





ANSI/GBI 01-2019: Green Globes Assessment Protocol for Commercial Buildings (Supersedes ANSI/GBI 01-2010: Green Building Assessment Protocol for Commercial Buildings)

This Standard is under continuous maintenance by the Green Building Initiative (GBI) and has a published schedule for regular publication of revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the GBI website (www.thegbi.org). The latest edition of the ANSI/GBI 01-2019 Green Globes Standard is free to download from the Green Building Initiative website (www.thegbi.org).

© 2019 Green Building Initiative, Inc



Disclaimer

This Standard provides a method of assessing commercial buildings in relation to commonly valued environmental and efficiency outcomes. This Standard is an assessment tool and does not purport to instruct users on the appropriate design, construction, operations and maintenance, standards, applicable laws, codes or regulations for their building. The use of the Standard does not establish, expressly or implicitly, the appropriate standard of care of licensed design or other professionals nor the appropriate duties and responsibilities of owners, design, construction, operations or maintenance personnel.

The Green Building Initiative (GBI) does not guarantee or warrant the actual performance of any building as a result of (1) the use of this Standard, or (2) a particular level of assessment indicated through the use of this Standard, whether through individual use or in conjunction with a provider of a third-party assessment. The Standard has been developed and structured to provide a general assessment tool for various attributes of buildings, as outlined in the Standard. The Standard is not a design, construction, operations or maintenance tool or a quality or performance assurance system. Building systems, technology, construction processes, design methodologies and best practices are constantly evolving and no building performance assessment system or tool, including this Standard, can account for these changes or the site-specific variances and limitations associated with individual buildings. The use of this Standard does not serve as a substitute for the work and advice of knowledgeable, licensed design, and other professionals; skilled construction personnel; building operators; and dedicated building owners.

GBI makes no representations about the results to be obtained from using the Standard. GBI, to the fullest extent permitted by law, disclaims all warranties of any kind, whether express of implied, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose and non-infringement.

Information on the ANSI approved procedures used to develop this Standard can be found at www.thegbi.org or by emailing info@thegbi.org.

Special Notes

The Foreword, Appendix, Informational References and Recommended Documentation are informative only and do not contain mandatory requirements necessary for conformance to this Standard. As such, they may contain material that has not been subjected to public review or a consensus process.

Reference documents cited within the Standard are mandatory unless they are identified as being Informational References. Referenced documents are only to be applied within the context for which they are cited.

This Standard is maintained under continuous maintenance procedures. GBI publishes notices for meetings and calls for public comment in ANSI Standards Action as required. GBI has a list of stakeholders that will receive email announcements when any maintenance activity occurs to the recommended practice. GBI's website contains a place for new stakeholders to register.

Comments or proposals for revisions to any part of the Standard may be submitted to GBI at any time. The following person(s) may be contacted by those interested in submitting changes:

Emily Marx, Manager, Standards & Program Support, Green Building Initiative, 7805 S.W. 40th St., #80010, Portland, OR 97219 (*we prefer all correspondence be sent electronically*), E-mail: *comment@thegbi.org*; Phone: 503.274.0448 x103.



FOREWORD

Note that the information contained in this Foreword is not part of this Standard. It does not contain requirements necessary for conformance to the Standard. The Foreword is not subject to public review.

The Green Building Initiative (GBI) is a nonprofit organization dedicated to delivering a results-driven process for achieving sustainability goals through a comprehensive, collaborative rating system with an emphasis on applicability over rigidity. Green Globes is reviewed through an American National Standards Institute (ANSI) consensus process. ANSI has helped develop private sector standardization systems for over 90 years, focusing on requirements for openness, balance, consensus and due process. We believe that green building certification should be flexible enough to encourage participation from every type of building. Our process encourages innovation while providing the most personalized green building certification experience in the market.

In 2005 GBI became the first building rating organization to become an ANSI Standards Developer. GBI used the ANSI process, recognized for being open, balanced, and consensus-based, to create *ANSI/GBI 01-2010: Green Building Assessment Protocol for Commercial Buildings* out of the Green Globes environmental design and assessment rating system for New Construction and Major Renovations.

GBI owns the global rights to Green Globes[®]—a green commercial building rating system that combines education with environmental assessments within interactive online tools for new and existing buildings as well as major renovations. Green Globes isn't here merely to set the bar for building performance, but rather to help its customers achieve success. Our third-party assessors personally visit properties to review progress toward compliance and certification, provide feedback on opportunities for improvement, and collaborate with project teams to ensure that buildings meet certification requirements and are on track to achieve sustainability goals. GBI has made the commitment to revise its Green Globes rating system using the ANSI consensus process and ANSI approved procedures.

The following document represents revisions to GBI 01-2010 as a result of over 800 public comments and over 200 public Subcommittee and Consensus Body meetings. The revised Standard became the rating system currently designated Green Globes NC 2019. The GBI maintains *ANSI/GBI 01-2019: Green Globes Assessment Protocol for Commercial Buildings* through a continuous maintenance schedule allowing for more frequent updates than the periodic maintenance schedule allows.

Stakeholder Involvement

GBI has encouraged public participation throughout the revision cycle beginning in 2014. All meetings of the Consensus Body are public. GBI accepts Consensus Body and Subcommittee applications year-round and maintains a queue of applicants to fill potential Consensus Body vacancies in three interest categories: User, Producer, and General Interest. The six Subcommittees are: Project Management & Energy, Site, Water Efficiency, Materials, Indoor Environment and Point Allocation. Subcommittee members are not required to also be members of the Consensus Body and individuals may serve on more than one Subcommittee. GBI's Secretariat maintains an email list of interested Stakeholders used for updates on developments or opportunities to participate or comment. More information is available at www.thegbi.org/ANSI.

GBI Encourages Participation in Public Comment Periods

The public comment process is a critical element to developing an ANSI Standard. GBI encourages discussion and debate. ANSI consensus processes afford due process to every commenter. Commenters will receive communication from the Secretariat upon receipt of their comment and again following Consensus Body action on their comment. Public comment notices are published in ANSI Standards Action.



Comprehensive Not Rigid

One of the many strengths of the Green Globes' collaborative process is that it allows for sustainability improvements that best fit each specific project, rather than a rigid checklist of requirements that don't consider unique sites, building function, or innovation opportunities.

"Not applicables" play a prominent role in Green Globes' flexibility, allowing projects to indicate criteria that are not applicable to a building or project. For instance, if a local code supersedes a criterion in the Standard and/or if optional features (e.g. cooling towers, etc.) are not included in the project scope, then those criteria could be marked Not Applicable removing those points from the denominator in determining percentages of points achieved.

The 1000 possible points are strategically allocated to direct projects toward criteria considered most critical in the reduction of a building's environmental impacts, as well as criteria that maximize a building's opportunity to have a positive impact on a community and its occupants. The new point distribution "weights" the Assessment Areas as follows:

- Project Management (100 points)
- Site (150 points)
- Energy (260 points)
- Water Efficiency (190 points)
- Materials (150 points)
- Indoor Environment (150 points)

The revised Standard, as is consistent with GBI-01-2010, does not contain mandatory criteria. Instead, additional weighting occurs within each Assessment Area to encourage pursuit of criteria considered to be most important. Every building that achieves Green Globes certification under these proposed revisions must achieve a minimum of 20% of points in each assessment area as well as a minimum of 35% of points overall.

Through point weightings, the Standard encourages users to strive to earn the highest number of applicable points for the building type, size, and budget, while using the flexibility built into the system to keep on track with the owners' goals and objectives, the planned functionality for the building, and the potential for deconstruction or repurposing of the building. Project teams achieving One Green Globes level of certification (Level 1) on their first project—may strive for higher levels of achievement and recognition in future projects through their lessons learned. The Standard is designed to encourage and recognize incremental achievements that take buildings beyond minimum compliance requirements while incentivizing teams to innovate and strive for Levels 2, 3 or 4, thereby going beyond code to achieve real-world results.

Technical Advances

Reviewers of this revised Standard will find many notable improvements that advance the art, form and definition of what constitutes a green building. Discussion and debate through the public comment process have been extensive and important to this process. Highlights of the revised Standard are noted below.

Project Management

- Site and Building Resilience
- Moisture control analysis
- Two paths for Building Commissioning or Systems Manual & Training



Site

- Transportation
- Stormwater management
- Urban-wildland interface design

Energy

- Three paths provided for assessing energy performance
- Renewable energy clarified
- Sub-metering

Water Efficiency

- Four paths for Indoor Domestic Plumbing
- Alternate sources of water
- Metering

Materials

- Whole Building Life cycle assessment
- Construction waste
- Post Occupancy Solid Waste Recycling

Indoor Environment

- Air Ventilation and Quality,
- Thermal Comfort
- Acoustic Comfort

How to Submit Public Comments

Calls for public comment will be published in ANSI Standards Action. Anyone wishing to submit a comment will be asked to complete a public comment form located at <u>www.thegbi.org/ANSI</u>. To submit a proposal for a substantive change to the Standard commenters must be specific about the change they are requesting and provide a reason. Commenters are expected to copy and paste a section of the Standard into the comment form and use <u>strikethrough</u> and <u>underline</u> to identify suggested deletions and additions to the text.

Learn more about the public comment process or review GBI's ANSI-approved procedures at <u>www.thegbi.org/ANSI</u>. For more information on upcoming calls for public comment or to request a public comment form, please contact the Secretariat at <u>comment@thegbi.org</u>.

Who Should Use This Standard

Property owners/operators, architects, green building consultants, design teams, developers, contractors, lenders, institutions, various levels of government, tenants, and occupants, as well as facility managers and maintenance personnel can apply this Standard to a broad range of commercial building types—such as office, multi-family, health care, schools, universities, labs, industrial, and retail. The Standard does not apply to single-family homes, two-family homes and townhouses that are three stories or less in height. These structures are covered in the ANSI/ICC 700 Standard developed by the National Association of Home Builders (www.nahb.com) and the International Code Council.

ANSI/GBI 01-2019: Green Globes Assessment Protocol for Commercial Buildings includes prescribed levels of achievement that government agencies or other entities wishing to establish specific criteria may consider when adopting this Standard. GBI also develops customized tools for governments to comply with government-specific requirements or other codes and standards. An example is GBI's unique Guiding Principles Compliance program, which is customized for use by federal agencies for compliance with Executive Orders and "High Performance and Sustainable Building" mandates.



To learn more about current Green Globes tools, visit <u>www.thegbi.org</u>. To learn about participation in GBI's Standard development and ANSI consensus processes, visit <u>www.thegbi.org/ANSI</u> or contact GBI's Secretariat at <u>comment@thegbi.org</u>.



TABLE OF CONTENTS

1.	PURPOSE
2.	SCOPE
3.	ACHIEVEMENT LEVELS, MINIMUMS, NOT APPLICABLES AND THIRD PARTY ASSESSMENTS
4.	ASSESSMENT OF COMPLIANCE
5.	DEFINITIONS, ABBREVIATIONS, AND ACRONYMS10
6.	PROJECT MANAGEMENT (100 points)23
7.	SITE (150 points)
8.	ENERGY (260 points)
9.	WATER EFFICIENCY (190 points)
10.	MATERIALS (150 points)
11.	INDOOR ENVIRONMENT (150 points) 91
12.	REFERENCES AND GUIDELINES 116



1. PURPOSE

This Standard provides a method for assessing commercial buildings relative to the tenets of integrated design and contemporary best practices for high-performance green buildings. This assessment method addresses the design and construction of buildings with respect to reducing life cycle resource consumption, waste, and global/regional/local environmental impacts; contributing to human and ecological system health; and providing performance feedback to owners and communities on indicators such as energy and water performance.

2. SCOPE

This Standard applies to a broad range of commercial building types, including offices, multi-family, health care, schools, universities, labs, industrial, retail, etc., as well as to *major renovations* as defined in Section 5 Definitions, Abbreviations, and Acronyms of the Standard. The Standard does not apply to single-family homes, two-family homes, and townhouses that are three stories or less in height.

The Standard includes a points-based assessment rating system that allows users to identify solutions that earn points for actions likely to achieve levels of performance commonly valued as having desirable environmental and related efficiency outcomes. The assessment criteria and rating system within the Standard apply to new commercial buildings and *major renovations*, including criteria related to planning for subsequent operations and maintenance.

The six Assessment Areas_within the Standard include Project Management, Site, Energy, Water Efficiency, Materials, and Indoor Environment.

This Standard shall not be used to circumvent any code, health, safety, security, or environmental requirements. It is the sole responsibility of the user of this Standard to establish appropriate safety and health practices, to comply with required building codes, and to assess the applicability of criteria based on other possible regulatory limitations prior to use.

3. ACHIEVEMENT LEVELS, MINIMUMS, NOT APPLICABLES AND THIRD PARTY ASSESSMENTS

3.1 Achievement Levels

TABLE 1			
Levels	Percentage of Points Achieved Out of Applicable Points	Description	
Level 4	85-100%	Demonstrates world-class leadership in resource efficiency and reduced environmental impacts.	
Level 3	70-84%	Demonstrates outstanding leadership in resource efficiency and reduced environmental impacts and a commitment to continual improvement.	
Level 2	55-69%	Demonstrates noteworthy progress applying best practices toward resource efficiency and reducing environmental impacts.	
Level 1	35%-54%	Demonstrates movement beyond awareness and a commitment to resource efficiency and reducing environmental impacts.	

Levels of Achievement 1, 2, 3, and 4 are specified in Table 1 below.



3.2 Minimum Achievement Requirements

To achieve compliance in any of the four Levels, buildings must:

- 1. attain a minimum of 35% of applicable points out of the 1000 possible points available; and
- 2. attain a minimum percentage of points in each environmental assessment area as denoted in Table 2.

Where calculations are used to determine points achieved, round to the nearest whole number.

	Т	ABLE 2
Environmental Assessment Area	Total Points Available	Minimum Percentage of Points Required For Compliance at the First Level
Project Management	100	20% of applicable points
Site	150	20% of applicable points
Energy	260	20% of applicable points
Water Efficiency	190	20% of applicable points
Materials	150	20% of applicable points
Indoor Environment	150	20% of applicable points
Total	1000 (less Not Applicable points)	

3.3 Not Applicable Criteria

Each environmental assessment area contains certain criteria that a design and delivery team may deem to be "Not Applicable" to the building. Selecting "Not Applicable" may be appropriate in the following circumstances as denoted in Table 3:

	TABLE 3		
Reason	Reasons for Use of Non-applicable Criteria		
1	If a criterion does not apply to the building type (e.g., if there are no oil fired burners on site,		
T	questions related to oil fired burners would be designated Not Applicable).		
2	If a code or regulation overrides, conflicts with, or otherwise prevents compliance with a		
2	criterion.		
3	If a criterion conflicts with best practices based on regional climatic differences.		

Questions without a Not Applicable option should be answered as appropriate for the building.

4. ASSESSMENT OF COMPLIANCE

Assessment of compliance with a specific Level of Achievement (Table 1) can be established through a third-party review of appropriate written plans, working drawings, specifications, site plans, energy modeling, life cycle assessment results, commissioning reports, *construction documents* and/or other data or documents that demonstrate conformance.

Items from the "Recommended Documentation" list at the end of each area of compliance in this Standard are typical documents that providers of the third-party assessment will use prior to, or in conjunction with, a post-construction site



visit and walk-through to assess compliance, although additional documentation may be requested or substituted prior to, or during, the on-site visit.

Informational Reference(s):

• The Green Building Initiative's Third-Party Rating/Certification for Green Globes

5. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

5.1 Definitions

Note: Italicized words found throughout this Standard indicate that a definition for the term can be found in the Definitions Section. Definitions not found in this section may be found in referenced standards contained in this Standard, and the user shall adhere to the meanings as defined in those standards. Other terms not defined in this Section or in referenced standards contained in this Standard shall have their ordinarily accepted meanings within the context in which they are used. Ordinarily accepted meanings are based upon American Standard English language usage as documented in a comprehensive dictionary. Where definitions in this Standard differ from those in a reference standard or any other source, definitions found in this Standard shall be used.

acoustically separated area: an enclosed space that, to function properly, requires separation from other adjacent spaces by wall, floor, and ceiling *assemblies* that have an STC rating adequate to allow clear, intelligible communication between sender and receiver within the space (e.g. meeting rooms, auditoria, theaters, concert venues, cinemas, lecture halls, libraries, classrooms, conference rooms, counseling offices, private offices, private rooms in health care facilities, sleeping rooms, etc.).

article: a manufactured item which:

- a.) is formed to a specific shape or design during manufacture;
- b.) has end use function(s) dependent in whole or in part upon its shape or design during end use; and
- c.) has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the *article*, and that result from a chemical reaction that occurs upon end use of other chemical substances, mixtures, or *articles*; except that fluids and particles are not considered *articles* regardless of shape of design.

assemblies: building systems categorized as exterior walls, internal partitions, windows, interim floors, roofs, beams, and columns.

alternate water source(s): non-potable water resources or water supplies not developed for potable use.

autoclaves: (see steam sterilizers).

baseline equivalent emission rate (BER): the baseline building emission rate (BER) represents the mass *carbon dioxide equivalent(CO₂e)* emitted for the average U.S. commercial building in the proposed building's location when using data from the U.S. Department of Energy's Energy Information Administration's (EIA) "Commercial Building Energy Consumption Survey (CBECS)." The BER is expressed as the mass of CO2e emitted per year per unit area of the total useful floor area of a building – lb./ft²/yr. (kg/m²/yr.).



biobased content: that portion of a material or product derived from plants and other renewable agricultural, marine, and/or forestry resources. *Biobased content* does not include animal feed, food, or biofuels.

boilerless/connectionless food steamers: an appliance designed to cook food within an enclosure via steam-laden air that does not have a dedicated connection to a water supply.

brownfield: real property, the expansion, redevelopment, or *reuse* of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (Some legal exclusions and additions may apply).

building commissioning: a process for enhancing the delivery of a project. The process assesses and documents that the facility,-systems, and/or *assemblies* are planned, designed, installed, tested, and can be operated and maintained to meet the Owner's Project Requirements.

building envelope: the element of a building that separates the conditioned interior space from the exterior, such as walls, roofs, floors, slabs, foundations, doors, and *fenestration*.

building product: building elements and assemblies.

building resilience: the ability of a building and project site to withstand and recover rapidly from adverse events and to adapt to changing environmental conditions.

C-factor (thermal conductance): the amount, in British Thermal Units (Btu), that flows each hour through 1 ft² of the surface area of material when there is a 1° temperature difference between the inside and outside air Btu/hr-ft²-F.

carbon dioxide equivalent (CO2e): a measure used to compare the impact of various greenhouse gases based on their *global warming potential* (GWP). CO2e approximates the time-integrated warming effect of a unit of a given greenhouse gas, relative to that of carbon dioxide (CO₂). GWP is an index for estimating the relative global warming contribution of atmospheric emissions of a unit mass of a particular greenhouse gas compared to the emission of a unit mass of CO₂.

carbon offset: a certificate representing the reduction of one metric ton (2,205 lbs.) of *carbon dioxide equivalent* emissions.

cartridge filtration: a removable type of filtration unit containing media. Cartridge filters are removed and cleaned or replaced as a unit in entirety.

CAS number: assignment by the Chemical Abstracts Service (CAS), a division of the American Chemical Society, which assigns numbers to chemicals to allow for database searches. Most molecule databases allow searching by *CAS number*.

charrette: a collaborative session in which a project team creates a solution to a design or project problem. The structure may vary, depending on the complexity of the problem or desired outcome and the individuals working in the group. *Charrettes* can take place over multiple sessions in which the group divides into sub-groups. Each sub-group then presents its work to the full group as material for future dialogue. *Charrettes* can serve as a way of quickly generating solutions while integrating the aptitudes and interests of a diverse group of people.

clear views: direct, unobstructed visual sightlines from a seated or standing position inside the building to a point at least 20 ft. (6.1 m) outside the building allowing occupants exposure to sunlight and a visual connection to nature and the outdoors. Adjustable shading devices for glare control shall not be considered an obstruction.



climate zone: see Normative Appendix B of ANSI/ASHRAE/IESNA Standard 90.1-2013, or Section 301 of the 2015 International Energy Conservation Code (IECC).

clothes washer:

- **commercial clothes washer:** a front-loading or top-loading *clothes washer* designed for use in applications in which the occupants of more than one household will be using the *clothes washer*, such as multi-family housing common areas or laundromats.
- multi-load clothes washer: a clothes washer with a bulk capacity generally equal to or greater than 25 lbs.
 (11.33 kg) of laundry; used in commercial laundromat operations and multi-family common areas for tenant use and are coin- or card-operated.
- **single-load clothes washer:** a *clothes washer* with a bulk capacity less than 25 lbs. (11.33 kg); typically termed "family-sized" and found in dwelling units, commercial laundromats, and multi-family common areas for tenant use. Except for those located within dwelling units, SLWs are typically coin-or card-operated.
- **tunnel washer:** an industrial laundry machine design specifically to accommodate heavy wash loads; also called a continuous batch washer. In operation, laundry progresses through the washer in one direction, while water and washing chemicals move through in the opposite direction on a continuous basis.

combination oven: an appliance designed to cook food within an enclosure via hot air convection and steam-laden air.

conceptual design phase: a document that records the concepts, calculations, decisions, and product selections used to meet the owner's project requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

construction documents: all of the written and graphic documents (including BIM, CAD, and other electronic files) prepared or assembled by the architect/engineer for communicating the design and administering the project. The term *"Construction documents"* also includes the Project Manual that contains the bidding forms and instructions, contract forms and conditions, and specifications, as well as documentation of all modifications made after the construction agreements are signed.

construction documents phase: the last stage of the design process. The *design and delivery team* is focused on finalizing the drawings and specifications for all components and systems of the building producing the Contract Documents. A complete set of Contract Documents provides a comprehensive, fully coordinated set of *construction documents* and specifications that the contractor uses to obtain necessary permits and construct the project.

conventional filtration: sorptive media filtration (e.g., with perlite or diatomaceous earth) in which regular backflushing is done with each filter cleaning and the media is replaced after each flush. In *conventional filtration*, the media is mixed in a slurry process inside the filter and deposited on fabric coated tubes in the pressure vessel.

counterflow systems: an evaporative cooling system in which the flow of air is upward across the wetted cooling media.

cradle-to-gate product life cycle: a partial product life cycle from resource extraction (cradle) to the factory gate before the product is transported to the consumer. This includes the product stages or raw material supply, transport, and manufacturing. The construction process, use, and end-of-life stages of the product are omitted in this case.

cradle-to-grave product life cycle: the full product life cycle from resource extraction (cradle) through the disposal stage (grave). This includes the product, construction process, use, and end-of-life stages.



crossflow system: an evaporative cooling system in which the flow of air is horizontal across the wetted cooling media.

daylighting: the integration of natural light for an enhanced connection to nature and to minimize the need for artificial lighting during the day using strategies such as effective *orientation* and placement of windows, use of light wells, light shafts or tubes, skylights, clerestory windows, light shelves, reflective surfaces, and shading, and the use of interior glazing to allow light into adjacent spaces.

deconstruction: the systematic dismantling and removal of a structure or its parts to salvage and harvest the components, for the purpose of reusing and recycling the *reclaimed materials* for their maximum value; the disassembly of a building with the explicit intent of recovering building materials for safe and economical *reuse*.

design development phase: refines the scope of work previously approved in the *schematic design phase*. In this phase, the project is developed to a level of detail necessary to work out a clear, coordinated description of all aspects of the project. Major elements including equipment, fire protection, mechanical, electrical, structural, telecommunications and plumbing systems are designed and coordinated through enlarged scale drawings, detailed elevations, and plans, and design mockups as required.

direct lighting: lighting provided from a source without reflection from other surfaces, which allows light to travel on a straight path from the light source to the point of interest, such as ceiling-mounted or suspended *luminaires* with mostly downward light distribution characteristics.

drift eliminator: structure to control water lost from cooling towers as liquid droplets are entrained in the exhaust air. A *drift eliminator* does not prevent water lost by evaporation.

drip irrigation: any non-spray, low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour (gal/hr.) or liters per hour (L/hr.). Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

drought tolerant plant: a plant that can withstand long periods with little or no water and/or that have relatively low water requirements.

dry vacuum system: a system that does not use water to form a seal for a vacuum pump or use flowing water to create a vacuum.

existing building: a building or portion thereof that was previously occupied or approved for occupancy by the authority having jurisdiction.

exterior vegetated space: outside the building footprint and paved areas. Applies only to sites where the site is vegetated with plants that are native, adapted to the ecosystem and/or non-invasive.

fenestration: all areas (including frames) in the *building envelope* that transmit light including windows, translucent panels, clerestory windows, skylights, and glass block walls. For doors where the glazed vision area is less than 50% of the door area, the *fenestration area* is the glazed vision area. For all other doors, the *fenestration area* is the door area (including frames).

fenestration area: total area of the *fenestration* measured using the rough opening and including glass, sash, and frame.

F-factor: the perimeter heat loss factor for slab-on-grade floor, expressed in Btu/hr-ft-°F (W/m-K).



food waste disposer: a device used to shred food and other kitchen wastes prior to disposal.

formulated product: any combination or blend of two or more constituent chemicals if the combination does not occur in nature and is not, in whole or in part, the result of a chemical reaction.

furnishings, finishes, and fit-outs: products and materials permanently installed on the interior of a building. This definition includes casework, shelving, and cabinets as well as finish materials used on floors, walls and ceilings. This definition does not include moveable furniture such as desks, tables, and chairs.

global warming potential (GWP): an index, describing the radiative characteristics of well-mixed greenhouse gases, that represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation. This index approximates the time-integrated warming effect of a unit mass of a given greenhouse gas in today's atmosphere, relative to that of carbon dioxide. (See *carbon dioxide equivalent*).

graywater: Untreated waste water that has not come into contact with toilet waste, kitchen sink waste, dishwasher waste or similarly contaminated sources. *Graywater* includes waste water from bathtubs, showers, and bathroom wash basins, *clothes washers* and laundry tubs.

greenfield: undeveloped lands such as fields, forests, farmland or rangeland.

grid displaced electricity: all electricity generated in or on the building site by, for example, PV panels, wind-power, combined heat and power systems (CHP), or similar systems.

impervious hardscape area: a hard surface area (e.g., parking lot) that prevents or retards the entry of water into the soil, thus causing water to run off the surface in greater quantities and at an increased rate of flow.

indoor environmental quality: refers to the quality of the air and environment inside buildings, based on pollutant concentrations and conditions that can affect the health, comfort, and performance of occupants-including temperature, relative humidity, light, sound and other factors.

integrated design process (IDP): a holistic approach to project design and planning where project team members from multiple disciplines work together throughout the project design and delivery process; this emphasizes goal setting, clear and ongoing communication, attention to detail, and active collaboration among team members with the objective of achieving holistic solutions.

integrated pest management: the use of different techniques to control pests, used singly or in combination, such as selection of pest-resistant plant varieties, regular monitoring for pests, use of pest-resistant materials or use of natural predators of the pest, to control pests, with an emphasis on methods that are least injurious to the environment and most specific to the particular pest.

landscape irrigation sprinkler(s): hydraulically operated mechanical device that discharges pressurized water into the air through a nozzle(s) as a spray or stream of water.

lavatory: a washbowl or basin plumbing fixture supplied with water from a *lavatory faucet* located within the confinements of a bathroom or toilet room and used for the sole purpose of personal hygiene.

lavatory faucet(s).: a fitting that controls the flow of water into a *lavatory*.



light pollution: any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.

luminaire: a complete lighting unit, consisting of an artificial light source(s) together with the components required to mount the unit and distribute the light, position the light source, and connect the light source to a power supply (often referred to as a "fixture").

major renovation: has occurred when 50% of the gross area (measured to the exterior footprint) of the building has been renovated.

makeup water: water added to a cooling tower for water replenishment or water quality maintenance in a cooling tower, evaporative cooler, humidifier, fountain, pool, or other items in which water is continually depleted or used during operation.

mature plant: a full-grown plant or the size of the plant after a specified period once the plant becomes established.

meter (or sub-meter): an instrument used to measure the volume and/or rate of flow of water in a conduit or channel.

modular construction: the remote assembly of major portions of a building constructed of multiple material types involving several trades working together to build a modular unit such as a bathroom pod, patient room pod, or a wall/floor/roof assembly including HVAC, electrical, and plumbing components.

mulch: a layer of permeable material applied to the surface of a landscape area to help conserve soil moisture, improve soil health, discourage weed growth and enhance visual appeal.

multi-load: (see clothes washer)

neighborhood asset(s): a single physical location where business transactions or services are available to the public. *Neighborhood assets* include, but are not limited to grocery stores, banks, retail outlets, and nonprofit and public services such as religious facilities, schools, parks, police and fire stations, and government offices.

non-potable water: water that is not potable water (see potable water).

non-structural element(s): elements attached to or housed in a building or building system, that are not part of the main load-resisting *structural system* of the building. These include:

- 1. architectural elements such as a parapet wall, partition wall, non-load carrying windows, suspended ceilings, *furnishings*, cladding systems, and veneer;
- 2. mechanical system components;
- 3. electrical system elements; and
- 4. miscellaneous components, such as sign boards and file cabinets.

off-site renewable energy: green power or *Renewable Energy Certificates (RECs)* purchased from a third-party source such as an electrical utility. There is no physical *renewable energy* system either on site or specifically connected to the building.

once-through water-cooled equipment: equipment that uses a heat exchange process for cooling only once before discharge of the water to a drainage system.



on-site renewable energy: energy derived from sun, wind, water, the Earth's core, and various forms of biomass from recovered waste sources that is captured, stored and used on the building site, using such technologies as wind turbines, photovoltaic solar panels, transpired solar collectors, solar thermal heaters, and small-scale hydroelectric power plants.

orientation: the relation of a building and its associated *fenestration* and interior surfaces to compass direction and, therefore, to the location of the sun, usually given in terms of angular degrees away from the south, (e.g., a wall facing due Southeast has an *orientation* of 45 degrees east of south).

overhang: a horizontal projection for a window or wall.

ozone depletion potential (ODP): a number that refers to the amount of ozone depletion caused by a substance. The *ODP* is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11. Thus, the *ODP* of CFC-11 is defined to be 1.0. Other CFCs and HCFCs have *ODP*s that range from 0.01 to 1.0. The halons have *ODP*s ranging up to 10. Carbon tetrachloride has an *ODP* of 1.2, and methyl chloroform's *ODP* is 0.11. HFCs have zero *ODP* because they do not contain chlorine. Manufacturers publish tables of all ozone depleting substances showing their *ODPs*, *GWPs*, and *CAS numbers*.

permeable pavement(s): infiltrate, treat, and/or store *rainwater* where it falls. They can be made of *pervious concrete, porous asphalt,* or permeable interlocking pavers.

pervious concrete: allows some or all water to penetrate the concrete assembly

porous asphalt pavement(s): allows some or all water to penetrate the asphalt assembly.

post-consumer recycled content: the portion of *recycled material,* in a product, generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. *Post-consumer recycled content* includes returns of materials from the distribution chain.

potable water: water that meets the requirement of the authority having jurisdiction and is satisfactory for drinking, culinary, and domestic purposes.

pre-consumer recycled content: the portion of *recycled material* in a product diverted from the waste stream during a manufacturing process. Materials that have been reutilized (i.e., reworked, reground, or scrap generated in a process and capable of being reclaimed within the same process that generated it) are excluded.

pre-design: the activities that happen during or prior to the conceptual/schematic design phase of the project.

prefabrication: off-site, custom fabrication of major building elements in specialized facilities, in which various materials are joined to form a component part of a final installation. Examples include trusses, joists, structural steel fabrications, architectural casework, curtain wall, and precast concrete. This does not include manufactured, multi-material components such as windows, doors, and gypsum sheathing unless they are incorporated into a prefabricated building element.

pre-rinse spray valve(s): a handheld device, used with commercial dishwashing and warewashing equipment and applications, that sprays water on dishes, flatware, and other food service items to remove food residue before cleaning and sanitizing the items.



pressure regulation: a device used to maintain a constant, desired down-stream water pressure in a pipeline or emission device.

previously developed site: land that is or was occupied by a permanent structure (excluding agricultural or forestry buildings), and associated fixed surface infrastructure.

primary [regularly] occupied space: a room or enclosed space designed for human occupancy in which individuals perform activities for which the space has been specifically designed.

product formulation: any combination or blend of two or more constituent chemicals, if the combination does not occur in nature and is not, in whole or in part, the result of a chemical reaction.

proposed equivalent emission rate (PER): *PER* is expressed as the mass of CO2e emitted per year per unit area of the total useful floor area of the proposed building – $lb/ft^2/yr$. (kg/m²/yr.).

