certified to at least the Yonkers Green Building Standards.

b) Exemptions.
A Covered Public Project does not have to meet the Yonkers Green Building Standard or comparable standard if the Commissioner determines that:

1) There is no appropriate Yonkers Green Building Standard or comparable standard for that type of building or renovation project. In such case, the Department may set lesser green building standards that are appropriate to the project.

2) There is no practical way to apply the Yonkers Green Building standard to a particular building or renovation project. In that case, the Department may set different green building standards that are appropriate to the project.

c) Any determinations made by the Commissioner as to exemptions under this section shall be detailed in writing and made part of the Department's record.


All new non-residential development site plan applications for projects greater than 15,000 square feet and residential development site plan applications for projects greater than 25 units shall include a Green Buildings survey in a form to be approved by the Commissioner.
GENERAL ORDINANCE NO.3-2013 (CONTINUED)

Section 2.
This Ordinance shall take effect immediately, subject to the provisions of § 50-4(a) contained herein.

MOTION BY COUNCILMEMBER JOHNSON, SECONDED BY COUNCILMEMBER SABATINO TO MAKE A FRIENDLY AMENDMENT TO THE ABOVE LEGISLATION. THIS MOTION WAS CARRIED UNANIMOUSLY

THIS GENERAL ORDINANCE WAS ADOPTED BY THE CITY COUNCIL AT A STATED COUNCIL MEETING HELD ON TUESDAY, MAY 14, 2013 BY A VOTE OF 7-0.

COUNCIL PRESIDENT
5-15-13
DATE

SENT TO MAYOR 5-17-13
DATE

MAYOR
APPROVED 5/22/13
DATE

ATTEST:

ACTING CITY CLERK
5/22/13
DATE
Appendix B

Downtown Districts Green Building Requirement
Chapter 43. ZONING

Article XVIII. Downtown Districts

§ 43-222. Green building requirement.
The provisions of the City of Yonkers’ green building standards apply to the construction, addition, alteration, enlargement, removal and demolition of every structure and any appurtenances connected or attached to such structures and to the site on which the structure is located, except that these provisions do not apply to detached and attached one- and two-family dwellings.
Appendix C

Downtown Districts Map