



CHARLESTON
R|I|S|E|S
HIGH PERFORMANCE BUILDING
RESILIENT, INNOVATIVE, SUSTAINABLE, EFFICIENCY STANDARDS

2016 TECHNICAL GUIDELINES

Charleston RISES™ is a program of The Sustainability Institute and Green Badger LLC.

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Introduction

The Charleston RISES™ certification program was created to address the specific green building needs of the Charleston, South Carolina region. The RISES Program promotes new construction projects that are at least 30% more energy and water efficient than projects that are simply code compliant and are constructed using materials and products that do not adversely affect the health and well-being of the building occupants. The RISES Program is customized to address the specific needs of the Charleston and Lowcountry region.

All local building codes must be met. When local building codes are more stringent than the RISES program, the local code must be followed.

The RISES Program consists of fourteen (14) required actions and thirty-four (34) optional credits for a possible eighty (80) points. Projects cannot earn certification without successfully implementing the required actions. Additionally, a threshold of points must be met in some sections. A minimum of five (5) of points must be achieved in Site Planning and Sustainability, six (6) points in Sustainable Materials and five (5) points in Healthy Interiors. A minimum of twenty-five (25) points from these optional credits is necessary to earn certification.

Certification Summary

25 Points Required for Certification			Yes	Maybe	No	Achieved
Site Planning - 5 Points Required		Possible Points:	14			
Required	Construction Pollution Mitigation					
Required	Mobility Amenities					
Required	Sensitive Land Protection					
Credit 1	Site Connectivity	2				
Credit 2	Impacted Site	1,3,5				
Credit 3	Mass Transit Access	1				
Credit 4	Electric Vehicle Stations	1				
Credit 5	On-site Green Space	1				
Credit 6	Stormwater Management	1,2				
Credit 7	Shaded or High Albedo Paving	1				
Credit 8	Light Pollution Reduction	1				
Water Conservation		Possible Points:	8			
Required	Potable Water Use - 30% Reduction					
Credit 1	Potable Water Use - 35% OR 40% Reduction	1,3				
Credit 3	Greywater Use	3				
Credit 4	Site Irrigation, Zero Potable Water Use	2				
Energy Efficiency and Renewable Power		Possible Points:	27			
Required	Building Systems Commissioning					
Required	Energy Conservation, 30%					
Required	Long Term Efficiency Verification					
Required	Air Sealing and Insulation					
Credit 1	Additional Reductions in Energy Use	1-10				
Credit 2	On-Site Renewable Energy	1-10				
Credit 3	LED Parking Lot Lighting	1-2				
Credit 4	Building Automation System	2				
Credit 5	Submetering and Reporting	2				
Credit 6	Green Power	1				
Sustainable Materials - 6 Points Required		Possible Points:	17			
Required	Onsite Recycling					
Credit 1	Building Reuse, Shell and Interior	1-4				
Credit 2	Construction Waste Management	1-2				
Credit 3	Materials Reuse	1-2				
Credit 4	Recycled Content	1-2				
Credit 5	Local & Regional Materials	1-2				
Credit 6	Rapidly Renewable Materials	1				
Credit 7	Certified Wood	1				
Credit 8	LED Light Fixtures	1-3				
Healthy Interiors - 5 Points Required		Possible Points:	11			
Required	Building Ventilation					
Required	Nonsmoking Building					
Required	Interior Air Quality During Construction					
Required	Low-Emitting Materials—Paints & Coatings/Adhesives & Sealants					
Required	Thermal Comfort					
Credit 1	Low-Emitting Flooring Materials	2				
Credit 2	Formaldehyde Free Composite Wood	2				
Credit 3	Low-Emitting Furniture	2				
Credit 4	Task Lighting & Multi-level Controls	2				
Credit 5	Daylit Spaces	2				
Credit 6	Green Cleaning Program	1				
Innovation		Possible Points:	3			
Prereq 1	Education and Outreach					
Credit 2	Innovation in Design	1				
Credit 3	Innovation in Design	1				
Credit 4	Innovation in Design	1				
Total		Possible Points:	80			

Certification Documentation

Local Jurisdiction Approvals

	Team	Scheduled Event	Deliverables	Point
<input type="checkbox"/>	GC	Construction Start	The City of Charleston approval of SWP3 & ESC plans	SPr1
<input type="checkbox"/>	GC	Design Review	SWP3 & ESC plan	SPr1
<input type="checkbox"/>	PM	Design Review	Official confirmation of brownfield status	SPc2
<input type="checkbox"/>	PM	Construction Start	Local jurisdiction approval of the gray water system	WCc2

Site Plan/Map (Permit Drawings)

	Team	Scheduled Event	Deliverable	Point
<input type="checkbox"/>	PM	Design Review	BMP locations	SPc6
<input type="checkbox"/>	PM	Design Review	Filtering system locations	SPc6
<input type="checkbox"/>	PM	Design Review	Electric vehicle parking spaces & bicycle racks	SPr2
<input type="checkbox"/>	PM	Design Review	100ft from wetlands, water bodies & green spaces	SPr3
<input type="checkbox"/>	PM	Design Review	Services & residential buildings within a ½ mile radius	SPc1
<input type="checkbox"/>	PM	Design Review	Bus, trolley or water taxi access points	SPc3
<input type="checkbox"/>	PM	Design Review	Electric vehicle charging station location & specs	SPc4
<input type="checkbox"/>	PM	Design Review	Green space and green space area calculations	SPc5
<input type="checkbox"/>	PM	Design Review	Tree shading/high albedo paving locations & area calcs	SPc7
<input type="checkbox"/>	PM	Design Review	Indicate that no irrigation system shall be installed	WCc3
<input type="checkbox"/>	EE	Design Review	Renewable energy system location & spec	EERPc2

Other Plans (Permit Drawings)

	Team	Scheduled Event	Deliverables	Point
<input type="checkbox"/>	EE	Design Review	Power: building automation system location & spec	EERPc4
<input type="checkbox"/>	EE	Design Review	Power: Submetering system location & spec	EERPc5
<input type="checkbox"/>	EE	Design Review	Lighting: Lighting controls & switching layouts	HIc4

Equipment Schedule: Manufacturers & Model Number (Permit Drawings)

	Team	Scheduled Event	Deliverables	Point
<input type="checkbox"/>	EE	Design Review	Exterior building and site lighting fixtures	SPc8
<input type="checkbox"/>	ME	Design Review	Insulation	EERPr4
<input type="checkbox"/>	MEP	Design Review	Lighting, HVAC, solar thermal & plumbing equipment	EERPc1
<input type="checkbox"/>	EE	Design Review	LED parking lot lighting fixtures	EERPc3
<input type="checkbox"/>	EE	Design Review	Electrical panel load schedules	EERPc6
<input type="checkbox"/>	EE	Design Review	LED interior & exterior lighting fixtures	SMc8
<input type="checkbox"/>	ME	Design Review	HVAC equipment schedules	HIr1

Equipment Cut Sheets (Bid Package)

	Team	Scheduled Event	Deliverables	Point
<input type="checkbox"/>	GC	Inspection	Electric vehicle charging station	SPc4
<input type="checkbox"/>	GC	Inspection	Exterior building & site lighting fixtures	SPc8
<input type="checkbox"/>	GC	Inspection	Lighting, HVAC, solar thermal & plumbing equipment	EERPc1
<input type="checkbox"/>	GC	Inspection	On-site renewable energy	EERPc2
<input type="checkbox"/>	GC	Inspection	LED parking lot lighting fixture	EERPc3
<input type="checkbox"/>	GC	Inspection	Building automation system	EERPc4
<input type="checkbox"/>	GC	Inspection	Submetering system	EERPc5
<input type="checkbox"/>	GC	Inspection	LED interior & exterior light fixtures	SMc8

New Forms

	Team	Scheduled Event	Deliverables	Point
<input type="checkbox"/>	PM	Design Review	Application	N/A
<input type="checkbox"/>	PM	Design Review	Utility waiver form	EERPr3
<input type="checkbox"/>	PM	Final Inspection	Renewable energy credit proof of purchase	EERPr6