R-value: indicates the resistance to heat flow (thermal resistance) of a material. The *R-value* of thermal insulation depends on the type of material, its thickness, and its density. **The higher the** *R-value*, **the greater the insulating effectiveness.** In calculating the *R-value* of a multi-layered installation, the *R-value* of the individual layers are added.

rain shutoff device: a device connected to an irrigation controller that overrides scheduled irrigation when significant precipitation is detected.

rainwater: untreated water from natural precipitation that has not been contaminated by use. Can be utilized through *rainwater harvesting*.

rainwater catchment: collection and conveyance of precipitation from a rooftop or other constructed, above ground collection surface.

rainwater harvesting: utilizing rainwater for potable, non-potable, industrial or irrigation applications.

reclaimed [recycled] water: highly treated wastewater that can be used for irrigation or other *non-potable* uses to extend water supplies.

recovered [reclaimed] material: material that would have otherwise been disposed of as waste or used for energy recovery (e.g., incinerated for power generation), but has instead been collected and recovered as a material input, in lieu of virgin primary material, for recycling or a manufacturing process.

recycled content: proportion, by mass, of *recycled material* in a product or packaging. Only *pre-consumer* and *post-consumer recycled materials* are considered to be *recycled content* (see **recycled material**).

recycled material: materials that have been diverted from the waste stream and reprocessed and remanufactured to form part or all of a new product.

regenerative sorptive media: filtration media capable of filtering down to 5 microns, that is usually composed of diatomaceous earth or perlite but that is unique in that it is not back-washed and replace after each use, but rather agitated off of filter tubes and then recoated on the filter. In addition to only needing occasional replacement, filtration processes using this type of media are much more water efficient.



remediation: cleanup or other methods used to remove or contain a toxic spill, contamination or hazardous material.

renewable energy: energy that is continuously replenished on the Earth, such as wind, solar thermal, solar electric, geothermal, hydropower, and various forms of biomass from recovered waste sources.

Renewable Energy Certificates (RECs): renewable energy certificates (RECs) also known as renewable energy credits, green certificates, green tags, or tradable renewable certificates, represent the environmental attributes of the power produced from *renewable energy* projects and are sold separately from commodity electricity. Customers can buy green certificates whether or not they have access to green power through their local utility or a competitive electricity marketer and they can purchase RECs without having to switch electricity suppliers.

renovation: changing in-kind, strengthening, refinishing, or replacing of structural elements or upgrading of existing materials, equipment and/or fixtures.

reuse: to use an object, material or resource again, either for its original purpose or a similar purpose, without significantly altering the physical form of the object or material.

risk: the probability that a *product formulation, article* or constituent chemical will cause an unacceptable hazardous or toxic human health or safety, or ecological effect under the intended exposure and use conditions.

risk assessment, product: a scientific product composition screening-level analysis that determines if a *product formulation, article,* or constituent chemical will produce a risk, based upon constituent hazards, dose and exposure assessments, and risk characterization.

risk characterization ratio (RCR): the quantitative probability estimate for adverse effects (i.e., toxicity) to occur under defined exposure conditions – calculated as *RCR*= exposure dosage/no adverse effects dosage, with *RCR* values < 1.0 indicating the risk is adequately controlled.

salvaged material: discarded or unused construction materials or products removed from a structure or a site that have value and can be directly substituted for new materials or products with minimal reprocessing.

sand-based filtration: filtration that does not utilize a sorptive media (such as diatomaceous earth or perlite) and does not filter down to 5 microns.

service life: the expected lifetime of a product.

shared use [multi-user] path: a form of infrastructure that supports multiple non-motorized transportation opportunities, such as walking, bicycling and inline skating. A multi-use path is physically separated from motor vehicular traffic with an open space or barrier.

sidelit daylighted area: the perpendicular area from the glazing into the space that is determined by either:

- 1. a distance of 15 ft. (4.6 m) or
- 2. the perpendicular distance from the glazing to the nearest partition that is 5 ft. (1.5 m) or higher multiplied by the smaller of either;
 - a. the width of the window plus 2 ft. (0.6 m) on both sides,
 - b. the width of the window plus the distance to a permanent partition, or
 - c. the width of the window plus one-half the distance to the closest skylight or vertical glazing.



single load: (see clothes washer)

Smart Water Application Technology (SWAT): a national initiative of water providers and irrigation industry representatives to promote landscape water-use efficiency through the application of state-of-the-art irrigation technologies.

soil moisture sensor: a device to measure the moisture level in the soil and which is, in some instances, connected to an irrigation system to signal the bypass of the scheduled irrigation cycle if the soil moisture is above a specified level.

specialized activities: activities that generate pollutants, that may include but are not limited to, printing rooms, and areas that contain industrial and quasi-industrial equipment.

splash out trough: the channel located around the edge of a pool that is designed to catch water that otherwise would spill or be tracked out of the pool onto the decking. The splash out trough drains back to the pool system.

steam sterilizer [autoclave]: a device that uses moist heat in the form of saturated steam under pressure for a predetermined period of time to sterilize materials.

stormwater: natural precipitation that has contacted a surface at, below (channels storm drain pipes), or above (elevated roadways) grade.

structural system: the load-resisting system of a structure that transfers loads to the soil or supporting structure through interconnected structural components or members.

sub-meter: a subdivision of the utility metering of a building that records the proportionate energy use of specific building systems and appliances.

substantial completion: the stage in the progress of a construction project when the project or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the project for its intended use.

Superfund site: a site that is on the U.S. Environmental Protection Agency's (EPA) National Priority List (NPL) based on a scoring process that rates its current or potential health impact.

task lighting: light that is directed to a specific surface or area to provide illumination for visual tasks.

toplit daylighted area: the actual perimeter of the rough glazing unit or skylight opening to a point expanding outward from each side to a distance of 70% of the ceiling height. Areas of overlap with *toplit daylighted area* or *sidelit daylighted area* can only be applied to one area. Light obstructed by a permanent partition that is 5 ft. (1.5 m) high or taller is not considered as part of the *toplit daylighted area*.

Total Material Value: the invoiced cost of materials and products as received by the contractor, permanently installed in the building project, not including the contractor's profit, overhead, or labor. Alternatively, 45% of the total construction cost may be used to establish the *Total Material Value*.

Tree Protection Zone (TPZ): an area established to minimize damage to trees and their root systems. The TPZ is determined by measuring the diameter of the trunk at a standard height of 4.5 ft. (1.37 m) above the ground line and a



radius from the tree trunk is extended 1.5 ft. (.46 m) for each inch (2.54 cm) of trunk diameter. For example, if the tree trunk is 10 in. (25.4 cm) at 4.5 ft. (1.37 m) above the ground line, then the TPZ radius would extend 15 ft. (4.57 m) from the tree trunk in all directions.

U-factor (thermal transmittance): the heat transmission in unit time through unit area for all the elements of construction and the boundary air films, induced by unit temperature difference between the environmental conditions on each side. Btu/hr-ft²-°F (W/m²-K).

variable air volume (VAV) system: an HVAC system that provides temperature control by varying the supply of conditioned air in different parts of the building according to heating and cooling needs. The air supply temperature may be constant or varied (also according to heating and cooling needs).

variable occupancy: a variance of 30% from design occupancy for a minimum of 30% of normally occupied hours.

vegetated roof: a roof system that may include a water proofing and root repellant system, a drainage system, filter cloth, a lightweight growing medium, and plants. *Vegetated roof* systems can be modular, with drainage layers, filter cloth, growing media and plants already prepared in movable, interlocking grids or each component can be installed separately.

waste heat: waste heat from industrial processes and power stations rated at more than 10MWe and with a power efficiency of greater than 35%.

water factor (WF): the quotient of the total weighted per-cycle water consumption for cold wash divided by the cubic foot (or liter) capacity of the *clothes washer*.

water features: a designated, often artificial, area in which visible water is moving or open for some purpose. While often this is for aesthetic purposes, these areas may have multiple uses. Generally, the term applies to places not used exclusively for irrigation.

water tempering device: a device that cools a discharge of hot water or steam to the sanitary sewer by dilution (mixing) with cooler water.

wetland: natural or constructed areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

5.2 Abbreviations and Acronyms

APBP: Association of Pedestrian and Bicycle Professionals

ASA: Acoustical Society of America

ASABE: American Society of Agricultural and Biological Engineers

ASCE: American Society of Civil Engineers



ASTM: ASTM International

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers

- ATFS: American Tree Farm System
- BUG: Backlight, Uplight and Glare Ratings
- CABI: Center for Agriculture and Bioscience International
- **CAS:** Chemical Abstracts Service

CBECS: Commercial Building Energy Consumption Survey. Developed by the U.S. Department of Energy's Energy Information Administration (EIA)

- **CDPH:** California Department of Public Health
- CHPS: Collaborative for High Performance Schools
- **CO2e:** Carbon Dioxide Equivalent Emissions Rate
- CRI: Carpet and Rug Institute, Inc.
- EMS: Environmental Management System
- EPA: Environmental Protection Agency
- **FEMA:** Federal Emergency Management Agency
- FGI: Facility Guidelines Institute
- HVAC&R: heating, ventilating, air-conditioning, and refrigerating
- IAPMO: International Association of Plumbing and Mechanical Officials
- ICC: International Code Council®
- **IDP:** Integrated Design Process
- IECC: International Energy Conservation Code
- IES: Illuminating Engineering Society of North America
- **INCE:** Institute of Noise Control Engineering
- ISO: International Organization for Standardization
- LCA: life cycle assessment



- LWA: Landscape water allowance
- MERV: Minimum Efficiency Reporting Value
- MURB: Multi-Unit Residential Building
- **NBI:** New Buildings Institute
- NCAC: National Council of Acoustical Consultants
- NFPA: National Fire Protection Association
- NISIC: National Invasive Species Information Center
- **NIST:** National Institute of Standards and Technology
- NREL: National Renewable Energy Laboratory
- PEFC: Programme for Endorsement of Forest Certification
- RCR: Risk Characterization Ratio
- **RELs:** Reference Exposure Levels
- **RFCI:** Resilient Floor Covering Institute
- SCAQMD: South Coast Air Quality Management District
- SMACNA: Sheet Metal and Air Conditioning Contractors' National Association
- TCNA: Tile Council of North America
- **USDA**: United States Department of Agriculture
- VOC: Volatile Organic Compounds
- WBDG: Whole Building Design Guide
- WF: Water Factor
- **WISP:** Whole Systems Integration Process
- **ZWIA:** Zero Waste International Alliance



ENVIRONMENTAL ASSESSMENT AREAS

6. PROJECT MANAGEMENT (100 points)

6.1 Team & Owner Planning (45 points)

6.1.1 Performance & Green Design Goals			
 6.1.1 Performance & Green Design Goals 6.1.1.1 Performance and green design goals (qualitative AND/OR quantitative) are established in collaboration with the owner in writing and are regularly assessed from <i>pre-design</i> through to completion of construction and occupancy for the following listed items: Site design; Environmentally responsible construction activities; Water conservation, efficiency, <i>alternate water sources</i>, and <i>reuse</i>; Building envelope and moisture control; Energy efficiency; Environmentally preferable products; and Storage of hazardous materials; Indoor environment including: Acoustic comfort; Thermal comfort; Lighting; Air quality; and 	 Maximum = 20 points One point is earned for each written performance and green design goal for listed items at <i>pre-design</i> to a maximum of eight points. One point is earned for evidence of each design stage review and assessment of goals prior to: <i>Conceptual design</i> <i>Design development</i> <i>Construction documents.</i> One point is earned for evidence of each design stage review and assessment completed at: Pre-construction 25% completion 50% completion <i>Substantial completion.</i> Five points are earned for a written plan and contract for post-occupancy review and assessment. 		
Assessment criteria: Pre-design written goals Design stage review and assessment of goals prior to: • Conceptual design phase • Design development phase • Construction documents Construction stage review and assessment of goals at: • Pre-construction • 25% completion of budget or schedule • 50% completion of budget or schedule • Substantial completion Occupancy assessment of goals: • Owner obtains a contract for Facility Performance Evaluation or Post-Occupancy Study to evaluate how the building meets the original and emerging goals and requirements within 18 months of being occupied.			



 6.1.2.1 Employ an Integrated Design Process (IDP) with evidence of comprehensive pre-design, design phase, and construction phase planning and coordination. Job functions involved in the IDP include but are not limited to the following: Architect; Building Envelope Specialist; Civil Engineer; Community Representative; Electrical Engineer; Facilities Manager; Contervention Designer; Interior Designer; Lighting Designer/Illuminating Engineer; Structural Engineer; ANSI/MST 1.0 Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 				
 6.1.2.1 Employ an Integrated Design Process (IDP) with evidence of comprehensive pre-design, design phase, and construction phase planning and coordination. Job functions involved in the IDP include but are not limited to the following: Architect; Building Envelope Specialist; Civil Engineer; Community Representative; Electrical Engineer; General Contractor/Construction Manager: Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0.Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014 	6.1.2 Integrated Design Process			
 with evidence of comprehensive pre-design, design phase, and construction phase planning and coordination. Job functions involved in the <i>IDP</i> include but are not limited to the following: Architect; Building Envelope Specialist; Civil Engineer; Community Representative; Electrical Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Lighting Designer/Illuminating Engineer; Machanical Engineer; Lighting Designer/Illuminating Engineer; Sustainability Consultant; AND/OR User Group Representative: Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	6.1.2.1 Employ an Integrated Design Process (IDP)	Maximum = 14 points		
design phase, and construction phase planning and coordination. The following points are earned when a minimum of the listed job functions or groups were represented at the following milestones or during the following milestones oreduring the following milestones or during the followi	with evidence of comprehensive pre-design,	T I (II)		
coordination.Job functions involved in the IDP include but are not limited to the following:Architect;Architect;Building Envelope Specialist;Civil Engineer;Community Representative;Electrical Engineer;Facilities Manager;o Specialty Contractors;Interior Designer;Landscape Architect or Designer;Lighting Designer/Illuminating Engineer;Michandal Engineer;Lighting Designer/Illuminating Engineer;Structural Engineer;Structural Engineer;Structural Engineer;Structural Engineer;Structural Engineer;Structural Engineer;Sustainability Consultant; AND/ORUser Group Representative;Structural Engineer;ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design.	design phase, and construction phase planning and	The following points are	earned whe	n a
Were represented at the biowing milestones or during the following project phases:Job functions involved in the <i>IDP</i> include but are not limited to the following: • Architect; • Building Envelope Specialist; • Civil Engineer; • Community Representative; • Electrical Engineer; • Eacilities Manager; • General Contractor/Construction Manager: • Specialty Contractors; • Interior Designer; • Lighting Designer; • Lighting Designer; • Landscape Architect or Designer; • Structural Engineer; • Structural Engineer; • Structural Engineer; • Structural Engineer; • Structural Engineer; • Structural Engineer; • Sustainability Consultant; AND/OR • User Group Representative.Pre-Design Event (meeting, charrette, or workshop)Pre-Design Event (meeting, charrette, or workshop)Informational Reference(s): • ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design.Pre-Design Event (meeting, charrette, or workshop)35Conceptual or Design • Documents Phase136General Contractor/Construction Manager: • Structural Engineer; • Sustainability Consultant; AND/OR • User Group Representative.1313the expectation of an in-depth review of the decisions made on the project sustainability goals1313the systems Integrated Process Guide (WISP)-2007 • ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design.13	coordination.	minimum of the listed jo	b functions of	or groups
Job functions involved in the <i>IDP</i> include but are not limited to the following:Architect;Milestone or ProjectPoints for 6 to 9 JobBuilding Envelope Specialist;FunctionsCivil Engineer;Community Representative;Community Representative;Pre-Design Event (meeting, charrette, 3Electrical Engineer;or workshop)Electrical Engineer;Conceptual or Design PhaseFacilities Manager;Conceptual or Design PhaseGeneral Contractor/Construction Manager:1O Specialty Contractors;Interior Designer;Interior Designer;Construction Documents PhaseInterior Designer;General Contractor or Designer;Interior Designer;Milestone or Project sustainability Consultant; AND/OR sustainability Consultant; AND/ORInformational Reference(s):ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Drocess Guide (WISP)-2007		were represented at the	Tollowing m	llestones or
Not limited to the following: Milestone of Project Points for Points for Interference (s): Architect; Phase 6 to 9 Job 10 or Building Envelope Specialist; Free-Design Event Success Functions Community Representative; Conceptual or Design 1 3 Community Representative; Conceptual or Design 1 3 Electrical Engineer; or workshop) Conceptual or Design 1 3 General Contractor/Construction Manager: o Specialty Contractors; 1 3 Interior Designer; Landscape Architect or Designer; 1 3 Lighting Designer/Illuminating Engineer; Maximum Price 1 3 Mochanical Engineer; Structural Engineer; Structural Engineer; 3 1 3 Owner's Representative; Structural Engineer; sustainability goals 1 3 3 Informational Reference(s): ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. Structural Engineer; Structural Engineer; Structural Engineer; Massin aduitity of mattive A	Iob functions involved in the IDP include but are	during the following proj	ect phases:	
 Architecti to the following. Architect; <i>Building Envelope</i> Specialist; Civil Engineer; Community Representative; Electrical Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Lighting Designer/Illuminating Engineer; Machanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	not limited to the following:	Milestone or Project	Points for	Points for
 Architect; Building Envelope Specialist; Civil Engineer; Commissioning Agent; Community Representative; Electrical Engineer; Energy Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Lighting Designer/Illuminating Engineer; Machanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Structural Engineer; Structural Engineer; Structural Engineer; Structural Engineer; Maximum Price (GMP) Review with the expectation of an in-depth review of the decisions made on the project Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MST 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Auchite etc.	Phase	6 to 9 Job	10 Or
 Building Envelope Specialist; Civil Engineer; Community Representative; Electrical Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	Architect;		FUNCTIONS	Functions
 Civil Engineer; Community Representative; Electrical Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	Building Envelope Specialist;	Bra Dasian Evant		Functions
 Commissioning Agent; Community Representative; Electrical Engineer; Energy Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Interior Designer; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	Civil Engineer;	mooting charrotte	2	E
 Community Representative; Electrical Engineer; Energy Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MST 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	 Commissioning Agent; 	(meeting, chartette,	5	5
 Electrical Engineer; Energy Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Intrigation Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	 Community Representative; 	Concentual or Design		
 Energy Engineer; Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Intrigation Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Electrical Engineer;	Phase	1	3
 Facilities Manager; General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Energy Engineer;	Construction		
 General Contractor/Construction Manager: Specialty Contractors; Interior Designer; Irrigation Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Facilities Manager; 	Documents Phase	1	3
Manager: • Specialty Contractors; • Interior Designer; • Landscape Architect or Designer; • Lighting Designer/Illuminating Engineer; • Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; • Owner's Representative; • Structural Engineer; • Sustainability Consultant; AND/OR • User Group Representative. Informational Reference(s): • ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 • ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design.	 General Contractor/Construction 	Final Budget or		
 Specialty Contractors; Interior Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Manager:	Guaranteed		
 Interior Designer; Irrigation Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Specialty Contractors; 	Maximum Price		
 Irrigation Designer; Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Interior Designer; 	(GMP) Review with		
 Landscape Architect or Designer; Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Irrigation Designer; 	the expectation of an		
 Lighting Designer/Illuminating Engineer; Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Landscape Architect or Designer; 	in-depth review of	1	3
 Mechanical Engineer – Plumbing, HVAC, AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0 Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Lighting Designer/Illuminating Engineer; 	the consequences of		
AND/OR Refrigeration; Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design.	 Mechanical Engineer – Plumbing, HVAC, 	the decisions made		
 Owner's Representative; Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Informative Appendix F: Integrated Design. 	AND/OR Refrigeration;	on the project		
 Structural Engineer; Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Owner's Representative; 	sustainability goals		
 Sustainability Consultant; AND/OR User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Structural Engineer;			
 User Group Representative. Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 Sustainability Consultant; AND/OR 			
 Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	User Group Representative.			
 Informational Reference(s): ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 				
 ANSI/MTS 1.0_Whole Systems Integrated Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Informational Reference(s):			
 Process Guide (WISP)-2007 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	 ANSI/MTS 1.0 Whole Systems Integrated 			
 ANSI/ASHRAE/USGBC/IES Standard 189.1- 2014, Informative Appendix F: Integrated Design. 	Process Guide (WISP)-2007			
2014, Informative Appendix F: Integrated Design.	ANSI/ASHRAE/USGBC/IES Standard 189.1-			
Design.	2014, Informative Appendix F: Integrated			
	Design.			

6.1.3 Site and Building Resilience	
6.1.3.1 Building Risk Assessment: An assessment	3 points
identifying risks to the building including continued	
building occupancy resulting from extreme natural	
events, global climate change, and human activity	
for the expected <i>service life</i> of the building has	
been conducted and provided to building owners	

ANSI/GBI 01-2019 **GREEN GLOBES® ASSESSMENT PROTOCOL FOR** S R



and designers. The assessment identifies hazards	
and evaluates the probability and severity of	
occurrence of those events. These hazards	
include, but are not limited to, weather, flooding,	
seismic and volcanic events, drought, wildfire, soil	
stability, and terrorism.	
	(Continued from 6.1.3.1 Building Risk
Informational Reference(s)	Assessment)
• National Academies and the Climate Resilience	
Toolkit/Climate Explorer:	
https://toolkit.climate.gov/ (last accessed	
6/30/17)	
NOAA Digital Coast:	
https://coast.noaa.gov/digitalcoast/ (last	
accessed 6/20/17)	
• NOAA NESDIS 142 Series – Regional Climate	
Trends and Scenarios for the U.S. National	
Climate Assessment	
6.1.3.2 Building Operational Continuity or	3 points
Recovery_Assessment: An assessment of the	
necessity of continuous or rapid recovery of	
various building functions during and after an	
extreme event has been conducted.	
Informational Reference(s)	
National Academies and the Climate Resilience	
Toolkit/Climate Explorer:	
https://toolkit.climate.gov/ (last accessed	
6/30/17)	
NOAA Digital Coast:	
https://coast.noaa.gov/digitalcoast/ (last	
accessed 6/20/17)	
NOAA NESDIS 142 Series – Regional Climate	
Trends and Scenarios for the U.S. National	
Climate Assessment	
6.1.3.3 Project Specific Design Parameters:	3 points
Document that the findings of both the risk and	
building function assessments have been	
integrated into the building design parameters and	
are reflected in the final design and construction	
of the building.	
Informational Reference(s)	
National Academies and the Climate Resilience	

• Na Toolkit/Climate Explorer: https://toolkit.climate.gov/ (last accessed 6/30/17)



NOAA Digital Coast:	
https://coast.noaa.gov/digitalcoast/ (last	
accessed 6/20/17)	
NOAA NESDIS 142 Series – Regional Climate	
Trends and Scenarios for the U.S. National	
Climate Assessment	
6.1.3.4 Publication of Emergency Preparedness	2 points
Manual: A building operation manual has been	
prepared outlining actions to be taken in the event	
of an extreme event, materials to be stockpiled in	
the building if continuing occupancy is anticipated,	
and timeline for regular review.	
Informational Reference(s)	
National Academies and the Climate Resilience	
Toolkit/Climate Explorer:	
https://toolkit.climate.gov/ (last accessed	(Continued from 6.1.3.4 Publication of
6/30/17)	Emergency Preparedness Manual)
NOAA Digital Coast:	
https://coast.noaa.gov/digitalcoast/ (last	
accessed 6/20/17)	
 NOAA NESDIS 142 Series – Regional Climate 	
Trends and Scenarios for the U.S. National	
Climate Assessment	

6.1.4 Recommended Documentation

- Facility performance evaluation;
- List of written performance and green design goals;
- Progress meeting agendas, attendance rosters showing function of each attendee, and meeting minutes;
- Post-occupancy study.

6.2 Environmental Management During Construction (8 points)

6.2.1 Environmental Management System (EMS)			
6.2.1.1 The general contractor (GC) or construction	Maximum = 8 points		
of their Environmental Management System (EMS):			
of their chvironmental Management System (CMS).	 Two points are earned for documenting the items listed in 		
6.2.1.1.1: GC/CM Environmental Policy:	6.2.1.1.1.		
 Includes policies and practices that support 	 Two points are earned for 		
the health of humans and site-environment	t documenting the items listed in		
during construction;	6.2.1.1.2.		
• 6.2.1.1.2: Designated GC/CM Environmental	• Two points are earned for		
Management Plan and Compliance Manager:	documenting the items listed in		
 Lists their qualifications, role, responsibilitie 	es, 6.2.1.1.3.		
and reporting compliance structure (e.g.,			



•	 checklists, inspections, and records of compliance). Indicates how this information is passed along to project personnel and sub-contractors; Describe continuous reporting mechanism; 6.2.1.1.3: Project Ecological and Health Risk Assessment: An assessment is conducted prior to the start of construction to identify major risks that 	• Two points are earned for documenting the items listed in 6.2.1.1.4.
	could impact the general welfare and health of humans (i.e., residents, workers, visitors, and construction trades people) and the ecological environment surrounding the immediate area of construction for the specific project and local agency requirements;	
•	 6.2.1.1.4: A construction management policy prohibits smoking within 25 ft. (7.62 m) of the building perimeter and construction zone during the construction phase. Smoking is defined as the inhalation of smoke from burning tobacco, use of electronic-cigarettes, or other substance encased in items such as, but not limited to, cigarettes, pipes, and cigars for recreational or medical use. 	(Continued from 6.2.1.1.4)

6.3 Life Cycle Cost Analysis or Building Service Life Planning (12 points)

Two paths are available for assessing Life Cycle Cost Analysis or Building Service Life Planning.

• Path A: Life Cycle Cost Analysis: 12 points

OR

• Path B: Building Service Life Plan: 12 points

Points cannot be combined between paths. Select one of the paths below.

6.3.1 Path A: Life Cycle Cost Analysis		
6.3.1.1 A cost of ownership financial analysis is performed on	12 points	
the project's collective bundle of green features (i.e.,		
energy/water conservation measures, energy/water efficiency		
features, maintenance best practices, waste reduction) that		
are expected to impact:		
Project first costs;		
• Operation costs (i.e., utility costs/savings, maintenance		
and repair costs, costs of replacement,); or		
Other financial features of ownership.		





The analysis is a life cycle cost analysis (LCCA) that compares the life time benefits of ownership to the subsequent costs. The analysis accounts for and cle?arly states all calculation assumptions related to:	
 The time value of money; Fuel escalation rates; Other relevant operational factors that affect the cost of ownership. 	
The LCCA study period is not less than the expected life of the building or system.	
Use projected annual energy costs for the proposed design for this LCCA.	
 Informational Reference(s): NIST Handbook 135, 1995 ANSI/ASHRAE/USGBC/IES Standard 189.1-2014 Table 10.3.2.3 	

OR

6.3.2 Path B: Building Service Life Plan	
6.3.2.1 A Building Service Life Plan is implemented that	Maximum =12 points
includes the expected service life estimates, including	
inspection and replacement during the life of the building. The	• Two points are earned for each of
Building Service Life Plan covers the following systems:	the listed elements included in the
	Building Service Life Plan up to a
• 6.3.2.1.1 : <i>Structural systems</i> ;	maximum of 12 points.
• 6.3.2.1.2 : <i>Building envelope</i> including facades, doors, and	(Continued from 6.3.2.1)
windows;	
• 6.3.2.1.3 : Building roof system;	
• 6.3.2.1.4 : Mechanical, electrical, plumbing, fire protection,	
and energy generation systems;	
• 6.3.2.1.5: Site hardscape; AND/OR	
• 6.3.2.1.6 : <i>Furnishing</i> and interior <i>fit-out</i> .	
Provide documentation of the project design <i>service life</i> , the	
listed systems service lives, the basis for the determination,	
and the following details for each assembly or component	
used in the building:	
 Building assembly and material description; 	
 Design service life in years; 	
 Predicted service life in years; 	
 Adaptability and repurposing at end of service life; and 	
Maintenance frequency and maintenance access.	





Informational Reference(s):

- ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Section 10.3.2.3
- CSA S478-95 (R2007): Guideline on Durability in Buildings
- ISO 15686 (series), 2014
- Preparing a Building Service life plan for Green Buildings, Dru Meadows, 2014
- Whole Building Design Guide (WBDG), Section 01 81 10 (01120), 2001

6.3.3 Recommended Documentation

- Building service life plan;
- Capital asset plan and business case summary.

6.4 Moisture Control Analysis (6 points)

 Maximum = 6 points Three points are earned when a moisture control design analysis is performed on walls and ceilings adjacent to spaces of added moisture. Not applicable where there are no spaces of added moisture. Three points are earned when a moisture control design analysis is performed on above-grade portions of the <i>building envelope</i>.

6.5 Commissioning or Systems Manual & Training (29 points)

Two paths are available for assessing Commissioning or Systems Manual & Training.

- Path A: Building Commissioning and Training: 29 points
- OR
- Path B: Systems Manual and Training: 20 points

Points cannot be combined between paths. Select one of the paths below.

6.5.1 Path A: Building Commissioning and Training	
6.5.1.1 Commissioning and building operator training is conducted in accordance with ANSI/ASHRAE/IES Standard	Maximum = 29 points or N/A
202–2013, Commissioning Process for Buildings and Systems, and ASHRAE Guideline 0-2013, The Commissioning Process, for the following building systems:	 Six points are earned if commissioning and training is conducted for HVAC&R systems and controls.



OR

6.5.2 Path B: Systems Manual & Training	
6.5.2.1 Produce a systems manual in accordance with	10 points
ASHRAE Guideline 0-2013, The Commissioning Process,	
Informative Annex O – Systems Manual, Sections 4 to 10,	
inclusive.	
6.5.2.2 Conduct systems training in accordance with	10 points
ASHRAE Guideline 0-2013, The Commissioning Process,	
Informative Annex P – Training Manual and Training Needs.	

6.5.3 Recommended Documentation



- Path A: Final Commissioning Report, Systems Manual, training syllabus and evidence of completion.
- Path B: Systems Manual, training syllabus and evidence of training completion.

7. SITE (150 points)

7.1 Development Area (38 points)

7.1.1 Urban Infill and Urban Sprawl	
7.1.1.1 The building is being constructed on a <i>previously</i>	14 points
developed site that has been served by existing utility and	
transportation infrastructure for at least a full year prior to	
construction.	

7.1.2 Greenfields, Brownfields, and Floodplains	
7.1.2.1 The building is being constructed on a <i>brownfield</i> or	14 noints
remediated Superfund site.	
7.1.2.2 The project is not located on or adjacent to sensitive	6 points or N/A
natural sites (e.g. land that is forest or woodland area,	
savannah, prairie, <i>wetland</i> , undeveloped riparian zones, or	 Not applicable where the legislative
wildlife corridor) or on land that was a sensitive natural site	body_with jurisdiction has not
for at least three years prior to time of purchase or from	declared a wildland-urban interface
the start of project.	area.
• The project is not located on a site that was used for farmland, public recreation, or a public park for at least three years prior to the time of purchase or from the start of the project.	
AND The project is not within or adjacent to a wildland-	
urban interface area where established by the legislative	
body with jurisdiction.	
Informational Reference(s):	
• Executive Order 13728: Wildland-Urban Interface	
Federal Risk Mitigation, 2016	
https://www.gpo.gov/fdsys/pkg/FR-2016-05-	
20/pdf/2016-12155.pdf (last accessed 6/30/17)	
ICC, 2015 International Wildland-Urban Interface Code	
United States Department of Agriculture, <i>The 2010</i>	
Wildland-Urban Interface of the Continuous United	
States,2015 https://www.nrs.fs.fed.us/pubs/48642	
(last access 6/30/17)	
7.1.2.3 Floodplains:	Maximum = 9 points
 7.1.2.3.1: No construction or site disturbance takes place in the 100-year floodplain. 	 Nine points are earned for 7.1.2.3.1. Not applicable where no areas in the local jurisdiction



• 7.1.2.3.2: Elevate Buildings and additions in the floodplain to a minimum of 3 ft. (.9 m) above the 100-year floodplain or are built to allow water to flow through or under the lowest floor.	fall within the 100-year floodplain. • Six points are earned for 7.1.2.3.2.
AND	
The facility also earns points for 7.2.1.1 or 7.2.1.7 or is within 0.25 mi (0.4 km) walking distance of developed residential land of at least 8 dwelling units per acre.	
AND	
Buildings and structures assigned a risk category of III or IV in Table 1604.5 of the 2012 International Building Code will not be located within a 500-year floodplain. (Not required if the entire jurisdiction is located within the 100-year floodplain. If the entire jurisdiction is located within the 500-year floodplain, then the facility is built outside the 100-year floodplain. Not applicable where no areas in the local jurisdiction fall within the 500-year floodplain.)	
 Informational Reference(s): FEMA Technical Bulletin 2/2008 ASCE/SEI 24-14 "Flood Resistant Design and Construction" (2014) 	

7.1.3 Recommended Documentation

- Site civil plans and existing site civil plans;
- Documentation by EPA, municipal, or other governmental authority of *Superfund* and *Brownfield* site;
- Construction documents;
- Zoning maps;
- Government maps of wildland-urban interface areas;
- Pre-construction site documentation;
- Landscaping plans;
- Floodplain map;
- Community resilience, climate action, or similar mitigation plan.

7.2 Transportation (34 points)

7.2.1 Transportation	
7.2.1.1 A building entrance is within 0.25 mi (0.4 km) walking distance of a local transit stop or 0.5 mi (0.8 km) walking distance of a rapid transit stop.	10 points





Note: Local transit includes public transit that uses the same right-of-way as automobiles AND for which the distance between stops averages less than 0.33 mi (0.5 km). Rapid transit refers to all other types of public transit.	
AND	
The stop is served by a transit route that offers service:	
 with single direction intervals (headways) no longer than 15 minutes during peak hours and 30-minute single direction intervals (headways) during off-peak hours for a minimum of 14 hours each weekday; 	
AND	
 with single direction intervals (headways) no longer than 1 hour and operating at a minimum of 14 hours at least one day each weekend. 	
 Information Reference(s): ASTM E2844-15, Standard Specification for Demonstrating that a Building's Location Provides Access to Public Transit 	
7.2.1.2 Designated preferred parking for car/van pooling, and shelter from weather exists for persons waiting for transportation serving carpools or transit listed in 7.2.1.1.	1 point
7.2.1.3 Alternative refueling facilities or electric charging stations are located on site or within 0.25 mi (0.4 km) of the site.	 2 points or N/A Not applicable where this strategy is not possible or where the_project will have no parking associated with the building.
7.2.1.4 A building entrance is located within 0.25 mi (0.4 km) of a public bicycle path, shared use [multi-user] path, or road with an existing dedicated bicycle lane.	2 points
AND	
The path, lane, or associated bicycle network connects within 5 mi (8.05 km) to a transit stop as	





described in 7.2.1.1 or to the developed residential land of at least 8 dwelling units per acre.	
AND	
There is reasonable, unobstructed access between	
the A bicycle lane or shared use [multi-user] path	
and the bicycle parking facilities or the building	
entrance.	1 maint
7.2.1.5 A bicycle parking rack is located within 50 ft (15.24 m) of an ontranso, and is either readily	1 point
visible from a main entrance, or signage indicating	
the location is posted at main entrances.	
Informational reference(s)	
• The Association of Pedestrian and Bicycle	
Professionals, Bicycle Parking Guidelines, 2 nd	
Edition (2010)	
7.2.1.0 Facilities for Bicycle Commuting and Long-	Maximum = 5 points
	• Two points are earned where sheltered bicycle
	parking facilities are provided (and showers
• 7.2.1.6.1: Sheltered bicycle parking is:	and changing facilities as applicable).
 provided for at least 10% of building 	Two points where the sheltered bicycle
occupants, where the building occupant	parking is secure. (Only applicable where the
International Building Code AND shower	above two points are achieved.)
and changing facilities are provided within	 One point is earned where the building is
the building project;	located hear a blice share facility.
OR	
 provided for at least 50% of units in a 	
multi-family residential building.	
• 77167: At least EO% of the sheltered his yeld	
 7.2.1.0.2. At least 50% of the shellered bicycle parking is located inside the building or within 	
storage lockers or another area that provides	(Continued from 7.2.1.6)
security of a locked room or cage secured by a	(Continued from 7.2.1.6)
keyed, cipher, or electronic lock and the ability	
to lock the bicycle to a rack within that space.	
• 7.2.1.6.3: The building is located within 0.25	
mi (0.4 km) walking distance of a bike share	
facility.	Maximum 10 a sinte
1.2.1.1 The building s Walkscore [®] IS 75 or greater;	waximum = 10 points
OR	• Ten points are earned where the building has a
• A building entrance is within 0.5 mi (0.8 km)	Walkscore of ≥ 90
walking distance of a grocery store and a	Seven points are earned where:
minimum of three other neighborhood assets.	



	These four <i>neighborhood assets</i> are open to the general public in operation, and as a	0	the building has a Walkscore of 75 to
	group have NAICS codes that start with a	0	is located within $0.5 \text{ mi} (0.8 \text{ km}) \text{ of a}$
	group have wates codes that start with a	0	is located within 0.5 millions with or a
	minimum of three different numbers;		grocery store and three other assets;
OR			OR
•	A building entrance is within 0.5 mi (0.8 km)	0	within 0.5 mi (0.8 km) of six assets.
	walking distance of a minimum of six		
	neighborhood assets. The six neighborhood		
	assets are open to the public, in operation,		
	and as a group have NAICS codes that start		
	with a minimum of three different numbers:		
OR			
•	The building's Walkscore is 90 or greater		
•			
Info	prmational Reference(s):		
•	ASTM F2843-16a Standard Specification for		
	Demonstrating That a Building is in Walkable		
	Dravimity to Naighborhood Assats		
_	North Argenian Industry Classification		
•	North American Industry Classification		
	System.(NAICS)		
	http://www.census.gov/eos/www/naics/ (last		
	accessed 6/20/17)		
•	www.walkscore.com (last accessed 6/20/17)		

7.2.2 Recommended Documentation

- Site civil plans, existing site civil plans, and civil engineering plans;
- Narrative stating total expected full-time building occupants.

7.3 Construction Impacts (29 points)

7.3.1 Site Erosion:

Two paths are provided for assessing erosion and sedimentation:

- Path A: Erosion and Sedimentation Control Plan: 5 points OR
- Path B: Erosion and Sedimentation Control Specifications: 5 points

Points cannot be combined between paths. Select one of the paths below.

7.3.1.1 Path A: Erosion and Sedimentation Control Plan					
7.3.1.1.1 An Erosion and Sedimentation Control Plan,	5 points or N/A				
signed and stamped by a professional engineer or designer approved by the authority having jurisdiction, is included in the <i>construction documents</i> .	 Not applicable where projects are interior-only. 				
Informational Reference(s):					



•	National Pollutant Discharge Elimination System							
	(NPDES) Permit Program							
DR								
7.3.1.2 Path B: Erosion and Sedimentation Control Specifications								
7.3.1.2.1 The specifications require the implementation of the following best practices as appropriate to the site for		Maximum = 5 points or N/A						
erc	sion and sediment control during construction:	•	Not applicable where the lot is larger than one acre.					
•	Construction Site Planning and Management Measures: construction sequencing, construction site operator BMP inspection and maintenance, preserving natural vegetation;	•	Not applicable where projects are interior-only.					
•	Erosion Control: articulated concrete block, chemical stabilization, compost blankets, dust control, flocculants, geotextiles, gradient terraces, <i>mulching</i> , riprap, seeding, sodding, soil retention, soil roughening, temporary slope drain, temporary stream crossings, wind fences and sand fences;							
•	Runoff Control: check dams, grass-lined channels, permanent slope diversions, temporary diversion dikes;							
•	Sediment Control: brush barriers, compost filter berms, compost filter socks, construction entrances, fiber rolls, filter berms, sediment basins and rock dams, sediment filters and sediment chambers, sediment traps, silt fences, storm drain inlet protection, straw or hay bales, vegetated buffers; and							
•	Good Housekeeping/Materials Management: concrete washout, general construction site waste management, spill prevention, and control plan, vehicle maintenance and washing areas at construction sites.							
Informational Reference(s):								
•	U.S. EPA's Construction Site Stormwater Runoff Control - Menu of Best Management Practices							

(Answer regardless of the Path chosen above):

7.3.2 Site Disturbance						
7.3.2.1 Construction activities do not go beyond 40 ft. (12.2	5 points or N/A					
m) of the building footprint(s) and remain within 5 ft. (1.5 m) of parking lots, roadways, sidewalks and utility right-of- ways except where the intent of the construction activities was one or more of the following:	 Not applicable where projects are interior-only. 					
Exceptions apply where the construction activities are intended-to specifically improve the natural integrity of the site, e.g., removing invasive plant species, replacing existing hardscapes with vegetation, restoring prairie or <i>wetlands</i> ,	(Continued from 7.3.2.1)					




or increasing on-site water retention by building rain	
gardens, swales, retention ponds, or berms.	

7.3.3 Tree and Shrub Preservation	
7.3.3.1 Non-invasive existing trees and woody shrubs are	Maximum = 6 points or N/A
retained and protected during construction.	
A certified arborist, a landscape architect, or a certified professional landscape designer provides plans and specifications that are used by the general contractor or construction manager to protect retained trees and shrubs from disturbance and soil compaction.	 Six points are earned when > 90% of the canopy of existing trees and shrubs <u>is</u> retained and protected. Five points are earned when ≥75% and ≤90% of the canopy of existing trees and shrubs is retained and protected.
Assessment Guidance:	• Four points are earned when ≥50%
Base Calculations on the area of canopy coverage provided by trees and shrubs prior to clearing and construction activity.	and_<75%-of the canopy of existing trees and shrubs is retained and protected.
Calculations exclude plants that will be removed because	the canopy of existing trees and
they are unhealthy, invasive or otherwise inappropriate for	shrubs is retained and protected.
site conditions (e.g., have water, soil, light, or other	• Not applicable where the site has no
requirements that are inconsistent with the site).	existing trees or shrubs or where
If an area is covered by overlapping layers of plants, it is not counted multiple times, (i.e., the maximum canopy coverage for any site is 100%).	existing plants do not qualify for calculation of canopy coverage, such as those that are invasive or in poor health.
Informational Reference(s):	
International Society of Arboriculture's "Avoiding Tree	
Damage During Construction," (2011)	
http://www.treesaregood.com/treecare/resources/Avo	
IdingTreeDamage.pdf (last accessed 6/20/17)	
 Invasive plant lists published by regional invasive plant councils (http://www.pa.ins.org/incs/) or by local 	
agricultural extension programs (last accessed	
6/20/17)	
 Sustainable Sites Initiative, SITES v2 Ratina System. 	
(2014) http://www.sustainablesites.org/resources (last	
accessed 6/20/17)	

7.3.4 Mitigating Heat Island Effect	
7.3.4.1 Roof: The building has a vegetated	Maximum = 6 points or N/A
roof, is shaded during summer months,	
AND/OR has a roof with a high Solar	The following number of points may be earned when
Reflectance Index (SRI) as prescribed based	using one or more of the listed heat island mitigation
on the slope of the roof.	strategies on the roof:



 Where used to comply, shading trees are to be existing, non-invasive plants that are retained on site or newly, non-invasive planted trees that will provide shade within 10 years. For a <i>roof</i> slope less than or equal to 2:12, a minimum initial SRI of 78 or greater or a three-year aged SRI of 60 or greater; For a <i>roof</i> slope greater than 2:12, a minimum initial SRI of 29 or greater or a three-year-aged SRI of 25 or greater. Informational Reference(s): 	 Six points are earned where >70% of the roof complies Three points are earned where 70% of the roof has a high initial SRI, and three points are earned where 70% of the roof has a high three-year-aged SRI. Four points are earned where >50% and ≤70% percent of the roof complies. Two points are earned where 56%-70% of the roof has a high initial SRI and two points are earned where >50% and ≤70% of the roof has a high initial SRI and two points are earned where >50% and ≤70% of the roof has a high three-year-aged SRI. Two Points are earned if 40%-55% percent of the roof complies. One point is earned where 40%-55% of the
Cool Roof Rating Council	roof has a high initial SRI. and one point is
(www.coolroofs.org) (last accessed	earned where 40%-55% of the roof has a high
6/20/17)	three-year-aged SRI.
College, state or local university, or	No points are earned if less than 40% of the roof
agency landscape reference guide	complies AND/OR has a high initial or three-year-aged
USDA National Invasive Species	SRI.
Information Center:	Not applicable for interior-only projects.
ants/main shtml (last accessed	
7/14/17)	
7.3.4.2 Hardscape: The building design addre	esses Maximum = 5 points or N/A
hardscape using one or more of the following	3
strategies:	• Five points are earned where ≥50% of
	hardscape_surfaces comply with 7.3.4.2.
 1.3.4.2.1 Solar Reflectance: Hardscape signature with a solar reflectance (SP) value of at 10 	urraces • Three points are earned where $\geq 25\%$ and $\sim 50\%$ of hardscape surfaces comply with
0.28 are used. New concrete and concret	re 7342
masonry without additional colored pigm	nent are • No points are earned where <25% of
deemed to comply without additional tes	sting. hardscape_surfaces comply with 7.3.4.2.
 Not applicable for interior-only p 	rojects. • Not applicable where there are no hardscape
• 7.3.4.2.2 Shading: Where the hardscape	surfaces.
surfaces are not shaded by the primary b	uilding
existing huildings) hardscape surfaces of	utier
the building footprint are intended to be	shaded
by trees or other vegetation within 10 ve	ars.
Take the shading measurement at noon	
Standard Time on the Summer Solstice a	nd
document in the shading plan	



- Construction documents;
- Erosion and sediment control plan;
- Irrigation plans;
- Landscape plans;
- Manufacturers specifications, cut sheets, and performance documentation;
- Manufacturer's specifications AND/OR interior design plans that show interrupted spaces;
- Photo-documentation;
- Pre-construction documentation;
- Roof plans;
- Shade site plan;
- Site civil plans;
- Ten-year hardscape shading plan;
- Tree preservation plan or landscaping or civil engineering plans that document the protection of existing trees during construction.

7.4 *Stormwater* Management (21 points)

7.4.1 Stormwater Management



7.4.1.1 A civil engineer makes a stormwater	Maximum = 17 points or N/A
management report that shows the following:	
 7.4.1.1.1: The project meets a minimum of 80% Total Suspended Solids (TSS) removal or complies with municipal AND/OR local watershed water quality control targets, whichever is more stringent; and 7.4.1.1.2: 50% annual average total phosphorus (TP) removal assuming typical pollutant concentrations in urban runoff. 7.4.1.1.3: Additional target pollutant removals are as follows: Nitrate + nitrite reduction of 40% OR pH below 6.5 OR Alkalinity below 10 mg CaCO3/L. 	 Three points are earned for compliance with 7.4.1.1.1. One point is earned for compliance with 7.4.1.1.2. One point is earned for compliance with each item in 7.4.1.1. 3. for a maximum of three points. OR Seventeen points are earned for compliance with 7.4.1.1.4. Not applicable for interior-only projects.
Note: Infiltration is not to <u>be</u> used as a treatment method if the site is located within 0.25 mi (0.4 km) of a lake or <i>wetland</i> .	
OR	
• 7.4.1.1.4 : The site retains at least the 95 th percentile storm volume as per a site water balance assessment, to be included in the <i>stormwater</i> management report.	
 Informational Reference(s): EPA National Stormwater Calculator: http://www.epa.gov/nrmrl/wswrd/wq/models/swc/ (last accessed 6/20/17) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects 2009 	
 7.4.1.2 Hardscapes and structures, excluding pervious walkways 48 in. (121.9 cm) or less in width, are located 100 ft. (30.5 m) or more from a natural body of water or natural waterway on or adjacent to the site. Document such distance on the site plan. Water bodies and waterways include: Oceans; Lakes; Rivers; Streams: 	 4 points or N/A Not applicable where the body of water is a retention pond or constructed <i>wetland</i>, or is a constructed feature that receives all <i>stormwater</i> runoff.

- Estuaries;
- Bays;
- Wetlands;
- Springs, or seeps;
- Ravines;
- Arroyos; AND/OR
- Canyons.

Note: Waterways may be intermittently dry provided they define channeled flow of water when wet.

7.4.2 Recommended Documentation

- Area rainfall charts;
- Civil AND/OR landscaping drawings indicating drainage;
- Percolation test results;
- Roof plans;
- Site plans, including all areas of hardscape;
- Soil boring reports;
- Storm water discharge plan.

7.5 Landscaping (21 points)

7.5.1 Landscaping	
7.5.1.1 A landscape design is planned and installed as follows:	Maximum = 6 points or N/A
 7.5.1.1.1: The plan is developed by a landscape architect, certified professional landscape designer, certified horticulturalist, or other qualified professional; AND The plan shows the natural light conditions of the site; AND The plan shows structural limitations (e.g., shading, utilities, <i>overhangs</i>, lights) that would impact the location and growth of plants. 7.5.1.1.2: The plan identifies existing soil types, and the installed landscape incorporates appropriate soil preparation and drainage to support root development for vegetation planned for the site. 	 Three points are earned where the landscape plan is developed and shows natural light conditions and structural limitations. Three points are earned where the plan identifies existing soil types, and the installed landscape incorporates soil preparation and drainage as stated. Not applicable where there is no room for landscaping.
Where an irrigation system is installed, refer to Water Efficiency, Section 9.8, Irrigation.	
Informational Reference(s):	
 Agroforestry Note 38 – Landscape planning for environmental benefits USDA Natural Resources Conservation Service, (2008) Local Cooperative Extension Research, Education, and Extension Service State and local university or college landscape reference guide 	
7.5.1.2 The vegetation palette includes the following:	Maximum = 3 points or N/A

BUILDING



• The vegetated area uses non-invasive, <i>drought tolerant plants</i> .	 Three points are earned if > 75% of the plants are <i>drought tolerant</i>
Required documentation:	and non-invasive.
Website or literature that indicates that the given plant(s) are	• Two points are earned if between
drought-tolerant or require little to no supplemental water for the	≥50% and ≤75% of the plants are
specific region.	drought tolerant and non-invasive;
	 One point is earned if between
	≥25% and <50% of the plants are
Only applicable when the determination of plant invasiveness is	drought tolerant and non-invasive.
guided by a list or lists that:	No points are earned if less than
 cover the appropriate geographical region; AND 	25% of the plants are <i>drought</i>
 are not limited to noxious weeds. 	tolerant and non-invasive.
	 Not applicable where there is no
Informational Reference(s):	room for landscaping.
 College, state or local university, or agency landscape reference guide 	
Federal and state noxious weed lists:	
<u>http://plants.usda.gov/java/noxComposite</u> (last accessed	
6/20/17)	
• 2016 Invasive Species Compendium: www.cabi.org/isc (last	
accessed 7/14/17)	
 USDA National Invasive Species Information Center: 	
http://www.invasivespeciesinfo.gov/plants/main.shtml (last	
accessed 6/20/17)	
 WaterSense[®]'s "What to Plant": 	
https://www3.epa.gov/watersense/outdoor/what_to_plant.html	
(last accessed 6/20/17)	
7.5.1.3 The vegetated area is covered with plants (new, retained, or	Maximum = 4 points or N/A
salvaged plantings) that are native.	
	 Four points are earned if > 75% of plants are patients
	plants are native.
	 Inree points are earned if hotwoon > E0 and <7E% of plants
	between > 50 and $\leq 75\%$ or plants
	 Two points are earned if between
	>32 and $<50%$ of the plants are
	native
	 One point is earned if between
	\geq 20 and \leq 32% of plants are native
	 No points are earned if < 20% of
	the plants are native.
	 Not applicable where there is no
	room for landscaping.
	2 points or N/A
7.5.1.4 The landscape design shows that plants with similar water	
requirements are grouped together on the site.	



	 Two points are earned if plants are grouped according to water requirements. Not applicable where all of the landscaping is a preserved natural area or where there is no room for landscaping.
7.5.1.5 The building project supports on-site agriculture accessible to building users or employees in any of the following ways:	Maximum = 6 points or N/A
 7.5.1.5.1: Rooftop garden(s), edible landscape(s), food forest, or community garden is installed on-site; 7.5.1.5.2: 25% of vegetated area is dedicated to pollinator-friendly plantings or an apiary; 7.5.1.5.3: Chicken coop, aquaponics farm, AND/OR greenhouse is installed on-site; 	 Two points are earned where there is an on-site rooftop garden, edible landscape, food forest, or community garden. Two points are earned where there is an apiary or pollinator garden on-site. Two points are earned where there is an earned where the earned wh
 Informational Reference(s): Pollinator Partnership, <i>Ecoregional Planting Guides</i>: http://www.pollinator.org/guides.htm (2015) (last accessed 6/20/17) 	 there is an on-site chicken coop, aquaponics farm, AND/OR greenhouse. Not applicable for interior-only
 Xerces Society for Invertebrate Conservation, Pollinator-Friendly Plant Lists: http://www.xerces.org/pollinator- conservation/plant-lists/ (2015) (last accessed 6/20/17) 	projects.

7.5.2 Recommended Documentation Landscape and irrigation plan; Local or regional plant list; Project drawings; Project specifications;

• Site plans.

7.6 Exterior *Light Pollution* (7 points)

Two paths are provided for assessing exterior *light pollution*:

- Path A: Lighting Design Performance: 7 points
- OR
- Path B: Prescriptive Lighting Requirements: 7 points

Points cannot be combined between paths. Select one of the paths below.

7.6.1 Path A: Lighting Design Performance	
7.6.1.1 An engineer or lighting professional creates a	7 points or N/A
lighting design that meets all the performance	
requirements of the IDA - IES Model Lighting Ordinance.	• Not applicable where there is no site
	lighting.
Informational Reference(s):	
• IDA – IES Model Lighting Ordinance (MLO, 2011)	



OR	
7.6.2 Path B: Prescriptive Lighting Requirements	
7.6.2.1 Exterior lighting does not exceed prescribed	1 point or N/A
values for the amount of light per unit of area.	
	 Not applicable where there is no exterior
Informational Reference(s):	lighting.
• IDA – IES Model Lighting Ordinance (MLO), Tables A	
and B, 2011	
7.6.2.2 Exterior lighting trespass does not exceed	3 points or N/A
prescribed Backlight, Uplight and Glare (BUG) ratings as	
per IDA – IES Model Lighting Ordinance (MLO), Table C	 Not applicable where there is no exterior
for the following:	lighting.
 Backlight trespass; 	
 Uplight trespass; and 	
• Glare.	
Informational Reference(s):	
• IDA – IES Model Lighting Ordinance (MLO), Tables C,	
C1, C2, 2011	
7.6.2.3 Parking lot lighting does not emit light above 90	1 point or N/A
degrees from the vertical axis.	
	Not applicable where there is no parking
	lot lighting.

7.6.3 Recommended Documentation

- Cut-sheets and calculations;
- Electrical engineer's site lighting plan with illuminance computations spaced no more than 10 ft. (3.05 m) apart;
- Exterior lighting plans;
- Narrative describing which lighting zone the property falls under;
- Path taken for compliance to the MLO;
- Zoning ordinance requirements.

7.7 Wildland-Urban Interface Site Design (3 points)

7.7.1 Wildland-Urban Interface Site Design	
7.7.1.1 There is a determination by a fire	3 points or N/A
protection engineer or certified fire marshal that	
the site wildland-urban interface hazard is	Not applicable where the authority having
moderate, high or extreme;	jurisdiction or legislative body has formally
	declared a wildland-urban interface area.
AND	
The project achieves points for 7.2.1.1 or 7.2.1.7	
or is within 0.25 mi (0.4 km) walking distance of	
developed residential land of at least 8 dwelling	
units per acre;	





AND

The site is designed to comply with the most recent International Wildland-Urban Interface Code;

AND

Excluding athletic fields and agriculture, greater than 50% of the vegetation on site achieves points for Section 7.5.1.2 for *drought tolerant plants,* and greater than 50% of the vegetation on site achieves points for Section 7.5.1.3 for native plants.

AND

A fire protection engineer or certified fire marshal has inspected the completed site within 90 days prior to project certification or re-certification and found it compliant with the International Wildland-Urban Interface Code.

Informational Reference(s):

International Wildland-Urban Interface Code 2015



8. ENERGY (260 points)

Three paths are provided for assessing energy performance.

• Path A: Performance - ANSI/ASHRAE/IES Standard 90.1-2010, Appendix G: 180 points

OR

- Path B: Performance Building Carbon Dioxide Equivalent (CO2e) Emissions: 180 points
- OR
- Path C: Prescriptive: 111_points

Points cannot be combined between paths. Select one of the paths below. 8.1 Path A: ANSI/ASHRAE/IES Standard 90.1-2010, Appendix G (180 points)

8.1.1 Performance Path	
8.1.1.1 The building complies with minimum	Maximum = 180 points
performance based requirements of	
ANSI/ASHRAE/IES Standard 90.1-2010 or the 2012	• One hundred eighty points are earned where
IECC;	the project achieves a level of 45%
	improvement over the baseline.
AND	 Four points are earned for every 1%
	improvement up to 45% improvement
The building demonstrates an improvement over	over the baseline for a maximum of
an ANSI/ASHRAE/IES Standard 90.1-2010 baseline	180 points.
using Appendix G through the use of a whole-	 No points are earned where the
building energy modeling simulation program	building complies with the minimum
showing energy cost savings.	performance based requirements of
 Energy cost calculations may include price 	either ANSI/ASHRAE/IES Standard
components based on time of day and	90.1-2010 or the 2012 IECC.
demand if these are available. Credit for	
demand-saving measures, cogeneration, and	
energy storage may be claimed by utilizing	
rate schedules that reflect the billing rates in	
effect for the local utility, rather than using EIA	
state average utility rates.	