New Reports/Calculations

* Submit item 1 week prior to scheduled event

** Submit item monthly

= Document created by Green Badger tools

	Team	Scheduled Event	Deliverable	Point
<input checked="" type="checkbox"/>	GC	Construction Start **	GB inspection status reports for ESC measures	SPr1
<input type="checkbox"/>	PM	Design Review	Brownfield remediation plan	SPc2
<input type="checkbox"/>	CE	Construction Inspection	Stormwater calculations	SPc6
<input type="checkbox"/>	CE	Construction Inspection	BMP quantitative analysis & narrative of TSS reduction	SPc6
<input checked="" type="checkbox"/>	PM	Design Review	GB 30% water reduction calculations	WCr1
<input checked="" type="checkbox"/>	PM	Design Review	GB 35% OR 40% water reduction calculations	WCc1
<input checked="" type="checkbox"/>	GC	Design Review	GB 50% toilet water calcs & water reuse strategies	WCc2
<input type="checkbox"/>	PM	Design Review	Landscape water use calcs & water reuse strategies	WCc3
<input type="checkbox"/>	PM	Commissioning	Commissioning report due within 2 weeks	EERPr1
<input type="checkbox"/>	PM	Final Inspection *	Updated commissioning report with issues resolved	EERPr1
<input type="checkbox"/>	EE	Design Review	30% energy reduction via prescriptive LPD calculations OR whole building energy modeling	EERPr2
<input type="checkbox"/>	SI/GC	Air Sealing Inspection	Air sealing/insulation installation issues due in 1 week	EERPr4
<input type="checkbox"/>	EE	Design Review	>30% energy reduction via prescriptive LPD calculations OR whole building energy modeling	EERPr1
<input type="checkbox"/>	PM	Final Inspection	Building policy & plan for on-site recycling	SMr1
<input type="checkbox"/>	GC	Design Review	Surface area building reuse calculations	SMc1
<input checked="" type="checkbox"/>	GC	Final Inspection	GB waste report, calculations & tickets	SMc2
<input checked="" type="checkbox"/>	GC	Final Inspection*	GB material reuse report & cost calculations	SMc3
<input checked="" type="checkbox"/>	GC	Final Inspection*	GB recycled content report & cost calculations	SMc4
<input checked="" type="checkbox"/>	GC	Final Inspection*	GB local & regional materials report & cost calculations	SMc5
<input checked="" type="checkbox"/>	GC	Final Inspection*	GB rapidly renewable materials report & cost calcs	SMc6
<input checked="" type="checkbox"/>	GC	Final Inspection*	GB certified wood report & cost calculations	SMc7
<input checked="" type="checkbox"/>	GC	Construction Start**	GB report of SMACNA measures	Hlr3
<input checked="" type="checkbox"/>	GC	Construction Inspection	GB report of paints/coatings/sealants/adhesives	Hlr4
<input type="checkbox"/>	ME	Design Review	Demonstrate compliance with ASHRAE 55-2004 & Section 6.1.1 AND/OR the Thermal Comfort Tool	Hlr5
<input checked="" type="checkbox"/>	GC	Design Review	GB low-emitting floor materials report	Hlc1
<input checked="" type="checkbox"/>	GC	Design Review	GB formaldehyde-free composite wood report	Hlc2
<input checked="" type="checkbox"/>	GC	Design Review	GB low-emitting furniture report	Hlc3
<input type="checkbox"/>	GC	Design Review	Footcandle computer simulation in daylit areas	Hlc5
<input type="checkbox"/>	GC	Final Inspection*	Light meter readings measured in the field	Hlc5
<input type="checkbox"/>	PM	Final Inspection*	Green cleaning policy/contract with cleaning services	Hlc6

Process

Registration	<ul style="list-style-type: none">•The Owner and Project Manager (PM) registers the project with the Sustainability Institute (SI)
Design Review	<ul style="list-style-type: none">• At 50-80% completed construction documents, the Project Team will review the design with SI to verify sustainable design elements as outlined in The Standard prior to submission for permitting.
Begin Construction	<ul style="list-style-type: none">•The General Contractor reports construction progress using Green Badger tracking software.
Air Sealing Inspection	<ul style="list-style-type: none">•SI performs on-site inspection to verify air sealing measures and Grade II or better insulation installation.
Construction Inspection	<ul style="list-style-type: none">•SI performs additional site visits to monitor the progress of sustainable construction practices as outlined by The Reference Guide.
Commissioning	<ul style="list-style-type: none">•The PM coordinates with SI to contract an independent 3rd party to commission the building systems and verify the design operating parameters.
Final Inspection	<ul style="list-style-type: none">•SI verifies the installation of the sustainable elements per the design plans and confirms that all of the issues identified in the commissioning report have been resolved.
Certification	<ul style="list-style-type: none">•Upon satisfactory field verification and Green Badger review, SI issues RISES certification to project team!

Disclaimer

The RISES Program recognizes projects that integrate sustainable and efficient building strategies throughout the design, construction and commissioning processes. The Owner, Project Manager and design team are solely responsible for choosing the criteria that are appropriate for their project. The Sustainability Institute (“SI”) is responsible only for verifying the completion of requirements as set forth in this Reference Guide. Such verification in no way constitutes a warranty as to the appropriateness of the selected criteria or the quality of implementation.

SI and GB have attempted to assemble all information in this Reference Guide and related materials accurately, but users should confirm all information independently. This Reference Guide and all activities of SI and GB relating to the program are not intended to be and may not be relied upon by third parties for any purpose.

Further, certification by SI and Green Badger, LLC (GB) should also not be construed as a warranty for the project, including, but not limited to any warranties of habitability, merchantability, or fitness for a particular purpose. There are no warranties, express or implied, written or oral, statutory or otherwise, with respect to the certification provided by SI to the accuracy, or completeness, or use of, or reliance on, any information contained in this Reference Guide, and SI and GB assume no responsibility for any injuries, losses or damages arising out of such use or reliance. Obtaining certification does not indicate that the project is structurally safe, compliant with applicable building and safety laws, regulations or codes or free of volatile organic compounds or allergens.

This program is not meant to serve as a basis to settle of disputes between third parties, including, but not limited to contractual disputes that arise between owners, project teams, government agencies and contractors. Accordingly, the RISES Program and the services provided by SI and GB do not replace the applicable judicial processes that such third parties may utilize to resolve such disputes between themselves.

Use of this Reference Guide or any other materials pertaining to the constitutes an agreement to waive and release SI and GB and other associated members from any and all claims, demands and causes of action for any injuries, losses or damages, including, but not limited to those that users may now or hereafter have a right to assert against such parties as a result of the use of, or reliance on, the Reference Guide.

About The Sustainability Institute

The Sustainability Institute (“SI”) is a nonprofit organization that empowers South Carolinians to conserve energy and reduce our environmental footprint where we live and work. SI aims to alter market behavior and systematically drive consumer demand for energy efficient and sustainable buildings through community education and outreach, the removal of identified barriers for customers and the development of trained and certified workforce professionals to perform quality energy improvements.

Contact

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About Green Badger

Green Badger (“GB”) is a sustainability-focused technology company that was founded to make life easier for all parties working on green building projects. Our mission is to simplify the green building documentation process. We believe that owners and project teams should not spend their valuable time and money on paperwork. They should focus on designing and constructing greener buildings. Green Badger exists to help make that happen.

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SITE PLANNING

SPr1 – Construction Pollution Mitigation Required

Intent

Stormwater runoff washes pollution from construction sites, roads, rooftops, parking lots, and driveways into tidal creeks. These tidal creeks feed into Charleston Harbor, exposing fragile ecosystems to pollution. To protect these fragile ecosystems, it is important to minimize the impact of the built environment on these sensitive waters.

Criteria

- Comply with the 2013 SCDHEC NPDES CGP 2003 EPA Discharge Permit or local code, whichever is more stringent.
- The General Contractor must inspect, document and report compliance with SWP3 and ESC measures each month and after rain events using:
 - Green Badger **OR**
 - Independent 3rd party inspections from a qualified agency per state requirements.

Deliverables

- *Construction Start:* The General Contractor shall provide a copy of the City of Charleston approval of Stormwater Pollution Prevention Plan (SWP3) and Erosion and Sedimentation Control (ESC) to the Sustainability Institute.
- *Design Review:* The General Contractor shall provide a copy of the SWP3 & ESC plan to the Sustainability Institute.
- *Construction Start:* The General Contractor must submit a copy of the inspection report to the Sustainability Institute each month:
 - Describes the status ESC measures and include photos.
 - Identify issues that must be resolved and include photos.

SPr2 – Mobility Amenities Required

Intent

In 2014, the Charleston tri-county metropolitan region was one of the fastest growing areas on the Atlantic Coast. Providing alternative transportation options can reduce traffic congestion and noise. Positive health effects include increased physical activity and improved air quality due to reduced vehicle miles travelled and the use of alternative transportation fuel.

Criteria

Project will provide mobility amenities consisting of the following:

- 2.5% of the total vehicle parking spaces shall be allocated to hybrid or electric vehicles and located at the primary building entrance, adjacent to accessible ADA parking spaces; **AND**
- 2.5% of the total vehicle parking spaces shall be allocated to carpool vehicles and located at the primary building entrance, adjacent to accessible ADA parking spaces; **AND**
- Bicycle Racks
 - Residential – Provide the greater of, one (1) bicycle parking space per bedroom **OR** ten (10) bicycle parking spaces, whichever is greater.
 - A studio unit shall count as one (1) bedroom.
 - Areas within dwelling units do not count toward the bicycle parking requirement.
 - Non-Residential – Provide the greater of, one (1) bicycle parking space for every two thousand (2,000) square feet of non-residential use **OR** five (5) bicycle parking spaces.
 - Mixed use – Use bicycle parking and facility requirements for non-residential and residential as defined above in a calculated ratio of the space. The minimum number of parking spaces required for a combination of office and residential in at least fifty (50%) percent of the building shall be five (5) parking spaces.