8.1.2 Recommended Documentation

- The energy modeling report includes a narrative describing energy efficiency measures included in the project along with input and output reports sufficient to verify the modeling approach used to demonstrate the higher level of performance including key assumptions and methods used to determine the inputs. The report may include tabular summaries of:
 - *Building envelope* performance (permit document tabulation for the enclosure, such as COMcheck forms);
 - o HVAC system capacities and efficiencies;
 - Lighting power densities and control methods;
 - Schedules for occupancy, equipment, and HVAC;
 - Assumptions for plug and process loads; AND/OR
 - ENERGY STAR[®] Target Finder results or other benchmarking comparisons for the baseline and proposed models.
- Description of any variances between models for plug and process loads.



• People moving equipment will be modeled identically in the proposed and baseline buildings, and credit taken appropriately in Section 8.4 Non-Modeled Energy Efficiency Statement of energy cost savings rounded to one-tenth of a percent.

LDING

OR

8.2 Path B: Building Carbon Dioxide Equivalent (CO2e) Emissions - (180 points)

8.2.1 Percent Reduction in Carbon Dioxide Equivalent (CO2e) Emissions		
8.2.1.1 The building achieves more than a 50% reduction in <i>carbon</i>	Maximum = 180 points	
 aloxide equivalent (CO₂e) emissions over the baseline building for its geographical location. This reduction is calculated using the following formula: Percent reduction in CO2e =100 X (1 – PER/BER), where: The Baseline Equivalent Emission Rate (BER) is the baseline building's carbon dioxide equivalent (CO₂e) emission rate. PER is the proposed building's carbon dioxide equivalent (CO2e) emission rate. PER is less than BER. 	• Four points are earned for each percent reduction in <i>CO2e</i> emissions above the baseline, to a maximum total of 180 points.	
Assessment Guidance:		
Baseline Equivalent Emission Rate (BER) Calculations		
BER is calculated using the following formula:		
 BER = (baseline Energy Use Intensity (EUI)) X product of [(percentage of each fuel in the annual energy fuel mix for the planned building type and location) X (<i>CO2e</i> Emission Factor for each fuel)], where: The baseline building's site Energy Use Intensity (EUI) is determined using ENERGY STAR Target Finder. The baseline building's site EUI is 35% better than the Energy Performance Rating (Target Finder) score of 50. The annual energy fuel mix for the baseline building is determined from DOE-EIA and reported at the top of Target Finder's Results page. The <i>CO2e</i> emission factor for each fuel in the baseline building's annual energy fuel mix can be found in Table 8.1.1- A. 		
Proposed Equivalent Emission Rate (PER) Calculations PER is calculated using the following formula: PER = (proposed EUI) X product of [(percentage of each fuel in the annual energy fuel mix for the proposed building) X (CO2e Emission Factor for each fuel)], where:		

The proposed building's Energy Use Intensity (EUI) is calculated using a computer-based simulation program that conforms to the requirements outlined in Section 506 of the 2009 International Energy Conservation Code or ANSI/ASHRAE/IES Standard 90.1-2010, Appendix G, Section G2.2. Determine the Proposed Building's Equivalent Emission Rate (PER) • by performing an EUI calculation for the proposed building using the energy performance requirements specified by Table G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance in ANSI/ASHRAE/IES Standard 90.1-2010. Only the Proposed Building Performance column is used for modeling the PER. Use the annual energy fuel mix planned for the proposed building for • this calculation. The CO2e emission factor for each fuel in the proposed building's annual energy fuel mix can be found in Table 8.2.1- A of this document.

Fuel	CO2e Emission Factor kg/kWh (lb./kWh)	
Biomass	0.026 (0.057) ²	
Coal	0.379 (0.836) ⁷	
Fuel oil (residual)	0.341 (0.751) ⁷	
Fuel oil (distillate)	0.320 (0.706) ⁷	
Gasoline	0.313 (0.689) ⁷	
Grid-delivered electricity	0.630 (1.387) ⁷	
Grid- displaced electricity ³	-0.833 (-1.835) ¹	
LPG	0.272 (0.600) ⁷	
Natural gas	0.219 (0.483) ⁷	
<i>Off-site renewable electricity</i> ⁴	-0.758 (-1.670) ¹	
Waste heat ⁵	0.019 (0.042) ²	
District chilled water	0.151 (0.332) ⁷	
District steam	0.368 (0.812) ⁷	
District hot water	0.348 (0.767) ⁷	

Table 8.2.1 - A: CO2e Emission Factors⁶



¹ Deru, M., P. Torcellini. 2007. Source Energy and Emissions Factors for Energy Use in Buildings. NREL/TP-550-38617, June 2007. Golden, CO. National *Renewable Energy* Laboratory.

² L2A Conservation of Fuel and Power in New Buildings other than Dwellings. April 2006. Office of the Deputy Prime Minister, United Kingdom.

³ Grid displaced electricity comprises all electricity generated at the building site by, for example, PV panels, wind-power, combined heat and power systems (CHP), etc. The associated *CO2e* emissions are subtracted from the total *CO2e* emissions for the building before determining the PER. *CO2e* emissions arising from fuels used by the building's power generation system (e.g., to power the CHP plant) is included in the building's *CO2e* emission calculations.

⁴ The associated *CO2e* emissions from off-site renewable electricity (e.g., using *renewable energy certificates* or "green power") are subtracted from the total *CO2e* emissions for the building before determining the PER. Contracts have a duration of at least three years. Only 25% of off-site renewable electricity can be credited to the proposed building's *CO2e* calculation.

⁵ This includes *waste heat* from industrial processes and power stations rated at more than 10MWe and with a power efficiency of greater than 35%.

⁶ Values include direct and indirect emissions.

⁷ASHRAE/USGBC/IES Standard 189.1-2014 Standard for the Design of High-Performance Green Buildings

8.2.2 Recommended Documentation

- Energy simulation program's input and results;
- ENERGY STAR Target Finder results;
- Lighting design permit documents, such as COMcheck reports;
- PER, BER, and CO2e emission reduction calculations.

OR

8.3 Path C: Prescriptive (111 points)

Compliance with the prescriptive requirements of this section earns points based on the minimum prescriptive requirements of referenced codes and standards and building characteristics or best practices that are related to energy efficiency.

8.3.1 *Building Envelope* and Form (20 points)

8.3.1.1 Thermal Resistance and Transmittance	
8.3.1.1.1 All of the opaque and fenestration	Maximum = 10 points
elements of the building envelope have a window-	
to-wall ratio less than or equal to 40% and comply	
with at least one of the following:	• Ten points are earned where there is a 10%
	decrease in U-factor, C-factor, F-factor and
• The thermal transmittance (U-factor), thermal	SHGC from prescriptive requirements of the
conductance (C-factor), F-factor, and SHGC are	2015 IECC, section C402, or ANSI/ASHRAE/IES
less than those in the 2015 IECC, Section C402,	Standard 90.1-2013, section 5.
or ANSI/ASHRAE/IES Standard 90.1-2013,	• Eight points are earned where there is a 5%
Section 5, by 10%, except for these items	decrease in U-factor, C-factor, F-factor, and
where the factors must meet the 2015 IECC or	SHGC from prescriptive requirements of the
ANSI/ASHRAE/IES Standard 90.1-2013:	2015 IECC, section C402, or ANSI/ASHRAE/IES
 Opaque elements in Climate Zones 1 	Standard 90.1-2013, section 5.
through 3	



 In cases where the <i>R</i>-value or SHGC are NR (no requirement). <i>fenestration</i>, <i>U</i>-factor, and SHGC meet or exceed prescriptive requirements of the 2 	2015
• Demonstrate that the <i>U-factor</i> , <i>C-factor</i> , <i>F-</i> IECC, section C402, or ANSI/ASHRAE/IES	
factor, and SHGC are less than those in the Standard 90.1-2013, section 5.5.	
2015 IECC, Section C402, or ANSI/ASHRAE/IES	
Standard 90.1-2013, Section 5, by 5%, except	
the 2015 JECC or ANSI/ASHBAE/JES Standard	
• Onaque elements in <i>Climate Zones</i> 1-3	
\circ SHGC for north and south-oriented	
fenestration	
 In cases where the <i>R-value</i> or SHGC 	
are NR (no requirement).	
• The thermal resistance (<i>R-value</i> /RSI-value) <i>or</i>	
the thermal transmittance (U-factor), thermal	
conductance (C-factor), and F-factor; and for	
fenestration, the U-factor and SHGC meet or	
exceed the prescriptive requirements of the	
2015 IECC, section C402, or ANSI/ASHRAE/IES	
Standard 90.1-2013, section 5.5.	
Note: A project must choose either the IECC or	
ANSI/ASHRAE/IES Standard 90.1 for all factors	
Informational Reference(s):	
ANSI/ASHRAE/IES Standard 90.1-2013, Section	
5.5	
• 2015 IECC, Section C402	
• 2012 IECC, Section C402	

8.3.1.2 Orientation	
8.3.1.2.1 The building is oriented such that the ratio of the west <i>fenestration</i> to the total <i>fenestration</i> and the ratio of the east <i>fenestration</i> to the total <i>fenestration</i> is between ¼ and 1/6.	 Maximum = 10 points Ten points are earned where the ratio is ≤1/6. Six points are earned where the ratio ≤ 1/5 and >1/6. Two points are earned where the ratio is ≤ ¼ and >1/5.

8.3	8.3.1.3 Recommended Documentation	
•	Construction documents;	
•	Fenestration ratios for north/south and east/west orientations;	
•	List of SHGC values including calculations for overall performance;	



- List of thermal resistance or *thermal transmittance* factors, thermal conductance factors, and *F*-*factors;*
- Manufacturer's specifications, cut sheets, and performance documentation;
- Site plans.

8.3.2 Lighting (41 points)

8.3.2.1 Interior Lighting Power	
8.3.2.1.1 The total interior lighting power density	Maximum = 20 points
(LPD) of the building is less than the referenced	
standard. Base calculations for LPD on either the	• Five points are earned where LPD complies
whole-building method or space-by-space method.	with ANSI/ASHRAE/IES Standard 90.1-2013 or 2015 IECC.
ANSI/ASHRAE/IES Standard 90.1-2013 or 2015	• One additional point is earned for each 2%
IECC baseline	beyond the requirements of
	ANSI/ASHRAE/IES Standard 90.1-2013 or
The control factors from Table 9.6.3 in 90.1-2013	2015 IECC up to an additional 15 points out of
are used to achieve or exceed LPD targets.	a maximum of 20 points for 8.3.2.1.1.
Account for high-end trim or Institutional tuning in	
all spaces where it is present by using a control	
factor of 0.15 for the purposes of scoring this item.	
Informational Reference(s):	
ANSI/ASHRAE/IES Standard 90.1-2013	
• 2015 IECC	

8.3.2.2 Interior Automatic Light Shutoff Controls	
8.3.2.2.1 All spaces have automatic controls that	2 points or N/A
turn off non-twenty-four-hour lighting based on	
occupancy or time schedule. One or more of the	 Not applicable where lighting control could
following provides automatic control:	endanger occupant safety in a space, patient
 Occupancy or vacancy sensors; 	care space, AND/OR dwelling units and guest
 Building control system based on timer or 	rooms, or where local code prohibits such
schedule, for example:	systems.
 Time switch; 	
 Automatic relays controlled by BAS; 	
 Embedded controls; or 	
Other control signal.	
Lighting control zones consist of up to 25,000 ft. ²	
(2,322.6 m ²) on a single floor.	

8.3.2.3 Lighting Level Control		
8.3.2.3.1 In all <i>regularly occupied spaces</i> that use at least 0.5 W/ft ² (5.4 W/m ²) of lighting power, more than 90% of light fixtures have lighting controls that can reduce the lighting load by at	Maximum = 3 points or N/A	



least E00/ from full lighting neuror using any of the	Three rejets are correct where more there 00%
fellowing technologies:	 Infee points are earned where more than 90%
Tonowing technologies:	of light fixtures have continuously dimmable
	light reduction controls.
• Dimming: Continuous dimming of the lamps or	 Two points are earned where more than 90%
<i>luminaires</i> from 100% to at least 10% of full	of the of light fixtures have light reduction
light output;	controls based multi-level lighting;
• Multi-level Lighting: Lighting with at least 5	One point is earned where there is bi-level
control steps including ON and OFF; or	control.
• Bi-level lighting: Dual switching of alternate	• Not applicable where spaces use less than 0.5
rows or <i>luminaires</i> ; Switching of individual	W/ft^2 (5.4W/m ²).
lamps independently of adjacent lamps within	
a lumingire.	
8.3.2.3.2 Occupants in private offices less than 250	Maximum = 3 points
ft^2 (23.23 m ²) and in open office workstation areas	•
can adjust their direct overhead lighting levels via	• Three points are earned where more than 90%
continuous dimming or multi-level lighting	of light fixtures have continuously dimmable
Droviding bi lovel overhead lighting in conjunction	personal lighting control
with concrete tack lighting is permitted for	personal lighting control.
with separate task lighting is permitted for	 I wo points are earned where more than 90%
compliance.	of the of light fixtures have multi-level light
	lighting.
	 One point is earned where there is bi-level
	control of overhead lighting and separate task
	lights.

8.3.2.4 Daylighting	
8.3.2.4.1 For buildings two stories or less	3 points or N/A
above grade, a minimum of 50% of the total	
combined floor area is in a <i>daylight area</i> . For	• Three points are earned for compliance,
buildings three or more stories above grade, a	excluding spaces that are not regularly
minimum of 25% of the total combined floor area is	occupied, such as, but not limited to,
in a daylight dred. Control Lighting in the primary	mechanical spaces and storage areas.
	 Not applicable where spaces would be functionally compromised by daylighting
responsive unnining plus of r.	runctionally compromised by <i>dayinghting</i> .
Informational Reference(s):	
• ANSI/ASHRAE/IES Standard 90.1-2013, Section	
3, Definition of Daylight Area	
8.3.2.4.2 A minimum of 2% of the roof area consists	Maximum = 3 points or N/A
of skylights that comply with the requirements of	
Sections 5 and 9 of ASHRAE Standard 90.1-2013.	• Three points are earned where ≥5% of the
Base this percentage upon the horizontal projected	roof consists of skylights.
area of the skylight and roof, without overhangs	• Two points are earned where >3% and <5% of
Earning this credit is contingent on compliance with	the roof consists of skylights.
the daylight control credit 8.3.2.5.	 One point is earned where ≥2% and ≤3% of
	the roof consists of skylights.



- No points are earned where <2% of the roof consists of skylights.
- Not applicable where the building is located in *Climate Zones* 7 or 8.

8.3.2.5 Control for Daylit Zones	
8.3.2.5.1 Control lighting in <i>primary and</i> <i>secondary daylight zones</i> [use 90.1-2013 definitions for daylight zones] with automatic daylight responsive lighting controls that lower the power consumption of the lighting system when daylight is available.	 Maximum = 3 points Three points are earned where there is automatic continuous daylight dimming to OFF control of all the general lighting in both primary and secondary zones. Two points are earned where there is automatic <i>daylighting</i> switching to OFF control of the general lighting in primary zone and secondary daylight zones. Two points are earned where there is no <i>daylighting</i> if it would be detrimental to the intended use of more than 90% of the building area.

8.3.2.6 Exterior Luminaires and Controls	
8.3.2.6.1 Exterior LPDs comply with or improve upon	Maximum = 2 points or N/A
ANSI/ASHRAE/IES Standard 90.1-2013 Section 9.4.3	
for exterior lighting power density.	• Two points are earned where LPDs are 20% below ANSI/ASHRAE/IES Standard 90.1-
Additional control requirements to earn LPD credit	2013.
include:	 One point is earned where
 Deactivating lighting when sufficient daylight is available; and 	ANSI/ASHRAE/IES Standard 90.1-2013 is met.
 Shutting off façade and landscape lighting 	• Not applicable where there are no exterior
between midnight and business opening, or other	luminaries.
similar hours approved by the AHJ.	
8.3.2.6.2 Garage and Parking Lot Lighting Control:	Maximum = 2 points or N/A
Pole lighting in parking lots and garage <i>luminaires</i> are	
controlled such that at least 50% of the lighting power is automatically reduced during periods of no	 Two points are earned where all garage and parking lot general lights are controlled to
activity detected in the lighting zone.	more than one lighting level.
	 One point is earned where 50% of the
	garage and parking lot general lighting is
	controlled to more than one lighting level.
	 Not applicable where there are no garage
	or parking lot general lighting fixtures.

8.3.2.7 Recommended Documentation

- Effective aperture calculations for all office and classroom areas;
- Electrical exterior/site lighting plans;
- Lighting plans with controls information or separate lighting controls plan;
- List of lamps specified on the project;
- LPD calculations and results (COMcheck is one acceptable calculation method);



- Manufacturer's product cut-sheets;
- Specifications for time switch/photo sensor.

8.3.3 HVAC Systems and Controls (37 points)	
8.3.3.1 Building Automation System (BAS)	
8.3.3.1.1 A central Building Automation System (BAS) encompasses all systems that affect building energy performance, lighting, and thermal comfort including all of the functionality listed below:	 1 point or N/A Not applicable where buildings are under 20,000 ft.² (1,858.06 m²).
 A series of direct digital controllers (DDC) interconnected by a local area network and accessible by a web browser; Open communication protocols (e.g., BACnet) to allow interoperability between building systems and control vendors; 	
 Energy management and monitoring software that provides: Start/stop control for HVAC equipment; control of economizer cycles and heat recovery equipment; and control of minimum outdoor ventilation air; Log of trending, scheduling, set-point adjustments, event information, alarm information, confirmation of operators, and execution of global commands; and Monitoring of fire safety systems, security systems, and elevator control systems to prompt emergency operating modes of HVAC and lighting systems. 	
8.3.3.1.2 The BAS has the capability to accept and collate data	1 point or N/A
generated by any and all <i>metering</i> equipment as required by	
Section 8.5 <i>Metering</i> , Monitoring, and Measurement of the	Not applicable where buildings are
Energy assessment area of this Standard.	under 20,000 ft.² (1,858.06 m²).

8.3.3.2 Cooling Equi	ipment		
8.3.3.2.1 The coolin	g equipment base efficiency meets		Maximum = 5 points or N/A
ANSI/ASHRAE/IES St	andard 90.1-2013 efficiency requirement	nts	
with respect to COP	, EER, IEER, and SEER or the building do	es	Five points are earned where
not use mechanical	cooling.		performance is 10% higher than
			the requirements of
90.1-2013 Table	Equipment		ANSI/ASHRAE/IES Standard 90.1-
Table 6.8.1-1	Unitary A/C and condensing units		2013.
Table 6.8.1-2	Unitary and applied heat pumps		Three points are earned where
Table 6.8.1-3	Water-chilling packages		performance is 5% higher than the
Table 6.8.1-4	PTAC, PTHP, single-package vertical		requirements of ANSI/ASHRAE/IES
	A/C and heat pumps, room air-		Standard 90.1-2013.
conditioners, and room A/C heat			 One point is earned where
	pumps		performance is equivalent to the



Table 6.8.1-9	Variable refrigerant flow A/C			requirements of ANSI/ASHRAE/IES
	(multisplit) systems			Standard 90.1-2013.
Table 6.8.1-10	Variable refrigerant flow air-to-air		٠	Not Applicable where the building
	and applied heat pumps			does not use mechanical cooling.
Table 6.8.1-11	Computer room A/C and condensing			
	units			
		•		
A weighted average	improvement over efficiency is provide	d by		
the design engineer	based on the capacity for projects with	-		
multiple applicable	types of equipment. Air-conditioning un	its		
constituting less tha	n 1% of the total capacity may be omitt	ed		
from the calculation	l.			
Cooling systems that	t utilize hydronic heat rejection also inc	lude		
measures to minimi	ze fan power in order to earn efficiency			
credits under this se	ection. Any of the following measures ar	e		
used in cooling towe	ers to reduce fan energy consumption:			
• Two-speed fans	;			
• Variable speed f	fans; AND/OR			
• Measures that a	allow operation at reduced fan power du	uring		
part-load operat	tion.			
Heat rejection equip	oment complies with minimum efficienc	ÿ		
levels in ANSI/ASHR	AE/IES Standard 90.1-2013, Table 6.8.1-	7.		

8.3.3.3 Heating E	quipment		
8.3.3.3.1 The hea	ting equipment base efficiency	Μ	aximum = 5 points or N/A
meets ANSI/ASH	RAE/IES Standard 90.1-2013		
efficiency require	ements with respect to AFUE, E _c ,	٠	Five points are earned where performance is
E _t , HSPF, or COP _H	as appropriate to the specific		10% higher than the requirements of
equipment, or th	e building does not have a		ANSI/ASHRAE/IES Standard 90.1-2013.
heating system.		•	Three points are earned where performance is
			5% higher than the requirements of
90.1-2013	Equipment		ANSI/ASHRAE/IES Standard 90.1-2013.
Table		•	One point is earned where performance is
Table 6.8.1-2	Unitary and applied heat		equivalent to the requirements of
	pumps (heating mode)		ANSI/ASHRAE/IES Standard 90.1-2013.
Table 6.8.1-4	PTHP, single-package vertical	•	No points are earned where there is electric
	heat pumps, and room A/C		resistance heat.
	heat pumps (heating mode)	•	Not Applicable where the building does not use
Table 6.8.1-5	Warm-air furnaces and unit		heating systems.
	heaters		
Table 6.8.1-6	Gas and oil-fired boilers		
Table 6.8.1-10	Variable refrigerant flow air-		
	to-air and applied heat pumps]	





The design engineer provides a weighted average improvement over efficiency based on the capacity for projects with multiple applicable types of equipment. Heating units constituting less than 1% of the total capacity may be omitted from the calculation. Steam systems return condensate to the boiler feedwater system or recover heat from the condensate before sending it to the drain in order to claim equipment efficiency points.

8.3.3.4 Domestic Hot Water Heaters	
8.3.3.4.1 All domestic hot water heaters meet the efficiency requirements of <i>ANSI/ASHRAE/IES STANDARD 90.1-2013,</i> Table 7.8, or domestic hot water heaters are not provided.	 Maximum = 1 point One point is earned where performance is 10% better than the requirements of ANSI/ASHRAE/IES Standard 90.1-2013. No points are earned where there is electric resistance heat

8.3.3.5 Energy Recovery	
8.3.3.5.1 The HVAC design complies with Section	6 points or N/A
6.5.6 of the ANSI/ASHRAE/IES Standard 90.1-2013.	
	 Not applicable where projects meet the
	exemptions of Section 6.5.6.

8.3.3.6 Simulta	neous Heating and Cooling	
 8.3.3.6 Simulta 8.3.3.6.1 The H simultaneous h the following st HVAC desig the ANSI/A OR HVAC desig configuration and re-cool compartment and ventila each zone, heat pump 	NAC design minimizes or eliminates eating and cooling through one of crategies: an complies with Section 6.5.2 of SHRAE/IES Standard 90.1-2013. In incorporates a on/strategy that eliminates reheat by using thermal and ventilation entalization, with heating, cooling, tion provided independently for e.g., fan coil systems, distributed s, single-zone systems.	 Maximum = 6 points or N/A Six points are earned where HVAC design uses ventilation compartmentalization. Four points are earned where HVAC design complies with Section 6.5.2. Not applicable for projects that meet the exemptions of Section 6.5.2.
Informational F	leterence(s): AF/IFS Standard 90 1-2013	

8.3.3.7 Economizers



8.3.3.7.1 The project complies with Section 6.5.1 of the ANSI/ASHRAE/IES Standard 90.1-2013.	3 points or N/A
 Informational Reference(s): ANSI/ASHRAE/IES Standard 90.1-2013, Section 6.5.1 	 Not applicable where projects meet the exemptions of Section 6.5.1.

8.3.3.8 Air-Handling Equipment and Ventilation Co	introl
8.3.3.8.1 The project uses equal or less fan power	Maximum = 6 points or N/A
than the requirements of ANSI/ASHRAE/IES	
Standard 90.1-2013 Table 6.5.3.1-1 including all	• Three points are earned where project complies
exceptions and modifiers.	with ANSI/ASHRAE/IES 90.1-2013 Table 6.5.3.1- 1.
Informational Reference(s):	• One additional point is earned for each 10% less
ANSI/ASHRAE/IES Standard 90.1-2013, Table	than the allowance according to Table 6.5.3.1-1,
6.5.3.1-1	up to a maximum of 6 points.
	• Not applicable where there are no fan systems.
8.3.3.8.2 Occupancy AND/OR CO ₂ sensors are	3 points or N/A
installed to control ventilation rates in regularly	
occupied spaces that may experience frequent	 Not applicable where spaces meeting this
variation in the number of occupants. CO2	criterion represent less than 40% of the total
sensors maintain calibration within 2% for one	design ventilation volume of the building.
year after initial installation.	

8.3.3.9 Recommended Documentation

- Basis of Design document;
- Construction documents;
- Description of condensate recovery system;
- Equipment specifications, control schedules, and diagrams;
- HVAC drawings;
- Manufacturer's specifications, cut sheets, and performance documentation;
- Mechanical design drawing, details, and specifications;
- Project specifications.

8.3.4 Energy Simulation Aided Design & Integrative Process (13 points)

8.3.4.1 Energy Simulation Aided Design	
8.3.4.1.1 Before finalizing the building footprint,	8 points
perform an energy simulation on a simplified	
geometric representation of the building to	
determine strategies to save lighting and HVAC	
energy. This simulation includes massing,	
orientation, window-to-wall ratio, and building	
envelope strategies.	

8.3.4.2 Integrative Process





8.3.4.2.1 Before issuing <i>construction documents</i> , simulation is used to inform design decisions regarding incremental equipment efficiency of building systems for the envelope, lighting, and HVAC.	5 points
--	----------

8.3.4.3. Recommended Documentation

• The findings, as well as the name and contact information for the individual responsible for the energy modeling, are provided.

Complete 8.4, 8.5, and 8.6 regardless of Path chosen above. 8.4 Non-Modeled Energy Efficiency Impacts (15 Points)

8.4.1 Vertical, Horizontal, and Inclined Trans	port Systems – Efficiency Measures
8.4.1.1 The building elevators use	2 points or N/A
roomless (MRL) elevators for all passenger elevators and any regularly utilized elevators.	 Two points are earned where there are regenerative drive systems elevators AND/OR machine-roomless (MRL) elevators. Not applicable where there are no elevators.
8.4.1.2 Enhance the energy efficiency of elevator systems through the use of:	1 pointOne point is earned where any of the prescribed
 TWIN elevators (stacked cabins on one operating elevator in one shaft); Elevators with a destination dispatch system (grouping people traveling to the same floor); AND/OR 	 strategies are used. One point is earned where there are no escalators or elevators.
 Elevators with a zero-power sleep mode. 	
8.4.1.3 Equip escalators and moving	1 point or N/A
walkways with the efficiency measures to reduce energy consumption.	 One point is earned where escalators and moving walkways have the capability to slow down or stop
	 when detectors indicate no traffic or for the use of motor efficiency controllers. Not applicable where there are no escalators or moving walkways.
8.4.1.4 One or more of the following energy	 when detectors indicate no traffic or for the use of motor efficiency controllers. Not applicable where there are no escalators or moving walkways. 1 point or N/A
8.4.1.4 One or more of the following energy efficient equipment systems related to the movement of people is in use:	 when detectors indicate no traffic or for the use of motor efficiency controllers. Not applicable where there are no escalators or moving walkways. 1 point or N/A One point is earned where any of the listed items are used.





 innovative energy efficient people- transport equipment or system (Requires statement of system description and benefits document for submittal). 	
Informational Reference(s):	
• ENERGY STAR Qualified Product Lists,	
2014	
 Federal Energy Management 	
Program's(FEMP) Energy-Efficient	
Product Procurement, 2012	

8.4.1.2 Recommended Documentation

- Construction documents;
- Descriptive explanation and technical definition document on the innovative solution used within the project;
- Drawings and specifications of vertical transport equipment;
- Manufacturer's specifications, cut sheets, and performance documentation.

8.4.2 Load Shedding	
8.4.2.1 Install lighting systems that are capable of load shedding. Loading shedding may be initiated automatically or manually.	 Maximum = 3 points Three points are earned where lighting system can reduce power by ≥30% from peak levels. Two points are earned where lighting system can reduce power by ≥15% and < 30% from peak levels.
8.4.2.2 HVAC equipment controls that are capable of load shedding are installed. Loading shedding may be initiated automatically or manually. Load shedding program initiates setback of space temperatures, heating and cooling system hydronic temperatures, air system static pressure setpoints, or cycling of heating and cooling equipment.	2 points

8.4.3 Plug Load and Process Energy Management	
8.4.3.1 The project documents include	Maximum = 2 points
an inventory of appliances and	
equipment organized by location. The	• Two points are earned where there is a complete
inventory includes:	inventory of expected plug load equipment appliances,
 nameplate power use; 	and hard-wired process equipment.
 typical power use; and 	• One point is earned where there is a complete inventory of
• an expected schedule of use.	hard-wired process equipment only.
	• One point is earned where there is a complete inventory of
	plug load equipment and appliances only.



8.4.3.2 Establish a policy that requires all new equipment purchases be based on energy efficient criteria, such as ENERGY STAR or other equivalent energy efficiency standards.	 1 point or N/A Not applicable if no equipment is subject to ENERGY STAR label criteria.
8.4.3.3 The project is furnished with receptacles that automatically control the availability of power based on occupancy sensors AND/OR timed schedules in accordance with ANSI/ASHRAE/IES Standard 90.1-2010.	 Maximum =2 points Two points are earned where energy-saving power strips are installed on ≥75% to 100% of private offices, open offices and computer classrooms, including receptacles installed in modular partitions. One point is earned where energy-saving power strips are installed on ≥50% and < 75% of private offices, open offices and computer classrooms, including receptacles installed in modular partitions.