Deliverables

- Design Review*: The Project Manager shall provide a site plan that clearly labels preferred parking spaces and bicycle racks to the Sustainability Institute.
- Final Inspection*: SI will verify installation during final inspection and submit a signed verification form to the owner.

SPr3 – Sensitive Land Protection Required

Intent

The natural landscape is an integral part of the history, culture and economy in the Lowcountry. It is important to protect greenfields, or undeveloped land, and repurpose developed land when possible.

Criteria

- A greenfield project will not disturb or develop any part of the site that is within one hundred (100) feet of wetlands or water bodies.
- Previously developed sites are excluded from this requirement.

Deliverables

- Design Review:* The project manager shall provide a site plan that illustrates a minimum of one hundred (100) feet distance from wetlands or water bodies to the Sustainability Institute. All wetlands, water bodies and green spaces shall be clearly labeled.

SPc1 – Site Connectivity 2 Points

Intent

Promote new developments in areas with existing infrastructure and services to reduce the impact on the environment and improve public health by encouraging physical activity.

Criteria

- Locate the project within a ½ mile walking distance of ten (10) distinct services. No more than two (2) services per category may be included; **AND**
 - Applicable services include, but are not limited to retail, grocery, convenience Store, fire Station, police Station, restaurant, coffee shop, gym, barber/salon, child care, school, place of worship, library, cultural center, medical office/center.
 - Coordinate the approval of applicable services that are not listed in this document with the Sustainability Institute.
- Locate the project within ½ mile distance of a residential development with a minimum density of seven (7) units per acre.

Deliverables

- Design Review:* The Project Manager shall provide a map that clearly labels the services and residential developments that are within a ½ mile radius of the site to the Sustainability Institute.

SPc2 – Impacted Site
1, 3 OR 5 points

Intent

Per EPA Phase I or Phase II assessments, sites that are impacted due to prior development activities or hazardous materials are designated as brownfields. Remediating these impacted sites will preserve existing greenfields and increase development opportunities in Charleston.

Criteria

Locate the project on:

- A previously developed site for 1 point; **OR**
- A brownfield site that is capped for 3 points; **OR**
- A brownfield site that is fully remediated for 5 points

Deliverables

- Design Review:* The Project Manager shall provide documentation confirming the status of the project site to the Sustainability Institute.
- Design Review:* The Project Manager shall provide a remediation plan that has been approved by the local regulating authority to the Sustainability Institute. These documents shall clearly indicate that no further action is required.

SPc3 – Mass Transit Access
1 Point

Intent

Reducing the use of single-occupancy vehicles can decrease traffic congestion and improve air quality.

Criteria

- Locate the project within ¼ mile walk of two (2) or more public bus, trolley or water taxi lines.

Deliverable

- Design Review:* The Project Manager shall provide a map that clearly labels the bus, trolley or water taxi access points.

SPc4 – Electric Vehicle Stations

1 Point

Intent

Providing electric vehicle charging stations promotes domestic and local energy consumption. It also improves air quality by promoting the use of low-emission transportation fuels and increases energy security by reducing petroleum dependency.

Criteria

- Install Level 2 or DC Fast Charging electrical vehicle recharging stations for 2% of total parking capacity of the project site.

Deliverables

- Design Review:* The Project Manager shall provide a site plan that clearly labels the electric vehicle charging stations to the Sustainability Institute.
- Final Inspection:* The General Contractor shall provide equipment cut sheets and/or specifications to the Sustainability Institute to verify compliance prior to purchase.
- Final Inspection:* SI will verify equipment installation during final inspection and submit a signed verification form to the owner.

SPc5 – On-site Green Space

1 Point

Intent

Development in the Lowcountry is increasing rapidly. It is important to balance the new construction with green spaces. Studies have shown that green space has a positive impact on the perceived general health of residents.

Criteria

- Provide twenty-five percent (25%) more green space on the project site than required by the local authority.
- If green space is not required by code, provide green space equal to the size of the building footprint.

Deliverables

- Design Review:* The Project Manager shall submit the following to the Sustainability Institute:
 - Area calculations; **AND**
 - A site plan that clearly labels the green space.

SPc6 – Stormwater Management

1 OR 2 Points

Intent

Stormwater runoff washes pollution from roads, rooftops, parking lots, and driveways into tidal creeks. These tidal creeks feed into Charleston Harbor, exposing fragile ecosystems to pollution. To protect these fragile ecosystems, it is important to minimize the impact of the built environment on these sensitive waters. Two methods may be utilized to achieve this goal.

- (1) Design, construct and maintain stormwater best management practices (BMPs) to reduce the quantity of off-site discharge.
- (2) To reduce the impact of pollution by improving the stormwater runoff water quality.

Decrease the Volume of Runoff into Storm Drains

1 Point

Criteria

- Prevent the off-site discharge of one (1) inch of stormwater runoff from the total site area using aesthetically pleasing and functional Low Impact Development systems as defined in the *Low Impact Development Manual for South Carolina*¹.
 - Approved systems include, but are not limited to, bioretention cells, rain gardens, permeable pavement, stormwater infiltration, green roofs, rainwater harvesting, impervious surface disconnection, pocket wetlands and open channels.
 - All vegetation used shall be *native plants*. Guidelines for plant selection and installation recommendations found in the below referenced Low Impact Development Manual should be followed, they can be found in Chapter 3 on pages 3-46 through 3-50.
- The use of stormwater controls on sites with contaminated soils will be considered by the Sustainability Institute on a case by case basis.
- Surface retention or detention facilities (i.e. ponds) shall only be permitted per local regulations.

Deliverables

- Design Review*: The Project Manager shall provide a site plan that clearly labels the location of the BMPs to the Sustainability Institute.
- Construction Inspection*: The Civil Engineer shall provide a copy of the stormwater calculations to the Sustainability Institute.

¹ Ellis, K., C. Berg, D. Caraco, S. Drescher, G. Hoffmann, B. Keppler, M. LaRocco, and A. Turner. 2014. Low Impact Development in Coastal South Carolina: A Planning and Design Guide. ACE Basin and North Inlet – Winyah Bay National Estuarine Research Reserves, 462 pp.

Improve Water Quality

1 Point

Criteria

- Treat 90% of the baseline site runoff to remove eighty percent (80%) of total suspended solids (TSS).

Deliverables

- Design Review*: The Project Manager shall provide a site plan that clearly labels the filtering system locations to the Sustainability Institute.
- Construction Inspection*: The Civil Engineer shall provide the quantitative analysis and narrative that explains how each BMP reduces the TSS for the site to the Sustainability Institute.

SPc7 – Shaded or High Albedo Paving

1 Point

Intent

The built environment consists of surfaces that absorb light and heat. This contributes to higher than average temperatures in urban areas relative to suburban or rural areas. South Carolina experiences high temperatures and humidity in the summer. As a result, people in cities may be at greater risk for heat-related illnesses. Heat absorption can be prevented by shading and mitigated by installing reflective surfaces (i.e. high albedo paving) with a high Solar Reflective Incidence (SRI).

Criteria

For fifty percent (50%) of the total impervious paving on project site:

- Provide tree shading **OR**
- Utilize light-colored paving materials (with a SRI of > 29)

Deliverables

- Design Review*: The Project Manager shall provide area calculations and a site plan that clearly labels tree shading and/or high albedo paving materials to the Sustainability Institute.

SPc8 – Light Pollution Reduction

1 Point

Intent

South Carolina is home to a wide range of flora and fauna whose biological cycles are adversely affected by excessive nocturnal light pollution. Directional light fixtures, or luminaires, would provide uniform and continuous light levels at walkways and access points to buildings, while limiting the detrimental effects on the local ecosystem.

Criteria

The scope of this credit includes the exterior building and landscape/ground luminaires. Interior light fixtures that are visible from the building exterior and located in unconditioned spaces (i.e. open parking structures) must comply with these requirements.

- Install full cutoff fixtures for one hundred percent (100%) of exterior building luminaires and landscape/ground light fixtures; **AND**
- Installed lighting power density (LPD) must be ten percent (10%) below ASHRAE 90.1-2007

Deliverables

- Design Review:* The Electrical Engineer shall provide a hardcopy of the lighting fixture schedule (luminaire and lamp manufacturer, ballast type, lamp type, and lamp quantities), lighting fixture counts and installed wattage calculation.
- Construction Inspection:* The General Contractor shall provide light fixture cut sheets to the Sustainability Institute.
- Final Inspection:* SI will verify LED installation during final inspection and submit a signed verification form to the owner no later than two (2) after SI's final inspection.

WATER CONSERVATION

WCr1 – Potable Water Use, 30% Reduction Required

Intent

The Hanahan Water Treatment Plant sources freshwater from the Bushy Park Reservoir. Maximum daily flow is currently at sixty-six percent (66%) permitted capacity. Sewage is treated at the Plum Island Wastewater Treatment Plant is at fifty-three percent (53%) permitted capacity. As the metropolitan region continues to grow, reducing water consumption and sewage will allow utilities to continue providing high quality potable water to residents and businesses while minimizing the detrimental effects on the local freshwater resources.

Criteria

The building water consumption must:

- Comply with the 2005 Energy Policy Act requirements for toilets, urinals, lavatories, kitchen/break room sinks, and showers; **AND**
- Relative to EPACT baseline requirements, reduce building water use by an additional thirty percent (30%).
- Utilize the Green Badger Water Calculator to perform calculations (see Table 1A in Appendix A).

Deliverables

- Design Review*: The Project Manager shall submit a copy of the Green Badger calculations to the Sustainability Institute

**WCc1 – Potable Water Use, 35 OR 40% Reduction
1 OR 3 Points**

Intent

To further reduce building water consumption.

Criteria

- Comply with the 2005 Energy Policy Act (EPACT) requirements for toilets, urinals, lavatories, kitchen/break room sinks, and showers; **AND**
- Relative to EPACT baseline requirements, reduce building water use by an additional:
 - 35% for 1 point; **OR**
 - 40% for 3 points
- Use the Green Badger Water Calculator to perform calculations.

Deliverables

- Design Review*: The Project Manager shall provide the Green Badger Water Calculation report to the Sustainability Institute.

WCc2 – Graywater Use

3 points

Intent

In 2006, irrigation was the 4th largest use of potable water and Charleston County was the largest surface water consumer in South Carolina. Potable water is treated to drinking quality, but this same water is also used for landscaping. To reduce potable water consumption, water used in baths, sinks, washing machines (i.e. graywater) can be reused on-site for landscaping.

Criteria

- Offset fifty percent (50%) of the volume of toilet water (blackwater) with graywater
 - Determine the projected annual toilet water consumption using the Green Badger Water Calculator.
 - Determine the projected volume of graywater to be offset from water reuse strategies.
- Approval of the system from the local jurisdiction.

Deliverables

- Design Review:* The General Contractor shall provide the following documents to the Sustainability Institute:
 - The Green Badger toilet water calculations
 - Water reuse strategies
- Construction Start:* The Project Manager shall provide documents indicating approval from the local jurisdiction of the greywater system to the Sustainability Institute.

WCc3 – Site Irrigation, Zero Potable Water Use 2 Points

Intent

Reduce overall potable water consumption by using zero potable water for site irrigation.

Criteria

- Incorporate the use of native and drought tolerant plant species and/or use reclaimed building or rainwater for irrigation.
- Temporary irrigation is permitted for up to twelve (12) months from landscaping installation.

Deliverables

- Design Review*: The Project Manager shall provide the following to the Sustainability Institute:
 - The landscape irrigation water use calculations; **OR**
 - A site plan with a note that clearly states that an irrigation system will not be installed.
- Design Review*: The General Contractor shall provide water reuse strategy documentation (i.e. equipment cut sheets, list of plant species and water requirements, etc.) to the Sustainability Institute.

ENERGY EFFICIENCY & RENEWABLE POWER

EERPr1 – Building Systems Commissioning Required

Intent

Engineered systems must be built to performance standards consistent with the Reference Guide. The project cannot earn certification until the project team verifies that all of the issues on the final commissioning report have been successfully remedied.

Criteria

- Implement a fundamental commissioning program that complies with the criteria in ASHRAE/NIBS Guideline 0-2005: The Commissioning Process: Articles 5, 6 and 7, for HVAC, electrical, lighting, hot water and plumbing systems.
- The Commissioning Agent shall be approved by the Sustainability Institute.
- The Commissioning Agent cannot be part of the design team, but may be part of a firm that was part of the project management process.

Deliverables

- *Commissioning*: The Project Manager shall provide the commissioning report to the Sustainability Institute no later than two (2) weeks after on-site commissioning is completed.
 - If initial commissioning indicates discrepancies with the design and/or installation, it is the responsibility of the Project Team to address these issues.
- *Prior to Final Inspection*: Provide an updated commissioning report to the Sustainability Institute indicating that these issues have been successfully resolved.

EERPr2 – Energy Conservation, 30% Reduction Required

Intent

Buildings consume fifty-eight percent (58%) of the total energy used in Charleston. Sixty percent (60%) of electricity is sourced from fossil fuels. Reducing energy use can reduce electricity bills and improve air quality.

Criteria

- Achieve a thirty percent (30%) reduction in energy consumption over the baseline per the ASHRAE Design Guide using:
 - Prescriptive design elements per Table 2A – Table 8A in the Appendix A; **OR**
 - Whole building performance energy modeling. Energy modeling must be performed in accordance with ASHRAE Standard 90.1-2007 (without amendments) using the Building Performance Rating Method described in Appendix G of the ASHRAE Standard.

Deliverables

- Design Review:* The General Contractor/Engineer shall provide either the prescriptive energy lighting power density calculations or the energy model report to the Sustainability Institute.

EERPr3 – Long Term Efficiency Verification Required

Intent

Designing and constructing an efficient building is only the first step. Annual verification is required to confirm that the installed building systems are operating per design standards.

Criteria

- The Owner shall sign a data release form that allows the Sustainability Institute to access utility electricity, gas, and water data for up to sixty (60) months to confirm that the building is operating per original design standards; **AND/OR**
- Utilize ENERGY STAR's Portfolio Manager to manage the energy and water use for up to sixty (60) months.

Deliverables

- Design Review:* The Project Manager shall submit the utility waiver form to the Sustainability Institute.

EERPr4 – Air Sealing and Insulation Required

Intent

Air leaks in the outer walls, windows, doors and other openings can result in uncontrolled air flow. This can increase building exposure to moisture (which can lead to degradation) and heat (which increases energy use and costs). Charleston experiences both high heat and humidity in the summer and air sealing and insulation is important to mitigate these detrimental effects.

Criteria

The Sustainability Institute or a qualified independent 3rd party that is approved by the SI, must inspect and approve of the air sealing and insulation installation.

- Insulation installation must be Grade II or better.
- The General Contractor must resolve any issues noted by the SI or qualified independent 3rd party.
 - A follow up inspection shall be scheduled within one (1) week of receiving the report.
 - Within one (1) week of receiving the initial report, the Project Manager and General Contractor will schedule a date for the follow up inspection.
- SI or a qualified independent 3rd party must perform a successful insulation inspection to confirm that all issues are resolved.

Deliverables

- Design Review*: The Mechanical Engineer shall provide equipment specifications **AND/OR** plan details to the Sustainability Institute.
- Air Sealing Inspection*: The Sustainability Institute or a qualified independent 3rd party will provide a report listing the installation issues to the Project Manager within one (1) week of the initial inspection.
- Air Sealing Inspection*: The Sustainability Institute will provide documentation verifying compliance with air sealing and insulation installation to the owner within two (2) weeks after a successful inspection.

EERPc1 – Additional Reductions in Energy Use

1-10 points

Intent

Extraordinary action to further decrease building energy consumption over the thirty percent (30%) minimum threshold shall be rewarded with additional credits.

Criteria

Exceed ASHRAE requirements in EERPp2 for HVAC, lighting, solar thermal, envelope, and equipment using either the prescriptive or performance approach.

- Prescriptive Approach per Table 9A in the Appendix A.
- Performance Approach: Earn 1 point for each 1% above the 30% threshold required for EERPp2.

Deliverables

- Design Review*: The Consulting Engineers shall provide equipment schedules and design calculations to the Sustainability Institute.
- Construction Inspection*: The General Contractor shall provide equipment fixture cut sheets no later than one (1) week prior to SI final inspection.
- Final Inspection*: SI will verify equipment installation and submit a signed verification form to the owner.

EERPc2 – On-site Renewable Energy
1-10 points

On-site renewable energy promotes local energy production, decreases electricity usage and reduces customer utility costs.

Criteria

Install onsite renewable energy such as photovoltaics (PV), wind or biomass systems on the project site.

- Earn 1 point for renewable energy capacity installed on site equal to .25 of installed watts (W)/square foot (SF)

Example 1: A 20,000 SF building installs a 5,000 W solar PV array.

$$\frac{5,000 W}{20,000 SF} = 0.25 \frac{W}{SF} = 1 \text{ point}$$

Example 2: A 10,000 SF building installs a 5,000 W PV array.

$$\frac{5,000 W}{10,000 SF} = 0.5 \frac{W}{SF} = 2 \text{ points}$$

Deliverables

- *Design Review:* The Electrical Engineer shall provide equipment specifications and a site plan to the Sustainability Institute. The renewable energy system shall be clearly labeled.
- *Construction Inspection:* The General Contractor shall provide equipment cut sheets to the Sustainability Institute.