8.5 Metering, Monitoring, and Measurement (25 points)

8.5.1 Metering	
8.5.1.1 Install <i>Metering</i> or ensure a mandatory design requirement exists for <i>metering</i> (at the building level) for the following:	 Maximum = 5 points or N/A One point is earned for each 20% increment of the building's site energy
 Electricity (N/A where <i>metering</i> does not exist for electricity); Heating fuels (N/A where <i>metering</i> does not exist for heating fuels); 	 combination of building-level energy <i>meters</i> up to a maximum of 5 points. Not applicable only where specified
 Steam (N/A where <i>metering</i> does not exist for Steam); and Other (e.g., chilled or hot water for campus/district) 	for each criterion.
systems) (N/A where <i>metering</i> does not exist for any other systems).	
8.5.1.2 Install <i>sub-metering</i> or energy monitoring	Maximum = 5 points or N/A
improvement in the building, or require a mandatory tenant improvement that calls for <i>sub-metering</i> or energy monitoring equipment to be installed for the following systems:	 One point each for <i>sub-metering</i> five or more of the listed systems in a MURB at the building level to a maximum of 5 points.
 Lighting and lighting controls by floor or by zones with floor areas no greater than 20,000 ft² (1860 m²); Plug loads by floor or by zones no greater than 20,000ft² (1860 m²); 	 Two points each are earned when heating, cooling, and electricity are sub-metered at the individual unit level in a MURB to a maximum of 5
 Major electric HVAC equipment (e.g., chillers, cooling towers, AHU fans, pumps) 5 HP or greater; Chilled water generation; 	 points. One point is earned for each listed system where <i>sub-metering</i> is
 On-site renewable energy power generation; Heating water or steam generation; AND/OR Specialty or process electrical equipment. 	 installed to a maximum of 5 points. Not applicable for buildings less than 20,000 ft² (1860 m²).



8.5.2 Monitoring and Reporting	
8.5.2.1 A Resource Management Plan addresses all	Maximum = 2 points
 8.5.2.1 A Resource Management Plan addresses all energy consuming areas of a building or project and includes the following monitoring protocols (i.e., hourly, daily, monthly, seasonal, by floor, etc.): Electricity; Heating fuels; Steam; and Other (e.g., chilled or hot water for campus/district systems) Note: This may reflect new technology that uses other energy sources as long as they are measurable. Informational Reference(s): International Performance Measurement and 	 Maximum = 2 points One point is earned where there is documentation of the plan that provides guidance for monitoring installed systems based upon Section 4.5 of the International Performance Measurement & Verification Protocol (IPMVP) Concepts and Practices for Determining Energy savings in New Construction, Volume III, Part I, January 2006. One point is earned where there is a definition of a constant feedback loop process in the plan for defining improvements in the efficiency of energy usage, based upon review and analysis of the gathered building level <i>meter</i> monitoring documentation.
Verification Protocol; DOE/EE-0157; December 1997	 One point is earned where the gathered data is provided for review by occupants and visitors with up-to-date or real-time information on space energy consumption.
8.5.2.2 Create an action plan for evaluating the	Maximum = 3 points
results of documentation defined by the Resource Management Plan and gathered by <i>metering</i> equipment (based upon Section 4.5 D, of the International Performance Measurement & Verification Protocol (IPMVP): Concepts and Practices for Determining Energy savings in New Construction, Volume III, Part I, January 2006). The action plan has a process for implementing	 One point is earned where there are provisions in the plan that mandate the creation of improvement goals, identified based upon the automated data collection of monitored <i>meter</i> usage information for two or more of the listed systems. Two points are earned where there is definition of a process for implementing improvements in
changes identified as a result of the analysis of the monitoring of energy use. The action plan addresses a minimum of two of the following systems:	energy usage to reach the stated goals, based upon review and analysis of the gathered documentation for two or more of the listed systems.
 Lighting and lighting controls by floor or by zones; Plug loads by floor or by zones; Major electric HVAC equipment (e.g., chillers, cooling towers, AHU fans, pumps) 5 HP or greater; Chilled water generation; On-site renewable energy power generation; 	





Heating water or steam generation; AND/OR	
Specialty or process electrical equipment.	
 Informational Reference(s): International Performance Measurement and Verification Protocol; DOE/EE-0157; December 1007 	
1221	
8.5.3 Verification	
 8.5.3.1 Provide verification of the measurement of energy use and efficiency in accordance with Section 4.5 Option D – Whole Building Calibrated Simulation, of the International Performance Measurement & Verification Protocol (IPMVP): Concepts and Practices for Determining Energy savings in New Construction, Volume III, Part I. January 2006. Savings are determined at the whole-building level by measuring energy use at main <i>meters</i> or <i>sub-meters</i> or using whole-building simulation calibrated to measured energy use data. 	 9 points Nine points are earned where verification documentation that the energy data gathered, analysis performed, and computation of energy efficiency is consistent with the objectives of the design intent of the project is provided.
 Informational Reference(s): International Performance Measurement and Verification Protocol; DOE/EE-0157; December 1997 	
8.5.3.2 Install a fault detection and diagnostic system (FDD) on HVAC and lighting systems with the ability to detect the following:	 1 point or N/A Not applicable for buildings without a Building Automation System (BAS).
 Economizer operation; Simultaneous heating and cooling; Photocell malfunction; and Additional HVAC and lighting setpoints. 	

8.5.4 Recommended Documentation

- Cut sheets for *meters* and *meter* reading equipment;
- Description of the monthly monitoring and verification reports that will be sent to building management and the process for constant feedback evaluation for improvement;
- Verification protocol report;
- Mechanical and electrical plans that clearly show what utilities are *metered*, what major end-uses are *sub-metered*;
- Resource Management Plan in the Operations and Maintenance Manual for both building level and *sub-metering* applications.

8.6 Renewable Sources of Energy (40 points)

8.6.1 On-Site Renewable Energy





8.6.1.1 Conduct a study to determine the technical feasibility and life cycle cost effectiveness of <i>on-site renewable energy</i> . The study considers an <i>on-site renewable energy</i> system that provides at least 2% of the total building annual energy cost.	5 points
 Informational Reference(s): Guide to Integrating <i>Renewable Energy</i> in Federal Construction National Institute of Standards and Technology (NIST) Building Life Cycle Cost (BLCC) Program: https://www.nist.gov/publications/blcc-nist-building-life-cycle-cost-program-version-50 (last accessed 6/30/17) 	
8.6.1.2 Use the recommendations of a Feasibility Study, or other owner's project requirements to implement <i>on-site renewable energy</i> system(s).	 Maximum = 25 points or N/A One point is earned for each percent of project energy produced by <i>on-site renewable energy</i> systems to a maximum of 25 points. Not applicable where Feasibility Study was completed, and implementation was found to be not life cycle cost effective.

8.6.2 Off-Site Renewable Energy Credits	
8.6.2.1 The building owner commits to signing a	Maximum = 10 points
contract to purchase Renewable Energy	
Certificates (RECs), either certified Green Power	Points are earned where <i>renewable energy</i> supplies
(US Dept. of Energy) listed renewable energy credit	a percentage of the building's energy:
products or other certified RECs or carbon offsets,	• Ten points are earned for 100%.
with a minimum three-year commitment.	• Nine points are earned for 90%.
	• Eight points are earned for 80%.
Renewable energy supplied as part of a utility	• Seven points are earned for 70%.
provider portfolio may be considered towards	• Six points are earned for 60%.
earning this credit for systems utilizing 10% or	• Five points are earned for 50%.
greater of power from appropriate sources.	• Four points are earned for 40%.
	• Three points are earned for 30%.
Buildings using the prescriptive path and that	• Two points are earned for 20%.
don't otherwise have an energy model may base	• One point is earned for 10%.
the percentage of <i>renewable energy</i> on median	• No points are earned for less than 10%.
EULITOM CBECS for the building type.	

8.6.3 Recommended Documentation Construction documents • Descriptive documentation of the utility provider's renewable energy sources used to provide . consumable energy at the project;

Executed agreements on "green" power or REC contracts; •



- Manufacturer's specifications, cut sheets, and performance documentation;
- On-site renewable energy feasibility studies;
- Study and financial evaluation for implementation.



9. WATER EFFICIENCY (190 points)

9.1 Indoor Domestic Plumbing (56 points)

Where installed in the project and as permitted by local codes, plumbing fixtures and fittings are certified and listed as being compliant with the requirements of the U.S. EPA's *WaterSense* Program where *WaterSense* specifications exist.

Four paths are provided for assessing Indoor Domestic Plumbing. If no path is achieved 75 total points are deducted from total earned points in the Water Efficiency Assessment Area:

- Path A: ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, Section 6.3.2.1: 54 points OR
- Path B: 2015 International Green Construction Code (IgCC), Table 702.1: 54 points OR
- Path C: 2015 IAPMO Green Plumbing & Mechanical Code Supplement Section 402: 54 points OR
- Path D: Major Renovations: 45 points. Not an eligible path for New Construction.

Points cannot be combined between paths. Select one of the paths below.

9.1.1 Path A: ANSI/ASHRAE/USGBC/IES Standard 189.1-2014		
9.1.1.1 Plumbing fixtures and fittings comply with ANSI/ASHRAE/USGBC/IES Standard 189.1-2014,	54 points or N/A	
Section 6.3.2.1.	 Not applicable where no fixtures or fittings exist. Not applicable where Path B, C or D is followed. 	
OP		

OR

9.1.2 Path B: 2015 International Green Construction Code (IgCC)	
9.1.2.1 Plumbing fixtures and fittings comply with	54 points or N/A
the 2015 International Green Construction Code	
(IgCC), Table 702.1.	Not applicable where no fixtures or fittings
	exist.
	• Not applicable where Path A, C or D is
	followed.

OR

9.1.3 Path C: 2015 IAPMO Green Plumbing & Mechanical Code Supplement

9.1.3.1 Plumbing fixtures and fittings comply with	54 points or N/A
2015 IAPMO Green Plumbing & Mechanical Code	
Supplement, Section 402.	 Not applicable where no fixtures or fittings exist. Not applicable where Bath A. B. er D is
	followed
OR	

9.1.4 Path D: Major Renovations	
9.1.4.1 New construction is not eligible for Path D.	Maximum = 45 points or N/A
Points are earned when plumbing fixtures and fittings installed in the project meet or exceed	



requirements for maximum water consumption as listed below and are certified as being compliant with the requirements of the U.S. EPA's WaterSense Program where WaterSense specifications exist.	 One point is earned where at least 80% of each fixture type meets credit requirements; and Four points are earned where 90% of each fixture type meets credit requirements; and Forty-five points are earned where at least
 Toilets (Maximum flush volume 1.28 gal. (4.8 L) per flush); 	98% of each fixture type meets credit requirements.
 Urinals (Maximum flush volume 0.5 gal. (1.9 L) per flush); 	 Seventy-five total points are deducted if less than 80% of each fixture and fitting type meets
 Showerheads (Maximum flow rate 2.0 gal. (7.6 L) per minute); 	credit requirements as listed in Path D. (Note: Points are deducted from the Water
Residential <i>lavatory faucets</i> (Maximum flow	Assessment Area)
rate 1.5 gal. (5.7 L) per minute);	 Not applicable where no fixtures or fittings
Residential kitchen faucets (Maximum flow	exist.
rate 2.2 gal. (8.3 L) per minute); and	• Not applicable where Path A, B or C is
• Non-residential lavatory faucets (Maximum	followed.
flow rate 0.5 gal. (1.9 L) per minute).	
• Pre-rinse spray valves (Maximum flow rate	
1.28 gal. (4.8 L) per minute)	

Complete regardless of the path chosen above.

9.1.5 Residential Indoor Appliances	
9.1.5.1 Residential clothes washers are ENERGY	1 point or N/A
STAR labeled and possess a maximum water factor	
(WF) of 5.4 gal/ft. ³ (720 L/m ³) per full cycle.	• Not applicable where there are no <i>clothes</i>
	washers.
9.1.5.2 Residential dishwashers are ENERGY STAR	1 point or N/A
labeled and possess a maximum water use of 3.8	
gal/ft. ³ (510 L/m ³) per cycle.	 Not applicable where there are no
	dishwashers.
 STAR labeled and possess a maximum water factor (WF) of 5.4 gal/ft.³ (720 L/m³) per full cycle. 9.1.5.2 Residential dishwashers are ENERGY STAR labeled and possess a maximum water use of 3.8 gal/ft.³ (510 L/m³) per cycle. 	 Not applicable where there are no <i>clothes</i> washers. 1 point or N/A Not applicable where there are no dishwashers.

9.1.6 Recommended Documentation ENERGY STAR labeling; Manufacturer has published fixture flush and flow rates; Manufacturer's published water use rates;

• WaterSense labeling.

9.2 Cooling Towers (24 points)

9.2.1 Cooling Towers	
9.2.1.1 Cooling towers minimize the amount of <i>make-up water</i> required by achieving one of the	Maximum = 13 points or N/A
following:	 Five points are earned where cooling towers achieve the respective threshold cycles of
 A minimum of 5 cycles of concentration for make-up water having less than or equal to 200 ppm (200 mg/L) total hardness as calcium 	concentration.Four points are earned when either;



 carbonate or 3.5 cycles for makeup water with more than 200 ppm (200 mg/L) total hardness as calcium carbonate; OR A minimum discharge conductivity of 1500 micromhos/cm or a maximum of 150 ppm (150 mg/L) of silica measured as silicon dioxide. A minimum discharge conductive data as silicon dioxide. Graduate data as a silicon data as a silicon dioxide. Graduate data as a silicon dioxide. Graduate data as a silicon dioxide. Graduate data as a silicon data asi	n he n ter 6 of a om
 Not applicable where there are no wet-co towers 	oling
9.2.1.2 Use advanced predictive or tracking tower control systems to mediate cooling tower makeup and discharge. Possible examples include integrated systems with occupancy sensors estimating demand, tracer based monitoring systems, etc. 2 point or N/A	ative
9.2.1.3 For the purposes of reducing evaporated Maximum = 7 points or N/A water losses at least 20% of appual cooling	
 demands are made up by non-evaporative cooling. Seven points are earned where ≥75% and <100% of annual evaporative cooling dem are replaced by non-evaporative cooling. Four points are earned where >50% and < of annual evaporative cooling demands are replaced by non-evaporative cooling. Two points are earned where ≥20% and < of annual evaporative cooling demands are replaced by non-evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. No points are earned where <20% of annue evaporative cooling. Not applicable where evaporative cooling not required. 	ands 75% e 50% e al by is
9.2.1.4 Equip Cooling tower(s) with <i>drift</i> 2 points or N/A	
eliminators that achieve an efficiency of 0.001% or	
less for <i>counterflow systems</i> ; • Two points are earned where <i>drift elimina</i>	tors
OR achieve the specified efficiency for either counterflow or crossflow systems.	

9.2.2 Recommended Documentation • Construction documents;



• Manufacturer's specifications, cut sheets, and performance documentation for cooling equipment, blowdown *meter*, *drift eliminators*, conductivity controllers and wet/dry cooling towers;

• Plumbing plans.

9.3 Boilers and Hot Water Systems (10 points)

9.3.1 Boilers and Water Heaters				
9.3.1.1 Boilers AND/OR water heaters have the	Maximum = 3 points or N/A			
following features:				
	• Two points are earned where boiler systems with			
• 9.3.1.1.1: Boiler systems with over 50 BHP	over 50 BHP have condensate return systems.			
have condensate return systems;	 Not applicable where there will be no 			
• 9.3.1.1.2: Non steam boilers have	steam boilers or where steam boilers are			
conductivity controllers; AND/OR	less than 200 BHP.			
• 9.3.1.1.3: Steam boilers have conductivity	One point is earned where boilers have			
meters.	conductivity controllers and meters.			
	• Not applicable where there are no boilers			

9.3.2 Domestic Hot Water Systems											
9.3.2.1 Hot Water Volume: Conserve energy and water								Ma	aximum = 4		
by designing efficient hot water delivery piping systems to one of the following:							ро	ints			
• A maximum of 48 oz. from a water heater AND/OR a maximum of 24oz from a									•	Four points	
recirculation or similar hot water line;										are earned	
OR										where there	
• A maxi	mum of 6	4 oz. from	a water h	neater A	ND/OR a	a maxim	um of 24	loz from a			is a
recircu	lation or s	similar hot	water lin	e;							maximum of
OR											48 oz. from
• A maxi	mum of 9	6 oz. from	a water h	neater A	ND/OR a	a maxim	um of 36	6oz from a			a water
recircu	lation or s	similar hot	water lin	e.							heater
											AND/OR a
Reduce ho	t water pi	ping volun	ne to all <i>lo</i>	avatory s	sinks, kit	chen sin	ks, and s	showers.			maximum of
Table E202.1										24 oz. from	
INTERNATL VOLUME OF VARIOUS WATER DISTRIBUTION TUBING									а		
Ounces of water per foot of tube									recirculation		
Size	Copper	Copper	Copper	CPVC	CPVC	CPVC	PE-	Composite	PEX		or similar
Nominal	Туре	Type L	Туре К	CTS	SCH	SCH	RT	ASTM F	CTS		hot water
Inch	М			SDR	40	80	SDR	1281	SDR		line.
				11			9		9	٠	Three points
3/8	1.06	0.97	0.84	N/A	1.17	-	0.64	0.63	0.64		are earned
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18		where there
3⁄4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35		is a
1	5.81	5.49	5.17	4.43	5.53	4.57	3.91	5.56	3.91		maximum of
1 ¼	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81		64 oz. from
1 ½	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09		a water
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86		heater
AND/OR a								AND/OR a			
											maximum of



	 24 oz. from a recirculation or similar hot water line. Two points are earned where there is a maximum of
	96 oz. from a water heater AND/OR a maximum of 36 oz. from a recirculation or similar hot water line.
9.3.2.2 Reduce hot water waste to <i>lavatory</i> sinks, kitchen sinks, and showers by use of hot	Maximum = 3
water recirculating systems that use occupant sensors, occupant controls, and	points
thermocouples to reduce waiting times and water purged down the drain.	
Note: Continuously operating recirculation systems and recirculation systems on timers are not eligible for this credit.	 Three points are earned where >90% of the hot water fixtures listed are served by a hot water demand system. Two points are earned where ≥75 and ≤90% of the hot water fixtures listed are served by a hot water demand system.



.

No points are earned where <75% of the hot water fixtures listed are served by a hot water demand system.

9.3.3 Recommended Documentation

- Certificate from professional engineer for steam system;
- Construction documents and piping layout;
- Manufacturer's specifications and instructions, cut sheets, and performance documentation for boilers, water heating systems, *meter*, controllers, appliances and steam system plans.

9.4 Water Intensive Applications (21 points)

9.4	9.4.1 Commercial Food Service Equipment				
9.4	.1.1 Food services avoid water intensive	Maximum = 2 points or N/A			
eq	uipment as follows:				
•	9.4.1.1.1: The project does not include <i>once-through water-cooled equipment</i> ; AND 9.4.1.1.2: The project does not include waterfed <i>food waste disposers.</i>	 One point is earned where food services avoid water intensive equipment per each listed item up to a maximum of 2 points. Not applicable where there are no commercial food service facilities. 			
9.4	.1.2 The following appliances and fittings meet	Maximum = 5 points or N/A			
the	e prescribed limits for water usage:				
•	 9.4.1.2.1: Combination ovens consume 1.5 gal per pan/hr. (39 L/hr.) or less in the steamer mode. N/A where there are no combination ovens; 9.4.1.2.2: Pre-rinse spray valves comply with the requirements of the U.S. EPA's WaterSense Program and consume 1.28 gal/min (4.8 L/min) or less; 9.4.1.2.3: Boilerless/connectionless food steamers consume 2 gal/hr./compartment (7.5 L/br.) or less 	 One point is earned where each listed appliance or fitting meets the specified water usage limits up to a maximum of 5 points. Not applicable where the listed appliance or fitting is not present. 			
•	 N/A where there are no food steamers; 9.4.1.2.4: Dishwashers comply with ENERGY STAR requirements and consume 1.6 gal/rack (6.1 L/rack) or less. Rackless flight-type dishwashers consume 160 gal/hr. (605.7 L/hr.) or less. 				





	 N/A where there are no dishwashers; and
•	9.4.1.2.5: Ice Makers comply with ENERGY
	STAR requirements where such requirements
	exist.
	 N/A where there are no ice makers.

9.4.2 Laboratory and Medical Equipment					
9.4.2.1 Equip <i>Steam sterilizers</i> with the following:	Maximum = 1 point or N/A				
 9.4.2.1.1: Mechanical vacuum systems; and 9.4.2.1.2: Water tempering devices that only allow water to flow when the discharge of condensate or hot water from the sterilizer exceeds 140°F (60°C). 	 One-half (1/2) point is earned where <i>steam</i> sterilizers are equipped per each listed item up to a maximum of 1 point. Not applicable where there are no steam sterilizers. 				
9.4.2.2 Specify <i>Dry vacuum systems</i> for all medical/dental purposes.	1 point or N/A				
	 Not applicable where there are no medical/dental systems. 				

9.4.3 Laundry Equipment	
9.4.3.1 Coin- or card-operated laundromat	2 points or N/A
machines meet the prescribed water factor (WF)	
performance as follows:	Two points are earned where all machines
	comply with the specified water factor.
Laundromat <i>clothes washers, single-load</i> have	 Not applicable where there are no coin- and
a WF of 4.0 or less and comply with ENERGY	card-operated machines.
STAR requirements; AND/OR	
• Clothes washers, Multi-load have a WF of 8.0	
or less.	
9.4.3.2 Laundry equipment in industrial laundry	2 points or N/A
facilities include the following features and	
systems:	 Not applicable where there is no industrial
	laundry or where volumes do not exceed 350
 Clothes washers, Tunnel clothes washers can 	lbs. (160 kg) per hour.
be programmed to use a specific amount of	
water depending on the soil level of the	
material to be washed;	
• Maximum water consumption of <i>washers</i> is	
1.0 gal/lb. (8 L/kg); AND	
Washers have a water recycling system.	
9.4.3.3 In an on-premise/institutional laundry,	2 points or N/A
clothes washers and washer-extractors have a	
maximum WF of 8.0.	 Not applicable where there are no coin- and
	card-operated machines.

9.4.4. Water Features and Pools





9.4.5 Recommended Documentation

- Construction documents;
- Description of *alternate water sources* to be used;
- Manufacturer's specifications, cut sheets, and performance documentation for *pre-rinse spray valves*, ice machines, food steamers, dishwashers, and *combination ovens*;
- Manufacturer's specifications, cut sheets and performance documentation for *steam sterilizers*, laboratory or medical equipment using *non-potable water* for once through cooling, water recycling units, and wet scrubbers;
- Manufacturer's specifications, cut sheets, and performance documentation for all special *water features* and for all *meters*;
- Plumbing plans.

9.5 Water Treatment (4 points)

9.5.1 Water Treatment for End Uses	
9.5.1.1 Equip filtration systems with pressure drop	1 point or N/A
gauges that allow backwash to be based on	
pressure drop and not on timers.	 Not applicable where there is no water
	treatment system.


9.5.1.2 Provide reverse osmosis that achieves one of the following:	Maximum = 2 points or N/A
 Rejects less than 70% of feed-water volume for a system that produces less than 100 gal. (380 L) per day; OR Rejects less than 60% of feed-water volume for a system that produces more than 100 gal. (380 L) per day. 	 Two points are earned where reverse osmosis rejects less than 60% of feed-water volume. One point is earned where reverse osmosis rejects less than 70% of feed-water volume. Not applicable where there is no water treatment system.
9.5.1.3 Water softeners are demand-initiated, equipped with recharge controls based on volume	1 point or N/A
of water treated or hardness and not on clock	Not applicable where there is no water
timers.	treatment system.

9.5.2 Recommended Documentation	
•	Construction documents;
•	Manufacturer's specifications, cut sheets, and performance documentation for filtration systems,
	pressure drop gauges, reverse osmosis systems, water softeners, and recharge controls.

9.6 Alternate Water Sources (28 points)

9.6.1 Alternate Water Sources for Indoor Uses	
9.6.1.1 Use non-potable water for indoor	Maximum = 10 points or N/A
purposes.	
	Points are earned based on the percentage of
Informational Resource(s):	indoor water demands met with non-potable
EPA's Guidelines for Water Reuse	water:
	 Ten points are earned for >75%.
	• Eight points are earned for >50 and ≤75%.
	• Six points are earned for $\geq 25\%$ and $\leq 50\%$.
	• Three points are earned for \geq 15% and \leq 24%.
	 No points are earned for <15%.
	Not applicable where the authority having
	jurisdiction prohibits the use of alternate
	water_sources for indoor applications.
9.6.1.2 One of the following systems is at least	2 points
80% pre-plumbed (pipes and valves) during	
construction:	
• Graywater;	
Reclaimed water;	
Recycled water;	
Stormwater; AND/OR	
Rainwater.	



Pre-plumbed systems are marked or otherwise identified as such.

9.6.2 Alternate Water Sources for Outdoor Uses	
9.6.2.1 Where applicable, use alternate water	Maximum = 15 points or N/A
<i>source(s)</i> to replace <i>potable water</i> for one or more	
of the following outdoor purposes:	 Fifteen points are earned where alternate water source(s) are used for Cooling Towers;
• 9.6.2.1.1: Cooling Towers;	
• 9.6.2.1.2: Irrigation;	OR
• 9.6.2.1.3: Water features;	
 9.6.2.1.4: Wash Down/Surface Washing; AND/OR 9.6.2.1.5: Dust Control. 	 Fifteen points are earned where alternate water source(s) are used for Irrigation. Not applicable where the vegetative
	landscape is less than 25% of the site. OR
	• Five points are earned where <i>alternate water source(s)</i> are used for Water features.
	 Five points are earned where alternate water source(s) are used for Wash Down/Surface Washing.
	 Five points are earned where alternate water source(s) are used for Dust Control.
	 Not applicable where there is no irrigation or other outdoor demand.

9.6.3 Graywater Treatment	
9.6.3.1 Graywater treatment systems are NSF 350	1 point or N/A
listed where present.	
	• Not applicable where there are no <i>Graywater</i>
	treatment systems.

9.6.4 Recommended Documentation

- Construction documents;
- Description of *alternate water sources* and implementation for *non-potable water* applications;
- Designer's drawings, specifications, and performance documentation including estimated yield and calculations to demonstrate the percentage of water from *non-potable* sources and *alternate water sources*;
- Manufacturer's specifications, cut sheets, and performance documentation.

9.7 *Meter*ing (20 points)

9.7.1 Metering	
9.7.1.1 Install Sub-metering for all water-	2 points or N/A
intensive applications such as commercial	
kitchens, commercial laundries, laboratories,	Not applicable where there are no water
pools, spas, etc.	intensive applications.





9.7.1.2 Install <i>metering</i> or <i>sub-metering</i> for water that is used for pressurized irrigation.	4 points or N/A
	• Not applicable where there is no irrigation.
9.7.1.3 Link all water meters and sub-meters to	2 points
a Meter Data Management System to store and	
report water consumption data.	
9.7.1.4 Equip chilled or hot water loops or	2 points or N/A
cooling tower make up water supply pipes with	
meters.	 Not applicable where there are no chilled or hot
	water loops.
9.7.1.5. Use tenant <i>Metering</i> or <i>Sub-metering</i> in	Maximum = 10 points or N/A
multi-unit developments.	
	 Ten points are earned when at least 90% of the
	units in the development are <i>sub-metered</i> and
	allow for tenants to view their consumption and
	be billed based upon it.
	 Seven points are earned when at least 75% of the units in the double ment are sub-metered and
	units in the development are sub-metered and
	he hilled based upon it
	 Five points are earned when at least 50% of the
	units in the development are <i>sub-metered</i> and
	allow for tenants to view their consumption and
	be billed based upon it.
	• Two points are earned when at least 25% of the
	units in the development are sub-metered and
	allow for tenants to view their consumption and
	be billed based upon it.
	 Not applicable where there is no multi-unit
	development.

9.7.2 Recommended Documentation

- Building plans showing *sub-meters;*
- Construction documents;
- Manufacturer's specifications, cut sheets, and performance documentation for the *Meter* Data System and *meters*;
- Plan for billing of tenants;
- Plumbing design drawings;
- *Sub-meter* specifications;
- Water Efficiency Measurement and Verification Plan including monthly reports.

9.8 Irrigation (27 points)

9.8.1 Irrigation9.8.1.1 No irrigation system is installed.Maximum = 16 points or N/A



OR Use the EPA WaterSense Water Budget Tool to determine landscape water allowance (LWA) and the landscape irrigation design and installation aligns with the allowance. Exclusion: The area of the landscape used to grow food for human consumption is not included in the calculations. Informational reference(s): • ASABE/ICC 802-2014 ANSI Landscape Irrigation Sprinkler and Emitter Standard. • EPA WaterSense Water Budget Tool (V 1.02) • 2014 Landscape Irrigation Best Management Practices	 Sixteen points are earned only where there is no irrigation system. Six points are earned when there is a 30% reduction in water demand compared to the baseline as determined by the EPA WaterSense Water Budget Tool. One point is earned for each additional 5% reduction in water demand above 30% to a maximum of an additional 9 points. Not Applicable where there is no landscaping or the landscaping has no vegetation.
5.0.1.2. All illigation plan is developed by a	waximum – 4 points
cerumed/incensed imgation designer for the	Eour points are carped where there is an
for landscape water requirements compared to	irrigation plan
the LWA.	
9.8.1.3 The irrigation system includes the	Maximum = 5 points or N/A
following:	
<u> </u>	
 9.8.1.3.1: WaterSense or Smart Water Application Technology (SWAT), smart controllers, soil moisture sensors, AND/OR automatic rain shutoff devices; 9.8.1.3.2: Pressure regulation for each zone to maintain proper operating pressures for landscape irrigation sprinklers or drip components; 	 One point is earned for each of the listed features included in the irrigation system up to a maximum of 5 points. Not applicable where no irrigation system is installed.
 9.8.1.3.3: Drip irrigation on all planting beds where mature plant height is 10 in. (25.4 cm) or greater AND/OR in any planted area with a dimension less than 5 ft. (1.5 m) in any direction; 9.8.1.3.4: Flow sensing incorporated in the control system to suspend irrigation in any zone where flows exceed expectation; AND/OR 	
• 9.8.1.3.5 : Landscape irrigation sprinklers and drip emitters that comply with ASABE/ICC 802-2014 ANSI Landscape Irrigation Sprinkler and Emitter Standard.	



irrigation plan and to assure that there is no runoff or overspray onto impervious surfaces. Two poin sprinkler	points or N/A
Not appli installed.	ts are earned where there is a system inspection. cable where no irrigation system is

9.8.2 Recommended Documentation

- Construction documents;
- Landscape architect/designer approved irrigation plan;
- Manufacturer's specifications, cut sheets, and performance documentation.