EERPc3 – LED Parking Lot Lighting

1-2 Points

Intent

Energy consumption can be reduced without compromising safety standards.

Criteria

One (1) point shall be awarded for parking lots with a total useable area equal to or less than 5000 square feet (SF). Two (2) points shall be awarded to parking lots with a total usable area greater than 5000 SF.

- Use LED luminaries for 100% of the parking lot lighting.
- Multi-level controls
 - Light fixtures must be connected to photo cells; **OR**
 - Light fixtures must be controlled by a programmable timer that reduces power to 50% between 12 am to 6 am. Twenty-four (24) hour building uses are exempt from this requirement.
- Light levels must comply with the safety requirements of the local jurisdiction.

Deliverables

- Design Review:* The Electrical Engineer shall provide a hardcopy of the lighting fixture schedule (light fixture and lamp manufacturer, ballast type, lamp type, and lamp quantities).
- Construction Inspection:* The General Contractor shall provide lighting fixture cut sheets.
- Final Inspection:* SI will verify LED installation during final inspection and submit a signed verification form to the owner.

EERPc4 – Building Automation System

2 Points

Intent

Automated building systems can maximize energy efficiency by optimizing building system operations which can simplify building management.

Criteria

- The Building Automation System (BAS) shall be programmable and control the operation of energy (lighting and power), HVAC and water systems per the occupant's business, weekend and holiday schedules.
- The General Contractor and Electrical Engineer shall coordinate BAS programming requirements with the Sustainability Institute and the equipment manufacturer.

Deliverables

- Design Review:* The Project Manager shall provide the BAS specifications to the Sustainability Institute for review.
- Construction Inspection:* The General Contractor shall provide equipment cut sheets to the Sustainability Institute.
- Final Inspection:* The Sustainability Institute will verify installation and program settings and submit a signed verification form to the owner.

EERPc5 –Submetering and Reporting

2 Points

Intent

A submetering system is an analytical tool that can manage energy and allocate costs to tenants, departments, equipment and other loads based on actual energy usage, rather than estimates. This system will facilitate the long term viability of energy conservation programs and green building initiatives through measurement and verification.

Criteria

- Install a submetering system capable of reporting the time of use consumption of HVAC, hot water heating, and power (lighting, plug, and other equipment) loads.
- The General Contractor shall coordinate submetering programming requirements with the Sustainability Institute and the equipment manufacturer.

Deliverables

- Design Review:* The Project Manager shall provide the submetering system specifications to the Sustainability Institute for review.
- Construction Inspection:* The General Contractor shall provide equipment cut sheets to SI.
- Final Inspection:* The Sustainability Institute will verify installation and program settings and submit a signed verification form to the owner.

EERPc6 – Green Power
1 Point

Intent

To increase energy security, promote the renewable energy economy and improve air quality in South Carolina.

Criteria

- Purchase Green-E Energy renewable energy credits (RECs) equal to 100% of the anticipated energy consumption of the project for two years.
- The prescriptive or performance approach may be used to calculate electricity consumption.

Deliverables

- Design Review:* The Electrical Engineer shall provide either the prescriptive energy calculations (power and lighting loads) or the whole building energy model report to the Sustainability Institute.
- Final Inspection:* The Project Manager shall provide documentation of REC purchases to the Sustainability Institute no less than one (1) week prior to the final inspection.

MATERIALS AND RESOURCES

SMr1 – On-site Recycling Required

Intent

To support the Charleston County Environmental Management Department and the County Council’s forty percent (40%) recycle goal. Recycling extends the lifetime of existing landfills, protects natural resources and promotes a healthy environment for residents and visitors.

Criteria

- Participate in the City of Charleston’s business and single stream recycling program.
- Provide interior bins for occupants in readily accessible spaces
- Coordinate with the local jurisdiction to locate exterior bins in an accessible location.

Deliverables

- Final Inspection:* The Project Manager shall submit documentation to the Sustainability Institute that details the building policy and comprehensive plan for on-site recycling.

SMc1 – Building Reuse, Shell and Interior
1-4 points

Intent

The Charleston County Bees Ferry Landfill ceased in the collection of construction and demolition (C&D) debris in 2008. Instead, C&D waste is hauled to private landfills or public landfills in adjacent counties at a higher cost. Efficiently using new building materials on-site and reusing existing building elements can reduce C&D disposal waste and cost.

Criteria

- Retain and incorporate the existing building structure (i.e. structural floor and roof decking) and envelope (i.e. exterior skin and framing) **AND/OR**
 - Exterior Building Structure
 - Fifty percent (50%) - 1 point **OR**
 - Seventy-five percent (75%) - 2 points **OR**
 - Ninety-five percent (95%) - 3 points **OR**
- Reuse existing non-structural elements (i.e. interior walls, doors floor coverings and ceiling systems) for at least 50% by area of the completed building, including additions.
 - Interior Nonstructural
 - Fifty percent (50%) - 1 point
- Window assemblies and nonstructural roofing material shall be excluded from calculations.
- Hazardous materials that are remediated shall be excluded from the calculation.

Deliverables

- Design Review*: The General Contractor shall submit surface area calculations demonstrating compliance to the Sustainability Institute. The calculations shall include:
 - The total area of the existing non-structural elements.
 - The total area of the existing exterior structural elements.
 - The area of the portions of the building that are being reused, maintained, or preserved
 - The area of the non-structural elements to be retained and incorporated into the new design. Windows and doors shall not be included.

SMc2 – Construction Waste Management

1-2 Points

Intent

Landfill waste can be reduced by recycling and/or salvaging nonhazardous C&D debris.

Criteria

Points shall be earned as follows:

- Recycle and/or salvage fifty percent (50%) of C&D debris - 1 point
- Recycle and/or salvage seventy-five percent (75%) of C&D debris - 2 points
- Excavated soil and land-clearing debris shall be excluded from calculations.
- Use the Green Badger Construction Tracking application to track compliance.

Deliverables

- Final Inspection:* The General Contractor shall submit the waste report (i.e. waste calculations, waste tickets, etc.) from the waste hauler as supporting documentation to the Sustainability Institute one (1) week prior to the final inspection.

SMc3 – Materials Reuse
1-2 points

Intent

To promote the use of salvaged, refurbished or reused materials sourced from a different project.

Criteria

- The cost of Construction Specifications Institute (CSI) Divisions 3-10 (See Table 10A in Appendix A) reused materials shall consist of five (5) or ten (10) percent of the total value of project materials.
- Use the Green Badger Construction Tracking application upload a list the reused materials.
- Points are earned as follows:

$$\left[\frac{\text{Cost of Reused Materials or Products (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 5\% \text{ (1 Point)}$$

$$\left[\frac{\text{Cost of Reused Materials or Products (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 10\% \text{ (2 Points)}$$

Deliverables

- Final Inspection:* The General Contractor shall provide the Green Badger report and cost calculations to the Sustainability Institute one (1) week prior to the final inspection.

SMc4 – Recycled Content
1-2 points

Intent

To promote the use materials with recycled content.

Criteria

- Calculate the material cost of recycled content of CSI Divisions 3-10 (See Table 10A in Appendix A):

$$\text{Material Cost of RC (\$)} = \text{Cost of PostConsumer RC (\$)} + \frac{1}{2} * \text{Cost of PreConsumer RC}$$

- Use Green Badger Construction Tracking application to document compliance.
 - List all materials containing recycled content on the project and upload product data sheets confirming the compliance of pre- and post-consumer recycled content.
 - Product data sheets MUST clearly identify both the pre- and post-consumer recycled content.
- A blended rate is not acceptable.
- Points are earned as follows:

$$\left[\frac{\text{Material Cost of Recycled Content (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 10\% (1 \text{ Point})$$

$$\left[\frac{\text{Material Cost of Recycled Content (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 20\% (2 \text{ Points})$$

Deliverables

- Final Inspection:* The General Contractor shall submit the Green Badger report and cost calculations to the Sustainability Institute no less than one (1) week prior to the final inspection.

SMc5 – Local and Regional Materials
1-2 Points

Intent

To support local and regional businesses and reduce transportation costs and emissions.