10. MATERIALS (150 points)

10.1 Whole Building Life Cycle Assessment (30 points)

10.1.1 Whole Building Life Cycle Assessment	
10.1.1.1 The project team evaluates a minimum of two	Maximum = 30 points
different building designs using ASTM E2921-13 and the	
following assessment protocol to select the building with the	Points are earned where the following
lower environmental impact.	percentage reduction is demonstrated
	by adding at least three impact
Assessment protocol:	indicators:
	Thirty points are earned for a total
The life cycle assessment reports the following life cycle impact	25% or greater reduction
indicators:	Twenty-eight points are earned for
Global warming potential (GWP)/climate change:	a total 24% reduction
Acidification notential:	Twenty-six points are earned for a
Eutrophication potential:	total 23% reduction
 Ozone depletion notential (ODP): and 	Twenty-four points are earned for
Coole depiction potential (ODP), and	• Twenty-Tour points are earned for
• Shog potential.	a total 22% reduction.
The proposed final design of the building with the lower	• Twenty-two points are earlied for
anticipated environmental impact achieves the following	a total 21% reduction.
anticipated environmental impact achieves the following	Twenty points are earned for a
performance targets compared to the reference design.	total 20% reduction.
 A minimum 5% reduction each, for at least three impact indicators, one of which is global warming notontial, and 	Eighteen points are earned for a
No other impact indicator eveneds the reference design by	total 19% reduction.
 No other impact indicator exceeds the reference design by 	Sixteen points are earned for a
more than 5%.	total 18% reduction.
	• Fourteen points are earned for a
Operating energy consumption and MEP systems can be	total 17% reduction.
included. A registered design professional verifies structural	Twelve points are earned for a
material quantities, with the exception of existing buildings.	total 16% reduction.
	Ten points are earned for a total
Informational Reference(s):	15% reduction.
ASTM E2921-13 Standard Practice for Minimum Criteria for	
Comparing Whole Building Life Cycle Assessments for Use	
with Building Codes and Rating Systems	
The Athena Impact Estimator for Buildings:	
http://calculatelca.com/software/impact-estimator/ (last	
accessed 6/20/17)	
 GaBi Software Building LCA: <u>http://www.gabi-</u> 	
software.com/america/solutions/building-lca/ (last	
accessed 6/20/17)	
SimaPro Sustainability Life Cycle Assessment Carbon	
Footprinting: <u>http://www.simapro.co.uk/</u> (last accessed	
6/20/17)	
 Tally[™]: <u>http://choosetally.com/</u> (last accessed 6/20/17) 	



10.2 Product Life Cycle (29 Points)

10.2.1 Product Life Cycle		
10.	2.1.1 Product Manufacturers provide one or	Maximum = 19 points
mo	re of the following for a minimum of twenty	
pro	ducts that at a minimum evaluate the cradle-to-	Points are earned where products include one of
gat	te product life cycle:	the listed third party verifications/certifications:
• • Info	Third party verified Type III Environmental Product Declarations (EPD) according to ISO 21930: 2007 or ISO 14025: 2006, either product specific or industry average; Third party Multiple Attribute Product Certification; AND/OR Third party verified product life cycle assessment based upon ISO 14040: 2006 and ISO 14044: 2006.	 Nineteen points are earned for 30 or more products. Fourteen points are earned for 29 products. Thirteen points are earned for 28 products. Twelve points are earned for 27 products. Eleven points are earned for 26 products. Ten points are earned for 25 products. Nine points are earned for 24 products. Eight points are earned for 23 products. Seven points are earned for 22 products. Six points are earned for 21 products. Five points are earned for 20 products. No points are earned for 20 products. No points are earned for 20 products.
•	use the same MAS Examples include the	products.
	following	productor
	NSF/ANSI 140-2015 Sustainability	
	Assessment for Carpet	
	• NSF/ANSI 332-2015 Sustainability	
	Assessment for Resilient Flooring	
	NSF/ANSI 336-2011 Sustainability	
	Assessment for Commercial Furnishings	
	Fabric	
	NSF/ANSI 342-2014 Sustainability	
	Assessment for Wallcovering Products	
	NSF/ANSI 347-2012 Sustainability	
	Assessment for Single Ply Roof Membranes	
	ANSI/NSC 373-2014 Sustainability	
	Assessment for Natural Dimension Stone	
	ANSI/BIFMA e3-2014: Business and	
	Institutional Furniture Sustainability	
	Standard (BIFMA e3) and Level®	
	Sustainability Certification Program for	
	Furniture	
	IIIe Council of North America's Green	
	Squarea Certification (ANSI A138.1-2011)	
	• OL 100: Sustainability of Gypsum Boards and Danals (2012)	
	runers (2012) III 102: Suctainability of Swinging Door Logfa	
	• OL 102: Sustainability of Swinging Door Leafs (2009)	



10.2.1.2 A minimum of five products include one or	Maximum = 10 points
more of the following verifications that evaluate the	
products through end of life (<i>cradle-to-grave product life cycle</i>):	Points are earned where products are evaluated through end of life:Ten points are earned for 10 or more
 Third party verified Type III Environmental Product Declarations (EPD) according to ISO 21930: 2007 or ISO 14025: 2006; 	products.Nine points are earned for 9 products.Eight points are earned for 8 products.
AND/OR	• Seven points are earned for 7 products.
 Third party verified product life cycle assessment based upon ISO 14040: 2006 and ISO 14044: 2006. 	 Six points are earned for 6 products. Five points are earned for 5 products. No points are earned for fewer than 5 products.
Compliance with 10.2.1.2 can be used for 10.2.1.1	
Informational Reference(s):	
 Multi-attribute Standards (MAS): products compared use the same MAS. Examples include the following: NSF/ANSI 140-2015 Sustainability Assessment for Carpet NSF/ANSI 332-2015 Sustainability Assessment for Resilient Flooring NSF/ANSI 336-2011 Sustainability Assessment for Commercial Furnishings Fabric NSF/ANSI 342-2014 Sustainability Assessment for Wallcovering Products NSF/ANSI 347-2012 Sustainability Assessment for Single Ply Roof Membranes ANSI/NSC 373-2014 Sustainability Assessment for Natural Dimension Stone ANSI/BIFMA e3-2014: Business and Institutional Furniture Sustainability Standard (BIFMA e3) and Level Sustainability Certification Program for Furniture Tile Council of North America's Green Squared Certification (ANSI A138.1-2011) UL 100: Sustainability of Gypsum Boards and 	
 Panels (2012) UL 102: Sustainability of Swinging Door Leafs (2009) 	

10.3 Product Risk Assessment (19 points)

10.3.1 Screening-Level Product Risk Assessment		
10.3.1.1 Select at least one formulated product or article that has a	Maximum = 19 points	
completed first, second, or third party screening-level product risk		

assessment in accordance with the chemical characteristics identified in NSF/GCI/ANSI 355: Greener Chemicals and Processes Information Standard, based on the product's intended use, concentration of each chemical constituent within the product, and completion of a peer reviewed exposure model in accordance with 10.3.2; including, as a minimum, the following technically supported and applicable exposure scenario factors for either interior or exterior product categorized products: frequency, duration, amount utilized, ventilation rate, wind speed, and room/space size, or unlimited for unconfined spaces.

Points are earned for discrete products with different functional uses and not variations of the same product, unless the manufacturers show substantial difference between the chemical constituents or components. Where a product has both interior and exterior exposure, the screening-level *product risk assessment* is required for the interior exposure only.

Product Screening-Level *Product Risk Assessment* Reporting: The product manufacturer provides a screening-level *product risk assessment* report that includes the following elements:

- Certification that their full *product formulation* underwent the screening-level *product risk assessment*, including each constituent chemical identified by applicable Chemical Abstract Service Number (*CAS number*) and the percentage (actual, estimated, or range %) of each constituent chemical in the formulation (de minimus of 0.1% for carcinogens and 1% for other hazardous ingredients); and
- Each screening-level *product risk assessment* for human health, safety and ecological impacts, is required based upon the NSF/GCI/ANSI-355 Chemical Characteristics, and the results are reported in the generic classification of Green (least risk), Yellow (second least risk), Orange (second most risk), and Red (most risk).

Note: Human health and safety risk and ecological screening-level *product risk assessments* may be completed separately by different entities.

Informational Reference(s):

• screening-level product risk assessment tools referencing NSF/GCI/ANSI 355: Greener Chemicals and Processes Information Standard AND/OR processes allowed by regulatory authorities, e.g. REACH, EPA, Health Canada or other sources (2011)

10.3.2 Recommended Documentation

Points are earned where products undergo a screening-level *product risk assessment:*

- Nineteen points are earned for 15 products or more.
- Fourteen points are earned for 14 products.
- Thirteen points are earned for 13 products.
- Twelve points are earned for 12 products.
- Eleven points are earned for 11 products.
- Ten points are earned for 10 products.
- Nine points are earned for 9 products.
- Eight points are earned for 8 products.
- Seven points are earned for 7 products.
- Six points are earned for 6 products.
- Five points are earned for 5 products.
- Four points are earned for 4 products.
- Three points are earned for 3 products.
- Two points are earned for 2 products.
- One point is earned for 1 product.



Product Screening-Level Product Risk Assessment Report includes:

• Description of how the screening-level *product risk assessment* system/tool calculated the overall product risk, including both human health and safety, and ecological risks;

- Applicable routes of exposure (i.e., inhalation, dermal, oral) and exposure scenario factors used in the calculation;
- Underlying assumptions and other relevant information needed for an independent validation of the assessment process;
- Description of how the product risks were converted into the Green, Yellow, Orange and Red classifications; and
- The product screening-level *product risk assessment* report additionally includes documentation of the worst case constituent chemical acute and chronic exposure concentration and/or dosage and *Risk Characterization Ratio (RCR)* for the applicable product routes of exposure (i.e., inhalation, dermal, oral) utilizing the constituent chemical percentages in the *product formulation* and at least the additional exposure factors listed above. (Note: the worst case constituent chemical may be a different constituent chemical for each applicable product route of exposure, based upon their NSF/GCI/ANSI-355 chemical characteristic impacts.) In the public report proprietary *product formulation*, ingredient and/or percentage need not be revealed. Instead formulation constituents may be grouped and identified by functional role, hazard grouping, or other descriptors for the product.

10.4 Sustainable Materials Attributes (10 points)

10.4.1 Product Sustainable Materials Attributes		
10.4.1.1 Points are earned based on adding	Maximum = 10 points	
percentages of materials, by material cost, that carry		
the pre-consumer recycled content, post-consumer	Points are earned where the Product	
recycled content, biobased content or third party	Sustainable Attribute Material is between 11%	
sustainable forestry certification content attribute:	and 29% or greater:	
	 Ten points are earned for ≥28%. 	
Product Sustainable Attribute Material =	 Nine points are earned for ≥26% and < 28%. 	
Pre-consumer recycled content %	• Eight points are earned for ≥24% and <26%.	
+	 Seven points are earned for ≥22% and 	
Post-consumer recycled content %	<24%.	
+	• Six points are earned for ≥20% and < 22%.	
Biobased content %	 Five points are earned where for ≥18% and 	
+	<20 .	
Third Party Sustainable Forestry Certification content %	 Four points are earned where for ≥16% and <18%. 	
	• Three points are earned for ≥14% and	
Use the formula below to determine the percentages	<16%.	
by cost of the products that carry the listed attributes.	 Two points are earned for ≥12% and <14%- 	
Only the portion of materials that has the identified	• One point is earned for ≥11% and <12%.	
attribute should be included. For example, if a product	 No points are earned for <11%. 	
has 40% pre-consumer recycled content, only 40% of		
the value of that product is included.		





10.4.2 Recommended Documentation

• Manufacturer's product data sheets or a statement from manufacturer(s) certifying claims or thirdparty certification from an organization that has the program in its ISO 17065 scope of accreditation.

10.5 Reuse of Existing Structures and Materials (30 points)

10.5.1 Structural Systems and Non-Structural/Interior Elements	
10.5.1.1 Structural systems (e.g. exterior walls,	Maximum = 12 points
interior bearing walls, roof systems, floor systems)	
from an existing building on the site are retained	Points are earned where a percentage of the
and incorporated in the new design.	existing structural systems is reused:
	• Twelve points are earned for ≥95% <i>reuse</i> .



Assessment Guidance:	 Eleven points are earned for ≥90% and <95% reuse.
Percentage = $100 \times (A \div B)$, where:	 Ten points are earned for >85% and <90%
A = Total square footage of <i>reused</i> existing	
structural systems	• Nine points are earned for $>80\%$ and $<85\%$
B = Total square footage of structural systems in	
the project	$\frac{1}{2} = \frac{1}{2} $
	 Eight points are earned for ≥75% and <80% reuse.
Wall Area is measured in the vertical plane and other structural systems are measured in the	 Seven points are earned for ≥70% and <75%
horizontal plane.	iverse.
	• Six points are earned for $\geq 65\%$ and $<70\%$ reuse.
	 Five points are earned for ≥60% and <65%
	reuse.
	 Four points are earned for ≥50% and <60%
	reuse.
	 Three points are earned for ≥40% and <50%
	reuse.
	• No points are earned for <40% reuse.
10.5.1.2 Non-structural interior systems and	Maximum = 10 points
finishes (e.g. ceiling, interior partitions,	
demountable walls, flooring, doors) from an	Points are earned where a percentage of existing
existing building on the site are retained and	non-structural/interior systems and finished is
incorporated in the new design.	reused:
	 Ten points are earned for ≥95% reuse.
Assessment Guidance:	 Nine points are earned for >85% and <95%
	reuse.
Areas are calculated as the projected area of the	 Eight points are earned for ≥75% and <85%
element (e.g. if an interior partition is reused, the	reuse.
area is calculated as length x height of the wall).	 Seven points are earned for >65% and <75%
	reuse.
Percentage = 100 x (A ÷ B), where:	 Six points are earned for >55% and <65%-reuse
A = Total area of reused existing interior systems	 Five points are earned for >45% and <55%
and finishes	
B = Total area of interior systems and <i>finishes</i> in	Eaur points are carped for >25% and <45%
the new design	 Four points are earned for 235% and <45%
	The second secon
	 Inree points are earned for ≥25% and <35%
	reuse.
	 I wo points are earned for ≥15% and <25%
	reuse.
	• One point is earned for ≥10% and <15% reuse.
	 No points are earned for <10% reuse.

10.5.2 Material Reuse from Off-Site		
10.5.2.1 The project incorporates reused,	Maximum = 4 points	
refurbished AND/OR off-site salvaged materials in		
place of new materials (except <i>furnishings</i>).		



Assessment Guidance:	Points are earned where a percentage of materials
Percentages are calculated as the percentage of	is reused, refurbished, <u>AND/OR</u> salvaged from off-
the total materials cost.	site:
	• Four points are earned for ≥20% of materials.
Percentage = 100 x (A ÷ B), where:	• Three points are earned for ≥10% and <20% of
A = Total value of reused materials	materials.
B = Total value of materials	 Two points are earned for ≥5% and <10% of materials.
The value of the reused, refurbished, or <i>salvaged</i>	• One point is earned for ≥2% and <5% of
material is the greater of the cost of the reused,	materials.
refurbished or salvaged material or the cost of	• No points are earned for <2% of materials.
new comparable material which is being avoided.	
10.5.2.2 Furnishings (including systems furniture)	Maximum = 4 points or N/A
are reused, salvaged AND/OR refurbished for	
reuse within the project.	Points are earned where a percentage of existing
	furnishings is reused:
Assessment Guidance:	 Four points are earned for ≥30% of existing
Percentages are calculated as the percentage of	furnishings.
the total <i>furnishings</i> cost.	 Three points are earned for ≥20% and <30% of existing <i>furnishings</i>.
Percentage = 100 x (A ÷ B), where:	• Two points are earned for ≥15% and <20% of
A = Total value of reused <i>furnishings</i>	existing furnishings.
B = Total value of <i>furnishings</i>	• One point is earned for ≥10% and <15% of
	existing <i>furnishings</i> .
	 No points are earned for <10% of existing
	furnishings.
	• Not applicable where there are no existing
	<i>furnishings</i> or if it is not feasible to <i>reuse</i>
	existing <i>furnishings</i> .

10.5.3 Recommended Documentation

- Calculation for area of existing major structural systems reused;
- Calculation for percentage of furniture reused;
- Calculation for percentage of off-site material reused onsite;
- Calculations for surface area of existing non-structural elements reused.;
- Construction documents;
- Manufacturer's specifications, cut sheets, and performance documentation (if applicable).

10.6 Waste (22 points)

10.6.1 Construction Waste	
10.6.1.1 A preconstruction waste management plan is created prior to any construction or demolition activities. This plan describes the project team's strategy for reducing construction waste and diverting materials from landfilling via reuse or recycling.	2 points
The preconstruction waste management plan will include:	(Continued from 10.6.1.1)





•	The strategies planned for construction waste	
	reduction, salvaging, recycling, returning to	
	supplier/manufacturer, or other methods for diverting	
	waste from landfill;	
•	The facility, hauler, or service provider that will handle	
	each material being diverted;	
٠	Whether construction and demolition materials will be	
	separated on-site or commingled;	
•	The name and contact information for the person(s)	
	responsible for developing and implementing the waste	
	management plan;	
•	Reporting and record keeping provisions;	
•	Target construction waste rate per 10.6.1.3 below; and	
٠	Target waste diversion rate.	
10.	6.1.2 A final waste management summary report is	1 point
con	pleted after construction documenting the results of	
the	implementation of the preconstruction waste	
ma	nagement plan, including:	
	• The weight or volume of the total quantity of	
	construction and demolition waste:	
	The calculated construction waste per unit area for	
	the project (see 10.6.1.3 below):	
	 The weight or volume of the major categories of 	
	materials that were reused or recycled:	
	The rouge/requeling rate for each major category of	
	• The reuse/recycling rate for each major category of	
	• The overall rouse/recycling rate for the project:	
	A description of whother materials are managed	
	A description of whether indicates are managed through course congration or comingling:	
	Contract reprints and invalues used to track the	
	Copies of receipts and involces used to track the	
	progress of the waste management enort;	
	A statement that describes it a waste recycling	
	facility was used whether it was certified by a	
	government or non-government organization;	
	Ine organization and contact information of the	
	author of the waste management summary report	
	and the name and contact information of the	
	person(s) at the off-site recycling facility (or	
	facilities) responsible for data collection and	
	reporting.	
10.	5.1.3 Minimize construction waste, per unit area of new	Maximum = 8 points
bui	lding floor area, generated in new portions of buildings.	
		• Eight points are earned where waste is
Cor	struction waste includes that which is hauled from the	less than or equal to 1.2 lbs./ft ² (5.9
site	, whether diverted, landfilled, incinerated, or otherwise	kgf/m ²)of the new building floor area.
disp	posed of.	• Five points are earned where waste is
		1.2 lbs./ft ² (5.9 kgf/m ²) to 2.0 lbs./ft ²



Soil and land-clearing debris are not included in the calculations.	 (9.8 kgf/m²) of the new building floor area. Three points are earned where waste is 2.0 lbs. (ft²) to 2.5 lbs. (ft²)
	(12.2 kgf/m ²) of the new building floor
	area.
10.6.1.4 Construction waste, including building demolition	Maximum = 5 points
waste and packaging, is diverted from the landfill through	
recycling, reuse, repurposing, or composting.	Points are earned where a percentage of
	the total amount of construction waste is
The amount of construction waste that is used for waste-to-	diverted from landfill:
energy combustion is multiplied by 0.5 when counted as	• Four points are earned for 75% or
waste diverted from landfill. Waste-to-energy facilities have	greater.
a combustion efficiency rate of 60% or more.	 Three points are earned for ≥50% and
Soil and land-clearing debris and materials used as	<75%.
alternative daily cover at landfills are not included in these	 Two points are earned for ≥25% and
calculations.	<50%
	 One additional point is earned for
Calculations may be performed based on weight or volume,	facilities that have verified their
but the same basis is used throughout this credit. Where	annual average recycling rate from an
calculations are performed to convert waste from weight to	independent third party organization
volume or volume to weight, the source of these	No points are carried for loss than
conversions is stated	
	25%.

10.6.2 Post Occupancy Solid Waste Recycling		
10.6.2.1 The building design addresses recycling for	Maximum = 2 points	
solid waste using one or more of the following:		
 10.6.2.1.1: Capacity: Provide recycling collection capacity as follows: Multi-family: Minimum of 0.0625 CY per resident; or Office and Retail: Minimum of 0.035 CY per full time employee; or Schools: Minimum of 0.010 CY per student. 	 Two points are earned where two or more of the listed items are used to address recycling for solid waste. One point is earned where one of the listed items is used to address recycling for solid waste. 	
 student; 10.6.2.1.2: Interior Storage Requirements: 		
Building design addresses interior storage of		
recyclables in accordance with one or more of the		
following space layouts, as required to meet		
minimum capacity for scheduled collection and		
any security or safety needs:		
 In-cabinet or under-counter/work station 		
collection bins;		
 A minimum of one collection bin centrally 		
located on each floor;		
• A separate and secure collection area for a		
single material stream; AND/OR		





- 10.6.2.1.3: Exterior Storage Requirements: Building design addresses exterior recycling storage by providing adequate, accessible enclosures for recycling collection containers in size and number that meet minimum capacity requirements and the following:
 - Permanent, durable enclosures are sized to accommodate collection bins required for minimum recycling capacity;
 - Enclosures are screened on three sides; and
 - Enclosures are designed to accommodate minimum clearances for collection equipment.

10.6.3 Supply Chain Waste Minimization

10.6.3.1 Products used in the construction of the building are selected from manufacturers who have minimized or diverted waste during the production/manufacturing of the products. This criterion applies gate-to-gate – to all material inputs and outputs to a facility (or facilities) that produce/manufacture finished products. The diversion rate is calculated for the entire facility (or facilities) in which the products were produced/assembled/manufactured, and not just for an individual product line.

Assessment Guidance:

(1

The diversion rate is expressed as a percentage and calculated as follows:

Diversion Rate =

- [Mass Landfilled + Mass Incinerated without Energy Recovery] Mass Discarded Material

Waste materials generated from the recycling of an external waste stream as an incoming material should not be considered a "discarded material" and should not appear in either the denominator or numerator.

The Diversion Rate is multiplied by 1.5 for products that have been produced or manufactured in a facility that meets the following standards and certification programs:

- Business or facilities that have achieved Zero Waste certification from the US Zero Waste Business Council; or
- Have followed and certified to UL2799

Maximum = 4 points

- Four points are earned where ≥50%, by cost, of building products used come from facilities that divert over 80% of their waste.
- Three points are earned where ≥40% and <50%, by cost, of *building products* used come from facilities that divert over 80% of their waste.
- Two points are earned where ≥30% and <40%, by cost, of *building products* used come from facilities that divert over 80% of their waste.
- One point is earned where ≥20% and <30%, by cost, of *building products* used come from facilities that divert over 80% of their waste.





The	following methods are accepted as valid diversion from landfill:
•	Recycling;
•	Returning to supplier;
•	Reuse in same process;
•	Reuse in different process;
•	Processing and selling to third party;
•	Commercial composting; AND/OR
•	Waste-to-energy: the manufacturer removes, to the maximum practical extent, recyclable materials from the waste stream using common or front-end recycling methods before material is sent to the waste-to-energy operation. Final by-products of waste-to- energy processes are disposed of properly and, if sent to landfill, are included in the total mass discarded value. Facilities are compliant with applicable government emissions regulations and facility permits. The waste-to-energy process used is one of the following:
•	Bio-diesel or other biofuels:
•	Anaerobic digestion with energy recovery: or
•	Combustion with energy recovery where:
	 Combustion makes up less than 10% of the total waste by mass diverted; and
	 Combustion does not generate bottom ash or fly ash defined as hazardous by US CFR 261.24 (TCLP) or equivalent test for the jurisdiction of the incineration plant.
Info	ormational Reference(s):
•	UL 2799, 2012
•	Zero Waste Principles of the Zero Waste International Alliance (ZWIA), 2015

10.6.4 Recommended Documentation

- Construction documents;
- Manufacturer's specifications;
- Preconstruction waste management plan;
- Verification to ZWIA or UL 2799;
- Waste management report.

10.7 Resource Conservation (10 points)

10.7.1 Off-Site Fabrication for Construction Optimization	
10.7.1.1 The project incorporates building	Maximum = 4 points
elements that are produced by one or both of	
the following methods, alone or in	Points are earned where a percentage of the building
combination:	construction by cost, not including site work, is
	Modular Construction AND/OR Prefabrication:
Modular Construction	• Four points maximum are earned for a minimum
Prefabrication.	of 20%.



- Three points are earned for a minimum of 15%.
- Two points are earned for a minimum of 10%.
- One point is earned for a minimum of 5%.
- No points are earned for less than 5%.

10.7.2 Design for Deconstruction (DfD)	
10.7.2.1 The project teams document the application of design for <i>deconstruction</i> (DFD) principles in the design of the building and provides the Owner with a <i>Deconstruction</i> Plan that addresses both partial <i>deconstruction</i> (for <i>renovations</i>) and total deconstruction (for end of life removal) of the building to maximize the <i>reuse</i> and recycling of building components and materials.	6 points
Informational Reference(s):	
• CSA Z783-12 <i>Deconstruction</i> of Buildings and Their Related Parts	
• Design for Disassembly in the Built Environment, Brad Guy, Hamer Center, Penn State University (2008)	
• Design for <i>Deconstruction</i> : Principles of Design to Facilitate	
Reuse and Recycling, W. Addis, B. Happold, and J. Shouten,	
Construction Industry Research & Information Association	
(2004)	
• Design for <i>Deconstruction</i> , M. Pulaski, C. Hewitt, M/	
Horman, and B. Guy, Modern Steel, (June 2004)	

10.7.3 Recommended Documentation

- Construction documents;
- Deconstruction Plan;
- Design specifications.



11. INDOOR ENVIRONMENT (150 points)

11.1 Air Ventilation and Quality (35 points)

11.1.1 Ventilation Air Quantity	
11.1.1.1 The quantity of ventilation for the building is compliant with one of	9 points
the following:	
• ANSI/ASHRAE Standard 62.1-2013; Ventilation for Acceptable Indoor Air	
Quality;	
• The ICC International Mechanical Code (ICC IMC 2015);	
IAPMO UMC (2015): Uniform Mechanical Code;	
ANSI/ASHRAE/ASHE Standard 170-2013, Ventilation of Health Care	
Facilities; OR	
 Local codes or standards (if more stringent). 	
Informational Reference(s):	
ANSI/ASHRAE Standard 62.1-2013	
ANSI/ASHRAE/ASHE Standard 170-2013	
ICC 2015 International Mechanical Code: section 605	
IAPMO 2015Uniform Mechanical Code: Section 402	

11.1.2. Air Change Effectiveness				
11.1.2.1. The following strategies are implemented for ve	ntilation sy	stems 9 points		
when used:				
• For mechanical ventilation systems, the zone air distr	ibution effe	ectiveness		
E _z value is greater than or equal to 0.9 in all <i>regularly</i>	occupied sp	paces,		
excluding circulation and transitional spaces.				
• Natural ventilation systems are designed in accordance	ce with Sect	tion 6.4		
of ANSI/ASHRAE Standard 62.1- 2013, or are designed	d using prof	essionally		
accepted sophisticated analytical methods such as co	mputationa	al fluid		
dynamics.				
The E_z value is determined using Table 11.1.2.1.				
Table 11.1.2.1: Air Distribution Effective	ness			
Air Distribution Configuration	Ez			
Ceiling supply of cool air	1.0			
Ceiling supply of warm air and floor return	1.0			
Ceiling supply of warm air 15F or more above space 0.8				
temperature and ceiling return				
Ceiling supply of warm air less than 15F above space				
temperature and ceiling return provided that the 150				
fpm supply air jet reaches to within 4.5 ft. (1.37 m) of				
the floor level. Note: For lower velocity supply air, E _z =				
0.8				
Floor supply of cool air and ceiling return provided	1.0			





that th	e 150 fpm supply jet reaches 4.5 ft. (1.37 m) or		
more a	above the floor. Note: Most underfloor air		
distrib	ution systems comply with this provision.		
Floor s	upply of cool air and ceiling return, provided	1.2	
low-ve	locity displacement ventilation achieves		
unidire	ectional flow and thermal stratification.		
Floor s	upply of warm air and floor return.	1.0	(Continued from
Floor s	upply of warm air and ceiling return.	0.7	11.1.2.1)
Makeu	ip supply drawn in on the opposite side of the	0.8	
room f	rom the exhaust AND/OR return.		
Makeu	ip supply drawn in near to the exhaust AND/OR	0.5	
return	location.		
1.	"Cool air" is air cooler than space		
	temperature.		
2.	"Warm air" is air warmer than the space		
	temperature.		
3.	"Ceiling" includes any point above the		
	breathing zone.		
4.	"Floor" includes any point below the		
	breathing zone.		
5.	As an alternative to using the above values, E_{z}		
	may be regarded as equal to air change		
	effectiveness determined in accordance with		
	ANSI/ASHRAE 129-1997 (RA 02), Measuring		
	Air Change Effectiveness for all air distribution		
	configurations except unidirectional flow.		
Informa	tional Reference(s):		
 ANS 	M/ASHRAE Standard 62.1-2013. Section 6.2. Sectio	n 6.4.	

11.1.3 Air Handling Equipment				
11.1.3.1 Air handling equipment is equipped with	6 points or N/A			
filtration as follows:				
 Air handling equipment that provides ventilation air (e.g. central mixed air equipment, make-up air equipment, ventilation equipment for "compartmental" systems such as fan coils or unitary heat pumps): minimum MERV 13; and Terminal equipment that circulates room or zone air (e.g. fan coils, unitary heat pumps): minimum MERV 8. 	 Not applicable where non-ducted circulating unitary equipment serves only a single zone (e.g. unit heaters, force-flows). 			
11.1.3.2 Interior liners that could harbor microbial	5 points or N/A			
growth AND/OR erode in the air stream are not				
utilized in any outdoor air, return air, and supply	 Not applicable where a building does not have 			
air ductwork, or any fan, coil, terminal, or other	ductwork with radiant systems and operable			
devices exposed to the airstream.	windows.			



11.1.4 CO ₂ Sensing and Ventilation Control Equipment			
11.1.4.1 Densely occupied rooms (25 or more people per 1,000 ft.² (92.9 m²)) with variable6 points or N/A			
occupancy (e.g. meeting rooms, assembly areas) • Not applicable where there are no densely			
have CO ₂ sensing and ventilation control	occupied spaces with variable occupancy.		
equipment.			
11.1.5 Recommended Documentation			
Air-handling equipment submittals;			
• Balancing reports for the ventilation systems;			
Construction documents and specifications;			
Design drawings;			
Engineering drawings and specifications for ductwork;			
Filter submittals;			
HVAC drawings and specifications;			
List of regularly occupied zones and associated air distribution system;			
Local ventilation codes or standards;			
 Occupant density calculation; 			
• Specifications for ventilation systems, CO ₂ sensing and ventilation control equipment;			
 Ventilation air quality design data; 			

• Ventilation schedule and tables.

11.2 Source Control and Measurement of Indoor Pollutants (35 points)

11.2.1 Volatile Organic C	ompounds		
11.2.1.1 Adhesives and s	Maximum = 3 points		
applied on site within, or	part of, the building envelope's c	ontinuous plane	
of air tightness_comply w	ith VOC content limits for 90% of	products by	Two points are
volume AND/OR VOC em	issions criteria for 70% of product	ts by volume.	earned where 70% of
			products by volume
Table 11.	2.1.1: Adhesives and Sealants VO	Cs	comply with VOC
Product Area	Product Sub-area	VOC	emissions criteria.
		Content	 One point is earned
		Limit ¹ 1	where 90% of
		point	products by volume
Adhesives –	Indoor Carpet	50 g/L	comply with VOC
Architectural	Carpet Pad	50 g/L	content limits.
Applications	Outdoor Carpet	150 g/L	
	Wood Flooring	100 g/L	
	Rubber Flooring	60 g/L	
	Subfloor	50 g/L	
	Ceramic Tile	65 g/L	
	VCT / Asphalt Tile	50 g/L	
	Dry Wall and Panel	50 g/L	
	Cove Base	50 g/L	
	Multipurpose Construction	70 g/L	





		Structural Glazing	100 g/L	
		Single Ply Roof Membrane	250 g/L	
	Adhesives –	Metal to Metal	30 g/L	
	Substrates	Plastic Foams	50 g/L	
		Porous Material (except	50 g/L	
		wood)		
		Wood	30 g/L	
		Fiberglass	80 g/L	
	Adhesives – Specialty	PVC Welding	510 g/L	
		CPVC Welding	490 g/L	
		ABS Welding	325 g/L	
		Plastic Cement Welding	250 g/L	
		Adhesive Primer for Plastic	550 g/L	
		Contact Adhesive	80 g/L	
		Special Purpose Contact	250 g/L	(Continued from Table
		Adhesive		11.2.1.1 Adhesives and
	Sealants	Architectural	250 g/L	Sealants VOCS)
		Non-membrane Roof	300 g/L	
		Single Ply Roof Membrane	450 g/L	
	Sealant Primers	Architectural		
		Non porous	250 g/L	
		Porous	775 g/L	
	1. The VOC content m	ust conform to the VOC limits in	the South	
	Coast Air Quality M			
(January 7, 2005). VOC limits are expressed as grams of VOC per				
liter of adhesive or sealant less water and less exempt				
	compounds, with n			
	dichloride, methyle	ene chloride, perchloroethylene,	and	
	tricnioroetnyiene a	ccording to SCAQIVID Rule 1168.	For low-solid	
	of material SCAON	AD Bulo 1168	grams per inter	
ļ				
	Assessment Guidance:			
ĺ	Provide documentation i	ndicating compliance with the V	OC content	
	requirements. Such docu	mentation includes manufacture	er declarations or a	
,	certification by a third pa	inty testing organization includin	g, but not limited	
	to, one of the following:		B) 2010 1100 1111000	
	 UL EcoLogo – UL Envi 	ironment		
	o UL 2762 Sust	ainability for Adhesives, 2011		
• Green Seal GS-36 Adhesives for Commercial Use (July 12, 2013)				
/	OC emissions results are	determined by either the Califor	rnia Department of	
Public Health's Standard Method for the Testing and Evaluation of Volatile				
	Organic Chemical Emissic	ons from Indoor Sources Using Er	vironmental	
	Chambers, Version 1.1, Fe	ebruary 2010; or		
L	JL 2821 GREENGUARD Certification Program Method for Measuring and			









	Floor Coatings	100g/L	
	Graphic Arts (sign) Coatings	500 g/L	
	High-temperature Coatings	420 g/L	
	Industrial	250 g/L	
	Maintenance Coatings	120 g/L	
	Low Solids Coatings	100 g/L	
	Mastic Texture Coatings	500 g/L	
	Metallic Pigmented Coatings	250 g/L	
	Multi-color Coatings	420 g/L	
	Pretreatment Wash Primers	100g/L	
	Primers, Sealers, and	350 g/L	
	Undercoaters		
	Reactive Penetrating Sealers	250 g/L	
	Recycled Coatings	250 g/L	
	Rust Preventative Coatings	730 g/L	
	Shellacs: Clear Opaque	550 g/L	
	Specialty Primers, Sealers,	100g/L	
	Undercoaters		
	Stains	250 g/L	
	Stone Consolidants	450 g/L	
	Swimming Pool Coatings	340 g/L	
	Tub and Tile Refinish Coatings	420 g/L	
	Waterproofing Membranes	250 g/L	
	Wood Coatings	275 g/L	
	Wood Preservatives	350 g/L	
	Zinc-rich Primers	340 g/L	
1. The VOC content	t conforms to the <i>California Air Re</i>	esources Board	
Suggested Contro	ol Measure for Architectural Coat	ings, February	
<i>1, 2008</i> (CARB 20	007 SCM) VOC limits. VOC limits a	re expressed as	
grams of VOC pe	r liter less water and less exempt	compounds,	
with no exceptio	n for methylene chloride and		
perchloroethyler	16.		
Assessment Guidance: Provide documentation requirements. Such do certification by a third	n indicating compliance with the N cumentation includes manufactur party testing organization includir	VOC content rer declarations or ng, but not limited	ra 1
Ul Ecologo	3.		
 UL ECOLOgO UL 2760 Sustainab 	ility for Surface Coatings: Pecycle	d Water-borne	
2011	inty for surface coatings. Recycled	u water-borne,	
UI 2768 Standard	for Sustainability for Architectura	Surface Coatings	
2011 Green Seal			,
- Environme 2013)	ntal Standard for Paints and Coat	tings, GS-11 (July 12	2,
VOC emissions results	are determined by the California	Department of	





Public Health's Standard Method for the	ne Testing and Evaluation of Volat	tile	
Organic Chemical Emissions from Indo			
Chambers, Version 1.1, February 2010			
UL 2821 GREENGUARD Certification Pr	ogram Method for Measuring and	d	
Evaluating Chemical Emissions from Bu	uilding Materials, Finishes and		
Furnishings, 2013.			
Provide documentation indicating com	pliance with the VOC emission		
requirements as stated in the Standard	d Private Office Scenario in CDPH		
Standard Method V1.1 Tables 4.4 and	4.5 and are compared to the		
maximum allowable concentrations in	CDPH Standard Method V1.1, Tal	ble	
4.1 does not exceed the maximum allo	wable concentrations or a		
certification by a certification body acc	credited to ISO/IEC 17065:2012 ar	nd	
with relevant certification program in	the scope of its accreditation.		
Certification programs include but not	limited to, one of the following:		
UL GREENGUARD Gold- UL Enviro	nment		
- UL 2818 GREENGUARD Ce	rtification Program for Chemical		
Emissions for Building Mat	erials, Finishes and Furnishings, 2	013	
 Indoor Advantage Gold [™] –SCS Glophics 	obal Services.		
Informational Reference(s):			
California Air Resources Board Sug	gested Control Measure for		
Architectural Coatings (February 1,	, 2008).		
UL 2760 Sustainability for Surface			
2011 (http://www.comm-			
2000.com/ProductDetail.aspx?Uni	queKey=23429) (last accessed		
7/14/17)			
UL 2768 Standard for Sustainability	y for Architectural Surface Coating	gs,	
2011 (<u>http://www.comm-</u>			
2000.com/ProductDetail.aspx?Uni	<u>queKey=23608</u>) (last accessed		
7/14/17)			
 UL 2821 GREENGUARD Certification 	g		
and Evaluating Chemical Emissions			
Furnishings, 2013 (http://www.cor			
2000.com/ProductDetail.aspx?Uni			
7/14/17)	and the second		Manimum 7 and the
11.2.1.3 Interior products will comply	with prescribed limits of product		iviaximum: 7 points
emissions AND/OR be certified.			Deinte are correct when
"Cortified" means compliance with any of the cortifications listed in Table			Points are earned when
"Certified" means compliance with any of the certifications listed in Table			50% by area of products
11.2.1.3: Interior Product VOC Emission.			in the following
Table 11.2.1.3: Interior Product VOC Emissions			VOC omissions critorio
Product Area VOC Emissions Criteria ¹			up to a maximum of 7
11 2 1 3 1. Floors / Floor Coverings	To determine accentability of		points:
(including carneting resilient other	the emission results VOC		
non-carnet flooring and	huilding concentrations are		Three points are
non-carper nooning, and	summing concentrations are		



nadding/cushion) ¹	estimated for the Standard		earned where
11 2 1 3 2: Acoustical and Thermal	Private Office Scenario in		floors/floor coverings
Insulation	CDPH Standard Method V1 1		comply with VOC
11 2 1 2 2: Coiling Systems	Tables 4.4 and 4.5 and are		emissions criteria.
(including acoustical ceiling and	compared to the maximum	•	Three Points are
gynsum board)	allowable concentrations in		earned where ceiling
11 2 1 2 4: Wall Systems (including	CDPH Standard Method V1.1.		systems comply with
wall coverings gynsum board and	Table 4.1. Modeled		VOC emissions
window shading devices) ¹	concentrations do not exceed		criteria.
	the maximum allowable	•	One point is earned
	concentrations. Additionally,		where acoustical and
	floors/floor coverings, ceiling		thermal insulation
	systems and wall systems		comply with VOC
	categories made with		emissions criteria.
	nonstructural composite	•	One point is earned
	wood and composite wood		where wall systems
	cores (particleboard, MDF,		comply with VOC
	and hardwood plywood) are		emissions criteria.
	compliant with the California		
	Air Resources Board Airborne		
	Toxic Control Measure		
	(CARB/ATCM(to control		
	formaldehyde emissions from		
	composite wood (Sections		
	93120-93120.12, litle 17,		
	California Code of		
	Regulations).		
Concrete, concrete masonry, cla	y brick, stone, glass and glass		
additional coating (coalors are do	wall systems without		
testing.	emed to comply without		
VOC emissions are determined b	v a third-party laboratory that is		
accredited to ISO/IEC 17025 with	the specified test method		
listed in the scope of its accredita	ation. VOC emissions results are		
determined by California Departi	ment of Public Health (CDPH)		
"Standard Method for the Testing	g and Evaluation of Volatile		
Organic Chemical Emissions from	Indoor Sources Using		
Environmental Chambers," V 1.1,	2010, Standard Private Office		
Scenario. Alternatively, VOC emis	ssion results are determined by		
UL 2821 "GREENGUARD Certifica	tion Program Method for		
Measuring and Evaluating Chemi	ical Emissions from Building		
Materials, Finishes and Furnishin	gs," March 2013, Table 2 Office		
Model and Section 34.1 Allowabl	e Limits for GREENGUARD		
Certification Gold.			
Assessment Guidance:			

© Green Building Initiative, Inc. (ww.thegbi.org). For personal use only. Additional reproduction, distribution or transmission in either print or digital form is not permitted without Green Building Initiative's prior written permission.

Provide documentation indicating compliance with the VOC emission





 requirements or a certification including, but not limited to, FloorScore (Resilient Floor Or Core (Res	(Continued from Table 11.2.1.3 Interior Product VOC Emissions)	
 CRI Green Label 	Plus – Carpet-and Rug Institute: CRI Green La	bel
Plus Carpet Prog	ram Test Criteria: http://www.carpet-	
rug.org/carpet-c	ushion-and-adhesive.html (last accessed	
//14/1/)		
For products containing com	posite wood, provide copies of product label	s,
chain-of-custody records, or	documentation demonstrating compliance	
with the CARB/ATCM formal	dehyde regulation.	
11.2.1.4 Furniture, casework	, cabinets, workstations, and seating all complexity of the second seating all complexity of the second s	oly Maximum = 3 points
with prescribed limits of VOC	emissions AND/OR are_certified.	One point is earned
Note: certified means compl	ance with any of the certifications listed per	when 100% by cost
Table 11.2.1.4: Furniture and	Furnishings VOC Emissions.	of installed furniture
Table 11 2 1 4. Fur	siture and Furnishings VOC Emissions	products comply with
Product Area	VOC Emissions Criteria ¹	ANSI/BIFMA 63
Furniture and Eurnishings	To determine accentability of the	One point is earned
(including case work	emission results. VOC product emission	when 90% by cost of
cabinetry, work stations,	concentrations are estimated per testing	installed furniture
and seating)	procedures from ANSI/BIFMA e3-2014,	products comply with
	7.6.1, 7.6.2, and 7.6.3. The maximum	ANSI/BIFMA e3
	allowable concentrations are not	Section 7.6.2.
	exceeded per each sections	One point is earned when 70% by east of
VOC amissions are date	requirements.	installed furniture
accredited to ISO/IEC 1	products comply with	
listed in the scope of its	ANSI/BIFMA e3	
determined by ANSI/BI	Section 7.6.3.	
Method for Determining		
Systems, Components a		
results may be determi		
Certification Program N		
Furnishings " 2012 Tahl		
Allowable Limits for GR	EENGUARD Gold Certification.	





Assessment Guidance:

Provide documentation indicating compliance with the VOC emission requirements or a certification by a third party testing organization including, but not limited to, one of the following:

- GREENGUARD Gold UL Environment 7.6.1, 7.6.2, and 7.6.3
 - UL 2818, GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes and Furnishings, 2013.
- MAS Certified Green Furniture per ANSI/BIFMA M7.1-2011(R2016)
- SCS Indoor Advantage per ANSI/BIFMA M7.1-2011(R2016)

11.2.2 Pre-Occupancy Indoor Air Quality Testing

Two paths are available for assessing 11.2.2.

- Path A: Indoor Air Quality (IAQ) Pre-Occupancy Testing: 6 points
 OR
- Path B: Total Volatile Organic Compounds (TVOC): 3 points

Points cannot be combined between paths. Select one of the paths below.

	6 points
11.2.2.1.1 To determine that the indoor air quality is acceptable upon <i>Substantial Completion</i> but prior to occupancy, the buildings indoor environments are tested using the U.S. EPA's Compendium of Methods for the Determination of Toxic Organic Pollutants in Ambient Air, TO-1, TO-11, TO-17, and ASTM D 5197-09e1 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology). The testing takes place after construction ends and prior to occupancy.	
 The test protocols are in accordance with the following: The VOC and Particulate Matter sampling and averaging times and measurement methods achieve the detection limits of the contaminant levels listed in Table 11.2.2.1.1 below; HVAC systems are operated at the minimum design outdoor air ventilation rate during testing; Air sampling and monitoring are at a height of 3-6 ft. (91-183 cm) from the floor and at least 3 ft. (0.9 m) away from walls and ventilation supply; The test protocols are documented to show that appropriate sampling methods and times were used; and The number of sampling locations are as follows for each portion of the building served by a separate ventilation system: At Least one per contiguous floor; and At Least one per 10,000 ft.² (929 m²) of floor area. 	

GBI INITIATIVE



strength with the least ventilation.

Table 11.2.2.1.1: Maximum level of contaminants:

Contaminant	Maximum Concentration
	µg/m3 (Unless Otherwise
	Noted)
Apatoldahuda	4.401
Acetaldenyde	1401
Acryionitrile	51
Benzene	60 ¹
1,3-Butadiene	201
t-Butyl metnyl ether (Methyl-t-butyl	000001
Carbon disulfide	<u>80000</u>
	800-
	1001
	401
Chlorobenzene	
	3001
1,4-Dichlorobenzene	8001
Dichloromethane (Methylene chloride)	4001
1,4-Dioxane	3000 ¹
Ethylbenzene	20001
Ethylene glycol	4001
Formaldehyde	33 ²
2-Ethylhexanoic acid	25 ²
n-Hexane	7000 ¹
1-Methyl-2-pyrrolidinone	160 ²
Naphthalene	91
Nonanal	13 ²
Octanal	7.22
Phenol	2001
4-Phenylcyclohexene (4-PCH)	2.5 ²
2-Propanol (Isopropanol)	7000 ¹
Styrene	9001
Tetrachloroethene	
(Tetrachloroethylene,	
Perchloroethylene)	351
Toluene	300 ¹
1,1,1-Trichloroethane (Methyl	
chloroform)	10001
Trichloroethene (Trichloroethylene)	600 ¹
Xylene isomers	700 ¹
Particulate (PM _{2.5})	35 (24-hr)





Particulates (PM ₁₀)	150 (24-hr)		
¹ Chronic RELS developed by the California			
Health Hazard Assessment			
² ANSI/ASHRAE/USGBC/IES Standard 189.1			
For any area that fails to meet the requirem	nents, the individual chemical(s)		
in the highest concentrations that are leadi	ng to failure are to be reviewed		
and the problem remedied.			
DR			
11.2.2.2 Path B: Total Volatile Organic Con	npounds (TVOC)		
11.2.2.2.1 Upon Substantial Completion, bu	It prior to occupancy, conduct a	3 points	
TVOC indoor air sampling and laboratory ar	nalysis of collected samples as		
follows:		Three points are	
		earned where the	
Sampling for TVOCs is conducted over a min	nimum four-hour period. All	test is conducted.	
measurements are completed prior to occu	pancy, but during normal occupied	There is no	
hours, with the building ventilation starting	at the normal daily start time and	pass/fail criteria for	
operated at the minimum outside air flow r	ate for the occupied mode	conducting this	
throughout the duration of the testing.		test.	
Construction of the Collection			
samples are taken using one of the following collection media:			
Thermal desorption tubes.			
Canisters.			
Laboratory analysis is conducted in accorda	ince with the following:		
• VUC Range (Carbon): C6 – C16.			
Reference Compound: Toluene.			
All interior <i>finishes</i> are in place at the time	All interior finiches are in place at the time of testing. Non-fixed furnishings		
such as workstations and partitions are end			
installed at the time of testing:			
Samples are collected for each portion of the	ne building served by a separate air		
handling system. In each area served by a s	ingle air handler, samples are		
collected for each 25,000 ft. 2 (2,323 m ²) of			
floor space, whichever is larger. Samples in			
least ventilation, and the strongest presum			
Samples are collected at 3-6 ft. (91-183 cm)			

11.2.3 Carbon Monoxide Monitoring	
11.2.3.1 Carbon monoxide monitoring devices and alarms are installed in enclosed areas where there are sources of combustion (i.e. stoves, ovens, grills, clothes dryers, furnaces, boilers, water heaters, heaters and fireplaces).	 1 point or N/A Not applicable where there are no areas with combustion sources.
Informational References:	
 NFPA 720 2015, CSA 6.19, UL 2034 or similar standard for detector 	



11.2.4 Legionellosis Mitigation in the Building Water Systems	
11.2.4.1 The building water systems conform with ASHRAE 188-2015,	3 points
Legionellosis: Risk Management for Building Water Systems.	
Informational Reference(s):	
ANSI/ASHRAE Standard 188-2015, Legionellosis: Risk Management for	
Building Water Systems	

11.2.5 Pest and Contamination Control	
11.2.5.1 The following <i>integrated pest management</i> strategies are used:	1 point
• Outdoor air inlets have insect screens of 18x14 mesh for plenum systems	
feeding multiple air handlers;	
Structural and mechanical openings are fitted with permanent	
protection (e.g. screens, sealants, etc.);	
• Advertising signs and other <i>assemblies</i> affixed to the building façade are	
designed and constructed in a way that reduces bird habitation, and	
penetrations in the façade are sealed to prevent entry; and	
• Mullions and ledges are less than 1 in. (2.5 cm) deep to discourage bird	
roosting.	
11.2.5.2 The building has a sealed storage area for food/kitchen solid waste	1 point
and recycling.	

11.2.6 Other Indoor Pollutants (Tobacco, Radon)	
11.2.6.1 An occupancy policy prohibits smoking. Signage is posted at every building entrance prohibiting smoking and the use of electronic cigarettes within 25 ft. (7.6 m) of the building.	1 point
Smoking is defined as the inhalation of smoke of burning tobacco, use of electronic-cigarettes or other substances encased in items such as (but not limited to) cigarettes, pipes, and cigars for recreational or medical use.	
11.2.6.2 The following measures are taken to address radon:	Maximum = 3 points or N/A
 11.2.6.2.1: A site-specified assessment of radon potential is conducted; AND 11.2.6.2.2: Radon prevention and mitigation measures are implemented as indicated by the assessment. Informational Reference(s) U.S. EPA document Radon Prevention in the Design and Construction of Schools and Other Large Buildings (EPA 625-R-92-016, June 1994). 	 Two points are earned where radon potential is assessed. One point is earned where prevention and mitigation measures are implemented as indicated by the radon potential assessment Not applicable if no
	measures are indicated.
11.2.6.3 Spaces housing <i>specialized activities</i> that generate hazardous	2 points or N/A



pol	lutants are:		
•	provided with separate ventilation AND/OR exhaust systems capable of maintaining the space at a negative pressure of at least 5.0 Pascals (0.02 in. water gauge) on average relative to adjacent spaces (with doors closed) to prevent the spread of air-borne contaminants to other spaces; physically isolated by doors and deck-to-deck partitions or hard lid ceilings	•	Not applicable where there are no spaces housing <i>specialized activities</i> .
1	C C		

11.3 Lighting Design and Systems (35 points)

11.3.1 Daylighting and Views	
11.3.1.1 Regularly occupied floor area achieves a	Maximum = 5 points
minimum daylight factor (DF) of at least 2 (excluding	
all direct sunlight penetration).	• Five points are earned where ≥75% of the
	floor area achieves a DF of 3 or more.
Assessment Guidance:	• Four points are earned where ≥50 and
Estimate the DF for a daylit space that has vertical	<75% of the floor area achieves a DF of 3
windows using the following formula:	or more.
	• Three points are earned where ≥25 and
DF = 0.1 x PG , where:	<50% of the floor area achieves a DF or 3
DF = daylight factor	or more.
PG = percentage of glass to floor area (area of the	• Two points are earned where ≥75% of the
windows/floor area)	floor area achieves a DF of 2 to <3.
	• One point is earned where ≥50 and <75%
Informational Reference(s):	of the floor area achieves a DF of 2 to <3.
 International Commission on Illumination: 	
www.cie.co.at (last accessed 3/16/18)	
 RADIANCE software (for evaluation) Validated 	
Lighting Simulation Tool: <u>www.radiance-online.org</u>	
(last accessed 3/16/18)	
Whole Building Design Guide (WBDG):	
Sustainability of Building Envelope, 2016:	
www.wbdg.org/resources/sustainability-building-	
<u>envelope</u> (last accessed 3/16/18)	
ASHRAE Advanced Energy Design Guides:	
https://www.ashrae.org/technical-	
<u>resources/aedgs</u> (last accessed 3/16/18)	
 Architectural Lighting Magazine –Benefits of 	
Natural Light:	
http://www.archlighting.com/technology/the-	
<u>benefits-of-natural-light_o</u> (last accessed 3/16/18)	
 Daylighting – <u>https://energy.gov</u>: 	
https://www.energy.gov/search/site/daylighti	
ng (last accessed 7/14/17 and 3/16/18,	
respectively)	
 New Building Institute –Advanced Buildings[®] 	
Daylighting pattern guide:	



http://patternguide.advancedbuildings.net/patter	
<u>ns</u> (last accessed 6/20/17)	
11.3.1.2 Regularly occupied task areas are designed to	Maximum = 3 points
(7.6 m) from a window	• Three points are carped where 200% of
	 Three points are earned where 250% of occupied space has clear views
	 Two points are earned where >60% and
	<9% of occupied space has <i>clear views</i> .
	• One point is earned where ≥40% and
	<60% of occupied space has <i>clear views</i> .
	• No points are earned where <40% of
	occupied space has clear views.
11.3.1.3 Southern, western, and eastern exposures	Maximum = 2 points
have the following shading devices:	
	• Two points are earned where there are
• 11.3.1.3.1: Active automated shading devices (e.g.	active automated shading devices for the
automated widow shades or electrochromic	specified exposures.
glazing) that automatically adjust based on sky	 One point is earned where there are
 11 2 1 2 2: Passive shading devices (e.g. manual) 	passive shading devices for the specified
window shades or permanent projections such as	 No points are earned if there are no
overhanas).	shading devices.
11.3.1.4 Davlit areas (with a <i>Davlight Factor</i> of at least	Maximum = 2 points
2) use photo-sensors to maintain consistent lighting	
levels throughout the day using both <i>daylighting</i> and	• Two points are earned where >75% of
electric lighting.	daylit areas use photo-sensors.
	• One point is earned where ≥50% and
	≤75% of daylit areas use photo-sensors.
	• No points are earned if <50% of daylit
	areas use photo sensors.

11.3.2 Lighting Design Quantity	
11.3.2.1 <i>Regularly occupied spaces</i> meet the Recommended Illuminance for the Locations/Tasks in Table 11.3.2.1-A and Table	Maximum = 5 points
11.3.2.1-В.	 Five points are earned where >90% of occupied
"Recommended vertical and horizontal illuminance targets" are	floor area meets the IES
found in the IES Lighting Handbook, 10 th Edition, Table 22.2 and	Illuminance
Applications Sections 21-37 OR Table 11.3.2.1-A: IES Illuminance	recommendations.
Categories and Table 11.3.2.1-B: IES Task/Location Categories.	Four points are earned
Lighting levels may be increased or decreased by 10% (max.) based	where ≥70% and < 90% of
on Occupant Age, Visual Performance Requirements, or other	occupied floor area meets
weighting factors as detailed in the IES Lighting Handbook, 10 th	the IES Illuminance
Edition Table 4.1, the following weighting factors:	recommendations
	 Two points are earned
	where ≥50% and <70% of
Table 11.3.2.1–A: IES Illuminance Categories	occupied floor area meets



Illuminance Category	Description	Recommended Illuminance (lux/footcandles)
A	Public Spaces	30 / 3
В	Simple orientation for short visits	50 / 5
с	Working spaces where simple visual tasks are performed	100 / 10
D	Performance of visual tasks of high contrast and large size	300 / 30
E	Performance of visual tasks of high contrast and small size or visual tasks of low contrast and large size	500 / 50
F	Performance of visual tasks of low contrast and small size	1,000 / 100
G	Performance of visual tasks near threshold	3,000-10,000 / 300- 1,000

the IES Illuminance recommendations.

 No points are earned where <50% of occupied floor area meets the IES Illuminance recommendations.

(Continued from Table 11.3.2.1-B: IES Location/Task Categories)

Table	11.3.2.	1–B: IE	S Locat	ion/Tas	sk Categories

	rusk categories	
Interior Location /Task	Horizontal	Vertical
	Category	Category
Auditoriums – Assembly	С	-
CAD drafting stations	С	A
Conference Rooms –		D
Meeting	D	D
Conference Rooms – Video	F	
Conference		
Hospital patient rooms –	D	
general	D	A
Hospital nursing stations –		D D
general		D
Hospital lobby	В	A
Hospital anesthetizing	F	C
locations	L	
Hospital general critical	R	
care	D	А
Hotel guest rooms – general	С	-
Hotel lobby general lighting	С	-
Library reading stacks	D	-
Museum exhibit cases	D	В





Open Office – Intensive VDT	D	В	
Open Office – Intermittent VDT	E	В	
Office lobby	С	A	
Office copy room	С	А	
Stairways and corridors	В	-	
Toilets and washrooms	В	А	
Informational Reference: • IESNA Lighting Handbook, 2 11.2.2.2 Luminance ratios do p	10 th Edition, 2011		2 points or N/A
for tasks:		iwing as per iesina	
 3:1 between the task and adjacent surroundings; 10:1 between the task and remote (non-adjacent) surfaces; and 20:1 between the brightest and darkest surface in the field of view; or 8:1 between rows of <i>luminaires</i> where there is indirect lighting and where ceiling luminance exceeds 124.1 fL (425 cd/m2). 			 Not applicable where spaces are designed such that source/task eye geometry do not require IESNA Standard VDT compliant <i>luminaires</i>.
 11.3.2.3 The average luminance for given <i>luminaire</i> angles when 248.1 fl (850 cd/m²) at 65° 	e does not exceed re there is <i>direct lig</i>	the following values ghting:	 2 points or N/A Not applicable where spaces are designed such
 248.11E (850 cd/m²) at 05 momente vertical; 102.2 fL (350 cd/m²) at 75° from the vertical; or 51.1 fL (175 cd/m²) at 85° from the vertical. 			that source/task eye geometry do not require IESNA Standard VDT compliant <i>luminaires</i> .