Criteria

- CSI Divisions 3-10 (See Table 10A in Appendix A) building materials or products that have been extracted, harvested or recovered **AND** manufactured, within 500 miles of the project site.
- Materials with recycled content are considered to be locally sourced if the recycled material was sourced from within 500 miles of the project site.
- Use Green Badger Construction Tracking application to document compliance.
 - List all locally sourced materials and upload product data sheets.
 - Product data sheets **MUST** clearly identify both the material’s origin (harvested or extracted) **AND** manufacturing locations.
- Points are earned as follows:

$$\left[\frac{\text{Material Cost of Local or Regional Products (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 10\% \text{ (1 Point)}$$

$$\left[\frac{\text{Material Cost of Local or Regional Products (\$)}}{\text{Material Cost of ALL products (\$)}} \right] X 100 > 20\% \text{ (2 Points)}$$

Deliverables

- *Final Inspection:* The General Contractor shall provide the Green Badger report and cost calculations to the Sustainability Institute no less than one (1) week prior to the final inspection.

SMc6 – Rapidly Renewable Materials
1 Point

Intent

To reduce the long term environmental impact of harvesting natural resources by utilizing rapidly renewable materials made from plants that are typically harvested within a ten (10) year or less.

Criteria

- The cost of rapidly renewable CSI Divisions 3-10 (See Table 10A in Appendix A) materials shall consist of 2.5 percent of the total value of all building materials.
- Use the Green Badger Construction Tracking application to document compliance.
 - Upload a list of all rapidly renewable materials on the project
 - Upload product data sheets.
- Point is earned as follows:

$$\left[\frac{\text{Material Cost of Rapidly Renewable Products (\$)}}{\text{Material Cost of ALL Building Products (\$)}} \right] X 100 > 2.5\%$$

Deliverables

- Final Inspection:* The General Contractor shall provide the Green Badger report and cost calculations to the Sustainability Institute no less than one (1) week prior to the final inspection.

SMc7 – Certified Wood
1 Point

Intent

Integrating certified wood encourages responsible forest management that reduces the impact of harvesting natural resources.

Criteria

- To qualify, wood building materials must be certified in accordance with the Forest Stewardship Council (FSC).
- Use Green Badger Construction Tracking to document compliance.
 - Upload a list all wood materials on the project and upload product data sheets.
 - Upload a list of vendor invoices showing the FSC Chain of Custody number for each wood product/vendor.
- The cost of FSC wood shall consist of at least 50 percent of the total value of all wood building materials. The point is earned as follows:

$$\left[\frac{\text{Material Cost of FSC Wood (\$)}}{\text{Material Cost of ALL Wood Products (\$)}} \right] \times 100 > 50\%$$

Deliverables

- *Final Inspection:* The General Contractor shall submit the Green Badger report and cost calculations to the Sustainability Institute no less than one (1) week prior to the final inspection.

SMc8 – LED Light Fixtures
1-3 Points

Intent

Utilizing low maintenance light fixtures with long operational lifetimes, such as LEDs, reduces the need for additional materials due to maintenance and disposal. Traditional light fixtures that utilize gas-discharge technology (i.e. metal halide, fluorescent, etc.) also contain various levels of mercury, which can result in harmful health exposures due to broken lamps.

Criteria

- Interior and exterior light fixtures shall be LED luminaires.. Points shall be earned as follows:
- CSI Divisions 3-10 (See Table 10A in Appendix A) building materials or products that have been extracted, harvested or recovered **AND** manufactured, within five hundred (500) miles of the project site.
- Materials with recycled content are considered to be locally sourced if the recycled material was sourced from within 500 miles of the project site.

$$LED\ Lighting\ Power\ (\%) = \left[\frac{LED\ Lighting\ Power\ (W)}{Total\ Installed\ Lighting\ Power\ (W)} \right]$$

50% ≤ LED Lighting Power (%) < 75% (1 point)

75% ≤ LED Lighting Power (%) < 100% (2 points)

LED Lighting Power (%) = 100% (3 points)

Deliverables

- Design Review:* The Electrical Engineer shall provide a hardcopy of the lighting fixture schedule (light fixture and lamp manufacturer, ballast type, lamp type, and lamp quantities), lighting fixture counts and installed wattage calculation.
- Construction Inspection:* The General Contractor shall provide lighting fixture cut sheets to the Sustainability Institute.
- Final Inspection:* The Sustainability Institute will verify LED installation during the final inspection and submit a signed verification form to the owner.

HEALTHY INTERIORS

Hlr1 – Building Ventilation Required

Intent

Most people spend at least half of the day indoors. Indoor air quality can impact health, productivity and comfort. People constantly generate carbon dioxide (CO₂). Furniture, paint, floor materials, cleaning products, etc. can release pollutants and volatile organic compounds (VOCs) into the air. Bringing in outside air into the indoor environment is important to dilute concentrations of CO₂, pollutants and odors.

Criteria

- Provide high quality ventilation by meeting the quantity of outside air as prescribed by ASHRAE 62.1-2007 using the Ventilation Rate Procedure.

Deliverables

- Design Review:* The Mechanical Engineer shall submit calculations and equipment/ventilation schedules to the Sustainability Institute.

Hlr2 – Nonsmoking Building Required

Intent

In 2006, the U.S. Surgeon General announced that any amount of secondhand smoke is unsafe and can cause respiratory issues, heart disease, stroke and lung cancer. A smoke-free environment protects residents, employees and visitors.

Criteria

- Prohibit smoking inside the building and within twenty-five (25) feet of building entrances, ventilation intakes, and operable windows.
- Signage that communicates smoking policy shall be posted at all building entrances.

Deliverables

- Final Inspection:* The Sustainability Institute will confirm installed signage and submit a signed verification form to the owner.

Hlr3 – Interior Air Quality during Construction Required

Intent

Construction involves a diverse set of conditions that may result in the release of contaminants which can degrade indoor air quality (IAQ) for existing building occupants. These contaminants may be transported through the ventilation system to occupied building areas. To maintain healthy IAQ levels in non-construction areas,

Criteria

- Implement the five (5) basic strategies included in the *Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction* as applicable.
- Protect stored on-site and installed absorptive materials from moisture damage.
- Permanent air handlers must use MERV 8 filters at each return air grill. These filters shall be replaced just prior to occupancy.
- Each month, use the Green Badger Construction Tracking application to report on each applicable SMACNA measure.

Deliverables

- Construction Start (monthly +)*: Each month, the General Contractor shall submit the Green Badger report on each applicable SMACNA measure to the Sustainability Institute.
- Air Sealing Inspection, Construction Inspection, Commissioning and Final Inspection*: The Sustainability Institute will verify compliance with SMACNA measures during each scheduled site visit and submit a signed verification form to the owner.

Hlr4 – Low-emitting Paints & Coatings and Sealants & Adhesives Required

Intent

Limiting the release of contaminants from new paint & coatings and sealants & adhesives improves indoor air quality.

Criteria

- Use low-VOC sealants and adhesives and paints and coatings on the interior of the building. Products must not exceed the VOC levels listed in Table 11A and Table 12A in Appendix A.
- Use the Green Badger Construction Tracking application for reporting.
 - Upload a list of every sealant, adhesive, paint and coating used within the building envelope.
 - Upload product data sheets that indicate VOC content and/or Material Safety Data Sheet (MSDS).
- Error! Reference source not found.**

Hlr5 – Thermal Comfort Required

To provide a comfortable indoor environment such that alternative heating and cooling equipment (i.e. space heaters, window-mounted air conditioners, fans, etc.) are not used by individual occupants.

Criteria

- Design building and systems to comply with ASHRAE 55-2004.
- Demonstrate design compliance in accordance with Section 6.1.1 documentation **AND/OR** ASHRAE's Thermal Comfort Tool.

Deliverables

- Design Review*: The Mechanical Engineer shall provide calculations and/or a compliance report to the Sustainability Institute.

Hlc1 – Low Emitting Floor Materials 2 points

Intent

Limiting the release of contaminants from new floor materials improves indoor air quality.

Criteria

- Use Green Badger Construction Tracker for report.
 - Upload a list non-organic (i.e. natural stone, tile, etc.) flooring material used within the building envelope.
 - Upload product data sheets and emissions label.
- All flooring must comply with the criteria listed in Table **Error! Reference source not found.** 13A in Appendix A.

Deliverables

- Design Review*: The General Contractor shall provide the Green Badger report (i.e. product sheets and/or specifications) to the Sustainability Institute for approval prior to purchasing.

H1c2 – Formaldehyde-Free Composite Wood

2 points

Intent

Limiting the release of contaminants from composite wood improves indoor air quality.

Criteria

- Composite wood (MDF, plywood, door cores, etc.) permanently installed on the interior of the building must contain no added urea-formaldehyde resins.
- Use Green Badger Construction Tracker for reporting.
 - Upload a list of all composite wood materials permanently installed within the building envelope. Urea-formaldehyde content shall be clearly noted.
 - Upload product data sheets confirming the urea-formaldehyde free statements.

Deliverables

- Design Review*: The General Contractor shall provide the Green Badger report (i.e. product sheets and/or specifications) to the Sustainability Institute for approval prior to purchasing.

H1c3 – Low-Emitting Furniture

2 points

Intent

Limiting the release of contaminants from new furniture improves indoor air quality.

Criteria

- Furniture (i.e. desks, tables and seats) manufactured within the past year must be Greenguard certified **OR**
- Comply with EPA Environmental Technology Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) **OR**
- Tested by an independent third-party air quality testing laboratory per the criteria in **Error! Reference source not found.** Table 14A in Appendix A. Procedures must be based on ANSI/BIFMA M7.1-2007 and ANSI/BIFMA X7.1-2007 protocols
- Use Green Badger Construction Tracker for reporting.
 - Upload a list of quantifying all qualifying furniture
 - Upload product data sheets or Greenguard certification sheets

Deliverables

- Design Review*: The General Contractor shall provide the Green Badger report (i.e. product sheets and/or specifications) to the Sustainability Institute for approval prior to purchasing.

H1c4 – Task Lighting and Multi-level Controls

2 points

Intent

Excessive lighting can cause glare on computer screens, which may lead to eyestrain or headaches or otherwise impact the user's ability to see images on the screen clearly. This could result in awkward postures to view the screen. These are health conditions that are detrimental to productivity. Providing multi-level lighting controls can mitigate these effects. Multi-level lighting controls include dimming, dual switching and multiple lighting systems.

Criteria

- Ninety percent (90%) of individual work stations shall have multi-level of lighting controls; **AND**
- One hundred percent (100%) of shared spaces (i.e. conference rooms, break rooms, etc.) shall have multi-levels of lighting controls **AND** vacancy sensors.

Deliverables

- Design Review*: The Electrical Engineer shall provide lighting plans that clearly show the lighting controls and light fixture switching.
- Final Inspection*: The Sustainability Institute or independent 3rd party commissioning agent shall verify installation during final inspections.

H1c5 – Daylit Spaces

2 points

Intent

Daylit spaces utilize natural sunlight and can provide health and cost benefits. Daylighting improves employee productivity and comfort. It also provides the mental and visual stimulation that is necessary to regulate human circadian rhythms. Use of daylight can also significantly decrease electric lighting consumption.

Criteria

- Seventy-five percent (75%) of regularly occupied spaces achieve daylight luminance levels of at least twenty-five (25) foot-candles and a maximum of five hundred (500) foot-candles.
- Show compliance using the following methods:
 - Computer simulation performed in clear sky conditions on September 21 at 9 AM and 3 PM; **OR**
 - Light meter readings taken in ten (10) foot grids.

Deliverables

- Design Review*: The General Contractor shall provide the computer simulation results to the Sustainability Institute for review; **OR**
- Final Inspection*: The General Contractor shall provide the light meter readings to the Sustainability Institute no later than one week prior to final inspections.

H1c6 – Green Cleaning Program

1 point

Intent

Many common cleaning products contain hazardous chemicals and VOCs that can cause and/or aggravate eye irritation and respiratory issue for occupants and janitorial staff. Implementing a green cleaning program will improve indoor air quality and reduce harmful exposures.

Criteria

- Implement a green cleaning program which includes:
 - Green Seal GS-37 cleaners for all general purpose, bathroom, glass and carpet cleaners
 - Green Seal GS-40 for industrial and institutional floor care products
 - Green Seal GS-41 for industrial and institutional hand cleaners

Deliverables

- Final Inspection*: The Project Manager shall provide a copy of the green cleaning policy and/or contract with the cleaning services to the Sustainability Institute no later than one (1) week prior to the final inspection.

INNOVATION AND DESIGN

IDp1 – Education and Outreach Required

Intent

This credit opportunity will promote outreach efforts to educate the community about how sustainable building practices and can impact health and energy consumption.

Criteria

- The Sustainability Institute retains full discretion in awarding an Education and Outreach point.

Deliverables

Minimum requirements:

- On-site signage or monitors highlighting sustainable aspects of the project.
- Handouts or electronic documents of related case studies.
- A website highlighting projects with sustainable building characteristics.

IDc2-4 – Project Team Innovation Opportunities 1 point

Intent

The Sustainability Institute recognizes that the built environment and the context in which it exists are dynamic and constantly evolving. This credit opportunity will promote innovative technologies and strategies that support the intent of this document.

Criteria

- The Sustainability Institute retains full discretion in awarding an Innovation point.

Deliverables

- Submit a narrative to SI for strategies that are not included in this rating system.
- Additional documentation (i.e. illustrations, figures, plans) may be required.

APPENDIX A: TABLES

Table 1A: Flow Rate of Baseline Water Fixtures

Fixture Type	Flow Rate
Toilets	1.6 GPF
Urinals	1.0 GPF
Commercial Lavatory	0.5 GOM
Commercial Lavatory (metering)	0.25 GPC
Private Lavatory	2.2 GPM
Shower	2.5 GPM
Kitchen/Break Sinks	2.2 GPM

Table 2A: ASHRAE Prescriptive Elements – Lighting and Power Loads

Item	Component	Requirement
Lighting	Lighting Power Density	30% below ASHRAE 90.1-2007
	Auto controls	All private offices, conference and meeting rooms, break rooms, copy rooms and storage rooms
	Auto controls	Restrooms, electrical/mechanical rooms,
	Auto controls	Time switch light control for general occupancy spaces
Exterior lighting	Façade/landscape lighting	0.05 w/sf - auto off controls 12 am to 6 am
	Parking lots and drives	0.075 w/sf
Equipment	EnergyStar	All equipment and appliances

Table 3A: ASHRAE Prescriptive Elements – Hot Water Heating

Item	Component	Requirement
Hot Water	Gas water heating – storage	Condensing water heaters, 90% efficiency
	Electric water heating - storage	EF>0.99 - 0.0012x volume
	Point of use water heating	0.81 EF or 81% Et
	Electric Heat Pump water heating	COP 3.0
	Pipe insulation	R3

Table 4A ASHRAE Prescriptive Elements – Envelope

Item	Component	Requirement
Roofs	Insulation entirely above deck	R-25 c.i.
	Attic and other	R-38
	Metal Building	R-19+R-10 FC
	SRI	78 low slope, 29 steep slope
Walls	Mass	R-11.4 c.i.
	Steel Framed	R-13+R-7.5 c.i.
	Wood Frame	R-13+R3.8 c.i.
	Metal Building	R 0 + R-13 c.i.
Floors	Mass	R-12.5 c.i.
	Steel joint	R-30
	Wood Frame	R-30
Slabs	Unheated	no requirement
	Heated	R-15 for 24 in
Doors	Swinging	U0.70
	Fixed	U-0.50
Continuous Air Barrier	Air Barrier	Entire building envelope
Windows	Thermal Transmittance	U < 0.40
	SHGC	U < 0.25

Table 5A ASHRAE Prescriptive Elements – HVAC

Item	Component	Requirement
Packaged Single Zone Air Source Heat Pumps	Heating and Cooling Efficiency	See Table 6A
	ESP	.7 in. w.c.
	DOAS ASHP	Yes
	DOAS Energy Recovery	Required
	DOAS heat/cool efficiency	See Table 7A
	DOAS fan – ESP	1.5 in. w.c. max
WSHP with DOAS	Unit size	5 tons or less
	Single stage cooling/heating	Cooling >16.4 EER, Heating >5.2 COP
	Two-stage cooling/heating	Cooling Part/Full Load, 17.6/15.0 EER Heating Part/Full Load 5.7/5.0 COP
	WSHP fan – ESP	0.5 in w.c.
	Condensing boiler efficiency	90%
	DOAS water to water heat pump	Required
	DOAS variable airflow with DCV	Required
	DOAS fan and motor	65% mechanical efficiency, VSD 95% efficiency
VAV DX	DX Efficiency	See Table 8A Error! Reference source not found.
	Low temp air supply and SAT reset	50-58 degree F
	Perimeter convector heat source	Electric
	Gas Furnace in DX units	
	Economizer	>54,000 btu/hr, differential enthalpy control
	Energy Recovery	Required
	Demand control ventilation and reset	Required
	ESP	2.0 in. w.c.
VAV CHW	Air cooled chiller efficiency	10 EER
	Air cooled chiller IPLV	12.5 IPLV < 150 tons, 12.75 IPLV > 150 tons
	Water Cooled Chiller	6.5 COP
	Condensing boiler efficiency	90%
	Variable Speed Pumping	Required
	Max fan power	0.72 w/cfm
Fan coils with DOAS	Air cooled chiller efficiency	10 EER
	Air cooled chiller IPLV	12.5 IPLV < 150 tons, 12.75 IPLV > 150 tons
	Water Cooled Chiller	6.5 COP
	Variable Speed Pumping	Required
	VAV Fan coil units	Required
	Fan coil unit fan power	0.30 w/cfm
	DOAS variable airflow w/DCV	Required
	DOAS Energy Recovery	Required
	DOAS fan and motor	65% mechanical efficiency, VSD 95% efficiency