11.3.3 Lighting Design Quality	
11.3.3.1 <i>Regularly occupied spaces</i> use electric light sources with a minimum Color Rendering Index (CRI) of 80.	1 point
11.3.3.2 <i>Regularly occupied spaces</i> use electric light sources with a Correlated Color Temperature (CCT) between 2700°K and	1 point or N/A
4500°K.	 Not applicable to specialty retail, medical, or exterior
	environments.
11.3.3.3 Regularly occupied spaces use no more than 50% direct	2 points
only general lighting. Direct only general lighting limits Direct	
Glare to no more than 50° above horizontal; Direct Glare	
includes direct view of the light source and luminances over	
2,335 fL (8,000 cd/m²).	
11.3.3.4 Individual control of primary workspace lighting is	Maximum = 2 points
provided for at least 90% of occupants.	
	 Two points are earned for
"Control" may either be dimming from 100% to at least 10% or	continuous dimming of at least



stepped dimming with at least three (3) steps: 100%, 50% and 0%.	•	10% to 100%. One point is earned for stepped dimming or switching with at least three steps (100%, 50%, 0%).

11.3.4 Lighting Sustainability	
11.3.4.1 A minimum of 75% of electric light sources have a	2 points
Lumen Maintenance factor of 35,000 hours to L70 or greater	
(the output of the lights have lost no more than 30% of their	
initial output at 35,000 hours). 35,000 hours is based on at	
least 1 hour of operation per start.	
11.3.4.2 All <i>luminaires</i> are RoHS compliant with EU Directive	2 points
2011/65/EU of the European Parliament. RoHS specifies	
maximum levels for the following six restricted materials:	
 Lead (Pb): < 1000 ppm; 	
 Mercury (Hg): < 100 ppm; 	
• Cadmium (Cd): < 100 ppm;	
• Hexavalent Chromium: (Cr VI) < 1000 ppm;	
 Polybrominated Biphenyls (PBB): < 1000 ppm; and 	
• Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm.	
Certification is provided by the <i>luminaire</i> manufacturer.	
11.3.4.3 A maintenance and operations plan is documented	1 point
and supplied to the building owners, management, and	
maintenance. The maintenance plan includes the following:	
Reflected ceiling plan;	
• Lighting fixture schedule (<i>luminaire</i> catalog numbers,	
manufacturer, lamp, wattage, beam spread, color	
temperature, and color rendering index);	
 Initial measured footcandle levels in each space; 	
Cleaning instructions and cleaning schedule; and	
• Lighting sequence of operations for each space (e.g. what	
the lights are supposed to do when someone enters the	
room, what are the light levels they can choose, what	
controls are in each space).	

11.3.5 Recommended Documentation

- Construction documents;
- Lighting plans;
- Maintenance, cleaning, and recycling plan;
- Manufacturer's specifications, cut sheets, and performance documentation;
- Percentages and calculations for occupied areas with daylight illumination levels;
- Percentage and calculations for views to building exterior or atria;
- Percentages and calculations for *primary occupied spaces* with IESNA recommended *task lighting* levels;
- Specifications for solar shading devices and luminaries.
ANSI/GBI 01-2019 GREEN GLOBES® ASSESSMENT PROTOCOL FOR COMMERCIAL BUILDINGS



11.4 Thermal Comfort (25 points)

11	4	.1	T	her	mal	Contro	ol Z	o	nes	
	-			_						

11.4.1.1 One or more of the listed thermal zoning strategies is used for continuously occupied areas:

- 11.4.1.1: Office Occupancies/Areas: Includes offices and conference rooms, among others. For open areas, thermal control zones are designed to be between 500 ft² (46.5 m²) and 1000 ft² (92.9 m²) for open areas. For single rooms, thermal control zones are designed to be between 750 ft² (69.7 m²) and 1200 ft² (111.5 m²) Circulation and support areas are excluded.
- 11.4.1.1.2: Educational Occupancies/Areas: Includes classrooms, teaching labs, etc. Classrooms AND/OR teaching labs are designed thermal control zones under 1500 ft.² (139.4 m²).
- 11.4.1.1.3: Healthcare Occupancies/Areas: Includes patient wards, diagnostic and treatment areas. Thermal control zones are designed to be between 500 ft.² (46.5m²) and 1000 ft.² (92.9m²).
- 11.4.1.1.4: Open-Area Mercantile and Assembly Occupancies/Areas: Includes retail, food service, convention halls, etc. For spaces exceeding 464.5 m² (5000 ft. ²) thermal control zones are designed to be less than 2500 ft.² (232.3 m²). For spaces between 2500 ft.² (232.3 m²) and 5000 ft.² (464.5 m²) thermal control zones are designed to be less than 1500 ft.² (139.4 m²).

For multiple occupancy types, score each occupancy area and prorate score by floor area (rounding upward to nearest integer to the maximum available total points). Maximum = 14 points or N/A

- Office Occupancies/Areas
 - Fourteen points are earned where thermal control zones are designed to be less than 500 ft.² (46.5 m²) for open areas or 750 ft² (69.7 m²) for a single room.
 - Ten points are earned where thermal control zones are designed to be less than 1000 ft² (92.9 m²) for open areas or 1200 ft² (111.5 m²) for single rooms.
 - Not applicable where there are no office occupancies/areas.
- Educational Occupancies/Areas:
 - Fourteen points are earned where classrooms AND/OR teaching labs are designed thermal control zones under 1500 ft.² (139.4 m²).
 - Not applicable where there are no educational occupancies/areas.
 - Healthcare Occupancies/Areas:
 - Fourteen points are earned where thermal control zones are designed to be less than 500 ft.² (46.5 m²).
 - Ten points are earned where thermal control zones are designed to be less than 1000 ft.² (92.9 m²).
 - Not applicable where there are no healthcare occupancies/areas.
 - Open-Area Mercantile and Assembly Occupancies/Areas:
 - Fourteen points are earned where thermal control zones in spaces between 2500 ft.² (232.3 m²) and 5000 ft.² (464.5 m²) are designed to be less than 1500 ft.² (139.4 m²).
 - Ten points are earned where thermal control zones in spaces exceeding 5000 ft.² (464.5 m²) are designed to be less than 2500 ft.² (232.3 m²).
 - Not applicable where there are no openarea mercantile and assembly occupancies/areas.
 - Not applicable for other occupancies/areas.



11.4.2 Thermal Comfort Design	
11.4.2.1 The HVAC systems and building are designed to provide a thermal environment in conformance with <i>ANSI/ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.</i> Exceedance hours for <i>regularly occupied spaces</i> do not exceed 300 hours per year.	 9 points or N/A Not applicable where the occupancy is outside the purview of 55-2013.

11.4.3 Recommended Documentation

- Basis of Design document AND/OR specifications;
- Construction documents;
- Documentation demonstrating compliance with ANSI/ASHRAE Standard 55- 2013, including relevant worksheets and report;
- Manufacturer's specifications, cut sheets, and performance documentation;
- Project specifications;
- Zone plan.

11.5 Acoustic Comfort (20 points)

11.5.1 Airborne Noise Isolation	
11.5.1.1 The building design includes at least one	Maximum = 4 points
of the following acoustic design strategies:	
 11.5.1.1 The building design includes at least one of the following acoustic design strategies: 11.5.1.1.1: Toilets are located remotely from acoustically separated areas. N/A if there are no toilets; 11.5.1.1.2: Acoustically separated areas are located away from noise producing areas such as dance studios, music rooms, cafeterias, indoor swimming pools, mechanical rooms, and gymnasia; 11.5.1.1.3: Entry doors to rooms opposite each other on the same corridor are staggered; 11.5.1.1.4: Through-wall penetrations comply with Annex B of ANSI/ASA S12.60-2010/Part 1; 11.5.1.1.5: Walls separating acoustically separated areas from other areas are constructed full height to underside of the next floor above or the roof deck; 11.5.1.1.6 Walls separating acoustically separated areas from other areas have all joints between wall panels and penetrations 	 Maximum = 4 points Four points are earned where four or more of the listed strategies are employed. Three points are earned where three of the listed strategies are employed. Two points are earned where one of the listed strategies is employed. One point is earned where one of the listed strategies is employed.
acoustically sealed. Fire-stopping and fire- rated assemblies comply with this	
rated assemblies comply with this	
requirement; and	
• 11.5.1.1.7: Areas with high floor impact activities (e.g. dance studios, shops, gymnasia,	





etc.) are not located above <i>acoustically separated areas</i> .	
separated areas.	
 Informational Reference(s): ANSI S12.60-2002 ASHRAE Handbook – HVAC Applications (Chapter 47) 	
• ASTM F1374-06	
 ASTME1374-06 11.5.1.2 Design complies with minimum Sound Transmission Class (STC) ratings of floor/ceiling assemblies, walls and doors between acoustically separated areas (e.g. learning spaces), and adjacent spaces as follows and as applicable: 11.5.1.2.1: STC-45 where the adjacent space is a corridor, stair, office, or conference room; 11.5.1.2.2: STC-50 where the adjacent space is a quiet area, speech clinic, health clinic, classroom, or an exterior wall; or 11.5.1.2.3: Floor Ceiling Assemblies: Designed to meet a minimum STC 50 rating. (Stacked non-critical spaces and spaces connected by an open stainyay are exempt) 	 Maximum = 2 points. Two points are earned where two or more of the listed measures is employed. One point is earned where one of the listed measures is employed.

11	.5.2	Sound Masking System	
11 wi wi	.5.2. th ar thin	1 The building design incorporates a sound masking system overall level specified to an A-weighted decibel (dBA) value the following spaces and ranges:	3 points
•	Of	fices:	
	0	Open: 45-48dBA	
	0	Enclosed: 35-45dBA	
	0	Meeting/Conference: 30-45dBA	
	0	Circulation: 45-48dBA	
•	Не	althcare:	
	0	Patient room: 40-48dBA	
	0	Private offices and exam/treatment room: 35-45dBA	
	0	Waiting area: 45-48dBA	
	0	Corridor and public spaces: 45-48dBA	
	0	Circulation: 45-48dBA	
•	Ot	her:	
	0	All other areas where speech privacy, concentration, or	
		sleep/relaxation is required: 35-48-dBA	
•	The	measured overall level is within 0.5dBA of that specified.	
•	The	measured spectrum conforms to the National Research	
	Cοι	incil's COPE Optimum Masking frequency range and 1/3	





octave band levels, or the project acoustician's specified 1/3 octave band levels, within +/-2.0dB.

Informational Refence(s)

- National Research Council's COPE
- ASTM E1374-06, Open Office Guide
- FGI Guidelines, 2014
- Facilities Guideline Institute, "Sound & Vibration", 2010
- GSA, Facilities Standards, P100, 2014
- GSA, Sound Matters, 2012

11.5.3 Structure Borne Noise Isolation	
11.5.3.1 The Impact Insulation Class (IIC) design of all floor-ceiling assemblies has a minimum rating of IIC-50.	1 point
Informational Reference(s): • ASTM E989-2012	

11.5.4 Reverberation Time or Ceiling Noise Reduction Coefficient (NRC)1
11.5.4.1 Either the maximum reverberation time of the room (RT) or	4 points or N/A
the minimum Noise Reduction Coefficient (NRC) rating of the ceiling	
complies with the following values:	Not applicable for Multi-
	Unit Residential Buildings
• 11.5.4.1.1: Offices:	(MURBs).
 Offices (enclosed): RT 0.6 seconds or NRC 0.75 or NRC 0.70 	
if floor is carpeted 100%.	
 Offices (open): RT 0.4 seconds or NRC 0.90. 	
• 11.5.4.1.2: Schools:	
 School classrooms: RT 0.6 seconds or NRC 0.80 or NRC 0.70 	
if floor is carpeted 100%.	
 Presentation and meeting spaces: RT 0.5 seconds or NRC 	
0.80 or NRC 0.70 if floor is carpeted 100%.	
• 11.5.4.1.3: Healthcare:	
 Patient/resident care areas: RT 0.5 seconds or NRC 0.90. 	
 Medication safety zones: RT 0.5 seconds or NRC 0.90 or 	
NRC 0.80 if floor is carpeted 100%.	
\circ Exam/treatment rooms: RT 0.5 seconds or NRC 0.90 or	
NRC 0.80 if floor is carpeted 100%.	
 Activity/waiting areas: RT 1.5 seconds or NRC 0.75 or 0.70 	
if floor is carpeted 100%.	
• 11.5.4.1.4: Other:	
 All other spaces where speech intelligibility, 	
concentration, privacy or sleep/relaxation is required: RT	
1.0 seconds or NRC 0.80.	
¹ If the average ceiling height exceeds 12 ft. (3.7 m), the reverberation	





time compliance path is used; the NRC compliance path is not permitted. If wall or floor absorption is present, the reverberation time compliance path may permit ceilings with lower NRC values.

11.5.5 Mechanical Noise						
 11.5.5.1 Design complies with background sound levels associated with mechanical systems in accordance with ANSI/ASA S12.2 Standard "Criteria for Evaluating Room Noise" and as follows: Airborne sound power levels from HVAC unit do not exceed the Room Criteria detailed in <i>ASHRAE Systems Application Handbook 2014</i>. <i>Chapter 8, Table 1</i> for listed spaces when HVAC units are in operation; use 2014 FGI Guidelines for Design and Construction of Health Care Facilities; and Spaces are designed such that room background noise using the Room Criteria (RC) ratings complies with <i>ASHRAE Systems Application Handbook-2014, Chapter 48, Table1; use 2014 FGI Guidelines for Healthcare Spaces.</i> 					 2 points or N/A Not applicable for MURBs. 	
lable 11.5.5.		Cation Design Guidelin				
Residence, Apartments,	25 to 35	Performing Art Spaces	RC (N)			
Hotels/Motels		Drama theaters, concert and recital halls	25			
Individual rooms or suites	25 to 35	Music teaching studios	25			
Meeting/banquet rooms	25 to 35	Music practice rooms	30 to 35			
Corridors/lobbies	35 to 45	Laboratories (with fume hoods)				
Service/support areas	35 to 45	Testing/research, minimal speech communication	45 to 55			
Office Buildings		Research, extensive telephone use, speech communication	40 to 50		(Continued from Table	
Executive and private offices	25 to 35	Group teaching	35 to 45		11.5.5.1: ASHRAE Application Design	

¹

Designers should also be sure to consult the additional guidance of the footnotes for this table listed in the ASHRAE Applications Handbook, 2007 version, Chapter 47, Table 42.

[©] Green Building Initiative, Inc. (ww.thegbi.org). For personal use only. Additional reproduction, distribution or transmission in either print or digital form is not permitted without Green Building Initiative's prior written permission.

ANSI/GBI 01-2019 GREEN GLOBES® ASSESSMENT PROTOCOL FOR COMMERCIAL BUILDINGS





Conference Rooms	25 to 35	Church, mosque, Synagogue		Guidelines)
Teleconference rooms	≤ 25	General assembly with critical music programs	25 to 35	
Open plan offices	≤ 40	Schools		
Open plan w/ sound masking	≤ 35	Classrooms	25 to 30	
Corridors and lobbies	40 to 45	Large lecture rooms	25 to 30	
Long Term Care Hospitals and Outpatient Facilities ¹	See Footnote 1	Large lecture rooms with speech amplification	≤ 25	
		Libraries	30 to 40	
		Indoor Stadiums, Gymnasiums		
		Gymnasiums and	40 to	
		natatoriums	50	
		Large seating-		
		capacity spaces	45 to	
		with speech	55	
		amplification		
Courtrooms				
Unamplified speech	25 to 35			
Amplified speech	30 to 40			
¹ For Long Term Care <i>Guidelines for Design</i> <i>Facilities,(2014)</i> : Chap through 1.2-8 includir https://www.fgiguide <i>for Design and Constr</i> <i>Facilities,</i> (2014): Cha 2.5-3 through 2.5-8 in https://www.fgiguide	Hospitals and Our and Construction oter 1.2-5.1 Acous ng Errata posted o lines.org/ (last ac uction of Residen pter 2.5-8 Acoust cluding Errata po lines.org/ (last ac	tpatient Facilities, refe of Hospitals and Outp stic Design and Tables on cess 6/30/17) and Gu tial Health, Care, and ic Design Systems and sted on cessed 6/30/17)	erence: patient 1.2-3 nidelines Support Tables	
 Informational Reference ASA/ INCE/ NCAC II Hospital and Health ASHRAE Systems A ASTM E989-2012 CHPS –Collaborativ HUD Guide to Airbo WBDG: Federal Gree (01353) Noise and WBDG: DG 1110-3- 	ee(s): nterim Sound and hcare Facilities pplication Handbo re for High Perform orne, Impact and een Construction of Acoustic Manage 122 Design Guide	Vibration Design Guid ook 2007, Chapter 47 mance Schools Structure Borne Noise Guide for Specifiers: 0 ment for Interiors, 1997	delines for 1 57 19.12	



11.5.6 Airborne HVAC Noise	
11.5.6.1 Sound attenuators and/or silencers, or ducts are designed in a	1 point
"Z" configuration where significant cross talk paths exist between two	
habitable spaces.	
Informational Reference(s):	
• ASTM E1332- 10a	
• ASTM E90- 09	
• ASTM E1686- 10e1	
• ASTM E413- 10	
• ASTM E966- 10e1	
• ASTM E1374-2006(2011)	
• ASTM E336- 14	
• ANSI S12-2- 2008	
• ANSI S12.60-2010/Part 1	
ASA/ INCE/ NCAC Interim Sound and Vibration Design Guidelines	
for Hospital and Healthcare Facilities	
11.5.6.2 HVAC grills and diffusers are selected that comply with	1 point
ANSI/ASA S12.60-2010/Part 1.	
Informational Reference(s):	
• ASTM E1332- 10a	
• ASTM E90- 09	
• ASTM E1686- 10e1	
• ASTM E413- 10	
• ASTM E966- 10e1	
• ASTM E1374-2006(2011)	
• ASTM E336- 14	
• ANSI S12-2- 2008	
• ANSI S12.60-2010/Part 1	
ASA/ INCE/ NCAC Interim Sound and Vibration Design Guidelines	

11.5.7 Structure Borne HVAC Noise	
11.5.7.1 Fans and other powered HVAC equipment are acoustically	1 point
separated from the structure using vibration isolators.	
11.5.7.2 Ducts are supported on resilient mounts to isolate them from	1 point
the structural systems, and ducts are isolated using resilient material	
where they pass through walls.	

11.5.8 Piping Noise					
11.5.8.1 With the exception of sprinklers and hydronic systems there is	1 point				
no piping running directly above or adjacent to quiet areas and					
learning spaces.					

11.5.9 Electrical System Noise



11.5.9.1 Low-noise ballasts are installed in quiet areas and all other	1 point
areas where speech intelligibility is important.	
11.5.9.2 Noise from light fixtures and other electrical fixtures does not	1 point
exceed values indicated in ANSI/ASA S12.60-2010/Part 1.	

11.5.10 Recommended Documentation

- Acoustic mitigation measures for mechanical equipment and plumbing systems;
- Construction documents;
- Description of acoustic design strategies and all design targets;
- FIIC value for flooring *assemblies;*
- Manufacturer's specifications, cut sheets, and performance documentation;
- Sound level measurements taken at the property line;
- Specification which includes Annex E of ANSI S12.60 2010;
- Test Report indicating compliance with ANSI S12.60 2010.

Note that the Foreword, Appendix, Informational References and Recommended Documentation are informative only and do not contain mandatory requirements necessary for conformance to this Standard. As such, they may contain material that has not been subjected to public review or a consensus process.

Reference documents cited within the Standard are mandatory unless they are clearly identified as being Informational References. Referenced documents are only to be applied within the context for which they are cited.

12. REFERENCES AND GUIDELINES

American National Standards Institute (ANSI)

ANSI S12, 2002

ANSI S12-2-2008

Association of Pedestrian and Bicycle Professionals (APBP)

The Association of Pedestrian and Bicycle Professionals, Bicycle Parking Guidelines, 2nd Edition (2010)

American Society of Acoustics (ASA)

ANSI/ASA S12.60-2010/Part 1 American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools

American Society of Civil Engineers (ASCE)

ASCE/SEI 24-14 "Flood Resistant Design and Construction (2014)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

ANSI/ASHRAE/IES Standard 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings

ANSI/ASHRAE/IES Standard 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential Buildings

ANSI/ASHRAE/USGBC/IES Standard 189.1-2014,

ASHRAE 160-2009



ASHRAE Guideline 0-2013, The Commissioning Process

ASHRAE 188-2015, Legionellosis: Risk Management for Building Water Systems

The ASHRAE Handbook – HVAC Applications (Chapter 47)

ASHRAE Advance Engineering Design Guides

ASHRAE Systems Application Handbook, 2014

ANSI/ASHRAE/IES Standard 202-2013 Commissioning Process for Buildings and Systems

ANSI/ASHRAE Standard 55-2013 Thermal Environmental Conditions for Human Occupancy

ANSI/ASHRAE Standard 62.1-2013, Ventilation for Acceptable Indoor Air Quality

ANSI/ASHRAE 129-1997 (RA 02), Measuring Air Change Effectiveness

ANSI/ASHRAE/ASHE Standard 170-2013 Ventilation of Health Care Facilities

American Society of Irrigation Consultants/The Irrigation Association

Landscape Irrigation Best Management Practices, 2014

Acoustical Society of America (ASA)/ Institute of Noise Control Engineering (INCE)/ National Council of Acoustical Consultants (NCAC)

ASA/ INCE/ NCAC Interim Sound and Vibration Design Guidelines for Hospital and Healthcare Facilities

American Society of Agricultural and Biological Engineers (ASABE)

ASABE/ICC 802-2014 ANSI Landscape Irrigation Sprinkler and Emitter Standard

ASTM International (ASTM)

ASTM D 5197-09e1 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)

ASTM D6866-16, Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis

ASTM E1980-11, Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

ASTM E2843-15, Standard Specification for Demonstrating That a Building is in Walkable Proximity to Neighborhood Assets

ASTM E2844-15, Standard Specification for Demonstrating that a Building's Location Provides Access to Public Transit



ASTM E2921-13 Standard Practice for Minimum Criteria for Comparing Whole Building Life Cycle Assessments for Use with Building Codes and Rating Systems

ASTM E989-06 Standard Classification for Determination of Impact Insulation Class (IIC)

ASTM E966-10e1 Standard Guide for Field Measurement of Airborne Sound Insulation of Building Facades and Facade Elements

ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

ASTM E413-10 Classification for Rating Sound Insulation

ASTM E336-14 Standard Test Method for Measurement of Airborn Sound Attenuation between Rooms in Buildings

ASTM E1374-06(2011) Standard Guide for Open Office Acoustics and Applicable ASTM Standards

ASTM E1332-10a Standard Classification for Determination of Outdoor-Indoor Transmission Class

ASTM E1686-10e1 Standard Guide for Selection of Environmental Noise Measurements and Criteria

Business and Institutional Furniture Manufacturer's Association (BIFMA)

ANSI/BIFMA e3-2014 Business and Institutional Furniture Sustainability Standard and Tools

ANSI/BIFMA M7.1-2011(R2016) Standard Test Method for Determining VOC Emissions From Office Furniture Systems, Components and Seating

CAB International (CABI)

CABI, 2016, Invasive Species Compendium

Canadian Standards Association (CSA)

CSA S4789-95 (R2007): Guideline on Durability in Buildings

CSA 6.19-01 (R2011): Residential Carbon Monoxide Alarming Devices

Carpet and Rug Institute, Inc. (CRI)

CRI Green Label Plus Carpet Program Test

Code of Federal Regulations (C.F.R)

Executive Order 13728: Vol. 81, Wildland-Urban Interface Federal Risk Mitigation, 2016

Collaborative for High Performance Schools (CHPS)

Collaborative for High Performance Schools

Facility Guidelines Institute (FGI)

Guidelines for Design and Construction of Hospital and Outpatient Facilities, 2014



Guidelines for Design and Construction of Residential Health, Care, and Support Facilities, 2014

Guidelines for Design and Construction of Health Care Facilities, 2014

Federal Emergency Management Agency (FEMA)

FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements (2008)

Green Seal®

GS-36 Adhesives for Commercial Use (July 12, 2013)

Environmental Standard for Paints and Coatings, GS-11 (July 12, 2013)

Illumination Engineering Society of North America (IES)

IDA – IES Model Lighting Ordinance (MLO), 2011

The IES Lighting Handbook: Informational Reference & Application, 2011

International Association of Plumbing and Mechanical Officials (IAMPO)

IAPMO 2015Green Plumbing & Mechanical Code Supplement

IAPMO 2015 Uniform Mechanical Code

International Code Council (ICC)

ICC 2012 International Building Code

ICC IECC 2012 International Energy Conservation Code

ICC IECC 2015 International Energy Conservation Code

ICC 2015 International Mechanical Code

ICC 2015 International Wildland-Urban Interface Code

International Green Construction Code (IgCC), 2015

International Organization for Standardization (ISO)

ISO 14025, Environmental labels and declarations – Type III environmental declarations – principles and procedures, 2006

ISO 14040, Environmental management – Life cycle assessment—Principles and framework, 2006

ISO 14044, Environmental management – Life cycle assessment – Requirements and guidelines, 2006

ISO 15686 (series), Buildings and Constructed Assets: Service Life Planning, 2014

ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories, 2005



ISO/IEC 17065, Conformity assessment – Requirement for bodies certifying products, processes and services, 2012

ISO 21930, Sustainability in building construction – Environmental declaration of building products, 2007

International Society of Arboriculture (ISA)

Avoiding Tree Damage During Construction, 2011

Market Transformation to Sustainability

ANSI/MTS 1.0 Whole Systems Integrated Process (WISP) Guide – 2007

National Fire Protection Association

NFPA 720: Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment, 2012

National Institute of Standards and Technology (NIST)

NIST Handbook 135, 1995

NIST Building Life Cycle Cost (BLCC) Program

Natural Stone Council

ANSI/NSC 373-2014 Sustainable Production of Natural Dimension Stone Standard

New Buildings Institute (NBI)

Advanced Buildings® Daylighting Pattern Guides

NSF International

NSF/ANSI 140-2015 Sustainability Assessment for Carpet

NSF/ANSI 332-2015 Sustainability Assessment for Resilient Flooring

NSF/ANSI 336-2011 Sustainability Assessment for Commercial Furnishings Fabric

NSF/ANSI 342-2014 Sustainability Assessment for Wallcovering Products

NSF/ANSI 347-2012 Sustainability Assessment for Single Ply Roof Membranes

NSF/GCI/ANSI 355 Greener Chemicals and Processes Information, 2011

Pollinator Partnership

Ecoregional Planting Guides, 2015

Resilient Floor Covering Institute (RFCI) – FloorScore®

FloorScore[®] Standard for Flooring Adhesives SCS- EC10.3.2014, Indoor Air Quality Product Performance Standard for Building Interiors, V 3.0, September 2015

FloorScore[®] SCS- EC10.3.2014, Indoor Air Quality Product Performance Standard for Building Interiors, V 3.0, September 2015



South Coast Air Quality Management District (SCAQMD)

Rule 11 68 -1 Adhesive and Sealant Applications, January 7, 2015

State of California, California Department of Public Health (CDPH)

Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010;

State of California, California Environmental Protection Agency

California Air Resources Board Suggested Control Measure for Architectural Coatings (February 1, 2008).

Sustainable Sites Initiative

SITES v2 Rating System, 2014

Tile Council of North America (TCNA)

ANSI A 138.1 Green Squared – American National Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials, 2011

UL

UL 100: Standard for Sustainability of Gypsum Boards and Panels, 2012

- UL 102: Standard for Sustainability of Swinging Door Leafs, 2009
- UL 2034: Standard for Single and Multiple Station Carbon Monoxide Alarms, 2008
- UL 2760: Sustainability for Surface Coatings: Recycled Water-borne, 2011
- UL 2762: Sustainability for Adhesives, 2011
- UL 2768: Standard for Sustainability for Architectural Surface Coatings, 2011

UL 2799: Environment Claim Validation Procedure for Zero Waste to Landfill, 2012

UL 2821: GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions from Building Materials, Finishes and Furnishings, 2013

UL 2818: GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes and Furnishings, 2013

U.S Census Bureau

North American Industry Classification System (NAICS)

U.S. Department of Agriculture's (USDA)

National Agroforestry Center's AF Note 38 – Landscape planning for environmental benefits, 2008

National Institute of Food and Agriculture's (NIFA) Cooperative Extension System (CES)



National Invasive Species Information Center (NISIC)

PLANTS Database, The State and Federal Noxious Weeds List

The 2010 Wildland-Urban Interface of the Conterminous United States, 2015

U.S. Department of Energy

Energy Information Administration's (EIA) "Commercial Building Energy Consumption Survey (CBECS)."

Federal Energy Management Program's (FEMP) Energy-Efficient Product Procurement, 2012

International Performance Measurement and Verification Protocol; DOE/EE-0157; December 1997

Guide to Integrating Renewable Energy in Federal Construction

U.S. Department of Housing and Urban Development (HUD)

Guide to Airborne, Impact and Structure Borne Noise Control in Multi-family Dwellings

U.S. Environmental Protection Agency (EPA)

Construction Site Stormwater Runoff Control – Menu of Best Management Practices

National Stormwater Calculator

ENERGY STAR® Qualified Product Lists, 2014

Guidelines for Water Reuse

WaterSense[®] Water Budget Tool

WaterSense® "What to Plant"

Radon Prevention in the Design and Construction of Schools and Other Large Buildings, (EPA 625-R-92-016, June 1994).

National Pollutant Discharge Elimination System (NPDES) Permit Program

Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects, 2009

Whole Building Design Guide

Whole Building Design Guide, 2016

Federal Green Construction Guide for Specifiers: 01 57 19.12 (01353) Noise and Acoustic Management, 2005

DG 1110-3-122 Design Guide for Interiors, 1997

Xerces Society for Invertebrate Conservation

Pollinator-Friendly Plant Lists, 2015



Zero Waste International Alliance (ZWIA)

Zero Waste Principles, 2015