Table 6A Constant Volume Heat Pump Efficiency Levels

Size (tons)	Cool Efficiency	Heating Efficiency
< 5.5	15.0 SEER 12.0 EER	9.0 HSPF
5.5-11	11.5 EER 12.8 IEER	47db/43wb 3.4 COP 17/db/15wb 2.4 COP
11.5-20	11.5 EER 12.3 IEER	47db/43wb 3.2 COP 17/db/15wb 2.1 COP
20 <	10.5 EER 11.3 IEER	47db/43wb 3.2 COP 17/db/15wb 2.1 COP

Table 7A DOAS Cooling and Heating Efficiency

Size (tons)	Cool Efficiency	Heating Efficiency
Air Source Heat Pumps		
< 5.5	15.0 SEER 12.0 EER	9.0 HSPF
5.5-11	11.5 EER 12.8 IEER	47db/43wb 3.4 COP 17/db/15wb 2.4 COP
11.5-20	11.5 EER 12.3 IEER	47db/43wb 3.2 COP 17/db/15wb 2.1 COP
20 <	10.5 EER 11.3 IEER	47db/43wb 3.2 COP 17/db/15wb 2.1 COP
VAV DX, Gas Heat		
< 5.5	15.0 SEER 12.0 EER	80%
5.5-11	11.5 EER 12.8 IEER	80%
11.5-20	11.5 EER 12.3 IEER	80%
20-63	10.5 EER 11.3 IEER	80%
63 <	9.7 EER 10.9 IEER	80%
Water to Water Heat Pump		
Any Size	13.8 EER, 86F EWT	3.8 COP, 68F EWT 3.1COP, 50F EWT

Table 8A VAV DX Cooling-Only Efficiency Levels

Size (tons)	Cooling Efficiency
<5.5	15.0 SEER 12.0 EER
5.5-11	11.5 EER 12.8 IEER
11.5-20	11.5 EER 12.3 IEER
20-63	10.5 EER 11.3 IEER
63<	9.7 EER 10.9 IEER

Table 9A Additional Prescription Criteria

System	Action	Points
HVAC	2 SEER/1 EER over pre-requisite	1
	3 SEER/2 EER over pre-requisite	2
	4 SEER/3 EER over pre-requisite	3
Lighting	For every 0.05 watts/square foot below the prerequisite lighting standard.	0.5
Solar Hot Water Heating	50% of demand	2
	75% demand	3
	100% demand	4
Insulation	For every 10% above pre-requisite (continuous and cavity)	1
Plug Loads	Occupancy sensors or smart power strips at every workstation	1

Table 10A Construction Specifications Institute (CSI) Materials

Division	Material
3	Concrete
4	Masonry
5	Metals
6	Wood, Plastics and Composites
7	Thermal and Moisture Protection
8	Openings
9	Interior Finishes
10	Specialties (i.e., signs, toilet accessories)

Table 11A: Sealant and Adhesive VOC Limits (g/L Less Water) (SCAQMD Rule 1168)

	Product Type	VOC Limits (g/L Less Water)
Architectural Application	Indoor carpet adhesives	50
	Carpet pad adhesives	50
	Wood flooring adhesives	100
	Rubber floor adhesives	60
	Subfloor adhesives	50
	Ceramic tile adhesives	65
	VCT & asphalt adhesives	50
	Drywall and panel adhesives	50
	Cove base adhesives	50
	Multipurpose construction adhesives	70
	Structural glazing adhesives	100
Substrate Specific	Metal to Metal	30
	Plastic forms	50
	Porous material (except wood)	50
	Wood	30
	Fiberglass	80
Specialty Application	PVC Welding	510
	CPVC Welding	490
	ABS Welding	325
	Plastic cement Welding	250
	Adhesive primer for plastic	550
	Contact adhesive	80
	Special Purpose Contact Adhesive	250
	Structural wood member adhesive	140
	Sheet applied rubber lining operations	850
	Top and trim adhesives	250
Sealants	Architectural	250
	Roadway	250
	Other	420
Sealant Primers	Architectural non-porous	250
	Architectural Porous	775
	Other	750

Table 12A: Paint and Coating VOC Limits (g/L Less Water) (SCAQMD Rule 1113)

Product Type	VOC Limits (g/L Less Water)	Product Type	VOC Limits (g/L Less Water)
Interior flat coating	50	Shellac: Pigmented	550
Interior non-flat coating	150	Stain	250
Anti-corrosive/antirust paint	250	Concrete curing compounds	350
Clear wood finish: Lacquer	550	Faux Finish Coatings	350
Clear wood finish: Sanding sealer	350	Magnesite Cement Coatings	450
Clear wood finish: Varnish	350	Pigmented Lacquer	550
Clear brushing lacquer	680	Waterproofing sealers	250
Floor coatings	100	Waterproofing concrete/masonry sealer	400
Primers, Sealers and undercoaters	200	Wood preservatives	350
Shellac: Clear	730	Low-solids coatings	120

Table 13A Low-Emitting Floor Requirements

Material	Standard
Carpet, Indoor	CRI Green Label Plus
Coating, Floor	SCAQMD Rule 1113
Coating, Low Solids	SCAQMD Rule 1113
Cushion, Carpet indoor	CRI Green Label
Flooring, Ceramic	Floor Score
Flooring, Laminate	Floor Score
Flooring, Linoleum	Floor Score
Flooring, Other Hard Surface	Floor Score
Flooring, Rubber	Floor Score
Flooring, Vinyl	Floor Score
Flooring, Wood	Floor Score
Rubber Wall Base	Floor Score
Flooring, Mineral Base	Exempt/Complies
Flooring, Unfinished/Untreated Wood	Exempt/Complies
Stain	SCAQMD Rule 1113
Sealer: Waterproofing, Concrete/Masonry	SCAQMD Rule 1113
Sealer: Waterproofing	SCAQMD Rule 1113

Table 14A ANSI Maximum Indoor Air Concentrations

Chemical Containment	Maximum Indoor Air Concentrations	
	Furniture	Seating
Total VOCs	0.5 mg/m ³	0.25 mg/m ³
Formaldehyde	50 ppb	25 ppb
Aldehydes	100 ppb	50 ppb
4-Phenylcyclohexene (4-PCH)	0.0065 mg/m ³	0.00325 mg/m ³

APPENDIX B: DEFINITIONS

Air sealing – The use of insulation to prevent unintentional air movement between the exterior and building interior.

ASHRAE – American Society of Heating, Refrigerating, and Air-Conditioning Engineers issues energy efficiency standards for building construction.

Brownfield – A site that has been contaminated from prior industrial or commercial development and activities.

Certified wood – Building products that are sourced from responsibly managed forests per specific certification standards.

Commissioning – Tests that verify that engineered systems are built to performance standards consistent with the design documents.

Electric Vehicle Charging Station (Level 2) – Typically 240V in residential applications and 208V in commercial applications. Chargers can operate up to 30 amperes and may require a 40 ampere circuit breaker.

Electric Vehicle Charging Station (DC Fast Charging) –Typically operates at 208/480V, 3-phase in both residential and commercial applications.

Greenfield – A site that has not been developed.

HVAC – Heating, ventilation, and air conditioning systems. Components of the system include, but are not limited to ductwork, heat and condensate pumps, air-conditioning units, compressors, etc.

Insulation (thermal) – A building material that reduces unwanted heat loss or gain in a structure. Common insulations include, but are not limited to blanket (batts and rolls), concrete block, foam (spray, board, rigid), loose-fill, blown-in, reflective and fiber.

LED – Light emitting diodes (LEDs) are composed of solid state technologies. Electricity passes through semiconductor materials to emit light in a specific direction. The excess heat is absorbed into a heat sink.

Performance Method –To evaluate the efficiency of the building systems as it operates as a whole.

Prescriptive Method – To evaluate the efficiency of the elements of a building (i.e. envelope, HVAC, plumbing, electrical, etc.) independently.

Potable water – Water that meets the safety standards required for human consumption with low risk of immediate or long term harm.

Renewable energy - Electricity that is generated from resources that restore themselves in a short period of time. Sources include, but are not limited to solar (i.e. photovoltaic and solar thermal), wind, geothermal, biomass, biogas (i.e. landfill gas, anaerobic digester), hydroelectricity.

Renewable energy credit (REC) – A tradable commodity that represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation. Typically, a REC can be sold separately from the underlying physical electricity associated with a renewable-based generation source.

Solar thermal – Harnessing the heat derived from solar energy to generate electricity. This form of electricity generation is often used in hot water heating and large-scale solar installations.

VOC – Volatile organic compounds are gases that are emitted from solids and liquids that include paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials, furnishings, office equipment (i.e. copiers and printers) and adhesives.